

**Advice in Relation to the Development of the
Regional Forest Agreement in Western Australia**

**Progress Report on Environmental Performance and mid-
term Report on Compliance: Forest Management Plans
1994-2003**

Department of Conservation and Land Management

Advice of the Environmental Protection Authority

**(This is not an assessment of the Environmental Protection Authority
under Part IV of the *Environmental Protection Act 1986*)**

**Environmental Protection Authority
Perth, Western Australia
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Summary and Recommendations

The Environmental Protection Authority (EPA) has provided advice in this Report to the Minister for the Environment on the Progress and Compliance Report prepared by the Department of Conservation and Land Management (CALM) in relation to the Forest Management Plan 1994-2003.

The Report also includes advice to assist the Minister, and others, in relation to the preparation of the Regional Forest Agreement (RFA) for Western Australia. The advice is offered as a contribution towards continuous improvement in ecologically sustainable forest management.

In preparing this Report, the EPA has been acutely aware that CALM has perhaps the most difficult natural resource management task in Western Australia. The requirement for balancing and integrating the multiple use objectives for the forest estate, coupled with the high public profile of forest management, presents considerable challenges in terms of the establishment of priorities, the research required, the management approach needed and the allocation of resources. It is the EPA's view that public expectations of CALM are sometimes out of proportion to the practicality of what can be achieved.

The key findings arising from this Report are:

- There have been significant International and National developments since 1992 which are of considerable relevance to the environmental and biodiversity protection aspects of forest activities being carried out within a framework of Ecologically Sustainable Forest Management.
- The EPA is of the view that for the most part CALM has complied with most of the Environmental Conditions set out in the Ministerial Statement of 24 December, 1992.
- The Environmental Conditions for compliance were set by the Minister on 24 December, 1992 but the project is the Forest Management Plan 1994-2003, and this has resulted in some timing variations which will need to be addressed.
- The EPA is conscious that the current review of compliance is mid-term into a 10-year Forest Management Plan 1994-2003, and that compliance for some of the Conditions may take the full term.
- The compliance situation in regard to Environmental Condition 2-2 is of major concern to the EPA, and the EPA has recommended that the Minister requests CALM to take action on this Condition.
- The Forest Monitoring and Research Committee has not functioned in the manner which was originally intended by the EPA and the Minister, nor in a manner which will enable the Committee to achieve its objectives.
- The EPA needs to work more closely with CALM to develop the criteria for determining compliance well in advance of the assessment of compliance in 2002/2003, and to improve the process for carrying out assessment of forest management plans, including ensuring transparency of process in the public domain.
- The current approved allowable sawlog harvest is not sustainable in the longer term, and a reduced harvest figure should be set by the Minister as soon as this is possible.

- The EPA expects continuous improvement from all proponents and overall environmental performance in forest management would be enhanced by CALM developing a formal environmental management system in accordance with the principles of the ISO 14000 Series Documents and the Montreal Process.
- The preparation of the Regional Forest Agreement for Western Australia is a major event in forest management, and this report provides EPA advice in relation to the preparation of that document.
- The organisational structures within CALM leaves CALM vulnerable to a perception of conflict of interest between its roles in conservation and the commercial elements of forest management.
- The RFA process has exposed major attitudinal problems in terms of public perceptions of CALM's forest management activities and, at times, CALM's response to these criticisms and observations. For better overall environmental performance, and public acceptability of it in terms of forest management, it would be useful if attitudinal change on all sides could be brought about.

Recommendations

1. The EPA recommends that the Minister notes the advice provided in this Report on the extent of CALM's compliance with the Ministerial Statement of 24 December, 1992, mindful that the current review has taken place 5 years into a 10 year plan, and that for most of the Conditions no specific date for compliance was stated. It could therefore be considered that CALM has until 2002/2003 in which to fully comply.
2. The EPA recommends that the Minister notes Table 1 (page vi) which gives a summary of the extent of CALM's compliance with the Conditions.
3. The EPA recommends that the Minister notes the advice provided to the EPA by the EPA Advisory Committee on Forest Management Plans in Appendix 1 of this Report.
4. The EPA recommends that the Minister notes the advice provided in this Report and Appendix 1, relating to aspects of CALM's environmental performance in implementing the Forest Management Plans (FMP).
5. The EPA recommends that the Minister requests CALM to provide to the EPA a response, within 3 months, to all of the advice and suggestions made in the EPA Report and Appendix 1, indicating how it will incorporate the advice and suggestions into its management of the Forest Management Plans (FMP), forest management practices and environmental management system.
6. The EPA recommends that the Minister notes that the EPA has the intention of providing further advice in a subsequent report in response to the specific forest management scenario resulting from the current process of the development of the Regional Forest Agreement (RFA) for WA. The presence or absence of an RFA will have implications for:
 - the continuation of the current Forest Management Plans, as amended following assessment of the "substantial" changes identified in this Report (see Recommendation 8);
 - specific EPA advice on the extent of amendments to, or replacement of, the 1992 Ministerial Statement;

- details of the approach to be taken by the EPA, and expectations of CALM by the EPA, for the assessment in 2002/2003, of CALM's compliance with the FMP over its 10 years in the event of continuation of the current FMP (with or without amendments).
7. The EPA recommends that the Minister notes that in the event that an RFA does not eventuate, or if there is an RFA but no new FMP requiring assessment, then the EPA will provide its advice, by the end of April 1999, on a number of matters, including detailed recommendations for amendments to the Ministerial Statement, as well as a strategy for developing (in a cooperative manner) with CALM and the public, the specific criteria that will be used by the EPA to assess compliance in 2002/2003.
 8. The EPA recommends that the Minister notes that Condition 2-2, about implementation being in accordance with the approved plan, has not been met in that some changes regarded by the EPA as significant were not submitted to the Minister for determination (on advice of the EPA) as to whether or not they are substantial, and that the Minister takes the following actions:
 - a) Requests CALM to refer the application of the shelterwood silvicultural treatment under the jarrah silvicultural prescription to the Minister under the Environmental Protection Act as required by Condition 2-2 and to refer it to the EPA to enable the EPA to provide advice as required by Condition 2-2; and
 - b) Requests CALM to refer the increase in the area harvested under the jarrah silvicultural prescription to the Minister under the Environmental Protection Act and to refer it to the EPA to enable the EPA to provide advice as required by Condition 2-2.
 9. The EPA recommends that the Minister notes that the EPA intends to convene a specialist committee to provide it with advice on the adequacy and appropriateness of the current forest models for guiding decision-making on multiple use forests in an ESFM framework.
 10. The EPA recommends that the Minister notes that the EPA holds the view that the Forest Monitoring and Research Committee (FMRC) has not operated in the manner that was intended under Condition 17 and that the Minister agrees that the Committee be re-formed to include external scientists and that adequate funds be provided to ensure that the Committee can operate in an effective manner to meet its responsibilities.
 11. The EPA recommends that the Minister notes that the EPA has discussed the structure, functions and membership of the Lands and Forests Commission and other matters relating to institutional arrangements for ESFM (Section 4.4) and that it may provide further advice on these matters in its subsequent report.
 12. The EPA recommends that the Minister notes the advice of the EPA and the Advisory Committee in relation to current forest monitoring and research undertaken by CALM, that significant changes are required in these areas and that the EPA will provide further advice in its subsequent report.
 13. The EPA recommends that the Minister takes into account the following advice in relation to development of the RFA for WA:
 - a) That the RFA gives explicit recognition to EPA's ongoing statutory responsibilities in relation to forest management and performance, as well as public expectations in this area, cognisant of the fact that WA is different from other States in having an independent EPA which would not necessarily be limited by an RFA in its provision of advice on environmental matters as required by its Act.

- b) That the RFA requires CALM to implement transparency of process in all aspects of the planning, execution, research, audit and public reporting of timber harvesting and forest management, recognising that the RFA has a significant role to play in improving and changing the dynamics between CALM and the conservation movement and community in relation to timber harvesting and forest management.
- c) That the RFA takes a precautionary approach to sustainable timber harvest. A conservative approach should be taken, in which full attention is given to the State's commitment through the InterGovernmental Agreement on the Environment (IGAE) in terms of applying the Precautionary Principle. The figure of 490 000 m³ /yr set by Minister Minson for jarrah sawlogs is not regarded by the EPA as being sustainable and a precautionary approach would be to substantially reduce the cut level as quickly as possible to a level in the order of 250 000 m³ /yr, subject to this figure being shown to be sustainable in the long term.
- d) That the RFA should require that CALM demonstrate in a transparent manner that proposed levels of cut of both jarrah and karri are sustainable and that the range of forest values desired by the community will be properly protected within an ESFM framework.
- e) That the RFA should note that the EPA has the intention of initiating and coordinating a review of the models with a view to development of appropriate models to enable determination of sustainable harvest according to the principles of ESFM and application of the Precautionary Principle (see Recommendation 9).
- f) That the RFA should require the terms and definitions and glossary used to define forest policy and to regulate yield to be consistently applied and, where possible, explained in everyday language.
- g) That the RFA should require silvicultural prescriptions to be more specifically formulated and applied to take account of variations in conditions such as soil, landform, forest types, forest ecosystems, slope, climate.
- h) That the RFA should ensure that forest areas regarded by the public as important "icons" or as "old growth" are fully considered for protection regardless of whether or not they meet the specific criteria being proposed for "old growth" forest.
- i) That the RFA should ensure that areas of forest protected in reserves are replicated, as far as is practicable, so that biodiversity values are adequately protected against pathogens, invader species and human use pressures.
- j) That the RFA should require that new Forest Management Plans be developed with proper regard for the relevant National and International protocols relating to ecologically sustainable development and biodiversity, namely:
- the Rio Declaration and Agenda 21;
 - National Strategy for Ecologically Sustainable Development;
 - InterGovernmental Agreement on the Environment;
 - National Forest Policy Statement; and
 - National Strategy for the Conservation of Australia's Biodiversity.
- k) That the RFA should explicitly recognise that Forest Management Plans are subject to assessment by the EPA.
- l) The EPA recommends that the Minister notes the advice of the EPA in relation to the recommendations of the Independent Expert Advisory Group (see Section 4.6)

Table 1: Summary of EPA findings on compliance

Environmental Condition	EPA Conclusion
1-1	The EPA has not been able to determine CALM's compliance with Condition 1 and has proposed actions to progress this matter.
2-1	The EPA notes that CALM has complied with Condition 2-1.
2-2	The EPA concludes that CALM has not complied with Condition 2-2.
3-1	The EPA concludes that CALM has yet to comply with Condition 3-1
3-2	The EPA concludes that CALM has yet to comply with Condition 3-2(1). In relation to Condition 3-2(2-4), refer to Conditions 8, 9, 10, 11 and 17.
4-1	The EPA concludes that significant progress has occurred and that CALM is yet to be in full compliance with Condition 4.
5-1	The EPA concludes that CALM has complied with Condition 5-1.
5-2	The EPA concludes that CALM has yet to demonstrate compliance with Condition 5-2 and has proposed actions to achieve compliance as soon as possible.
5-3	The EPA concludes that CALM has yet to demonstrate compliance with Condition 5-3 and has proposed actions to achieve compliance as soon as possible.
6-1	The EPA concludes that CALM has complied with Condition 6-1.
6-2	The EPA concludes that CALM has yet to demonstrate compliance with Condition 6-2 and has proposed actions to achieve this as soon as possible.
7-1	The EPA notes that CALM has yet to comply with Condition 7-1 and understands that this may occur through the RFA process.
7-2	The EPA notes that CALM has yet to comply with Condition 7-2 and understands that this may occur through the RFA process.
8-1	The EPA notes that the Minister has made determinations in accordance with Condition 8-1.
8-2	The EPA notes that the Minister has made determinations in accordance with Condition 8-2.
9-1(1)	The EPA concludes that CALM has complied with Condition 9-1(1).
9-1(2)	The EPA is unable to determine compliance with Condition 9-1(2).
10-1	The EPA concludes that CALM has complied with Condition 10-1.
11-1	The EPA concludes that CALM has not complied with Condition 11-1, to the extent that monitoring has only been carried out on one of the trial areas, and has proposed actions to enable CALM to achieve compliance as soon as possible.
11-2	In relation to Condition 11-2, refer to Condition 17.
11-3	CALM has until 2002 to comply with Condition 11-3.
12-1	The EPA concludes that CALM has complied with Condition 12-1.

12-2	The EPA concludes that CALM has complied with Condition 12-2.
12-3	CALM has until 2002 to comply with Condition 12-3.
13-1	The EPA concludes that CALM has not complied with Condition 13-1 in that the determination by the Minister has not been obtained.
14-1	The EPA notes that CALM has not implemented this programme and that this may have been appropriate.
14-2	The EPA notes that CALM has not implemented this programme and that this may have been appropriate.
15-1	The EPA concludes that CALM has complied with Condition 15-1.
15-2	The EPA concludes that CALM has complied with Condition 15-2.
15-3	The EPA concludes that CALM may not have complied fully with the intent of Condition 15-3.
16-1	The EPA concludes that CALM has complied with Condition 16-1.
16-2	The EPA concludes that CALM has complied with Condition 16-2.
17-1	The EPA concludes that Condition 17-1 has been complied with to some extent.
17-2	The EPA concludes that Condition 17-2 has been complied with to some extent.
17-3	The EPA concludes that Condition 17-3 has been complied with to some extent.
17-4	The EPA concludes that Condition 17-4 has not been fully complied with.
18-1	The EPA concludes that CALM has complied with Condition 18-1.

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1. Introduction and background

Following a report and recommendations by the Environmental Protection Authority (EPA, 1992) and the subsequent report of an Appeals Committee (Barnett, 1992), the then Minister for the Environment issued the Ministerial Statement under Section 45 of the Environmental Protection Act, 1986, relating to the implementation of the 1992 Draft Forest Region Management Plans by the Department of Conservation and Land Management (CALM). The Ministerial Statement contained 18 Environmental Conditions and was issued on 24 December, 1992.

Condition 18 of the Statement requires CALM to prepare public Progress and Compliance Reports (PCR) to "help verify the environmental performance of this projectin 1997 and 2002." It also states that:

"The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of the Minister for the Environment or any other Government agency."

As a consequence, in 1996 the EPA and CALM initiated a process for reviewing CALM's environmental performance with the Forest Management Plans as well as progress towards compliance with the 17 other Environmental Conditions in the Minister's Statement. Guidelines for a PCR were prepared, with public input (EPA, 1997), and CALM prepared a Progress and Compliance Report on its compliance with the Conditions, which was released to the public for comment in December, 1997 (CALM, 1997).

Also in 1996, the EPA convened an Advisory Committee on Forest Management Plans (ACFMP) under Section 25 of the Environmental Protection Act, 1986. This Committee reviewed CALM's Progress and Compliance Report, the submissions received during the review period, and considered additional information from CALM and other sources. The ACFMP provided its report to the EPA in October, 1998 (Appendix 1). CALM provided comments to the EPA on 15 October, 1998 as to errors of fact in the ACFMP finalised report (Appendix 2).

The report of the ACFMP contains the Committee's advice to the EPA on CALM's compliance with the Environmental Conditions and comment on a number of key issues relating to management of the forest estate, as part of providing its advice to the EPA, as required, on environmental performance. The Committee advice arises from published information, the expert knowledge of its members, as well as from information prepared as part of the current Regional Forest Agreement (RFA) process.

The EPA appreciates the considerable commitment given by members of the Advisory Committee in preparing its advice to the EPA. The EPA has been guided by the advice of the ACFMP. However, the final responsibility for advising the Minister on the extent of compliance with the Ministerial Statement rests with the EPA. The EPA has used all of the above information and advice, in addition to other information, in arriving at its conclusions.

A frequent comment made in the public submissions was about the difficulty in determining whether CALM had complied with the various Environmental Conditions. This related to the nature and extent of the information provided by CALM in its Progress and Compliance Report. The ACFMP sought clarification from CALM on a number of aspects of the Compliance Report. Similarly, the EPA obtained clarification from CALM on a number of issues. The ACFMP and the EPA have provided advice to the Minister for the Environment on the need to define clearly aspects of some of the Conditions so that CALM can include the information needed to enable the EPA to report fully at the time of the next review, in 2002/2003.

Coincident with the timing of this review of progress and compliance has been the preparation of a Regional Forest Agreement (RFA) between the State and Commonwealth Governments. Although this review was not initiated as part of the RFA process, the advice provided in this Report and that of the ACFMP is relevant to the finalising of the RFA, and EPA has made recommendations in relation to the RFA.

At the time of writing this Report, the RFA has not been completed. This has caused considerable difficulty for the EPA in terms of the usefulness of providing specific, detailed

advice at this time, on the changes to the Environmental Conditions and the Ministerial Statement that are required in relation to the current approved Forest Management Plans. The uncertainty over the scenario that may eventuate has a bearing on the extent of advice that it is useful for the EPA to provide in this Report. Accordingly, the EPA has limited the scope of this Report, with the intention of providing more specific advice on a range of matters in a subsequent report, following finalisation of a forest management scenario.

This Report is a further step towards ecologically sustainable forest management in Western Australia. The overall objective of the EPA is to protect the environment and to improve environmental performance. The advice in this Report is provided to be helpful in moving towards Ecologically Sustainable Forest Management ESFM. It suggests change where this is warranted to achieve this objective. It is not the intention of this Report to evaluate whether or not CALM has met the letter of its legal obligations or to recommend a legal remedy.

Section 2 of this Report indicates the context of the EPA's advice. Section 3 considers progress and compliance with the Minister's 1992 Ministerial Statement. The review has identified a number of issues relating to forest management within the context of environmental performance that should be considered by the Minister for the Environment and these are discussed as "Advice to Assist the Minister in Relation to the RFA and Forest Management" in Section 4. Section 5 presents the EPA's conclusions and recommendations. The report of the Advisory Committee on Forest Management Plans, including details of its membership, is provided in Appendix 1, which includes a summary of the issues raised in submissions. The full text of the public submissions made on the PCR is being published as a separate document. Appendix 2 is CALM's comments as to errors of fact in the finalised ACFMP report.

2. Context of this Report

2.1 The 1987 and 1988 Ministerial Statements

The EPA's report on the assessment of the 1992 proposal to amend the Forest Management Plans and Timber Strategy (EPA, 1992) did not explicitly indicate which components of the earlier EPA assessments of the 1987 Forest Management Plans (CALM, 1987a; 1987b; 1987c) and Timber Strategy (CALM, 1987d) and the WACAP proposal (EPA, 1987; 1988), and Ministerial Statements should continue to apply to the current Forest Management Plans. The current Forest Management Plans 1994-2003 were approved by the Minister following conclusion of the EPA's assessment of the 1992 proposal, and the setting of Environmental Conditions by the Minister in 1992 and 1993 (Minister for the Environment, 1992; 1993).

The Department of Environmental Protection has advised that this has created difficulties for the auditing of the Forest Management Plans, in accordance with the 1992 Ministerial Statement. Some of the 1992 proposals by CALM were intended to meet with the requirements of some of the Conditions in the two earlier Ministerial Statements. However, the EPA report of 1992 did not provide a view on the extent to which earlier Conditions (or proposed actions) were to be superseded by the later approved Forest Management Plans 1994-2003. There was therefore no mechanism by which this matter could be addressed through administrative processes.

The EPA expects that changes to the Forest Management Plans regarded as substantial, and proposals to amend the Forest Management Plans, will be referred to the EPA for its consideration. The Ministerial Statements can then be rationalised if this remains an appropriate action at that time. Detailed discussion of the Environmental Conditions to be considered for amendment or revocation would be premature at present as future requirements will depend on the outcome of the RFA.

2.2 The 1992 Ministerial Statement

Several Environmental Conditions in the 1992 Ministerial Statement identify the Minister for the Environment as the responsible agent for determining compliance. Other Environmental Conditions are not specific in this regard, however, the Ministerial Statement requires that the EPA determines compliance and progress towards compliance on those Environmental Conditions that are not otherwise specified. The Minister has also indicated how some other Environmental Conditions should be progressed to achieve compliance and this Report also includes these Conditions for completeness.

The EPA established the ACFMP as an expert Committee to provide advice on compliance with the Environmental Conditions and to provide additional advice on a range of issues related to the environmental performance of forest management. Both the Committee and the EPA examined aspects of CALM's forest management in the field during their respective considerations and additional information was sought from CALM during the preparation of the ACFMP and EPA reports.

In preparing this Report, the EPA was acutely aware that CALM has perhaps the most difficult natural resource management task in Western Australia. The requirement for balancing and integrating the multiple use objectives for the forest estate, coupled with the high public profile of forest management, presents considerable challenges in terms of the establishment of priorities, the research required, the management approach needed and allocation of resources. It is the EPA's view that public expectations of CALM are sometimes out of proportion to the practicality of what can be achieved. Although CALM applies an integrated approach to potential environmental problems associated with forests and their management, public expectations continue to be in advance of the management improvements achieved.

During its review of progress and compliance with the 1992 Statement, the EPA was mindful of two points:

1. The EPA will undertake a further review of progress and compliance with the Environmental Conditions after the 2002 PCR report by CALM has been published, in accordance with Condition 18. This requirement raises a more significant issue. Where the nature of the Condition makes it difficult to determine compliance at this time, an

improved basis of definition or measurement needs to be developed and applied at the time of the review in 2002/2003. As a consequence the EPA will be recommending actions and processes to achieve more effective ongoing review, recognising the major review required by the EPA in no later than four years time.

2. The Ministerial Statement relates to forest management over a period of ten years. Given the complexity, scale and duration of the proposal, the EPA recognises that it may be too early for CALM to have achieved full compliance with some of the Environmental Conditions. In those cases where the EPA considers that this might be the case, comment has been provided to assist CALM in the achievement of full compliance by 2002/2003.

2.3 Relationship of this Report to the RFA

As the Advisory Committee has stated in its report, the preparation of a Regional Forest Agreement (RFA) for Western Australia is an entirely separate process from the review of progress and compliance discussed in this Report. However, this Report has relevance to development and consideration of the RFA and provides specific recommendations to assist in finalising the RFA.

CALM and the Department of Premier and Cabinet are the lead WA Government agencies responsible for managing the RFA process and negotiating the final agreement with the Commonwealth on behalf of the Western Australian Government, with the final agreement to be signed by the Premier and the Prime Minister.

Some EPA members have been made aware of the RFA process and many of the issues associated with the preparation of the RFA through briefings by CALM and through representations by interested organisations and members of the public. Although the EPA is not itself a direct participant in the RFA process, it does have an interest in some elements of the RFA which relate to the stated objectives of the RFA which are:

- identification of areas in the South West forest region which both the Western Australian and Commonwealth Governments believe are required for the establishment of a comprehensive, adequate and representative forest reserve system, and to provide for the conservation of those areas;
- provide for ecologically sustainable management and use of forested areas in the region; and
- provide for the long-term stability of land use decisions for the forest and forest-based industries.

The EPA is aware that the RFA may result in changes to legislation in the forestry and conservation areas, to Government agency policy and to forest management systems and processes, as well as likely changes to the current Forest Management Plans. Any amendments to the existing Forest Management Plans or new Forest Management Plans will trigger a referral to the EPA.

The EPA has provided advice in Section 4 of this Report to assist in the finalisation of the Regional Forest Agreement for Western Australia.

3. Assessment of CALM's Compliance with the Environmental Conditions in the 1992 Ministerial Statement

The EPA's assessment of compliance is set out in Sections 3.1 to 3.18. As a preliminary to considering the EPA's assessment, the EPA has provided the following six recommendations in relation to process as an aid to understanding the advice given under each Environmental Condition. These form the first six recommendations in Section 5.

1. The EPA recommends that the Minister notes the advice provided in this Report on the extent of CALM's compliance with the Ministerial Statement of 24 December, 1992, mindful that the current review has taken place 5 years into a 10 year plan, and that for most of the Conditions no specific date for compliance was stated. It could therefore be considered that CALM has until 2002/2003 in which to fully comply.
2. The EPA recommends that the Minister notes Table 1 (page vi) which gives a summary of the extent of CALM's compliance with the Conditions.
3. The EPA recommends that the Minister notes the advice provided to the EPA by the EPA Advisory Committee on Forest Management Plans in Appendix 1 of this Report.
4. The EPA recommends that the Minister notes the advice provided in this Report and Appendix 1, relating to aspects of CALM's environmental performance in implementing the Forest Management Plans (FMP).
5. The EPA recommends that the Minister requests CALM to provide to the EPA a response, within 3 months, to all of the advice and suggestions made in the EPA Report and Appendix 1, indicating how it will incorporate the advice and suggestions into its management of the Forest Management Plans (FMP), forest management practices and environmental management system.
6. The EPA recommends that the Minister notes that the EPA has the intention of providing further advice in a subsequent report in response to the specific forest management scenario resulting from the current process of the development of the Regional Forest Agreement (RFA) for WA. The presence or absence of an RFA will have implications for:
 - the continuation of the current Forest Management Plans, as amended following assessment of the "substantial" changes identified in this Report (see Recommendation 8);
 - specific EPA advice on the extent of amendments to, or replacement of, the 1992 Ministerial Statement;
 - details of the approach to be taken by the EPA, and expectations of CALM by the EPA, for the assessment in 2002/2003, of CALM's compliance with the FMP over its 10 years in the event of continuation of the current FMP (with or without amendments).

3.1 Environmental Condition 1 - Proponent's commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

1-1 In implementing the proposal the Proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the proposal and in response to issues raised following public submissions.

Discussion

This is a standard Environmental Condition applied to Ministerial Statements issued by the Minister for the Environment under Section 45 of the Environmental Protection Act, 1986. Normally, the Statement would include a list of commitments which form an essential element of implementing and auditing of the proposal. As mentioned by CALM (CALM, 1997) and the ACFMP (Appendix 1 of this Report), the 1992 Ministerial Statement does not include such a list.

The lack of a list of commitments does not mean that no commitments are required of CALM. The Land and Forest Commission (LFC) and the National Parks and Nature Conservation Authority (NPNCA), which are the authorities in which forests and reserves are vested under the Conservation and Land Management Act, 1984, provided commitments for CALM to adopt. The 1992 Proposals to Amend the 1987 Forest Region Management Plans and Timber Strategy (CALM, 1992a-c) contained statements of intent describing, to varying degrees, forest management objectives or strategies to be implemented by CALM. These were subsequently refined and incorporated into the statutory 1994 Forest Management Plans (CALM, 1994).

As a result, there are forest management commitments which have been given by CALM, but which have not been formally identified through the Environmental Protection Act process. The Department of Environmental Protection (DEP) and CALM commenced a process of preparing a list of agreed commitments in 1994 but this was deferred when the RFA process was initiated.

Without a consolidated list of commitments, it is extremely difficult to determine compliance with Environmental Condition 1.

The ACFMP has suggested two means of improving this situation. The first would be the formulation of a list of commitments which can be used to verify compliance. The second is that the Committee has suggested the development of an environmental management system (EMS) which would formally document the management systems being used in forest management to ensure that the commitments are implemented and that continuous improvement is achieved.

The EPA notes the advice of the Advisory Committee and considers that compliance with Condition 1 needs to be clearly measurable and demonstrable to the public. The EPA has formed the view that:

- 1) Commitments should be consolidated by CALM, in consultation with the DEP, and published, to enable effective assessment of monitoring and compliance.
- 2) The list of commitments should include:
 - a commitment to develop and implement the EMS referred to below;
 - the definition of the precautionary principle used in the InterGovernmental Agreement on the Environment (IGAE) (see discussion under Condition 3 below)
 - the adoption of the principles of ecologically sustainable forest management (see discussion under Section 7.2.5 of Appendix 1)
- 3) An environmental management system should be developed, according to the principles of the ISO 14000 Series Documents and the Montreal Process, within 1 year.

The EMS should include the following elements:

- an environmental policy incorporating arrangements for community involvement during its development;

- corporate commitment to the environmental policy;
- environmental performance objectives which are outcome oriented and measurable;
- an environmental management plan and implementation programme;
- research and monitoring programmes in relation to forest management which address the commitments;
- an external audit plan for measuring performance against objectives; and
- a procedure for regular public reporting.

Conclusion on Compliance

The EPA has not been able to determine CALM's compliance with Condition 1 and has proposed actions to progress this matter. The EPA is of the view that an agreed set of auditable commitments and an EMS are essential.

It should be noted that specific aspects of the above, including the final list of commitments, are subject to the scenario that will result from the finalisation (or otherwise) of the RFA and EPA will provide specific recommendations at a later date (see Recommendations 6 and 7 in Section 5).

3.2 Environmental Condition 2 - Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

- 2-1 An expert scientific and administrative committee will be established by the Minister for the Environment to review and report on the implementation of this proposal by 30 June 1993. The terms of reference of the committee will be to consider:
- reserve recommendations within multiple use forests involving those proposals related to temporary exclusion from timber production and potential reserves to act as wildlife corridors;
 - the environmental, economic and social implications of such proposals for:
 - nature conservation within WA's native forests,
 - the maximum sustainable timber supply, and
 - the existing and future timber industry;
 - the potential to increase the plantation estate on cleared agricultural land to contribute to the production of timber products.
- 2-2 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

Discussion

In 1993, the then Minister for the Environment established the Scientific and Administrative Committee (the Meagher Committee) to consider and advise on the issues identified in Environmental Condition 2-1. A statement was subsequently issued by the Minister on the outcomes of the review (Minister for the Environment, 1993).

The EPA notes the advice of the Advisory Committee in relation to Condition 2-1.

Environmental Condition 2-2 requires that the proposal as assessed by the EPA, and as modified by the Minister's Statement of Conditions, is the proposal to be implemented by the proponent. Where any changes to that approved proposal are proposed, the Minister (on the advice of the EPA) must agree to that change before it is applied.

Having examined CALM documents prepared since 1992 (in particular CALM Annual Reports), the EPA is of the view that significant modifications to the approved proposal have been implemented by CALM. Examples of such changes are the increase in the use of the shelterwood silvicultural prescription and the increase in total area of forest harvested. CALM indicated in its Progress and Compliance Report that it did not consider any of the changes it has made to operations to be substantial requiring agreement from the Minister (CALM, 1997).

The term 'gap creation' or 'regeneration release' refers to an almost total removal of harvestable and non crop trees within the treated areas with provision for 4 habitat trees per hectare to be retained. The Jarrah Silviculture Guidelines 1/95 document states that the 'regeneration release' treatment is used where there are insufficient crop trees to merit thinning (ie less than 50% of required stocking) but where the stocking of lignotubers and ground coppice will adequately regenerate the gaps created by harvest. Each area of forest to be logged is assessed shortly prior to logging to ensure that there are adequate lignotubers present to ensure that the forest will regenerate. CALM has advised of a 99% success rate in re-establishment of the forest under this treatment, based on assessment initiated in 1997/98 (CALM letter of 23 July 1998 in Appendix 4 (p 19) of Appendix 1 in this Report).

The term 'shelterwood' is applied to a silvicultural prescription where there is not an adequate stocking of crop trees for thinning and where there are insufficient lignotubers available for immediate release. An overstorey of mature trees is retained to provide seed for regeneration and a continuation of forest values until the ground coppice has developed to a stage where it is capable of rapid growth when the overstorey is removed. In virgin stands, 50% of the overstorey is retained. In previously cut over stands, the retained trees should have a basal area of 10-15 square metres per hectare.

During the assessment in 1992, CALM advised the EPA, in response to a question about the area to be affected by the changed silvicultural prescriptions, that "the areas cut over in the future are likely to be similar" to those cut over in the years 1989/90 to 1991/92, which ranged from 14 500 (1989/90) to 10 900 (1991/92) hectares per annum." (EPA, 1992)

CALM also advised that the proportions of the various silvicultural treatments (including harvest methods) would be similar to those shown in the 1991/92 annual report. These proportions were as follows, where the balance of 2% is "other" including clearing:

- thinning - 25%
- gap creation - 55%
- shelterwood - 5%
- single tree selection - 13%

CALM's annual reports show that application of the jarrah silvicultural prescription over the past five years has seen a significant increase in area harvested and an increase in the area cut to shelterwood (see Table 2). The area cut to gap creation has been more consistent over the period.

Changes to the implementation of the approved proposal which are deemed by the Minister (on the advice of the EPA) to be "substantial" and requiring amendments to the Conditions are assessed using Section 46 of the Environmental Protection Act, 1986. The changes to the proposal may be significant enough to warrant a new assessment under Section 38.

The EPA has considered the advice of the Advisory Committee and information from CALM and has formed the view, expressed as a recommendation in Section 5, that the Minister should take the following actions:

- a) Requests CALM to refer the application of the shelterwood silvicultural treatment under the jarrah silvicultural prescription to the Minister as required by Condition 2-2 and to refer it to the EPA to enable the EPA to provide advice as required by the Condition; and
- b) Requests CALM to refer the increase in the area harvested under the jarrah silvicultural prescription to the Minister as required by Condition 2-2 and to refer it to the EPA to enable the EPA to provide advice as required by the Condition.

Conclusion on compliance

The EPA notes that Condition 2-1 has been complied with.

The EPA concludes that Condition 2-2 has not been complied with by CALM. EPA is of the view that it is important that all proponents consult with the DEP whenever any departure from the approved project is being contemplated.

Table 2: Change in total area of jarrah forest harvested and in percentage of jarrah forest harvested by shelterwood silvicultural treatment.

Year	Area harvested (ha)	Shelterwood treatment (ha)	Shelterwood as percentage of total area treated (%)
1992/93	14000	1100	8
1993/94	14290	2120	15
1994/95	14100	3550	25
1995/96	17860	5530	31
1996/97	22320	9870	44
1997/98	18240	8460	46

(Source: CALM Annual Reports)

3.3 Environmental Condition 3 - Precautionary approach and adaptive management

- 3-1 The proponent shall manage karri and karri-marri forest in accordance with a precautionary approach. This approach requires that where there is a significant risk that a particular forest management measure could lead to an irreversible consequence, appropriate monitoring and subsequent adjustments to management within an acceptable time-frame be carried out.
- 3-2 The proponent shall manage the jarrah forest in accordance with the following general principles:
- (1) a precautionary approach;
 - (2) adaptive and flexible management practices based on research and monitoring of environmental monitoring of operations (see condition 17);
 - (3) implementation as a trial, with a reassessment by the Environmental Protection Authority after ten years - the period of the Management Plans and the Timber Strategy (see condition 11); and
 - (4) no commitment of all of the wood resource in the long term (see conditions 9 & 10).

Discussion

The advice of the Advisory Committee reflects the complexity associated with the implementation of the precautionary principle in relation to Ecologically Sustainable Forest Management. The public comment referred to in the Advisory Committee's report is a further indication that there are many interpretations of this concept and that it can be difficult to implement in complex situations.

Some of the difficulties in assessing the degree of application of the precautionary approach and the principles of adaptive management to forest management with the present situation are discussed in the Advisory Committee's report. However, taking into account information presented in CALM's PCR and the Advisory Committee's report, as well as other information,

the EPA considers that the ecological knowledge base of the many complex forest ecosystems upon which the silvicultural prescriptions and the fire management regimes are based, is insufficient at present to allow confident prediction of ecological outcomes. The EPA is therefore of the view that a comprehensive monitoring and research programme aimed at testing impact predictions is of critical importance to ensuring that management policy and implementation undergo continuous improvement. The Australian Science Technology and Engineering Council (ASTEC) Principles and Guidelines for the Ethical Conduct of Research in Protected and Environmentally Sensitive Areas (ASTEC, 1997) contain useful guidelines which may be applicable, given that much of forest exploitation and management can be regarded as a field scale trial or experiment.

The EPA is also concerned about the way in which some of the post-harvest treatment of harvested areas is being applied and of the availability of adequate resources to ensure that this work is carried out according to the most appropriate prescription, taking account of soil, climate, slope, forest types and forest ecosystems. Similarly, monitoring of the environmental consequences of harvest and post-harvest management requires improved focus so that the silvicultural prescription can be adjusted within an adaptive management approach to avoid unexpected impacts.

The EPA believes that operating in accordance with a precautionary approach would be indicated by an increased and focused research program as well as adequate implementation and monitoring of post-harvest treatments, to ensure compliance with the Environmental Conditions.

Although this Condition is one which can only be progressively implemented over the total period of the Forest Management Plans, the EPA believes that significant improvement and changes to approach being taken are required if CALM is to be in a position to be able to demonstrate compliance in 2002. Other aspects of Environmental Condition 3-2 are addressed in more detail under Conditions 17, 11, 9 and 10.

Conclusion on compliance

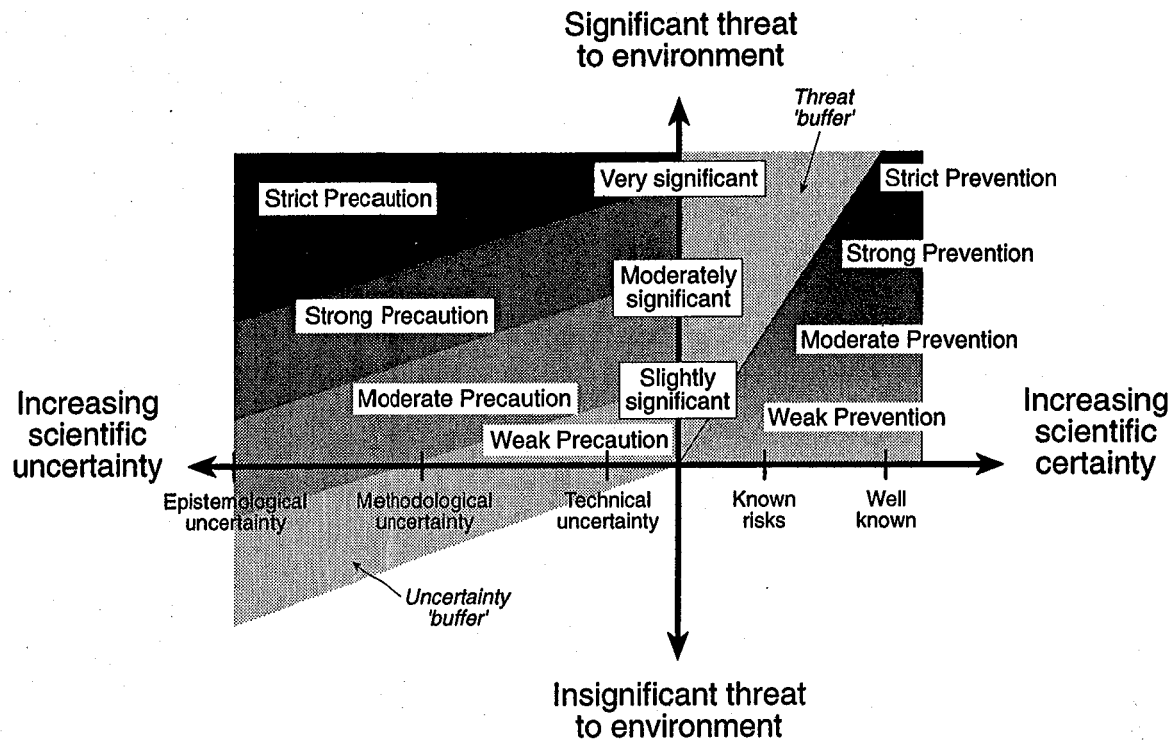
While CALM appears to be not yet implementing the Forest Management Plans in accordance with the Precautionary Principle (see Conditions 8 and 11), the EPA has formed the view that progress towards achieving compliance would be demonstrated by:

- Improvement of the knowledge base through relevant, focused research and monitoring;
- The lack of knowledge related to the application of the jarrah silvicultural prescriptions being progressively addressed by an increased and focused research program;
- Additional resources being allocated to ensure adequate implementation and monitoring of post-harvest treatments;
- Using the definition of Precautionary Principle provided in the InterGovernmental Agreement on the Environment (Commonwealth of Australia, 1992c); and
- Using the approach in Figure 1 to assist in identifying what degree of precaution to employ in different situations.

The EPA concludes that CALM has yet to comply with Condition 3-1 and 3-2(1) and has proposed actions that would lead to compliance by 2002. In relation to Conditions 3-2(2) to 3-2(4), refer to Conditions 8, 9, 10, 11 and 17.

Figure 1: Determining Degrees of Precaution

(Source: Deville and Harding, 1997, p38)



3.4 Environmental Condition 4 - Amendments to conservation estate

4-1 The proponent shall initiate the Government processes required to implement the proposed amendments to the conservation reserve estate, as agreed to by the Minister for the Environment and defined in the approved Forest Management Plans.

Discussion

CALM has reported that action has been initiated to implement proposals for 425 of the 467 recommended areas. The PCR also states that the exceptions are largely those where some downgrading is proposed.

The EPA notes the Advisory Committee advice that the adequacy of the conservation estate is being addressed further through the RFA process. The Committee has also pointed out that there was some public concern about progress towards reservation of some larger areas including Julimar, Moore River, Lane Pool Reserve and Mt Roe.

In terms of this Condition it is relevant to note that the vegetation and forest mapping carried out as part of the RFA has been very detailed, and takes account of landform, soil type, forest types, forest ecosystems, vegetation complexes and climate zones. This has resulted in a much greater number of distinct forest ecosystems than previously thought and has added to the complexity of ensuring that a fully comprehensive, adequate and representative reserve (CAR) system is provided for in the RFA.

The EPA notes that the JANIS criteria used in the RFA are minimum criteria (RFA, 1998a). The EPA would, as a matter of principle, favour erring on the side of a greater total reservation, favouring a precautionary approach which should ensure representation and conservation across all forest types/forest ecosystems/ soil/ climate/landform types as identified in the most recent mapping.

The EPA notes:

- The advice of the Advisory Committee regarding progress on implementation of approved amendments to the conservation reserve estate;
- That the approved Forest Management Plans may need be re-examined in the context of the outcome of the current RFA process, to ensure that there is full representation and conservation of all forest types/forest ecosystems/soil/climate/landform types and that areas of special local value and ecological and visual interest are also reserved; and
- That CALM has yet to initiate implementation of 42 of the 467 approved amendments under the current Forest Management Plans but has until 2002 to do so.

Conclusion on compliance

The EPA concludes that CALM has achieved significant progress in actioning a substantial majority of the proposed amendments to the conservation estate and has yet to be in full compliance with Condition 4.

3.5 Environmental Condition 5 - Revised travel route (road), river and stream reserves

- 5-1 The proponent shall implement the revised system of travel route (road), river and stream reserves consistent with condition 16. It is noted that the minimum combined width (both sides of a first, second or third order stream) of the proposed zones is 60 metres.
- 5-2 The proponent shall ensure that the travel route (road), river and stream reserves remain unharvested in perpetuity, except for those portions of regrowth forest within road zones where thinning can be undertaken in a manner consistent with, and so as to enhance in the longer term, the defined visual quality objectives.
- 5-3 The proponent shall monitor the effectiveness of the travel route (road) river and stream reserves for nature conservation and protection of water quality to the requirements of the Minister for the Environment.

Discussion

The EPA notes the Advisory Committee comment that the PCR states that CALM is in compliance with Condition 5-1 but that there is some community concern about the adequacy of protection of these zones from fire and the incursions of contractors.

It is also noted that the Department of Environmental Protection, in its submission on the PCR, has emphasised that the prescribed 60-metre reserves for streams should be considered as a minimum, in accordance with Condition 5-1. The Department has also pointed to the need for CALM to provide further information on how the reserves will "remain unharvested in perpetuity" except for those portions of regrowth forest where thinning is appropriate (Conditions 5-2) and to allow assessment of the monitoring program to ensure the adequacy of the reserves for nature conservation and water quality protection (Condition 5-3).

The EPA notes that buffer distances may vary depending on site characteristics and that in other ecosystems in the State (eg the Mount Lesueur area) widths of at least 400 metres are considered desirable to protect the corridor functions and to prevent degradation from weed incursions and other pressures.

The EPA has formed the view that CALM should provide the details of how Conditions 5-2 and 5-3 are to be implemented in the EMS referred to under Condition 1.

Conclusion on compliance

The EPA concludes that CALM has complied with Condition 5-1.

The EPA concludes that CALM has yet to demonstrate compliance with Condition 5-2 and 5-3 and has proposed actions to achieve compliance as soon as possible.

3.6 Environmental Condition 6 - Diverse ecotype conservation areas

6-1 Diverse Ecotype Conservation areas shall be identified by the proponent and those greater than five hectares shall be identified on publicly available maps.

6-2 The proponent shall ensure that the Diverse Ecotype Conservation areas remain protected from timber harvesting and associated activities in perpetuity.

Discussion

The EPA notes the advice of the Advisory Committee and comments in submissions.

Environmental Condition 6-2 requires CALM to protect these areas from forestry-related activities, including fire and roading. The implementation of detailed management guidelines for these Diverse Ecotype Conservation areas would substantially assist the protection of their biodiversity (Condition 6-2).

