

**IDENTIFYING AND CONSERVING THREATENED ECOLOGICAL COMMUNITIES IN THE
SOUTH WEST BOTANICAL PROVINCE**

**ANCA NATIONAL RESERVES SYSTEM COOPERATIVE PROGRAM:
PROJECT NUMBER N702**

FINAL REPORT: MAY 1997

by

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The report may be cited as "Identifying and conserving threatened ecological communities (TECs) in the South West Botanical Province".

ACCOMPANYING DOCUMENTS

This report includes hard copy of a database and the form methods detailing methods used in programming that database (Attachments 2, 3 and 4) . For reference, two sets of these documents have been lodged with this report - one in the library, WA Department of Conservation and Land Management, the other with Environment Australia, Canberra.

FINAL REPORT TO ANCA NATIONAL RESERVES SYSTEM COOPERATIVE PROGRAM

Project title: "Identifying and conserving threatened ecological communities (TECs) in the South West Botanical Province".

Project Number: N702

Project Officer: Valerie English

Commencement date of project: Monday 29 August 1994. Original due date of Final Report: 15 October 1996.

Extent of Project Area: The South West Botanical Province is the south western portion of Western Australia. This is south of a roughly diagonal line across the state from a north western point 113° 10' 06"E; 24° 45' 00"S to the south eastern point 125° 19' 34"E; 32° 41' 4"S.

Precis: An advisory group for the threatened ecological community project was formed at the beginning of the project. Members have expertise in a variety of community types. They have provided comments on draft material and have acted as a preliminary review committee by assessing communities and assigning them to categories of threat.

Definitions, categories, criteria and procedures for identifying and listing threatened ecological communities (TECs) to define their conservation status have been finalised. A database of TECs in the South West Botanical Province has been developed and includes sufficient information to assign TECs to conservation categories.

A total of 110 ecological communities has been identified as possibly threatened, that is probably meriting inclusion on the TEC database. Communities entered on the database are threatened (critically endangered, CR; endangered, EN; or vulnerable, VN) or data deficient, (DD). Communities proposed for the database that have not yet been assessed are termed "not evaluated".

Thirty eight ecological communities have been entered on the database and assessed against the criteria that define conservation status by the project advisory group. Sixteen of these communities were assessed as critically endangered, seven as endangered, ten as vulnerable and five as data deficient.

Thirty two General Recommendations, and recommendations for conservation of thirty three specific threatened ecological communities (containing a number of sub-recommendations) have been supported by the advisory group and are included in this report. The major recommendations are:

- 22 communities recommended for acquisition as conservation reserve, by purchase or change of purpose and vesting for one or more occurrences of the community if effective management for conservation seems unlikely.
- the formation of Recovery Teams and writing of 19 Recovery Plans for communities - 12 within one year and 7 within five years of endorsement of their status by CALM and the Biodiversity Group, Environment Australia.
- liaison with landowners, vestees or other decision makers to conserve one or more occurrences of 26 TECs.
- conservation management actions for one or more occurrences of 19 communities on lands vested in the Department of Conservation and Land Management.

Many of the areas subject to recommendations for acquisition or change of purpose or tenure (if effective management for conservation seems unlikely) contain multiple occurrences of one or more TECs.

The recommendations for the inclusion of TECs in the conservation reserve network and for other conservation actions have been ranked according to the conservation category assigned to each community, but have not been ranked within categories. Procedures for use of spread sheets at the working level to assist decision making for allocation of resources within categories are suggested in the General Recommendations.

Maps indicating the location of all of the communities on the database have been produced, indicating point locations only. The General Recommendations contain reference to the need for accurate mapping of boundaries and of the area of influence for all occurrences of threatened ecological communities. For example, the area of influence for wetlands, would be the catchment.

The main limitation of the study was lack of sufficient data for assessing many of the communities possibly threatened against the criteria for defining categories of conservation status. The defining characteristics and/or extent of many of the communities proposed for inclusion on the database are not known and require additional research. Some of the communities that are currently data deficient are likely to fit the criteria for critically endangered and should be considered high priority for further investigation.

The database contains information on communities for areas of the south west, such as the Swan Coastal Plain, for which there is detailed community information. There are many other areas of the south west, particularly, the Wheatbelt Region, for which sufficiently detailed information to allow assessment of the status of many ecological communities was not available. Other areas of the state, including the Kimberley and the Pilbara regions, were not included in the brief for this study and require investigation.

Many actions towards conserving TECs have begun as a result of this project. They include: joint purchase of two areas by CALM and Environment Australia, with another under negotiation; and listing for acquisition of several critically endangered communities (by CALM's Conservation Lands Acquisition Committee); establishment of Recovery Teams for Sedgeland in Holocene Dune Swales and the Lake Richmond thrombolite community; writing of Interim Recovery Plans in train; inclusion of TECs in planning by CALM at Regional and District levels; and inclusion of TECs in State and Metropolitan Planning by Department for Environmental Protection (DEP) and Ministry for Planning (MFP).

Although some actions towards conserving TECs identified as critically endangered have been undertaken in this project, many other communities require emergency actions to ensure they are not totally destroyed or significantly decline in the immediate future. Most such required actions are not possible in the current project and are described in Recommendations.

Scope:

1. Finalise criteria and procedures for identifying and listing threatened ecological communities in categories which define conservation status.

As reported previously, categories for assigning conservation status to ecological communities have been developed. The categories selected for application to communities that are based on the most recent World Conservation Union (IUCN) categories for threatened species or communities are:

- a) presumed totally destroyed (PD)
- b) critically endangered (CR)
- c) endangered (EN)
- d) vulnerable (VU)
- e) data deficient (DD)
- f) lower risk (LR)
- g) not evaluated

A set of definitions and criteria for assessing ecological communities against the various categories has been developed, as was previously reported. These have been modified slightly since the report dated 30 April 1996.

We believe the definitions, categories and criteria are now in their final form (refer Attachment 1).

2. Finalise a minimum data set for allocating TECs to conservation categories and continue applying it to appropriate data, including many for plant assemblages of the Swan Coastal Plain against which it has been tested.

The factors to be included in the database were discussed in the December 1995 report to ANCA, and a number of modifications have been made to the reporting functions of the database. Reports are now more concise and easier to read.

The final data set that is considered to be a minimum for allocating TECs to categories of threat is a subset of that contained in the Threatened Communities Database. A full print out of the data set contained in this database for communities is at Attachment 2. The community summary report provides a precis of this information, and is considered to be the minimum data set required. Attachment 3 contains a print out of the community summary information for communities entered on the database.

A consultant - Woodman's Computing Solutions - created the threatened community database and provided a report entitled "Data Relationships and Data Structure". This contains a listing of all of the fields in the database. Woodman's Computing Solutions also provided a user guide for the system. Both of these reports were provided as attachments in the report dated 26 July, 1995. The report "Listing of all Form Methods", that details methods used in the programming of the database, has not been previously provided and is Attachment 4.

As mentioned in previous reports, the minimum data set was not tested against data from the project "Conservation values of small reserves in the central wheatbelt", as the data were found to be inappropriate for this purpose. However, data from "A floristic survey of the southern Swan Coastal Plain" by Gibson *et al.* (1994) were in an appropriate form and that report was utilised as the main source of data for determining the minimum data set. This testing of the information required was continued and modified where appropriate with each community entered on the database.

3. Finalise a database of TECs in the South West Botanical Province

The preliminary list of communities proposed for inclusion on the TEC database has been modified since the April 1996 report with the help of the advisory group and as a result of information provided by additional experts (refer Attachment 5). Data on 38 of these community types have been entered into the database (also refer Attachment 5). A hard copy of the computer database occurs as Attachments 2 and 3, and a digital version is also supplied.

