



Appeals Convenor
Environmental Protection Act 1986

**REPORT TO THE
MINISTER FOR ENVIRONMENT**

**APPEALS IN OBJECTION TO THE REPORT AND RECOMMENDATIONS
OF THE ENVIRONMENTAL PROTECTION AUTHORITY**

**PROPOSED FOREST MANAGEMENT PLAN 2014-2023
EPA REPORT 1483 (ASSESSMENT 1921)**

**PROPONENT:
Conservation Commission of Western Australia**

Appeal numbers 064 to 119 of 2013

September 2013

Appeal summary

This report addresses 56 appeals lodged in objection to the content of, and recommendations in, the report of the Environmental Protection Authority (EPA) in relation to the *Proposed Forest Management Plan 2014-2023* (**Proposed FMP**) prepared by the Conservation Commission of Western Australia (**Commission**).

A range of issues were raised in the appeals from conservation and industry perspectives, with key matters relating to the the ability of the Proposed FMP to meet the principles of ecologically sustainable forest management; the suitability of the data informing the development of the Proposed FMP; the impacts of native forest timber harvesting on flora and fauna (including threatened species), soil compaction and local rainfall; the necessity for the retention of and appropriateness of fauna habitat zones and habitat trees; the classification and nomination of old-growth forest; formal and informal reservations; the impacts of climate change on forest ecosystems, their ability to adapt to decreasing rainfall, increasing temperatures and episodic events, and their ability to recover after harvesting activities; the calculation of sustained yields and average annual allowable cuts (and upper limits); the EPA's recommendation of no implementation conditions; and the EPA's assessment process. The Appeals Convenor has summarised and considered these matters under 13 grounds. The Appeals Convenor also provided comment on a number of other issues under 'Other Advice'.

Recommendation

If the Proposed FMP is to be implemented, the Appeals Convenor recommended a number of changes to strengthen management activities within it via a Ministerial Statement, with the intention of improving environmental outcomes, as follows:

Performance monitoring and evaluation:

- amend management activity 121 to include a target completion date within the first half of the implementation of the FMP for the development of a protocol for each KPI in the Proposed FMP to specify how the measurement of each KPI will be undertaken;
- amend management activity 130 to include target completion dates for the mid-term and end-of-term performance reviews, and to require that the reviews are made publicly available on completion;

Further and ongoing research:

- add a management activity that requires, within the first quarter of the implementation of the FMP, the establishment of a process to identify and deliver research priorities, in collaboration with research institutions and relevant organisations as required; and the development and implementation of a program which commits to timeframes to extend forest monitoring programs (including FORESTCHECK) to include a greater focus on the impacts of soil compaction, key climate change indicators, a greater diversity of forest types, and a greater range of threats to the forests;
- amend management activity 20 to include a target completion date within the first quarter of the implementation of the FMP for the extension of the FORESTCHECK monitoring program;

- add a management activity that requires, as part of the mid-term performance review, a review of the sustained yield calculations to take into account monitoring and research results, the need for amendments to enable the FMP to adapt to episodic events such as major fires, cyclones, and pest or disease outbreaks (as identified by the Sustained Yield Expert Panel (Ferguson *et al*, 2013)), and the need for any further research to support ecologically sustainable forest management;

Guidance documents and policies:

- amend management activity 14.2 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the preparation of *Goals for Understorey Structural Diversity*;
- amend management activity 17.1 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the revision of *Guidelines for Selection of Fauna Habitat Zones*;
- amend management activity 42 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the revision of relevant subsidiary documents pertaining to rehabilitation requirements for major extraction tracks and landings, and roads and tracks no longer required;
- amend management activity 49 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the development of a position statement to provide guidance when proposals to take water area considered;
- amend management activity 118.1 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the preparation of a regulation policy to confirm the regulatory framework around timber harvesting;
- amend management activity 126.4 to include a target completion date within the first quarter of the implementation of the FMP for the preparation of an adaptive management policy;
- add a management activity that requires, within the first quarter of the implementation of the FMP, the development of a procedure to identify and demarcate old-growth forest;

Stakeholder engagement:

- add a management activity that requires, within the first quarter of the implementation of the FMP, the development of a communications strategy that identifies, among other things, the establishment of advisory groups and stakeholder reference groups (as identified throughout the Proposed FMP) to assist in providing opportunities for the community, and relevant non-government organisations and government agencies, to participate in and to inform the implementation of the FMP;

Related items:

- amend management activity 118.2 to include the target completion date of 31 December 2014 for the development and implementation of formal working arrangements between the DPaW and the FPC;
- remove the upper limits and corresponding management activities and KPIs from the Proposed FMP; or alternatively amend management activity 61 so that any proposal to increase harvesting levels beyond the average annual allowable cut up to the upper limit is to be approved by the Minister for Environment;

- amend management activity 4 to reference the correct Appendix; and
- amend any other minor typographical, grammatical or formatting errors identified within the Proposed FMP as appropriate.

In addition, the Appeals Convenor noted the EPA's advice under section 106 of the EP Act, and recommended that the Minister considers assigning a higher priority to adequately-funded research into the long-term impact associated with the compaction of soil from timber harvesting and any additional measures that should be applied to timber harvesting.

Noting that the *WA Environmental Offsets Policy* (2011) outlines compensatory actions to address the significant residual environmental impacts resulting from a development or activity, it is suggested that the Minister may wish to consider seeking industry support to fund scientific research into the effects of native forest timber harvesting activities by way of indirect offsets.

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INTRODUCTION

This report addresses 56 appeals lodged in objection to the content of, and recommendations in, the report of the Environmental Protection Authority (EPA) in relation to the *Proposed Forest Management Plan 2014-2023* prepared by the Conservation Commission of Western Australia (Commission). This report provides the Appeals Convenor's recommendations to the Minister for Environment in respect to the appeals, and is given under section 109(3) of the *Environmental Protection Act 1986* (EP Act).

Layout of this report

The 'Background' section of this report contains discussion around the scope of the EPA's assessment, a summary of some of the data informing the preparation of the Proposed FMP, and a brief description of the management activities contained in the Proposed FMP. The 'Grounds of Appeal' section outlines the grounds of appeal, each of which includes the EPA's advice and the proponent's response to the concerns raised followed by the Appeals Convenor's consideration of relevant information in respect to the ground. The Appeals Convenor's conclusion and recommendations to the Minister for Environment are provided at the end of the report.

Abbreviations used in this report

BOM	Bureau of Meteorology
BRM	basic raw materials
CALM	Department of Conservation and Land Management (replaced by DEC)
CALM Act	<i>Conservation and Land Management Act 1984</i>
CAR	comprehensive, adequate and representative (system of formal reserves)
Commission	Conservation Commission of Western Australia
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Current FMP	current Forest Management Plan 2004-2013
DEC	Department of Environment and Conservation (replaced by DER and DPaW)
DER	Department of Environment Regulation
DMP	Department of Mines and Petroleum
DPaW	Department of Parks and Wildlife
Draft FMP	Draft Forest Management Plan 2014-2023 (as circulated for public comment)
DSEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
EP Act	<i>Environmental Protection Act 1986</i>
EPA	Environmental Protection Authority
EPBC Act	Commonwealth <i>Environmental Protection and Biodiversity Conservation Act 1999</i>
ESFM	ecologically sustainable forest management
FHZ	fauna habitat zone
FM Regulations	<i>Forest Management Regulations 1993</i>
FMP	forest management plan
FP Act	<i>Forest Products Act 2000</i>
FPC	Forest Products Commission
ha	hectare(s)
IOCI	Indian Ocean Climate Initiative
IPCC	International Panel for Climate Change
KPI	key performance indicator
PER	Public Environmental Review
Proposed FMP Report 1483	<i>Proposed Forest Management Plan 2014-2023</i> (as assessed by the EPA) EPA's report and recommendations on the <i>Proposed Forest Management Plan 2014-2023</i>
RFA	<i>Regional Forest Agreement for the South-West Forest Region of Western Australia</i> (May 1999)
UNFCCC	United Nations Framework Convention on Climate Change

BACKGROUND

The Commission is required to prepare a Forest Management Plan (**FMP**) for all lands vested in it, in accordance with the *Conservation and Land Management Act 1984 (CALM Act)*. Typically the duration of FMPs has been ten years. As the current *Forest Management Plan 2004-2013 (Current FMP)* is nearing the end of its term, the process for developing a new FMP is underway.