The EPA is of the view that detailed management guidelines to protect the biodiversity of Diverse Ecotype Conservation areas should be prepared and implemented as part of the EMS referred to under Condition 1.

Conclusion on compliance

The EPA concludes that CALM has complied with Condition 6-1.

The EPA concludes that CALM has yet to demonstrate compliance with Condition 6-2 and has proposed actions to overcome this to achieve compliance as soon as possible.

3.7 Environmental Condition 7 - Old growth karri areas of high social or environmental value

7-1 The proponent shall identify and protect areas of old growth karri (up to 3200 hectares) with a high aesthetic, social or environmental value. This is to be implemented on a regional basis and with the benefit of public involvement. These areas shall:

- (1) include those trees in Beavis, Carey and Giblett forest blocks protected from clearfelling by environmental conditions related to the Manjimup-Beenup power line proposal (EPA Bulletin 603);
- (2) be identified publicly and progressively from the adoption of the Management Plans, with the proponent reporting to the Minister on progress towards implementation within three years; and
- (3) shall not be harvested, and shall be managed to retain their values (other than timber production).

7-2 The proponent shall report on the implementation and management of these special areas at the next Forest Management Review.

Discussion

The EPA:

- Notes the advice of the Advisory Committee; and
- Notes that the Minister has agreed that the actions required under Condition 7 should be integrated into the RFA process.

Conclusion on compliance

The EPA notes that CALM has yet to comply with Condition 7-1 and 7-2. The EPA understands that this may occur through the RFA process.

3.8 Environmental Condition 8 - Sustainable yield estimates

- 8-1 The allocated timber resource for the period ending 30 June 1993, prior to the consideration by the Minister for the Environment of the report of the committee referred to in condition 1, will not exceed the 1993 level described in the 1987 Timber Strategy, together with an additional amount of the timber resource that was approved in the 1987 Timber Strategy but remained uncut. This additional amount may be allocated by the proponent, with the approval of the Minister for the Environment, on a needs basis, up to a total level not exceeding that proposed by the proponent in its 1992 proposals.
- 8-2 Following consideration of the report of the committee referred to in condition 2, the Minister for the Environment shall determine the annual sustainable timber resource available for allocation.

Discussion

CALM has developed forest inventory systems for jarrah and karri, including the establishment of some 650 growth plots in the jarrah forest which are set aside permanently and monitored. CALM has also developed models for the estimation of productivity of the forest to enable estimation of harvest yields.

The EPA notes in particular the following comments of the Advisory Committee in relation to sustainable yield estimates:

- The critical importance of the estimates of growth rate as an input to the models. The Scientific and Administrative Committee estimated that for jarrah, a yield of 450 000 m³/yr of 1st and 2nd grade saw logs was sustainable (Meagher, 1993). However, based on a more conservative figure for whole of forest growth, developed by CALM, which included *inter alia* "allowance for low productivity areas and dieback," an average forest growth rate of 1.2 plus or minus 0.2 m³/ha/yr was obtained. This figure leads to a sustainable yield of 298 000 plus or minus 50 000 m³ year. These estimates are based on a 33% recovery of 1st grade saw logs (Meagher, 1993).
- The response in August 1993 of the then Minister for the Environment to the Scientific and Administrative Committee Report accepted the advice from CALM and the Scientific and Administrative Committee that 'the long term non-declining yield of sawlog supply is likely to be around 300 000 m³/yr but may be as high as 450 000 m³/yr if utilisation rates increase', where utilisation rate is the ability to use a greater percentage of timber already felled. The then Minister approved a level of cut of 490 000 m³/yr for the period 1 January 1994 to 31 December, 2003 to provide sufficient time for industry restructuring to occur to accommodate a lower level of cut at the end of the ten years.
- The Public Consultation Paper (PCP), published earlier this year as part of the RFA process, states that the long-term non-declining yield of 1st and 2nd grade jarrah sawlogs is approximately 300 000 m³/yr. The PCP further states that, based on the CALM harvest prediction model FORSCHED, if the current level of cut is maintained beyond 2004, a substantial decline in sustainable yield is likely by the year 2030 (RFA, 1998b).

- CALM has recently advised that as a result of a major adjustment proceeding in the industry better conversion of useable product from the total tree bole volume felled will result. CALM also expects that the development of seasoned jarrah production by the mills would open up markets for dried jarrah. CALM sees this development as providing new opportunities for the production, marketing and use of smaller dimension timber and an approach that could make the present current sawlog specification irrelevant in future.
- The issue of sustainable forest yield is a very significant issue in the public debate on future forest allocation and management. While CALM has developed a sophisticated set of models to enable it to predict sustainable yield, they are mathematical models inherently dependent on a range of inputs and assumptions which may not accurately reflect the overall forest but rather the sampled forest. Since CALM's 1992 estimations of sustainable jarrah yield were made (CALM, 1992a), scientific review has highlighted the optimism of the yield forecasts and recommended lower, more conservative levels of sustainable jarrah harvesting. Comments by Turner (1998) and in the RFA Public Consultation Paper (RFA, 1998b) point to uncertainties related to CALM's yield predictions.
- CALM's annual reports indicate that the demand for 1st and 2nd grade has been below the approved jarrah cut. It is understood that the approved cut of 490 000 m³/ yr is an average over the period of the approved Forest Management Plans. Therefore, it would be possible, if the demand increased, for CALM to cut at a rate greater than 490 000 m³/ yr for the remainder of the period.
- The Scientific and Administrative Committee found that karri and marri were being harvested at a sustainable rate and that the harvest levels agreed with estimates of sustainable yield.
- As a result of the 1993 Scientific and Administrative Committee report, the then Minister for the Environment determined the harvest levels that would meet compliance with Conditions 8-1 and 8-2.

The EPA is concerned about the high cut level approved by the then Minister as it is not an environmentally sustainable figure. According to the CALM 1997-98 Annual Report (CALM, 1998) the actual cut in 1997-98 was significantly less than the approved figure.

The EPA:

- Notes the advice of the Advisory Committee;
- Notes that, in 1993, the then Minister approved a level of cut of 490 000 m³/ yr for the period 1 January 1994 to 31 December, 2003 to provide sufficient time for industry restructuring to occur to accommodate a lower level of cut at the end of the ten years; and
- Notes that the Scientific and Administrative Committee Report (Meagher, 1993) commented that there is an urgent need to get an accurate basis for the estimation of growth rate for jarrah. This need for better jarrah models to enable longer term predictive capacity has been reinforced by Turner (1998).

The EPA is of the view that, given the advice in the 1993 Scientific and Administrative Committee Report and the PCP that the sustainable jarrah cut is approximately 300 000m³/ yr (plus or minus 50 000m³/ yr), any shortfall from that harvested during the approved period should not be cut. Furthermore, the EPA is of the view that as industry has already been given 10 years in which to re-structure, it would be untenable for industry to expect any extension of the unsustainable cut level beyond the current 10 year period.

In addition, the EPA is of the view that a precautionary approach would be to substantially reduce the cut level as quickly as possible to a level in the order of 250 000m³/ yr (subject to this figure being shown to be sustainable in the long term), in accordance with the Meagher Committee Report findings that CALM's FORSCHED model predicted that a yield of "somewhere close to 250 000m³ of (jarrah) sawlogs would be sustainable in perpetuity" (Meagher, 1993, p.24).

The EPA is sufficiently concerned about the sustainable yield issue and the narrow focus of the models being used that it intends to initiate a review of the models. Furthermore, to enable

decision-making on multiple use forests to occur in an Ecologically Sustainable Forest Management (ESFM) framework more sophisticated models will be required.

The issue of sustainable yield and the models used to predict yield are covered more extensively in Section 4.3 of this Report and Recommendations 7 and 9 are relevant.

Conclusion on compliance

The EPA notes that the Minister has made determinations in accordance with Condition 8-1 and 8-2.

3.9 Environmental Condition 9 - Commitment of wood

9-1 Subject to condition 8, in the letting of contracts for wood supply from the jarrah forest, the proponent shall:

- (1) not exceed the annual levels of timber supply defined in condition 8 above; and
- (2) recognise the possibility of the necessity to reduce wood supply beyond 2002 as a result of monitoring and adaptive management following the trial implementation of the jarrah forest silvicultural prescription.

Discussion

The EPA notes the advice from the Advisory Committee and the information provided by CALM in the Progress and Compliance Report and in response to requests from the Advisory Committee.

The EPA has discussed its concerns in relation to the current and future sustainable harvest yields under Condition 8 above and also in Section 4 of this Report.

The EPA is of the view that it would be desirable for the maximum permissible timber harvest to be reduced as a matter of urgency.

Conclusion on compliance

The EPA concludes that CALM has complied with Condition 9-1(1).

The EPA is unable to determine compliance with Condition 9-1(2).

3.10 Environmental Condition 10 - Commitment of new resource to be referred

10-1 Notwithstanding Section 38 of the Environmental Protection Act, the proponent shall refer to the Environmental Protection Authority any proposal to enter into a contract for a substantial portion (as determined by the Minister for the Environment) of forest produce identified as other logs (jarrah) or forest residue (marri) in the revised Timber Strategy (Table 13 of the proposals document).

Discussion

The EPA notes the advice of the Advisory Committee. In particular, the EPA notes the advice that any use which could be made of forest residue should be encouraged, as its remaining or being disposed of on-site represents both wastage of resource and a potential problem for the future management of the forest.

The use of residue material may have implications for small mammals and other fauna in terms of loss of potential habitat and protection. Plans for extensive use of residue should take account of these consequences.

The EPA notes that at present there is no market for this product.

The EPA is of the view that any plans for extensive use of this residue should consider the habitat requirements of small mammals and other fauna.

Conclusion on compliance

The EPA concludes that CALM has complied with Condition 10-1.

3.11 Environmental Condition 11 - Jarrah silviculture trial

- 11-1 The proponent shall implement the jarrah silvicultural prescription so that monitoring of the environmental impacts on a representative range of treated sites and localities in the forest can be carried out to the requirements of the Minister for the Environment. This shall include long term monitoring which quantifies the impacts of silvicultural practices on environmental elements and values in the forest and provides bases to adjust management.
- 11-2 The proponent shall give all necessary assistance to the Monitoring and Research Committee (condition 16) to enable it to have an active and fully informed role in the planning and oversight of the scientific monitoring of this trial period.
- 11-3 The proponent shall report to the Minister for the Environment on outcomes of this implementation and monitoring and on any modifications to the prescriptions by 2002 as part of the next review of the Forest Management Plans and Timber Strategy.

Discussion

The EPA has noted the Advisory Committee comments and advice on the actions taken by CALM under this Condition. The EPA considers that CALM's response to the requirements of the Condition has been disappointing, to date. The work on the impact of the jarrah silvicultural trial on other environmental elements in the Kingston, Warrup and Winnejup forest blocks appears to have been of high quality. However, its narrow areal limitation has reduced the overall value, as Condition 11-1 requires work to be carried out on a representative range of treated sites and localities.

The PCR report states that funds were not available for work at more sites than those listed above but that further work will be commenced in 1998/99. The PCR also proposes that this delay has been an advantage because it has allowed for the mapping of both the spatial and temporal components of past timber harvest operations and the detailed map of vegetation carried out under the RFA process.

The EPA is of the view that a precautionary approach would have been to implement the new silvicultural prescription on a trial basis across a wide range of extensively monitored sites, in accordance with Condition 11 and the ASTEC principles and guidelines mentioned earlier (ASTEC, 1997).

The EPA is also disappointed that given the extensive nature of the field-scale trials, no information has been supplied in the PCR on the success or otherwise of regeneration of the forest following the implementation of these techniques on a range of forest types and areas. The EPA will be seeking further information from CALM on the programs that are being established to ensure that adequate information is available for decision-making and for CALM to achieve compliance by 2002. It will also be seeking ongoing reports up to the conclusion of the present plan.

Recent information provided by CALM in response to questions has been more reassuring in relation to harvesting through 'gap' creation, but information on 'shelterwood' has been insufficient for the EPA to form a judgement on performance, particularly in relation to judging success in regenerating shelterwood areas. It appears likely that soil types, climate and location will prove to be key elements in the regeneration of the forest under these new silvicultural prescriptions. This was anticipated by the EPA in 1992 and was a major reason for the Condition.

The EPA:

- Notes the advice of the Advisory Committee; and
- Considers that in the case of the silvicultural prescriptions which were introduced on an experimental basis in the current Forest Management Plans (FMP), the research program which has been undertaken is inadequate at this time.

The EPA recommends that the Minister notes Recommendations 6, 7, 8, 13 and 14 which are relevant to this Condition.

The EPA has provided additional material on this issue in Section 4 of this Report.

Conclusion on compliance

The EPA concludes that CALM has not complied with Condition 11-1 to the extent that the monitoring has only been carried out on one of the trial areas and has proposed actions to enable CALM to achieve compliance as soon as possible.

Conclusions on Condition 11-2 are covered under Condition 17 which deals specifically with the Forest Monitoring and Research Committee (FMRC).

CALM has until 2002 to comply with Condition 11-3.

3.12 Environmental Condition 12 - Phased logging

12-1 The proponent shall ensure that, in all second order catchments in the intermediate and low rainfall zones of the multiple use jarrah forest subject to logging, at least 30 per cent of each second order catchment has a retained basal area of greater than 15 m²/ha for a period of at least 15 years after harvesting of the remainder of the catchment.

12-2 This retained forest shall be selected to enhance wildlife, water resource and visual objectives.

12-3 The proponent shall monitor, to the requirements of the Minister for the Environment, and report by 2002 on the status and effectiveness of these measures to protect nature conservation values and water quality at the time of the next review of the Forest Management Plans and Timber Strategy.

Discussion

The EPA notes the Advisory Committee's advice in relation to compliance.

The EPA is of the view that CALM should provide advice on the results of monitoring and on any impacts on nature conservation values and water quality to the EPA.

Conclusion on compliance

The EPA concludes that CALM has complied with Condition 12-1 and 12-2 and has until 2002 to comply with Condition 12-3.

3.13 Environmental Condition 13 - Habitat trees

13-1 The proponent shall ensure that the number, condition and age of trees retained on sites subject to gap treatment is sufficient, as determined by the Minister for the Environment, to adequately provide the habitat function throughout the cutting cycle of the forest.

Discussion

The EPA notes the Advisory Committee comment and looks forward to the further advice likely to flow from work referred to in the PCR which will provide a basis for review of the current prescription.

When considering compliance with this Condition, the EPA noted that the Jarrah Silviculture Prescription provides for the retention of four habitat trees. However, the PCR makes no reference as to whether this aspect of the prescription has been approved by the Minister in accordance with the requirements of Condition 13.

Conclusion on compliance

The EPA concludes that CALM has not complied with Condition 13-1 in that the Minister's approval for the prescription has not have been obtained. However, CALM has advised that the current CALM guideline has been amended to retain four trees per hectare rather than three as previously.

3.14 Environmental Condition 14 - *Banksia grandis* reduction

14-1 The proponent shall concentrate the proposed reduction of the population of *Banksia grandis* in specific areas where the environmental circumstances suggest that treatment will have the greatest impact on reducing the spread and intensification of *Phytophthora cinnamomi* in the jarrah forest and where required to establish jarrah and marri regeneration.

14-2 The proponent shall establish a programme, to the requirements of the Minister for the Environment, to identify and evaluate the environmental implications of the proposed reduction and that the results of that evaluation shall be reported on, at or before the time of the next review of the Forest Management Plans by 2002.

Discussion

The EPA notes the Advisory Committee comment and advice, that CALM has not implemented the requirements of Conditions 14-1 and 14-2 and that CALM will focus on the recommendations of the Dieback Review Panel as a basis for future dieback management.

The EPA supports the shift in dieback management away from targeting the removal of *Banksia grandis* because the effects on the forest and on flora and fauna of doing so are not known.

The Advisory Committee has suggested that this Condition should be removed.

Although the EPA is of the view that a revised dieback programme may be appropriate, it does not believe that there is a need to delete the Condition at this time and the EPA considers that the environmental implications of removal of *Banksia grandis* and other forest understorey species in silvicultural treatments should be evaluated within the context of the jarrah silvicultural trial.

The EPA is of the view that CALM should develop, through a publicly transparent process, improved programmes to minimise the spread of *Phytophthora cinnamomi*.

Conclusion on compliance

The EPA notes that CALM has not implemented this programme of *Banksia grandis* reduction. The EPA has formed the view that this may have been appropriate action.

3.15 Environmental Condition 15 - Fire management

15-1 The proponent shall ensure that the fire management objectives related to the jarrah forest silvicultural prescription include the minimisation of air pollution in urban areas, to the requirements of the Minister for the Environment.

- 15-2 The proponent shall inform the public about its fire management on a regional basis each year in its annual report. This shall include but not be limited to the following:
- (1) occurrences and causes of wildfires;
 - (2) purposes of burns;
 - (3) areas burnt under different regimes of season and periodicity;
 - (4) escapes; and
 - (5) the contribution of prescribed burning to reducing wildfire hazard.
- 15-3 Within 12 months of this proposal being given authority to be implemented the proponent shall initiate a public review of its prescribed burning policy and practices and the wildfire threat analysis. This should be done with the close involvement of the Research and Monitoring Committee. If possible it should be linked with a review of the provisions of the Bush Fires Act.

Discussion

The EPA notes the Advisory Committee advice and notes that the review carried out under Condition 15-3 (Fire Review Panel, 1994) appears not to have included any involvement of the Forest Research and Monitoring Committee as required by the Condition.

Conclusion on compliance

The EPA concludes that CALM has complied with Condition 15-1 and 15-2.

The EPA concludes that CALM may not have complied fully with the intent of Condition 15-3.

3.16 Environmental Condition 16 - High salt risk catchments

- 16-1 Within three years, or such other period as the Minister for the Environment shall nominate, the proponent, on advice from the Water Authority of Western Australia, shall identify second order catchments with a high salt risk.
- 16-2 Within each catchment identified according to the requirements of condition 16-1, the proponent shall retain additional river and stream buffers and locate areas temporarily reserved during phased logging operations to the requirements of the Water Authority of Western Australia

Discussion

The EPA notes the Advisory Committee comment.

The EPA is of the view that the management prescriptions in high salt risk catchments should be reviewed by CALM and the Water and Rivers Commission and Water Corporation in the light of current knowledge and experience, and taking into account riparian water use.

Conclusion on compliance

The EPA concludes that CALM has complied with Conditions 16-1 and 16-2.

3.17 Environmental Condition 17 - Forest Monitoring and Research Committee

- 17-1 The Minister for the Environment will set up a committee having objectives which include:
- (1) identification, prioritisation and approval of monitoring and research programmes and projects on environmental impacts of forestry management,
 - (2) the granting of funds towards such monitoring and research,

- (3) receipt of progress reports,
 - (4) reporting to the Minister for the Environment and
 - (5) publication of results.
- 17-2 The Committee shall include the heads (or nominees) of the Department of Conservation and Land Management, the Environmental Protection Authority, the Western Australian Forest Industries Federation, the Conservation Council and the Water Authority of Western Australia, and the Chairpersons of the Land and Forests Commission and the National Parks and Nature Conservation Authority.
- 17-3 The Committee shall appoint working groups of scientists to recommend and report to the Committee on the design and funding of research projects, the identification, prioritisation and review of monitoring and research programmes and projects relating to the environmental impacts of forest management.
- 17-4 The Committee shall provide brief annual progress reports to the Minister for the Environment, with major reports in 1997 and 2002, at the time of the next review of the Forest Management Plans and Timber Strategy.

Discussion

The EPA has considered its advice from 1992 whereby the EPA recommended that the FMRC should provide brief annual reports to the Authority with major reports in 1997 and 2002 (Recommendation 14 of EPA, 1992, p.51) and notes that this intent was not reflected in the above Condition. The EPA notes the comments of the Advisory Committee relating to the operation of the Forest Monitoring and Research Committee.

The EPA is of the view that:

- The FMRC has not functioned in the manner that was intended nor in a manner which enables it to meet its objectives. The Minister should ensure that the Committee establishes processes which enable it to undertake its responsibilities in accordance with Condition 17 and is supported by CALM in a manner which enables it to operate according to its objectives. This could be better achieved by adopting the recommendations from the EPA's 1992 assessment.
- There is a need for research and monitoring in the field in the area of forest management to be focused on high priority issues identified by the FMRC, on the advice of expert panels, as envisaged in Condition 17;
- The role and activity of the FMRC needs to be raised significantly, so that it can undertake its responsibilities. This requires sufficient funding, not only for its own functioning, but also to utilise the mechanism of appointing advisory groups of scientists and the granting of funds for research. As previously recommended (EPA, 1992), the allocation of a particular percentage from royalties for research would be an appropriate way to provide the funds;
- The current funding allocated by CALM to non-salary (operational) functions from the CALM research budget would suggest that it will be difficult to achieve an effective level of field research and monitoring. It should be a matter of highest priority to address this situation; and
- The FMRC should report to the Minister for the Environment through the EPA as recommended in the EPA's 1992 assessment.

The FMRC is discussed further in Section 4 of this Report. Recommendations 10, 11 and 12 also apply.

Conclusion on compliance

The EPA concludes that Condition 17-1, 17-2 and 17-3 have been complied with to some extent, recognising that the FMRC has not been able to function in the manner that was intended by the EPA (EPA, 1992) and has been unable to operate to meet its objectives .

The EPA concludes that Condition 17-4 has not been fully complied with. The Condition states that the FMRC is required to report to the Minister for the Environment annually. CALM's PCR reports that the first report was for the year 1993-94 and then the FMCR decided to report on a calendar year basis as the first meeting was held in December. Reports for the 12-month periods to December, 1995 and December, 1997 have recently been forwarded to the Minister. No meetings were held in 1996.

3.18 Environmental Condition 18 - Progress and Compliance Reports

18-1 The proponent shall prepare "Progress and Compliance Reports" to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority. These shall include brief annual progress reports to the Environmental Protection Authority, and major public reports in 1997 and 2002.

Discussion

The EPA notes that CALM has provided a Progress and Compliance Report and has provided "brief annual progress reports" in accordance with the requirements of this Condition.

Conclusion on compliance

The EPA concludes that CALM has complied with Condition 18-1.

4. Advice to Assist the Minister in Relation to the Development of the RFA and Forest Management

The EPA and the public expects a high standard of management of projects and continuous improvement in environmental performance from all proponents.

The RFA will be a significant long-term strategic document which will provide a framework for conservation and exploitation of forests in Western Australia for the next 20 years. Continuous improvement in environmental performance will be an integral part of the successful implementation of the RFA.

In preparing this advice in Section 4, the EPA is mindful of public expectations of the ongoing role of the EPA in forests assessments and environmental performance within the context of understanding and encouraging ecologically sustainable forest management.

4.1 The Regional Forest Agreement Process

Recognising the EPA's ongoing statutory responsibilities in relation to environmental aspects of forest management and performance, as well as public expectations of the EPA in this area, the EPA endorses the broad objectives of the RFA which are:

- to identify areas in the South West forest region which both Western Australian and Commonwealth Governments believe are required for the establishment of a comprehensive, adequate and representative forest reserve system, and provide for the conservation of those areas;
- to provide for ecologically sustainable management and use of forested areas in the region; and
- to provide for the long-term stability of land use decisions for the forest and forest-based industries (RFA, 1998b).

The changes agreed under the terms of an RFA may supersede the current Forest Management Plans and related Environmental Conditions, because the RFA is likely to result in changes to the current Forest Management Plans. Modifications to the current plan, or a new plan, would require referral to the EPA. The statements and recommendations made by the EPA in this Report, and in Section 7 of the Advisory Committee report, provide contributions to assist in the achievement of ecologically sustainable forest management in WA.

The EPA provides the advice in the following Sections as a contribution to the development of the Regional Forest Agreement for Western Australia.

As stated earlier in this Report, because of the RFA process there is uncertainty over the forest development and management scenario that will result. To ensure that appropriate advice on the resultant scenario can be provided by the EPA, the Authority will be providing specific advice on some matters raised in this Report in a subsequent report to be prepared after resolution of the RFA process, or by the end of April 1999 (see Recommendations 6 and 7).

4.2 Forest Monitoring and Research

4.2.1 Research

CALM's responsibilities extend from production forestry to the management of endangered flora and fauna. CALM is also heavily involved in the development of tree plantations on farmland as sources of wood chips and timber. Its forest production responsibilities are carried out in an area covering many diverse forest ecosystems which have developed on the different soil types, positions in the landscape, and range of climate zones throughout the South West of WA.

Thirty different forest ecosystems were identified within the forest estate of WA through the RFA process (Bradshaw and Mattiske, 1997). This complex of forest ecosystems is affected to

a greater or lesser extent by a number of pressures, including introduced diseases, weeds, and predators.

Management of this complexity and diversity requires the development of knowledge soundly based on research and monitoring which gives both policy makers and operational staff access to the best available information. There is also a need for a flexible management approach capable of adjusting to changed circumstances and new information.

The EPA considers it essential that CALM has a well funded, managed and focused program of applied research covering its activities. Appropriately targeted and conducted research, with the findings of research being fed back into the forest management system should form the basis for the development of future management policy and is pivotal to the achievement of the multiple objectives required of forest management in WA.

The Advisory Committee report and reviews of the effects of forest disturbance on forest ecosystems prepared for the RFA have identified a number of areas where a greater research emphasis is needed. These include:

- study of the outcomes of the changes in silvicultural prescriptions across the full range of situations in which they are being applied;
- long-term productivity and sustainability of the native hardwood forests in the lower rainfall zone and poorer soils of the southern forests (and in the intermediate and low rainfall zone) where the jarrah silvicultural prescriptions are being applied;
- work on jarrah silviculture in the area south of the Preston River which is the main source of all logs harvested at present. To date, the Northern Jarrah Forest has been the focus of most work as is apparent from the reviews by Abbott and Loneragan (1986) and Shearer and Tippett (1989) but greater research emphasis is required in the Southern Jarrah Forests;
- ecological work on the impact of management practices on forest ecosystems rather than on individual species;
- more extensive application of the work on disturbance ecology in selected areas of the forests (such as the area selected for the Kingston Project) to test the wider applicability of the work. The WA Museum report on natural science for the RFA (WA Museum of Natural Science, 1998) refers to deficiencies in the availability of site-specific fauna data which have shown the effects of some disturbances on subject fauna to be minimal;
- the need to develop research programs on indicator or keystone species which may be utilised to monitor functions, processes and condition of ecosystems;
- the effect of fire of different intensities and frequencies on the survival of species and ecosystems in the forests;
- the effect of fire on different fauna species;
- the identification of indicator species which can be used to show when an area is susceptible to fire;
- study of the epidemiology of dieback in the southern forests;
- sensitivity of the forest to fire at different stages of regeneration; and
- nutrient fluxes in soils, particularly the naturally low fertility and duplex soils.

Many of the research needs identified earlier by the EPA in 1992 continue to warrant further investigation (EPA, 1992).

The EPA reaffirms its view of 1992 that:

"...the community is expecting CALM to provide answers to a wide range of complex questions. Even though its research effort is significant and its research staff have considerable expertise, there is a need for greater effort to be applied to these issues. The Government needs to recognise the concerns of the community and enable CALM, as forest manager with prime responsibility for research in the forest, to carry out the necessary monitoring and research. Much of it is long term and therefore requires suitable commitment and funding and needs to be independently programmed and reviewed and available to the public."

"An integral part of the process of accountability and review relates to the need to monitor outcomes, to make conclusions based on those outcomes and for resultant decisions to be subject to scrutiny".

In addition, the EPA is of the view that the construction of conceptual models of the forest ecologies and relevant research are key aspects of the development of models that can facilitate decision-making in an ESFM framework.

The EPA has been informed by the Advisory Committee that the information available has not enabled it to fully determine the current level and adequacy of research being carried out in the various areas related to forest production and the growth of regenerating forests.

However, it was noted that the 1993 to 1995 Triennial Report for the CALM Science and Information Division states that there has been a steady decline in funding reflecting successive cuts in public sector finances. Also there has been a sharp increase in the percentage of research funding being spent on salaries, to the point where this has now reached around 94% of the research expenditure. It is stated that this change, coupled with rising infrastructure costs, has resulted in the funds available for operational activities, such as field work, falling sharply. In other natural resource sector research organisations, such as the CSIRO, there would be concern if the amount of the research budget being spent on salaries reached a figure above 70 percent.

The report also states that there has been a sharp rise in externally-generated funding (eg sources such as the Natural Heritage Trust). However, the majority of this funding appears to come from organisations with narrow funding criteria which would not permit use of the funds to support research associated with forest production activities, including native forest regeneration, management and resource productivity.

It is noted that Podger, in the report on the Review of Dieback (Dieback Review Panel, 1996), also commented on the high percentage of funds committed to salaries within the research budget of CALM.

The EPA is concerned about the high percentage of the research budget being used to fund salaries and is of the view that the proportion should be significantly changed to a figure closer to 70% salaries and 30% operational. The EPA believes that this issue is of sufficient importance because of long-term and inter-generational equity issues that, if necessary, the Government should make additional funds available from Treasury to secure the interests of the public and the environment in the long term.

The EPA re-emphasises its view that as much research as possible should be published, either in CALM's own publicly-distributed documents or in refereed journals of National standing. Apart from publication increasing the value of the research to the community, it achieves recognition for the organisation and the research workers and provides a measure of the quality of the work. It also serves as a method of informing interested parties and the public of the issues involved.

4.2.2 Monitoring

Monitoring of outcomes of forest management and the influence of natural events and variation on forest productivity is vital for effective management and long-term decision-making. The RFA Ecologically Sustainable Forest Management (ESFM) Report and Public Consultation Paper have identified monitoring, reporting and accreditation as essential elements of the RFA process (IEAG, 1997; RFA, 1998b)

The EPA continues to be of the view that monitoring of the outcomes of forest management should be carried out over a wide range of sites and locations throughout the forest, representative of a broad range of forest types, and that it is important that results of monitoring be available in the public domain. As with research, the results of monitoring increase in value considerably when they can be read and understood by the public and other interested parties; particularly professionals working in the same field. Wherever practicable, the public should be directly involved in participating in research and monitoring in the field.

It is important that monitoring be undertaken in a consistent manner and over an adequate timeframe and that observations are recorded in a manner that is readily accessible to all those involved in research and operational activities. Research and monitoring results need to become

available as quickly as possible so that they can be built into management decision-making and are available to facilitate timely reviews.

Long-term monitoring requires commitment by the organisation and by Government to ensure that adequate time-series data can be collected and analysed for trends. It should be noted that for some of the monitoring required, CALM is dependent upon other organisations and Government. For example, the Water and Rivers Commission is responsible for the State's streamflow data, and multiple organisations (both State and Commonwealth) for climate change monitoring.

4.2.3 Research Funding and Organisation

The EPA has emphasised the importance of research and monitoring over the last decade. In 1992 it recommended that a Forest Monitoring and Research Committee (FMRC) be formed with a broad range of functions and a membership to be drawn from organisations with a strong research background. This was reflected in the Minister's Environmental Condition 17.

The EPA comments on CALM's lack of progress with the intent of Condition 17 are addressed elsewhere in this Report.

It is now urgent that this issue be addressed in a positive manner. It is apparent that an arrangement whereby the FMRC operated 'within CALM' has not worked in the best interests of CALM or the public. It appears from the lack of activity by members that a Committee composed of members who are there as representatives of organisations is also not a satisfactory arrangement. It is essential that the Committee has adequate funding to carry out its functions independently, including the appointment of expert groups to provide advice on specific issues, and to independently fund research contracted by it to researchers within CALM or other organisations.

The EPA is of the view that:

- 1) It would be appropriate for the FMRC to be established as an independently funded committee. This would provide CALM with increased protection against public criticism, as well as allowing independent review of research priorities. The terms of reference of a changed FMRC should include (but not be limited to):
 - determining strategic directions for forest research;
 - identifying and prioritising research programs;
 - ensuring long-term monitoring programmes;
 - obtaining independent funds for research;
 - granting funds for research;
 - appointing advisory groups of scientists and others to advise it on specific issues; and
 - appointing or contracting from other organisations such staff as are needed to fulfil its requirements.
- 2) the FMRC be funded by a fixed percentage of funds raised as part of the royalty on timber, as well as being able to apply for funds from elsewhere on a competitive basis.
- 3) the FMRC to consist of an independent Chairperson and up to five independent members having skills in science or science administration, plus the head of the Science Division of CALM. The members should be appointed by the Minister on the recommendation of the Chairperson.

Recommendations 9, 10, 11, and 12 are relevant to research and monitoring and the Forest Monitoring and Research Committee. EPA may report further on these matters in its subsequent report.

4.3 Maintenance of Productive Capacity of Forest Ecosystems

4.3.1 Determination of Sustainable Harvest Levels.

The EPA recognises the establishment of sustainable yield as being fundamental to the future environmental condition of the South West forests and to the forest industry. In terms of environmental performance, the accuracy of the estimates of growth, the yield and quality of the timber produced and the quality of the environment re-established within the regenerating forest are the key parameters requiring continuous monitoring and refinement. While there is a significant amount of information available based on past practices, most of the areas which have been extensively harvested in the past have been in the higher-yielding forest in the Northern Jarrah Forests, and the impact of the current silvicultural practices on these parameters remain to be determined, particularly in the southern forests.

It is expected that the average size of logs available to the industry will decrease over the next 20 years. The reservation of increased areas of old growth forest and high-yielding forest under the RFA could reduce the availability of larger logs. This could impact on the sustainable yield of the forest unless technology changes to enable the handling of smaller log sizes and enhanced utilisation of timber.

The EPA view is that in committing timber supplies, conservative estimates should be used to ensure that supplies of timber, as well as environmental outcomes, are not compromised in the long term. Management options and the application of the Precautionary Principle should not be precluded by the over-commitment of the resource to satisfy the demands of contract requirements or revenue generation in the short term.

The EPA is aware that the current permitted harvest volume of jarrah sawlogs approved by Government (which is based on the current specification of 1st and 2nd grade sawlogs), exceeds the long-term non-declining level as estimated from CALM's forest yield predictions. This is expected to lead to a substantial overall reduction in the yield of sawlogs of the current specification and may result in a substantial reduction in the overall mean age of trees in the South West forests within the next 30 years, unless the permitted volume harvested reduces after 2003 or economic conditions limit the market for jarrah sawlogs (RFA, 1998b).

A review of the data and methods used to calculate the sustainable yields set by Minister Minson (on behalf of Government) in the Ministerial Statement of 1993 was conducted as part of the RFA process. The RFA public consultation paper stated:

"A review of the data and methods used to calculate these sustainable yields was conducted as part of the Comprehensive Regional Assessment. This included examination of CALM's timber scheduling program (FORSCHED) for the determination of long-term sustainable yield. As noted in the Meagher Report, under current log specifications, harvesting practices and conversion technologies, the long-term non-declining level of 1st and 2nd grade jarrah sawlogs is approximately 300 000 m³/yr." (RFA, 1998b)

The recent report of the Standing Committee on Ecologically Sustainable Development stated that:

"Dr Martin Rayner of CALM confirmed to the Committee that 300 000m³/yr is the best available projection. It should also be noted that the Meagher Committee in 1993 reported that CALM's FORSCHED model predicted that a yield per year of "somewhere close to 250 000m³ of (jarrah) sawlogs would be sustainable in perpetuity" (Parliament of WA, 1998, p.76).

The EPA considers that there is a need to be conservative in setting yield levels. These need to give full attention to the State's commitment through the IGAE to apply the Precautionary Principle and take into account the potential negative influences on forest yield and impacts on forest ecosystems. The EPA notes that the high quality sawlog and 1st grade sawlog production from Crown Land for 1997-98 was 304 139 m³ (CALM, 1998, p.20) and for jarrah sawlogs (including veneer) was 376 454 m³ (CALM, 1998, p.23) CALM has also advised that the total volume of 1st and 2nd grade sawlogs for 1997 was 420 874 m³. Although these figures are less than the "approved" level of up to 490 000 m³/yr, they are still of concern to the EPA (see Condition 8 and Sections 4.3.2 and 4.3.3). The EPA is of the view that EPA and a re-

structured Lands and Forest Commission have legitimate roles to play in providing advice to the Minister to assist in the determination of sustainable harvest levels according to the principles of Ecologically Sustainable Forest Management (ESFM) and the Precautionary Principle.

The figure of 490 000m³ /yr set by Minister Minson for jarrah sawlogs is not regarded by the EPA as being sustainable and should be substantially reduced as quickly as possible to a level in the order of 250 000 m³ /yr, subject to this figure being shown to be sustainable in the long term, consistent with the application of the Precautionary Principle.

Approved yield levels should be based on the regulation of forest yield derived from appropriately developed ecosystem modelling that allows for multiple use decision-making within an ESFM framework. To achieve this, the EPA has the intention of initiating and coordinating a committee of specialists to provide it with expert advice on the current models used for yield estimation as well as to advise on appropriate models to allow for sound multiple use decision-making within an ESFM framework. The EPA is desirous that this be carried out in a co-operative manner with CALM to achieve positive outcomes. This is dealt with further in Section 4.3.2 and EPA Recommendations 13 (c), (d), and (e) relate to the issues of timber yield and the models.

The EPA has noted that changes to the terms and definitions used to define forest policy and to regulate yield are difficult for the public in general, and for non-forest professionals, to understand in terms of the consequences of those re-definitions. In addition, the terminology and the way that data are presented in CALM's Annual Reports makes it difficult for the public (and others) to understand fully the changes to forest management that are occurring, including:

- definition of timber use type versus whole bole;
- use of the terms "high quality sawlogs" and "1st grade sawlogs" when other publications use "1st and 2nd grade sawlogs";
- the inclusion of veneer into "sawlog" figures; and
- the amount of various types of timber taken from Crown land versus private land.

The EPA is of the view that it is important to assist the public in their understanding of forest issues. Public understanding of the concept of sustainability in relation to harvest levels would be greatly assisted by consistent use and application of the terms and definitions used in forestry language. Where possible, terms and definitions should be explained fully in everyday language and by consistent reporting in Annual Reports. Changes to terminology used should not be made frequently and where changed to reflect developments in management, should be fully and accountably justified. For example, the implications of the change from regulation of forest harvest levels based on 1st and 2nd grade sawlogs to "whole bole volume" is not well understood or accepted by many members of the public and has not been adequately explained in terms of the impact of current harvest levels on the spatial and temporal distribution of the various forest age classes. The change to whole bole volume will have a significant effect on the appearance of the forest which the public needs to understand. The EPA believes that many members of the general public would prefer to know what proportion of the various forest age classes (0-50 years old, 50-100, 100-150 etc) will exist now and in the future and how these will be distributed by forest region. Statements such as "*the structural goal for the jarrah forest is to maintain the existing distribution of size classes in a multi aged structure.*" (CALM, 1992a) do little to assist understanding in the public domain.

4.3.2 Forest Yield Estimation.

Dr Brian Turner, in his study of the methods used to estimate wood yields in the South West of WA (Turner, 1998), identified the following as the key components of the system used by CALM to estimate sustainable yield:

- land information;
- inventory;
- growth and yield projections;
- harvest scheduling; and
- yield regulation.

Dr Turner found that all systems dealing with land information were well managed.

The inventory for both jarrah and karri was based on two different measures but was regarded by Dr Turner as being effective, particularly the practice of measuring wood harvest from plots on which the yield had been estimated previously. This has shown an over-estimate of only 6% on the 1991 assessment of the jarrah inventory.

However, Dr Turner considered that the critical component for yield regulation was the estimation of growth and the projections of that growth. CALM maintains over 1000 permanent sample plots, a few dating back to 1916, which are measured every three to ten years. Some 650 growth plots have been established in the jarrah forest.

Dr Turner identified a shortage of growth plots representing current jarrah silvicultural regimes but he concluded that, provided the system of plots is properly maintained and augmented in the future as the regrowth estate increases, future growth modelling utilising data input from the plots should be adequate.

Dr Turner reported that the jarrah modelling has used a matrix approach which he regarded as 'not very robust' for long-term forest harvest level predictions and he considered that the development of strategic-level growth models for jarrah was a high priority. In his overall analysis he concluded that "*jarrah growth estimation in the short term is fairly reliable, but in the long term, less so, with the current modelling approaches*" (Turner, 1998, p.10).

Dr Turner regarded the karri models being used, as being satisfactory, stating that "*karri growth is reliably estimated except for low site quality and mixed stands*" (Turner, 1998, p.10) and only requiring modification if silvicultural practice changes significantly.

However, the EPA considers that the current modelling of forest growth, focused as it is on estimations of timber yield from a few high productivity areas rather than reflecting more variation in growth rates to take account of soil, climate and nutrient differences, is an approach that can be misleading, as it does not deal with the complexities of a biological system spread over a range of climatic and environmental conditions. The sensitivity of model predictions to linkages and changes within ecosystems is important. Some of the factors which can result in variations include:

- changes in soil productivity;
- harvest and post-harvest treatment of logged areas;
- rate of development of regeneration;
- disease spread or intensification;
- insect and fungal damage;
- frost;
- waterlogging;
- short-term (tens of years) climatic shifts, especially rainfall;
- long-term climate change; and
- the interactions and linkages between parts of ecosystems.

The EPA is of the view that there is a need to develop a system of yield regulation based on yield predictions derived directly from conceptual models of forest ecosystem function based on the principles of multiple use and ecologically sustainable forest management. Models should be developed which allow decision-making within an ESFM framework as the objective. These matters may be dealt with in a subsequent report.

4.3.3 The Impact of the New Jarrah Silvicultural Prescriptions

There has been detailed discussion of the issue of the application of silvicultural prescriptions to sustainability and forest yield in the Section of this Report dealing with the Environmental Conditions and in the Advisory Committee report. It is not the intention to deal with these issues further in this Report, other than to summarise the main points.

According to the CALM document *Silvicultural Guidelines 1/95* (Appendix 1 of the PCR), the shelterwood treatment is applied to areas of forest in which there is an insufficient density of 'potential crop trees' to permit thinning and in which pre-logging surveys have indicated a paucity of established lignotubers available for release by logging. In these areas jarrah trees are marked for retention resulting in a reduced density overstorey composed of trees selected as a seed source for natural establishment of seedlings.

Information provided in CALM annual reports on the extent of application of silvicultural treatments indicates that there are significantly greater areas of forest being harvested using the shelterwood prescription than was predicted at the time of the EPA's 1992 assessment. As much of this forest appears to be in areas of lower yield than those previously harvested, monitoring and assessment of the establishment of seedlings, and their development into ground coppice and saplings, is important. This is reinforced by the fact that the application of the shelterwood treatment over a more extensive area than predicted, means that a greater proportion of the forest is being affected by logging in a given time.

This may affect productivity, and depending on the quality of the regeneration, it may therefore be necessary to discount or reduce the growth estimates for shelterwood and gap areas, based on conservative estimates and regular data input from growth plot measurements. The overall estimate of sustained yield may need to be reviewed in response to this as well as a review of the data and assumptions used to develop the model and update yield estimates.

The EPA has provided further advice relating to these issues in the Sections of this report dealing with Environmental Conditions 2, 8 and 11.

The EPA is of the view that more work is needed to develop or adapt forest management systems to ensure that silvicultural prescriptions can be applied in a more flexible and adaptive manner to take account of variations in forest type and site conditions, such as landform, vegetation, slope, climate and other factors.

4.3.4 Alternative Timber Processing

The stated intent of the Hon Kevin Minson's 1993 Ministerial Statement was for there to be greater utilisation of the total harvested timber resource to cater for the anticipated reduction in the supply of 1st and 2nd grade sawlogs from the current level of 490 000 m³ /yr to 300 000 m³/yr in 2003 (Minister for the Environment, 1993). CALM has stated that changes in the industry are such that a greater focus on value-added production will allow the use of smaller and lower quality timber from trees which are cut down for other purposes, parts of which are not currently being utilised. CALM has stated that this is enabling the industry to move rapidly toward the objective of utilising the maximum possible proportion of each tree felled, (commonly referred to as 'whole bole logging') and that this has made regulation of log harvest levels according to availability of 1st and 2nd grade logs inappropriate.

However, the published data do not show that there has been much progress toward full utilisation of trees felled, apart from the extensive adoption of kiln drying to improve the value of the material which is currently harvested. There has not been a major uptake of lower grade logs by industry and data collated from CALM Annual Reports indicates that the extent of utilisation of lower grade logs has declined since 1992. The EPA notes that CALM is currently exceeding the target for value-adding for sawn jarrah of 50% stipulated in CALM's jarrah sawlog sale contracts, achieving a level of 63% (including kiln-dried jarrah) in the 1997-98 year (CALM, 1998).