The advisory group acting as a preliminary review panel recently utilised information from the database to finish assessing communities on the database. The categories recommended by the group for all communities on the database are as follows:

TABLE 1 - Categories assigned to communities on the threatened ecological communities database

Community	Category	Criteria met (refer Attachment 1) / Comments
Perth to Gingin Ironstone Association	Critically Endangered	A(ii), B(ii), C
Perched wetlands of the Wheatbelt region with extensive stands of living sheoak and paperbark across the lake floor (Lake Toolibin)	Critically Endangered	A(i), B(ii), C
Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)	Critically Endangered	A(i), A(ii), B(i), B(ii)
Shrublands and woodlands on Muchea Limestone	Critically Endangered	B(ii)
Stromatolite-like microbialite community of coastal freshwater lakes (Extant coastal freshwater lake thrombolitic community probably formed by biologically influenced precipitation of a mineral phase; Lake Richmond, Rockingham)	Critically Endangered	B(i), B(ii)
Aquatic Root Mat Community of Caves of the Swan Coastal Plain	Critically Endangered	B(i) and B(ii)
Montane Thicket and Heath above approximately 900m above sea level, of the South West Botanical Province	Critically Endangered	B(ii)
Swan Coastal Plain community type 20c - Shrublands and woodlands of the eastern side of the Swan Coastal Plain	Critically Endangered	B(ii)
Sedgeland in Holocene dune swales of the southern Swan Coastal Plain (SCP19)	Critically Endangered	B(iii)
Shrublands on southern Swan Coastal Plain ironstones (Busselton area) (type 10b)	Critically Endangered	B(ii)
Aquatic Root Mat Community Number 1 of Caves of the Leeuwin Naturaliste Ridge	Critically Endangered	B(i) and B(ii)
Aquatic Root Mat Community Number 2 of Caves of the Leeuwin Naturaliste Ridge	Critically Endangered	B(i) and B(ii)
Aquatic Root Mat Community Number 3 of Caves of the Leeuwin Naturaliste Ridge	Critically Endangered	B(i) and B(ii)
Aquatic Root Mat Community Number 4 of Caves of the Leeuwin Naturaliste Ridge	Critically Endangered	B(i) and B(ii)

Community	Category	Criteria met / Comments
<i>Eucalyptus calophylla</i> - <i>Kingia australis</i> woodlands on heavy soils, Swan Coastal Plain (type 3a)	Critically Endangered	B(ii)
<i>Eucalyptus calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands, Swan Coastal Plain (type 3c)	Critically Endangered	B(ii)
Stromatolite-like microbialite community dependent on fresh ground water of coastal brackish lakes (Lake Clifton, Yalgorup)	Endangered	B(i) and B(ii)
Rimstone pools, algal nodules and cave structures formed by microbial activity on marine shorelines (Sea Cliffs, Augusta)	Endangered	B(ii)
Swan Coastal Plain community type 20a - <i>Banksia attenuata</i> woodlands over species rich dense shrublands	Endangered	B(ii)
Scott River Ironstone Heaths (Scott River area)	Endangered	B(i) and B(ii)
Swan Coastal Plain community type 20b - <i>Banksia attenuata</i> and / or <i>Eucalyptus marginata</i> woodlands of the eastern side of the Swan Coastal Plain	Endangered	B(i) and B(ii)
Southern wet shrublands. Swan Coastal Plain community type 2	Endangered	B(ii)
Swan Coastal Plain community type 10a - shrublands on dry clay flats	Endangered	B(ii)
Swan Coastal Plain community 8 - Herb rich shrublands in freshwater clay pans	Vulnerable	B
Swan Coastal Plain community type 9 - dense shrublands on clay flats	Vulnerable	B
Swan Coastal Plain community type 15 - forests and woodlands of deep seasonal wetlands	Vulnerable	C
Swan Coastal Plain community type 18 - Shrublands on calcareous silts	Vulnerable	B
Stromatolite community of stratified hypersaline coastal lakes (Lake Thetis)	Vulnerable	B
<i>Calothamnus graniticus</i> heath on south west coastal granites (Meelup)	Vulnerable	B
<i>Callitris preissii</i> (or <i>Melaleuca lanceolata</i>) forests and woodlands, Swan Coastal Plain community 30a	Vulnerable	B
Swan Coastal Plain community type 1b - southern <i>Eucalyptus calophylla</i> woodlands on heavy soils	Vulnerable	B
Swan Coastal Plain community type 3b - <i>Eucalyptus calophylla</i> - <i>Eucalyptus marginata</i> woodlands on sandy clay soils	Vulnerable	B
Swan Coastal Plain community type 7 - herb rich saline shrublands in freshwater clay pans	Vulnerable	B

Community	Category	Criteria met / Comments
Perched wetlands of the Wheatbelt region with stands of living <i>Eucalyptus camaldulensis</i> across the lake floor (Morilla Swamp)	Data Deficient	Similarity to other freshwater wooded wetlands unknown
Deep pools and natural braided sections of fresh to brackish rivers of the Avon Botanical District	Data Deficient	Insufficient information to define as a community type, and further survey may locate additional occurrences of the community
Stromatolitic community number 3 of coastal hypersaline lakes (Pink Lake, Esperance)	Data Deficient	Extent of community in Pink Lake unknown. Extent of crushing damage unknown.
Hypersaline microbial community 2 (Hamelin Pool, Shark Bay)	Data Deficient	Extent of community unknown
Deeper seasonal wetlands on sandy soils, Swan Coastal Plain community 14	Data Deficient	Extent of community unknown

A form for proposing additions or other changes to the database of threatened ecological communities has also been developed. The final draft of this form occurs at Attachment 6. The form has been tested by a number of staff of the Department of Conservation and Land Management (CALM), and by several environmental consultants and has been found to expedite assessment of whether the community should be on the database, and, if so, the applicable category of threat.

4. Continue development of ranked recommendations for the inclusion of TECs in the conservation reserve network and for other conservation action.

Recommendations for reservation and for other conservation actions for threatened ecological communities were discussed at the second workshop, and information relevant to the assessment of actions required has been gathered for specific communities on the database.

The Discussion Document for determining the priority of recovery actions for threatened ecological communities (refer Attachment 7) was tested at the final meeting of the advisory group on Friday 27 September 1996. The group decided to recommend against using the document to rank communities within categories for urgency of recovery actions, as the process in effect weighted and compared different attributes of communities. The advisory group recommended that such factors should not be given numerical values which often fail to account for particular circumstances.

It is therefore recommended that all TECs in each category be given equal ranking for policy and planning uses, so that rank order would be; 1. all critically endangered communities 2. all endangered communities 3. all vulnerable communities.

Assigning priorities for further study and assessment of data deficient communities and those not evaluated is, by their very definition, difficult. We recommend that such ranking should be the same as that of the threat category most likely to apply using the qualitative judgement of recognised ecologists with knowledge of that ecological community.

The process of ranking communities for resource allocation should be done at a working level and a procedure for doing this is suggested in General Recommendation 16. Resource allocation would be by managers, giving consideration to all factors that influence such decisions at any particular time. In effect, this visual analysis has the advantage of not requiring numerical scoring of attributes, and allows the user to choose criteria relevant to each ecological community. General Recommendation 16, outlines the use of a spread sheet to examine factors to determine the priority of recovery actions for communities within categories.

GENERAL RECOMMENDATIONS ARISING FROM THIS PROJECT:

We recommend, following official endorsement by CALM and Biodiversity Group, Environment Australia of the final report for the threatened community project, that the steps below occur;

1. CALM revise the existing draft policy statement on threatened ecological communities and endorse it as soon as possible. This should include a strategy for implementing recommendations held in this report. Such a strategy should include scientifically sound allocation of resources for conservation management of threatened ecological communities, specify accountability, and clearly define priorities and a time frame for completion of tasks within local works programs.
2. CALM advise other agencies of the existence of the TEC database and of the existence of threatening processes that may occur in the area of influence of each threatened ecological community. CALM seek to influence individuals and organisations to achieve conservation management of all threatened ecological communities through the provision of this information.
3. CALM establish a Scientific Advisory Group to assist the process of assessing and updating the TEC database and the actions required on TECs.
4. CALM develop and begin implementing Interim Recovery Plans for all communities identified as critically endangered within one year of endorsement of their status by CALM's Director of Nature Conservation. Full Recovery Plans should then be written and their implementation begun if the need is established during the three year life of the Interim Recovery Plans. If, during that time, threats to the community have decreased to the extent that a Recovery Plan is not required the threatened ecological community should be delisted or downgraded in conservation status.
5. For all communities identified as endangered, CALM develop Interim Management Guidelines or their equivalent as soon as possible, and Interim Recovery Plans within five years of endorsement of their status by CALM. Full Recovery Plans should then be developed within the three year life of the Interim Recovery Plan if the need is established.
6. CALM review the status of all communities identified as vulnerable within two years of endorsement of their status by CALM.
7. Key stakeholders be involved in all recovery planning processes as in 4) and 5) above, including owners of private lands where their activities may influence maintenance of TECs.
8. Wherever possible and desirable, Recovery Plans should be combined for threatened ecological communities and/or species: eg where threatening processes are similar, or two or more threatened communities occur close together, or where endangered species occur nearby or within a threatened community.