The Proposed FMP was referred to the EPA in February 2012, and was assessed at the level of Public Environmental Review (**PER**). A draft Environmental Scoping Document was released for a two-week public review period in May 2012, and approved by the EPA in July 2012. The *Draft Forest Management Plan 2014-2023* dated August 2012 (Commission, 2012c) (**Draft FMP**) was released for a 12-week public review period from 15 August 2012 to 7 November 2012, to fulfil requirements under the CALM Act and the *Environment Impact Assessment Administrative Procedures 2010* (EPA, 2010a) (**Administrative Procedures**). During the public review period the Commission received over 5,000 submissions, and published its responses to those submissions in the *Analysis of Public Submissions* document (Commission, 2013a). The Commission advised that the submissions were taken into consideration in the development of the *Proposed Forest Management Plan 2014-2023* dated April 2013 (**Proposed FMP**).

In July 2013 the EPA released its report and recommendations in respect to the Proposed FMP (**Report 1483**). The EPA concluded that the Proposed FMP would meet the EPA's objectives for the key environmental factors (a) flora and vegetation, and terrestrial fauna, (b) terrestrial environmental quality, and (c) hydrological processes, that the Proposed FMP builds on the Current FMP that was previously assessed by the EPA, and is based on sound science and conservative assumptions. The EPA considered that the Proposed FMP has been subject to a high level of public scrutiny, and acknowledged that forest management is a complex and contentious subject with contested views on many issues.

The area to which the Proposed FMP relates is shown in Figure 1. The Proposed FMP contains a number of key changes from the Current FMP:

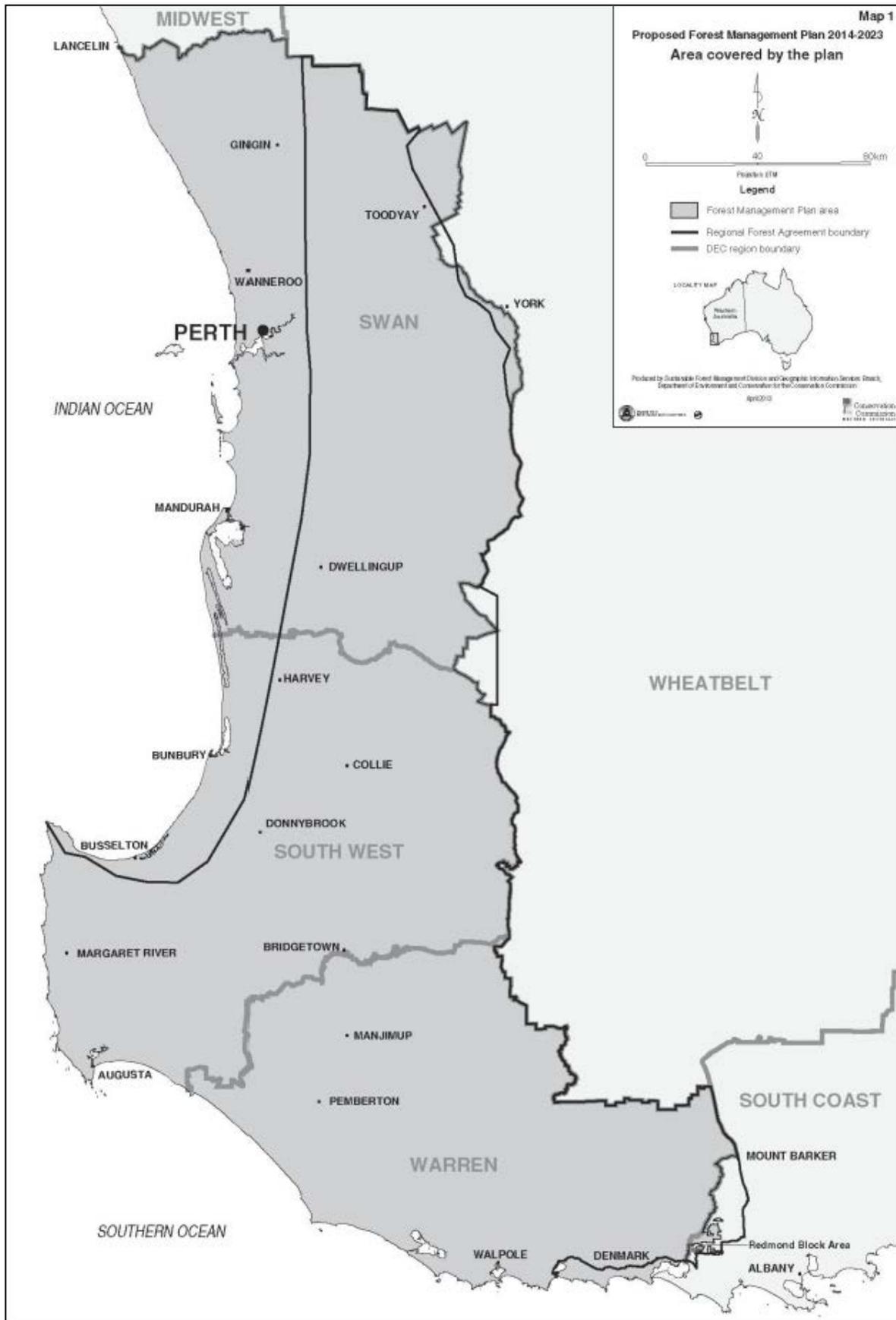
- adding to the formal conservation reserve system in the Whicher Scarp area;
- introducing improvements to silviculture guidelines, including improved protection of marri trees as habitat for threatened fauna black cockatoos;
- annual publishing of a map of old-growth forest status and extent (identifying any variations) on the Department of Parks and Wildlife (**DPaW**) website;
- revising travel route zones in the DPaW's Warren Region;
- reviewing the processes for planning for all disturbance operations, on all land categories, to ensure a consistent approach for checking for old-growth forest;
- those areas previously classified as old-growth forest but which are confirmed not to be old-growth forest are no longer to be recognised as an informal reserve type;
- removing the phased harvesting requirement in the DPaW's Swan and South West regions, and parts of the Warren Region, because of the reduced risk of salinity;
- making basic raw materials (**BRM**) available from a network of (fewer) strategic pits; and
- formalising the inter-agency arrangements between the DPaW and the Forest Products Commission (**FPC**) (Commission, 2012c and 2013b).

The Proposed FMP also contains values and threats that are not listed in the Current FMP, and reviews the key performance indicators (**KPIs**) contained in the Current FMP. As required by section 55(1) of the CALM Act, the Proposed FMP also contains the statements of policies or guidelines proposed to be followed and a summary of operations proposed to be undertaken. The Commission acknowledged that some of the changes in the Proposed FMP will have the potential to alter the sustained yields from the volumes allowed under the Current FMP.

By section 100(1)(d) of the EP Act, any person who disagrees with the content of or recommendations in a report of the EPA in relation to a proposal may lodge an appeal in writing, setting out the grounds of that appeal. It is under this section that 56 appeals were lodged in objection to the EPA's report and recommendations on the Proposed FMP:

Tanya Marwood (064/13)	Michael Hulme (092/13)
Denmark Environment Centre Inc (065/13)	Busselton Dunsborough Environment Centre Inc (093/13)
Alison Wylie (066/13)	Possum Centre Busselton Inc (094/13)
Leith Maddock (067/13)	The Wilderness Society (WA) Inc (095/13)
Barry Lang (068/13)	Viviane Missack (096/13)
William (Trevor) Tobin (069/13)	Lauren Fisher (097/13)
Institute of Foresters of Australia (WA Division) (070/13)	Jessica Chapman (098/13)
Thomas Clark (071/13)	WA Forest Alliance (099/13)
Anita Downing (072/13)	Judith Blyth (100/13)
Leeuwin Environment Inc (073/13)	Tom and Lisa Hoyer (101/13)
Margaret River Regional Environment Centre Inc (074/13)	Dr Marjorie Apthorpe (102/13)
Rebecca Purchon (075/13)	South West Forests Defence Foundation Inc (103/13)
Norma Kirkland (076/13)	Conservation Council of WA Inc (104/13)
Timber Communities WA (077/13)	Heidi Hardisty (105/13)
Derek Fraser (078/13)	South Coast Environment Group Inc (106/13)
Diana Corbyn (079/13)	Jodie Lane (107/13)
Wendy Dugmore (080/13)	Hon Lyn MacLaren MLC (108/13)
Michelle London (081/13)	Dr Mark Andrich (109/13)
Brian Mollan (082/13)	Jessica Panegyres (110/13)
Kevin Schaffer (083/13)	Jo MacDonald (111/13)
Forest Industries Federation (WA) Inc (084/13)	Lilith Furlonger (112/13)
Assoc. Prof. Michael Calver (085/13)	W/Prof. Stephen Hopper (113/13)
Phil Shedley (086/13)	Margaret Marian Burke (114/13)
Christopher Lee (087/13)	Rhys Jones (115/13)
Gabriel Maddock (088/13)	Donna O'Brien (116/13)
Mary Frith (089/13)	Robert Day (117/13)
Chris Irving (090/13)	Bronwyn Winfield (118/13)
Jarrahdale Forest Protectors Inc (091/13)	Friends of the Earth (Australia) (119/13)

Figure 1: Area to which the *Proposed Forest Management Plan 2014-2023* relates



(Source: Commission, 2012e)

Related appeals

In September 2003 eighteen appeals (221-235/03, 238-239/03 and 248-03) were received in objection to the EPA's report and recommendations on the *Proposed Forest Management Plan 2004-2013*.