The ability of the Industry to utilise poorer grade timber may be a matter of re-structuring and economics. It is not known whether the trials of whole bole logging which have been carried out have yielded a sufficiently high percentage recovery to justify widespread implementation of whole bole logging. Also, in recent evidence to the Parliamentary Standing Committee on Ecologically Sustainable Development Mr Cam Kneen of the Forest Industry Federation (WA) stated inter alia that "... *early indications from the trials are that we are just transferring a waste product from the forest to the mill at fairly great expense*" (Parliament of WA, 1998, p.78).

It is the EPA's view that improved utilisation of trees and logs may not result in sufficiently reduced demand for 1st and 2nd grade sawlogs to permit a smooth transition to a reduced harvest level of 1st and 2nd grade logs. The EPA therefore reiterates its view that on the basis

of the current evidence, a conservative approach should be taken to setting the annual level of timber supply from the earliest possible date and that extending the current cut level of 490 000 m³/yr beyond the 10-year period should not occur.

4.4 Institutional Arrangements for Ecologically Sustainable Forest Management

4.4.1 Significant Initiatives Affecting Forest Management and Assessment since 1992

Since the EPA's 1992 assessment there have been significant International and National developments which have a bearing on the environmental aspects of forest management. In addition there have been organisational changes within both CALM and the EPA.

Relevant International and National Developments

In 1992, Australia became a signatory to two important international protocols, namely the Rio Declaration and Agenda 21. Both of these resulted from the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro. These led to Australian State Governments (including Western Australia) developing and becoming signatories to Australia's first National Strategy for Ecologically Sustainable Development (Commonwealth of Australia, 1992b) and the InterGovernmental Agreement on the Environment (Commonwealth of Australia, 1992a). Also in 1992, Western Australia became a signatory to the National Forest Policy Statement (Commonwealth of Australia, 1992c) which makes provision for the sustainable management of Australia's forests, taking account of the concept of Ecologically Sustainable Forest Management, and to the InterGovernmental Agreement of the Environment (IGAE).

In 1996 the State Government became a signatory to The National Strategy for the Conservation of Australia's Biodiversity (Commonwealth of Australia, 1996) which adopted nine principles for the development of objectives and actions.

These International and National agreements are of considerable relevance to the environmental and biodiversity protection aspects of forest activities and to the environmental assessment of forest development and management within a framework of Ecologically Sustainable Forest Management and will be used by the EPA as a basis for future assessments of performance in relation to forest management and compliance.

In addition, in 1991, the Resource Assessment Commission (RAC) carried out a detailed examination of forestry in Australia (RAC, 1991). The National State of the Environment process has also given rise to the development of core environmental indicators for reporting on the State of the Environment (ANZECC, 1998).

The Montreal Process

The seventh internationally agreed Montreal Process Criterion for the Assessment of ESFM entitled "Legal, institutional and economic framework for forest conservation and sustainable management" (MIG, 1997; CFS, 1995) was not used explicitly by the RFA process to assess systems of forest management in WA. This criterion was given some attention by the Independent Expert Advisory Group (IEAG) in its report. However, the analysis of organisational issues by the IEAG was restricted mainly to considerations within the current disposition of management agencies, rather than to the broader issues which might lead to the need for Government to consider the need for agency re-structuring. Some of these broader issues are covered in brief by the EPA in Section 4.4.2 of this Report.

Relevant Changes to the Environmental Protection Act since 1992

Since 1992, the roles of Chairman of the Environmental Protection Authority and Chief Executive Officer of the Government's environmental agency (renamed the Department of

Environmental Protection) have been separated. This clarifies the independence of the EPA from direction by Government as to the advice that it gives, as well as providing a Department structure subject to Ministerial direction.

Additional changes have delegated the function of auditing compliance with the Environmental Conditions in the Ministerial Statement, on behalf of the Minister, to the Chief Executive Officer of the DEP for most projects. However, in the case of the Ministerial Statement of 1992 relating to CALM's Forest Management Plans, it is still the EPA that has this responsibility.

Relevant Organisational Changes within CALM

Since 1992 there have been significant changes within the organisation of CALM which have the potential to have varying degrees of impact on the approach to and funding of forest management and research (source CALM Annual Reports). The key changes include:

- a move to a system of "net appropriation", whereby CALM has moved from being funded by Government from central revenue, to a position of funding more of its activities from royalties collected from the sale of timber;
- the introduction of business units and specialist service sub-agencies within CALM such as the Forest Resources Business Units and CALMfire; and
- introduction of debt-reduction strategies, whereby money collected from royalties can be used to "retire" debt.

These changes mean that there are now multiple demands being made on the royalties being collected from timber harvesting and money so collected can now be applied across a wide range of activities including conservation, which are beyond those required strictly for sustainable timber production and management and associated research. The changes also mean that various sub-agencies within CALM carry significant responsibility for the Department's operating revenue and for accessing the possible expenditure on forest management. However, the focus of the units is narrowed and the ability to balance conflicting management objectives has been reduced by this move away from a more integrated approach.

The drive to agency self funding can have significant consequences, particularly where income from royalties earned in one sector can then be applied to other non-income, or lower income generating areas. One of the consequences can be that funds available to ensure that proper resource management can be carried out over the long term are no longer available. This is a particular risk where ecosystem recovery and regeneration timeframes in the order of 100 to 150 years are involved. It can also accentuate perceptions of "conflict of interest" between the various functional arms of an organisation, where an income generating area may be regarded as being "over-exploited" to maximise income generation in the short term, perhaps even jeopardising the ability of the income generating sector in the long term. The issue here is the perception of long-term risk and "conflict of interest" that this funding approach generates rather than whether or not a problem actually exists. Perceptions of "conflict of interest" have been a significant force in the re-structuring of other natural resource sectors. This matter is discussed in further detail in Section 4.4.2.

4.4.2 The Structure of CALM and the Controlling Bodies Under The CALM Act in Relation to Custodial Responsibilities and the Potential for Perception of Conflict of Interest

The EPA is aware of the complexity of responsibilities given to CALM and the controlling bodies under the CALM Act, as well as the general concerns relating to custodial functions and potential for perception of conflict of interest. The EPA has noted the advice of the Advisory Committee as well as that of the Independent Expert Advisory Group (IEAG) and will be providing specific advice to the Minister in a subsequent report. Background to understanding the issues is provided in the following Section.

The Role of CALM and the Controlling Bodies for Land Vested under the CALM Act

The CALM Act establishes three controlling bodies for land vested under the Act. These are:

- the Lands and Forest Commission (LFC). Membership consist of the Executive Director CALM, and two other persons appointed by the Governor, one of whom is Chairman. The CALM Act says that the Minister shall not nominate a person for appointment under this subsection unless in his opinion the person has a knowledge of and experience in matters relevant to the management of land for conservation, recreation and forest production;
- the Forest Production Council (FPC). Membership consists of the Executive Director CALM (as Chairman), Director of Forests CALM (as Deputy Chairman), and 12 members representative of forest industries, unions and others with interest in forest production or country communities; and
- the National Parks and Nature Conservation Authority (NPNCA). Membership consists of the Executive Director CALM, 3 other CALM Directors (the Directors of Nature Conservation, National Parks and Forests), and 11 community and expert representatives.

All the controlling bodies are dependent upon CALM for support and to carry out their functions, including the preparation of draft management plans for consideration by the controlling body. The CALM Act provides that management plans for any land have the objective of promoting the purpose for which the land is vested. Although the controlling bodies are responsible for approving management plans for land which is vested in them, the plans are prepared by CALM and are finally approved by the Minister "with such modifications as he thinks fit".

The Lands and Forests Commission (LFC) is the key body in relation to the Forest Management Plans. In relation to indigenous State forests, the LFC is to achieve the purpose or combination of purposes provided for in the proposed management plan, including ensuring that the appropriate balance of forest values and integration of forest issues is achieved in the management of multiple use forests, as set down in Forest Management Plans. The LFC is also to "monitor the carrying out of the management plans" by CALM. However, the LFC has very limited capacity to do so independently of CALM.

The NPNCA also has important roles in relation to forest activities in terms of national park selection and management of flora and wildlife. State Forests are also in many cases contiguous with national parks or nature reserves with the potential for interactions at the boundaries, especially in relation to management of fire, forest pathogens and other threats.

Custodial Responsibilities, Conflict of Interest and Cost Recovery in Natural Resource Management

The term "custodial responsibility" relates to the need to have adequate resource protection in the short term to ensure long-term access to resources for future generations and is relevant to a number of natural resource sectors including the agricultural (soil conservation), forestry, fisheries, water resources, and mining and petroleum sectors. Some parts of the community are nervous about custodial responsibility being given to resource users. Others argue that the custodial function will best be carried out by those with the greatest interest in protection of that resource in the long term (for example agriculturalists and soil conservation). Regardless of which position is correct, the community expects to be reassured that the key environmental aspects required for maintenance of the productive capacity of ecosystems are being looked after and that adequate checks and balances have been put in place to do so. As a result, Governments and Government departments, as well as direct users of resources, are increasingly being expected to operate as a custodian of those resources for which they are responsible on behalf of the community.

The extensive changes in resource management sectors that have been occurring over the last few years serve to illustrate the general concerns. For example, in the water industry, the Australian Government now recognises that past systems of surface water allocation and management are unsustainable and has implemented wide-ranging reforms through the Commission of Australian Governments (COAG), including applying the principles of "user pays" and "full cost recovery".

The Industry Commission Inquiry into Ecologically Sustainable Land Management draft report stated:

"... the water reform framework consolidates and extends the major policy shift, underway nationwide, toward:

- pricing reform based on "user pays" and full cost recovery, the reduction or elimination of cross subsidies and making the remaining subsidies transparent by 2001 for rural water;..
- infrastructure investment and institutional reforms by 1998" (Industry Commission, 1997, p.94)

In terms of the 1994 COAG Water Reform Framework (COAG, 1994) the key reforms in the area of provision of rural water services include full cost recovery, the reduction or elimination of cross subsidies, and making cross subsidies transparent, for example by the use of community service obligations (CSOs) which are funded on a cost recovery basis from Treasury. Cross subsidies can mean between city and rural within one sector (eg the provision of water) or may mean transfer of capital between different sectors, for example between provision of water and provision of sewerage services where one is more profitable than the other. They both mean that some people pay more than the actual cost for water and services, while others pay less than actual costs, because they are subsidised.

Applying the above model to the CALM structure, it could be argued that all royalties gained from timber harvesting should be applied in full to forest regeneration and management and that all non-forest management related activities should be funded as CSOs rather than by cross subsidy within CALM from timber royalties, or funded externally from grants such as the Natural Heritage Trust.

In terms of institutional reform, COAG reform requires the adoption of an integrated water management (whole water cycle) approach, and separating the roles of water resource management, from water provision, standard setting and regulatory functions. This separation is designed to remove any perception (whether real or otherwise) of conflict of interest between the resource manager and allocator and the provider of water services.

In Western Australia, this split of the WA Water Authority into a service provider (Water Corporation), water resource manager and allocator (Water and Rivers Commission) and water industry regulator (Office of Water Regulation) has now been completed

Applying this model to CALM it would be easy to propose that the functions of resource manager and allocator and all other conservation functions should be separated from those of timber production, and furthermore, that the resource allocation function should be completely independent of CALM as the resource manager. This approach would remove the conflict of interest that is perceived by some to exist in the present CALM structure.

Custodial Responsibilities in Relation to CALM's Activities

In the case of forest ecosystems, CALM is responsible for ensuring sound management, on behalf of all Western Australians, over long timeframes to ensure forest resources are both protected and used in a manner which is sustainable through future generations, and not just exploited in the short term for immediate gain. Given the very long regeneration times required to re-establish South West forest timbers (many tens to hundreds of years), this is a particularly important consideration. The very long timeframes are a challenge both in terms of the biological recovery times of ecosystems (reported to be in the order of 150 years (Bjorn

Stigson, pers. comm.)) and sound, long-term planning, and also in the context of short political timeframes of less than five years which, nevertheless, can have a significant influence on Government decision-making in the natural resources area. This can be particularly complex when the decision-making domain requires consideration of multiple objectives which include long-term protection of forest ecosystems, maintenance of sustainable timber yield, revenue-generation and debt reduction, as well as the requirement to maintain a reasonable ongoing level of supply of timber resource to companies.

The many opposing expectations that arise from these constraints puts CALM into a very difficult position and it is unlikely that it is possible to make decisions that will completely satisfy the interests of all those with a stake in the management of forests. The organisational structure of CALM also leaves CALM vulnerable to accusations that it is not fulfilling its custodial responsibilities and that there are conflicts of interest not being addressed.

Vulnerability of CALM to Perception of Conflict of Interest in CALM's Activities

The current structure and funding of CALM and the controlling bodies leaves CALM in an exposed position in relation to potential criticism and allegations of conflict of interest. A perception of conflict can easily arise from an institutional situation where a natural resource agency is the principal resource user (essentially the commercial operator) as well as the agency responsible for protecting and managing that resource, as well as being a key member of the independent controlling bodies and the service agency to those bodies.

The present institutional arrangements have CALM as the principal agent of commercialisation of the forest as well as being responsible for determining sustainable harvest levels, and requirements for forest management to achieve multiple use objectives, including biological conservation. CALM also services and is a member of the LFC, FPC and NPNCA. In addition there is concern that CALM is not legally bound by the provisions of the Wildlife Protection Act with respect to the protection of fauna (for which it is responsible on behalf of Government and the people of Western Australia) in relation to its own forestry activities.

The perception of conflict of interest is enhanced by CALM's high level of dependence on income from timber sold to finance its operations, including the servicing of its non-forest sectors. Concern has also been expressed that the situation may be further exacerbated in 2002, by which time CALM is required to manage a reduction in harvest level of jarrah sawlogs of current specification to meet the "long term declining level", an anticipated reduction to some 60 percent of the current level which would be likely to result in an equivalent reduction in royalties at that time. The fact that timber harvested in the 1997-98 financial year is less than in the past means that CALM will already be having to adjust to reduced timber royalties.

The current forest management organisational structures, membership of controlling bodies and lack of budget and administrative independence mean that the potential for perception of conflict of interest applies to many areas. Using the Lands and Forests Commission as an example, the obvious potential conflicts include (but are not limited to) the following areas:

1. The presence of the Executive Director of CALM as a member of the LFC;
2. That draft Forest Management Plans are prepared by CALM for consideration by the LFC, whose Executive Director is a member;
3. That although draft Forest Management Plans are approved by the LFC, final approval rests with the Minister who can make changes and who would seek the advice of the Executive Director CALM; and
4. The LFC has an audit function but has extremely limited capacity to carry out audit independent of CALM because LFC has no staff of its own and the Executive Director of CALM is a member. In relation to the audit function, the EPA Advisory Committee on

Forest Management Plans recommended several changes to the LFC and provision of administrative support, including:

- an independent Chairman;
- up to five members chosen for their expertise;
- a revised charter; and
- financial and administrative independence from CALM.

Comparable potential conflict of interest areas also apply to the NPNCA.

It should be noted that the Independent Expert Advisory Group (IEAG) established under the RFA recommended that the Executive Director of CALM should not serve on the Lands and Forests Commission or the NPNCA.

The changes proposed would enhance the independence and ability of the LFC to carry out its statutory roles. It would also be desirable for the LFC to be able to facilitate the necessary level of community involvement in policy formulation, and to take a substantial role in terms of forest research and audit.

4.5 Comprehensive, Adequate and Representative Reserve System:

The development of a Comprehensive, Adequate and Representative (CAR) forest reserve system fits within the aims of the National Strategy for the Conservation of Australia's Biodiversity and is a goal of the National Forest Policy.

Objective 1.4 of the National Biodiversity Strategy is to "establish and manage a comprehensive adequate and representative system of protected areas covering Australia's biological diversity"

To meet the requirements of the National Forest Policy with respect to identification of a 'CAR' reserve system, nationally agreed criteria for a conservation reserve system for forests were developed by a technical working group convened by the Australia and New Zealand Environment and Conservation Council (ANZECC) and the Ministerial Council on Forestry Fisheries and Agriculture (MCFFA). This group was called the JANIS Technical Working Group (JANIS TWG).

The criteria developed by the JANIS TWG, which are now referred to as the JANIS criteria, recognise the need for protection of old growth forests and forest wilderness values within a CAR forest reserve system, in addition to the protection of biodiversity per se. The JANIS criteria and parallel environmental, social, economic and heritage assessment processes have been used to provide the information and decision-making basis for developing the Regional Forest Agreement in Western Australia.

The EPA considers that the JANIS criteria are a useful contemporary framework for the development of a CAR forest reserve for the protection of biodiversity within the context of the RFA. The EPA is aware that the flexibility provisions of the JANIS criteria and the way that definitions and assessment data have been applied or presented in the Western Australian case have been subject to considerable public debate and that there are areas of the forest regarded as "icons" or "old growth" regardless of whether they strictly meet the criteria, and there is public expectation that these areas should also be reserved through the RFA or some other mechanism. The EPA is of the view that Government should give consideration to further consulting with members of the public or relevant stakeholder groups prior to finalising the agreement. Recommendation 13(h) addresses the issue of publicly identified "icon" and "old growth" areas.

Much of the public debate has surrounded consideration of whether areas which are of particular significance to local groups will be included in the CAR reserve system. The EPA is of the view that to meet public expectations it will be necessary to address this issue and to ensure provision for replication of particularly old growth types to be given increased emphasis in the forest reservation option developed. This will ensure that forest ecosystems and forest types which are popular for recreational, cultural, aesthetic or other purposes, are sufficiently

and widely enough distributed to accommodate public enjoyment of non-timber production forest values and tourism industry requirements and to ensure that biodiversity is adequately protected against pathogens, invader species and human use pressures.

Perhaps most importantly the EPA understands that informed public debate is inevitable and necessary for the proper consideration of reservation proposals which are to form the basis of a 20 year agreement, and recommends that the parties involved in negotiating and deciding the final Regional Forest Agreement give full and adequate consideration of the relevant issues and public submissions and concerns before finalising the agreement.

Recommendation 13 contains 12 elements relating specifically to the finalisation of the RFA.

4.6 Preliminary EPA Comment on the Recommendations of the Independent Expert Advisory Committee Report

The EPA considers that the report on the review of management systems and processes relating to forest management by the Independent Expert Advisory Group (IEAG, 1997) is an extremely useful document for consideration of the future systems and processes required to achieve ecologically sustainable forest management.

The EPA has considered the IEAG recommendations in the context of:

- a) The objectives of the EPA set out in the Environmental Protection Act, 1986, which includes "to protect the environment"; and
- b) The functions of the Authority, and its role, which derives from the Act, of providing the Minister for the Environment with over-arching policy advice on environmental matters.

The objectives and the functions of the Authority need to be fully taken into account when the recommendations of the IEAG are being considered. The EPA would not necessarily be in support of all of the IEAG recommendations and will be providing further advice to the Minister on this matter at a later date. However, the following advice is provided below in relation to some of the recommendations.

IEAG Recommendation 1.4

"Change the Conservation and Land management Act to ensure that the Executive Director of CALM does not serve on either the Lands and Forests Commission or the National Parks and Nature Conservation Authority, in order to avoid perceptions of conflict of interest. The composition of the Lands and Forests Commission should include an independent Chair, a community representative, and three experts with experience in relevant aspects of forest management including wood production and nature conservation."

The EPA advises that this matter has been discussed in Section 4.4 and the EPA may provide further advice on this matter.

IEAG Recommendation 1.5

Recommendation 1.5 of the IEAG's report is that the Government of Western Australia should; *"review and where necessary, amend the review provisions of the Environmental Protection Act and Conservation and Land Management Act to;*

- *encompass a joint review of environmental protection, management plan requirement, and environmental management systems, such that the strategic issues of balancing and integrating forest uses, including social economic and environmental implications, can be considered together. The review process should include some expert representation from outside the State, and*
- *enable periodic independent and transparent audits of compliance with forest management processes, including codes of practice, and for subsequent joint reviews of those processes and codes."*

The EPA has considered this recommendation and the supporting discussion of issues in the IEAG report and advises, that although some review of the assessment and approval process for forest management is warranted, the purpose of the Environmental Protection Act, 1986 and the current definition of the 'social environment' under Act does not (and should not) permit the EPA to balance the environmental, social and economic aspects of proposals in providing advice to the Minister.

The balancing of environmental, social and economic considerations for any decision-making involving impacts on the environment, including the formulation and approval of Forest Management Plans is quite correctly a matter for Government. The EPA therefore is of the view that Government should ensure that any amendments to related legislation result in an approvals process which maintains the separation of the environmental aspects from the social and economic evaluations of Forest Management Plans options. This will allow Government to make its decision, taking account of the best environmental, social and economic advice available to it.

IEAG Recommendation 1.7

Recommendation 1.7 of the IEAG report states that CALM should:

"Revise the draft Nature Conservation Strategy for Western Australia in the light of public comment already received and approve and implement the strategy as soon as possible"

The EPA has considered this recommendation and considers that the developments in biodiversity conservation at the national level since 1992 (such as the National Strategy for Conservation of Australia's Biodiversity, the National Strategy for Ecologically Sustainable Development, the National Forest Policy, and the Montreal process) mean that the 1992 draft nature conservation strategy will require considerable amendment, particularly if it is to become the State's means of giving effect to the National Strategy for Conservation of Australia's Biodiversity.

The EPA is of the view that the issue of biodiversity requires greater consideration by Government and the community, in terms of how to best give effect to the National Strategy for the Conservation of Australia's Biodiversity at the State and local levels. Biodiversity issues run across a number of agency and Authority interests, as well as applying to land of all tenures as well as private land. The Environmental Protection Act, 1986 requires the EPA to ensure that the environment is adequately protected on all land in WA, regardless of tenure. The EPA is involved in assessment of biodiversity as part of project environmental impact assessment, as well as through development of policies. Furthermore, the EPA's functions include "to co-ordinate all such activities, whether Governmental or otherwise, as are necessary to protect, restore or improve the environment in the State" (Section 16(m)). The EPA also has over-arching responsibilities in relation to the provision of advice to the Government on all environmental matters, including policy advice.

Because of its co-ordination function and its role in the conservation of biodiversity through environmental protection policies and impact assessment as well as the over-arching policy advice function, it would be appropriate for the EPA to coordinate the development of a State Biodiversity Strategy, including seeking input through public consultation, to give effect to the National Strategy for the Conservation of Australia's Biodiversity.

IEAG Recommendation 2.2

The IEAG's recommendation 2.2 states that the Minister, the controlling bodies and Executive Director of CALM should:

"Determine a schedule for concurrent development of strategies and a new Forest Management Plan spanning all State public tenures in the South-West Forest Region. Where previous ministerial conditions have been imposed, these conditions and references to other plans should be revoked and replaced by a complete set of conditions consistent with the terms of the currently gazetted plan."

Some aspects of this recommendation are covered in Sections 3 and 4 of this Report. The EPA fully intends to address the issue of the Conditions at such time as the forest management scenario is stabilised. However, it should be noted that Conditions are set by the Minister on the advice of the EPA and it would be most unusual for a proponent to have a major role in doing so. Although the reaction of a proponent to Conditions may be sought (and usually is), the main task of a proponent is to provide a set of commitments indicating in some detail the manner in which they will manage their operations, so as to meet the environmental requirements of both the EPA and Minister in ensuring that the environment is properly protected.

The setting of Conditions is set down by the Environmental Protection Act and applies to all proponents. It would not be appropriate for a special exception to be made for forest management such as is being proposed by the IEAG.

IEAG Recommendations 2.3, 2.4 and 2.5

The EPA has several concerns in relation to these recommendations because of the overlap with current National and State initiatives including indicators for State of the Environment Reporting as well as the need to involve a number of other agencies which have existing and legitimate interests in these matters. The EPA will address these in additional advice at a later date.

IEAG Recommendation 3.1

This states:

“Ensure that the management of CALM lands in the South-West Forest region is placed under a single integrated management entity, either as a:

- *public service entity being an integral part of CALM, or*
- *separate commercial entity with its own board of management, chief executive, and commercial objectives.”*

This has been partially discussed in Sections 3 and 4 of this Report as well as in the Advisory Committee Report. The EPA is of the view that there would be merit in the management being controlled by a separate commercial entity, subject to the same environmental processes, controls and expectations as all other proponents. The EPA may be providing additional advice on this matter.

IEAG Recommendation 4.1

This states that the Lands and Forests Commission and the National Parks and Nature Conservation Authority should:

“Jointly report on compliance with all provisions of relevant management plans, including periodic reporting of progress with structural goals prescribed within the Forest Management Plan.”

The EPA supports the above recommendation but it should be noted that responsibility for advising the Minister for the Environment on overall environmental performance in forest management and on compliance with the Environmental Conditions in the Ministerial Statement is carried out by the EPA or DEP through the provisions of the Environmental Protection Act, 1986. However, the EPA would welcome the additional input from the Lands and Forests Commission and the National Parks and Nature Conservation Authority that would arise from implementation of the above IEAG recommendation.

IEAG Recommendation 4.5

This recommendation is that:

“CALM should continue to operate the CALM management Audit Branch as an internal audit of CALM planning and implementation priorities. In addition, there should be an external independent audit of a sample of operational practices on an annual basis. Performance criteria and the results of external audit should be published in the annual report of CALM”

The EPA would support the independent external audit proposed in Recommendation 4.5 and the inclusion of the results in the Annual Report of CALM if they are appended as an independent report.

IEAG Recommendation 5.3

This recommendation of the IEAG states that CALM should:

“Retain the Forest Monitoring Research Committee as a peak committee for advising on research priorities within CALM, but the committee within CALM, but the committee should not have authority or responsibility for funding or the detail of the research program. CALM should ensure that the Forest Monitoring and Research Committee represents a wide range of stakeholder interests relevant to ecologically sustainable forest management.”

The recommendation is discussed in Section 3.17 (Environmental Condition 17) and in Section 4.2 of this Report.

5. Conclusions and Recommendations

This Report is a further step towards ecologically sustainable forest management in Western Australia. The overall objective of the EPA is to protect the environment and to improve environmental performance. The advice in this Report is provided to be helpful in moving forest management towards ESFM. It suggests change where this is warranted to achieve this objective. It is not the intention of this Report to evaluate whether or not CALM has met the letter of its legal obligations or to recommend a legal remedy.

The EPA has a statutory role to ensure that all of the environment of WA is adequately protected and managed and there is a public expectation that the EPA should provide independent advice to Government on the overall environmental performance of forest management. WA is different from other States in having an EPA which is required to provide independent, ongoing advice on the overall performance of environmental management of public and privately owned land and resources. Furthermore, the EPA expects continuous improvement in environmental performance from all proponents. It should be noted that the EPA is not bound by an RFA as to its legal requirement to provide independent advice on environmental matters relating to forest management in the future.

In terms of the EPA's intention to progress in the areas of forest management and the process by which EPA assesses Forest Management Plans and reports on compliance and overall environmental performance in the forest sector, the EPA is of the view that it would be useful for the Minister for the Environment to:

- request CALM to provide to the EPA a response, within 3 months, to each of the items of specific advice and the suggestions made in this Report (including Appendix 1, the report of the Advisory Committee) indicating how it will incorporate the advice and suggestions into its management of the Forest Management Plans, forest management practices and its environmental management system; and
- to invite CALM to engage with the EPA in a cooperative process of developing the criteria for determining compliance in 2002/2003 with the Environmental Conditions and an improved process between CALM and the EPA for carrying out assessments, including ensuring transparency of process in the public domain.

The EPA has found that CALM is in compliance with most of the Conditions. In some instances compliance has not been achieved or has not yet been achieved. The EPA is mindful

that the current review has taken place 5 years into a 10 year plan and for some of the Conditions has until 2002/2003 to achieve compliance. The EPA has provided advice to assist in improved forest management and in the achievement of compliance.

Noting that a further report from the EPA will be provided once a forest development and management scenario is decided through the finalisation of the RFA process, the EPA submits the following recommendations to the Minister for the Environment at this time:

1. The EPA recommends that the Minister notes the advice provided in this Report on the extent of CALM's compliance with the Ministerial Statement of 24 December, 1992, mindful that the current review has taken place 5 years into a 10 year plan, and that for most of the Conditions no specific date for compliance was stated. It could therefore be considered that CALM has until 2002/2003 in which to fully comply.
2. The EPA recommends that the Minister notes Table 1 (page vi) which gives a summary of the extent of CALM's compliance with the Conditions.
3. The EPA recommends that the Minister notes the advice provided to the EPA by the EPA Advisory Committee on Forest Management Plans in Appendix 1 of this Report.
4. The EPA recommends that the Minister notes the advice provided in this Report and Appendix 1, relating to aspects of CALM's environmental performance in implementing the Forest Management Plans (FMP).
5. The EPA recommends that the Minister requests CALM to provide to the EPA a response, within 3 months, to all of the advice and suggestions made in the EPA Report and Appendix 1, indicating how it will incorporate the advice and suggestions into its management of the Forest Management Plans (FMP), forest management practices and environmental management system.
6. The EPA recommends that the Minister notes that the EPA has the intention of providing further advice in a subsequent report in response to the specific forest management scenario resulting from the current process of the development of the Regional Forest Agreement (RFA) for WA. The presence or absence of an RFA will have implications for:
 - the continuation of the current Forest Management Plans, as amended following assessment of the "substantial" changes identified in this Report (see Recommendation 8);
 - specific EPA advice on the extent of amendments to, or replacement of, the 1992 Ministerial Statement;
 - details of the approach to be taken by the EPA, and expectations of CALM by the EPA, for the assessment in 2002/2003, of CALM's compliance with the FMP over its 10 years in the event of continuation of the current FMP (with or without amendments).
7. The EPA recommends that the Minister notes that in the event that an RFA does not eventuate, or if there is an RFA but no new FMP requiring assessment, then the EPA will provide its advice, by the end of April 1999, on a number of matters, including detailed recommendations for amendments to the Ministerial Statement, as well as a strategy for developing (in a cooperative manner) with CALM and the public, the specific criteria that will be used by the EPA to assess compliance in 2002/2003.
8. The EPA recommends that the Minister notes that Condition 2-2, about implementation being in accordance with the approved plan, has not been met in that some changes regarded by the EPA as significant were not submitted to the Minister for determination (on advice of the EPA) as to whether or not they are substantial, and that the Minister takes the following actions:

- a) Requests CALM to refer the application of the shelterwood silvicultural treatment under the jarrah silvicultural prescription to the Minister under the Environmental Protection Act as required by Condition 2-2 and to refer it to the EPA to enable the EPA to provide advice as required by Condition 2-2; and
 - b) Requests CALM to refer the increase in the area harvested under the jarrah silvicultural prescription to the Minister under the Environmental Protection Act and to refer it to the EPA to enable the EPA to provide advice as required by Condition 2-2.
9. The EPA recommends that the Minister notes that the EPA intends to convene a specialist committee to provide it with advice on the adequacy and appropriateness of the current forest models for guiding decision-making on multiple use forests in an ESFM framework.
 10. The EPA recommends that the Minister notes that the EPA holds the view that the Forest Monitoring and Research Committee (FMRC) has not operated in the manner that was intended under Condition 17 and that the Minister agrees that the Committee be re-formed to include external scientists and that adequate funds be provided to ensure that the Committee can operate in an effective manner to meet its responsibilities.
 11. The EPA recommends that the Minister notes that the EPA has discussed the structure, functions and membership of the Lands and Forests Commission and other matters relating to institutional arrangements for ESFM (Section 4.4) and that it may provide further advice on these matters in its subsequent report.
 12. The EPA recommends that the Minister notes the advice of the EPA and the Advisory Committee in relation to current forest monitoring and research undertaken by CALM, that significant changes are required in these areas and that the EPA will provide further advice in its subsequent report.
 13. The EPA recommends that the Minister takes into account the following advice in relation to development of the RFA for WA:
 - a) That the RFA gives explicit recognition to EPA's ongoing statutory responsibilities in relation to forest management and performance, as well as public expectations in this area, cognisant of the fact that WA is different from other States in having an independent EPA which would not necessarily be limited by an RFA in its provision of advice on environmental matters as required by its Act.
 - b) That the RFA requires CALM to implement transparency of process in all aspects of the planning, execution, research, audit and public reporting of timber harvesting and forest management, recognising that the RFA has a significant role to play in improving and changing the dynamics between CALM and the conservation movement and community in relation to timber harvesting and forest management.
 - c) That the RFA takes a precautionary approach to sustainable timber harvest. A conservative approach should be taken, in which full attention is given to the State's commitment through the InterGovernmental Agreement on the Environment (IGAE) in terms of applying the Precautionary Principle. The figure of 490 000 m³ /yr set by Minister Minson for jarrah sawlogs is not regarded by the EPA as being sustainable and a precautionary approach would be to substantially reduce the cut level as quickly as possible to a level in the order of 250 000 m³ /yr, subject to this figure being shown to be sustainable in the long term.
 - d) That the RFA should require that CALM demonstrate in a transparent manner that proposed levels of cut of both jarrah and karri are sustainable and that the range of forest values desired by the community will be properly protected within an ESFM framework.

- e) That the RFA should note that the EPA has the intention of initiating and coordinating a review of the models with a view to development of appropriate models to enable determination of sustainable harvest according to the principles of ESFM and application of the Precautionary Principle (see Recommendation 9).
- f) That the RFA should require the terms and definitions and glossary used to define forest policy and to regulate yield to be consistently applied and, where possible, explained in everyday language.
- g) That the RFA should require silvicultural prescriptions to be more specifically formulated and applied to take account of variations in conditions such as soil, landform, forest types, forest ecosystems, slope, climate.
- h) That the RFA should ensure that forest areas regarded by the public as important "icons" or as "old growth" are fully considered for protection regardless of whether or not they meet the specific criteria being proposed for "old growth" forest.
- i) That the RFA should ensure that areas of forest protected in reserves are replicated, as far as is practicable, so that biodiversity values are adequately protected against pathogens, invader species and human use pressures.
- j) That the RFA should require that new Forest Management Plans be developed with proper regard for the relevant National and International protocols relating to ecologically sustainable development and biodiversity, namely:
- the Rio Declaration and Agenda 21;
 - National Strategy for Ecologically Sustainable Development;
 - InterGovernmental Agreement on the Environment;
 - National Forest Policy Statement; and
 - National Strategy for the Conservation of Australia's Biodiversity.
- k) That the RFA should explicitly recognise that Forest Management Plans are subject to assessment by the EPA.
- l) The EPA recommends that the Minister notes the advice of the EPA in relation to the recommendations of the Independent Expert Advisory Group (see Section 4.6).

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Appendix 1

Report of the Advisory Committee on Forest Management Plans



Environmental Performance
and
Compliance with Ministerial Conditions
for the
Forest Management Plan 1994-2003

Report to the Environmental Protection Authority

by the EPA Advisory Committee on Forest Management Plans

October 1998

EPA ADVISORY COMMITTEE ON FOREST MANAGEMENT PLANS

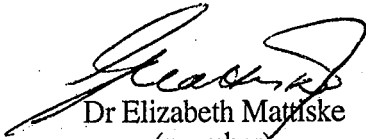
Environmental Protection Authority
8th Floor Westralia Square
141 St Georges Terrace Perth

Report on Environmental Performance and Compliance with Ministerial Conditions for the Forest Management Plan 1994-2003.

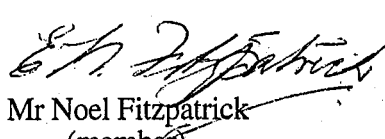
We submit to the Authority, our final report on the environmental performance, and compliance with the Ministerial Conditions of December 1992, for the above project.

The Committee wishes to express its appreciation to the EPA for the opportunity to provide assistance in this very important and significant area of environmental management and hopes that the Report provides a positive contribution to achieving the EPA's objectives for forest management.

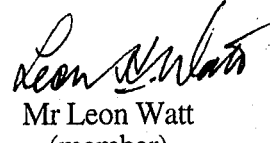
Yours Faithfully



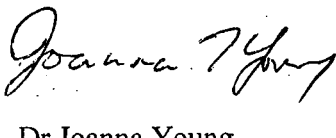
Dr Elizabeth Matiske
(member)



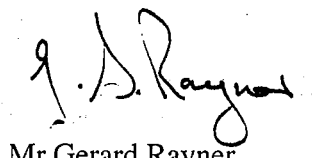
Mr Noel Fitzpatrick
(member)



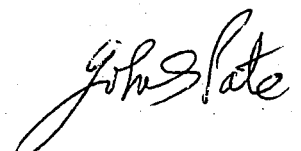
Mr Leon Watt
(member)



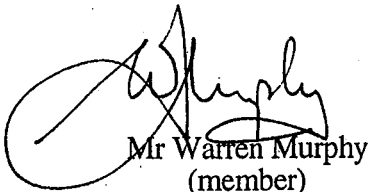
Dr Joanna Young
(member)



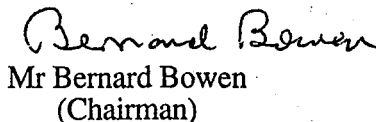
Mr Gerard Rayner
(member)



Professor John Pate
(member)



Mr Warren Murphy
(member)



Mr Bernard Bowen
(Chairman)

7 October 1998.

EXECUTIVE SUMMARY

This Report documents the advice of an advisory committee convened by the Environmental Protection Authority (EPA) under Section 25 of the *Environmental Protection Act 1986*. The overall purpose of this committee, termed the Advisory Committee on Forest Management Plans (ACFMP), was to:

- consult with the Department of Conservation and Land Management (CALM), the proponent of the 'project' known as the Forest Management Plan 1994-2003;
- provide advice to the EPA with respect to a Performance and Compliance Report (PCR) prepared by CALM; and
- provide advice on the environmental performance of the project and the related Environmental Conditions on the project under Part IV of the *Environmental Protection Act 1986*, which are set out in the Ministerial Statement of December 1992.

In evaluating environmental performance and the compliance with Environmental Conditions, the Advisory Committee utilised public submissions made to the EPA on a definition statement prepared by CALM outlining the intended scope of the proposed Progress and Compliance Report (PCR), and also public submissions received by the EPA in response to the PCR.

The Advisory Committee has undertaken the task of fulfilling its Terms of Reference with the aim of providing positive and helpful advice. In preparing this report, the Advisory Committee has not been able to undertake detailed field investigations or exhaustive reviews of available research, but has considered readily available information and public submissions, and has made general observations with respect to compliance and to environmental performance. The Advisory Committee has provided advice with respect to each Condition, and also comment on forest management issues as a contribution to ecologically sustainable forest management (within the context of the environmental performance of the project).

The Advisory Committee concluded that the key issues in achieving a sustainable forestry industry are as follows:

- 1) A review of the Environmental Conditions is required in the light of improved knowledge and changed approaches to forest management. These changes include the development of the concept of Ecologically Sustainable Forest Management, the Montreal Process, the development of a National Forest Policy and the imminent signing of the Regional Forest Agreement.
- 2) There should be continuing development of a first class knowledge base on all aspects of forest management, and forest management should continue to be progressively modified in response to new information. In this context, the Advisory Committee was concerned that there appears to be a reduced level of research and development of forest management being carried out by CALM. Also, the Forest Monitoring and Research Committee, established under Condition 17, has not functioned as intended and requires changed membership and independent funding if it is to achieve its original purpose.
- 3) A series of commitments should be developed and agreed by the proponent together with performance criteria and detailed audit elements against which progress of the project can be audited. Such a list has not been established in the Forest Management Plan to date, but should follow from the review of the current Conditions set out in the Ministerial Statement.

- 4) There should be independent auditing of forest management by an external agency on a continuing basis rather than at 5 year intervals, as is the current situation. The Advisory Committee would see a strengthened and independent Lands and Forest Commission being charged with this function.
- 5) The sustainable level of forest which can be cut annually should be determined, recognising the need for the:
 - a) establishment of a conservative harvest level, ensuring long term sustainability of the forest resource (the Advisory Committee noted that a major report commissioned under the relevant Condition has stated that, on a conservative basis, the sustainable cut from the forest was little more than 60% of the current cut level of 490 000 cubic metres of first and second quality jarrah saw logs);
 - b) development of silvicultural prescriptions which are specifically appropriate to the locality on which they are to be applied and which do not threaten the long term sustainability of forest in that locality (the Advisory Committee has concluded that this is a particularly important issue in the future management of the forests);
 - c) recognition of the variability of productivity and regeneration due to climate, soil type and / or the presence of diseases or pests;
 - d) recognition of the impact of disease, changed environmental conditions and the changed silvicultural practice on the quality of the timber resource available to the industry in the future; and
 - e) achievement of a high percentage use of the harvested resource, focusing on high value and economically feasible end uses.
- 6) Publicly accepted methods of fuel reduction should be developed or improved, aimed at achieving the multiple objectives of safety and protection of the timber resource, and protection of sensitive species and ecosystems. Matching the management of prescribed fire with the needs of particular ecosystems within the forest is likely to be operationally difficult, and can probably only be achieved at a higher cost than the current extensive program.
- 7) Excellent communications with the community must be established so that the basis and objectives of the Forest Management Plan are widely known, and the community is involved in the planning processes to the extent that they have 'ownership' of these plans at all levels. CALM has advised the Advisory Committee that over the period they have had extensive meetings, workshops and discussions with community groups. The Advisory Committee believes that the process should be developed further to involve the community in policy development and program planning.

The Advisory Committee has recommended that a new set of Environmental Conditions be prepared for the project, with commitments agreed by CALM in consultation with the EPA. These commitments should include a commitment to the development and implementation of an Environmental Management System (EMS) according to the principles of the ISO 14000 Series documents, Ecologically Sustainable Forest Management and the Montreal Process.

It should be noted that the process of preparing a Regional Forest Agreement (RFA) for Western Australia is an entirely separate process to the review discussed in this report, but this report may have relevance to the development of the RFA. The timing of this report and the RFA is purely coincidental.

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APPENDICES

Appendix 1: Ministerial Statement of December 1992 Containing Environmental Conditions

Appendix 2: Media Statement Issued by the Minister for the Environment.

Appendix 3: Summary of Public Submissions

Appendix 4 : Questions from the Advisory Committee and CALM responses.

1 INTRODUCTION

This Report documents the work and advice of an advisory committee convened by the Environmental Protection Authority (EPA) under Section 25 of the Environmental Protection Act 1986. The overall purpose of this committee, termed the Advisory Committee on Forest Management Plans (ACFMP), was to consult with the Department of Conservation and Land Management (CALM), the proponent of the 'project' known as the Forest Management Plan 1994-2003, to provide advice to the EPA with respect to a Performance and Compliance Report (PCR) prepared by CALM, and to provide advice on the environmental performance of the project and the related Environmental Conditions set on the project *under Part IV of the Environmental Protection Act 1986*, which are set out in the Ministerial Statement of December 1992. The Terms of Reference of the Committee are explained in detail in Section 4-3 of this report. Please note that in the text of this report which follows, the words "Environmental Conditions as set out in the Ministerial Statement" have been substituted for brevity, by the words "Ministerial Conditions" in both the singular and plural situation.

In providing this report, the Advisory Committee wants to record that, in its view, CALM has perhaps the most difficult natural resource management task in Western Australia. The requirement for balancing of the multiple uses of the forest estate and the high public profile of forest management provides immense challenges in terms of research required, the management approach needed and the resources available. The public expectations of the management agency are sometimes out of proportion to the practical outcomes achievable.

2 MEMBERSHIP OF THE ADVISORY COMMITTEE

The Advisory Committee was formed in order to provide multidisciplinary advice to the EPA and therefore included people with differing expertise. The Advisory Committee was first convened in September 1996.

The membership of the Advisory Committee is as follows:

Mr Bernard Bowen *	(Chairman) Chairman of the EPA
Mr Noel Fitzpatrick	Australian Academy of Technological Sciences and Engineering
Dr Elizabeth Mattiske	Plant Ecologist (now also a member of the EPA)
Mr Warren Murphy	Business Manager
Professor John Pate	Botanical Ecophysiologicalist
Mr Gerard Rayner	Environmental Manager
Mr Leon Watt	Chairman of the Lands and Forest Commission
Dr Joanna Young	Forest Pathologist

* Mr Bowen was Deputy Chairman of the EPA when the Committee was formed.

3 BACKGROUND TO THE PROJECT

3-1 The Project

In October 1992 the EPA published a report (Bulletin 652) on its assessment, under section 38 of the *Environmental Protection Act*, of forest management proposals for 1992 onwards (EPA 1992). These proposals constituted an amendment to the 1987 Regional Management Plans for the Northern, Central and Southern Forest and to the 1987 Timber Strategy document, which together had previously been assessed by the EPA under Part IV of the *Environmental Protection Act 1986* (EPA 1987).