9. CALM treat Interim Recovery Plans and Recovery Plans that have been approved by the Director of Nature Conservation as if they were Interim Management Guidelines for the area of land or water containing the threatened ecological community: ie management of the community would be based on the Interim Recovery Plan or Recovery Plan until a formal management plan is in place that incorporates the control of threatening processes acting on the TEC.
10. The relevant information held on the threatened communities database be made freely available to all managers / owners (ie Commonwealth, State or local government agencies and private landholders) on whose properties TECs are located. Only information about TECs occurring on the manager's/owner's property should be provided. Information on the TEC database pertaining to private land to be provided at the discretion of the Director of Nature Conservation.
11. CALM and other government agencies and individuals provided with information from the threatened ecological communities database should treat threatened communities as areas of significant conservation value and give them high priority for conservation actions within regional and district works programs.
12. Information provided to agencies such as those referred to in recommendations 13 and 14 below be regularly updated (yearly) as communities are added to the database.
13. CALM liaise with agencies including Ministry for Planning (MFP), Department of Environmental Protection (DEP), local government, Agriculture Western Australia, Main Roads Western Australia, Water and Rivers Commission, Water Corporation, Department of Minerals and Energy to ensure that information on threatened ecological communities is considered in planning and operations. CALM work with these agencies to determine appropriate strategies for incorporating information on threatened communities into planning, especially in determining appropriate land uses for threatened ecological communities and adjacent lands. In particular, information on threatened ecological communities should be incorporated into the Metropolitan Region Scheme, town planning schemes, and the System 6 Update (Note: some areas that contain threatened ecological communities have been identified through the integrated process of updating the "System 6" Conservation Through Reserves System Recommendations and the Ministry for Planning Urban Bushland Strategic Plan, now called Perth's Bush Plan. Perth's Bush Plan is proposed to be released in 1997).
14. CALM liaise with land management agencies including Main Roads Western Australia, Water Corporation and local government to ensure information on threatened ecological communities is considered in land management. CALM work with these agencies to determine appropriate strategies for incorporating information on threatened communities into land management decisions.
15. The only ranking of communities for priority for conservation be the category of threat: ie recommendations for actions for critically endangered communities be considered higher priority than those assessed as endangered, and actions for endangered communities be considered higher priority than those assessed as vulnerable.
16. CALM develop and use procedures to assist decision making at a working level for allocation of resources for recovery actions on threatened ecological communities. This would include a table listing a summary of all factors influencing resource allocation for TECs within each of the three categories. Such factors include the reservation status, existence of current or interim recovery plan or other actions in train, historical level of decline, relative cost, likelihood of success, ability to combine recovery actions for communities, or communities and species, and biodiversity considerations. This would also help clarify the most appropriate method of achieving conservation management: ie acquiring, reserving, covenanting, ceding of land, cooperative agreements etc.

17. All threatened ecological communities on CALM managed lands and waters be managed for their recovery or conservation. For those on State Forest or timber reserves within the area being assessed by the Regional Forest Assessment process, such management will be consistent with recommendations arising from that process.
18. CALM seek management for the purpose of conservation of public lands that contain threatened ecological communities. If a management plan that would conserve the threatened ecological community is not being implemented or prepared, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared a reserve for the purpose of conservation vested in the National Parks and Nature Conservation Authority.
19. CALM encourage management for the purpose of conservation of private lands that contain TECs. If a management plan that would conserve the TEC is not being implemented or prepared, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM seek funds and seek to negotiate purchase. If purchased, CALM have the area declared a reserve for the purpose of conservation vested in the National Parks and Nature Conservation Authority.
20. CALM encourage and assist owners to access available incentives and mechanisms for conserving TECs on private land. Incentives for protection of TECs will incorporate existing mechanisms such as the Remnant Vegetation Protection Scheme and funds and covenants that would be available under the planned "nature conservation foundation" where appropriate to ensure long term protection of TECs on private property.
21. CALM / Agriculture Western Australia / Department of Environmental Protection / Environmental Protection Authority request survey for threatened ecological communities where private land is subject to application to clear and there is reasonable evidence such communities may occur. If occurrence/s of threatened ecological communities are located within an area subject to application, CALM / Agriculture Western Australia seek protection for the occurrence, eg, under the Remnant Vegetation Protection Scheme.
22. Local CALM staff notify owners of property and/or managers of land on which TECs occur. Such notification should be positive and lead to continuing liaison in seeking cooperation in applying protective management. This would involve development of the equivalent of Interim Management Guidelines as a temporary measure, and ultimately full management plans to address threatening processes acting on communities.
23. CALM mark, or encourage the appropriate authority to mark, roadside occurrences of TECs with the same pegs used to indicate the presence of Threatened Flora to reduce the likelihood of accidental destruction. Local CALM staff to ensure regular liaison with owners or vestees of such lands to ensure threatened ecological community information is up to date.
24. CALM give priority to preparing and implementing management plans, or Interim Management Guidelines if management plans are not immediately achievable, for CALM managed lands and waters that address threatening processes affecting TECs for which Interim Recovery Plans or Recovery Plans do not exist.
25. CALM investigate communities assessed as data deficient, and those not evaluated. The priority for investigation of these communities should be as determined on the basis of the best available knowledge. Appropriate research should then be undertaken to collect sufficient information to allow assessment of these communities against the definitions and criteria for TECs.

26. CALM undertake and promote research into threatening processes and methods of ameliorating those broad-scale processes that are identified as commonly impacting on threatened communities. The priorities for research should be based on the levels of threat posed, the extent of the impact of the threatening process and the number of TECs affected by it.
27. CALM update information on the TEC database on a regular basis. This would require regular monitoring (two yearly) and checking of data already on the database including extent, condition and tenure information for occurrences. In addition, communities should be added to the database as they are identified.
28. Data from the TEC database be included as a subset of the CALM's Threatened Flora Management Geographic Information System database being developed to aid operational planning and eventually expanded to cover all CALM regions.
29. Once on the CALM GIS, the boundaries of occurrences of threatened communities on the database be mapped as soon as possible. Every occurrence of each community should be mapped and include accurate consideration of buffer areas where threatening processes extend beyond apparent boundaries eg catchment areas.
30. CALM involve local community groups and industry in the recovery of threatened ecological communities wherever possible and practical.
31. CALM seek to expand the database into the remainder of the State using processes for identifying and conserving TECs developed in this study. CALM seek additional data for these studies from the scientific community and land owners, when resources are available. Where possible CALM to include relevant information from future work under the Hopkins' et. al. project in determining sub-vegetation types in the wheatbelt, in the TEC database.
32. CALM seek amendments to the Wildlife Conservation Act to address the conservation of threatened ecological communities.

SPECIFIC RECOMMENDATIONS FOR ALL CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE COMMUNITIES

The following recommendations are proposed for critically endangered, endangered and vulnerable ecological communities. Recommendations listed are not in detailed format, rather they provide a summary of the major actions required for recovery.

Recommendations, except those pertaining to private land, contain one site identifier (eg BOOTINE01) that can be used to identify occurrences on the database to which the recommendation refers (note: there may be a number of site identifiers for each occurrence on the database but one is sufficient to identify the corresponding occurrence).

General Recommendation number nine above refers to actions for necessary operations for control of threatening processes as prescribed in Interim Recovery Plans or Recovery Plans. The Interim Recovery Plans or Recovery Plans for specific communities, as recommended below, would incorporate Interim Management Guidelines for CALM's management of areas, as occurs for Threatened Flora.

Note: negotiations for vesting of vacant Crown land or unvested areas would be through the Department of Land Administration - the responsible authority in these cases.

PRIORITY 1

Critically Endangered Ecological Communities

1. Perth to Gingin Ironstone Association

- a) CALM establish a recovery team to develop an Interim Recovery Plan for the community. Plan to incorporate the need to liaise with the owner on management of the only known occurrence. CALM encourage and assist owner to access available incentives and mechanisms for conserving the threatened ecological community (see General Recommendation 20). If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under this arrangement, CALM seek funds and seek to negotiate purchase of the occurrence and adequate buffer and declare the area Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. If area becomes vested in National Parks and Nature Conservation Authority, CALM implement control of threatening processes as identified in the Recovery Plan.

2. Perched wetlands of the Wheatbelt region with extensive stands of living sheoak and paperbark across the lake floor.

CALM staff continue to support the recovery process as performed by the Recovery Team for Toolibin Lake wetland reserves 24556, 9617 and 14398 (DULB01, TOOL01, WALB01).

3. Communities of tumulus springs (organic mound springs, Swan Coastal Plain)

- a) CALM establish a Recovery Team to develop an Interim Recovery Plan for the community. Interim Recovery Plan to incorporate the following (b, c, d).