A range of issues were raised in the appeals, with key matters relating to the nature and scope of the EPA's assessment, the overall environmental acceptability of the FMP, particularly in relation to the proposed silvicultural practices and levels of logging, impacts of the proposal on fauna, and the EPA's recommendations in relation to the review of the formal reserves proposed in the FMP. A number of other more detailed matters were also raised.

The then Minister for the Environment determined to allow the appeals to the extent that:

1. The EPA's recommendations relating to the review of reserves not to be adopted.
2. The Commission be required to amend the *Proposed Forest Management Plan 2004-2013* prior to it being transmitted to the Minister for the Environment under the CALM Act in line with the following:
 - the incorporation of specific timeframes for the completion of the key subsidiary management guideline documents, with particular focus on the early completion of the documents highlighted by the EPA in its recommended conditions;
 - the addition of a requirement for an expert panel review to be undertaken in the second half of the FMP to review silvicultural practices and their impacts on biodiversity;
 - the inclusion of the provision for a concentration of fauna habitat zones in the Greater Kingston Area;
 - the performance target for KPI 1 be modified to require the Commission and the (then) Department of Conservation and Land Management (**CALM**) to complete those actions for which they are responsible, for 100% of the individual areas proposed to have their land category formally changed, within ten years of the approval of the FMP;
 - the adoption of the EPA's recommendation in relation to the inclusion of specific species sampling approaches in addition to FORESTCHECK in Action 8.2;
 - the provision of a requirement for the immediate implementation of indicative fauna habitat zones;
 - the addition of requirements to improve the transparency, and undertake a review of, areas of old-growth forest which have been re-classified in accordance with the approach proposed by (then) CALM;
 - the incorporation of requirements for the FPC to provide publicly available reports on the compliance of forestry operations with the provisions of the FMP and subsidiary management guideline documents on a regular basis;
 - the expansion of Action 34.2 to include the development and implementation of a programme for the improved public availability of information relating to the sustained yield statistics and models as recommended by the EPA;
 - modification to the performance targets in KPI 5 to remove the potential for consistent over-cutting in the first five years of the FMP; the intent of the wording in KPI 5 was to put a limit of 10% on any over supply for the first five years, caused by operational reasons and industry requirements; and
 - the incorporation of the EPA's recommendations in relation to the provision of indicative timeframes for each action or sub-action listed in the FMP, and the inclusion of an end of term audit report in the penultimate year of the FMP in Action 31.3.

Scope of the EPA's assessment

Part IV of the EP Act makes provision for the EPA to undertake environmental impact assessment of significant proposals, strategic proposals and schemes. The scope of the EPA's assessment report is outlined in section 44(2) of the EP Act. In brief, if the EPA decides to assess a proposal, it must report to the Minister on the key environmental factors it has identified in the course of the assessment, whether or not it considers the proposal may be implemented, and any conditions which should apply to implementation of the proposal. The scope of the EPA's assessment is necessarily constrained by the State's jurisdiction.

The Administrative Procedures (EPA, 2010a) set out the principles and practices adopted by the EPA for dealing with referrals and assessing proposals under Part IV of the EP Act, and guided its assessment of the Proposed FMP. This document has since been replaced by the *Environment Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012* (EPA, 2012c). In addition, the EPA has prepared a series of environmental assessment guidelines to help proponents and other parties to understand its decisions about which proposals to assess and the appropriate level of assessment, the key environmental factors in assessments, the environmental acceptability of proposals, and the conditions that should be applied:

- the *Environmental Assessment Guideline for Defining the Key Characteristics of a Proposal* (EPA 2012) focuses on how to define the key proposal characteristics for the purposes of assessing the proposal and incorporation in a Ministerial Approval Statement;
- the *Environmental Assessment Guideline for Environmental factors and objectives* (EPA, 2013) communicates the environmental factors and associated environmental objectives, describe the EPA's framework for environmental factors and objectives, and outline the EPA's expectations for applying environmental factors, objectives and guidance through EIA.
- the *Environmental Assessment Guideline for Application of a significance framework in the environmental impact assessment process* (EPA, 2013b) describes how the EPA makes decisions, throughout the entire EIA process, on the likely significance of impacts of a proposal, using a risk based approach;

It is noted that in this case the proposal being assessed by the EPA is a management plan for the south-west forests, and it is understood that the consideration of management options is somewhat different from that of a typical proposal, where the main purpose of the proposal is something other than environmental management.

The EPA advised that in a typical proposal, options for environmental management are considered by the proponent in the context of their compatibility with the actual proposal, environmental effectiveness, and cost, and that the EPA then assesses the proposal and any proposed management against its environmental objectives. In the case of the Proposed FMP, the EPA advised that it is assessing a particular management plan that, by its nature, has already excluded some management alternatives (e.g. cessation of native timber harvesting, or a large expansion of the area available for timber harvesting).

Data relating to the Proposed FMP

Appellants contended across a number of grounds that the EPA has not considered in its assessment the aspects of the Commission's mid-term and end-of-term audits of performance of the Current FMP (Commission, 2008 and 2012a), the EPA's review of those audits (EPA, 2010b and 2012b), the Auditor General's report (OAG, 2013) and the data informing the Proposed FMP. Some of this information is outlined below by way of background for the appeal grounds.

Mid-term and end-of-term audits

Consistent with Ministerial Statement 641, the Commission undertook mid-term and end-of-term audits of performance of the Current FMP (Commission, 2008 and 2012a), which were subsequently reviewed by the EPA in Bulletins 1362 (EPA, 2010b) and 1443 (EPA, 2012b). In

summary, the EPA raised concerns about the Commission's capacity to require compliance with the FMP and the EPA's belief that current arrangements were not effective in bringing about compliance, and identified the need for the next FMP to include arrangement that provide for transparency, accountability and enforcement of compliance (OAG, 2013).

In Bulletin 1362 the EPA made the following comments in relation to the Proposed FMP:

The current FMP can operate until the end of 2013. It is important that preparation of the next FMP commences as it is now less than four years before the end of 2013, and the EPA's experience with previous FMPs suggests that it will take all of that time to prepare for the next plan. In particular, the identification of options for management strategies, including sustained yield, takes considerable time. Of course, there is an expectation that the community can participate in the identification of these management strategies and be sufficiently informed to understand the basis of the settings that are fundamental to the plan. ...

The EPA considers that climate change and governance are critical matters to be addressed. The whole question of climate as a fundamental agent and driver of change to current values has many other issues attached to it, including sustained yield, disease, fire, soil and water protection, etc. Unless the governance arrangements related to information, planning, management and activities in the forest areas, within clear policy settings, are resolved there will remain levels of mistrust and justifiable challenges to those agencies. This has to be addressed outside of the FMP, but then be reflected in it. ...

In Bulletin 1443, the EPA provided the following advice to the Minister:

The end-of-term audit of performance (*Forest Management Plan 2004-13: End-of-term audit of performance report*) has not identified any new matters that were not already evident at the time of the mid-term audit. Therefore the EPA has reviewed those matters raised in its mid-term report and the end-of-term audit of performance and provided comment on those which require further consideration. ...