The CALM documents which describe the 1992 CALM proposals are entitled :

- *'Proposals to Amend the 1987 Forest Management Plans and Timber Strategy and Proposals to Meet Ministerial Conditions on the Regional Plans and WACAP ERMP (CALM 1992 a)*, (hereinafter referred to as the 1992 Proposal);
- *'Management Strategies for the South West Forest : A Review: Draft for Public Comment' (CALM 1992 b)*, (hereinafter referred to as the 1992 Draft Forest Strategy);
- *'A Nature Conservation Strategy for Western Australia: Draft for Public Comment' (CALM 1992c)*, (hereinafter referred to as the Draft Nature Conservation Strategy); and
- *National Estate Values in the Southern Forest Region, South West Western Australia (AHC/CALM 1992)*, (hereinafter referred to as the SFR National Estate Report).

The reason for the EPA's assessment of CALM's 1992 proposal was that the proposal involved significant changes to the proposed conservation reserve system outlined in the approved 1987 Forest Management Plans, and also changes to methods and systems of forest management and the projected timber harvesting levels outlined in the Timber Strategy. These changes originated partly from new information which had become available since 1987, including:

- a comprehensive inventory of timber resources in the jarrah forests;
- a new objective for management of WA's south west forests and the setting of whole of forest structural goals;
- a joint CALM / Australian Heritage Commission assessment of the National Estate values of the Southern Forest Region (AHC & CALM 1992); and
- an internal review of the forest road, river and stream reserve system.

The EPA's assessment of the 1992 Proposal was also intended to formalise the transfer of responsibility for Ministerial Conditions and commitments (and environmental aspects of woodchip production) from WA Chip and Pulp Pty Ltd (WACAP) to CALM. This transfer included the responsibility for direct control of the harvesting of woodchips from public forests. WACAP's proposal to harvest and export woodchips from the south west forests (on public and private land) had been assessed by the EPA in 1988, shortly after the EPA's 1987 assessment of the Forest Management Plans (EPA, 1988).

Subsequent to the 1992 assessment by the EPA, a number of related actions were undertaken, as described in Sections 3-3 to 3-7 of this report. The Forest Management Plan 1994-2003 (see Section 3-7) has now become the principal forest management plan for south west Western Australia. Accordingly, the "project" referred to in Ministerial Condition 18-1 is now considered to be the Forest Management Plan 1994-2003.

3-2 The EPA's Report

In providing its advice on the 1992 proposal, which is contained in its assessment report, Bulletin 652 (EPA 1992), the EPA drew extensively on the advice of an independent Technical Advisory Panel specially appointed for the assessment, and an independent forestry consultant. The detailed EPA report ran to more than 150 pages including appendices. The degree of public interest in the report was such that it was necessary for a 'Summary and Recommendations' report to be published. Over 900 copies of this summary report were eventually distributed to agencies, organisations and members of the public. Some of the matters discussed in Bulletin 652 are discussed in more detail in other sections of this report.

The EPA's assessment of the 1992 proposal resulted in the EPA recommending that the 1992 proposal to amend the Forest Management Plans and Timber Strategy was environmentally acceptable, subject to certain recommended conditions.

However, the EPA's report did not document environmental commitments made by CALM, as would normally occur as a component of assessment under the *Environmental Protection Act 1986*. Neither did the report explicitly indicate which (if any) of the Ministerial Conditions or commitments applicable to the 1987 Forest Management Plans and Timber Strategy or the WACAP proposal, should continue to apply.

It is of considerable importance that around the same time as the EPA's 1992 assessment, Australia became a signatory to two important international protocols relating to the concept of Ecologically Sustainable Development. These resulted from the 1992 United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro, Brazil, and are known as the Rio Declaration and Agenda 21. Subsequently most states of Australia, including Western Australia, became signatories to Australia's first National Strategy for Ecologically Sustainable Development (Commonwealth of Australia 1992a) and to the Intergovernmental Agreement on the Environment (Commonwealth of Australia 1992c). All of these agreements have relevance to forest management and to environmental impact assessment.

The EPA did not explicitly apply the principles of ecologically sustainable development to the evaluation of the 1992 forest management proposals. However, both the EPA and CALM are now giving increasing attention to the incorporation of the principles of Ecologically Sustainable Development in the formulation of policies and management plans, and in the evaluation of development proposals. Furthermore, in 1992 Western Australia became a signatory to the National Forest Policy, which makes provision for the sustainable management of Australian forests, taking into account the concept of 'Ecologically Sustainable Forest Management (ESFM)' (Commonwealth of Australia 1992b). Subsequently the 1995 Santiago Declaration on the development of criteria and indicators for ESFM (of temperate and boreal forests), known as the Montreal Process, was signed by 12 countries including Australia.

In 1997, Australia published a 'First Approximation Report' on the Montreal Process indicators (Commonwealth of Australia 1997) and has now developed a draft framework of sub-national indicators based on the International Montreal Process Indicators, which could be used to evaluate the effectiveness of management in the future (Montreal Implementation Group 1997).

Most recently, an independent assessment has been made of West Australian systems and processes relating to forest management with respect to nationally agreed principles and criteria for Ecologically Sustainable Forest Management (ESFM), within the process of developing a Regional Forest Agreement for the 'South West Forests' region (IEAG 1997).

3-3 The Appeals Committee (Barnett) Report

Under Section 100 of the Environmental Protection Act, the EPA recommendations to the Minister for the Environment on assessment reports are subject to appeal to the Minister. Such appeals are finally determined by the Minister, who may seek advice from an independent person or persons appointed by the Minister.

The Minister for the Environment received 21 appeals on the recommendations of the EPA with respect to the CALM 1992 Proposal, and subsequently appointed a one-person Appeals Committee (Mr Thomas Barnett) under Section 101 (1) of the Environmental Protection Act, to provide advice for the determination of the appeals.

After considering the appeals and undertaking further investigation, Mr Barnett reported publicly to the Minister (Barnett 1992) stating that :

"in general terms I am in agreement with the approach taken by the EPA in the narrative and recommendations set out in the report as far as they go, but in light of some of the matters raised in the appeals, I feel in some respects the EPA did not go far enough to maintain the appropriate balance required in CALM's management of the forests and in some other respects."

Mr Barnett recommended that further independent reviews be carried out with respect to some aspects of forest management, notably:

- dieback management (Recommendation K(iii));
- fire management (Recommendation L);
- monitoring and research (Recommendation N); and
- forest policy options (Recommendation R).

Mr Barnett also recommended that the level of timber harvest proposed by CALM in the 1992 Proposal not be approved, but rather that the level remain as stipulated by the 1987 Timber Strategy. He also recommended that a system of 'forest habitat corridors' be established to form a network of old growth forest habitats across the landscape to function as fauna corridors and to preserve flora and fauna values.

3-4 The Ministerial Statement and Environmental Conditions

On 24 December 1992 a Ministerial Statement approving the 1992 Proposal was signed by the then Minister for the Environment, The Hon Jim McGinty. The Ministerial Statement (see Appendix 1) contained 18 Conditions of approval. A number of these Conditions constituted significant variations to the EPA recommendations, as a result of the Barnett Appeals Committee Report.

3-5 The Scientific and Administrative (Meagher) Committee

In March 1993 the Minister for the Environment, The Hon Kevin Minson, appointed four people with qualifications and experience relevant to forest management, to provide advice to him in accordance with Condition 2-1 of the Ministerial Statement relating to the 1992 Proposal. This committee, chaired by Dr Timothy Meagher, was called the Scientific and Administrative Committee (hereafter referred to as the Meagher Committee) and its report is called the Meagher Report.

The Meagher Report of June 1993 provided recommendations on six key issues relevant to the requirements of Condition 2-1. The Report also provided advice with respect to some of the Conditions contained in the December 1992 Ministerial Statement, which the Meagher Committee considered relevant to its terms of reference (Scientific and Administrative Committee 1993).

3-6 Ministerial Response to the Meagher Report

In response to the Meagher Report, the Minister for the Environment published a written report in August 1993 which announced the Minister's decision that:

- the wildlife corridors recommended by the Barnett Appeals committee would not be implemented;
- timber harvest levels would not be restricted to those levels stipulated in the 1987 Timber Strategy as recommended by the Barnett Committee;
- CALM's proposals for harvest levels of first and second grade karri logs was approved;
- CALM's proposals for harvest levels of marri logs (excluding residue) was approved ;
- CALM's proposal for harvesting karri and marri branch-wood was approved;
- a jarrah harvest level of 490 000 cubic metres of first and second grade sawlogs, as recommended by the Meagher Report, was approved; and
- additional material felled in the process of harvesting first grade jarrah logs was approved for removal, up to the estimated sustainable wood increment for each species.

(Minson 1993)

3-7 Forest Management Plan 1994-2003

Subsequent to the 1993 'Ministerial Response', the *Forest Management Plan 1994-2003* was published. This Plan documented the amendments to the 1987 Forest Management Plans which had been approved under the *Conservation and Land Management Act 1984 (CALM 1994)*.

4 TERMS OF REFERENCE AND EVALUATION PROCESS

4-1 Interpretation of the Ministerial Statement and the Role of the EPA

Ministerial Condition 18 of the Ministerial Statement of December 1992 relating to the 1992 Proposal headed "Reporting on Compliance," states that:

"The proponent shall prepare "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority. These shall include brief annual progress reports to the Environmental Protection Authority, and major public reports in 1997 and 2002."

Under the heading "Procedure: Compliance", the Statement states that:

"The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of the Minister for the Environment or any other government agency."

The Section of the Statement entitled 'Procedure' also states that:

"If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement that dispute will be determined by the Minister for the Environment."

The Advisory Committee understands that these statements mean that for the purposes of verifying the "environmental performance of this project" and "compliance with conditions", the role of the EPA is to consider the proponent (CALM)'s Progress and Compliance Report (PCR) and any other matters which enable it to verify whether in its opinion, satisfactory environmental performance and compliance with the Ministerial Conditions has been achieved. The Authority is then to convey its view and any related recommendation to the Minister.

In cases where the views of the EPA (or other agency) and CALM differ with respect to interpretation of the wording of any of the Conditions, the Ministerial Statement sets out that the Minister for the Environment has the responsibility to determine the interpretation to be applied to such Conditions, and therefore whether satisfactory compliance and environmental performance has been achieved. The Minister may also provide a determination on the interpretation or need for amendments to the Conditions, or other changes to be made, to ensure that satisfactory environmental performance is achieved.

4-2 Ministerial Press Release

In September 1996, the then Minister for the Environment, The Hon Peter Foss QC, issued a press release announcing the EPA's review of the environmental performance of the Forest Management Plan 1994-2003 (Appendix 2).

The press release announced that the EPA would be consulting with CALM to assist in that agency's preparation of a major public report in accordance with Condition 18-1 of the Ministerial Statement. The press release also indicated that after considering the report and public comments received with respect to the report, the EPA would provide advice to the Minister for the Environment.

The press release also announced that the EPA would be appointing an Advisory Committee in accordance with Section 25 of the Environmental Protection Act to assist the EPA with the preparation of its public advice to the Minister.

4-3 Terms of Reference

The first task of the Committee, under the guidance of the then Chairman of the EPA, Dr Ray Steedman, was to clarify the work of the Committee and to recommend to the EPA the final wording for the terms of reference. The following terms of reference were then endorsed by the EPA:

- 1. To liaise with CALM to develop an agreed approach to the preparation by CALM of the 1997 Progress and Compliance Report to allow the EPA to evaluate CALM's performance and compliance with the Ministerial Conditions to date in relation to the Forest Management Plan 1994-2003.*
- 2. In developing the agreed approach, to give attention to the scope and content of the report, and the definition of terms, and specifically the manner by which each of the Ministerial Conditions will be reported upon.*
- 3. To liaise with CALM during CALM's writing of the report to ensure that the report covers the scope and content agreed upon.*
- 4. To evaluate and report to the EPA on the CALM Progress and Compliance Report, including CALM's performance in compliance with Ministerial Conditions, recommend changes to procedures where shortcomings exist and adjustments to Ministerial Conditions where appropriate.*

The first three of the terms of reference required the Committee to liaise with CALM in the definition of the scope and content of the major Progress and Compliance Report (PCR), as required by Ministerial Condition 18-1 of the December 1992 Ministerial Statement. To achieve this objective, the Advisory Committee met with CALM's Director of Forests over a series of meetings during late 1996 to discuss the format and content of the proposed PCR.

4-4 Definition Statement

In order for the EPA and CALM to canvass a wider public view with respect to the material to be included in the PCR, the EPA decided that a Definition Statement outlining the proposed scope and content of the PCR should be prepared by CALM and made available by the EPA for public comment. The Definition Statement prepared by CALM was released by the EPA in February 1997 for a two week period of public comment (EPA 1997).

Twenty-six public submissions were received with respect to the Definition Statement and these were reviewed by the Advisory Committee. The Advisory Committee then provided advice to CALM on matters which should be given particular attention in the PCR and undertook to engage in further dialogue with CALM with respect to material to be covered, while the PCR was being prepared.

Some of the matters raised in public submissions were clearly beyond the scope of the PCR, an example being the suggestion that the EPA should review existing legislation relating to forest conservation and management and forest wildlife and biodiversity and make recommendations for improvements. However, in providing advice to CALM, the Advisory Committee indicated that, although not necessarily backed by scientific evidence in every case, the issues raised by persons and organisations making submissions deserved consideration.

4-5 Consultation with CALM and Familiarisation with Relevant Issues

While CALM was preparing the PCR, the Committee took the opportunity to improve its understanding of matters related to the implementation of the project, the Ministerial Conditions, and other relevant matters. The following activities were undertaken in pursuing this objective:

- In May 1997, the Advisory Committee attended a 2-day briefing at Manjimup, at which CALM officers discussed the Department's management systems for the areas of forest management affected by the Ministerial Conditions, and the specific procedures applied to give effect to the Conditions. The Committee was then taken to forest areas by CALM to demonstrate the application of these systems.
- The Committee met on 7 occasions during 1997 to discuss the project, relevant areas of forest science and management, and the system employed to audit the implementation of projects assessed by the EPA, on behalf of the Minister for the Environment.
- Between June and December 1997, members of the Committee had informal discussions with community groups and individuals, and visited forest areas.
- Members of the Committee consulted with the Independent Expert Advisory Group on Ecologically Sustainable Forest Management in September 1997 to improve their understanding of the work being undertaken by that Group.
- Members of the Committee were briefed on the Regional Forest Agreement (RFA) Process by members of the RFA Steering Committee.
- After the publication of the PCR, the Advisory Committee corresponded with the Executive Director of CALM to obtain supplementary information about matters discussed in the PCR or related to the environmental performance of the project (see Appendix 4).

4-6 Publication of the Progress and Compliance Report

On 24 December 1997 CALM submitted the Progress and Compliance Report on the Forest Management Plan 1994-2003 to the Environmental Protection Authority (CALM 1997). The Advisory Committee had previously invited CALM to provide a draft of the report for discussion with the Committee. However this was not possible as the preparation of the report by CALM took longer than had previously been expected.

On the advice of the Advisory Committee, the EPA decided that it would seek public comment on the PCR for a 12 week period between 28 January and 17 April 1998. Following discussions with the Chairman of the EPA, CALM advertised the availability of the report in the *West Australian* newspaper on 26 January 1998. This advertisement advised that all public submissions would be treated as being available for public release unless otherwise marked by the author. Subsequently the availability of the reports was also advertised at two-weekly intervals in the EPA's weekly advertisement in the Saturday edition of the *West Australian*.

Twenty four submissions were received by the EPA in relation to the PCR, some of which were very detailed. All submissions were forwarded directly to the Advisory Committee for evaluation. As with the submissions received with respect to the Definition Statement, some of the points raised in the submissions were beyond the scope of the terms of reference of the Advisory Committee.

The Advisory Committee has recommended (Section 6) that the EPA publish all of the submissions in full (except those marked confidential) as a separate volume to its report providing advice to the Minister. This would ensure that members of the public reading the report could better understand the material which was available to the Advisory Committee in formulating its advice.

5 RELATIONSHIP TO THE REGIONAL FOREST AGREEMENT PROCESS

The preparation of a Regional Forest Agreement (RFA) for Western Australia is an entirely separate process to the review discussed in this report, but this report may have relevance to the RFA process.

The RFA is an important development in forest planning and management in Western Australia, involving scientific study, formulation of forest land use options and public consultation over a period of three years. The final agreement, which will be negotiated by representatives of the State and Commonwealth Governments at the conclusion of the public consultation phase, will be signed by the Premier of Western Australia and the Prime Minister of Australia. The RFA will affect forest management in Western Australia for a 20-year period with 5-yearly reviews of implementation.

The RFA was developed in order to:

- identify areas in the south west forest region which both Western Australian and Commonwealth governments believed were required for the establishment of a comprehensive, adequate and representative forest reserve system, and provide for the conservation of those areas;
- provide for ecologically sustainable management and use of forested areas in the region; and
- provide for the long term stability of (land use decisions for) the forest and forest-based industries.

(RFA Steering Committee 1998b)

Outcomes agreed under the RFA will be achieved through amendments to legislation, policy, management plans and systems, and by the reservation of agreed proposed reserves under relevant legislation.

To a large extent, the changes agreed under the terms of the RFA will overshadow the importance of the current Ministerial Conditions, because the RFA is likely to result in changes to the current Forest Management Plan, and these changes may require assessment by the EPA. However, any statements and recommendations to the Minister made by the EPA as a result of this report may further contribute to the initiation and refinement of changes in forest management toward ecologically sustainable forest management.

Of particular relevance to the Advisory Committee are the recommendations of the Independent Expert Advisory Group (IEAG), whose report on systems and processes for Ecologically Sustainable Forest Management (ESFM) was published in December 1997 by the State and Commonwealth Governments for the purposes of assisting in the formulation of the RFA.

6 THE ADVISORY COMMITTEE'S APPROACH TO PROVIDING ADVICE

The Ministerial Statement of 24 December 1992 that the project may proceed, effectively raised two matters which needed to be taken into account by CALM in its Progress and Compliance Report and which needed to be considered by the Environmental Protection Authority. These were:

- (a) The Ministerial Condition 18 which set out that the Progress and Compliance Report was to "help verify the environmental performance of this project"; and
- (b) The Procedure Statement about compliance which set out that "The Environmental Protection Authority is responsible for verifying compliance with the conditions in this statement with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency".

Thus, the Progress and Compliance Report has two reporting elements: one about progress and the other about compliance.

The Definition Statement which preceded the 1997 Progress and Compliance Report of February 1997 (EPA Bulletin 842), set out the broad approach which CALM would follow in preparing its report on these two matters. It stated that the report would be structured around the Ministerial Conditions, and in so doing the report would focus on some major elements of forest management as set out in the Statement.

The task of the Advisory Committee, as set out in its Term of Reference 4, is to evaluate and report to the EPA on the Progress and Compliance Report, and to recommend changes to procedures where shortcomings exist and adjustments to Ministerial Conditions where appropriate.

The Advisory Committee has undertaken its task of fulfilling its Terms of Reference with the aim of providing positive and helpful advice. The Ministerial Conditions are of a nature that for some of them it is not necessarily a matter of judging compliance or non-compliance but rather a matter for providing advice to the EPA as to how the Conditions might be progressed, including suggested adjustments to those Conditions.

In preparing this report, the Advisory Committee has not been able to undertake detailed field investigation or exhaustive reviews of available research, but has considered readily available literature and information and public submissions and has made general observations with respect to compliance and to environmental performance.

The approach adopted by the Advisory Committee in Section 7 is in two parts:

- (i) advice on each Ministerial Condition; and
- (ii) comment on forest management issues as a contribution to ecologically sustainable forest management (within the context of environmental performance of the project).

In providing advice and comment the Advisory Committee wants to record that in its view CALM has perhaps the most difficult natural resource management task in Western Australia. The multi-purpose nature of the forest estate and the high public profile of forest management provides immense challenges in terms of research required, the management approach needed and the resources available. The public expectations of the management agency are sometimes out of proportion to the practical outcomes achievable.

The public submissions (a summary of which is provided in Appendix 3 of this report) have been passed to the EPA as a separate parcel, and the Advisory Committee recommends to the EPA that these be published in full, except for those submissions marked confidential.

7 ADVICE TO THE ENVIRONMENTAL PROTECTION AUTHORITY

7-1 Advice on Ministerial Conditions

7-1-1 Ministerial Condition 1 : Proponent's commitments

1 Proponent commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

1-1 In Implementing the proposal the Proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the proposal and in response to issues raised following public submissions.

Background

In the PCR, CALM has pointed out that it is normal for the EPA and the Proponent to agree on a schedule of commitments, but that this was not undertaken in relation to the forest management project. As a result, the PCR does not attempt to trace each detail in the proposal documents and report on them individually. The PCR provides information on the process that CALM has developed to give effect to its commitments.

CALM has referred to the overall commitment within the Conservation and Land Management Act to:

"manage the native forests of the south-west of Western Australia in consultation with the community, so that they provide the values required by society while sustaining indefinitely their biological and social diversity."

To achieve this CALM has established a number of subsidiary objectives and strategies under the broad headings of Conservation, Management, Production, Tourism and Recreation, Knowledge and Implementation.

CALM states that, because many of the individual strategies are complex, the various parts of the overall plan are implemented according to available resources.

Advisory Committee Comment

The Committee was briefed by CALM on the modelling of sustainable yield and harvest levels, the Geographic Information System (GIS), the Hardwood Integrated Planning System (HIPS), the Forest Management Information System (FMIS) and the strategies and work plans which are being used to plan forest operations. The Committee was impressed by the professional approach taken at the planning level.

Despite CALM's very professional approach, reservations have been expressed in a number of public submissions regarding a range of issues of relevance to the implementation of commitments.

The Committee believes that greater knowledge and understanding would be assisted by both:

- consolidation of agreed commitments in place of the current arrangements whereby the commitments are scattered through various documents; and
- supplementation of the CALM internal audit process with an active and ongoing external audit element as part of the recommended environmental management system.

Advisory Committee Advice

The EPA is advised that:

- 1) Commitments should be consolidated by CALM in consultation with the Department of Environmental Protection (DEP) to assist in monitoring and compliance assessment. These commitments should include a commitment to the development and implementation of an Environmental Management System (EMS) according to the principles of the ISO 14000 Series Documents and the Montreal Process.
- 2) The EMS referred to above should include the following elements:
 - An environmental policy including arrangements for community involvement;
 - The development of environmental performance objectives which are outcome orientated and measurable;
 - An environmental management plan and implementation program;
 - An external audit plan for measuring performance against objective; and
 - A procedure for public reporting.

7-1-2 Ministerial Condition 2 : Implementation

2 Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

2-1 An expert scientific and administrative committee will be established by the Minister for the Environment to review and report on the implementation of this proposal by 30 June 1993. The terms of reference of the committee will be to consider:

- reserve recommendations within multiple use forests involving those proposals related to temporary exclusion from timber production and potential reserves to act as wildlife corridors;*
- the environmental, economic and social implications of such proposals for:
 - nature conservation within WA's native forests,*
 - the maximum sustainable timber supply, and*
 - the existing and future timber industry;**
- the potential to increase the plantation estate on cleared agricultural land to contribute to the production of timber products.*

2-2 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

Advisory Committee Comment

Compliance has been fully achieved for Condition 2-1. The expert (Meagher) committee has been appointed and has reported.

The PCR outlines the Minister's response to the Meagher report, the subsequent negotiation of long term (10-year) contracts, the consequent industry investment, and the increase in the area of plantation estate on cleared agricultural land.

A number of public submissions expressed concern about sustainable yields. This issue is dealt with in the discussion of Condition 8 (Section 7-1-8).

The Committee considers there is a need to clarify the process for giving attention to Condition 2-2. In the PCR CALM has advised that any changes to the proposal are not substantial and that, therefore, none have been submitted for approval. The Advisory Committee advises that this Condition, which it understands is standard for all proposals assessed by the EPA, provides for proposed changes to be submitted to the Minister for a decision on the degree of substantiality (on advice from the EPA).

Advisory Committee Advice

The EPA is advised that:

- 1) Compliance with Condition 2-1 has been achieved.
- 2) The basis on which reports of proposed changes under Condition 2-2 are made to the Minister should be clarified for CALM, so that it is clear when there is a need to submit changes to the Minister for consideration. CALM should liaise with the Department of Environmental Protection to determine the practical application of Condition 2-2 in accordance with standard practice for other proponents.

7-1-3 Ministerial Condition 3 : Precautionary approach and adaptive management

3 *Precautionary approach and adaptive management*

3-1 *The proponent shall manage karri and karri-marri forest in accordance with a precautionary approach. This approach requires that where there is a significant risk that a particular forest management measure could lead to an irreversible consequence, appropriate monitoring and subsequent adjustments to management within an acceptable time-frame be carried out.*

3-2 *The proponent shall manage the jarrah forest in accordance with the following general principles:*

- (1) a precautionary approach;*
- (2) adaptive and flexible management practices based on research and monitoring of environmental monitoring of operations (see condition 17);*
- (3) implementation as a trial, with a reassessment by the Environmental Protection Authority after ten years - the period of the Management Plans and the Timber Strategy (see condition 11); and*
- (4) no commitment of all of the wood resource in the long term (see conditions 9 & 10).*

Advisory Committee Comment

The PCR summarises the factors which CALM considers require assessment in applying a precautionary approach and adaptive management to forest management. The issues listed are:

- managing for sustainable yield;
- protecting forest from catastrophic fire;
- protecting forest from disease;
- minimising the impacts of wood rots and stem cankers;
- protecting native fauna from feral animals; and
- restricting the spread of weeds.

A number of other Ministerial Conditions impact on these issues. The PCR reports on strategies, programs and management approaches under these headings which address the problems in each of these areas.

The Advisory Committee found difficulties in addressing the application of the Precautionary Principle to the complexities of forest management despite the information provided in the PCR.

The difficulty of addressing the application of the Precautionary Principle to the wide range of issues is reflected in the breadth of public submissions. For example some of the key issues raised in public submissions include the following:

- CALM should be reporting on the Montreal indicators of Ecologically Sustainable Forest Management rather than adherence to the relatively abstract 'precautionary principle.'
- CALM is intensively logging the forest and carrying out other activities with irreversible consequences but is not carrying out sufficiently detailed and comprehensive monitoring, and is therefore not exercising a sufficiently precautionary approach.
- Biodiversity and forest productivity may not be adequately protected by current management systems and prescriptions, because there is insufficient knowledge of management impacts to ensure that the systems are adequate.
- Levels of timber harvest are set at commercially and politically expedient (not precautionary) levels and do not reflect community aspirations.
- CALM is only making marginal reforms to prescribed burning policy and practice, despite this operation having irreversible consequences and despite considerable public concern.
- CALM can be proud of its efforts to control fox baiting in operations such as Western Shield.
- Dieback disease management is not being undertaken in an adequately publicly transparent and precautionary manner.

Some of these concerns may reflect a problem of perception caused by insufficient transparency in the processes for assessment of CALM's programmes, and also possibly insufficient independent assessment of the outcomes of these programmes and the differences between people in their interpretation of the precautionary approach.

The Advisory Committee therefore decided to give attention to the application of the precautionary principle in considering other Ministerial Conditions rather than attempt to make an overall judgement with respect to adherence to the Precautionary Principle.

The Committee notes that the wording of the Precautionary Principle in Condition 3-1 is different to that used in the Intergovernmental Agreement on the Environment and considers that it should be the same.

Advisory Committee Advice

The EPA is advised that:

- 1) Any revision of the Ministerial Conditions should result in adoption of the definition of the Precautionary Principle in Clause 3-5-1 of the Intergovernmental Agreement on the Environment, which defines the principle as:

“Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions shall be guided by;

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and

(ii) an assessment of the risk-weighted consequences of various options”.

(Commonwealth of Australia, 1992c)

- 2) CALM should be actively encouraged to continue the development of its forest management knowledge base and to progressively modify the Forest Management Plan and related documentation, in response to the information obtained.

7-1-4 Ministerial Condition 4 : Amendments to conservation estate

4 Amendments to conservation estate

4.1 The proponent shall initiate the Government processes required to implement the proposed amendments to the conservation reserve estate, as agreed to by the Minister for the Environment and defined in the approved Forest Management Plans.

Advisory Committee Comment

The PCR states that action has been initiated to implement proposals for 425 of the 467 areas recommended for reservation. The PCR also states that the exceptions are largely those where some downgrading is proposed.

However there are public submissions questioning the progress toward reservation of some larger areas including Julimar, Moore River, Lane Pool Reserve and Mt. Roe. Separately, the RFA process seeks to establish a Comprehensive, Adequate and Representative (CAR) reserve system.

There is some public concern that the combined effect of reservation under both the Ministerial Conditions and the RFA, may result in areas being reserved which are individually or collectively greater in area than is required by the JANIS criteria.

It seems sensible for the present proposals to be re-examined in the context of the outcome of the CAR process, following finalisation of the RFA.

Advisory Committee Advice

The EPA is advised that:

While some larger areas recommended for inclusion in the conservation estate are progressing slowly, it would be appropriate, where similar vegetation types or forest ecosystems are involved, for proposed reserves under the Forest Management Plan to be reconsidered in the context of the CAR reserve system proposal which is likely to result from the RFA.

7-1-5 Ministerial Condition 5 : Revised travel route, river and stream reserves

5 Revised travel route, river and stream reserves

5-1 The proponent shall implement the revised system of travel route (road), river and stream reserves consistent with condition 16. It is noted that the minimum combined width (both sides of a first, second or third order stream) of the proposed zones is 60 metres.

5-2 The proponent shall ensure that the travel route (road), river and stream reserves remain unharvested in perpetuity, except for those portions of regrowth forest within road zones where thinning can be undertaken in a manner consistent with, and so as to enhance in the longer term, the defined visual quality objectives.

5-3 The proponent shall monitor the effectiveness of the travel route (road) river and stream reserves for nature conservation and protection of water quality to the requirements of the Minister for the Environment.

Advisory Committee Comment

The PCR states that CALM is in compliance with Condition 5-1. However there is some community concern about the extent of protection of these zones from either fire or the incursions of contractors.

There is also concern about the degree of monitoring and the extent and rigour of control of contractors in field situations.

The DEP, in its submission on the PCR, sought further information on the implementation of Conditions 5-2 and 5-3.

Advisory Committee Advice

The EPA is advised that:

- 1) CALM is in compliance with Condition 5-1.
- 2) The advice of the DEP with respect to Conditions 5-2 and 5-3 should be noted.

7-1-6 Ministerial Condition 6 : Diverse ecotype conservation areas

6 Diverse ecotype conservation areas

6-1 Diverse Ecotype Conservation areas shall be identified by the proponent and those greater than five hectares shall be identified on publicly available maps.

6-2 The proponent shall ensure that the Diverse Ecotype Conservation areas remain protected from timber harvesting and associated activities in perpetuity.

Advisory Committee Comment

The system of mapping diverse ecotype conservation areas, which is demonstrated in the PCR, is admirable, but there is some criticism in the public submissions about the size of the scale of the maps and the fact that roads are not shown. It has also been suggested that management guidelines for the maintenance of biodiversity in these areas should be further developed at a CALM District level. This is not a requirement of the current Ministerial Conditions. Protection of Diverse Ecotype Conservation areas is an issue which is being considered within the RFA Process.

Advisory Committee Advice

The EPA is advised that:

CALM is in compliance with Conditions 6-1 and 6-2.

7-1-7 Ministerial Condition 7 : Old growth karri areas of high social or environmental value

7 Old growth karri areas of high social or environmental value

7-1 The proponent shall identify and protect areas of old growth karri (up to 3200 hectares) with a high aesthetic, social or environmental value. This is to be implemented on a regional basis and with the benefit of public involvement. These areas shall:

- (1) include those trees in Beavis, Carey and Giblett forest blocks protected from clearfelling by environmental conditions related to the Manjimup-Beenup power line proposal (EPA Bulletin 603);*
- (2) be identified publicly and progressively from the adoption of the Management Plans, with the proponent reporting to the Minister on progress towards implementation within three years; and*
- (3) shall not be harvested, and shall be managed to retain their values (other than timber production).*

7-2 The proponent shall report on the implementation and management of these special areas at the next Forest Management Review.

Advisory Committee Comment

This requirement has been affected by discussions between the State and the Commonwealth on future forest management. After a joint assessment of the reservation of high conservation forests in 1995, interim arrangements for protection of old growth forests were proposed to satisfy the draft Commonwealth reserves criteria. After a period of public consultation and further negotiations, a joint agreement (the Deferred Forest Agreement) was reached.

The RFA process which is now in progress is designed to lead to a joint Commonwealth - State agreement on the long term management and protection of forest values and consideration of social and economic values of the region.

Part of the RFA process is designed to establish a Comprehensive Adequate and Representative (CAR) Reserve system which includes strategies to protect high conservation value old growth forests. The PCR advises that a mapping project designed to map the occurrence of all old growth forests meeting the RFA Old Growth definition in the south west forests RFA Region, was completed during 1997 and that public consultation is provided for within the RFA process.

It seems appropriate for the provisions of Condition 7 to be met through the RFA process. The Minister has already accepted that action taken by CALM up to the time of their report to her on 18 March 1997 satisfied the requirements of Condition 7-1.

In the PCR, CALM has stated that Condition 7-2 will be reported on at the next Forest Management Review.

Advisory Committee Advice

The EPA is advised that:

- 1) Condition 7 should be reconsidered by the EPA at the conclusion of the RFA process when the proposed CAR forest reserve system will be defined.
- 2) The EPA review and final advice to the Minister should take into account the process used in the development of the CAR for the RFA.

7-1-8 Ministerial Condition 8 : Sustainable yield estimates

8 *Sustainable yield estimates*

8-1 *The allocated timber resource for the period ending 30 June 1993, prior to the consideration by the Minister for the Environment of the report of the committee referred to in condition 1*, will not exceed the 1993 level described in the 1987 Timber Strategy, together with an additional amount of the timber resource that was approved in the 1987 Timber Strategy but remained uncut. This additional amount may be allocated by the proponent, with the approval of the Minister for the Environment, on a needs basis, up to a total level not exceeding that proposed by the proponent in its 1992 proposals.*

8-2 *Following consideration of the report of the committee referred to in condition 2, the Minister for the Environment shall determine the annual sustainable timber resource available for allocation.*

* The reader should note that the wording of the Ministerial Statement should have referred to Condition 2-1 rather than Condition 1.

Advisory Committee Comment

The Meagher Committee was appointed under Condition 8-1 to consider the issue of sustainable yield. The Committee used CALM's models to look at a number of scenarios. One of the critical inputs to the models is the estimate of growth rate of jarrah.

The Meagher Report indicated that in 1992, the figure CALM accepted for whole of forest growth rate was 1.65 m³ per hectare, per annum. Based on that growth rate, and a 74.4% jarrah component, the sustainable yield of first- and second-grade saw logs was calculated at around 450 000 m³/yr (Scientific and Administrative Committee, 1993).

Subsequent to 1992, the growth rate was reconsidered and allowance made for low productivity areas and dieback and other considerations. The re-assessment arrived at a more conservative average figure of 1.2 plus or minus 0.2 m³/ha/yr for the growth rate of the whole of the forest. Calculated on a 74.4% jarrah component this gave the figure of 298 000 m³/yr plus or minus 50 000 m³ as a sustainable yield. These estimates are based on a 33% conversion rate to first- and second- grade saw logs (Scientific and Administrative Committee, 1993).

The Meagher Report commented that there is an urgent need to get an accurate basis for the estimation of growth rates for jarrah.

Minister Minson's response to the Meagher Report, of August 1993, accepted the advice from CALM and the Meagher Committee that 'the long term non declining yield of sawlog supply is likely to be around 300 000 m³/ yr, but may be as high as 450 000 m³ / yr, if utilisation rates increase'.

The Public Consultation Paper (PCP), published earlier this year as part of the RFA process, has commented on the Meagher Report. The PCP states that the long-term non-declining yield of first- and second-grade jarrah sawlogs is approximately 300 000 m³/yr. The Minister approved a level of cut of 490 000 m³/ yr for the period 1 January 1994 to 31 December 2003. The PCP further states that, based on the CALM harvest prediction model FORSHED, if the level of cut is maintained above 300 000 m³/yr beyond 2004, a substantial decline in sustainable yield is likely by the year 2030 (RFA Steering Committee, 1998b). This is in accord with comments made in the Meagher Report, as a result of the yield scenarios that the Committee had assessed.

CALM has recently advised that there is major adjustment proceeding in the industry, which will result in better conversion of useable product from the total tree bole volume felled. On this basis, CALM expects that the level of wood production by the industry can continue at its present level, even if the level of cut is reduced (presumably in 2004) to match the current estimated long term sustainable yield level of sawlogs.

The Meagher Committee found that karri was being harvested at a sustainable rate and that the harvest levels agreed with estimates of sustainable yield and made a similar statement with respect to marri.

Advisory Committee Advice

The EPA is advised that:

- 1) Compliance with Conditions 8-1 and 8-2 has been achieved. It is doubtful that this Ministerial Condition serves any useful future purpose, because cut levels have been determined until the timing of the next Forest Management Review.

7-1-9 Ministerial Condition 9 : Commitment of wood

9 *Commitment of wood*

9-1 *Subject to condition 8, in the letting of contracts for wood supply from the jarrah forest, the proponent shall:*

(1) not exceed the annual levels of timber supply defined in condition 8 above; and

(2) recognise the possibility of the necessity to reduce wood supply beyond 2002 as a result of monitoring and adaptive management following the trial implementation of the jarrah forest silvicultural prescription.

Advisory Committee Comment

CALM has advised that the long term non-declining level of saw log supply at current specifications is approximately 300 000 m³/yr but may be as high as 450 000 m³/yr if the proportion of tree volume felled which is converted to sawlog (utilisation rate), increases.

CALM has also advised that the jarrah saw milling industry has undergone remarkable change since 1987. The requirement in CALM's post 1993 timber supply contracts for 50% of the mills' jarrah output to be value added within three years has resulted in large scale investment in value adding equipment, particularly drying kilns and new saw lines, which will make it possible to add value to smaller pieces of timber.

CALM has advised that the recovery of value added product has now reached 60% of output volume, industry wide.

CALM anticipates that the above changes will make the current sawlog specification irrelevant, with smaller dimension timber being processed, making it possible to make greater economic use of the remainder of the tree bole. Harvesting with the objective of utilising the maximum proportion possible of each tree felled, is commonly referred to as 'whole bole logging'.

In his 1993 response to the Meagher Report, the then Minister for the Environment, The Hon Kevin Minson, flagged a proposed change to the utilisation of harvested trees in Western Australia's forests to an approach employing whole bole logging. Since then, CALM has advised that five trials of whole bole logging have been carried out and that while some issues remain to be resolved, there are no insurmountable obstacles to implementation of whole bole logging. Whole bole logging is also more likely to be more readily compatible with the measurement of forest growth and yield using gross bole volume, rather than the current system which works on the basis of availability of first- and second-grade sawlogs.

CALM has advised that the results of the whole bole utilisation studies are ongoing, involve a number of studies and are not currently available.

The adoption of whole bole logging will need to be accepted fully by industry, and issues such as transport, particularly over longer hauls, will need to be resolved if sustainable harvest levels are to be achieved. The RFA Public Consultation Paper (PCP), observes that advice received from consultant BIS Shrapnel, indicates that forcing the timber industry to utilise lower quality material 'could lead to market distortions and consequential inefficiencies both in terms of transport and resource utilisation'(RFA Steering Committee, 1998b).

Advisory Committee Advice

The EPA is advised that:

- 1) CALM is in compliance with Condition 9-1(1).
- 2) In relation to 9-1(2), CALM advises that industry adjustment is proceeding which will manage the potential decline in saw-logs of the current first and second grade specification in 2004. The adjustment involves the greater economic use of the remainder of the tree, whole bole volume and greater recovery of lower grade logs.

7-1-10 Ministerial Condition 10 : Commitment of new resource to be referred

10 Commitment of new resource to be referred

10-1 Notwithstanding Section 38 of the Environmental Protection Act, the proponent shall refer to the Environmental Protection Authority any proposal to enter into a contract for a substantial portion (as determined by the Minister for the Environment) of forest produce identified as other logs (jarrah) or forest residue (marri) in the revised Timber Strategy (Table 13 of the proposals document).

Advisory Committee Comment

The table and explanation on page 38 of the PCR indicate that 685 000 m³/yr of “other logs - jarrah” and 300 000 m³/yr of (jarrah and marri) forest residue “with some commercial potential” would be available from the forest for prospective purchasers, if markets were available. Any use which could be made of this residue should be encouraged, as the under-utilisation of this material represents both a loss of resource, and a potential problem for the future management of the forest. At present there is no market for this product.

Advisory Committee Advice

The EPA is advised that:

- 1) CALM has not signed any contract for other logs or forest residue and Condition 10 has not been invoked. Therefore CALM is in compliance with this Condition.

7-1-11 Ministerial Condition 11 : Jarrah silviculture trial

11 Jarrah silviculture trial

11-1 The proponent shall implement the jarrah silvicultural prescription so that monitoring of the environmental impacts on a representative range of treated sites and localities in the forest can be carried out to the requirements of the Minister for the Environment. This shall include long term monitoring which quantifies the impacts of silvicultural practices on environmental elements and values in the forest and provides bases to adjust management.

11-2 The proponent shall give all necessary assistance to the Monitoring and Research Committee (condition 16) to enable it to have an active and fully informed role in the planning and oversight of the scientific monitoring of this trial period.*

11-3 The proponent shall report to the Minister for the Environment on outcomes of this implementation and monitoring and on any modifications to the prescriptions by 2002 as part of the next review of the Forest Management Plans and Timber Strategy.

* The reader should note that the Ministerial Statement should have referred here to Condition 17 and not Condition 16.

Advisory Committee Comment

CALM has reported in the PCR that the jarrah silviculture prescription trial has been implemented at one trial site (Kingston). Condition 11-1 requires that the trial be carried out over 'a representative range of treated sites and localities in the forest'. CALM has indicated that it has had insufficient resources to implement this Condition according to the literal interpretation of the wording and it is argued that in any case, the delay in widening the extent of the trial will improve planning for other sites which are to be selected in the near future.

As stated in the PCR "much of the focus of the Kingston Study has been on the impact of logging and associated activities on medium sized mammals" and the first interim report published is on the impact of timber harvesting on medium sized mammals. CALM is yet to report on other environmental impacts associated with the implementation of its jarrah silvicultural prescriptions .

The PCR provides no information on the extent, species composition or growth rates of the forest regeneration.

The Kingston research work is interesting and detailed , however it is restricted to one location and therefore may not necessarily be applicable to other locations in the south west.

The public comments include two statements which suggest that the Forest Monitoring and Research Committee (FMRC) has not been allowed to fulfil the role intended for it under this Condition.

The PCR states that the FMRC has been briefed on progress with the Kingston trial. It also states that the FMRC will be involved in the planning phase of future work which is described as a retrospective trial.

In view of the wide application of the forest prescription across a range of soil types and climate zones, it is unfortunate that this important Condition has been given a low priority by CALM. Until the trials are carried out in a range of conditions there will be continued uncertainty about the rate of regeneration of jarrah under the general silvicultural prescription. This makes further evaluation across the range of conditions an urgent issue

Advisory Committee Advice

The EPA is advised that:

- 1) Noting that the use of the gap creation method of harvesting was introduced as a trial measure for jarrah and jarrah-marri, Condition 11-1 has been complied with at one site, and the trial will now be extended to other sites. The geographic limitation on the extent of experimentation to date is argued on the basis of limited resources.
- 2) Noting that under Ministerial Condition 3-2, implementation of the management of the jarrah forest was to be within the principle of a trial, with reassessment by the EPA after 10 years, the EPA should consult with CALM in relation to the EPA's requirements of the report by CALM, to ensure that there is an agreed basis for the 10 year reassessment by the EPA in 2002.

7-1-12 Ministerial Condition 12 : Phased logging

12 Phased logging

12-1 The proponent shall ensure that, in all second order catchments in the intermediate and low rainfall zones of the multiple use jarrah forest subject to logging, at least 30 per cent of each second order catchment has a retained basal area of greater than 15 m²/ha for a period of at least 15 years after harvesting of the remainder of the catchment.

12-2 This retained forest shall be selected to enhance wildlife, water resource and visual objectives.

12-3 The proponent shall monitor, to the requirements of the Minister for the Environment, and report by 2002 on the status and effectiveness of these measures to protect nature conservation values and water quality at the time of the next review of the Forest Management Plans and Timber Strategy.