- b) CALM liaise on management with the owner of the Bullsbrook occurrence. CALM encourage and assist owner to access available incentives and mechanisms for conserving the threatened ecological community (see General Recommendation 20). If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under this arrangement, CALM seek funds and seek to negotiate purchase of the occurrence and adequate buffer and declare the area Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. If area becomes vested in National Parks and Nature Conservation Authority, CALM implement recovery actions as identified in the Recovery Plan including monitoring and management of groundwater quality and quantity, appropriate fire regime, weed control program and fencing.
- c) CALM continue to implement actions to control threatening processes as prescribed in the Interim Management Guidelines for the tumulus spring area purchased by CALM and ANCA - Muchea Town Lot 13, Archibald St, Muchea (PETERS01). Interim Management Guidelines to guide management actions until the Interim Recovery Plan is in place.
- d) Department of Environmental Protection and / or Ministry for Planning negotiate with developer of site containing tumulus springs at Ellenbrook - Swan Location 1, Lot 148 (EG01) to reserve springs and adequate buffer of remnant vegetation around springs (see General Recommendation 13) and have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then implement actions for the control of threatening processes as prescribed in the Interim Recovery Plan, including the need to manage effluent from the development, monitoring and management of groundwater quality and quantity, and access control - including the possibility of the use of boardwalks.

4. Shrublands and woodlands on Muchea Limestone

- a) CALM establish a Recovery Team to prepare an Interim Recovery Plan for the community that addresses the following (b, c, d, e).
- b) CALM seek a change of status of Class C reserve 2336 in Muchea that is now vested in the National Parks and Nature Conservation Authority (MUCHEA01) to Class A for "Conservation of Flora and Fauna". CALM implement recovery actions as identified in the Interim Recovery Plan.
- c) Department of Environmental Protection and /or Ministry for Planning negotiate with the owners of Swan Lot 3, Plan 18927, Cardinal Drive Ellenbrook - the Vines development area (VINESSE) to reserve this Muchea Limestone occurrence along with an appropriate remnant vegetation buffer and have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority (see General Recommendation 13). CALM then implement recovery actions as identified in the Interim Recovery Plan.
- d) CALM continue to develop Interim Management Guidelines for the occurrence of the community on Swan Location 2358 in Bootine Rd, Gingin (BOOT01, BOOTINE2) purchased by CALM and ANCA. Interim Management Guidelines to guide management actions until Interim Recovery Plan is in place.

- e) CALM liaise with the owners of the occurrences on private land in the Shire of Gingin on management of the areas. CALM encourage and assist the owners to access available incentives and mechanisms for conserving the threatened ecological community (see General Recommendation 20). If management plans that would conserve the threatened ecological community are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM seek funds and seek to negotiate purchase of the occurrence/s and suitable buffer areas and declare them Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then implement recovery actions as identified in the Interim Recovery Plan.

5. Stromatolite-like community of coastal freshwater lakes (Lake Richmond).

- a) CALM in liaison with the City of Rockingham establish a Recovery Team to prepare an Interim Recovery Plan for the community that incorporates the following (b, c, d).
- b) CALM provide support and advice as required to the Naturalists Club who manage Lake Richmond (RICHNW) for the City of Rockingham.
- c) DEP, MFP and City of Rockingham continue to negotiate with owner of Cockburn Sound Location 16, Lot 402 to reserve the lake bed along with an appropriate remnant vegetation buffer to be added to reserve 9458 for "Recreation" vested in the City of Rockingham. CALM negotiate with the City of Rockingham to have reserve purpose altered to "Conservation and Passive Recreation". CALM and City of Rockingham to then ensure the management plan already in place incorporates recovery actions as identified in the Interim Recovery Plan.
- d) CALM negotiate with Ministry for Planning to ensure the planned Garden Island Highway does not impact the community or the wetland vegetation that currently provides a protective buffer.

6. Aquatic root mat community of caves of the Swan Coastal Plain.

- a) CALM establish a Recovery Team to prepare an Interim Recovery Plan for the community, that incorporates the following (b, c).
- b) CALM implement control of threatening processes as identified through the Interim Recovery Plan, if not already included in actions implemented under the current management plan for Yanchep National Park. Actions to include determining in detail the water sources for the caves and maintaining the quality and quantity of the water supply (CARPK01, GILGIE01, TWILGHT01, YN99, CABAR01).
- c) CALM immediately investigate engineering solutions to water table changes if monitoring indicates the need eg pumping water into caves if flow in streamlines ceases.

7. Montane thicket and heath of the Southwest Botanical Province, above approximately 900m above sea level.

- a) CALM establish a Recovery Team to prepare an Interim Recovery Plan for the community that occurs on the eastern peaks of the Stirling Range National Park reserve 14792 (COYAN01, BLUFF01, ISONG01, PYUNG01). CALM implement actions to address threatening processes including developing a strategy for extensive monitoring, research and management programs as part of a dieback strategy for the eastern peaks of the Stirling Range National Park, including Cayanarup Peak, Bluff Knoll, Isongerup Peak, Bakers Knob, Pyungoorup Peak and Ellen Peak. Recovery actions identified in the Interim Recovery Plan to be ultimately incorporated into the management plan for the Stirling Range National Park.

8. Shrublands and woodlands of the eastern side of the Swan Coastal Plain (Gibson *et al.*, 1994; type 20c)

- a) CALM establish a Recovery Team to prepare an Interim Recovery Plan for the community. Plan to address the need to liaise about management of "Recreation" reserve A23953 (TALB02) with the Shire of Swan - the vestee of the reserve and/or current land managers. If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under these arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then to implement recovery actions as identified in the Interim Recovery Plan.

9. Sedgeland in Holocene dune swales (Gibson *et al.*, 1994; type 19)

- a) CALM continue to provide support and advice to the Recovery Team that is currently preparing an Interim Recovery Plan for the community (PB01, PB06, COOL09). Recovery Plan to incorporate the need to liaise to ensure management of the community for conservation, and negotiation for reservation of the community wherever it occurs and having the areas declared Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority, wherever possible. For all areas in which the community occurs CALM, vestees or owners in consultation with CALM, implement recovery actions as identified in the Interim Recovery Plan.

10. Shrublands on Swan Coastal Plain ironstones (Gibson *et al.*, 1994; type 10b).

- a) That CALM establish a Recovery Team to prepare an Interim Recovery Plan for the community that incorporates the following (b, c, d, e, f).
- b) CALM manage the following occurrences and adequate buffer areas in State Forest 32 or 33 (located in the Shire of Busselton) for their recovery or conservation: on Williamson Rd (WIL01, WIL03); in Ironstone Gully (IRON01); two on Smith Rd (SMITH01, SMITH04); and the portion of the occurrence on Jacka Road that is in State Forest (JACKA01). CALM implement recovery actions as identified in the Interim Recovery Plan including a dieback strategy (this is in experimental phase now), rehabilitation of degraded areas and appropriate fire regime.

- c) CALM liaise with Minister for Railways - the vestee of the disused Wonnerup rail reserve 12969 (WONN03, 04, 05, 06, WONNEW1) and/or current land managers on management of the reserve. If a management plan that would conserve the threatened ecological communities is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under this arrangement, CALM negotiate to have reserve 12969 between Ludlow-Hithergreen and Armstrong Roads declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then implement recovery actions as identified in the Recovery Plan including appropriate fire regime.
- d) CALM liaise with the Shire of Busselton and/or current land managers on management of the road reserve on Wonnerup Road between Ludlow-Hithergreen and Armstrong Roads (WONN04, WONNEW1, WONN06). If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under this arrangement, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. If area becomes vested in National Parks and Nature Conservation Authority, CALM implement control of threatening processes as identified in the Recovery Plan, including applying an appropriate fire regime. Road reserve to be amalgamated with adjacent rail reserve if both vested in National Parks and Nature Conservation Authority. CALM then implement recovery actions as identified in the Interim Recovery Plan.
- e) CALM liaise on management of properties containing the largest areas of the community with owners. CALM encourage and assist owners to access available incentives and mechanisms for conserving the threatened ecological community (see General Recommendation 20). If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under these arrangements, CALM seek funds for, and negotiate with the owners of properties to purchase and have the area/s declared Class A reserve/s for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation. CALM then implement recovery actions as identified in the Interim Recovery Plan.
- f) CALM liaise with owner of the smaller occurrence on private land in the Shire of Busselton to implement recovery actions as identified in the Interim Recovery Plan including rehabilitation of the degraded portion of the community.