The end-of-term audit has highlighted the need to take into account changes in threatening processes and required management at the "whole of forest" scale. The EPA is of the preliminary view that additional actions may be required to ensure that the current ecological values of the 2.5 million hectares of the land covered by the forest management plan are maintained into the future, even in the face of new and continuing threats, such as: extended periods of below average rainfall which may alter the health and structure of the forests; disease and pest impacts (possibly exacerbated by the effects of below average rainfall); clearing for approved and proposed mining operations; as well as the impacts of timber harvesting operations. In taking this view, the EPA acknowledges that even the best management practices may not be able to prevent some loss of environmental values in the forests when dealing with these threats. Therefore it may be necessary to reduce those threatening processes over which we have some control and thereby maintain a balance between the environmental, economic, and social values of the southwest forests.

In Report 1483 the EPA states that it has taken into account the conclusions of the Commission's mid-term and end-of-term audits and the EPA's reviews of those audits. In addition, in its advice for Ground 1, the EPA has demonstrated that it had regard to the Commission's end-of-term audit.

Findings of the Auditor General

In June 2013 the Western Australian Auditor General published his 10th report (of 2013) *Supply and Sale of Western Australia's Native Forest Products* (OAG, 2013) in respect to the Current FMP and the development of the next FMP. The Auditor General's objective was to determine whether the (former) Department of Environment and Conservation (**DEC**) has robust systems to ensure harvest planning aligns with key sustainability settings used in the FMP and whether the Commission is effectively managing the sale and supply of harvested product.

The Auditor General found that the planning processes align with key sustainability assumptions of the FMP. The Auditor General, however, identified a general lack of transparency and accountability in the implementation of FMPs in practice through harvesting and subsequent sale of timber, and instances of wastes and breaches of environmental standards. In summary, in respect to timber harvesting activities, the Auditor General recommended that:

- three-year harvest planning guidance material should be developed, noting that the (former) DEC started developing these in 2008 but they are yet to be finalised;
- records in support of each three-year harvest plan should be kept, to enable the process and decisions to be reviewed against the settings used to develop the FMP volume limits (also to show why areas are excluded from or included on the three-year harvest plans); and
- monitoring programs aimed at ensuring high levels of harvest contractor compliance with contractual obligations should be planned and implemented.

In its advice the EPA supported the actions in the Auditor General's report, but noted that these do not require changes to the Proposed FMP.

Expert Panel and other reviews

It is understood that a number of studies and reviews were undertaken to inform the development of the Draft FMP (and subsequently the Proposed FMP). Some of these are summarised below:

- In response to concerns raised by the Commission in its mid-term audit of the Current FMP (Commission, 2008), the (former) DEC established an expert panel to investigate the impact of climate change on the productive capacity and health and vigour of the south-west forests (for the purposes of this report this will be referred to as the Climate Change Expert Panel). Membership of the Panel comprised Deirdre Maher, Dr Colin Yates and Dr Lachie McCaw. The Panel's report *Vulnerability of Forests in South-west Western Australia to Timber Harvesting under the Influence of Climate Change* (Maher *et al*, 2010) was published in September 2010.
- Consistent with an action in the Current FMP, the (former) DEC established an expert panel to review silvicultural practices in various south west forest types (for the purposes of this report this will be referred to as the Silviculture Review Expert Panel). Membership of the Panel comprised Neil Burrows, Bernard Dell, Mark Neyland and John Ruprecht. The Panel's report *Review of silviculture in forests of south-west Western Australia* (Burrows *et al*, 2011) was published in December 2011.
- To inform preparation of the Draft FMP, the Commission and the (former) DEC commissioned URS Australia to identify and quantify the social and economic impacts resulting from a range of scenarios and management practices which could be implemented under the Draft FMP. The analysis report *Social and Economic Impact Assessment on the Potential Impacts of Implementation of the Draft Forest Management Plan 2014-2023* (URS Australia, 2012) was published in August 2012.
- To inform preparation of the Proposed FMP, the Commission and the (former) DEC established an expert panel to confirm (among other things) whether the calculations for sustained yields were sufficiently robust, flexible, and factored in uncertainties associated with a drying climate and volume estimates (for the purposes of this report this will be referred to as the Sustained Yield Expert Panel). Membership of the Panel comprised Ian Ferguson, Bernard Dell and Jerome Vanclay. The Panel's report *Calculating the Sustained Yield for the South-west Native Forests of Western Australia* was published in March 2013 (Ferguson *et al*, 2013).

Management activities in the Proposed FMP

The Proposed FMP contains 134 management activities (operations proposed to be undertaken). It is understood that, if the Proposed FMP is implemented, the management activities stated in the Proposed FMP are binding on the agencies to which it refers under the CALM Act. The management activities and 24 associated KPIs (which the Proposed FMP states will form the basis for mid-term and end-of-term performance reviews) are listed in Appendix 3 of this report.

APPEALS PROCESS

Pursuant to section 106 of the EP Act, a report was obtained from the EPA in relation to the matters raised in the appeals.

The Commission was also invited to provide a response to the appeals. In its response the Commission indicated that, overall, it considered that the issues raised are adequately addressed in the documentation already provided, including the Proposed FMP and *Analysis of Submissions* document (Commission, 2013a).

As part of the investigation of the appeals, the Office of the Appeals Convenor invited all appellants (with the exception of those who provided insufficient contact details) to meet to discuss their concerns through meetings, telephone contact or by other means, having regard to the issues raised, location of the appellant and other factors. In addition, the Appeals Convenor visited Margaret River and Busselton to provide opportunities to meet with appellants from those communities.

The Office of the Appeals Convenor met with, or otherwise spoke with or received a further submission from, a total of 32 appellants. The remaining appellants declined to meet, or did not respond to the invitation. The Office of the Appeals Convenor also met and discussed the appeals with the EPA, the Commission and with the DPaW.

The environmental appeals process is a merits based process. Appeal rights in relation to EPA report and recommendations normally consider the environmental merits of the assessment by the EPA, based on objectives as set by the EPA as well as other environmental factors. The appeals process considers environmental significance, relevance of factors, additional information not considered by the EPA, technical errors and attainment of policy objectives.

OUTCOMES SOUGHT BY APPELLANTS

The majority of appellants sought for the Proposed FMP to be re-submitted to the EPA for further assessment, particularly in respect to the calculations of available timber resource and sustainable yield informing the calculation of allowable cut, the ability of the forests subject to a changing climate and pests/diseases to recover from timber harvesting activities, and the impacts of timber harvesting activities on biodiversity and biophysical elements. Some appellants sought for timber harvesting activities to be placed on hold until adequate research had been undertaken and evidence was obtained to inform sustainability and confirm that timber harvesting would not exacerbate biodiversity decline. Some appellants sought for no further reservations or restrictions.

GROUNDINGS OF APPEAL

A range of issues were raised in the appeals from conservation and industry perspectives, with key matters relating to the nature and scope of the EPA's assessment, overall environmental acceptability of the Proposed FMP (including calculation of sustainability, allowable cut and upper limit), suitability of the data informing the development of the Proposed FMP, impacts on threatened species, and impacts in respect to climate change. The main grounds of appeal related to the following broad matters:

- the EPA did not properly nor independently assess the environmental factors it identified as being relevant to the proposal, the EPA should have more thoroughly assessed the necessity for retention of and appropriateness of fauna habitat zones and habitat trees, the calculations of available resource and sustained yield, the ability of the Proposed FMP to meet the principles of ecologically sustainable forest management (**ESFM**), the classification and nomination of old-growth forest, formal and informal reservations, inconsistencies such as the retention of marri as habitat trees versus the higher allowable cut of marri, and the impacts of implementing the Proposed FMP on threatened fauna, local rainfall, and a number of other factors specified in the appeals;

- the EPA did not identify all of the environmental factors relevant to the proposal, in particular the EPA should have assessed the impacts of climate change as a separate factor, and the EPA identified different environmental factors to those identified for the Current FMP;
- the EPA did not have proper regard for all of the objects and principles stated in section 4A of the EP Act, the EPA did not consider the principles relating to improved valuation, pricing and incentive mechanisms or the principle of waste minimisation, and has not properly considered the precautionary principle, the principle of intergenerational equity or the principle of the conservation of biological diversity and ecological integrity;
- the EPA relied too heavily on the information provided by the Commission and accepted the proposal without any additional analysis or public review, the EPA was not sufficiently independent of the DPaW or Commission in undertaking its assessment;
- the EPA should have recommended implementation conditions to govern the Proposed FMP if it is to be implemented, the EPA should have recommended checks and balances including at least mid-term and end-of-term audits of performance, requirement that research and other commitments in the Proposed FMP are met, changes to the Proposed FMP consistent with recommendations for improvements in the mid-term and end-of-term audits of performance of the Current FMP and other reviews, enforcement measures, and penalties for non-compliance;
- the EPA did not consider the implications of the ten-year duration of the Proposed FMP, in respect to the impacts of a changing climate, and to the expiry of the *Regional Forest Agreement for the South-West Forest Region of Western Australia* (May 1999) (RFA) in 2019 and the need to refer the Proposed FMP for assessment under Commonwealth legislation;
- the EPA should have had consideration for social and economic factors, as these factors relate directly to the preparation of the Proposed FMP.