Advisory Committee Comment

A primary purpose of this Condition is to prevent the development of salinity, although there is also reference to nature conservation values. The Advisory Committee's comments on salinity can be found in the Section 7-1-16 relating to Condition 16.

While there is little concern about any increase in long term salinity under normal forest management, there is concern about short term impacts. In order to minimise the possibility of short term effects, the phased logging prescription was agreed.

In some public submissions there was comment that the basal area requirement was difficult to audit. However the Advisory Committee is of the view that the current provisions should be retained in total.

The Advisory Committee notes that the PCR does not indicate the extent or nature of monitoring carried out by CALM on the effectiveness of this prescription.

The PCR advises that the requirements of 12-1 and 12-2 have been included in the relevant silvicultural prescriptions.

Advisory Committee Advice

The EPA is advised that:

- 1) CALM is in compliance with Condition 12-1 and 12-2.
- 2) The EPA may wish to seek advice from CALM on the results to date of monitoring required under Condition 12-3.

7-1-13 Ministerial Condition 13 : Habitat trees

13 Habitat trees

13-1 The proponent shall ensure that the number, condition and age of trees retained on sites subject to gap treatment is sufficient, as determined by the Minister for the Environment, to adequately provide the habitat function throughout the cutting cycle of the forest.

Advisory Committee Comment

The use of habitat trees has to be considered in relation to the surrounding forest. CALM's forest prescription as set out in the PCR recognises this issue. It further states that it is developing the capacity to estimate the number of hollows per hectare by linking predictive models to the regional forest inventory database.

Advisory Committee Advice

The EPA is advised that:

- 1) CALM has implemented the provisions of Condition 13.
- 2) Provision of critical habitat requirements for fauna should be reviewed by CALM in line with ESFM objectives and results of the Kingston study and other information, to enable the EPA to determine whether a condition dealing specifically with habitat trees is justified.

7-1-14 Ministerial Condition 14 : *Banksia grandis* reduction

14 *Banksia grandis* reduction

14-1 The proponent shall concentrate the proposed reduction of the population of *Banksia grandis* in specific areas where the environmental circumstances suggest that treatment will have the greatest impact on reducing the spread and intensification of *Phytophthora cinnamomi* in the jarrah forest and where required to establish jarrah and marri regeneration.

14-2 The proponent shall establish a programme, to the requirements of the Minister for the Environment, to identify and evaluate the environmental implications of the proposed reduction and that the results of that evaluation shall be reported on, at or before the time of the next review of the Forest Management Plans by 2002.

Advisory Committee Comment

The PCR reports that CALM has not implemented the requirements of conditions 14-1 and 14-2. The PCR states that CALM will now focus on the recommendations of the Dieback Review Panel as a basis for future dieback management and will advise the Minister accordingly.

Advisory Committee Advice

EPA is advised that:

- 1) CALM has not implemented this Ministerial Condition. Although this decision has been taken without reference to the Minister or the EPA, there is general agreement that *Banksia grandis* should not be targeted for removal, especially as the consequences are unknown.
- 2) Conditions 14-1 and 14-2 should be removed and more appropriate programmes relating to minimising the spread of *Phytophthora cinnamomi* should be developed through a publicly transparent process, on the basis of the recommendations of the Dieback Review Panel.

7-1-15 Ministerial Condition 15 : Fire management

15 Fire management

15-1 The proponent shall ensure that the fire management objectives related to the jarrah forest silvicultural prescription include the minimisation of air pollution in urban areas, to the requirements of the Minister for the Environment.

15-2 The proponent shall inform the public about its fire management on a regional basis each year in its annual report. This shall include but not be limited to the following:

- (1) occurrences and causes of wildfires;*
- (2) purposes of burns;*
- (3) areas burnt under different regimes of season and periodicity;*
- (4) escapes; and*
- (5) the contribution of prescribed burning to reducing wildfire hazard.*

15-3 Within 12 months of this proposal being given authority to be implemented the proponent shall initiate a public review of its prescribed burning policy and practices and the wildfire threat analysis. This should be done with the close involvement of the Research and Monitoring Committee. If possible it should be linked with a review of the provisions of the Bush Fires Act.

Advisory Committee Comment

The summary of issues raised in public submissions illustrates the extent of public concern about the detail of the fire management by CALM. This concern relates to the scale, frequency, timing and intensity of burns.

Specific issues include fire tolerance of flora and fauna, dieback spread and expression and protection of 'no burn' areas.

The general issues are being considered within the RFA process, with recent RFA documents stating that management must be actively geared to maintaining all basic ecosystem processes, including nutrient and carbon cycling and the maintenance of biodiversity.

Fire management is an area in which public involvement at the local level could provide input and support for local programs and may assist recognition of concerns and acceptance of program implementation.

The wider community should be involved in fire management more fully at the local level and also at the policy level.

The PCR shows that the Conditions have been complied with, except for involvement of the FMRC in the fire management review.

Advisory Committee Advice

The EPA is advised that:

- 1) CALM has complied with Conditions 15-1 and 15-2 and has substantially complied with Condition 15-3. The PCR makes no reference to the involvement of the FMRC in the public review of prescribed burning policies and practices and the Wildfire Threat Analysis.
- 2) The *CALMfire* process for setting priorities for the use of prescribed fire and the weighting given to different values used in the Wildfire Threat Analysis, should be revised to better reflect the two over-arching and six specific principles of ecologically sustainable forest management and the current knowledge of the response and resilience to fire, of ecosystems in the south-west forest region. This is in accordance with Recommendation 3-2 of the Independent Expert Advisory Group report on Ecologically Sustainable Forest Management (IEAG, 1997).

7-1-16 Ministerial Condition 16 : High salt risk catchments

16 High salt risk catchments

16-1 Within three years, or such other period as the Minister for the Environment shall nominate, the proponent, on advice from the Water Authority of Western Australia, shall identify second order catchments with a high salt risk.

16-2 Within each catchment identified according to the requirements of condition 16.1, the proponent shall retain additional river and stream buffers and locate areas temporarily reserved during phased logging operations to the requirements of the Water Authority of Western Australia

Advisory Committee Comment

Advice from the Water and Rivers Commission (WRC), is that up until 1996, little was done to identify any 'at risk' catchments. During this time there was a considerable amount of logging by CALM in the intermediate rainfall zone.

The additional river and stream buffers and phased logging approach proposed in Condition 16, is based on research which has been carried out by the WRC and its predecessors since the 1970's. This work has shown that while there are situations where increases in salinity can occur following logging, there is no risk of serious long-term salinity developing under normal forest management programs. Any short term effects would be minimised through the phased logging prescription. This issue is discussed further in Section 7-2-11 on the issue of Salinity.

The WRC concluded, however, that there could be circumstances where short-term increases in salinity are important. These circumstances are related to situations where the ecology of pristine aquatic systems could be sensitive to small short-term increases in salinity level.

As a result, the WRC identified stream systems which it considered should be protected. In each of the Natural Resource Management (NRM) areas in the south west of the state, at least one stream system with these special values, was identified. The identified stream systems are of high environmental value and could be sensitive to increased salinity, and therefore warrant the additional protection measures required by Condition 16 (as set out in detail in the record of agreement between CALM and the WRC). The maps of salt-sensitive catchments in the CALM PCR (Map 2 of Appendix 18) show the catchments of all second order streams within the stream systems identified by this process.

The WRC considers that in susceptible catchments, any effect will be eliminated provided there is phased logging of the area and retention of adequate stream buffers in accordance with the CALM WRC Agreement. The Commission has advised that no more than 70% of each identified catchment should be permitted to be cut in any 15 year period, and that the uncut buffer should be maintained adjacent to the watercourses.

The wording of Condition 16-1 refers to 'identification of second order catchments with a high salt risk'. However it does not define what is considered to be a risk situation. If the requirements of the literal interpretation of the wording of this Condition were to be met, it would require considerable expenditure by CALM on hydrogeological investigation work. On the basis of the WRC research described, this would seem to be largely unjustified, as any deleterious effects would be of a short-term nature. It was for this reason, that the WRC elected to identify catchments with special properties which they considered warranted protection.

In view of current knowledge it would seem desirable for this Condition to be rewritten to provide that action only be taken under 16-2 in situations where special protection is warranted (ie in the catchments identified). It would be expected that there would be a limited number of additional situations where phased logging might be required.

Some farmers have expressed concern that 'short term' rises in the salinity level of their water supplies might have a serious impact on their enterprises, and it would seem appropriate for CALM to be responsive to this issue in planning their harvesting programs.

Advisory Committee Advice

The EPA is advised that :

Salinity development has been shown by WRC research to be a minor problem under normal harvesting programs in the forest industry. The measures set up in Condition 12 largely satisfy any potential problems. Condition 16 has not been complied with in accordance with the literal interpretation of the Condition, but the Advisory Committee considers that on current knowledge, the action taken has been appropriate. Conditions 16 should be redrafted to ensure that:

- only selected high value aquatic environments are identified and protected from damage through short term rises in salinity; and
- harvesting operations are carried out in a way which ensures that where appropriate, farm water supplies are protected from short-term increases in salinity resulting from forest activities, which could make those supplies unsuitable for their current use.

7-1-17 Ministerial Condition 17 : Forest Monitoring and Research Committee

17 Forest Monitoring and Research Committee

17-1 The Minister for the Environment will set up a committee having objectives which include:

- (1) identification, prioritisation and approval of monitoring and research programmes and projects on environmental impacts of forestry management,*
- (2) the granting of funds towards such monitoring and research,*
- (3) receipt of progress reports,*
- (4) reporting to the Minister for the Environment and*
- (5) publication of results.*

17-2 The Committee shall include the heads (or nominees) of the Department of Conservation and Land Management, the Environmental Protection Authority, the Western Australian Forest Industries Federation, the Conservation Council and the Water Authority of Western Australia, and the Chairpersons of the Lands and Forest Commission and the National Parks and Nature Conservation Authority.

17-3 The Committee shall appoint working groups of scientists to recommend and report to the Committee on the design and funding of research projects, the identification, prioritisation and review of monitoring and research programmes and projects relating to the environmental impacts of forest management.

17-4 The Committee shall provide brief annual progress reports to the Minister for the Environment, with major reports in 1997 and 2002, at the time of the next review of the Forest Management Plans and Timber Strategy.

Advisory Committee Comment

The Forest Monitoring and Research Committee (FMRC) was established in December 1993, complying with the requirements of 17-1 and 17-2. The FMRC's terms of reference require it to focus on research directly relevant to the impacts of forest management on the environment.

Under condition 17-4 the FMRC is required to report annually and to provide major reports to the Minister for the Environment in 1997 and 2002.

The PCR states that since it was established in December 1993, the FMRC has met twice in 1994, four times in 1995 and twice in 1997. During those meetings it is reported to have spent its time on considering the way in which it would operate, and receiving briefings from CALM in order to assist members to make informed decisions about the science being carried out by CALM. The PCR states that reports have been presented for the financial year 1993/94 and for the calendar years to December 1995 and 1997. The FMRC did not meet in 1996.

The FMRC has had no funds and understandably considered that 17-3 would be difficult to implement without funding. The FMRC is also reported in the PCR, to have agreed that 'the likelihood of the Committee identifying something not already in CALM's research program was very low'. Instead, the FMRC decided to review material provided to members about CALM's research program and ask CALM's scientific staff to present summaries of their work. Although documents summarising *Science Project Plans* in CALM's Science and Information Division were forwarded to the FMRC and the FMRC was briefed by key scientists, it is understood that no research projects were referred to the FMRC. The Advisory Committee also understands that until 1997 the FMRC made no specific request to CALM for funds for specific projects.

In August 1997 CALM agreed to make limited funds available for this purpose, and the Committee finally agreed to appoint a working party of scientists to report to it under Condition 17-3 on:

- CALM's current forest research and monitoring programs and the priority given to them; and
- any gaps in the research and monitoring program which may be identified.

In early 1998, at the request of the FMRC, CALM contracted three scientists to work with two CALM scientists to undertake an identification, prioritisation and review of the monitoring and research programs and projects related to environmental impacts of forest management. This group was not asked to consider the design and funding of the research projects.

The Advisory Committee has discussed the issue of the level of funding available for research within Section 7-2-3 of this report.

The IEAG has proposed that the FMRC be retained as a peak body for advising on research priorities within CALM, and should represent a wide range of stakeholder interests but should not be involved in the funding of research.

Advisory Committee Advice

The EPA is advised that:

Compliance with Ministerial Conditions 17-1 and 17-2 has been achieved. However :

- 1) Based on the statements in the Progress and Compliance Report PCR, any reasonable interpretation of the actions taken under this condition since 1993 indicates that the FMRC has never functioned in the manner that was intended under Condition 17.
- 2) The Advisory Committee considers that there is a need for research and monitoring in the area of forest management to be focused on high priority issues identified by the FMRC on the advice of expert panels, as proposed in Condition 17, and must be adequately funded.
- 3) To achieve the outcomes intended in Condition 17 there is a need for the purpose, membership, powers, procedures and resources required for the effective functioning of the FMRC, to be specified and included in legislation or a Ministerial direction.
- 4) The majority of the Advisory Committee considers that transparency of funding and focus of research will be best achieved through the establishment of the FMRC as an independent committee which is provided with a substantial budget, and powers to monitor and fund research related to forest management.

7-1-18 Ministerial Condition 18 : Reporting on compliance

18 Reporting on compliance

18-1 The proponent shall prepare "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority. These shall include brief annual progress reports to the Environmental Protection Authority, and major public reports in 1997 and 2002.

Advisory Committee Advice

The EPA is advised that:

CALM has complied with the requirements of Condition 18.

7-2 Comment on Forest Management Issues As a Contribution to Ecologically Sustainable Forest Management

7-2-1 Issue 1 : Transparency of process

Background

Forest management is high profile in terms of public interest. This was evident when the EPA undertook its forest assessment in 1992 and it is still evident throughout the current RFA process.

Comment

The high public interest in forest management has raised questions about the transparency of the management process. The Advisory Committee recognises this as an important issue and has been assisted in its discussions by having available the report of the Independent Expert Advisory Group (IEAG), on the 'Assessment of Ecologically Sustainable Forest Management (ESFM) in the South-west Forest Region of Western Australia'. The IEAG's report includes "public transparency" as one of the six criteria for assessment of forest management systems and processes against the principles of ESFM. These criteria are listed in Table 1 of the IEAG report, and are consistent with the principles of environmental policy expressed in the Intergovernmental Agreement on the Environment and the National Forest Policy Statement (IEAG, 1997).

There is an increasing move to provide transparency of outcomes in environmental management within both the private and the public sectors. This forms part of the philosophy of the ISO 14000 Management System Series, and is supported by the International Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests (Montreal Process) which has stated that "*It should be emphasised that an informed, aware and participatory public is indispensable to promoting the sustainable management of forests*" (Canadian Forest Service 1995). Noting the high public profile of forest management and multiple use of the forest estate, the matter of transparency of environmental outcomes against objectives is of increasing importance.

Transparency of process needs to be demonstrated at all levels of environmental performance. The Advisory Committee has noted that the EPA now includes in its reports to the Minister under section 44 of the Environmental Protection Act, a recommendation that the Environmental Conditions attaching to the Ministerial Statement, include a requirement that the proponent demonstrate that there is an environmental management system (EMS) in place which includes the following elements:

- an environmental policy and commitment;
- planning of environmental requirements;
- implementation and operation of environmental requirements;
- measurement and evaluation of environmental performance; and
- review and improvement of environmental outcomes.

In any review of the Ministerial Conditions in relation to the project, attention should be given to the inclusion of an EMS Condition, and its implementation should include the requirement for transparency of environmental performance consistent with the high public profile of the environmental aspects of forest management.

7-2-2 Issue 2 : The Lands and Forest Commission

Background

The Lands and Forest Commission (LFC) is established under Part III of the *Conservation and Land Management Act 1984* (the CALM Act). The membership of the LFC consists of two persons appointed by the Governor on the nomination of the Minister and the Executive Director.

The LFC has a number of statutory roles. Two of the more important responsibilities in the context of this report are to 'submit proposed management plans to the Minister,' and to 'monitor the carrying out of management plans' by CALM.

Comment

The Advisory Committee recommends that the role of the LFC be expanded to ensure that the audit process is in accord with the Environmental Management Strategy set out Committee's advice on Condition 1-1 of the Minister's statement. To enable it to undertake this role in addition to its current responsibilities, the LFC would need to be established with a new composition, be clearly independent of CALM, and have its own budget.

In consideration of the proposed change in role of the LFC, it is further proposed that its composition include an independent chairperson, and up to five members chosen for their expertise in areas such as business management, forest production, forest ecology, timber processing, conservation, community affairs and government administration. The LFC should continue to be a 'controlling body' under the Conservation and Land Management (CALM) Act, but it should have a revised charter.

In providing this advice, the Advisory Committee recognises that changes to the CALM Act will be necessary. The proposed restructuring is broadly in accord with recommendation 1.4 of the Independent Expert Advisory Group on Ecologically Sustainable Forest Management.

7-2-3 Issue 3 : Forest research and monitoring

The area under the management control of CALM includes many diverse ecosystems, occurring in different soil types, positions in the landscape and ranges of climate conditions throughout the State. This complex situation is overlain by problems associated with the increasing importance of introduced diseases, weeds, and predators in the forests. In addition, CALM's responsibilities extend from forest production to the management of endangered flora and fauna. CALM is also heavily involved in the development of tree plantations on farmland as sources of wood chips and timber, and the management of wildlife across all land tenures.

Management of this complex and diverse portfolio requires both access to the best available information and the flexibility to adjust to changed circumstances and new information.

Information obtained by the Advisory Committee suggests that while CALM is to be commended on its record and its very good research and development programs in some areas, there are substantial gaps in its overall program. These gaps are doubtless related to the level of funding that is available for the overall program.

The original objectives for the reporting, monitoring and re-evaluation of ecosystems and ecosystem management set out in CALM's Policy Statement 28 in 1988 were to:

- study and record management decisions and their effects on CALM lands, and to incorporate the information gained in subsequent development of policy and management plans;
- maintain up-to-date records of distribution and status of the State's biota, the management decisions that are made about that biota and about department lands (and waters) and the consequences of those decisions;
- provide a mechanism for systematically reviewing management policy and programs in light of new information; and
- provide an ongoing record system which will document changes in community species composition through natural ecological changes as well as management.

Research

It is essential that CALM has a well funded, managed and focused research and development program covering its activities. Appropriately targeted and conducted research, with the findings of research fed back into the system as a basis for future management policy, is pivotal to the achievement of the above objectives.

The Advisory Committee considers that it is particularly important at this stage, where there are major changes in silvicultural prescriptions, for adequate resources to be available to study the outcomes in the range of situations in which they are being applied. The applicability of the results of research on highly productive forest areas, to the outcomes in less productive areas, is uncertain, as is the direct transferability of research in the northern jarrah forest to the southern jarrah forest.

The Advisory Committee is aware that recently advertised tenders for timber resource indicate that a high proportion of the jarrah logs harvested at present are obtained from the southern forests (south of the Preston River), whereas reviews by Abbott and Loneragan (1986) and Shearer and Tippett (1989) illustrate that the northern jarrah forest has been the focus of most research work on both dieback and jarrah silviculture to date. It is also apparent that within the broad region south of the Preston, the jarrah silviculture specification is now being applied to areas of differing climate and poorer soils in the southern and eastern forest areas. As the long-term productivity and sustainability of the native hardwood forests in these areas is dependent upon the effectiveness of the jarrah prescription, these values are correspondingly significantly affected by the reliability of the information basis (ie research and monitoring) of the prescription.

Information available to the Advisory Committee does not allow it to quantify the current level of research being carried out in the area of forest regeneration and growth of regenerating forests. It was noted however, that the 1993 to 1995 Triennial Report for the CALM Science and Information Division (CALM 1995) states that there has been a steady decline in funding reflecting successive cuts in public sector finances. The Triennial Report also shows that there has been an increase in the percentage of funding spent on salaries, to the point where this has reached approximately 93.7% of research expenditure. It is stated that this change, coupled with rising infrastructure costs, had resulted in the funds available for research falling sharply. In other research institutions involved in research on resource management, such as the CSIRO, a rise in the percentage of the total research budget spent on salaries as opposed to operational expenses and equipment to above 70%, would be cause for concern.

The report also states that there has been a sharp rise in outside funding. However the majority of this funding appears to come from organisations whose focus is not directly relevant to research on native forest regeneration and productivity. While information has been provided by CALM, there still appears to be some major gaps in forest research.

Nevertheless some very good work has been reported on the disturbance ecology in selected areas of the forests, such as the area selected for the Kingston Project. The work to date has generally shown that the effects of some disturbances on subject fauna are minimal. The Advisory Committee has also been presented with other information which suggests that disturbance in other areas of the forest may be having a greater influence on wildlife and landscape values.

Some of the issues raised with the Advisory Committee or by members include:

- Concern was expressed about the large component of funding for fauna research which is committed to the very successful 'Western Shield' program. Although the program has been very successful, it does include large scale baiting, monitoring of impact and the re-introduction of rare fauna into new habitats, all of which are costly. This is seen by some outside observers as affecting other important areas of fauna research. The WA Museum report on natural science for the RFA (WA Museum of Natural Science, 1998), for instance, refers to serious deficiencies in the availability of site-specific fauna data.
- Ecological work on the impact of management practices on fauna and flora is regarded by some scientists outside CALM as being too focused on individual species, as opposed to total systems.
- Scientists have identified the potential need to develop research programs on indicator or keystone species, which may be utilised to monitor functioning processes and the condition of forest ecosystems.

Monitoring

Monitoring of the outcomes of forest management, and the influence of natural events and variation on forest productivity, are vital for effective management and long-term decision-making. The RFA ESFM Report (IEAG 1997) and Public Consultation Paper (RFA Steering Committee 1998b) have identified monitoring and reporting of forest outcomes and accreditation of monitoring systems as essential elements of the RFA process.

Monitoring can be at various levels of sophistication. One approach might include satellite imagery and aerial photography, coupled with ground verification and tower based systems for measuring net CO₂ and H₂O exchanges and associated carbon sequestration by vegetation. Such tools have been used to measure a range of issues in relation to growth rates and overall health of specific types of forest, but are quite expensive and require highly trained staff for data interpretation. However, they can provide unique long-term inventories on forest health, as well as large-scale, short-term comparisons between areas.

Alternatively, monitoring can involve a less sophisticated approach, for example recording the adequacy of post-harvest treatment of forest blocks, or the impact of forest management on stream water quality.

The Committee considers that CALM should be encouraged to provide a series of public statements about its monitoring programs to raise public awareness of the activities being undertaken and the nature of the data which will be publicly available.

It is important that monitoring be undertaken in a consistent form and the observations are recorded in a form that is readily available to all those involved in research and operational activities.

It is appreciated that adequacy of funding is always an issue in the area of research and monitoring. However, the Advisory Committee considers that the adequacy of funding for research is a question of priority, and that the importance of a comprehensive knowledge base makes it essential that sufficient resources are made available to research new opportunities and to monitor the field outcomes of current operational practices.

The Advisory Committee has referred in this and other sections of this report, to a special issue in relation to native hardwood production, associated with implementation of the new jarrah silvicultural prescriptions over a large area of the jarrah forest. However the Committee recognises that this need should not be pursued to the extent that it prevents important work on the ecological impact of the total package of forest management programs.

The Advisory Committee has noted that Bulletin 329, Bulletin 652, the review of Dieback by Dieback Review Panel, and the 1992 Appeals Committee (Barnett) report, all recommended industry-funded research for studies of many issues associated with forest production. While there is an industry fund for forest and wood products in existence, this deals with timber management and processing rather than 'in-forest' issues.

The Advisory Committee has made four recommendations on the future focus and funding of forest research and monitoring under Condition 17.

7-2-4 Issue 4 : Timber production and the management of uncertainties

Background

CALM has a well-developed management system for regulating forest harvests. It is based on a number of information data bases and support systems for decision-making.

The system, developed as a result of a major departmental commitment, has a number of facets and uses. The inventory system is considered sophisticated and of world class. As with all management systems, its use helps focus attention on the validity, variability and sensitivity of data inputs which require frequent verification and review.

Although the timber industry has been seeking certainty of supply, there are a number of uncertainties in projecting yields over large areas and over long periods of time. The management of natural ecosystems is inherently more complex than, say, the management of plantations. The multiple-use production forest approach also requires that a variety of values be identified and accounted for in a systematic way.

Comment

CALM is to be commended on the development of a large number of mathematical models which have been used to provide estimates of wood resources and yields for the south west forest region of the State. The methods and data used by CALM have been reviewed by Dr Brian Turner as part of the RFA process (Turner, 1997).

As with all production models, the reliability of the predictions depends on the assumptions made and the quality of the data available. This requires continuous review and an on-going research program to ensure continuous improvement in the outcomes available to decision-makers, the industry and the public. An important assumption behind the predictions is that the silvicultural treatments are being carried out according to the schedule defined as appropriate for the success of the modelling work, and that the outcomes of the silvicultural treatments will be as predicted. Those treatments also need continuous review to take into account changing circumstances which may result from physical or biological change, the requirements of the industry or changes in the expectations of the community in relation to forest management.

The sensitivity of the model predictions to changes in forest growth parameters is also important. Some of the factors which can result in variations are changes in soil productivity, post-harvest treatment of areas logged, disease spread or intensification, insect damage, waterlogging and long-term climatic change.

By way of example, harvesting to gaps appears to increase the vulnerability of jarrah to frost damage, and therefore to forking, and this needs to be monitored (Abbott and Loneragan 1986). Bullseye borer is also known to affect the growth rates and log quality of both jarrah and karri regrowth forests (Siemon 1995). There is concern that the current intensive rate of cutting will progressively reduce the average age and size of trees in the jarrah forest, resulting in a serious impact on the quality of logs available for industry.

The lead time for growth of a forest to harvesting is very long compared with most other biological systems subjected to resource use, and this needs to be taken into account in determining the impact of parameter variations.

Growth information is a major component of any production model. In this regard, Dr Turner (1997) has advised as follows:

"Because of the checks and balances built into the system it is probable that estimators of current growing stock statistics are quite reliable and that karri growth is reliably estimated, except perhaps for low site quality or mixed species stands. Jarrah growth estimations in the short term are likely to be fairly reliable but in the long term, less so with the current modelling approaches."

On-going dedicated research is a necessary part of the modelling approach so that the information-base, on which the estimates of sustainable yields are so heavily dependent, is continually being improved and made available for public information. For instance, Dr Turner has pointed to a 'shortage of long-term plots' (for estimating growth) in areas which are representative of forests treated using the current silvicultural regimes.

Jarrah permitted harvest- level and sustainable yield

The following points summarise the current situation with respect to jarrah production:

- The current annual allowable jarrah sawlog cut is 490 000 m³/yr of first and second grade sawlogs. This allocation was approved by The Hon Kevin Minson in a Ministerial Statement in 1993. Substantial quantities of lower grade material are also available.
- The RFA CRA report (p 51) indicates that in 1996-97, 453 000 m³/ yr of first and second grade jarrah sawlogs were cut (RFA Steering Committee, 1998a).
- The RFA Public Consultation paper states that "Under current log specifications, harvesting practices and conversion technologies, the long-term non-declining level of first and second grade jarrah sawlogs is approximately 300 000 m³ / annum." (RFA Steering Committee, 1998b).
- The RFA Public Consultation Paper sets out that the 'FORSCHED' simulations indicate that while the level of first and second grade jarrah sawlog harvest could be maintained at greater than 300 000 m³/ yr from the year 2004, this would lead to a substantial decline in these sawlogs by the year 2030."

The current level of jarrah cutting is above the sustainable level of 300 000 m³/yr of first and second grade sawlogs, but as discussed by the Hon Kevin Minson (1993), the Meagher Committee recommended a higher level of cut be allowed until 2003 to allow time for the industry to restructure or invest in equipment for improved utilisation of lower quality logs.

The Advisory Committee has noted that the annual allowable cut can currently be exceeded in any one year as the volumes taken are averaged over 10 years (Minson, 1993). However the total cut must not exceed the volumes committed for the life of the management plan. Noting that the current cut of jarrah sawlogs is higher than the long-term sustainable level recommended by the Meagher Committee, such accrual of any uncut allowance from year to year should be reconsidered. This would be in accord with the Meagher Committee report and would encourage an incremental decline in the cut toward more sustainable levels.

Karri permitted harvest level and sustainable yield

For karri, the annual sustainable yield (first-grade plus other logs) was calculated to be 417 000 m³/yr. The tables on page 34 and 35 of CALM's PCR indicate that the average annual volume of karri logs harvested between 1994 and 1996 (around 372 000 m³) was less than this figure.

It was planned that during the period 1992-2003, up to 100 000 m³/yr of the karri harvested would be the residue from thinning of regrowth forests. This was tabulated in the 1992 Proposal document (CALM 1992a) and reproduced in the Meagher report. Thinning forms an important part of the management program for the regeneration of a karri forest. As set out by Turner (1997), "*Thinning of karri regrowth is also critical for realising the growth potential as estimated by the simulator*". The Advisory Committee understands that during the four years prior to 1996/97, the area of karri thinned was only 140 hectares. In response to a question put to it after the publication of the PCR, CALM has advised that the average height of the karri forest regenerated since 1975 is predominantly within CALM's thinning guidelines, and that therefore there has been no impact on future timber yields.

CALM should be encouraged to give special attention to the thinning program and its assessment of growth rates of regenerating karri forests in its future annual reports.

Improvements in timber utilisation

As set out above, the data currently available in the Meagher Report, and repeated in later reports, show that the non-declining level of jarrah supply at the current specification of first- and second-grade sawlogs is approximately 300 000 m³/yr. This figure is derived though modelling using the total annual growth of the jarrah forests on Crown land available for harvesting, combined with the utilisation rate producing first and second grade sawlogs as defined by the current specifications. CALM has a long-term program to improve utilisation of the timber harvested and any movement in this direction is encouraged.

Improved utilisation will be an important component of increased productivity to offset the reduction in logs of the current first and second grade standard which will be available. Increased utilisation of sawlogs (recovery rate) from 36 per cent to 40 per cent of gross bole volume for example, would increase the timber product yield substantially, allowing for a possible reduction in log volume harvested. There is a need for changes in mill technology if this is to be achieved.

However, because of the high public interest in forest management, the Advisory Committee considers that CALM should provide public statements about improvements in tree or log utilisation (or other factors) which result in changes to either the allowable cut, or the production output of products from sawlogs.

Updating of the sustainable yield prediction

The arrangements outlined in the Minson Ministerial response, indicate that after 2004, the annual allowable cut of jarrah will be reduced to the long term sustainable yield of approximately 300 000 m³/yr. Variations in this figure could be expected as the data inputs, such as growth rates, area of jarrah available, utilisation rates and sawlog specifications, are amended. The figure could also vary if research indicates that any of the biological uncertainties need to be given greater attention under the precautionary approach to forest management.

The Advisory Committee is of the view that information on variations which may lead to changes in the annual allowable jarrah harvest should be provided in a public information paper and that there should be regular reporting on these variations together with a discussion of the consequences in relation to the allowable forest cut. The public needs to be kept fully aware of the decision-making process for determination of the sustainable yield, particularly as the current arrangements (using the volume of first and second grade sawlogs) are likely to be more readily understood by members of the public, and changes to methods of accounting for yield levels (utilising whole bole estimates, for example) appear not to be readily accepted.

Dr Turner (1997) has advised in his review that *"The complex computerised systems and production of scenarios for estimating future yields are largely the result of the efforts of a dedicated few and the Department (CALM) needs to ensure that the skill base is disseminated through documentation, training and transparency of decision procedures."* The use of production models is a specialised discipline, and there would be value in there being regular external reviews of the models and the data being used in the simulations.

In summary, the Advisory Committee commends CALM on the development and implementation of its production models for the estimate of wood resource yields, and encourages CALM to include in the existing public reporting process information on:

- (i) the modelling process;
- (ii) the data used in producing the estimates of allowable long term sustainable cut;
- (iii) the research being undertaken to test, and if necessary amend, the biological assumptions used in the models; and,
- (iv) the environmental and industrial variations which should be taken into account whenever proposals are being considered to amend the estimate of the long-term sustainable cut.

The Advisory Committee also considers that CALM's Annual Report should include details of such development for the information of the public.

7-2-5 Issue 5 : Ecologically sustainable forest management

Background

The Independent Expert Advisory Group reporting on systems and processes for Ecologically Sustainable Forest Management (ESFM) for the RFA (IEAG 1997) used the following principles (and others) derived from the National Forest Policy, the Montreal Process and other documents to undertake it's evaluation:

- maintenance of ecological processes (formation of soil, energy flows and carbon, nutrient and water cycles);
- maintenance of biodiversity; and
- maximising the net social benefit derived from the mixture of forest uses, within ecological constraints, whilst maintaining options for future generations.

As stated in the 1998 State of the Environment Report (Government of Western Australia, 1998), fire, disease, weeds and feral animals are environmental factors which can impact significantly on forest values in an adverse way. CALM's commitment to fox control has led to the remarkable recovery of some important animal species and CALM should be applauded for this.

For ESFM to be achieved, it is important that if a management practice, or perhaps more likely, a combination of practices, result in, or exacerbates threatening factors, these management practices should be adjusted as soon as is practicable.

Comment

The Advisory Committee agrees with the observation of the Independent Expert Advisory Group (IEAG) as stated in the ESFM Report (IEAG, 1997), that there is considerable potential for forest management guidelines to be developed which *"specify the levels and types of disturbance that are acceptable for a particular forest so as not to affect adversely national estate and other conservation values of that forest."* The Committee also notes recent discussion within the context of Australia's national strategy for the conservation of biological diversity, on the development of methods for assessing the positive and negative contributions of silvicultural systems to the maintenance of biological diversity (Commonwealth of Australia, 1996).

The Committee is also aware that internationally-agreed criteria and indicators for ecologically sustainable forest management such as those defined in the Montreal Process are now being given national attention. For example, in a working document of the Montreal (process) Implementation Group (MIG, 1997), which proposes indicators for measuring environmental characteristics including the 'Maintenance Of Ecosystem Health And Vitality,' it has been proposed that monitoring be undertaken to measure changes in the area of forest that is either *"...affected by processes or agents beyond the range of historic variation"* or which has *"...diminished biological components indicative of changes in fundamental ecological processes..."*

The amount of information required to assess impacts of logging using the aforementioned criteria is likely to be considerable and may take some time to collect. The Advisory Committee agrees that environmental performance criteria need to be developed and considers that it would be prudent to exercise a precautionary approach to management in the interim period.

The Committee notes that the Independent Expert Advisory Group (IEAG) for the RFA has made a number of recommendations for the improvement of legislation, policy and management systems with the objective of facilitating Ecologically Sustainable Forest Management (IEAG 1997). However the expert members of the Advisory Committee consider that it should not be assumed that current levels of biomass extraction can continue without affecting basic ecosystem processes.

Habitat fragmentation, fire regimes, introduced species and pollution are identified as pressures potentially affecting forest biodiversity, but methods of measuring level of significance of fragmentation of forests in Australia are yet to be developed (ANZECC 1998). Open discussion is to be encouraged on the relationships between ecological sustainability and both spatial and temporal effects on the levels of biomass extraction and associated burning.

The Advisory Committee has noted that the Western Australian Museum, in a project report to the RFA Steering Committee on 'Attribution And Modelling Of Fauna For The South-West Forest Region' (WA Museum of Natural Science 1998) has stated that;

"...the most compelling finding of the fauna database attribution and modelling project was that there is an almost total absence of systematic fauna survey data from precise locations within the RFA region. This applies to all invertebrate and the great majority of vertebrate taxa, the latter having only been systematically surveyed in a limited number of locations in the northern jarrah forest."

It is considered that such data are vital if the ecosystems are to be shown to be managed in an ecologically sustainable manner.

The Advisory Committee encourages the EPA and CALM to undertake detailed consideration of all of the recommendations of the IEAG as a significant step towards advancing the goal of ecologically sustainable forest management in the State.

7-2-6 Issue 6 : The precautionary approach and adaptive management

Background

A precautionary approach is dependent on the identification of factors which may adversely affect outcomes, research and monitoring. The factors which increase the risks of adverse environmental outcomes can be acknowledged in a number of ways. Risks of adverse environmental outcomes may increase as, for example, the percentage area of a forest block logged increases and undisturbed areas become fragmented. There are many variables in managing natural ecosystems and it is important that the uncertainties are considered in the planning process. The nature of the risks and uncertainties can vary from locality to locality and there are risks in applying prescriptions developed for one area to another without either trial or adequate monitoring.

Comment

A cautious approach to particular forest management issues was suggested by the EPA in Bulletin 652 (EPA, 1992). Some of the issues and uncertainties referred to were also raised by the public by way of submissions to CALM or the EPA on the 1992 proposal. The EPA noted that the 1992 proposals for jarrah harvesting would see a radical restructure of the production forest. It recommended that a precautionary approach be taken, with the proposals implemented as a trial and with adaptive and flexible management practices based on research and monitoring. It was proposed that this trial would be under the guidance of an independently-funded committee (the FMRC) reporting to the EPA or the Minister for the Environment.

The Advisory Committee has noted that, after listing factors requiring consideration, the PCR states that *"There is currently no forest management measure that CALM believes carries a significant risk of an irreversible consequence. Existing forest management practices are designed to minimise such risks in order to achieve a sustainable system."*

Implementation of the precautionary principle will always engender debate on the degree of caution required. The longer the lead-time for outcomes to be known, the greater the need for the adoption of a cautious approach, especially where matters such as impacts of fire, nutrient cycling and disease are involved.

It is important to maintain sufficient flexibility and to encourage management to respond effectively to problems as they arise. This is to a large degree dependent on the application of the findings of monitoring and research. CALM has not discussed in any detail how prescriptions may have been modified during the first five years of implementing the current management plan.

As CALM is revising its policy on monitoring, it would be valuable for the revised policy to ensure that information necessary for improved management and application of the precautionary principle is available. Lack of resources may be the reason long-term monitoring of ecosystem processes, as proposed in the current forest management plan, has not been initiated, but the Advisory Committee would encourage this being given further consideration. The Committee believes that the involvement of the proposed reconstituted FMRC in such monitoring could be advantageous.

A transparent risk assessment process is important to quantify and manage impacts of forest management practices on forest biodiversity. This could be of particular significance in relation to the issue of the flexible application of jarrah silvicultural practices according to local factors, as discussed elsewhere in this report.

The Advisory committee believes that a high level of community involvement is of great importance to the successful future application of CALM's forest management planning process. Local knowledge and concerns should be sought early and evaluated to a greater degree. Some risks of management may be ameliorated by sound planning at the local level. Communities can be involved in identifying risks, especially if they perceive that there may be consequences which could affect them.

The effective application of the precautionary principle, as a tool to aid in decision-making, aimed at minimising adverse environmental effects, is dependent on research and monitoring and integration of the data into the decision-making process.

7-2-7 Issue 7 : The jarrah silviculture trial

Background

The 1992 EPA report (Bulletin 652) on which the Ministerial Conditions were based, stated (at page ii) that CALM's proposals for the jarrah forests "involve major changes to forest management in Western Australia - the most significant since the extensive forest clearfelling of large areas of the forest in the 1930's". It also stated that "the new proposals see gap creation, a process similar to clearfelling, and other intensive management techniques, as becoming the common silvicultural technique in jarrah forest."

The Advisory Committee has noted that the EPA held the view at that time that the proposals for jarrah and jarrah-marri should be operated as a trial with an assessment of the trial after ten years. The EPA's concept of the trial nature of the proposals for jarrah and jarrah-marri meant that a report on implementation would have been helpful in the 1997 PCR.

Although the Kingston study may, in part, satisfy the legal requirements of Ministerial Condition 11, it is noted that the quality of regeneration and the results of post-logging regeneration surveys, particularly with respect to jarrah gap creation and shelterwood cutting, have not been reported in the PCR.

The revised silvicultural guidelines for jarrah are an appendix to the PCR, and the three main silvicultural treatments applied in the jarrah forest (thinning, gap and shelterwood) are presented. The process used to decide which treatment is appropriate for an area has been summarised by Stoneman et al (1989).

A variety of apparent problems with the application of the current silvicultural guidelines have been brought to the attention of the Advisory Committee through the public comments. These problems include the following:

- poor regeneration of jarrah on some soil types;
- dominance of marri and stump coppice in some southern jarrah forest areas;
- large quantities of jarrah waste material after logging and follow-up treatment;
- lack of post harvest treatments in some areas; and
- frost damage.

The critical assessment of regeneration is important for the ongoing development of harvesting prescriptions. The standards of post-harvest treatments will also affect future sawlog quality and should be continually assessed.

Comment

Gap creation (release of regeneration).

Approximately 26,000 hectares of jarrah forest have been harvested as gaps in the last 5 years without previous trials in areas such as the southern jarrah forest. CALM has advised that a process to monitor regeneration in gaps was introduced in 1997/98 and that the department is now achieving a 99% success rate in gap regeneration release and that, if required, results could be correlated with soil type. About 1% of the area harvested as gaps annually has been planted with jarrah seedlings.

CALM has also advised that care is taken in selecting areas to be harvested by gap creation to ensure there is adequate jarrah advance growth present to develop into saplings, poles and mature trees. CALM further advised that the shelterwood prescription is used where the existing regeneration may not be adequate and that such sites are more prevalent in the eastern and southern areas, often being associated with sandy soils or duplex clay soils.

The Report of the Independent Expert Advisory Group (IEAG) on ESFM observed that:

"CALM should monitor and report on the adequacy of stocking in jarrah forest which have been treated for the release of advance growth of crop trees, and the early growth and composition (commencing at five to ten years) of tree species on sites after harvesting or mining activities."

The IEAG also noted on page 68 that:

"Routine inventory does not commence until about age twenty or twenty five years. As a result there is no procedure for the assessment of early growth which would enable an early determination of whether site productivity has been maintained." (IEAG, 1997).

Within the requirement for reporting on the regeneration of jarrah forest following harvesting which has resulted in either shelterwood or gap areas, CALM should be encouraged to provide information on matters such as :

- variations to the silvicultural prescriptions presented in the PCR
- the level of large debris left after logging and silvicultural treatment of some sites (which could impede future operations);
- the issue of marri dominance; and
- the percentage of regeneration comprised of multiple stump coppice.

Shelterwood (establishment of regeneration)

Under the jarrah silviculture prescription, the shelterwood treatment is applied to areas of forest in which pre-logging surveys have indicated a paucity of established lignotubers awaiting release by logging. In these areas jarrah trees are marked for retention resulting in a reduced density overstorey composed of trees selected as a seed source for natural establishment of seedlings.

Although in 1992 CALM predicted that in the order of 700 hectares per annum of jarrah forest would be logged as shelterwood (EPA 1992, page 38), the Advisory Committee has noted that over 9 000 hectares were recorded by CALM as having been cut in this way in the reporting period for the 1996/7 CALM Annual report (CALM 1997b).

Problems in the establishment of seedlings in some areas of shelterwood were summarised in a CALM Science and Information Division Summary of proposed Science Project Plans which stated that;

"...seedlings are not establishing on many of these (shelterwood) areas following logging and site preparation, and the reasons for this failure are unknown."

(CALM Unpublished 1995).

Many factors can affect jarrah seedling survival (Stoneman et al. 1994, Strelein, 1988) and trials of the regeneration of jarrah from nursery-raised seedlings are being conducted in areas of shelterwood cutting as well as in some gaps. However in the past, trees of poor form have resulted from hand planting (Abbott and Loneragan 1986).

The Committee is aware that in a recent variation to the specification used to guide forest managers, Jarrah Silviculture Specification 1/95, it is stated that:

"To ensure timely regeneration in areas treated as shelterwood it has also been proposed that where regeneration surveys post establishment burn indicate unacceptable stocking, the planting of jarrah seedlings will be trialed."

As many factors are likely to affect jarrah regeneration in areas treated as shelterwood, and these areas are of varying tree density, on-going monitoring of success in establishment of regeneration is essential. Extensive shelterwood cutting in low quality forest could result in a downgrading of these forests.

CALM has also indicated to the Advisory Committee that refinement of silvicultural prescriptions according to variation in soil type is yet to be done. This is a topic which requires a departmental research commitment.

It could be useful for the EPA, in its consultation with CALM as proposed in the advice of this committee on Ministerial Condition 11 (Section 7-1-11), to discuss trends in the application of prescriptions according to forest district, or forest ecosystem type over the life of the Forest Management Plan.

Thinning

CALM has had an ongoing programme of thinning regrowth stands in areas which have been previously heavily cut. Thinning has continued since 1992, but data provided by CALM shows that the area of jarrah forest thinned has declined from 4 750 hectares in 1992 to 1 900 hectares in 1996.