11. Aquatic root mat community numbers 1- 4 of caves of the Leeuwin Naturaliste Ridge (Note: Recovery actions for 4 cave communities with similar threatening processes have been combined)

- a) CALM establish a Recovery Team to prepare a combined Interim Recovery Plan for aquatic root mat community numbers 1-4 of the Leeuwin Naturaliste Ridge. Interim Recovery Plan to incorporate the following (b, c).
- b) CALM in conjunction with Western Australian Museum - the vestee of reserve 8437 for "Protection and Preservation of Caves and Flora and for Health and Pleasure Resort"; and the Tourist Bureau of Augusta-Margaret River - the vestee of reserve 8438 Location 4174, to implement recovery actions for these cave occurrences and the two in Leeuwin Naturaliste National Park reserve 8434 as identified in the Interim Recovery Plan. Actions to include determining in detail the water sources for the caves, and management to ensure maintenance of the quality and quantity of the water supply.

- c) CALM immediately investigate engineering solutions to water table changes if monitoring indicates the need eg pumping water into caves if flow in streamlines ceases.

12. *Eucalyptus calophylla* - *Kingia australis* woodlands on heavy soils (Gibson *et al.*, 1994; type 3a)

- a) CALM establish a Recovery Team to prepare an Interim Recovery Plan for the community that addresses the following; (b, c).
- b) CALM liaise with the vestees and/or current land managers about management of the following areas: "Parklands and Conservation" reserve 31437 vested in the Shire of Waroona (WARO06); "Recreation" reserve 17490 on Brickwood Road, Byford vested in the Shire of Serpentine-Jarrahdale (BRICK01, BRICK03, BRICK05); "Government Requirements" reserve 23793 and the verge on Mundijong Road from Duckpond Rd to Webb Rd, Mundijong (MUD04); and unvested "Government Requirements" reserve 42044 (LAMB01 - Armadale). If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under these arrangements, CALM negotiate to have the area/s declared Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from the previous vestees then implement the control of threatening processes as identified in the Interim Recovery Plan.
- c) CALM/DEP/MFP continue to ensure intent of conservation of Planning Control Area that extends from Lot 37 of Canning Location 10 owned by Homeswest (Brixton Street, Gosnells BRIX02) to Roe Hwy is met.

13. *Eucalyptus calophylla* - *Xanthorrhoea preissii* woodlands and shrublands (Gibson *et al.*, 1994; type 3c)

- a) CALM establish a Recovery Team to prepare an Interim Recovery Plan for the community that addresses the following (b, c).
- b) CALM and Threatened Species and Communities Section, Environment Australia liaise with the vestee and/or current land managers of Defence Department land at the junction of Great Northern Highway and Chittering Road (PEARCE02 - Bullsbrook) about management of the area. CALM liaise about management of the following areas with vestees and/or current land managers: "Recreation" reserve A23953 (TALB01) vested in the Shire of Swan; "Drainage and Camping" reserve 22215 vested in the Shire of Waroona (YARL01 - Yarloop); Crown land - portion Cockburn Sound Location 16, Part Lot 101/3 on Plan 3950, unvested "Government Requirements" reserve 23793 and the remnant on the adjacent road verge - Duck Pond Road, Mundijong (DUCK01); Swan Location 11764 - vacant Crown land (TALB12 - Shire of Swan); and unvested "Government Requirements" reserve 23376 (WATER03 - Waterloo). If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under these arrangements, CALM negotiate to have the area/s declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM with input from the previous vestees then implement the control of threatening processes as identified in the Interim Recovery Plan.

- c) CALM implement actions for reserve 27620 for “Preservation of Fauna - Short Necked Tortoise” (Ellen Brook Nature Reserve - Upper Swan; ELLEN06) that address conservation of ecological communities in conjunction with conservation of the tortoise and incorporate the control of threatening processes as identified in the Interim Recovery Plan. In particular, management to include a weed control program to control invasive weeds such as *Watsonia*.

PRIORITY 2
Endangered Ecological Communities

1. Stromatolite like freshwater microbialite community of coastal brackish lakes (Lake Clifton).

- a) CALM urgently implement high priority management actions as recommended in the final management plan for Yalgorup National Park that affect the conservation of thrombolites in Lake Clifton (LCLIFT01). These include recommendations on tenure and boundaries etc.
- b) CALM liaise with Ministry for Planning, local government and other decision makers who have influence on planning decisions for the area around Lake Clifton, to ensure that land use of lake catchment does not impact the thrombolites. This includes exclusion of land uses that alter water quality and quantity in the lake, and uses that may cause physical crushing of the structures.
- c) CALM liaise with Ministry for Planning, Water and Rivers Commission and other relevant authorities to determine strategy for monitoring and management of water quality and quantity, to maintain thrombolites.

2. Rimstone pools and cave structures formed by microbial activity on marine shorelines (Cape Leeuwin)

- a) CALM develop Interim Management Guidelines for microbial communities in Leeuwin Naturaliste National Park, reserve 32376. Actions to control threatening processes include the need to develop interpretive signage and walkways to prevent crushing of rimstone pool structures on the shoreline in Leeuwin Naturaliste National Park (AUGSE). Interim Guidelines also to incorporate the need for CALM to liaise with Water Corporation to develop program of research, monitoring and management of water source for all occurrences of microbialites on the shoreline at Cape Leeuwin (AUGSE, AUGNE, AUG01). Recovery actions ultimately to be incorporated into management plan for the Park.

3. *Banksia attenuata* woodlands over species rich dense shrublands (Gibson *et al.*, 1994; type 20a)

- a) CALM liaise with vestees and/or current land managers on management of the following areas: Swan Lot 4, Location H - "Koondoola Regional Reserve and Parklands" vested in Homeswest (KOON01); "Recreation and Housing" reserve 24794 (LAND01 - Landsdale) and the remnant portion of "Recreation and Parklands" reserve 20091 (GOLF01) both vested in the City of Wanneroo; contiguous reserves 37997 for "Community Welfare" purposes vested in the Minister for Community Welfare, 31709 for "Sewerage Treatment and Effluent Disposal" vested in the Water Corporation and remnant portion of reserve 37260 for "Fire Training Area" vested in the Western Australian Fire Brigades Board (all M53 - Forrestfield). If a management plan that would conserve the threatened ecological communities is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under these arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from the previous vestees then to develop Interim Management Guidelines for these areas that incorporate the control of threatening processes.

- b) CALM and Agriculture Western Australia to develop Interim Management Guidelines for reserve 29815 for "Use and Requirements of Agriculture Protection Board and Conservation of Flora and Fauna" (APB01- Forrestfield) that incorporate the control of threatening processes. If change of use to purpose that is not compatible with conservation aims is likely, CALM negotiate with Agriculture Western Australia - the joint vestee of reserve 29815 with the Executive Director of CALM, to declare the area Class A reserve for "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from the previous vestee then to develop Interim Management Guidelines for the area that incorporate the control of threatening processes.
- c) CALM liaise with owners on management of the following areas: the occurrence near Gingin; Part Swan Location 7561, Maida Vale (ACTIV01); and Swan Lots 497, 498, 499 and the subdivided Lot north of Lot 497 (Lot 1 and 2 Diagram 75856) (SULT497). CALM encourage and assist owner to access available incentives and mechanisms for conserving the threatened ecological community (see General Recommendation 20). If management plans that would conserve the threatened ecological community are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under these arrangements, CALM seek funds or land swaps through the Ministry for Planning and negotiate with owners to seek to purchase the portion of private land that contains the community and an adequate buffer area and have the area/s declared Class A reserves and the purpose "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from the previous owners then to develop Interim Management Guidelines for these areas that incorporate the control of threatening processes including dieback management strategy, appropriate fire regime (Note: these areas have been identified through the integrated process of updating the "System 6" Conservation Through Reserves System Recommendations and the Ministry for Planning Urban Bushland Strategic Plan, now called Perth's Bush Plan - refer General Recommendation 13).

4. Scott River ironstone heaths and shrublands

- a) CALM seek change of status of Gingilup Swamps Nature reserve 30626 (GSNR8), reserve 42942 (SR19) and reserve 42377 (MY42377) from Class C to Class A. CALM also develop Interim Management Guidelines for these reserves, and for Scott River National Park, reserve 25373 (SR19) that incorporate control of threatening processes.
- b) CALM liaise with the vestees and/or current land managers on management of the following areas: "Water, Camping and Recreation" reserve 12951 which abuts Scott River National Park (SRFE02) vested in the Shire of Augusta-Margaret River; and Shire Road reserves containing the community on Governor Broome Road between Dennis Road and Scott River Road (MYGVBMN4 etc), Dennis Road (MYDENIS01 etc), and on Scott River Road (MYSCOTRDE etc) between Scott River and Mileannup Coast Road (containing many small occurrences). If management plans that would conserve the threatened ecological community are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then develop Interim Management Guidelines that incorporate the control of threatening processes in consultation with previous vestees.
- c) CALM negotiate with current land managers of Sussex Location 4973 (Vacant Crown Land - SCOTT02NTH) to have area declared Class A reserve for "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then develop Interim Management Guidelines that incorporate the control of threatening processes.