The EPA was of the view that very few new points have been raised that had not previously been raised through the public submissions on the Draft FMP. It is also noted that there is a degree of similarity in the issues raised in the appeals as were raised appeals relating to the EPA's report and recommendations on Current FMP and on earlier FMPs and Timber Strategies.

Further to the matters raised in the appeals, it is evident from meetings and discussions between the Office of the Appeals Convenor and the appellants that there is a strong community interest in, and a large degree of opposition to, the continuation of native forest timber harvesting generally and concern a level of uncertainty of the sustainability of current methods in a changing climate. Many appellants asserted that the Proposed FMP is a logging management plan that does not have much regard to other uses of the native forests and does not consider alternatives to timber harvesting.

While specific issues are noted for the Minister's consideration, the appeals process in relation to EPA report and recommendations considers environmental significance, relevance of factors, additional information not considered by the EPA, technical errors and attainment of policy objectives. As such the appeals are considered as they relate to environmental matters relevant to the Proposed FMP and the process undertaken by the EPA in conducting its assessment. Therefore some appeal grounds are beyond the scope of this appeals process.

FLORA AND VEGETATION, AND TERRESTRIAL FAUNA

The EPA's objectives for the key environmental factors flora and vegetation, and terrestrial fauna, are:

Flora and Vegetation: To maintain representation, diversity, viability and ecological function at the species, population and community level.

Terrestrial Fauna: To maintain representation, diversity, viability and ecological function at the species, population and assemblage level.

Ground 1: Biodiversity

Some appellants were concerned that the EPA and the Proposed FMP have not given adequate consideration to threatened species and their habitats, significant flora, the suitability and currency of data including FORESTCHECK, the nomination process for old-growth forest, the extent and need for fauna habitat zones, formal and informal reservations, the results from mid-term and end-of-term audits of the Current FMP, findings in the Auditor General's report (OAG, 2013), and the impacts of soil compaction. Specific issues raised were:

- The Commission has drawn unjustified conclusions from the FORESTCHECK data, which do not support the claim that biodiversity is resilient to disturbance from silvicultural operations. The FORESTCHECK monitoring system is fundamentally inadequate for assessing impact on the distribution and abundance of threatened species (many have not been monitored). The FORESTCHECK methodology, findings and interpretation of findings by the Commission cannot be relied upon as a scientific basis for assessing the impacts of logging activities permitted under the Proposed FMP. Threatened species (including flora variations within a species) and isolated communities of these have not been monitored by the FORESTCHECK system, and a lack of research means that variations could be permanently lost by excessive logging. FORESTCHECK is limited in its duration.
- Rainfall projection modelling used for the Proposed FMP is inadequate. Harvesting, species adaptation, climatic change and financial modelling should be based on accurate independently peer reviewed rainfall projections.
- The rainfall data used for the Proposed FMP appears to be from the period 1991-2010 however rainfall has declined and will continue to decline. There should be re-calculation of growth rates, sustainable yield and allowable cut using the most up-to-date rainfall data and projections for rainfall decline over the next 50 years.
- There is a lack of adequate, independently peer-reviewed science on the ecological impacts of logging activities, and a lack of adequate or effective measures to ensure that there are no adverse impacts on threatened forest species. It is scientifically and ethically unacceptable to rely on sparse, out-dated and inadequate data on the range and abundance of threatened species in order to inform management prescriptions. The protection of habitat values for threatened species within their anticipated current and historical range is inadequate, given that future climate change is likely to drive these species into areas that they have not previously occupied. The responsible agencies should provide scientifically validated evidence that supports logging.
- There has been a failure to include all of the known contemporary scientific, environmental and economic evidence available to the responsible individuals, other authorities and the EPA when assessing and constructing the recommendations to the Minister.
- The EPA failed to properly assess the significant factor of impacts on threatened species. The EPA's assessment of the risks to threatened species and other native fauna was inadequate, misleading and contradictory. No less than 12 native forest species of flora and fauna have been moved to a higher level of threat since the Current FMP came into effect, and the EPA has not considered the cumulative impact on these species. Continued and increased logging (and burning) risks driving threatened species closer to local and total extinction. The entire

forest should be managed to protect habitats of threatened species, rather than just within reservations and fauna habitat zones.

- The EPA and the Proposed FMP have failed to acknowledge the need for adequate retention of trees with hollows and understorey vegetation for dependent threatened fauna such as three species of black cockatoo and western ringtail possums, and have underestimated the impact of marri tree decline on these species. Allowing a 30% increase in the extraction of marri trees would be another step towards extinction of red-tailed black cockatoos.
- The prescribed level of habitat trees to be retained for black cockatoos is unnecessary to protect the species, as only 10% of black cockatoos breed in any one year and that nesting generally occurs within 6 km of permanent water. It is inappropriate to be seeking to retain 100% of habitat trees for every breeding pair and in areas where they wouldn't nest.
- The Proposed FMP does not contain an appendix similar to Appendix 13 of the Current FMP dealing with the management of significant flora values.
- The total area of fauna habitat zones has been reduced from 52,673 hectares (**ha**) to 48,400 ha and their minimum size reduced from 200 ha to 50 ha. There are no supporting data to show that 50 ha is sufficient to support and maintain biodiversity until adjacent logged areas recover, and there is no scientific justification for the reduction in the total area.
- The retention of fauna habitat zones, and the EPA's support for greater variation in zone and size and consolidating larger areas of fauna hotspots, is unjustified. There has been no measure or study to demonstrate the merits of fauna habitat zones as refugia or as sources of re-colonisation following disturbance. The Expert Silvicultural Panel recommended that there needed to be an assessment of the benefit or otherwise of fauna habitat zones, and that FORESTCHECK research demonstrates that biodiversity recovers without fauna habitat zones.
- The proposal to transfer the administration of the public nomination process of old-growth forest from the Commission to the DPaW is unacceptable. There are numerous examples of the community identifying areas of old-growth forest which have been inadequately mapped.
- Areas of old-growth forest, and of forest with old-growth characteristics, are still being logged. Forest areas that have old-growth characteristics but which are affected by dieback or have been subjected to past selective felling, should be protected.
- Clarification is required around the area to be added to the Whicher Scarp National Park. Report 1483 states that approximately 4,020 ha will be added to the conservation estate, however since the Whicher National Park already exists the additions are around 2,380 ha.
- National parks and nature reserves supported in the Current FMP and the additions to the Whicher Range National Park should be established by legislation as soon as possible, and that the process should not be held up because of mining interests, and sought for the gazettal of approved statutory conservation reserves as soon as possible.
- The EPA's assessment has ignored some of its own advice and conclusions in its advice to the Minister on the mid-term and end-of-term audits of performance of the Current FMP (EPA, 2010b and 2012b). The EPA did not address what it considered to be a significant issue for resolution in its review of the end-of-term audit: "*Lack of progress towards establishing reserves listed in Appendix 2 of the FMP 2004-2013*". The EPA or the Minister should provide an explanation as to why this issue has been neglected, if only to justify its position and credibility to the general public.
- The level of reservation is already high and in excess of the ESFM, and some reservation types are unwarranted. Excess reservation would be to the social and economic detriment to the native forest timber industry, and is in breach of the RFA.
- The impacts of soil compaction and topsoil disturbance on biodiversity. The EPA recommended that the Minister give consideration to the merit of extending forest monitoring programs (including FORESTCHECK) and public reporting of outcomes with a greater focus on the impacts of soil compaction. A further delay of ten years should such monitoring be implemented would exacerbate biodiversity risks already evident and render the Proposed

FMP unsustainable in terms of biodiversity conservation pertaining to biota dependent upon uncompacted soil or intact topsoil.