Extensively Managed Areas.

In the Silviculture Guidelines 1/95 on page 1 (Appendix 2 of the PCR), CALM refers to "Extensively Managed Areas". It is stated that areas such as the eastern low-rainfall zone jarrah forest and poorer jarrah country of the Donnybrook Sunklands have a low proportion of sawlogs and therefore, "*the opportunity to thin and create regeneration gaps by commercial timber removal is limited.*" The guidelines state that the resultant forest structure will be different from that prior to logging because of the "*preponderance of unsaleable culls.*"

Logging to remove saleable trees without the necessary treatment to remove forest culls will result in a downgrading of the forest resource with future wood production being on trees of already poor form or with obvious defects. If areas are being logged without proper regeneration, and are unlikely to provide a supply of sawlogs in the future, they should be discounted or treated separately from the area of jarrah forest which is used to calculate sustainable yield (see page 19 of the Meagher Report), in a similar way to some other forest areas infected by dieback. In any event, logging without proper forest regeneration is contrary to the maintenance of productive capacity, a principle of ecologically sustainable forest management. CALM should therefore be encouraged to report on whether it has sufficient resources to regenerate all forest areas which are logged so as to maintain or enhance their productive capacity .

Quality of Jarrah Regeneration

There are a number of potential issues impacting on the quality of jarrah regeneration which need to be monitored and researched within the context of a properly designed trial of jarrah silviculture. These include accentuated frost damage in regenerated areas and the effects of bullseye borer on regrowth stands, and are discussed elsewhere in this report.

7-2-8 Issue 8 : Karri silviculture

Background

The earliest karri clearfelling for both agriculture and timber mostly involved well drained karri loams. However, most clearfelling is now occurring on less well-drained and shallower soils (Braidahl and Hewett 1995). On the poorer soils karri grows naturally, with varying proportions of marri and jarrah. In the Forests Department's Working Plan No 87 (Forests Department, 1982) it was stated on p12 that there was approximately 150 000 hectares where karri was a significant species, but "...less than 40 per cent of this area was pure karri, the remainder being associations of karri with marri, and in some areas, karri with jarrah or the three tingle species." Some of the areas now planted to karri (with a small percentage of jarrah) were mixed karri/jarrah stands prior to harvesting. In CALM's Silvicultural Guidelines (2/95), a mixed karri/jarrah stand is defined as one that contains between 2 and 8 overstorey karri trees per hectare.

The present protocol for growing karri is planting of seedlings or natural regeneration from seed. Thinning is programmed to maximise growth of trees for future sawlogs. Nutrient cycling occurs with legumes fixing nitrogen which may compensate for losses as a result of thinning and burning of trash. Some trial applications of fertiliser have been made (Braidahl and Hewett 1995).

Comment

The ongoing development of silvicultural and burning prescriptions for stands on a range of soil types is obviously important. It is evident from Braidahl and Hewett's review that a considerable amount of recent work has been done on karri thinning, but some important questions remain for what might be considered "marginal karri areas" on the fringes of the main karri belt now being harvested.

The following relevant issues have been raised by members of the Advisory Committee:

- Form and growth rates of hand-planted karri and jarrah in formerly mixed stands.
- Soil compaction on duplex soils and its effect on the morphology of the root systems of planted seedlings. (Braidahl and Hewett 1995 and Misra and Gibbons, 1996).
- Delays in implementing thinning programs and associated fuel reduction burns.
- Net nutrient balances of operations such as thinning and prescribed fires.
- The incidence of disease and the effects of insects and fungi on productivity and timber quality.
- The performance of karri regrowth on poorer quality sites where marri or jarrah were dominant prior to logging and where nutrient cycling and competition from marri may result in karri growth rates below those forecast by the models.

With respect to the methods of regenerating karri, CALM has indicated in Karri Silviculture Guidelines 2/95 (Appendix 3 of the PCR) that *"the preferred method of regeneration is by seed trees when there is sufficient seed available to ensure successful regeneration"* (CALM 1997).

However, in the 1996/7 CALM Annual Report, only 40 hectares out of 990 hectares of karri harvested was regenerated by natural seed fall. CALM states that its recent logging plans have been altered by dispute over forest logging and the RFA, and that, once planning can proceed without disruption, it would be expected that a reasonable percentage of karri harvested will be regenerated using seed trees. Hand planting of nursery-raised seedlings is more expensive than using seed trees and there are a number of risks in relying solely on hand planting for regeneration (Breidahl and Hewett 1995).

A considerable amount of information on karri flowering cycles is available from Loneragan (1979) who suggests that many factors can affect karri flowering and seed production. The basic cycle from bud to seed supply takes four years and is unpredictable. As discussed in the Silvicultural Guideline 2/95 for Karri, (appendix to the PCR) *"wildfire or prescribed burning is likely to cause abortion or premature seed shed"*. It would also appear that many insect and bird populations are dependent upon occasional good flowering years of both karri and marri.

Three examples of issues requiring on-going assessment are the stump and root-rot *Armillaria luteobubalina* (Pearce et al 1986), bullseye borer (Abbott et al 1991) and wood rots (CALM 1995, Davison and Tay 1994). Based on experience in other eucalypt forests (Kile et al. 1991), and on work by Pearce (being revised for publication in Australasian Plant Pathology), *Armillaria* disease expression may intensify after karri is thinned. According to CALM's PCR, research on *"the incidence and spread of Armillaria and on determining the extent of Armillaria infections across the karri forest is continuing."* CALM also states that while *Armillaria* may occasionally act as an aggressive primary pathogen killing individual trees, it is more often of a secondary nature infecting suppressed and predisposed trees.

With respect to bullseye borer, CALM has reported to the Advisory Committee that preliminary research results indicate that *"the prevalence of borers increases along a gradient from high to low rainfall and that the incidence of borer attack is greater in larger trees than in smaller trees"*. Borer damage is often related to brown wood, but not in every case. Abbott et al (1991), suggested that thinning should be investigated as a way of alleviating tree stress and the incidence of the bullseye borer larvae in young karri stands.

In recent correspondence with the Advisory Committee, CALM has also outlined current areas of research and monitoring *"...relevant to the development of silvicultural prescriptions for the range of soils supporting regrowth karri."* These are listed below:

- Monitoring of regrowth stands to produce maps of top height, which are then used for the application of Silviculture Specification 1/92.
- Thinning experiments in regrowth karri stands covering a range of different site qualities.
- Two experiments examining the initial spacing on the growth and tree form of karri (these experiments also investigate whether there is a difference between the growth and form of planted and seed-regenerated karri).
- An investigation into the establishment and growth of karri in relation to soil characteristics (this project aims to determine whether the physical characteristics of soils can be used as indicators of sustainable productivity from karri forests).

As thinning and burning can result in loss of nutrients from the karri regrowth areas, it is important that net nutrient balances be determined with respect to essential operations for a range of soil types. As stated on page 7 of the Resource Assessment Commission's Draft Overview Report of 1991 (Resource Assessment Commission 1991);

"...in general, timber harvesting on low fertility sites has a greater impact on nutrient cycling and loss than does harvesting on higher fertility sites over all rotations."

This is particularly pertinent for Western Australia, and some problems in karri growth performance on the poorer soils should be anticipated. Legume development in some of the stands may be less than expected and nitrogen may become limiting early in the rotation.

Insect attack and fungal diseases may reduce productivity and quality of sawlogs from regrowth forests (Siemon 1995). CALM should be encouraged to make adequate allowance for such problems and apply research results to the variation of silvicultural prescriptions, where this is warranted, in order to reduce the impact of these pathogens.

7-2-9 Issue 9 : Fire management

Background

There is a public perception that, in practice, the results and effects of prescribed burns can differ quite markedly from those which may be anticipated from reading CALM literature and reports such as that from the Fire Review Panel (1994). Fire management is possibly the most contentious issue of public concern. There is concern about scale, frequency, timing and intensity of burns in areas, especially where relatively little is known about the biological and ecological tolerance of flora and fauna to fire. There are also concerns about interactions between fire, dieback expression, and local hydrologic changes due to the effects of burns on vegetation.

Such issues are discussed in six comprehensive reviews prepared for the RFA (Bougher 1997, Christensen 1997, Horwitz et al 1997, Safstrom and Lemson 1997, Lamont et al 1997, Majer and Heterick 1997).

The IEAG (1997) has made two recommendations for ecologically sustainable forest management which are:

Recommendation 2.6

"(CALM should) address the ecological basis for burning regimes in all forest ecosystems in planning for fire management. Annual District burning plans should be available for public access and medium-term (five to seven years) fire management plans should be published. Such plans should be prepared in conjunction with the medium-term integrated harvesting and regeneration plans specified within the manual of Harvesting Specifications."

Recommendation 3.2

"(CALM should) review the CALM fire process for setting priorities for the use of prescribed fire and change the weighting given to different values to better reflect the two over-arching and six specific principles of ecologically sustainable forest management and the current knowledge of the response and resilience to fire of ecosystems in the South-West Forest Region."

Comment

There are risks involved with prescribed burning which may not be adequately assessed in developing burn programmes. In practice, some objectives which relate to maintaining biodiversity may be difficult to meet in some of the different forest ecosystems. For example, under practical field circumstances, it may be operationally difficult to retain unburnt areas within large aerial burns. Similarly, stated objectives of varying fire season, intensity and frequency in forests blocks within the high rainfall zone, which includes areas which have rapid fuel accumulation, may be difficult to meet because of a variety of planning constraints including expense.

There are views outside CALM (as reflected in the public submissions) that there are ecosystems and some forest communities that require very different treatment from those initially developed for the Northern Jarrah Forest, and that prescribed burns of the current frequency and size within such areas may be inappropriate. Fire ecology research by CALM in areas such as the Southern forests may be inadequate, taking into account the lack of information about them.

As stated in many recent State and Commonwealth documents such as the State of the Environment Report (Government of Western Australia 1998), forest management must now be actively focused on maintaining all basic ecosystem processes, including nutrient and carbon cycling and the maintenance of biodiversity. CALM should therefore be encouraged to review policy, planning, implementation and monitoring of fire to ensure that ESFM principles are met. This view is in accordance with the recommendations of the Independent Expert Advisory Group in the section of the ESFM Report dealing with "Planning".

Data-bases and monitoring are essential for the development of planning systems which address the ecological basis for burning regimes. A system which results in vegetation assessments being made prior to burns could be expanded to cover not only species classified rare and endangered, but also species or families sensitive to dieback and obligate re-seeders after fire. The position of these species in communities may be vulnerable because of dieback (Dieback Review Panel 1996), and frequent fire has the potential to hasten their decline (Safstrom and Lemson 1997).

It was suggested by the Dieback Review Panel (1996) that fire may help to re-establish some species in dieback infected areas, as natural selection of individuals resistant to *Phytophthora cinnamomi* may occur in some dieback infected communities. CALM should be encouraged, with some urgency, to develop a policy to address the fire management of dieback affected communities.

Certain indicator species may be used to help determine the risks of planned burning operations, to plant communities. For example, the amount of seed stored by individuals of particular species which generally fail to re-sprout after fire, could be assessed prior to burning. Spring burns, or those which take place when some species are in bud or are flowering may put at risk, some species which do not rely on soil seed banks for re-establishment (Meney et al. 1996; Roche et al. 1997). Results from recent research undertaken by the University of Western Australia and Kings Park and Botanic Gardens should, where appropriate, be incorporated into planning.

There are also a number of specific issues which need to be reviewed which relate to fire management or to the interaction between fire management and current harvesting and silvicultural practices. Some of these were raised in public submissions and are listed as follows:

- The effects of fire on structure of communities need assessment as recruitment of some species is being affected (Saffstrom and Lemson, 1997) and a high degree of buttress attrition is occurring in some fire sensitive species.
- The effects of different fire regimes on fauna need further examination (refer to Gill, 1986).
- Management should take further account of the vulnerability of regeneration to fire damage from ignition of heavy fuels left after gap creation treatment in the Jarrah forest (refer to Burrows, 1987).
- The management of the Temporary Exclusion Areas (TEAS) between gaps in jarrah created by harvesting requires consideration (refer to Christensen, 1997).
- Alternative methods of minimising fire losses in areas of regenerating forest may have to be considered as the number and size of areas of regrowth in need of protection from fire increases. Turner (1997) made comment that burn buffers affect harvest plans.
- Methods of reducing the frequency of prescribed burning may need to be sought in areas set aside for conservation when ecological research data suggests that conservation values will be adversely affected, particularly by burning on a short rotation.

The maintenance of biodiversity is important, and therefore CALM should be encouraged to develop burning programs which allow for variation in fire intensity, frequency and season. Results of research on the development of management strategies to provide for greater variation in the application of burning prescriptions should be made available to the public. Importantly, as revised burning practices are undertaken, opportunities will present for progressive monitoring of the effects on flora and fauna, the type and amounts of flammable material, and local changes in soil hydrology.

Notwithstanding safety considerations, some "no planned burn" areas are important for scientific reference and maintenance of biodiversity. The Advisory Committee understands that some "no planned burn" areas have been burnt in recent years and that these fires originated from a variety of ignition sources. In Appendix 16 of the PCR, CALM has provided a summary of action taken on Recommendations of the Fire Review Panel. Under recommendation 2.3, it is stated that the objectives and strategies for "*the location, retention and management of No Planned Burn Areas are being reviewed*" (for National Parks) "*for the consideration of CALM's Corporate Executive*". It is suggested that CALM provide a copy of this review to the EPA, as well as a summary of the no planned burn areas within State forest.

An open assessment should be made of both beneficial and adverse effects of burning on various communities, such as those represented in Diverse Ecotype Conservation Areas. This would assist in any revision of CALM's Wildfire Threat Analysis, as discussed in the section of this report dealing with Ministerial Condition 15.

7-2-10 Issue 10 : Dieback Management

Background

The 1998 State of the Environment Report for Western Australia (p 28) states that dieback caused by *Phytophthora cinnamomi* is "now seen to be a biological disaster of global significance, given the richness and high degree of endemism of the flora of south-western Western Australia." The magnitude of the problem has been described in both the Parliamentary Select Committee report on dieback diseases (Parliamentary Select Committee 1992) and more recently in the report by the Dieback Review Panel (1996) to the Minister for the Environment. The then Minister for the Environment, The Hon Kevin Minson, commissioned the latter independent reappraisal of dieback and the problems which the disease presents.

Phytophthora cinnamomi has the widest host range, and has been the most devastating of all of the *Phytophthora* species isolated in the south-west. Despite the emphasis on *P. cinnamomi*, there are other pathogen species which under certain conditions can have severe impact on some plant communities. A summary of fungi associated with "dieback diseases" was presented in the Parliamentary Select Committee report (Parliamentary Select Committee 1992). Further appraisal and research into the epidemiology of a number of other pathogens is still required. In recent years, canker or stem invading fungi, such as *Cryptodiaporthe* have also been identified as agents causing decline of some plant species. Serious marri decline is evident in some forest areas. This was mentioned by Shearer (1992).

The Dieback Review Panel provided 33 recommendations with respect to the management of *P. cinnamomi* and as reported in the PCR, these recommendations are now being implemented through the formation of a Dieback Consultative Council and the appointment of a Dieback Coordinator within CALM. As outlined in the PCR, there will be significant changes to dieback management strategies in relation to forest use and operations, in line with the following recommendations (Dieback Review Panel 1996):

Recommendation 1.

"That Government adopts a dieback management strategy which identifies significant protectable areas (those for which the values at risk are significant and the benefits of hygiene likely to be sustained for more than a few decades), prioritises them and concentrates available resources on rigorous application of hygiene for their protection".

Recommendation 2.

"That fewer restrictions on access be applied to and within essentially unprotectable areas."

The following statement follows Recommendations 1 and 2 in the Review Panel's report.

"Adoption of a management strategy which concentrates resources on protectable areas will require comprehensive consideration of the biological, physical and human factors influencing the risk of infestation of areas to be considered for protection. The task will require close interaction between scientists and managers."

Furthermore, recommendation 3 of the report states that;

"CALM (should) urgently develop protocols for the objective identification of protectable areas and for their prioritisation and management."

Comment

Recommendations 1, 2 and 3 appear to represent a major change to the current CALM dieback disease policy. The intention to pursue their implementation may be interpreted as signifying an intention by CALM to relax constraints and restrictions on logging practises, and to progressively relax or to move away from the current strict system of forest hygiene, based on detailed mapping of infections across many areas of the jarrah forest.

The recommendations of the Dieback Review have now been endorsed by Government, but the issue of the method and extent of their implementation is likely to be of significance to the interested public. To date, a full explanation and summary of progress in implementing the recommendations have not been available. The Advisory Committee understands that the issues are being reviewed by CALM in consultation with the Dieback Consultative Council (formed in late 1997). The progress with respect to dieback policy appears to be slow, although this is doubtless related, in part, to the complexity of determining the application of recommendations in the range of environments affected by the dieback issue. In general, the purpose, application, scale and full intent of the recommendations will remain unclear until the implementation issues are clarified.

The Dieback Consultative Council has an important role in this process and the linkages at the policy level with CALM need to be developed rapidly to assess the issues related to implementation.

Some of the issues which will need to be addressed include:

- an assessment of the risks and consequences of abandoning hygiene in areas deemed unprotectable;
- the definition of the term 'protectable' (this is a very difficult issue and land tenure may affect decisions);
- an estimation of the percentage of the production forests currently protected by dieback policy, which may be considered worthy of rigorous hygiene measures in future;
- the explicit definition of the application of the precautionary principle to the management of dieback in forests;
- a review of the limited amount of dieback research which is being undertaken in the main timber supply areas (questions which need to be addressed include the refinement of dieback impact prediction in the southern forests); and
- the determination of the method and extent of dieback monitoring and reporting required under the new regime.

If there were a shift in policy from the current position of protecting the inherent value of vegetation from *Phytophthora cinnamomi* to a position where protection measures would only be applied if it could be proved that protection was worthwhile, this would represent a significant departure from the precautionary principle.

It has long been recognised that forest operations under dry soil conditions will reduce the risk of spreading *P. cinnamomi*, but there will still be considerable problems associated with road construction and logging in some areas of forest, simply because the forests are a mosaic of landforms and dieback is widespread in some of these landforms. For example, some areas of forest considered essential to maintain timber supplies can only be accessed through swamps already infected with the fungus.

The extent and results of monitoring of disease incidence and impact in relation to road construction and logging in a number of areas need to be made public for consideration along with prescriptions for implementing new recommendations. The proposed methods of implementing the endorsed recommendations also need to be made readily available to the public, prior to their introduction.

To allow for full public understanding of the purpose, application, intent and effect of the Dieback Panel's recommendations, CALM, in consultation with the Dieback Consultative Council, should be requested to publish annual progress reports addressing issues relating to their implementation, including the aforementioned issues.

With respect to outbreaks of new diseases and insect pests, it would be advisable for CALM to be encouraged to develop a forest health surveillance system, as has been initiated in New Zealand and in some other states of Australia.

7-2-11 Issue 11 : Salinity

There is some public concern about the potential for salinisation of streams following reduction in density of forest under the new forest silvicultural prescriptions. This concern is reflected in the provisions of Ministerial Condition 16.

The Water and Rivers Commission(WRC) through its predecessor has been carrying out research on this issue since 1970.

This research has shown that;

- increased stream salinity is not likely to develop if the natural ground-water level is greater than 4 metres from the surface;
- if increased stream salinity were to develop, the main impact would become manifest after 4-5 years;
- the hydraulic balance would be progressively re-established over about 15 years, as regrowth again dried out the soil profile to depth;
- the higher stream salinity would only be significant at times of low stream flow; and
- since the quantity of flow would be small at low stream flow its affect on resource quality would be minimal.

This work also showed that:

- in the case of the majority of short rivers originating in the western slopes of the Darling Range and the short rivers flowing into the southern ocean, there is little evidence of salinity developing following forest operations. Presumably this is because of the lower salt content of the soils and the ground waters; and
- in the low rainfall zone where ground water is more saline it is deeper in the soil.

Unlike clearing for agriculture, the period when there are no actively growing deep rooted species is relatively short on a logged forest area, provided trees and associated undergrowth are allowed to regrow after logging.

Having in mind other urgent demands on its resources, the WRC considered that the hydrological work necessary to identify all high salt risk catchments was not warranted when balanced against the low risk of a significant salinity problem occurring. However, as a precautionary approach, the WRC supports the phased logging approach, required by Ministerial Condition 12, in the catchments of all second order streams in the intermediate and low rainfall zones of the jarrah forest.

The WRC does consider however, that changes in stream salinity could be important to the ecology of currently pristine aquatic systems. On this basis the WRC has identified catchments which it considers to be currently relatively pristine and need to be protected on that basis. Catchments were selected which possess all or the majority of the following characteristics:

- relatively undisturbed;
- able to be retained in a largely undisturbed condition;
- clear boundaries;
- within a particular drainage area; and

- high ecological aquatic value.

One stream system in each of the Natural Resource Management (NRM) areas in the South West of the State which;

- had these special values;
- could be sensitive to increased salinity; and
- warranted protection;

has been identified.

These areas are effectively to be used as reference areas for the protection of stream biota and may be useful for long term comparison with other second order streams which are subject to the standard phased logging approach (required under Ministerial Condition 16) to be applied to forest in the intermediate and low rainfall zone.

The WRC's advice was to specially protect the second order catchments of only these high-value stream systems.

The maps of salt sensitive catchments in the CALM PCR reflect this process. Whereas the WRC maps (Map 1 in Appendix 18 of the PCR) show the stream systems to be protected, Map 2 provided by CALM in Appendix 18 of the PCR shows the catchments of the second order streams within the protected stream systems.

Subsequently, some public submissions made to the EPA in response to the PCR have raised concerns about the impact of forest operations on farm water supplies in areas near forest which is logged. These supplies are used either for irrigation, stock, or domestic purposes. Short-term increases in salinity could be serious where the supplies are marginal for the purpose for which they are being used. It would therefore seem desirable that this situation be taken into account.

8 CONCLUSIONS

The Committee has been dependent on its corporate experience, literature, information from the public, the observations of its members, and briefings and information provided by CALM on their systems and their operations. In preparing our report we have been impressed with CALM as a very professional organisation with a difficult task in the area of forest management which is internationally sensitive.

The Committee has commented on the Ministerial Conditions promulgated by the then Minister The Hon Jim McGinty, in December 1992, and members have provided a number of detailed comments on aspects of forest management in WA.

In discussion, however, we have decided to offer further advice. This advice is offered as a contribution to the development of a forest management system for WA, whereby the community, the Government Agencies and Industry work together to achieve a sustainable, productive and economically successful forest timber industry, and also sustainable forest tourism and other industries. We offer this advice in the form of our conclusions.

We have concluded that the key issues in achieving a sustainable forestry industry are as follows:

- 1) Development, on a continuing basis, of a first class knowledge base on all aspects of forest management, and modification of forest management progressively in response to the growing knowledge base.
- 2) Establishment of a series of agreed commitments by the proponent together with performance criteria against which progress can be audited.
- 3) Auditing of progress by an external agency on a continuing basis, rather than at 5-year intervals as is the current situation.
- 4) Determination of the sustainable level of forest which can be cut annually, recognising the need for the following:
 - a) The establishment of a conservative harvest level ensuring long term sustainability of the forest resource.
 - b) The development of silvicultural prescriptions which are appropriate to the locality on which they are to be applied and do not threaten the long term sustainability of forest in that locality.
 - c) The recognition of the variability due to climate, soil type, presence of disease or pests on productivity and regeneration.
 - d) The recognition of the impact of disease, changed environmental conditions and the changed silvicultural practice on the quality of the timber resource available to the industry in the future
 - e) The achievement of a high percentage use of the harvested resource; focusing on high value and economically feasible end uses.
- 5) Development of agreed methods of fuel reduction, aimed at achieving the multiple objectives of safety and protection of the timber resource and protection of sensitive species and ecosystems.
- 6) Establishment of excellent communications with the community so that the basis and objectives of the Forest Management Plan are widely known, and that the community is involved in the planning processes to the extent that they have ownership of these plans at all levels.

Evaluation of Present Management With Respect to These Key Issues

There is no agreed set of commitments against which the current plan can be audited. The commitments are made up of the Ministerial Conditions and a range of other commitments contained in various other documents. There are no easily auditable performance criteria against which the proponent's performance can be measured.

The Advisory Committee considers that some of the Ministerial Conditions should be amended and a set of auditable proponent commitments and environmental performance criteria developed in consultation with the Department of Environmental Protection.

There is no external audit of the implementation of the Forest Management Plan and there is a need for improvements to the structure and function of the Lands and Forest Commission.

The Advisory Committee considers that a system of continuing external audit should be set up. To achieve both a greater level of public participation in policy setting and audit by an independent authority, the Committee recommends that the Lands and Forest Commission (LFC) be reconstituted to be the policy setting body and the independent auditor of the Forest Management Plan. The LFC should be constituted with clear terms of reference and comprise a majority of community representatives embodying an apparent range of skills. It should be separately funded, and should continue to be responsible to the Minister.

There is a need for community-wide involvement in policy setting and in the development of local management plans.

The Advisory Committee considers that the opportunity for community involvement in policy formulation should be provided through the reconstituted Lands and Forest Commission. At the local level, detailed plans for the implementation of silvicultural prescriptions, fuel reduction and other plans should be finalised in close consultation with the community.

The expenditure on and current focus of research and development appears inadequate to deal with such a complex range of issues. There is also a need to have a transparent basis for setting research priorities.

The Advisory Committee considers that an adequate research and development capacity is required and an appropriate externally reviewed mechanism needs to be established to determine priorities, allocate funding into areas of research, and monitor outcomes.

The Committee has not been in a position to assess the level of funding needed but the level currently spent on issues directly related to the development of sustainable forest production appears low.

The Committee further considers that a strengthened Forest Monitoring and Research Committee (FMRC) mostly comprised of persons outside CALM should be established under the Lands and Forest Commission to administer the forest research program.

The overall level of funding and the method of funding should be part of any future Forest Management Plan.

A system which has been successful elsewhere is for the research funds to be jointly provided by industry and Government up to an agreed percentage of the value of production. In this case there are difficulties in determining the extent of 'the industry'. In general, however, Australia does not spend enough on research and it is the first thing to suffer when economies are implemented. The level therefore needs to be protected by legislation.

The fuel reduction program does not appear to cater for the range of situations found in the forest.

The Advisory Committee recognises that there are a range of competing issues in determining how fuel reduction will be achieved. There is clearly a need for greater flexibility to accommodate regional and floristic considerations. The Independent Expert Advisory Group (IEAG) on ESFM has recommended (Recommendation 2.6) that annual District burning plans should be available for public access and medium term plans should be published.

The Advisory Committee considers that local burning plans should be discussed at an early stage of development with the community to get community input and subsequent ownership of those plans.

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WESTERN AUSTRALIA
MINISTER FOR THE ENVIRONMENT

**STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)**

**AMENDMENTS TO THE 1987 FOREST MANAGEMENT PLANS AND TIMBER
STRATEGY AND PROPOSALS TO MEET ENVIRONMENTAL CONDITIONS ON THE
REGIONAL PLANS AND THE WACAP ERMP**

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT (CALM)

This proposal may be implemented subject to the following conditions:

1 Proponent commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

- 1-1 In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the proposal and in response to issues raised following public submissions.

2 Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

- 2-1 An expert scientific and administrative committee will be established by the Minister for the Environment to review and report on the implementation of this proposal by 30 June 1993. The terms of reference of the committee will be to consider:

- reserve recommendations within multiple use forest involving those proposals related to temporary exclusion from timber production and potential reserves to act as wildlife corridors;
- the environmental, economic and social implications of such proposals for:
 - nature conservation within WA's native forests,
 - the maximum sustainable timber supply, and
 - the existing and future timber industry;
- the potential to increase the plantation estate on cleared agricultural land to contribute to the production of timber products.

- 2-2 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

Published on
24 December 1992

Appendix 1: Ministerial Statement of December 1992 Containing Environmental Conditions

3 Precautionary approach and adaptive management

- 3-1 The proponent shall manage karri and karri-marri forest in accordance with a precautionary approach. This approach requires that where there is a significant risk that a particular forest management measure could lead to an irreversible consequence appropriate monitoring and subsequent adjustments to management within an acceptable timeframe be carried out.
- 3-2 The proponent shall manage the jarrah forest in accordance with the following general principles:
- (1) a precautionary approach;
 - (2) adaptive and flexible management practices based on research and monitoring of environmental monitoring of operations (see condition 17);
 - (3) implementation as a trial, with a reassessment by the Environmental Protection Authority after ten years - the period of the Management Plans and the Timber Strategy (see condition 11); and
 - (4) no commitment of all of the wood resource in the long term (see conditions 9 & 10).

4 Amendments to conservation estate

- 4-1 The proponent shall initiate the Government processes required to implement the proposed amendments to the conservation reserve estate as agreed to by the Minister for the Environment and defined in the approved Forest Management Plans.

5 Revised travel route, river and stream reserves

- 5-1 The proponent shall implement the revised system of travel route (road), river and stream reserves consistent with condition 15. It is noted that the minimum combined width (both sides of a first, second or third order stream) of the proposed zones is 60 metres.
- 5-2 The proponent shall ensure that the travel route (road), river and stream reserves remain unharvested in perpetuity, except for those portions of regrowth forest within road zones where thinning can be undertaken in a manner consistent with, and so as to enhance in the longer term, the defined visual quality objectives.
- 5-3 The proponent shall monitor the effectiveness of the travel route (road) river and stream reserves for nature conservation and protection of water quality to the requirements of the Minister for the Environment.

6 Diverse ecotype conservation areas

- 6-1 Diverse Ecotype Conservation areas shall be identified by the proponent and those greater than five hectares shall be identified on publicly available maps.
- 6-2 The proponent shall ensure that the Diverse Ecotype Conservation areas remain protected from timber harvesting and associated activities in perpetuity.

Appendix 1: Ministerial Statement of December 1992 Containing Environmental Conditions

7 Old growth karri areas of high social or environmental value

7-1 The proponent shall identify and protect areas of old growth karri (up to 3200 hectares) with a high aesthetic, social or environmental value. This is to be implemented on a regional basis and with the benefit of public involvement. These areas shall:

- (1) include those trees in Beavis, Carey and Giblett forest blocks protected from clearfelling by environmental conditions related to the Manjimup-Beenup power line proposal (EPA Bulletin 603);
- (2) be identified publicly and progressively from the adoption of the Management Plans, with the proponent reporting to the Minister on progress towards implementation within three years; and
- (3) shall not be harvested, and shall be managed to retain their values (other than timber production).

7-2 The proponent shall report on the implementation and management of these special areas at the next Forest Management Review.

8 Sustainable yield estimates

8-1 The allocated timber resource for the period ending 30 June 1993, prior to the consideration by the Minister for the Environment of the report of the committee referred to in condition 1 will not exceed the 1993 level described in the 1987 Timber Strategy together with an additional amount of the timber resource that was approved in the 1987 Timber Strategy but remained uncut. This additional amount may be allocated by the proponent with the approval of the Minister for the Environment on a needs basis up to a total level not exceeding that proposed by the proponent in its 1992 proposals.

8-2 Following consideration of the report of the committee referred to in condition 2, the Minister for the Environment shall determine the annual sustainable timber resource available for allocation.

9 Commitment of wood

9-1 Subject to condition 8, in the letting of contracts for wood supply from the jarrah forest, the proponent shall:

- (1) not exceed the annual levels of timber supply defined in condition 8 above; and
- (2) recognise the possibility of the necessity to reduce wood supply beyond 2002 as a result of monitoring and adaptive management following the trial implementation of the jarrah forest silvicultural prescription.

10 Commitment of new resource to be referred

10-1 Notwithstanding Section 38 of the Environmental Protection Act, the proponent shall refer to the Environmental Protection Authority any proposal to enter into a contract for a substantial portion (as determined by the Minister for the Environment) of forest produce identified as other logs (jarrah) or forest residue (marri) in the revised Timber Strategy (Table 13 of the proposals document).

Appendix 1: Ministerial Statement of December 1992 Containing Environmental Conditions

11 Jarrah silviculture trial

- 11-1 The proponent shall implement the jarrah silvicultural prescription so that monitoring of the environmental impacts on a representative range of treated sites and localities in the forest can be carried out to the requirements of the Minister for the Environment. This shall include long term monitoring which quantifies the impacts of silvicultural practices on environmental elements and values in the forest and provides bases to adjust management.
- 11-2 The proponent shall give all necessary assistance to the Monitoring and Research Committee (condition 16) to enable it to have an active and fully informed role in the planning and oversight of the scientific monitoring of this trial period.
- 11-3 The proponent shall report to the Minister for the Environment on outcomes of this implementation and monitoring and on any modifications to the prescriptions by 2002 as part of the next review of the Forest Management Plans and Timber Strategy.

12 Phased logging

- 12-1 The proponent shall ensure that, in all second order catchments in the intermediate and low rainfall zones of the multiple use jarrah forest subject to logging, at least 30 per cent of each second order catchment has a retained basal area of greater than 15 m²/ha for a period of at least 15 years after harvesting of the remainder of the catchment.
- 12-2 This retained forest shall be selected to enhance wildlife, water resource and visual objectives.
- 12-3 The proponent shall monitor, to the requirements of the Minister for the Environment, and report by 2002 on the status and effectiveness of these measures to protect nature conservation values and water quality at the time of the next review of the Forest Management Plans and Timber Strategy.

13 Habitat trees

- 13-1 The proponent shall ensure that the number, condition and age of trees retained on sites subject to gap treatment is sufficient, as determined by the Minister for the Environment, to adequately provide the habitat function throughout the cutting cycle of the forest.

14 *Banksia grandis* reduction

- 14-1 The proponent shall concentrate the proposed reduction of the population of *Banksia grandis* in specific areas where the environmental circumstances suggest that treatment will have the greatest impact on reducing the spread and intensification of *Phytophthora cinnamomi* in the jarrah forest and where required to establish jarrah and marri regeneration.
- 14-2 The proponent shall establish a programme, to the requirements of the Minister for the Environment, to identify and evaluate the environmental implications of the proposed reduction and that the results of that evaluation shall be reported on, at or before the time of the next review of the Forest Management Plans by 2002.

Appendix 1: Ministerial Statement of December 1992 Containing Environmental Conditions

15 Fire management

15-1 The proponent shall ensure that the fire management objectives related to the jarrah forest silvicultural prescription include the minimisation of air pollution in urban areas, to the requirements of the Minister for the Environment.

15-2 The proponent shall inform the public about its fire management on a regional basis each year in its annual report. This shall include but not be limited to the following:

- (1) occurrences and causes of wildfires;
- (2) purposes of burns;
- (3) areas burnt under different regimes of season and periodicity;
- (4) escapes; and
- (5) the contribution of prescribed burning to reducing wildfire hazard.

15-3 Within 12 months of this proposal being given authority to be implemented the proponent shall initiate a public review of its prescribed burning policy and practices and the wildfire threat analysis. This should be done with the close involvement of the Research and Monitoring Committee. If possible it should be linked with a review of the provisions of the Bush Fires Act.

16 High salt risk catchments

16-1 Within three years, or such other period as the Minister for the Environment shall nominate, the proponent, on advice from the Water Authority of Western Australia, shall identify second order catchments with a high salt risk.

16-2 Within each catchment identified according to the requirements of condition 16.1, the proponent shall retain additional river and stream buffers and locate areas temporarily reserved during phased logging operations to the requirements of the Water Authority of Western Australia

17 Forest Monitoring and Research Committee

17-1 The Minister for the Environment will set up a committee having objectives which include:

- (1) identification, prioritisation and approval of monitoring and research programmes and projects on environmental impacts of forestry management,
- (2) the granting of funds towards such monitoring and research,
- (3) receipt of progress reports,
- (4) reporting to the Minister for the Environment and
- (5) publication of results.

17-2 The Committee shall include the heads (or nominees) of the Department of Conservation and Land Management, the Environmental Protection Authority, the Western Australian Forest Industries Federation, the Conservation Council and the Water Authority of Western Australia, and the Chairpersons of the Lands and Forests Commission and the National Parks and Nature Conservation Authority.

Appendix 1: Ministerial Statement of December 1992 Containing Environmental Conditions

17-3 The Committee shall appoint working groups of scientists to recommend and report to the Committee on the design and funding of research projects, the identification, prioritisation and review of monitoring and research programmes and projects relating to the environmental impacts of forest management.

17-4 The Committee shall provide brief annual progress reports to the Minister for the Environment, with major reports in 1997 and 2002, at the time of the next review of the Forest Management Plans and Timber Strategy.

18 Reporting on compliance

18-1 The proponent shall prepare "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority. These shall include brief annual progress reports to the Environmental Protection Authority, and major public reports in 1997 and 2002.

Note

Wherever the term "jarrah forest" is used in this statement it includes both the jarrah and the jarrah-marri forests.

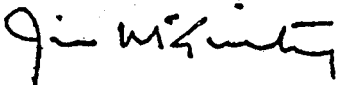
Procedure

Compliance

The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.

If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

Prior to making determinations as provided for in these conditions the Minister for the Environment may seek advice from the Forest Monitoring and Research Committee.



Jim McGinty, MLA
MINISTER FOR THE ENVIRONMENT

24 December 1992

MEDIA STATEMENT
6/9/96

MINISTER FOR THE ENVIRONMENT

Environment Minister Peter Foss today announced a public review of the environmental performance of Western Australia's 10-year forest management plan.

The review is required under ministerial conditions set down in 1992.

Mr Foss said the Department of Conservation and Land Management (CALM) would compile a progress and compliance report into the environmental performance of the Forest Management Plan 1994-2003.

CALM would compile the report in consultation with the Environmental Protection Authority (EPA) and an advisory committee, set up under the auspices of the EPA.

The advisory committee would be required to ensure the scope and content of the progress and compliance report specifically addressed each of the ministerial conditions to be reported on.

It would be chaired by EPA deputy chairman Bernard Bowen.

The membership of the committee was still being finalised but would comprise representatives from community, conservation, academic and industry sectors.

CALM's progress and compliance report would be released for public comment.

The advisory committee would then assess the public comments and report to the EPA to assist the EPA prepare its advice to the Minister on CALM's report.

The EPA's advice, which would also be available to the public, was required to be with the Minister by October 31, 1997.

Mr Foss said widespread public comment would be invited during the review.

A definition statement outlining the scope of CALM's progress and compliance report would be made available for public comment.

Media contact: Peter Harris (09) 321 2222 or (09) 222 9595

Appendix 3: Summary of Public Submissions

The Following is a summary of issues raised in public submissions to the EPA in response to the Progress and Compliance Report. The summary was compiled by the Advisory Committee to synthesise the scope and focus of submissions. The order in which issues are listed is not related to any perceived level of importance or to the frequency of their occurrence in submissions. The authors may be assured that the Advisory Committee has given due attention to the substance of the submissions.

The Advisory Committee has recommended to the EPA that the submissions be published in full, in a separate volume to this report, and be available from the office of the Environmental Protection Authority.

Ministerial Condition 1: Proponent's commitments

The following is a summary of the key points which were made in public submissions:

- The commitments are important as some were made in order to satisfy earlier Ministerial Conditions.
- The PCR does not adequately report on commitments.
- The PCR demonstrates that commitments are being fulfilled through appropriate structures and instruments.
- Information in the PCR on pre-harvesting checks etc appears very comprehensive.
- The PCR should have listed commitments.
- The PCR should have reported on commitments.
- There must be a system to ensure that commitments made in the various documents (including the response to public submissions) are documented in a publicly available form, systematically included in operational documents and fully implemented.
- Those commitments and conditions relating to the earlier 1987 Forest Management Plans which are still relevant, should be reported by the EPA and then documented and implemented.
- CALM has not complied with the commitments made in the various documents.
- It is recommended that the EPA nominate in its report, a list of 'significant' commitments associated with the Ministerial Statement which should require reporting in future annual and or major compliance reports.

Appendix 3: Summary of Public Submissions

Ministerial Condition 2 : Implementation

Public Submissions

The following is a summary of the key points which were made in public submissions:

- Disagree with the findings of the Meagher report (in various ways).
- The Meagher report did not properly perform its function because it distorted the intentions of the EPA by recommending that over-cutting could continue.
- The EPA should commission a competent independent assessment of the Meagher Report because its methodology and rationale is flawed.
- This condition has been complied with.
- The PCR demonstrates that the proposal has been systematically implemented.
- CALM should be made to specify every instance where it has sought to change details of the proposal so that the public, the EPA and /or the Minister can judge whether or not they are substantial.
- Despite the management objective for state forests, the legally required process for consultation is inadequately defined.
- Consultation is inadequate at the local level. A new level of planning procedures needs to be created (preferably through amendments to Ministerial Conditions or the CALM Act) to involve the local public in decision-making with respect to operations (logging and burning).
- CALM's "in house" management systems such as the pre-harvesting checklist are designed to avoid public scrutiny. Therefore CALM is not adhering to the proposal by not managing in consultation with the community.
- The numerous protests about logging are evidence that CALM is not making in consultation with the community as it is required to do.
- The 'proposal' is not being implemented because specific area management plans are receiving a low priority.
- The EPA should set out the action taken with respect to auditing conditions to date and indicate the responsibility for auditing conditions in the future.
- The EPA should report on the adequacy of CALM's audit arrangement with respect to implementation of the Forest Management Plans.
- The Lands and Forest Commission is ill equipped to carry out its statutory function of monitoring implementation of management plans.
- CALM's internal audit system is unsatisfactory because of the conflict of interest between regulatory and business functions of the agency.
- CALM's internal audit system does not allow for the public observers of operational practice who report concerns to be responded to.
- The current internal audit system should be changed to allow for external oversight, more regular audit inspections and a more transparent reporting system.
- The level of detail of the coverage of CALM's audit system in the report is inadequate
- Implementation of management in practice differs markedly from CALM documents and too much effort is put into publicity rather than proper implementation.
- CALM is not implementing the proposal by selling treed land in the Blackwood Valley.
- CALM is not adhering to the proposal because it is breaching its own dieback regulations.
- It appears that CALM is not updating its research plans as often as it claims in the PCR.

Appendix 3: Summary of Public Submissions

Ministerial Condition 2 : Implementation(cont'd)

- CALM's proposal documentation states that it will retain 30% of the Forest on every second order catchment but the silviculture specification appears to contradict this.
- CALM should integrate its management documents and develop an Environmental Management System to ISO 14001 standard.
- CALM should seek public input beyond the management planning stage, or should provide more detail in management plans so that the public can be informed when invited to make public submissions.
- CALM has breached Condition 2-2 by not implementing the *Banksia* eradication programme, but not seeking approval to vary the proposal.
- CALM has operational difficulties with implementing burning policy and prescriptions (for the avoidance of burning of stream zones) but is not reporting this as it should.
- CALM is having problems with the results of implementing silviculture prescriptions and has varied them but this has not been reported. The EPA should be told about these variations by CALM.
- There are many instances where dieback hygiene requirements are not being met.
- CALM is not managing proposed reserves adequately as conservation reserves as stated in the proposal documentation and is claiming to members of the public that these areas are effectively state forest.

Appendix 3: Summary of Public Submissions

Ministerial Condition 3: Precautionary approach and adaptive management

The following is a summary of the key points which were made in public submissions:

General

- The Supreme Court judgement confirmed CALM's view that this Ministerial Condition does not have an objectively verifiable standard and that the precautionary approach requires caution but not inaction. Given this CALM's interpretation and the action taken to comply seems appropriate.
- The PCR does not sufficiently indicate whether there is sufficient monitoring to detect management impacts at an early stage, or that adjustments have or will be made to forest practices before major or permanent damage is done. Nor does the report demonstrate enough examples where adjustments to management practices have been made.
- The PCR should have provided evidence that CALM has been addressing Condition 3-2 on the basis of the key areas of research identified by the EPA in Bulletin 652, rather than with respect to the main issues and objectives arising out of the Forest Management Plan.
- This Condition is superfluous because the implementation of the proposal should fulfil the requirements of the Condition.
- The definition of Precautionary Approach used in this Condition should be changed to that agreed by State Environment Ministers under the Intergovernmental Agreement on the Environment.
- CALM should be reporting on the Montreal indicators of Ecologically Sustainable Forest Management rather than adherence to this relatively abstract concept.
- The PCR does not indicate how the success in meeting the objectives and strategies necessary for achieving compliance with the condition, which are referred in the report, will be monitored.
- The EPA should evaluate the adequacy of CALM's application of the precautionary approach and adaptive management with respect to specific areas of forest management.
- The EPA should recommend to the Minister, areas of management for which more intensive monitoring or research should be undertaken than is currently the case.