- d) CALM manage the occurrence and an adequate buffer area in Chester Block of the State Forest (CHESTER01) for its' recovery or conservation. CALM develop Interim Management Guidelines that incorporate the control of threatening processes.
- e) CALM seek funds and permission of owners of land containing the community to undertake flora surveys and determine extent and condition of occurrences on private land. CALM then determine management and/or purchase priorities based on floristics, extent and condition.
- f) CALM liaise with owners on management of larger areas of the Scott Ironstone community that are in good condition on private land. CALM encourage and assist owners to access available incentives and mechanisms for conserving the threatened ecological community (see General Recommendation 20). If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM seek funds and negotiate to seek purchase and have the area/s declared Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then develop Interim Management Guidelines that incorporate the control of threatening processes in consultation with previous owner/s.

5. Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands (Gibson *et al.*, 1994; type 20b)

- a) CALM liaise with vestees and/or current land managers on management of the following areas: unvested "Timber and Flora" reserve 6268 - Shire of Murray (BURNRD01); and Brickwood "Recreation" reserve 17490 vested in the Shire of Serpentine-Jarrahdale (BRICK02). If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines for the areas that incorporate the control of threatening processes.
- b) CALM liaise with the vestees and/or current land managers on management of the following areas: unvested "Rifle Range" reserve 16681; "Sandpit" reserve 31901 vested in the Commissioner of Main Roads; "Sandpit and Rubbish Disposal" reserve 31900 vested in the Shire of Harvey; all in Yarloop (MYYARL03, YARL04). If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserve/s for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines for the areas that incorporate the control of threatening processes. (Note: the reserves named in this recommendation and reserve 3672 - see (c) below, are all contiguous within one remnant; some of these reserves also contain vulnerable community type 3b, of which approximately 8ha in reserve 31900 is subject to proposal to clear for sand mining).
- c) CALM manage the occurrence and an adequate buffer area in "Timber" reserve 3672 that is currently vested in the Lands and Forests Commission for its' recovery or conservation. CALM develop Interim Management Guidelines that incorporate the control of threatening processes.

- d) CALM develop Interim Management Guidelines for Cardup Nature Reserve 2457 (CARD01, CARD05) that incorporate the control of threatening processes including dieback management, weed management program.

6. Southern wet shrublands (Gibson *et al.*, 1994; type 2)

- a) CALM liaise with the vestees and/or current land managers on management of the following reserves: Fish Road Nature Reserve 23321 vested in the Minister for Water Resources (FISH05); and "Spanish Settlers" reserve 1459 (YOON02) vested in the Shire of Busselton. If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines for the areas that incorporate the control of threatening processes.
- b) CALM liaise with current land managers on management of unvested "Parkland" reserve 22614 (the Naturalists Club - AMBR02 - in the Shire of Busselton). If a management plan that would conserve the threatened ecological communities is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from current managers then to develop Interim Management Guidelines for the area that incorporate control of threatening processes

7. Shrublands on dry clay flats (Gibson *et al.*, 1994; type 10a)

- a) CALM liaise with the vestees and/or current land managers on management of the following reserves: "Parklands and Conservation" reserve 31437 (WARO05) vested in the Shire of Waroona; and Fish Road Nature Reserve 23321 (FISH03) vested in the Minister for Water Resources. If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines for the areas that incorporate the control of threatening processes, where areas are not covered by recovery actions in Interim Recovery Plans or Recovery Plans for other communities (reserve 31437 also contains critically endangered community type 3a, reserve 23321 also contains endangered community type 2).
- b) CALM liaise with the Shire of Waroona - the vestee of "Camping" reserve 23172 (C5804) and/or current land managers on management of the reserve. If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines for the area that incorporate the control of threatening processes.

- c) CALM continue negotiations with the Town of Armadale - the vestee of "Recreation" reserve 27165 (FL02) to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority and amalgamate with Forrestdale Lake Nature Reserve. CALM, with input from previous vestees then ensure current management plan for Forrestdale Lake Nature Reserve incorporates the control of threatening processes.
- d) CALM liaise with owners of Canning Location 382, Lots 9, 10, 11,12, 13, 14, 15, 16, 77, 78 (YULE04 - Kelmscott) to ensure Interim Management Guidelines currently in place incorporate the control of threatening processes.
- e) CALM / Department of Environmental Protection / Ministry for Planning continue to ensure conservation aims of Planning Control Area that extends from Canning Location 382, Lots 9, 10, 11,12, 13, 14, 15, 16, 77, 78 (YULE04 - Kelmscott) to Brixton St remnant are met.
- f) CALM develop Interim Management Guidelines for Kooljerrenup Nature Reserve 23756 (KOOLJ06) that incorporate the control of threatening processes.

PRIORITY 3
Vulnerable Ecological Communities

1. Herb rich shrublands in clay pans (Gibson *et al.*, 1994; type 8)

- a) CALM liaise with the vestees and/or the current land managers on management of the following reserves: "Government Requirements" reserve 23793 and the verge on Mundijong Road from Duckpond Rd to Webb Rd (MUD02, MUD09); "Parklands and Conservation" reserve 31437 vested in the Shire of Waroona (WARO03); unvested "Government Requirements" reserve 23376 (WATER04 - Waterloo); and "Camping" reserve 23172 (C5803) vested in the Shire of Waroona. If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines for the areas that incorporate the control of threatening processes, where areas are not covered by recovery actions held in Interim Recovery Plans or Recovery Plans for other communities (reserve 31437 and 23793 also contain critically endangered community type 3a; reserve 23376 also contains critically endangered type 3c; reserves 31437 and 23172 also contain endangered community type 10a).
- b) CALM / Department of Environmental Protection / Ministry for Planning continue to ensure conservation aims of Planning Control Area that extends from Lot 37 of Canning Location 10 vested in Homeswest (Brixton Street, Gosnells, BRIX01) to Roe Hwy are met (remnant also contains critically endangered community type 3a).
- c) CALM continue negotiations with Town of Armadale - the vestee of "Recreation" reserve 27165 (FL03, FL07, MYFL01) to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority and amalgamate with Forrestdale Lake Nature Reserve. CALM, with input from previous vestee then ensure current management plan for Forrestdale Lake Nature Reserve incorporates the control of threatening processes (reserve also contains endangered community type 10a).
- d) CALM liaise with owner on management of land containing the community adjacent to the Meelon Nature Reserve 24430 (MEELON01). CALM encourage and assist owner to access available incentives and mechanisms for conserving the threatened ecological community (see General Recommendation 20). If a management plan which would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under these arrangements, CALM seek funds and negotiate to seek purchase and vest area in the National Parks and Nature Conservation Authority and amalgamate with Meelon Nature Reserve (note: property is surrounded on 3 sides by Meelon Nature Reserve).
- e) CALM seek to alter status of Meelon Nature Reserve 24430 (MEELON01) from Class C to Class A Nature Reserve for "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority.
- f) CALM develop Interim Management Guidelines for Meelon Nature Reserve 24430 (MEELON01) that incorporate the control of threatening processes.

- g) CALM implement actions for reserve 27620 for "Preservation of Fauna - Short Necked Tortoise" (Ellen Brook Nature Reserve - Upper Swan; ELLEN01) that address conservation of ecological communities in conjunction with conservation of the tortoise and incorporate the control of threatening processes as identified in the Interim Recovery Plan for community type 3c. In particular, management to include a weed control program to control invasive weeds such as *Watsonia* (reserve also contains critically endangered community type 3c).