- The EPA's reliance on the DPaW to manage biodiversity is misguided. There is no evidence that the EPA has properly considered the factors of diseases and pests, climatic variation largely reflected in declining rainfall and rising temperatures, mining and wood removal, recreational use, fire, and land management practices in its assessment of the Proposed FMP.
- In its advice to the Minister (Report 1362) on the *Forest Management Plan 2004-2013 Mid-term Audit of Performance Report* (Commission, 2008), the EPA stated that biodiversity values continue to be under substantial threat from the factors of diseases and pests, climatic variation largely reflected in declining rainfall and rising temperatures, mining and wood removal, recreational use, fire, and land management practices. The Proposed FMP cannot meet the ESFM principles related to sustainability, precautionary approach, intergenerational equity, biodiversity conservation and pricing and valuation if biodiversity in the south-west forests continue to be under threat.
- The EPA has failed to properly assess the key environmental factors, and is therefore in breach of its most fundamental duty. The EPA has instead accepted at face value the Commission's claims that existing measures and new changes to silvicultural guidelines will address the biodiversity problems evident across public forest estate.
- Logging results in even-aged monocultures that replace diverse forest ecosystems and are less resilient to the effects of climate change.
- Logging is occurring, and continuing, in one of the world's 34 biodiversity hotspots.
- Future generations should have a chance to experience a spiritual connection to the native forest and its inhabitants.
- Other species have a right to live out their lives and not be prevented by doing so by humans encroaching on their habitat.
- The forest belongs to Australians, not the government. The proposal should be in the public domain so that everyone can understand it. The (former) DEC and the EPA should protect.

EPA advice

The EPA was of the view that the Proposed FMP generally maintains the same management measures that have successfully operated for the past ten years in maintaining biodiversity. The EPA considered that this management is also consistent with the broader system of reserves and recovery plans for species/communities under threat that are applied throughout the state. The EPA was of the view that, although it accepts that biodiversity values continue to be under substantial threat from a range of influences, the Proposed FMP provides adequate management for those impacts that can be managed (e.g. timber harvesting and other uses of the forest) and makes allowances for those threats that cannot be directly managed (e.g. climate change, disease, and pest). The EPA advised that in the absence of any demonstrated failure or compelling reasons for change, it considers that the Proposed FMP meets its environment objectives for this factor.

The EPA was of the view that the Proposed FMP maintains a comprehensive, adequate and representative (**CAR**) system of formal reserves and makes modest refinements to the network of fauna habitat zones. The EPA advised that all previous recommendations for additions to the formal conservation estate have either been implemented or maintained in the Proposed FMP. The EPA also advised that, from its perspective, these areas are not considered to be excessive, even though they exceed the target reservation levels, because there are many reasons why additional areas of forest should be protected in the south-west of WA given its biodiversity values and the potential future threats. The EPA considered that a relatively small but important addition is the proposed reclassification of 4,020 ha (of State Forest, and Timber Reserves) at Whicher Scarp to the National Park (refer Proposed FMP, Appendix 1, reserve proposal ID 224). Further, the EPA considered that this addition will protect values of the area previously identified by both

the (former) DEC and the EPA, which includes 2,370 ha of the Whicher Scarp ecosystem type which will put this ecosystem above the target 15% reservation level.

The EPA noted that the concept of fauna habitat zones was put forward in the Current FMP to maintain refugia for local fauna populations and to provide a source of recolonisation of nearby areas after timber harvesting. The EPA advised that areas identified as fauna habitat zones can be rotated over time as alternative areas of regenerating forest are able to replace the purpose of fauna habitat zones. Further, the EPA advised that the Proposed FMP makes some refinements to the particular network of fauna habitat zones developed during the life of the Current FMP, and that this refinement gives greater weighting to forest ecosystems with lower levels of representation in the conservation reserve system, allowing a greater variation in zone sizes, and consolidating larger areas in fauna habitat hotspots. The EPA advised that, although the refinement results in a smaller minimum size for individual fauna habitat zones (as small as 50 ha) and a 4,273 ha decrease in total area, it considered that the refined network would still fulfil the original purpose of fauna habitat zones as refugia and recolonisation sources. The EPA noted that through applying their other selection criteria, fauna habitat zones are unlikely to ever be totally isolated from surrounding forest, so the minimum size is not so important as it would be in the case of, for example, isolated reserves surrounded by cleared areas. In addition, the EPA advised that while no specific studies have been conducted to either conclusively demonstrate the value of fauna habitat zones in maintaining biodiversity or to try to establish a minimum viable size for particular fauna habitat zones, it still considers that fauna habitat zones are a prudent management measure and that the reduced minimum size would not comprise their intended function.

The EPA considered that the Proposed FMP does not change the criteria by which old-growth forests are classified and so is not expected to have any significant effect on this conservation category. The EPA noted that the criteria for old-growth forests arose from the RFA process with the Commonwealth over ten years ago, and all of those areas known at that time are now excluded from timber harvesting (over 93% in existing or proposed formal reserves or Forest Conservation Areas and the remainder in informal reserves). The EPA advised that proposed change in the assessment role on public nominations from the Commission to the DPaW will not occur until procedures have been finalised in consultation with the Commission, and so this is largely an administrative handover rather than attempt to change the assessment rules or criteria.

The EPA did not accept that timber harvesting and burning conducted under the Current FMP has resulted in the changed conservation status of threatened fauna. The EPA advised that in the end-of-term audit of performance of the Current FMP (Commission, 2012a) the Commission acknowledged that while some species had moved to a higher level of threat, that this was not a result of management activities under the FMP (refer to Table 2.1 of the end-of-term audit for a detailed listing of reasons). Further, the EPA advised that in Report 1483 it has set out how biodiversity is maintained through setting aside 62% of the area from timber harvesting, then applying biodiversity components in silvicultural guidelines in areas that are harvested. The EPA also advised that after a review of the silviculture guidelines the proponent has included additional components to improve the outcomes for cockatoo habitat. In addition, the EPA advised that the planning processes for timber harvesting and prescribed burning require the DPaW and the FPC to take into account the Fauna Distribution Information System (management activity 12 of the Proposed FMP) as well as recovery plans for selected threatened species and ecological communities. The EPA considered that this, along with the fact that timber harvesting results in temporary, selective removal of native vegetation (with management applied to promote rehabilitation) rather than the permanent, broadscale clearing associated with many proposals assessed by it, means that detailed biological surveys are not required prior to harvesting.

The EPA was of the view that while the Proposed FMP does not repeat measures set out in the Appendix 13 of the Current FMP relating to significant flora values, this is because most of these measures have incorporated into other plans and processes over the life of the Current FMP and are now to be monitored through KPIs based on regional nature conservation plans (e.g. KPIs 2 and 4 of the Proposed FMP).

The EPA considered that it properly acknowledged the results, and limitations, of the FORESTCHECK program in its report, with advice provided on extensions to FORESTCHECK or other monitoring programs to deal with the limitations. The EPA advised that regardless of these limitations it still considers that the FORESTCHECK program has been a valuable piece of research that goes a long way to demonstrating the proposition that timber harvesting of native forests can be managed to preserve biodiversity in the long-term. The EPA noted that the FORESTCHECK program was designed after much consultation to monitor a wide range of biodiversity elements, rather than to focus on indicator species or rare species. The EPA advised that in Report 1483 it acknowledges that the findings of the program are therefore limited to those elements that the program was designed for, and that FORESTCHECK is not well-suited to measuring the impacts on rarer flora and fauna species and that more species-specific research, rather than monitoring, may be needed to form conclusions on rarer species.

The EPA advised that one aspect of the FORESTCHECK results that concerned it was the long-term impact associated with the compaction of soil from timber harvesting. The EPA recommended to the Minister that a greater focus should be given to this issue when considering the merits of extending forest monitoring programs (including FORESTCHECK). In addition, noting that only a relatively small proportion of the forest is harvested under each ten-year FMP and that about 12% of harvested areas were disturbed by timber landings and extraction tracks, where the soil compaction effects are greatest, the EPA considered that this matter could be considered during the life of the Proposed FMP as one of a number of priority areas for further research and monitoring. However, the EPA also recommended that, given that this issue has been raised in appeals by an eminent scientist, with the warning that that is a risk of serious or irreversible damage to the environment, this issue be given a higher priority in the Minister's consideration and that a properly resourced program be put in place early in the life of the Proposed FMP, so that adaptive measures could be implemented during the period of the Proposed FMP, if found to be necessary.

The EPA recommended that this ground of appeal be upheld to the extent that in finalising the Proposed FMP the Minister consider assigning a higher priority to adequately funded research into the long-term impact associated with the compaction of soil from timber harvesting and any additional measures that should be applied to timber harvesting, within the first few years of the Proposed FMP.