Logging and Silviculture

- CALM is intensively logging the forest and carrying out other activities with irreversible consequences, but is not carrying out sufficiently detailed and comprehensive monitoring, and is therefore not exercising a sufficiently precautionary approach.
- CALM is failing to properly regenerate every hectare of forest cut-over, but this is not being recognised due to insufficient monitoring.
- Regeneration of karri by hand planting from nursery stock does not adequately conserve the genetic make up of individual forest areas, and thus is not adequately precautionary.
- Clearfelling is not adequately precautionary because it is leading to problems with vulnerability of the forest to diseases and climatic events and extremes.
- The EPA should seek further information on the extent to which adaptive management is taking place with respect to karri forest management.
- Management of karri forest appears to be based on inadequate data with respect to effects of clearfelling on birds.
- The Condition should require that logging be scheduled away from high conservation value forest.
- Application of prescriptions is excessively narrow and rigid. This has resulted in examples of failed forest regeneration after logging.

Appendix 3: Summary of Public Submissions

Ministerial Condition 3: Precautionary approach and adaptive management (cont'd)

- The Condition should provide for spatial and temporal dispersion of the application of the jarrah silviculture prescription as recommended by the EPA in Bulletin 652.
- Jarrah regeneration is not always successful and many logged stands are now dominated by marri coppice from stumps. CALM has not addressed this in the PCR and has not indicated that it is monitoring to detect problems with jarrah regeneration.
- Levels of timber harvest are set at commercially and politically expedient (not precautionary) levels, and do not reflect community aspirations.
- Steep slopes should not be logged under a precautionary approach but it appears that these areas have not been excluded from yield calculations and will be logged.
- Evidence in the field is that pre-logging rare flora surveys appear to be inadequate.

Fire Management

- Fire management is not being undertaken in a precautionary manner.
- CALM is only making marginal reforms to prescribed burning policy and practice, despite this operation having irreversible consequences and despite considerable public concern.
- CALM is not undertaking appropriate monitoring to detect any potentially irreversible consequences of prescribed burning or logging within an adequate time-frame.

Feral Animals, Weeds, Pests and Disease

- CALM can be proud of its efforts to control fox using baiting, in operations such as *Western Shield*.
- From the PCR it does not appear that weeds are being managed in an adequately precautionary manner.
- The definition of weeds used in the PCR suggests that weeds in state forest will not be controlled unless they interfere with timber production. This is not adequately precautionary.
- There is little evidence in the PCR that CALM has considered the effects of forest operations on the incidence of forest wood pathogens.
- How is "care... taken" "not to predispose the forest to increased risk of (wood rot and canker) disease" as referred to in the PCR?
- The science supporting the recommendations of the Dieback Review Panel should be published before implementation of the Review's recommendations.
- CALM's habitat tree prescription is not being comprehensively implemented or monitored.
- Dieback disease management is not being undertaken in an adequately precautionary manner.
- The report did not explain in sufficient detail, the application of dieback policy to management of forest operations.
- The recommendations of the Dieback Review Panel should be immediately implemented.
- It is recommended that the EPA seek a more detailed explanation and planned time schedule for implementation of the recommendations of the Dieback Review.
- The EPA should ask for the results of CALM's pre- and post-logging dieback surveys.

Appendix 3: Summary of Public Submissions

Ministerial Condition 4: Amendments to the conservation estate

The following is a summary of the key points which were made in public submissions:

- CALM and the Lands and Forest Commission are not ensuring that these proposed reserves are adequately managed for their proposed function in the interim period.
- The PCR should have indicated when the reserve proposals received Ministerial approval, so that it is clear how long reservation is taking. CALM should be made to provide this information to the public.
- The majority of the proposed amendments when taken on an area basis, have not been implemented. The explanation of the reasons for delays etc, which are provided in the comments column of Appendix 5, are inadequate.
- The PCR demonstrates satisfactory progress with this Condition.
- The RFA may result in changes to the proposed Reserve system as outline in the FMP. Therefore implementation of proposed reserve amendments should not continue where new reserves will result in the JANIS criteria being exceeded.
- The RFA will be inadequate in meeting the requirements of this Condition.

Ministerial Condition 5: Revised travel route, river and stream reserves

The following is a summary of the key points which were made in public submissions:

- The maps provided in the PCR to demonstrate compliance with this condition are at an inadequate scale and should be published at a smaller scale to enable the public to verify them.
- The PCR provides no evidence that the effectiveness of the travel route and stream reserve system has been monitored since the imposition of the Condition. Informally, CALM officers say that there are no resources available to do this monitoring.
- The PCR provides no evidence as to whether the Minister's requirements with respect to monitoring under this condition have been met by CALM, or even what these requirements are.
- It is recommended that the EPA seek further information in order to determine the adequacy of the monitoring programme being implemented by CALM in meeting the requirements of the Minister with respect to protection of water quality and nature conservation.
- The PCR refers to penalties for non-compliance with the protection of stream reserves for contractors, but no indication was provided as to whether the penalties have ever been applied.
- We present evidence that contrary to the PCR, not all stream terraces are protected within the width of stream reserves and logging contractors are permitted to enter stream zones, apparently at will.
- This Condition re-states the requirements of Conditions 1 and 2 (Implement the proposal / fulfil commitments).
- The PCR does demonstrates that the Condition is being complied with.
- The statement in the PCR that in "most cases" the "informal reserves" are kept free from fire when regeneration burning is carried out, is incorrect. Many examples exist in the field to demonstrate that these areas are frequently burnt at that time. This is likely to be detrimental to the role of these areas as faunal refuges and corridors.
- Application of the area estimates in CALM's annual report demonstrate that TEAS and "informal reserves" are usually burnt at the time of post-logging regeneration burns.
- Apart from the ambiguity of wording in the specification of stream reserve width, it is concluded that, on the basis of the statements in the PCR, this Condition is being complied with.
- The PCR has not demonstrated that the travel and stream zones are being protected "in perpetuity"
- There is ample evidence that these areas are not respected by CALM Officers or contractors.

Appendix 3: Summary of Public Submissions

Ministerial Condition 6 : Diverse ecotype conservation areas

The following is a summary of the key points which were made in public submissions:

- The PCR demonstrates a practical approach to compliance with this Condition.
- On the basis of information provided in the PCR it is considered that this Condition is being complied with.
- The maps provided in the PCR are inadequate, being too large in scale, and defeat the purpose of the Condition, that the areas be identifiable on publicly available maps. The paucity of themes shown on this map may also indicate that it has been produced purely for the PCR and may not be used in practice.
- The absence of the logging roads theme from the map of these areas precludes evaluation of the extent to which roads cross the Diverse Ecotype Conservation Areas. We can provide an example of the inappropriate location of roads in these areas.

Ministerial Condition 7 : Old growth karri areas of high social or environmental value

The following is a summary of the key points which were made in public submissions:

- The JANIS criteria used in the RFA and the RFA process itself are inadequate to meet the requirements of this Condition and to be in accordance with a precautionary approach to forest conservation.
- The RFA has not involved any genuine public consultation.
- CALM has not complied with this Condition because it has not identified these areas publicly and progressively from the adoption of the Forest Management Plan.
- The methodology used to identify areas of social value within the RFA social assessment was flawed, and was compressed into a much shorter time frame than the similar process in Tasmania.
- This Condition is no longer needed because it is superseded by the JANIS criteria used in the RFA. Because it is overtaken by the RFA this condition should be removed once the RFA is finalised.
- The requirement for progressive identification has not been met because CALM has been logging important old growth areas while the RFA process was taking place.
- The EPA's Bulletin (652) was amended part way through distribution to change recommendation 5 to the effect that "up to 3200 hectares of old growth forest" be protected rather than "areas of old growth forest not protected by reservation". The EPA should clarify the reason for this change.
- Despite the Manjimup-Beenup power lines being re-located, the condition still currently requires that the areas of forest referred to in the EPA's Bulletin be protected. The EPA should seek further information to determine whether or not the Condition has been complied with.
- The EPA should seek further information about the management of deferred forest areas for their non-timber values as required by this Condition.
- The Minister has accepted CALM's use of the RFA process to identify old growth areas. This part of the Condition is therefore being complied with.
- This Condition is no longer appropriate because the proposed power-line was moved to another route.
- Areas which would ordinarily be included in the Diverse Ecotype Conservation Areas should not be allowed to be included in the old growth karri areas identified under this Condition.

Appendix 3: Summary of Public Submissions

Ministerial Condition 8: Sustainable yield estimates

The following is a summary of the key points which were made in public submissions:

- This Condition is now unnecessary and should be removed.
- On the basis of information in the PCR, this condition has been complied with.
- basing the sustained yield on gross bole volume will not sustain the biological values of the forest, because unless sustained yield of sawlogs of the standard currently harvested is maintained, the forest will be juvenilised and have insufficient old trees.
- sustained yield is not being achieved because CALM has a backlog of follow-up treatment work which is delaying the proper regeneration of the forest.
- The Meagher committee and the Minister wrongly set the allowable cut at 60% above the level known to be sustainable.
- Sustained yield is not being achieved because the Meagher report's recommendations were flawed.
- The level of cut for marri is of concern because there is very little information about marri growth rate.
- The volume available for harvest should allow for gaps to reach maturity before harvesting TEAS because evidence from Kingston is that fauna will need the TEAS as refuges until then.
- At the current area rate of logging, the rotation should be much shorter than is predicted by CALM.
- The RFA CAR report states that the sustained yield will have to be reduced to 200 000 m³ after 2002 to achieve sustained yield. This is proof that the forest is being over cut.
- The levels of marri sawlog being recovered are far below those predicted in the Forest Management Plan. Is this because they are not in the forest or are marri sawlogs being woodchipped?

Ministerial Condition 9: Commitment of wood

The following is a summary of the key points which were made in public submissions:

- The DRD report "Further Development In The Forest Products Industry", containing information on predicted timber availability sourced from CALM, appears to indicate that CALM is expecting to maintain the current level of jarrah cut beyond the year 2000 to the year 2020.
- Promises to reduce the cut have been made repeatedly in forest management documents since the 1930's, but these have always been deferred when the time came to implement them.
- The jarrah cut must be reduced for the forest to be sustained.
- This Condition is unnecessary and should be removed.
- On the basis of the information in the PCR, this Condition has been complied with.
- Logging of native forests should cease in favour of plantation development.

Appendix 3: Summary of Public Submissions

Ministerial Condition 10: Commitment of new resource to be referred

The following is a summary of the key points which were made in public submissions:

- In order for compliance to be assessed, CALM must declare any new contracts of sale which have been entered into for materials in these classes.
- This Condition is illogical as it is a disincentive to industry to utilise resources that are available as a result of the approval of the proposal. It also restricts environmental benefits from increased efficiency in wood utilisation and residue use.
- On the basis of information presented in the PCR, this Condition is being complied with.

Ministerial Condition 11: Jarrah Silviculture Trial

The following is a summary of the key points which were made in public submissions:

- The report provided by CALM provides insufficient evidence of the impacts of logging (and related operations) on fauna to verify that logging is not detrimental.
- Marri dominance in jarrah regeneration areas is a big problem which is not mentioned in the PCR.
- The Condition requires monitoring on a range of sites and localities throughout the forest, but the Kingston study is only one locality.
- CALM's claim that resources are not available to carry out monitoring on a range of sites is not defensible, because this is a legal requirement of the Condition and money is made available for the Maritime Pine venture.
- The EPA should evaluate whether the Kingston study and the planned retrospective study meet the requirements of Condition 11-1.
- The scope of future trials and monitoring necessary to meet the requirements of the Condition, need to be determined by the EPA as soon as possible, so that results are available within the (ten-year) management planning period.
- The PCR does not say how well jarrah is regenerating in gaps.
- The role of the FMRC with respect to this Condition needs explicit definition, under a determination from the Minister, in order to ensure that Condition 11-2 is adequately met.
- The FMRC has not been allowed to fulfil its function with respect to this Condition.
- The report on the Kingston study is only interim, and is inadequate and too limited in scope to be useful in defining the full range and extent of the impacts of logging.
- There is little evidence of comprehensive monitoring of forest regeneration, and little evidence that management strategies are modified in response to management based experimentation.

Appendix 3: Summary of Public Submissions

Ministerial Condition 12: Phased Logging

The following is a summary of the key points which were made in public submissions:

- CALM is not applying the strict wording of this Condition, which would require them to take into account the fact that some second order catchments proposed for logging are already predominantly cleared, and therefore any further logging may result in a breach of the Ministerial Condition.
- The EPA should examine maps of verifiable examples of the application of the requirements of this condition provided by CALM to verify that this Condition is being complied with.
- Appendix 2 does not demonstrate compliance with Condition 2-2, as professed by CALM in the PCR.
- The EPA should seek further information to determine the extent of fulfilment of the requirements of Condition 12-2, and the silvicultural guidelines should then be modified to adequately address the EPA's requirement.
- CALM should be required to publish the requirements of the Minister with respect to this Condition.
- The PCR does not provide anything of substance on the monitoring of the status and effectiveness of phased logging, yet reporting on this is required by 2002.
- The EPA should seek more specific information on the monitoring) being applied, (as required by this Condition) and any results available to date.

Ministerial Condition 13: Habitat Trees

The following is a summary of the key points which were made in public submissions:

- In practice, habitat trees are being poorly selected and are not being adequately protected from the effects of logging, post-harvesting silviculture and post-logging burning.
- Bill McComb's preliminary study on habitat trees has not been used because it was critical of CALM's first management.
- Habitat tree locations should be, but are not, adequately marked and located in the field to enable checking of adherence to prescriptions and monitoring of their survival.
- The habitat tree prescription is based on inadequate or unbalanced scientific information.
- Protection of habitat trees by CALM field staff is not adequately overseen or supported by senior staff.
- Habitat trees selected are vulnerable to fire and wind and are not surviving for an adequate length of time after logging.
- The determination of the Minister with respect to this Condition must be provided.
- On the basis of information provided in the PCR, it appears that this Condition is being complied with.
- This Condition is not necessary because it duplicates the requirements for implementing the proposal.
- The long term efficacy of the habitat tree prescription is uncertain and subject to contradictory evidence. The habitat tree prescription should therefore be comprehensively monitored, but the PCR does not indicate that this is occurring.

Appendix 3: Summary of Public Submissions

Ministerial Condition 14 : *Banksia grandis* Reduction

The following is a summary of the key points which were made in public submissions:

- The fact that this part of the proposal was not implemented demonstrates that it was poorly conceived and researched in the first place. It is likely that other aspects of management are similarly poorly conceived and researched.
- The report on this Condition demonstrates that CALM is being adaptive.
- The Minister's requirements for this Condition should be published.
- The EPA should seek further information on whether CALM is monitoring the potential impacts of reduction of *Banksia grandis* occurring as a result of silvicultural or other operations.
- Operations may no longer specifically target *Banksia grandis*, but monitoring of impacts of reduction of the species which may occur as a result of logging or silviculture should be a component of wider ecosystem monitoring.
- CALM should have sought approval from the Minister or the EPA before deciding not to implement the Banksia reduction programme.

Ministerial Condition 15: Fire Management

The following is a summary of the key points which were made in public submissions:

- The public has no way of verifying the claims made in the PCR about a reduction in the number of incidents of excessive smoke haze.
- There is no formal process for public input into burning practices. This highlights inadequate public accountability, consultation and peer review processes in relation to burning.
- Compliance has been achieved.
- CALM should be reporting all escapes and their effects in annual reports or PCRs.
- In practice, CALMfire ignores the requirement for exclusion of fire from no planned burn areas and for a proportion of each burn to be left unburned.
- Prescribed burn implementation should be monitored to check that burning is meeting predefined objectives.
- Fire planning should take more account of public aspirations.
- Despite the findings of the Fire Review Panel, there is growing evidence of lasting ecological harm caused by broadscale prescribed burning.
- It is difficult to know the extent to which the mosaic effect is being achieved.
- Research indicates that future burns should be conducted in high litter-moisture content conditions (ie. winter) to reduce litter loss.
- On the basis of information in the PCR, it is considered that this Condition is being complied with.
- CALM should be required to publish more thorough and transparent information on its prescribed burning programme.
- The Fire Review Panel was not independent but was uncritical and biased, being too closely associated with CALM, and gave inadequate consideration to public submissions.
- The EPA should conduct an independent audit of implementation of many of the recommendations of the Fire Review Panel.
- This Condition has only been partly met and the recommendations of the ESFM Report with respect to fire management should be acknowledged by the EPA.
- The FMRC should have been involved in the review but was not, and the review was not linked with the review of the Bushfires Act.

Appendix 3: Summary of Public Submissions

Ministerial Condition 15: Fire Management (cont'd)

- The EPA should seek further information with respect to the requirements of Condition 15-3 on the involvement of the FMRC in the review.
- Fire law and burning policy and practice is in need of change to allow for more local community input with respect to planning and approval for fire management activities.

Appendix 3: Summary of Public Submissions

Ministerial Condition 16: High Salt Risk Catchments

The following is a summary of the key points which were made in public submissions:

- The definition of high salt risk catchments used in the agreement is excessively narrow because only a handful of streams in the south west will be protected under the Condition.
- In the interests of public transparency, the parties to the agreement with respect to high salt risk catchment, should explain the basis for identification of catchments in more detail in a public document.
- The methodology for identification of streams should have included the low rainfall zone and areas in the Whicher Scarp, Donnybrook Sunklands and Leeuwin Naturaliste Ridge.
- Little action had been taken in the 3 years until 1996 by CALM.
- Salinity will develop following logging in all zones but particularly in the intermediate and low rainfall zones.
- All potentially salt affected catchments should be identified, but only a handful of catchments have been identified.
- CALM should explain the basis of identification of the selected catchments.
- Such specific figures as 30% and 15 m² per hectare for bole area are too difficult to verify.
- Farmers have a reason to be concerned about the possible impact of logging on their water supplies.

Ministerial Condition 17: Forest Monitoring and Research Committee

The following is a summary of the key points which were made in public submissions:

- CALM never intended or permitted the FMRC to have an active role in anything, and did not provide the necessary resources for it to perform its function, so it has not complied with this Condition.
- The FMRC has not functioned as the Minister intended, and the EPA should now recommend that it be fully resourced to carry out its duties.
- The limited progress of this Committee is of concern, and possibly reflects the disparate interests of its membership and the lack of funding and authority provided to it.
- CALM has obstructed the working of the FMRC and therefore there has never been a coherent programme of monitoring, using CALM Policy 28. This is hidden by the PCR.
- No working groups of scientists were appointed by the Committee until late 1997. It is therefore recommended that the EPA assess the adequacy of progress with this Condition.
- The EPA should seek further information to determine which annual reports were submitted to the Minister.

Appendix 3: Summary of Public Submissions

Ministerial Condition 18: Reporting on Compliance

The following is a summary of the key points which were made in public submissions:

- This PCR shows that CALM has contempt and disdain for the EPA and its compliance process.
- The PCR is written so as to make public scrutiny of compliance difficult. Relevant questions remain unanswered.
- Given the decision of the Supreme Court not to consider granting a legal remedy for breaches of Ministerial Conditions, we request that the EPA explain the purpose and intention of Condition 18, the reporting on compliance process.
- The PCR is written to explain what is being done by CALM, rather than whether or not compliance with Ministerial Conditions is being achieved.
- Many of the reporting requirements suggested by the definition statement were not imposed on CALM. This has allowed too much opportunity for covering up non-compliance.
- The PCR was poorly presented and hurriedly compiled and doesn't reflect the scope or the detail required of a major public report on compliance.
- The PCR should have included the brief annual reports required for this Condition.
- Our requests to CALM for information missing from the PCR were responded to excessively slowly.
- CALM is commended for this thorough yet readable report, which demonstrates that CALM actively monitors and researches the environmental impacts of its management.
- Future PCRs should contain clear statements under each sub-condition, indicating the degree of compliance achieved and any problems encountered with implementation, and how these were managed.
- The PCR does not address all of the points raised in our response to the definition statement, and does not adequately cover all of the 'major elements of forest management' as referred to in the definition statement.
- The EPA should seek further information, not provided in the report, to verify compliance.
- The EPA should consider establishing performance indicators for key requirements to enable determination of adequate progress to be made in subsequent reviews.
- Future PCRs should contain a summary of the results of external audits, if these are carried out.
- The PCR avoids a balanced response which addresses outcomes, and only reports process and positive outcomes. This invites public concern about transparency and the adequacy of self audit.
- The PCR provides little recognition of problems in implementation or with results, and assumes that all plans are carried out as set down.
- The PCR is missing some maps which are essential for evaluation and which were requested in response to the published definition statements.
- The lack of transparency in the PCR makes it difficult for the EPA to perform its function, suppresses healthy debate and avoids recognition of any problems.
- The PCR contains little of substance and shies away from any areas of contention. It seems to have had little input from staff in the field.
- Future PCRs should report on commitments which are agreed between CALM and the EPA.
- The PCR has not reported arguably substantial changes to prescriptions which have taken place.

Appendix 4 : Questions from the Advisory Committee and CALM responses.



Environmental Protection Authority

Dr S Shea
Executive Director
Department of Conservation and Land Management
Locked Bag 104
BENTLEY DELIVERY CENTRE WA 6983

Dear Syd

CALM'S COMPLIANCE REPORT

I have had discussions with Noel Fitzpatrick about broad-based questions which have arisen during the drafting of the report for the consideration by the EPA Advisory Committee.

There are two items about which we would be grateful to have the benefit of your advice. These are:

1. Research
 - a. Based on information in the 1993 to 1995 Triennial report of the Science and Information Division there appears to have been a substantial reduction in the funds available for research in complex areas of forest management. Since further information about funds is presumably available for later years, I would appreciate your advice on the current situation.
 - b. In other areas it has been found desirable to set up Industry supported funds for R & D to isolate this important long term function from the effects of periodic Government economies. We would like to test the proposition that such a fund could be established in WA to be administered by an expert committee and be responsible directly to the Minister responsible for forests.

2. Resource Sustainability

Noting that the 1993 Meagher report set the long term sustainable jarrah sawlog yield at 300 000 cubic metres per annum on the basis of revised estimates of growth rates made from growth plots taken after 1992; and that the figure has been repeated as a firm estimate in the Consultation Paper issued recently under the RFA, two questions arise:

- (a) Do current estimates of growth rates taken from growth plots still support that figure, or is there a case for the issue to be revisited by a group of experts ?

Appendix 4 : Questions from the Advisory Committee and CALM responses

- (b) If the figure remains the best estimate; are plans in place to reduce the allowable cut after 2003; and if so do these plans include proposals for industry adjustment?

Kind regards

Bernard

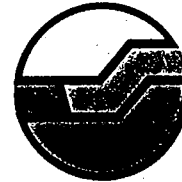
Bernard Bowen
CHAIRMAN

13 July 1998

Appendix 4 : Questions from the Advisory Committee and CALM responses

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Mr Bernard Bowen
Chairman
Environmental Protection Authority
Westralia Square
141 St George's Tce
PERTH WA 6000

Dear Bernard

CALM'S COMPLIANCE REPORT

I refer to your letter dated 13 July 1998 requesting information on two questions to assist the EPA Advisory Committee. The following information is provided:

1. Research

- (a) Your comment that the 1993-95 Triennial Report indicates a substantial reduction in research funding in the forest management area appears not to take account of the full amount of funding available for research in CALM.

I assume that your comment is based on page 135 of the Triennial Report. Page 136 of the same report shows that external funding for total research for the same period rose from \$1.56 million to \$2.9 million. Obviously when balancing an overall departmental budget, account must be taken of the full amount of funding available to the research division.

You should also note that not all of CALM's research expenditure is in the Science Division budget. CALM's forest inventory and forest dieback interpretation functions are within the Forest Management Branch. The 1998/99 budget for these functions is \$1.3 million.

CALM's research into wood properties and timber products is undertaken by CALM Timber Technology. The 1998/99 budget of the branch is \$917 000.

The following table details expenditure by CALM Science's, Forests and Tree Crops Group and Biodiversity Conservation Group on research carried out within or directly relevant to State forest for the period 1992 to 1998. Research on tree crops and sandalwood is excluded.

Appendix 4 : Questions from the Advisory Committee and CALM responses

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Year	Total budget
*97-98	2656
*96-97	2651
95-96	2746
94-95	2790
93-94	2735
92-93	1923

(*excludes RFA projects)

Most importantly, recognition must be given to the research projects undertaken under the auspices of the Regional Forest Agreement (RFA). Attached at Appendix 1 is a schedule of these projects which shows that \$7.5 million has been spent since November 1996. CALM estimates that well over \$1 million has been spent by CALM in additional in-kind science contributions to the RFA, not including administrative costs.

- (b) Your suggestion that an industry supported independently administered R & D fund be created to support research into forest management is noted. You advise that the rationale for this suggestion is to isolate the research and development function from "the effects of periodic Government economics". However, you should be aware that CALM operates on a net appropriation agreement with the Government under which all revenue, including that received from native forest operations, is retained by the Department to fund CALM's commercial activities, with a substantial surplus applied to CALM's other programs.

The royalty and in-forest charges, applied to forest produce by CALM, meet the costs of commercial activities including forest management research.

Given the extraordinary level of research undertaken as part of the RFA project and the guaranteed funding as part of CALM's net appropriation agreement, it would be very difficult to justify increased funding for forest research, particularly when deficiencies in the knowledge of other ecosystems are considered.

You will recall that CALM's compliance report in respect of Ministerial Condition 17 referred to the establishment of a working group of five scientists to review current forest research and monitoring programs and identify any gaps in current research and monitoring programs. The working group includes two CALM scientists and Drs Bernie Dell, Libby Matiske and Owen Nicholls. The report of the working group should be finalised in the next month. CALM will have regard to any research gaps identified by the working group.

It is important to recognise that within CALM there is a detailed triennial prioritisation of science projects and the overall direction of scientific research. In the case of forest-related research, this involves interaction of the Science Management Council (the policy-making body of CALM Science Division) with the Directors of Nature Conservation, Forests and Regional Services. The final decision on the allocation of budgets to proposals put forward by CALM scientists rests with the Science Management Council.

Your suggestion for the industry supported R & D fund, administered by an expert committee, be established, appears to be outside of issues to be addressed in CALM's Compliance Report, and as indicated above, the justification for the proposal appears to be based on a false premise.

2. Resource sustainability

- (a) You have asked whether current estimates of growth rates taken from growth plots support the estimates of long-term sustainable sawlog supply from jarrah forest.

The short answer to your question is that the wood resource yields for the forests have been examined as part of the RFA project. A report by Dr Brian Turner of the Australian National University has supported CALM's current estimates of yield.

However, your question raises a number of issues that warrant detailed examination and explanation (see below).

- (b) You have asked whether there are plans to reduce the allowable cut of jarrah after 2003. CALM's view is that the harvest of the jarrah forest should not exceed the growth increment of that forest currently estimated to be 1 360 000 m³/year.

The following statement should assist your Committee to understand the migration of the jarrah sawmilling industry from use of sawlogs of current specifications to whole bole sawmilling. While this matter does not impact on the current forest management plan and CALM's compliance with Ministerial conditions, it is important that the Committee have an understanding of the new directions in jarrah sawmilling that have occurred under the current forest management plan.

LONG-TERM SUSTAINABILITY OF JARRAH SAWLOG YIELD

There has been considerable recent interest in the issue of the long-term sustainability of jarrah sawlog yield.

It is impossible to consider this issue without understanding the background to the establishment of the present jarrah sawlog harvest of 490 000 cubic metres of 1st and 2nd grade sawlogs. The background is set out in considerable detail in the Ministerial Statement entitled "Native Forest Management and the Future for the Native Hardwood Timber Industry" made to Parliament by the Hon Kevin Minson MLA on 5 August 1993 (Attachment 2).

As set out in the Ministerial Statement the key factors in considering long-term sustainable sawlog supply are the average jarrah increment (ie, the growth of the jarrah forest) and the percentage of that increment that can be converted to sawlog.

The Minson Statement advises that the likely range of jarrah growth is:

Average jarrah increment m ³ /ha/yr	Total annual growth of jarrah on Crown land available for harvesting (m ³)
1.1	1 221 100
1.2	1 332 000
1.3	1 443 000
1.4	1 554 000

Mr Minson was advised by an independent scientific committee that he appointed (the Meagher Committee) that it was reasonable to consider that the annual growth of jarrah is 1 360 000 m³/year.

CALM's estimation of resource yields for the jarrah forest has been independently verified and supported by Dr Brian Turner in his report "An Appraisal of Methods and Data Used by CALM to Estimate Wood Resource Yields for the South West Forest Region of Western Australia" (May 1998) produced for the WA Regional Forest Agreement process. Dr Turner has recommended that modelling be adjusted to take account of the trial of new jarrah silvicultural specifications to ensure that long-term yield estimates remain accurate. CALM is also establishing new growth plots in regrowth jarrah stands to complement the 650 permanent growth plots measured by the Department every 3-10 years.

Having established that the estimated annual increment on the jarrah forest of 1 360 000 m³/year is reasonable, the issue becomes the sustainability of sawlog supply from that growth on the forest.

This issue was also dealt with very clearly by the Minson Statement. The following quote is pertinent:

"Working from the total annual growth of 1 360 000 m³, the question is what will that mean in terms of sawlog production? Again this is variable depending on the size class distribution of the trees in the forest and for those large enough to yield sawlogs, their inherent quality i.e. straightness or defect level. For example, if the forest was composed entirely of trees below sawlog size, even though the annual growth was 1 360 000 m³ the yield of sawlogs would be nil because they would all be too small. On the other hand if the forest was comprised entirely of trees with no defects which were all above sawlog size, the yield of sawlogs would equal the annual growth of 1 360 000 m³."

Therefore, the sawlog yields that are possible depend on the amount of the total jarrah increment that can be converted to sawlogs of the required specifications.

Minister Minson determined that 490 000 m³ of 1st and 2nd grade jarrah sawlogs of the current specification would be the allowable sawlog harvest. This equated to a 36 per cent yield from the gross bole increment available. CALM has had a long-term program to increase the utilisation of the felled bole. For example, if utilisation is increased from 36 per cent to 40 per cent the sawlog yield increases from 490 000 m³ to 544 000 m³.

However, the other issue to be considered in sawlog supply is whether the forest can sustain the sawlog specification being supplied.

CALM has advised that the long-term non-declining level of sawlog supply at current specifications is approximately 300 000 m³/year but may be as high as 450 000 m³/year if utilisation rates increase (Minson Statement, page 5). It should be remembered that this is at the current specification for 1st grade sawlogs which must have greater than 50 per cent millable wood on the worst end face, a small end diameter of at least 200 mm and a minimum length of 2.1 m. The current specification for 2nd grade sawlogs is as for 1st grade logs but the worst end face must have greater than 30 per cent millable wood, with a minimum diameter of 250 mm.

Appendix 4 : Questions from the Advisory Committee and CALM responses

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These specifications were established to supply an industry that was predominantly producing green structural and heavy section output.

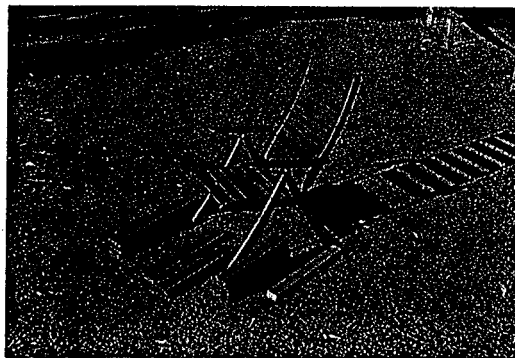
However, the jarrah sawmilling industry has undergone a remarkable change since CALM's 1987 Timber Strategy. CALM's contracts for sawlog supply, which followed Minister Minson's Statement, required that 50 per cent of the mills' jarrah output be value-added within three years. The secure 10-year supply contracts, based on the current forest management plan, have seen large-scale investment in value-adding equipment, specifically drying kilns and new sawlines to provide timber for furniture and architectural feature uses rather than the predominance of heavy and structural sections that were produced prior to the 1987 Timber Strategy.

The change in product output is clearly demonstrated at Attachments 3 and 4 which show that Bunnings product mix has changed from an historical average of 72 per cent green sawn with only 28 per cent value-added, to its current Deanmill Mill output of 11 per cent green sawn and 89 per cent value-added.

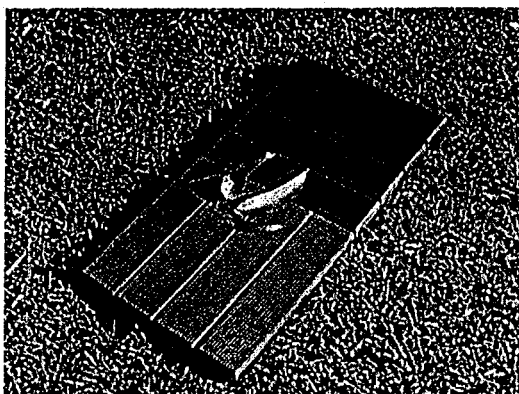
The first five years of the current forest management plan have therefore seen a revolutionary change in the end-use of jarrah with constant increases in the amount of dried jarrah and a consequent reduction in heavy and structural green sawn output. The recovery of value-added product now exceeds 60 per cent on an industry-wide basis.

What this means for the future is that the current sawlog specification has become irrelevant with the smaller dimension sawn timber now being produced to meet the demands of the furniture and architectural feature markets. Also, given the higher value of the output, it is now possible to make greater economic use of the remainder of the tree bole.

This can be seen in the photograph below which shows an outdoor chair that is currently manufactured by Clarecraft. There is no component of the chair that is over 900 mm in length. The components are displayed in front of the chair.



Another example of high value output from seasoned jarrah is illustrated by the photograph below.



These interlocking jarrah flooring tiles are used as outdoor decking. They are produced by Bushmills Timbers for the export market. The maximum length of the timber used in the tiles is 300 mm.

The change in the seasoned output of mills has also seen a dramatic opening of opportunities for downstream manufacturing. The Western Australian hardwood outdoor furniture and feature grade furniture sectors were recently studied by BIS Shrapnel for the Regional Forest Agreement process. The consultants found that both sectors had grown rapidly over the last five years – the outdoor hardwood furniture industry at 18 per cent and the natural feature furniture industry at 17 per cent per annum between 1993 and 1998. Growth predictions for the industries for the next five years are 9 per cent and 17 per cent per annum respectively, far outstripping most other manufacturing growth.

As the industry is export driven there is potential for new entrants, in which case the consultants consider that growth rates could be well above these projections.

Importantly, the sectors have created direct and indirect employment of approximately 2 500, most of which has occurred over the last five years. Obviously, future employment projections are tied to growth rates. However, if the planned investment by current industry operators of 60 per cent over the next five years is realised, these sectors have the potential to be significant employment generators.

A good deal of this employment could be based in the south-west as evidenced by a recent proposal by Jensen Jarrah, an outdoor jarrah furniture manufacturer, to extend their current operation at Busselton by opening a new plant in the Manjimup-Bridgetown area.

Following the successful implementation of jarrah seasoning technology into mills and the development of markets for the dried jarrah, CALM and the timber industry are now addressing the change to whole bole log supply.

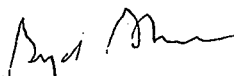
Five trials of whole bole logging and sawing have now been carried out. Issues to be resolved include the need for some improvements in sawmill processes, determination of the specifications of the whole boles to be supplied, and the royalty and other charges applicable.

Appendix 4 : Questions from the Advisory Committee and CALM responses

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As a result of the trials to date, CALM is confident that there is no insurmountable obstacle to the implementation of whole bole logging. A CALM/Timber Industry working group is addressing outstanding issues with the expectation that all fundamental issues will be resolved soon after the completion of the Regional Forest Agreement for Western Australia.

Yours sincerely



Syd Shea
EXECUTIVE DIRECTOR

17 July 1998

Appendix 4 : Questions from the Advisory Committee and CALM responses

Attachment 1

Money Spent on the WA RFA Projects

Assessment Theme Project		Total Cost (\$)	To	From
Biodiversity	Vegetation mapping	80,000	Consultant	Comm
	Vegetation mapping	941,000	Consultant, CALM	Comm
	Soils mapping	235,000	AgWA	Comm
	Remnant vegetation			
	Biodiversity data review			
	Species of special interest	252,200	CALM, Museum	Comm
	Fauna distribution	45,000	CALM, Museum	Comm
	Responses to disturbance		Consultants	Comm
	Other fauna?		Museum	Comm
	Flora distribution	412,000	CALM	Comm
	Fire	94,100	CALM	Comm
	Fire	127,700	CSIRO, CALM	Comm
	Hollows	120,900	CALM	Comm
Endangered specie	Endangered species	101,100	CALM	Comm
Old-growth	Disturbance mapping	189,000	CALM	Comm
	Development stages	93,300	CALM	Comm
Wilderness	Wilderness	37,600	CALM	Comm
National Estate	Natural values	186,000	CALM	Comm
	Cultural (non-indig)	290,000		Comm
	Cultural (non-indig) data audit	25,000		Comm
	Cultural (indigenous)	129,000		Comm
	Cultural (indigenous) data audit	25,000	Consultant	Comm
	Cultural protection guidelines		Consultant	Comm
	Reports	100,000	Printer	Comm
World Heritage	World Heritage	50,000	Consultants	Comm
Wood Resource	Plantations	35,000	Comm, State	Comm
	Accreditation	139,300	Consultant, Comm, State	Comm, State
	Wood profile	118,700	Consultant, Comm, State	Comm, State
	Future demand	214,900	Comm, State	Comm, State
	Development opportunities	251,400	Consultants	Comm, State
Economic	Profile of forest industries	838,200	Comm, State	Comm, State
	Minerals	869,740	Comm, State	Comm, State
	Integrated modelling	210,000		
Social	Post impact analysis	130,000	Comm, State	Comm, State
	Regional profile	162,000	Comm, State	Comm, State
	Case studies	82,000	Comm, State	Comm, State
	Locational impact	280,000	Comm, State	Comm, State
ESFM	Ecologically sustainable forest	86,000	CALM	Comm
Integration	Integration	600,000	Comm, State	Comm, State
Total		7,551,140		

Attachment 2

REPORT NOT INCLUDED

Native Forest Management

and

**The Future for the
Native Hardwood Timber Industry**

A Ministerial Response to


**The Report of the Scientific and Administrative
Committee**

**Established Under Ministerial Conditions In
respect of CALM's 1992 Forest Management
Proposals**

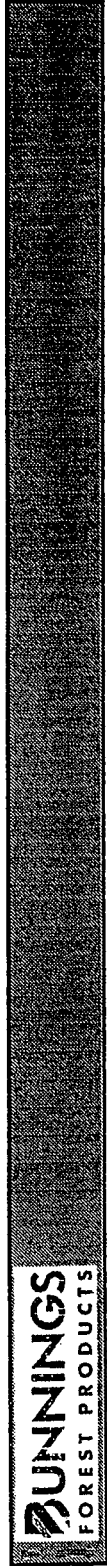
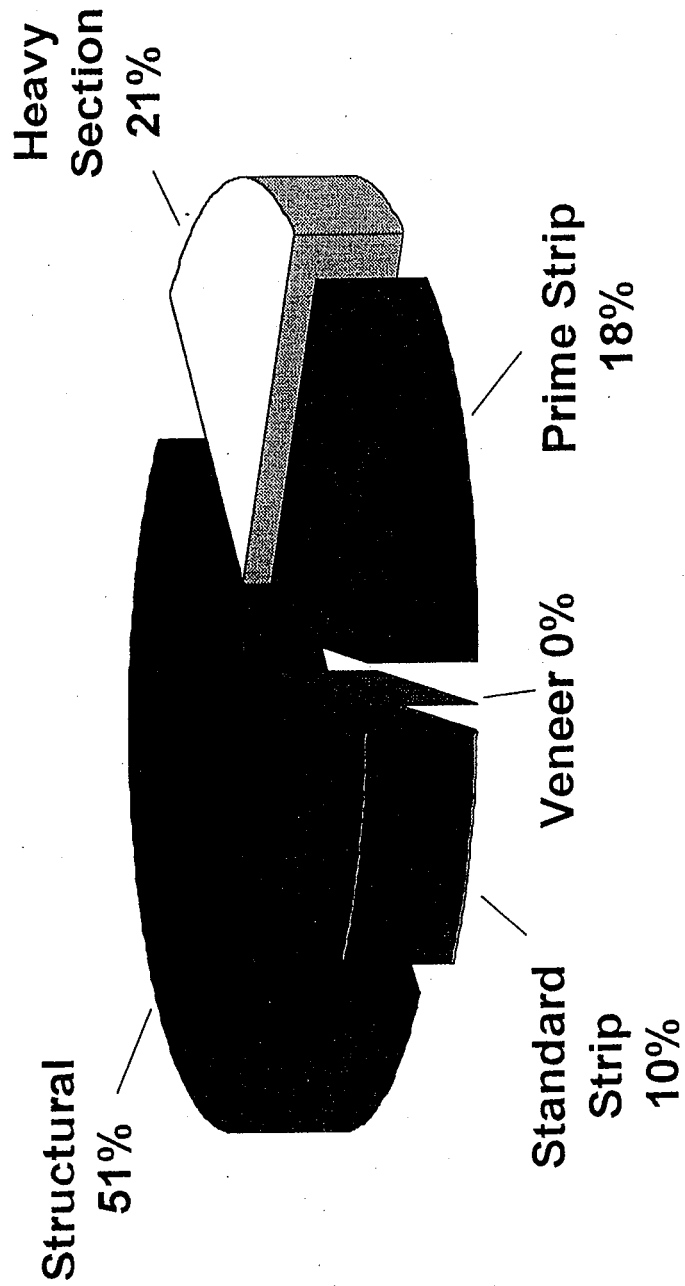
**Hon Kevin Minson MLA
Minister for the Environment**

5 August 1993

Product mix - historical



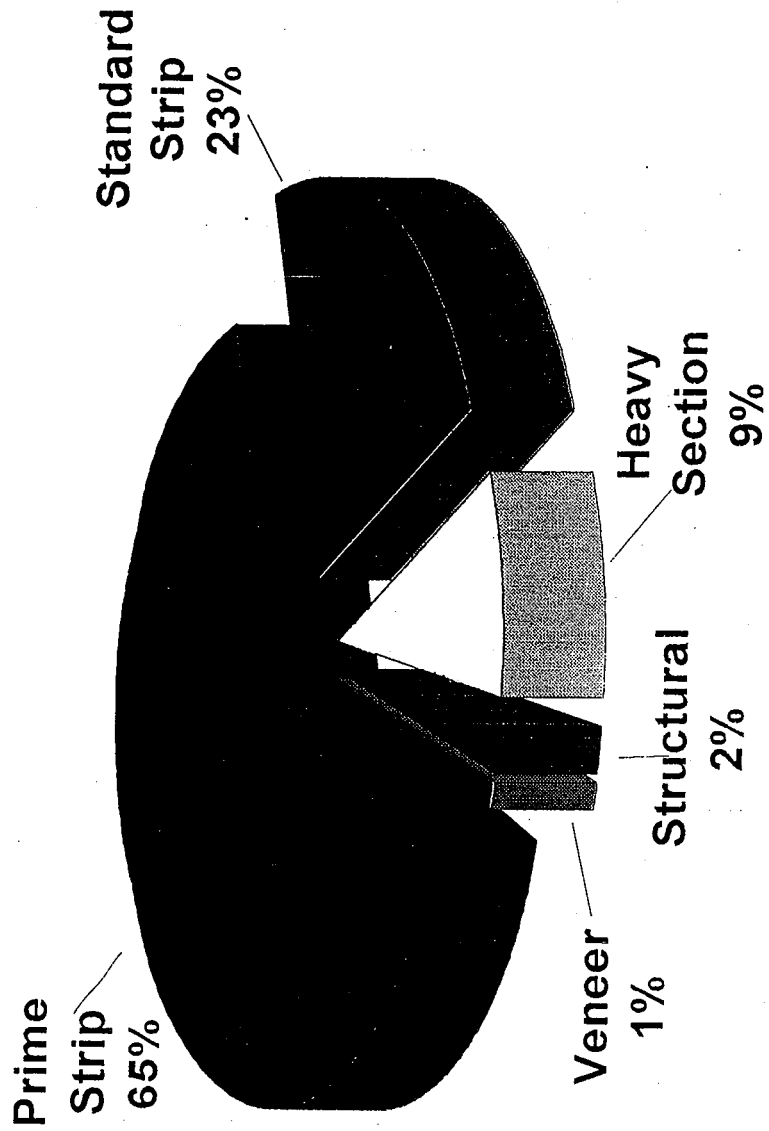
Wesfarmers



Deannmill performance
July 1997 - May 1998



Wesfarmers



BUNNINGS
FOREST PRODUCTS



Environmental Protection Authority

FAXED
22/7/98

Dr S Shea
Executive Director
Department of Conservation and Land Management
Locked Bag 104
BENTLEY DELIVERY CENTRE WA 6983

Dear Syd

CALM'S COMPLIANCE REPORT

Many thanks for your letter of 17 July 1998 providing a response to the questions posed in my letter of 13 July 1998.