2. Dense shrublands on clay flats (Gibson *et al.*, 1994; type 9)

- a) CALM liaise with the vestees and/or current land managers on management of the following reserves: "Drainage and Camping" reserve 22215 vested in the Shire of Waroona (YARL02); Crown Land - portion Cockburn Sound Location 16, Part Lot 101/3 on Plan 3950; unvested reserve 23793 and the remnant on the adjacent road verge - Duck Pond Road, Mundijong (DUCK03); and "Recreation" reserve 17490 on Brickwood Road vested in the Shire of Serpentine-Jarrahdale (BRICK04 - Byford). If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines for the areas that incorporate the control of threatening processes, where areas are not covered by recovery actions held in Interim Recovery Plans or Recovery Plans for other communities (reserve 17490 also contains critically endangered community type 3a; reserve 22215 and Duck Pond Rd areas also contain critically endangered community type 3c).
- b) CALM liaise with the City of Bunbury - the vestee of "Recreation and Parkland" reserve 32963 (MANEA01) and/or current land managers on management of the area. If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines that incorporate the control of threatening processes.
- c) CALM develop Interim Management Guidelines for Byrd Swamp Nature Reserve 2517 (BYRD01) and Wellard Nature Reserve 2547 (WELR01) both located in the Shire of Harvey, that incorporate the control of threatening processes.

3. Forests and Woodlands of deep seasonal wetlands (Gibson *et al.*, 1994; type 15)

- a) CALM develop Interim Management Guidelines for Twin Swamps Nature Reserve 27621 (TWIN05, TWIN10 - Bullsbrook) that address conservation of ecological communities, in conjunction with conservation of the tortoise, and incorporate the control of threatening processes.
- b) CALM develop Interim Management Guidelines for Carabungup Nature Reserve 4990 (CARAB01 - Shire of Murray) that incorporate the control of threatening processes.

- c) CALM liaise with the Shire of Gingin - the vestee of "Recreation" reserve 22831, Bambun Rd (BAMBUN02) and/or current land managers on management of the reserve. If a management plan that would conserve the threatened ecological communities is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestee then develop Interim Management Guidelines for the area that incorporate the control of threatening processes.

4. Shrublands on calcareous silts (Gibson *et al.*, 1994; type 18)

- a) CALM ensure Management of reserve 22057 - Yalgorup National Park (Note: management plan already in place) incorporates consideration of threatening processes acting on this community (ELLIS02).

5. Stomatolite community of stratified hypersaline lakes (Lake Thetis)

- a) CALM continue negotiations with Shire of Dandaragan - the vestee of "Recreation" reserve 35819 to have the area vested in the National Parks and Nature Conservation Authority and amalgamated with Nambung National Park (included in land tenure recommendations contained in draft management plan for Nambung). CALM, with input from previous vestee then ensure the final management plan incorporates the control of threatening processes acting on this community including the maintenance of water quality and quantity (THETISNE).

6. Shrublands on Meelup Granites

- a) CALM liaise with the Shire of Busselton - the vestee of Meelup Regional Park - reserve 21629 for "Conservation and Recreation" (MEELUP01 to MEELUP07) and/or current land managers on management of the reserve. If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, and the local community group that currently manages the area (the Meelup Regional Park Management Committee) ensure that Interim Management Guidelines incorporate control of threatening processes.

7. *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands (Gibson *et al.*, 1994, type 30a)

- a) CALM continue to provide advice and support as required to the Commonwealth Department of Defence - the vestee of Cockburn Location 9 - Garden Island (GARD01, GARD04, MYGI01 to MYGI49) in the implementation of the management plan that addresses threatening processes; fire regime and weed control in particular.
- b) CALM continue negotiations with vestee of "Conservation and Recreation" reserve 40184 - the Recreation, Camps and Reserve Board, to amalgamate portions of reserve 40184 with reserve 42469 for "Conservation of Flora and Fauna". CALM in consultation with Recreation, Camps and Reserve Board then to develop Interim Management Guidelines for reserve 42469 - Woodman Point (MYWOODPT01, WOODP01, MYWOODPT03). Guidelines to incorporate control of threatening processes, in particular, appropriate fire regime, and weed and rabbit control program.

- c) CALM liaise with the Shire of Peppermint Grove - the vestee of "Recreation" reserve 17113 (PEPGR01) and/or current land managers to encourage them to develop Interim Management Guidelines in consultation with CALM, that incorporate control of threatening processes, including a weed control program and rehabilitation of degraded areas.

8. Southern *Eucalyptus calophylla* woodlands on heavy soil (Gibson *et al.*, 1994, type 1b)

- a) CALM liaise with vestees and/or current land managers of the following reserves: "Spanish Settlers" reserve 1459 (YOON01) and "Parks and Recreation" reserve 38582 (CARB01, CARB02 - Carbanup River) both vested in the Shire of Busselton; and the Minister for Railways - the vestee of the disused Wonnerup Rail reserve 12969 between Ludlow-Hithergreen Road and Armstrong Road (WONN02) on management of the reserves. If management plan/s that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestee then develop Interim Management Guidelines that incorporate the control of threatening processes, where they are not addressed by recovery actions held in Interim Recovery Plans or Recovery Plans for other communities (reserve 1459 also contains endangered community type 2; reserve 12969 also contains critically endangered community type 10b).
- b) CALM liaise with current managers of unvested "Parkland" reserve 22614 (AMBR01 - Shire of Busselton) on management of the reserve. If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then to develop Interim Management Guidelines for the area that incorporate control of threatening processes (reserve 22614 also contains endangered community type 2).
- c) CALM liaise with the Shire of Busselton - the vestee of the road reserve on Wonnerup Road between Ludlow-Hithergreen and Armstrong Roads (WONN02) and/or current land managers on management of the reserve. If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. If area becomes vested in National Parks and Nature Conservation Authority, CALM implement control of threatening processes as identified in the Recovery Plan including appropriate fire regime. Road reserve to be amalgamated with adjacent rail reserve if both vested in National Parks and Nature Conservation Authority (reserves also contain critically endangered community type 10b).
- d) CALM negotiate with current land managers of unvested "Parkland" reserve 36717 (YALLIN01) for the area to be declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then develop Interim Management Guidelines that incorporate the control of threatening processes.

- e) CALM liaise with vestee of "Parks and Recreation" reserve 38582 - the Shire of Busselton (CARB01, CARB02 - Carbanup River) and/or current land managers on management of the reserve. If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestee then develop Interim Management Guidelines for the reserve that incorporate the control of threatening processes.
- f) CALM develop Interim Management Guidelines for Capel Nature Reserve 16144 (CAPEL05), and unnamed reserve 14567 on the Vasse Hwy, Busselton (YOON01) that incorporate the control of threatening processes.

9. *Eucalyptus calophylla* - *Eucalyptus marginata* woodlands on sandy clay soil (Gibson *et al.*, 1994, type 3b).

- a) CALM liaise with the vestees and/or current managers on management of the following reserves: unvested "Rifle Range" reserve 16681, "Sandpit and Rubbish Disposal" reserve 31900 vested in the Shire of Harvey, "Sandpit" reserve 31901 vested in the Commissioner of Main Roads - all in Yarloop (MYEARL01, MYEARL02, YARL03). If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the areas amalgamated as a single Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines that incorporate the control of threatening processes (Note: the reserves named in this recommendation and reserve 3672 - see (b) below, are all contiguous within one remnant; approximately 8ha of type 3b in reserve 31900 is subject to proposal to clear for sand mining).
- b) CALM manage occurrence and an adequate buffer area in "Timber" reserve 3672 that is currently vested in the Lands and Forests Commission for its' recovery or conservation. CALM develop Interim Management Guidelines that incorporate the control of threatening processes.
- c) CALM negotiate with current land managers of unvested "Timber and Flora" reserve 6268 - Shire of Murray (BURNRD02), for area to be declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then develop Interim Management Guidelines for the area that incorporate the control of threatening processes (reserve also contains endangered type 20b).
- d) CALM develop Interim Management Guidelines for Cardup Nature Reserve 2457 (CARD12), and for Kooljerrenup Nature Reserve 23756 (KOOLJ05) that incorporate the control of threatening processes including dieback management and weed management program (reserve 2457 also contains endangered community type 20b, reserve 23756 also contains endangered community type 10a).

- e) CALM liaise with the vestees and/or current land managers on management of the following reserves: reserve 20585 for "Protection of Roadside Vegetation and Stopping Place" vested in the Commissioner of Main Roads (WARO01 - Waroona); and reserve 35773 vested in the Shire of Busselton (DUNS01) for "Protection of Flora". If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserves for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM with input from previous vestees then develop Interim Management Guidelines for the reserves that incorporate the control of threatening processes. In particular, this would require development of a control program for invasive weeds such as *Watsonia* for the latter reserve.