Proponent response

The Commission advised that, as stated in the Proposed FMP, conservation of biodiversity is one of the purposes for which State forest and timber reserves are managed, and a fundamental consideration in ESFM. The Commission also advised that existing and proposed conservation reserves will be managed in an integrated way with State forest and timber reserves, to achieve biodiversity objectives that are consistent with *Australia's Biodiversity Conservation Strategy 2010-2030* (Commonwealth of Australia, 2010), which, together with *Australia's Strategy for the National Reserve System 2009-2030* (Commonwealth of Australia, 2009) has been endorsed by the Natural Resource Management Ministerial Council.

The Commission advised that the Proposed FMP provides strategies to support the range of natural biodiversity that exists, including protecting threatened and priority species and communities, managing key disturbance activities including timber harvesting, mining, infrastructure development and maintenance, prescribed burning and bushfires, and the conservation of flora.

The Commission advised that the Proposed FMP asserts that biodiversity can be conserved by a forest management regime that embeds silvicultural operations in a mosaic of connected areas where no harvesting occurs, and where specific measures are applied to conserve important habitat elements at the local scale in areas where harvesting does occur, including actions under recovery plans to conserve threatened species and communities.

In addition, the Commission advised that, as noted in the Proposed FMP, long-term research and monitoring, including that conducted through the DPaW's major monitoring project, FORESTCHECK, indicates that forest biodiversity is resilient to disturbance from silvicultural operations, and that comparison of biodiversity at sites where timber harvesting has occurred in the jarrah forest at a range of intensities, and at reference sites, shows that "*few significant impacts were evident and most species groups were resilient to the disturbance imposed*" (Abbott and Williams, 2011). Further, the Commission advised that research presented to it supports that species assemblages in harvested forest return to those typical of unharvested forest as the structure of the forest, and specific habitats, re-establish, however the Commission noted that the length of time required for this process may vary from a few years to several decades, depending on the intensity of disturbance and the requirements of particular species.

The Commission acknowledged that some structural elements of the forest, such as tree hollows and large coarse woody debris, can take many decades to reform and must therefore be retained in-situ during silvicultural operations. The Commission advised that FORESTCHECK monitoring has shown that in the jarrah forest "*for all species groups studied*" (vascular flora, macrofungi, lichens, bryophytes, mosses, macroinvertebrates, birds and terrestrial vertebrates) "*the imprint of harvesting 40 or more years earlier on species composition had become indistinguishable from that on grids never harvested*" (Ibid.).

The Commission advised that the network of informal reserves, fauna habitat zones and other protected areas and the retention of key habitat elements in areas subject to timber harvesting serve to provide connectivity across areas of State forest and between formal conservation reserves. The Commission also noted that the Proposed FMP notes the management procedures and systems that support the protection of threatened and priority flora and fauna, including:

- maintaining databases of the locations of threatened species and ecological communities, conducting searches where high impact disturbance is proposed; and
- use of the Forest Vertebrate Fauna Distribution Information System, which combines the vegetation complexes mapped for the Regional Forest Agreement into fauna habitats and correlates those habitats with the likely presence in them of particular vertebrate fauna species.

The Commission advised that the Proposed FMP proposes a lesser total area in fauna habitat zones. However, this lesser area reflects a refinement of the network of fauna habitat zones to better complement formal and informal reserves and achieve improved biodiversity outcomes, and that, as noted in the Proposed FMP, the refined network has the following characteristics:

- A reweighting of the area allocated to fauna habitat zones to forest ecosystems with lower levels of representation in the conservation reserve system. This has resulted in an increased area of fauna habitat zones in the Jarrah North West, Jarrah North East and Wandoo Forest and Woodland forest ecosystems, and a lesser area of fauna habitat zones in the Jarrah Sandy Basins, Jarrah Blackwood, Jarrah South and Karri Main Belt forest ecosystems.
- A slightly greater area of mature forest and a greater proportion of the area in fauna habitat zones being mature forest.
- A lesser area of regrowth forest in fauna habitat zones.
- A greater range of size of fauna habitat zones in recognition of the characteristics of the landscape in which they are located. For example, some fauna habitat zones as small as 50 hectares are located in areas affected by bauxite mining to more effectively sample the mature forest in these areas.
- Larger fauna habitat zones are located in Batalling forest block (a recognised area for fauna values), portions of Molloy and Rapids forest blocks adjacent to the upper reaches of the Margaret River (areas of highly prospective habitat for threatened fauna, including invertebrates and quokka), Topanup forest block (to consolidate a poorly represented

vegetation complex), together with the consolidated fauna habitat zone included in the previous FMP in portions of Kingston, Mersea and Warrup forest blocks.

The Commission advised that the Proposed FMP has embedded an acceptance that adaptation must be part of standard operating capacity, and that to consider the available science and adapt to change are essential ingredients of the Proposed FMP, for example, as stated by Allen *et al* (2010) and discussed in the Proposed FMP:

... given the potential risks of climate-induced die-off, forest managers need to develop adaptation strategies to improve the resistance and resilience of forests to projected increases in climate stress. Options might include thinning stands to reduce competition, selection of appropriate genotypes (for example improved drought resistance), and even translocation of species to match expected climate changes.

The Commission advised that a lack of progress towards the establishment of reserves listed in Appendix 2 of the Current FMP was noted by the EPA in its review of the end-of-term audit of performance of the Current FMP (EPA, 2012b). The Commission also advised that Appendix 1 of the Proposed FMP carries forward proposals for reserves from the Current FMP not yet implemented and additional information gathered since the Current FMP came into effect in 2004 supports the recognition of the Whicher Scarp as a separate forest ecosystem, which would increase the area of existing and proposed formal reserves by 4,010 hectares, including 2,370 hectares of the Whicher Scarp ecosystem. In addition, the Commission advised that the Proposed FMP acknowledges that consultation with relevant agencies is progressing relative to the proposed reserves but that it may take some time to conclude the remaining administrative steps in the processes involved.

The Commission considered that significant additions to the reserve system were a feature of the Current FMP and, when fully implemented, will result in a reserves system that generally exceeds the minimum standards set by the Commonwealth of Australia (ANZECC and MCFFA, 1997).

The Commission referred to its *Analysis of Submissions* document (Commission, 2013a), and noted that the best available/most recent rainfall data and Indian Ocean Climate Initiative (IOCI)/Commonwealth Scientific and Industrial Research Organisation (CSIRO) climate projections were used in developing the Proposed FMP.

The Commission also provided the following advice in response to concerns raised in regards to biodiversity:

- The Proposed FMP has been developed based on scientific knowledge and socio-economic information, and in line with the principles of ESFM as detailed in the CALM Act, and seeks to achieve an appropriate balance between various values and uses of the forest.
- Biodiversity protection has been enhanced through changes to silviculture, such as retention of additional habitat logs for numbats, retention of large marri trees for black cockatoos and modification of silviculture in areas around mine clearing and rehabilitation and fragmented forest blocks in the agricultural landscape.
- The Proposed FMP acknowledges the recovery plan process to address the risks to threatened species, proposes to continue predator control programs for foxes and feral cats.
- Habitat values and biodiversity are provided for at three levels – formal reserves; forest conservation areas, informal reserves and fauna habitat zones; and retention strategies at the local level. This serves to maintain stand structural complexity and landscape heterogeneity, and support resilience and threatened species. These approaches provide connectivity of habitat that allows for fauna movement.
- The public can still nominate areas for assessment for old-growth forest, nothing has changed in that respect. The DPaW is the operational agency so it is appropriate that it should undertake the assessment role. The Commission can undertake independent audits, which is consistent with its role.