Following inputs by Warren Murphy and my discussions with Noel Fitzpatrick, Libby Mattiske and Joanna Young some further questions have arisen. These flow from consideration of the "general advice" being provided in the report as a contribution to environmental performance rather than from the section of the report on compliance. During the course of the work of the Advisory Committee, submissions have been prepared by one or more members as contributions to the discussions and to provide the "general advice". The questions mostly arise from these submissions.

We realise that the questions may not be ones which can be answered in a short time frame, and they may better be held over until the EPA considers the preparation of its report to the Minister in about September or October 1998 after the EPA has the final text of the Advisory Committee report. As you may be aware the Advisory Committee is endeavouring to have available a draft report for the EPA so that it can be made available to the Minister, yourself and the public in the lead up to the preparation of the Regional Forest Agreement.

The questions are:

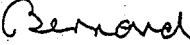
1. Could you please provide information on the regeneration success of jarrah from lignotubers in areas of gap creation. Also, how do the results vary with soil type?
2. Could you please provide advice on what actions have been taken aimed at establishing regeneration in the event that regeneration monitoring of young jarrah demonstrates insufficient new growth, ie. what actions are taken and with what success?
3. We note that in some areas of the south west the cutting is to gaps, but cutting to leave a shelterwood has become the most extensively used prescription overall. We would be pleased if you could clarify why this has occurred.

Appendix 4 : Questions from the Advisory Committee and CALM responses

4. Could you please provide advice on what percentage of jarrah programmed for thinning during the life of the current plan has now been thinned. Also, how many hectares have been thinned since 1987?
5. Could you please explain the procedure for regenerating jarrah in "extensively managed" areas?
6. In 1996/97 only 40 hectares out of 990 hectares of karri harvested was regenerated by natural seed fall. It would be informative if the reasons for CALM's recent reliance on nursery raised seedlings could be explained to the Advisory Committee.
7. Several concerns have been raised regarding the impact of Armillaria, bullseye borer and wood rots on log quality and productivity in the karri forest. Could you please outline the main research findings to date in relation to these matters?
8. Could you please describe what current research is being undertaken addressing the development of karri silviculture prescriptions for the range of soils now supporting regrowth karri, noting that we understand that some of the soils are of lower fertility than others?
9. Could you please advise whether the impact of delaying thinnings in the karri forest longer than expected from the Draft Management Plan has any impact on estimates of future yields?
10. Further to your reply to our earlier questions, would it be possible for you to identify that portion of the research funds which could be identified as being available for research on forestry production?

I would be pleased if you could let me know how you would like to handle these questions.

Kind regards


Bernard Bowen
CHAIRMAN

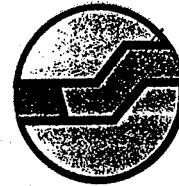
22 July 1998

Appendix 4 : Questions from the Advisory Committee and CALM responses

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

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Your Ref:
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 Enquiries: Dr Shea
 9442 0325
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Mr Bernard Bowen
 Chairman
 Environmental Protection Authority
 Westralia Square
 141 St George's Tce
 PERTH WA 6000

ENVIRONMENTAL PROTECTION AUTHORITY	
Date Received: 23/7/98	
To	Date
Chairman	
CEO/DEP	
Exec. Officer	
Original Filed	V 132
Copies to	

Dear Bernard

Thank you for your letter of yesterday 22 July 1998 requesting advice on answers to a number of questions. We will provide these answers by the close of business today or tomorrow morning. I am pleased that the Committee is seeking advice on technical matters rather than raising them unanswered in the report.

We were in the process of responding to questions raised in a copy of a letter to the Minister dated 17 June which you left with me at our last meeting. In view of the timetable you are facing, I thought it would be useful to give you a response to one of the questions (the other which relates to sustained yield has already been answered).

Your second question was as follows:

"(ii) *Has there been sufficient research on inputs to the model relating to regeneration to take account of risks imposed by variations in soil types, disease, recruitment success, and so on, to provide assurance that there has been sufficient buffer between the allowable harvest derived from the model and the allowable harvest for real long term sustainability.*"

The following information is provided in response.

As you correctly observe, it is essential that yield projections incorporate the best available knowledge on the likely future downgrade of timber quality and quantity arising from such factors as variation in regeneration success, the extent of pest and disease infestation, and the probability of future wildfire or storm events.

Irrespective of the RFA process it has been standard practice for many years to account for such likely impacts when calculating future wood flows from native forests or plantations. As you may recall from briefings provided by CALM staff to the Advisory Committee in Manjimup in 1997, adjustments for the effects of regeneration success or disease impact occur at a number of stages in the yield regulation process. For example, precise estimates of the area of regenerated forest are captured within geographic information systems from a combination of aerial photography and ground survey. The acceptability of stocking levels (to quantitative standards of stem numbers per hectare) within these areas is monitored and, if appropriate, patches of lower quality forest are stratified separately in the yield scheduling. Similarly, known areas of severe insect attack or fungal impact which may create timber degrade are stratified and the future yield discounted.

Current research and monitoring to map the extent and assess the risk of disease or insect occurrence varies with the particular pest or disease, and is at a level considered commensurate with their perceived risk.

Appendix 4 : Questions from the Advisory Committee and CALM responses

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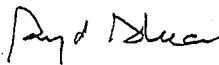
Such assessments and monitoring must also be considered in the over-riding context that the commitment of sawlog harvest from the available forest estate is set in accordance with each new Forest Management Plan at 10 yearly intervals. Thus, for the jarrah forest with rotation lengths of between 150 to 200 years there will be many revisions of yield forecasts and the opportunity to incorporate the continuing monitoring and research results. Such periodic revisions are necessary to not only refine the impacts of variations due to regeneration success or disease impacts, but also to accommodate any changes in the available forest area arising from land tenure changes.

I also thought it would be useful to provide to your Committee copies of two RFA reports which were the results of independent assessment of CALM's forest management. One is a report by Dr Brian Turner of the Australian National University titled "*An appraisal of Methods and Data Used by CALM to Estimate Wood Resource Yields for the South-West Forest Region of Western Australia*". Dr Turner, having assessed the methodologies used by CALM in estimating timber yields, concluded that existing practices were adequate. The other is the "*Assessment of Ecologically Sustainable Forest Management in the South-West Forest Region of Western Australia*" compiled by an Independent Expert Advisory Group chaired by Professor Ian Ferguson. Professor Ferguson, who is also an internationally recognised expert in forest measurement and yield regulation, was also briefed on these issues. These reports are extremely comprehensive and I believe that because they are independent will be of additional value. I appreciate that it is proposed that your compliance report is intended to contribute to the RFA process, but the reverse also applies of course. I am sure these reports will assist the Committee in its assessment of our compliance to the 1994 Ministerial Conditions.

In addition, I understand that the Committee is interested in the positive achievements in the area of forest management as it affects biodiversity. Consequently, I thought it might be useful for the Committee to have available to it the most recent data from the Kingston Study into the impact of timber harvesting and burning on forest fauna. These interim results show the dramatic impact of fox control on the survival of native animals. They also demonstrate that timber harvesting has had no significant impact on the population levels of the fauna species monitored in this study.

Since the 1994 plan, one of the most significant forest management conservation achievements has been the implementation of broadscale fox control programs throughout the forest. Unfortunately, some sections of the conservation movement have not appreciated how significant the impact of feral animal control is on native animals. Your Committee could make a really positive contribution to the debate over forests by drawing attention to the dramatic improvement in biodiversity as a consequence of this feral animal control program and the dominant effect of foxes on forest fauna relative to other disturbances in the forest.

Yours sincerely



Syd Shea
EXECUTIVE DIRECTOR

23 July 1998

Encl
cc Mr Noel Fitzpatrick
Dr Joanna Young
Professor John Pate
Dr Libby Mattiske
Mr Gerry Rayner
Mr Leon Watt
Mr Warren Murphy

Appendix 4 : Questions from the Advisory Committee and CALM responses

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

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┌ Mr Bernard Bowen ┐
Chairman
Environmental Protection Authority
8th Floor, Westralia Square
141 St George's Terrace
└ PERTH 6000 ┘

Dear Bernard

CALM'S COMPLIANCE REPORT

Your letter of July 22, 1998 refers.

It is unfortunate that CALM received late notice of these questions. However, I am pleased to advise that none of the questions raises any matter of substance that is not already the subject of routine management or research attention.

I have provided below responses to the questions posed by your Committee to assist it in providing "general advice" as a contribution to environmental performance rather than the section on compliance. I note that the Ministerial Conditions themselves do not specifically require this advice to be provided.

Question 1

Could you please provide information on the regeneration success of jarrah from lignotubers in areas of gap creation. Also, how do the results vary with soil type?

CALM's response

The jarrah forest is a complex mosaic of structure and quality. The silviculture practice may be described as a group selective system and thinning. The Silviculture practice accorded to any area of forest depends mainly on the forest structure with one of three principle silvicultural objectives adopted for any particular group or patch of forest. The three main silvicultural objectives are:

Thinning -

Appendix 4 : Questions from the Advisory Committee and CALM responses

2

Where the forest consists of a relatively uniform well stocked stand of regrowth trees which requires thinning by removal of a proportion of non-crop trees to promote growth and health of retained or crop trees.

Shelterwood -

A shelterwood consists of mainly mature trees and is developed where there is inadequate stocking of crop trees for thinning and where there is insufficient stocking of lignotubers or saplings. A partial removal of the overstorey allows the retained overstorey of mature trees to provide seed for regeneration to develop by reducing the competition of the overstorey.

Gap creation -

Where there is adequate existing stocking of lignotubers or saplings the removal of the overstorey encourages the existing jarrah regeneration to develop unimpeded by the overstorey competition.

A series of silvicultural guidelines have been developed to assist field officers to achieve the above objectives in accordance with Ministerial Conditions and the Forest Management Plan.

The 1992 Ministerial Conditions (Conditions 3 and 11) require the jarrah forest to be managed by implementing current jarrah silviculture as a trial during the period of the Management Plan and the adoption of adaptive and flexible management practices based on research and monitoring. CALM has embraced the spirit and intent of this condition and has made a number of modifications to the silvicultural guidelines such as changes to habitat tree retention and the method of jarrah regeneration surveys.

The presence of adequate regeneration is assessed prior to determining the method by which particular areas of jarrah forest will be harvested and regenerated. Where the creation of gaps is selected as the most appropriate method the criteria that have been set (refer Silvicultural Guidelines 1/95 and 4/97) ensures existing jarrah regeneration (advanced growth) is encouraged to develop unimpeded into saplings, poles and mature trees.

Field inspections over time have meant silvicultural guidelines have been amended as a result of new knowledge gained since the mid 1980s. A small proportion of gaps which are less than ideally stocked with regeneration receive follow up treatment by planting using jarrah seedlings. The area treated in this manner has averaged about 50ha per annum in recent years or about 1% of the annual area harvested.

A process to monitor the development of regeneration in gaps post harvest was initiated during 1997/98. The results of this monitoring could be correlated with the new maps of vegetation complexes produced during the RFA process and which reflect soil type and land form. While CALM is always pleased to incorporate new knowledge the Committee should note that CALM is now achieving a 99% success rate in gap regeneration release.

Question 2

Could you please provide advice on what actions have been taken aimed at establishing regeneration in the event that regeneration monitoring of young jarrah demonstrates insufficient new growth. ie. what actions are taken and with what success?

CALM's response

CALM has adopted a cautious approach in deciding the proportion of forest harvested and regenerated by gap creation compared with treatment using the shelterwood system in areas where existing regeneration may not have been considered adequate. This means that the likelihood of areas where gaps are created and which require follow up treatment are minimised.

The action taken in areas where it is has been necessary to plant jarrah seedlings has been answered in Question 1.

The success of the follow up treatment and any enhancement to guidelines will depend on the results of monitoring carried out during the balance of the Forest Management Plan period.

It is considered that those areas of jarrah forest which may have been identified to the Committee as ones with inadequate regeneration are mainly situated where the forest has always been marginal with trees of low height and being widely dispersed.

These areas are now identified through preharvest assessments and unlikely to be harvested. Regeneration in the limited areas which were harvested in the 1980's reflect the initial low quality forest.

CALM is aware that a small component of some areas cut to gaps during the 1980's are not adequately stocked. The Department will be scheduling these areas over the next 12 months for follow up treatment for the completion of the current Forest Management Plan.

The Committee should note that the location in low quality forest and the relatively minor area involved will be such as to have no impact on future yield calculations.

Question 3

We note that in some areas of the south west the cutting is to gaps, but cutting to leave a shelterwood has become the most extensively used prescription overall. We would be pleased if you could clarify why this has occurred.

CALM's response

The shelterwood (or regeneration establishment) silvicultural treatment in the jarrah forest was developed as part of a review of jarrah silviculture in the mid to late 1980's.

Appendix 4 : Questions from the Advisory Committee and CALM responses

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Cutting to shelterwood is a more cautious approach in areas where doubts exist about the stocking or development stage of jarrah lignotubers. The shelterwood overstorey is retained to provide seed for regeneration until the regeneration has developed to the stage where initial growth can be released by removal of the overstorey. Such sites are more prevalent in the eastern and southern parts of the jarrah forest, often being associated with sandy soils or duplex clay soils. The vegetation complex maps referred to in the answer to Question 1 will be of assistance in this area.

The proportion of areas cut to gap, thinning or shelterwood prescription will fluctuate according to the existing structure of the areas of forest scheduled for harvesting. The increase in shelterwood cutting in recent years is a reflection of that fluctuation. It is also due to the cautious approach being undertaken to ensure with increased certainty that there will be an adequate stocking of lignotubers at the time of regeneration release. Monitoring of areas treated by the shelterwood system will be carried out as outlined in Silvicultural Guideline 4/97.

Question 4

Could you please provide advice on what percentage of jarrah programmed for thinning during the life of the current plan has now been thinned. Also, how many hectares have been thinned since 1987?

CALM's response

There is no specific area of or percentage of jarrah forest programmed for thinning during the life of the current Forest Management Plan, nor have detailed projections been made.

As described in the answer to Question 1 the area of forest suitable for thinning is not able to be accurately determined until the field officer on the ground makes a detailed assessment of the presence and condition of regeneration or sapling and pole sized regrowth in the stand scheduled for harvesting.

The areas of jarrah forest thinned since 1987 are as follows: -

Year	Area (ha)
1987	2319
1988	5131
1989	4130
1990	3800
1991	2540
1992	4750
1993	3500
1994	2430
1995	2520
1996	1900

Areas shown as thinned from 1987 to 1990 include areas treated for regeneration as well as thinning.

Question 5

Could you please explain the procedure for regenerating jarrah in "extensively managed" areas?

CALM's response

"Extensively managed" areas is a term used for parts of the jarrah forest where the proportion of sawlogs is reduced such as the low rainfall eastern jarrah forest. In these areas the opportunity to thin or create regeneration gaps on a commercial basis is limited by a reduced commercial timber harvest resulting in a higher component of standing noncommercial trees.

Silvicultural Guideline 1/95 does not differentiate between treatments to used in the main jarrah forest and other areas nominated as "extensively managed". Where regeneration is adequate gaps may be created, where regeneration is inadequate shelterwood may be created and where crop trees exist the forest may be thinned.

The difference between "extensively managed" areas and the remainder of the jarrah forest is not the method of regeneration but rather to the structure of the forest prior to harvesting. The pre-existing structure has a large influence on the structure of the forest after harvesting. In extensively managed areas the forest often contains a high component of non commercial trees. For this reason, many of the trees may remain standing following harvesting.

Question 6

In 1996/97 only 40 hectares out of 990 hectares of karri harvested was regenerated by natural seed fall. It would be informative if the reasons for CALM's recent reliance on nursery raised seedlings could be explained to the Advisory Committee.

CALM's response

Although natural regeneration using seed trees is the preferred silvicultural treatment in karri, its use relies heavily on sufficient flexibility in relation to areas of forest available for harvest. There must be sufficient number of harvesting coupes available to enable sequencing of operations to enable harvesting and regeneration to be timed to match seed being available in the forest canopy. Since 1994 areas of karri forest available for harvesting in State forest have been significantly constrained by a number of factors including:

- 1994 Commonwealth Government moratorium on woodchip exports from "high conservation value" forests
- 1995 Deferred Forest Assessment

Appendix 4 : Questions from the Advisory Committee and CALM responses

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1996 Present Regional Forest Agreement

1994-1998 Litigation in particular karri forest blocks -- Jane and Sharpe

1994-1998 Forest protests in particular karri forest blocks

Under these circumstances the area of karri forest available for scheduled timber harvest using the seed tree method of regeneration has been severely constrained. This has meant that the flexibility required to allow optimum use of the seed tree system has been severely reduced. In some cases it has been necessary to harvest potential seed tree areas in one operation and regenerate by planting because there have been no alternative areas available.

CALM anticipates that when the RFA is finalised and dependent of which areas of forests are available for harvesting the areas cut under the seed tree system will be reinstated.

It should also be noted that there is a significant additional cost associated with the enforced use of nursery grown seedlings for regeneration compared to seed trees.

Question 7

Several concerns have been raised regarding the impact of Armillaria, bullseye borer and wood rots on log quality and productivity in the karri forest. Could you please outline the main research findings to date in relation to these matters?

CALM's response

CALM has paid close attention to these forest pests and is satisfied on the basis of current research that they will not cause a significant impact. These all naturally in the karri forest.

Armillaria

The impact of Armillaria is not considered to be a matter other than a natural component of the karri forest. Generally in the karri forest of the south west armillaria appears to be behaving as expected for an endemic pathogen. Its role appears to be of a secondary nature infecting suppressed and predisposed mature individual trees. It occasionally acts an aggressive primary pathogen infecting and killing apparently healthy individual trees.

However, CALM has initiated an important step by employing a pathologist with expert knowledge in armillaria through Dr R Robinson. This has increased recent research into the impact of armillaria in the karri forest with Dr Robinson's location at Manjimup to investigate armillaria and other forest pathogens.

Research on the incidence and spread of armillaria and on determining the extent of armillaria infection across the karri forest is continuing.

Previous work (initiated by Dr M. Pearce of CSIRO) has shown that the inoculation of stumps with competitive fungi, as bio-control agents, has largely been ineffective in reducing the spread of armillaria in karri root systems. Fumigation with a chemical control agent metham-sodium appeared to be the most effective treatment. A further evaluation of this experiment will determine if the treatments have had any useful effect in reducing the spread of armillaria.

Bullseye borer/wood rots:

Preliminary analysis of a recent study by CALM entomologist Dr J. Farr indicates that the prevalence of borers increases along a gradient from high to low rainfall, i.e. there was a greater incidence of borers in lower rainfall sites. It also appeared that larger trees had a higher incidence of borer attack than smaller trees.

The incidence of brown wood and borers appears to be related, however this relationship is not exclusive with both borer attack and brown wood occurring separately. This suggests that the main role of the borers may be to provide entry points for the brown wood fungi.

Work on defining the relationship between the incidence of brown wood and the subsequent occurrence of wood rots has been inconclusive.

Question 8

Could you please describe what current research is being undertaken addressing the development of karri silviculture prescriptions for the range of soils now supporting regrowth karri, noting that we understand that some of the soils are of lower fertility than others?

CALM's response

Silvicultural specifications for karri forest recognise the need to tailor silvicultural treatments to the specific stand. For example, silvicultural specification 1/92 recognises that thinning of karri stands needs to be varied in relation to site quality. The measure of site quality that is used is the top height of the dominant trees in an area. Top height could be expected to vary in relation to a number of environmental attributes, including soil type and fertility. Thus, where soil type and fertility affect top height, then thinning is delayed until the height criterion is reached.

Silvicultural specification 1/92 was developed on the basis of considerable research. A review of silvicultural research in karri forest was compiled by Breidahl and Hewett (1995).

There are a number of current research and monitoring activities relevant to the development of silvicultural prescriptions for the range of soils supporting regrowth karri. These include:

- Monitoring of regrowth stands to produce maps of top height, which are then used for the application of silvicultural specification 1/92.

- A number of thinning experiments in regrowth karri stands covering a range of different site qualities. The experiment sites range from high quality sites such as the Warren and Treen Brook areas through to the eastern karri of lower quality such as Sutton Block.
- Two experiments examining the impact of initial spacing on the growth and tree form of karri are in progress in Nairn and Wheatley blocks. These experiments also investigate whether there is a difference between the growth and form of planted and seed-regenerated karri.
- An investigation into the establishment and growth of karri in relation to soil characteristics. This project aims to determine if soil physical characteristics can be used as indicators of sustainable productivity from karri forests.

Reference

Breidahl, R. and Hewett, P.J. (1995). A review of silvicultural research in the karri (*Eucalyptus diversicolor*) forest. CALMScience, 2: 51-100.

Question 9

Could you please advise whether the impact of delaying the thinnings in the karri forest longer than expected from the Draft Management Plan has any impact on estimates of future yields?

CALM's response

Neither the Draft Forest Management Plan (1992) nor the Forest Management Plan (1994-2003) contains a reference to the annual area of karri forest to be commercially thinned.

5750ha of regrowth karri stands have been thinned since 1980. These forests which were regenerated prior to 1975 have not been materially delayed. Since 1975 there has been an increase in the area of karri forest regenerated. Because the actual average height of these stands are predominantly within guidelines contained in Silvicultural Specification 1/92 there has been no impact on future timber yields.

Question 10

Further to your reply to our earlier questions, would it be possible for you to identify that portion of the research funds which could be identified as being available for research on forestry production?

CALM's response

I assume by the term 'production forestry' you are referring to timber production from native forest.

The following components of CALM funds are related to research aspects of timber production from native forest:

Forest Management Branch – 1998/99 budget of \$1.3 million for forest inventory and dieback interpretation functions.

CALM Timber Technology – 1998/99 budget of \$917 000 for research into wood properties and timber products.

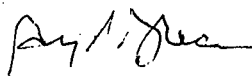
CALMScience's Forests and Tree Crops Group research (excluding tree crops and sandalwood), for the period 1992 to 1998 –

Year	Total Budget (\$)
1997/98	2 210 000
1996/97	2 171 000
1995/96	2 192 000
1994/95	2 329 000
1993/94	2 306 000
1992/93	1 773 000

Regional Forest Agreement – Of the estimated \$7.5 million spent on RFA projects, about \$1.8 million is related to timber production on native forest.

Further to the question in your letter of 13 July 1998 regarding an industry supported research fund, you should be aware that such a fund already exists. The Forest and Wood Products Research and Development Corporation operates in a similar manner to the other research and development funds to which you refer. Funds for projects are allocated on a competitive basis, and CALM competes for these funds against other applicants.

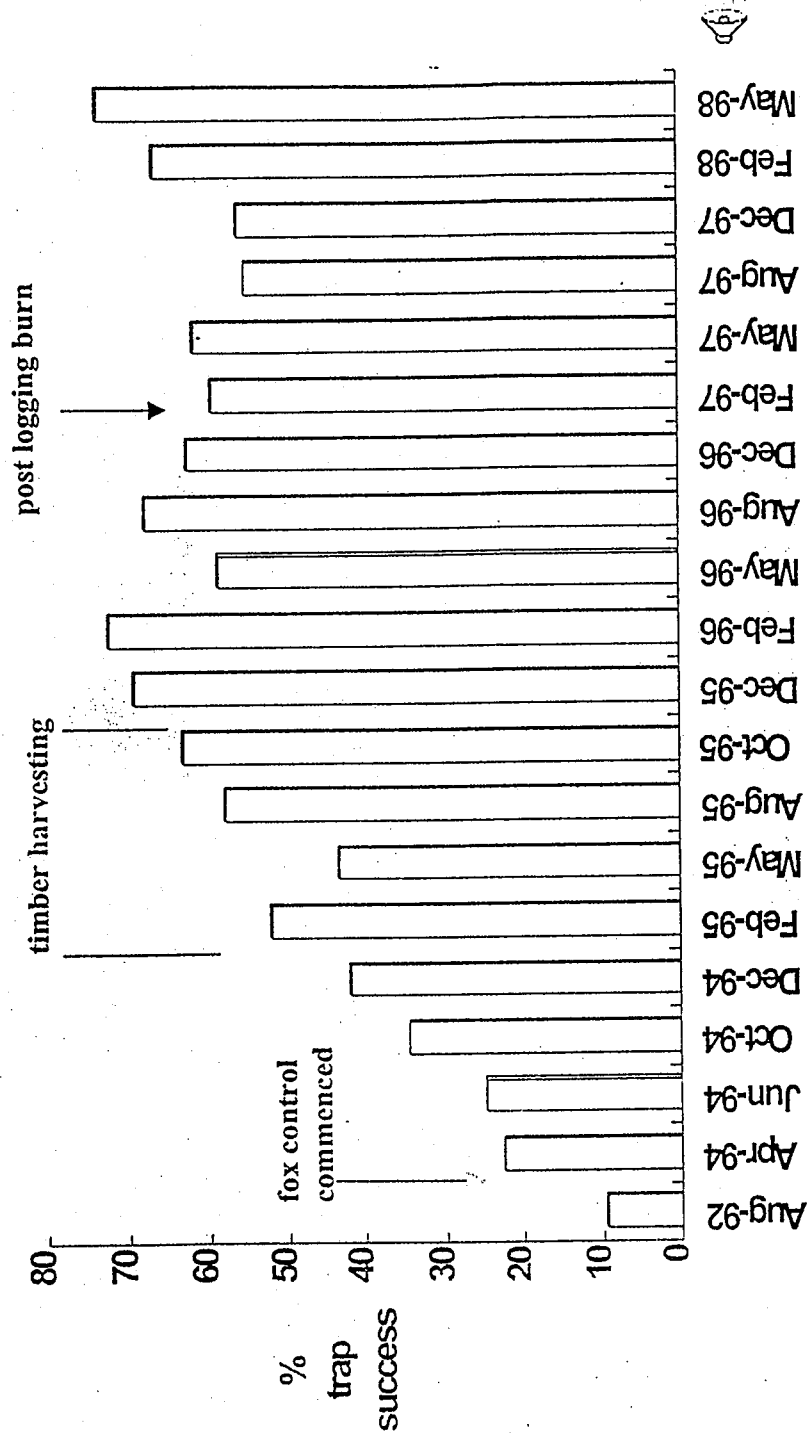
Yours sincerely



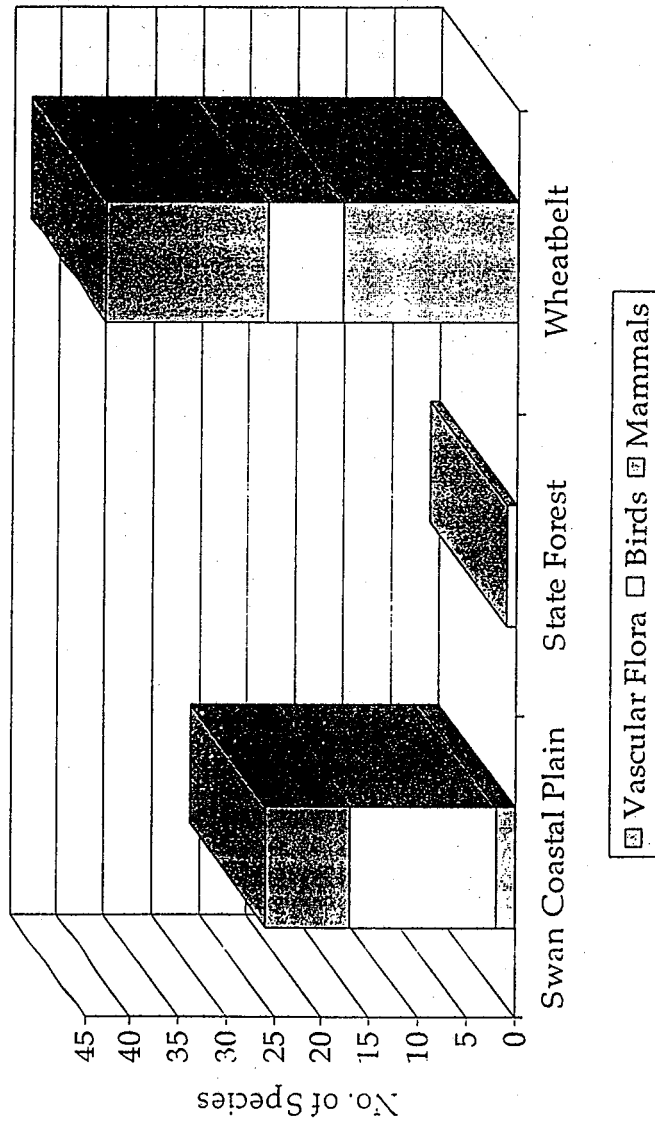
Syd Shea
EXECUTIVE DIRECTOR

23 July 1998

Kingston Timber Harvesting Study - Trap Success Rates
 for all Medium Sized Mammals (Woylie, Quenda,
 Chuditch, Bt Possum) along Road Transects



Species Extinctions Since European Settlement in 1829 (After Armstrong and Abbott, 1995)



Appendix 2

**Comments by CALM as to Errors of Fact in the Report of the Advisory
Committee on Forest Management Plans**

COMMENTS BY THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT ON REPORT TO THE EPA BY THE EPA ADVISORY COMMITTEE ON FOREST MANAGEMENT PLANS

GENERAL COMMENTS

1. In the three day period available for the Department to comment on this report it has not been possible to consider every aspect of the report as comprehensively as the Department would prefer.
2. CALM notes and is very pleased that the Committee has concluded that CALM has complied with ministerial Conditions.

GENERAL ISSUES

It is appropriate that CALM comments on some of the general issues raised by the report and the approach taken by the Committee.

1. Throughout the report there is an emphasis on the need for consultation and community participation in the planning and implementation of forest management. While I am sure the Committee is conscious of the fact that there has been extensive community consultation over a period of 13 years, the consistent theme of the need for community consultation may give the EPA the impression (and the community when the report is published) that there has been little consultation in the past. Consequently I attach to this report a summary of the consultation process which CALM has engaged in over the period 1981-98.
2. Throughout the report the Committee refers to public submissions and the opinions of a variety of unidentified individuals. Some of the comments that have been taken up by the Committee relate to very detailed scientific and technical matters. While it is a legitimate part of the community consultation process for groups or individuals to comment on these matters, it is important to note that without appropriate scientific information to support the opinions and some peer review process by an independent qualified person or group, these opinions can only be opinions. Unfortunately there is a tendency throughout the report to give a perception that many of these opinions are facts. Forest management and science is a complex subject and even experts have legitimate disagreements about various aspects of it. Thus it is important when consideration is given to anonymous opinions about technical matters that subjective and ideological biases are separated from reproducible peer reviewed scientific fact.
3. Some of the recommendations of the Committee fail to acknowledge the current system of government that operates in Western Australia. CALM operates as a Department under the "Westminster" system. That is, the Minister for the Environment is ultimately responsible for all decisions that are made with respect to forest management. The Minister can and does receive advice from a variety of sources, including other government agencies and authorities in addition to the advice she receives from CALM.

CALM, however, is responsible under the statute that set up the Department for the implementation of policy determined by the Minister and for accountability for the funds that are expended to implement that policy. Significant changes to legislation would be required if separate and independent committees are set up to independently administer funds and independently make decisions about management and research activities.

4. It is noted that in addition to the Committee's consideration of CALM's compliance with the Ministerial Conditions, it also made a general report on issues which included environmental, philosophical and political matters. CALM was able to make a detailed submission to the Committee on issues relating to the Ministerial Conditions and it also provided answers to specific technical questions that the Committee requested during its deliberations. CALM has not had the opportunity, however, to comment on the general issues raised by the Committee.

RESPONSE TO SPECIFIC ISSUES RAISED IN THE REPORT

Listed below are preliminary comments on statements made in the Advisory Committee's report. A number of the statements made in the report are contentious and will require further examination. However, there are some significant concerns regarding errors of fact and statements made in the report that require an immediate response.

PAGE	ISSUE	COMMENT
i	Executive Summary	<p>Considering that the purpose of the report was to examine CALM's compliance with Ministerial Conditions, it is considered that the fact the Committee concluded that CALM complied with the Ministerial Conditions should have been part of the Executive Summary.</p> <p>Most of the Executive Summary deals with the concept of sustainable forest management. A number of comments are made about the Committee's views on sustainable forest management below.</p> <p>It is noted that the Committee recommends that new Ministerial Conditions should be formulated. It is difficult to see how the Minister could formulate new Ministerial Conditions under the current Act without following a prescribed statutory process which would take some time to complete. It is obvious, however, that the Minister does have the opportunity to set new conditions, taking into consideration the Committee's recommendations when a new management plan is formulated.</p>

14	Proponents Commitments	The Committee's report has not addressed the obvious difficulty associated with accommodating the EP Act process of setting commitments with the Statutory requirements under the CALM Act governing the production of draft documents for public comment followed by a final management plan that CALM is obliged to implement. Draft documents which may be relevant under the EP Act processes have no relevance under the CALM Act once the final management plan has been gazetted.
19	Definition of the precautionary principle	This matter received considerable attention in the public submissions and has been the subject of recent litigation all the way to the High Court. The revision of the Ministerial Condition to make any change to this definition requires very careful consideration.
21	Protection of travel route, river and stream reserves in perpetuity	The report refers to the DEP submission which expressed concern at the mechanisms to be employed to ensure that these reserves are protected in perpetuity. This seems to ignore the very fact that the Ministerial Conditions themselves have established that legally binding mechanism.
31	Implementation of the Jarrah Silviculture trial	The report asserts that CALM has given a low priority to this condition. This is not correct. CALM has paid considerable attention to this condition. The Kingston Study is still in its early stages. The interim report provided with CALM's compliance report reflects research results already obtained. Considerably more information on wider impacts will become available over time.
34	Banksia grandis reduction	The report states that CALM made the decision not to implement the Banksia grandis reduction program without reference to the Minister. This statement misrepresents the fact that the recommendations of the Dieback Review Panel, which examined the role of such programs in dieback management, were considered carefully by the Minister who subsequently endorsed all 33 of the Panel's recommendations.
36	Fire management	The statement that CALM's compliance report makes no reference to the involvement of the FMRC in the public review of prescribed burning is incorrect. Page 54 of CALM's report states quite clearly that in March 1994 the FMRC met with the Review Committee.

38	High salt risk catchments	The report states that CALM has not complied with the literal interpretation of condition 16. This is incorrect. CALM has identified high salt risk catchments in accordance with the Minister's timeframe shown in Appendix 17 of CALM's report and in accordance with advice from Water and Rivers Commission.
39	Forest Monitoring and Research Committee	The report is seeking funding for this Committee. CALM notes that this conflicts directly with Recommendation 5.3 of the ESFM Panel, which states "The Forest Research and Monitoring Committee should be retained as a peak committee for advising on research priorities within CALM, but should not have authority or responsibility for funding or the detail of the research program."
42	Transparency of process	The report places great weight on transparency of process, yet frequently refers in the subsequent pages dealing with ESFM issues, to unsubstantiated information obtained or made available to the Committee. Frequently statements are made without substantiation or adequate reference. Examples are listed in the issues noted below.
45	Forest research and monitoring	The report refers to information obtained by the Committee suggesting substantial gaps in CALM's research program. This is not substantiated and can only be considered as subjective opinion. The report also makes the incorrect statement that most jarrah logs harvested come from the southern forests.
46	Research effort	The report makes the statement that CALM's level of research is inadequate when the Committee admits that it has not quantified the current level of research being carried out.
46	Impacts of disturbance	The Committee states that it has been presented with information indicating significant disturbance to wildlife and landscape values without providing this information or acceptable references to the purported data.
46	Research issues raised with the Committee	The report lists some issues that have been raised with the Committee that CALM would vigorously refute. In particular the assertion that CALM's Western Shield program is costly and funded at the expense of other fauna research is

		<p>demonstrably incorrect.</p> <p>The report states that the industry research fund does not deal with "in forest" issues. This is incorrect.</p>
52	Ecologically sustainable forest management	<p>CALM is currently developing a set of regional indicators of ESFM based on the framework agreed to in August 1998 by the Commonwealth and State Governments as part of the Montreal process. In August 1998 several senior CALM scientists participated in the International Conference on Indicators for Sustainable Forest Management held in Melbourne and hosted by the International Union of Forest Research Organisations and FAO. The results of the Kingston Study, the Gray Block Karri Bird Study, the long-term fire study plots and other research are being used to compile a short-list of potential candidate species of mammals, birds and vascular plant species which can be used to measure the extent of recovery after disturbances such as timber harvesting, prescribed burning and wildfires.</p> <p>CALM disagrees that the "amount of information required to assess impacts of logging using the aforementioned criteria is likely to be considerable and may take some time to collect". The rationale behind the use of indicators is to simplify monitoring, focus on the species most sensitive to disturbance, and provide easily collected and unequivocal data that can be used to assess the extent of recovery of biota, especially before further disturbance is imposed. Thus the indicator approach is inherently precautionary and is a particularly fine example of adaptive environmental management.</p> <p>CALM acknowledges that the knowledge base for invertebrates and fungi in the south-west forests is largely incomplete. However this is the situation in nearly every ecosystem on earth. It simply reflects the lack of attention given to these groups by museum and university taxonomists relative to vertebrates and vascular flora.</p> <p>The application of the concept of habitat fragmentation to the jarrah and karri forests is</p>

		<p>incorrect. This concept refers to <i>permanent</i> clearing of native vegetation in agricultural and urbanised landscapes. In the south-west forests, coupes which are harvested for timber are then regenerated, resulting in a mosaic of young regrowth, old regrowth, and old growth forests. The correct concept is that of habitat variegation. Recent fine-scale mapping of vegetation complexes in the RFA area by Mattiske and Havel has shown that the south-west forests originally and still exhibit an extraordinary heterogeneity of vegetation types.</p> <p>The excerpt (page 53) from the WA Museum project report that "there is an almost total absence of systematic fauna survey data from precise locations" is not accurate. Dr Per Christensen and his team conducted site-based surveys of all vertebrates throughout the southern forests. This information was published in 1985. There have also been many site-based surveys of birds throughout the forest. The statement is correct in so far as it applies to invertebrates. Further, the report quotes the Museum document out of context as the study was within the context of a project which had the limited objectives of modelling fauna distribution. Therefore the Museum comments only relate to the availability of information for that modelling purpose.</p> <p>Reference: Commonwealth of Australia (1998). A framework of regional (sub-national) level criteria and indicators of Sustainable Forest Management in Australia. Canberra.</p>
54 - 62	<p>Comments on silviculture Precautionary approach" ie, jarrah silviculture</p>	<p>The Committee has noted CALM's high success rate in jarrah gap regeneration and yet still maintains the unsubstantiated perception that the precautionary approach adopted by CALM in its jarrah silviculture is not being achieved.</p> <p>The Committee asserts that CALM has not discussed how silvicultural prescriptions have been modified. CALM responded in writing (23 July 1995) to the EPA Chairman on a number of silvicultural issues, including a statement on amendments to silvicultural guidelines. These are ongoing.</p>

	<p>Karri silviculture</p>	<p>The Committee comments on the increased area of shelterwood treatment since 1992. CALM has already (23 July 1998) answered those queries, ie, more cautious approach and fluctuating proportions of different treatments.</p> <p>Committee comments on "Extensively Managed Area" and lack of removing forest culls. These areas are not all low stocking and reflect a naturally occurring forest type which has high preponderance of poorer formed and poor quality trees for commercial purposes already accounted for in the forest inventory. This is an example of selective silviculture as opposed to "gap" treatment. Critics normally advocate selective treatment and criticise gaps.'</p> <p>Committee made series of generalised comments on CALM's previous responses.</p>
63 - 65	<p>Fire management</p>	<p>The EPA Advisory Committee report speculates about public concerns and perceptions about the results and effects of prescribed burning on ecosystem components and sustainable forest management. The EPA Report implies that the various CALM reports and articles, and the report from the Ministerial Fire Review Panel are not credible. This is despite the fact that CALM's fire management systems are based on numerous well researched, comprehensive scientific fire ecology studies and the Ministerial Fire Review Panel was made up of highly regarded scientists who are independent of CALM.</p> <p>The following are comments on the various issues raised in the report.</p> <p>Objectives for maintaining biodiversity may be difficult to meet</p> <p>CALM's approach to ecological fire management is based on long-term fire ecology studies at a number of different forest sites throughout the South-West. For example, studies on response of native plant communities show that about 98% of plant species in the jarrah forest flower within three years after fire. Further studies undertaken</p>

		<p>as part of the RFA process are providing information that will enable the development of a set of plant indicator species that will refine the decision process for future fire regimes.</p> <p>Field assessments supported by remote sensing imagery show that CALM's prescribed burns do indeed meet the various objectives of burn coverage, burn frequency and fire intensity. Master burn plans using computer-based decision-making tools, such as Wildfire Threat Analysis, allow planners to provide for diversity in fire frequency and season. Where practical these include the sequence of spring, autumn, rest fire regime described in the recent article by Dr Neil Burrows (Landscape, Summer 1998).</p> <p>Some forest communities require very different fire treatments from those developed for the northern jarrah forest. There is no single fire regime applied to the full range of forest communities in the South-West.</p> <p>Very few forest areas are treated in a uniform manner. Fire frequencies vary with time and may range from 5 or 6 year rotation through to medium term (10-15 years) through to long unburnt (15+).</p> <p>There is concern that very short frequency fire treatment (ie, 2-4 year rotation) as was common to most of the jarrah forest prior to European settlement is not being applied. This appears to have disadvantaged native grass species as well as fauna species that rely on those short-lived plant species.</p> <p>Interaction between fire management and current harvesting/silvicultural practices</p> <p><i>Effects of fire on structure of community needs assessment</i></p> <p>There have been a number of fire effect studies in the South-West forests which monitor the impacts of various fire frequencies on plant communities, (eg Boundary Road plots and Batalling plots). These long-term studies show that understorey shrub species are not irreversibly affected by any</p>
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		<p>of the current fire frequencies.</p> <p><i>High degree of buttress attrition</i></p> <p>Fire studies on the old growth red tingle forests near Walpole indicate that the high number of old, hollow-butted trees are extremely vulnerable to attrition by high intensity wildfires, whilst relatively few are affected by low to moderate intensity prescribed fire.</p> <p>The effects of different fire regime on fauna needs further examination</p> <p>There are currently a number of fauna studies being undertaken, eg Kingston and Batalling, which augment a number of previous studies that have provided the scientific basis of CALM's current fire management regimes.</p> <p>Fire management of regrowth forests and TEAS areas</p> <p>A great deal of consideration is given to the protection of vulnerable regeneration, TEAS areas and other harvested areas from fire damage as a result of prescribed burning and wildfires. Up to 1998 less than 2% of regrowth areas established over the past 30 years have been damaged by fire, despite the fact that these areas do carry heavy accumulations of flammable litter and vegetation.</p>
67	Dieback management	<p>The report asserts that recommendations of the Dieback Review Panel signify an intention by CALM to relax dieback constraints and restrictions. This assertion is absolutely incorrect given that the recommendations were made by an independent panel, considered and approved by the Minister for subsequent implementation by CALM.</p>
69 - 70	Salinity	<p>The report states that the Water and Rivers Commission has been carrying out research on this since 1970 but neglects to note that CALM has also been carrying out research on this issue over the same period.</p> <p>The report uses the term "high salt risk catchments" in a way that is confusing and</p>

		<p>contradicts the definition of this term under the Ministerial Conditions.</p> <p>The report's presentation of the definition of high salt risk catchments does not match that adopted under Ministerial Condition 16.</p> <p>Farm water supplies are protected under Ministerial Condition 12 and are not the focus of protection under Ministerial Condition 16. Reference to this issue in relation to Ministerial Condition 16 is inappropriate.</p>
71	External auditing	The report advocates external auditing on a continuing basis rather than at five year intervals which is described as the current system. This statement seems to ignore the ongoing involvement of the DEP / EPA in auditing and the fact that CALM reports annually, not just every five years.
72	Community involvement	The report seems to ignore the fact that the CALM Act specifically requires community input on all management plans produced by CALM.
73	Level of funding for research	The report makes the sweeping statement that Australia does not spend enough on research and says that CALM's funding of research is low, whilst admitting that it hasn't assessed that level of funding.

* Attachments referred to in this document have not been included as part of Appendix 2.