10. Herb rich saline shrublands in clay pans (Gibson *et al.*, 1994, type 7).

- a) CALM liaise with the vestees and/or current land managers on management of the following reserves: Fish Road Nature Reserve 23321 vested in the Minister for Water Resources (FISH01); "Spanish Settlers" reserve 1459 (YOON03) vested in the Shire of Busselton; and reserve 22831 (BAMBUN01) vested in the Shire of Gingin. If management plans that would conserve the threatened ecological communities are not being prepared or implemented, CALM seek involvement in the cooperative preparation of such plans. If effective management for conservation seems unlikely under such arrangements, CALM negotiate to have the area/s declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM, with input from previous vestees then develop Interim Management Guidelines that incorporate the control of threatening processes (reserve 23321 and 1459 also contain endangered community type 2; reserve 23321 also contains endangered type 10a; reserve 1459 also contains vulnerable type 1b; reserve 22831 also contains vulnerable community type 15).
- b) CALM negotiate with current land managers of unvested reserve 25431 for Public Utilities (MUCK02) for area to be declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then develop Interim Management Guidelines that incorporate the control of threatening processes (reserve 25431 also contains vulnerable community type 15).
- c) CALM develop Interim Management Guidelines for Bullsbrook Nature Reserve 1654 (BULL06); and for Austin Bay Nature Reserve 4990 (AUSTB02, 07, 08; CARAB02) in the Shire of Murray that incorporate the control of threatening processes (Note: Carrabungup Nature reserve is now included in Austin Bay Nature Reserve and also contains vulnerable community type 15).
- d) CALM ensure that Draft Management Plan prepared by the Shire of Busselton for Ruabon Townsite Nature Reserve 33269 (RUAB04) incorporates control of threatening processes.

- e) CALM liaise with owners on management of occurrence on private land in the Shire of Gingin. CALM encourage and assist owner to access available incentives and mechanisms for conserving the threatened ecological community (see General Recommendation 20). If a management plan that would conserve the threatened ecological community is not being prepared or implemented, CALM seek involvement in the cooperative preparation of such a plan. If effective management for conservation seems unlikely under such arrangements, CALM seek funds and seek to negotiate purchase of the area and have it declared Class A reserve for the purpose of "Conservation of Flora and Fauna" vested in the National Parks and Nature Conservation Authority. CALM then develop Interim Management Guidelines for the area that incorporate the control of threatening processes.
- f) CALM liaise with owners of Canning Location 382, Lots 9, 10, 11, 12, 13, 14, 15, 16, 77, 78 (YULE05 - Kelmscott) to ensure Interim Management Guidelines currently in place incorporate the control of threatening processes.
- g) CALM / Department of Environmental Protection / Ministry for Planning continue to ensure conservation aims of the Planning Control Area that extends from Canning Location 382, Lots 9, 10, 11, 12, 13, 14, 15, 16, 77, 78 (YULE05 - Kelmscott) to Brixton St remnant are met (area also contains endangered community type 10a).

Actions Arising From Scope Item 4

Sixteen TECs have been identified as critically endangered by the advisory group acting as a preliminary review panel, and the following describes some actions for their conservation that have already begun as a result of the current project.

The shrublands and woodlands on Muchea Limestone and the Communities of Tumulus Springs are communities that have been extensively cleared and are threatened with total destruction. Properties containing an area of each of these types were located and purchased jointly by CALM and Environment Australia, with the full cooperation of the owners. CALM has begun developing and implementing Interim Management Guidelines for both of these occurrences of critically endangered communities. The joint purchase of a property containing an occurrence of the community, shrublands on southern Swan Coastal Plain Ironstones (Busselton area), by CALM and Environment Australia is also in train. Several additional areas containing critically endangered communities have been listed for acquisition through CALM's Conservation Lands Acquisition Committee.

Recovery Teams have been formed for the communities "sedgeland in Holocene dune swales of the southern Swan Coastal Plain" and for the thrombolites of Lake Richmond including a representative of major developers of the area containing the communities. Draft Interim Recovery Plans have been prepared for the communities. Writing of Interim Recovery Plans for all other critically endangered communities on the database is also in train and is expected to be completed by the end of 1997.

A number of Aquatic Root Mat communities occur in a selection of caves at Yanchep and on the Leeuwin Naturaliste Ridge and are critically threatened by water table drawdown. Discussions with personnel from the Water and Rivers Commission, who determine water allocations for environmental purposes occurred in January 1996.

Hard copy information from the threatened ecological community database has been provided to all relevant CALM regions and districts and is being incorporated into their planning operations. CALM is also currently incorporating the information onto a spatial database for the Threatened Flora Management System. This information will initially be made available to CALM's forest regions to be incorporated into planning operations, but is likely to be more widely available to CALM regions and districts in the near future. In addition, this information has been provided to the Department of Environmental Protection and the Ministry for Planning and is being used in metropolitan and state planning.

5. Hold second workshop and continue to produce maps identifying TECs.

The results of the technical workshop held on 24 November 1994 were reported previously.

A second workshop was held on 21 August 1996. The invitation list included people from a variety of backgrounds involved in managing land or making decisions about land management issues. Invitees included farmers, Landcare groups, Soil and Land Conservation Council, Department of Environmental Protection, Main Roads, consultants to developers, industry groups, CALM operational staff, Local Authorities in which threatened communities have been located, Ministry for Planning, Conservation Council and Greening Western Australia. The workshop provided a summary of the results of the Threatened Community Project, six examples of threatened ecological communities and the associated land management issues, and the possible management actions for identified critically endangered ecological communities.

It was noted that the information provided at the workshop and the effective dissemination of data on threatened ecological communities could help prevent more ecological communities from becoming critically endangered by their early identification as "threatened". This could save major expense in future through declining need of expensive recovery actions as is the case with Toolibin Lake in the wheatbelt.

A number of suggestions for procedures for involving land owners and community groups in conservation of threatened ecological communities arose as a result of the workshop. Firstly, a request was made for the information from the project to be made readily available to groups such as Soil and Land Conservation Councils, and Agriculture Western Australia to help determine funding priorities to protect biological values through charters such as the Remnant Vegetation Protection Scheme and for catchment planning for agricultural areas by Agriculture Western Australia. This information was seen as a crucial first step in protection of threatened communities in agricultural areas, particularly in view of the requirement of Environment Australia, the Commonwealth Department of Primary Industry and Energy, and the Rural Assistance Scheme that funding priorities are to be linked to private and public benefit eg protection of agricultural and/or conservation lands.

A limitation of the current project that was noted is the lack of data on the database for the agricultural areas in the south west due to lack of detailed information, funding and time constraints for the current Threatened Community Project. This omission could be addressed in part by detailed study of the digital information collected in the National Reserves System Cooperative Program funded project to digitise boundaries of vegetation complexes as per the vegetation mapping for the state by J. Beard (Hopkins *et al.*, 1995). This analysis should be a priority for future projects on threatened communities and is addressed in General Recommendation 31 above. Future work under the Hopkins' *et. al.* project in determining sub-vegetation types in the wheatbelt may produce data in a format more suitable for the threatened community database.

Provision of available information to farming communities, especially Landcare District Committees, was seen as a vital step in the conservation of threatened communities in agricultural areas. A suggestion was made that a suitable method of disseminating this information would be through feature articles on specific community types in publications such as the Countryman and Farm Weekly.

It was noted that land owners were often enthusiastic about looking after areas of biological significance. However, there is a common fear that the landowners would be obliged to protect these values even in the absence of financial assistance. Assured funding priority for protection of threatened communities identified on private land is likely to help alleviate this fear.

Maps indicating the locations of the communities that are on the threatened community database have been produced and occur as attachments to this report. The code (site identifier) on the maps eg MORILLA01, corresponds to site numbers of particular occurrences entered on the database. This is linked within the database to information about the occurrence in which the site occurs and to data about the corresponding community type.

The Ministry for Planning and the Department for Environmental Protection have been provided site identifiers and location information for communities on the database. The Ministry for Planning has entered this information on their Geographic Information System (GIS). Ministry for Planning proposes that this information will be used for planning purposes. It is understood that the Department of Environmental Protection intend to use the data as an input to determining decisions about development proposals.

A copy of this report will be supplied to the state library (Battye Library, Perth).

6. Prepare reports on the above scope items in accordance with the reporting schedule.

This provides the final report for the second year of the project.

References

Gibson, N., Keighery, B., Keighery, G., Burbidge, A., Lyons, M. (1994). *A floristic survey of the southern Swan Coastal Plain*. Unpublished report by the Western Australian Department of Conservation and Land Management and the Western Australian Conservation Council for the Australian Heritage Commission.

Hopkins, A.J.M., Coker, J., Beeston, G.R., Bowen, P., Harvey, J.M. (1995). *Conservation Status of Vegetation Types throughout Western Australia*. Unpublished report by the Western Australian Department of Conservation and Land Management and the Department of Agriculture for the Australian Nature Conservation Authority.