- The Proposed FMP provides for a CAR reserve system of formal reserves supported by a network of informal reserves, together with fauna habitat zones and habitat retention strategies at the local scale. This serves to maintain stand structural complexity and landscape heterogeneity, resilience and threatened species.
- State forest areas, including Mundlimup block, are available for timber harvesting. Timber harvesting is planned and undertaken to minimise impacts on other values such as recreation assets and aesthetics.
- FORESTCHECK was established following an extensive consultation process involving a range of science institutions. Results have been published in the peer-reviewed scientific literature. Research on threatened species is largely done outside of FORESTCHECK. The Proposed FMP has accurately quoted or paraphrased the published findings from FORESTCHECK. A range of monitoring and research is undertaken in addition to FORESTCHECK, including that to support reporting of KPIs of the Proposed FMP.
- The best available data has informed the development of the Proposed FMP. A strategic approach is used to assess fauna values in areas where disturbance is proposed. The Fauna Distribution Information System (**FDIS**) is used to identify likely occurrence in areas planned for timber harvest and prescribed burning, along with the DPaW's planning checklist for site-level plans. Additional conditions (to the standard requirements of various operational guidance documents) may be imposed where threatened species are likely or known to occur.
- Fauna habitat zones are one of a number of strategies at a range of scales that are adopted to provide for the conservation of biodiversity. It is considered that the understanding of the effectiveness of the overall package of measures is most important, rather than potentially challenging and costly studies on one element of the package.
- The Draft FMP noted the importance of marri trees as a source of food and habitat for black cockatoos. Measures have been included in the Proposed FMP. Trees of various sizes, ages and species are retained in areas subject to timber harvesting. The use of 'where practicable' is appropriate and acknowledges other management considerations (e.g. safety/resourcing).
- Ongoing acquisition of biodiversity information is supported by various activities, including biological surveys provided for in the Proposed FMP. Research into many aspects of forest management is ongoing, and informs recovery plans for threatened taxa.
- Research and long-term monitoring of the effects of timber harvesting on biodiversity, including that conducted through the DPaW's major monitoring program, FORESTCHECK, shows that for the species groups studied the impacts are relatively transient (Abbott and Williams, 2011). Also, monitoring of regeneration of forest following harvesting by the FPC and by the DPaW (including through FORESTCHECK) has found that regeneration is being effectively achieved across both the karri and jarrah forests.
- Revised silviculture guidelines will include measures for enhancing biodiversity (e.g. protecting marri trees as a source of food and habitat for black cockatoos) and regeneration outcomes.
- The Proposed FMP includes a range of measures to minimise soil disturbance including both proactive management through the use of the trafficability index and outcomes based management in regard to soil compaction and timber harvesting. The soil management system will continue to be refined, through review of the guidance documents, to provide for protection of soils whilst seeking to have the least impact on industry. FORESTCHECK monitoring indicates that for all species groups studied forest biodiversity is resilient to disturbance from silvicultural operations. Limits are placed on the amount of soil disturbance so as to protect species such as geophytes. The revised jarrah silviculture guideline aims to protect understory and second-storey species through a range of strategies.

Consideration

FORESTCHECK

Some appellants were of the view that the Commission has drawn unjustified conclusions from the FORESTCHECK data, which the appellants contended to be limited in its content (e.g. does not include types of forest other than jarrah, does not include many threatened forest species), limited in its monitoring duration (five years), and not scientifically robust.

It is noted that Information Sheet No.50 (DEC, 2012b) states:

FORESTCHECK is an integrated monitoring system designed to support forest management in the south-west of Western Australia by providing information about changes and trends in key elements of forest biodiversity associated with management activities (McCaw *et al.* 2011). Under conditions of uncertainty and change, monitoring forms the basis for adaptive management. Integrated monitoring is a fundamental component of Ecologically Sustainable Forest Management. The focus of FORESTCHECK is on timber harvesting and silvicultural treatments in jarrah (*Eucalyptus marginata*) forest but the program has potential for a much wider application.

It is noted that the Climate Change Expert Panel (Maher *et al.*, 2010) made the following recommendations in respect to FORESTCHECK:

- in the context of an integrated forest health monitoring program at three scales of management, at the landscape level utilising and enhancing the FORESTCHECK protocol to ensure representative monitoring of a range of elements of biodiversity across major climate gradients (part Recommendation 3); and
- in the context of undertaking biological surveys to assist in evaluating the extent to which biodiversity is being conserved, this could include establishing additional FORESTCHECK monitoring sites in areas of jarrah and karri forest identified as potentially vulnerable to climate change by 2030 (part Recommendation 4).

It is noted that the Silviculture Review Expert Panel (Burrows *et al.*, 2011) considered FORESTCHECK to represent the current best-practice forest biodiversity monitoring, and recommended that it be maintained as an integral component of forest monitoring. The Panel recommended:

- that the FORESTCHECK monitoring protocol be reviewed in light of proposed silvicultural changes so that the effects of these changes on biodiversity can be monitored and properly evaluated (Recommendation 5);
- that consideration be given to extending FORESTCHECK to karri forest available for timber harvesting to monitor the efficacy of silvicultural practices designed to conserve legacy habitat elements and associated dependent biota (Recommendation 13); and
- that consideration be given to extending FORESTCHECK to wandoo forest available for timber harvesting to monitor the efficacy of silvicultural practices designed to conserve legacy habitat elements and associated dependent biota (Recommendation 18).

It is also noted that the Proposed FMP includes the following management activity in respect to FORESTCHECK:

- 20 The Department will seek to:
 - 20.1 maintain, review in consultation with the Conservation Commission and as appropriate, modify, the species, community and process monitoring program, *FORESTCHECK*, and seek to extend it
 - 20.2 maintain a research program on ESFM.

In Report 1483 the EPA advised that it supports the extension of FORESTCHECK to cover other forest types, other threats to the forests, and possibly other parameters such as soil micro-organisms, following the 2007-2012 FORESTCHECK assessment. The EPA recommended that the Minister considers the merit of extending forest monitoring programs (including FORESTCHECK).

In its advice the EPA considered that FORESTCHECK has been a valuable in demonstrating the proposition that timber harvesting of native forests can be managed to preserve biodiversity in the long-term. The EPA acknowledged the limitations of FORESTCHECK, and advised that it supported extension of the project (as described in Report 1483).

It is considered that the recommendations of the Climate Change Expert Panel, the Silviculture Review Expert Panel and the EPA that the FORESTCHECK project be reviewed with consideration given to extending the project to include other elements, combined with appropriate management activities to minimise the impacts of forest use on environmental values, are consistent with the intent of the precautionary principle. In addition, these recommendations are supported.

Noting the EPA's advice, it is recommended that the extension of FORESTCHECK is included in a broader program in consultation with scientists in relevant organisations and departments, to extend forest monitoring programs to include a greater focus on the impacts of soil compaction, key climate change indicators, a greater diversity of forest types, and a greater range of threats to the forests.

It is also recommended that management activity 20 is amended to include a target completion date within the first quarter of the implementation of the FMP for the extension of the FORESTCHECK monitoring program.

Rainfall projection data

Some appellants considered that the rainfall data used in the preparation of the Proposed FMP is inadequate and outdated, and that accurate independently peer reviewed rainfall projections should have been used in the calculation of sustained yield and allowable cut and in considering species adaptation, climatic change and financial modelling. Some appellants submitted that the Current FMP was developed using rainfall data based on records up to 1961, and that the Proposed FMP was developed using rainfall data no more recent than 2010.

The Commission advised that the best available/most recent rainfall data and IOCI/CSIRO climate projections were used in developing the Proposed FMP, and that the high severity climate change projection was used in calculating the sustained yield. The Proposed FMP (p.72) acknowledges predictions by the IOCI in respect to further decreases in rainfall and increases in summer and winter temperatures.

The EPA advised that the calculation of sustained yield took into account the high climate change severity projections for climate (to 2070) published by the CSIRO in 2007. The EPA considered that, although the CSIRO may have published more recent information on the current climate, the 2007 dataset is still the most recent dataset for longer term projections used in modelling.

It is noted that the list of references in the reports of the Climate Change Expert Panel (Maher *et al*, 2010) and the Independent Panel on Sustained Yield (Ferguson *et al*, 2013) include published research and climate information by the IOCI (2005 and 2012), Intergovernmental Panel on Climate Change (IPCC) (2000 and 2007) and the CSIRO (2007).

According to the IOCI (WA) website, the IOCI is a partnership of the State, CSIRO, and the Bureau of Meteorology. The CSIRO website, accessed in September 2013, contains a page *Australia's climate future – Climate change in Australia* which states:

CSIRO and the Bureau of Meteorology produce projections for climate in Australia. Projections provide the best information available on likely future climate conditions. The information is valuable for decision makers, including government and those investing in infrastructure, agriculture, urban planning, biodiversity and health.

The first projections were released in 1992. Projections were last released in 2007. ...

Maps indicating projected changes to climate can be generated for selected regions, years (2020, 2030 and 2070), seasons, emission scenarios and climate variables.

CSIRO is developing a new way of presenting projections for decision makers. These new projections for Australia are due to be released in 2014. ...

The IPCC website indicates that the most recent reports on climate change were published in 2007, with the next series to be considered in 2014.

Noting the above, it is considered that the EPA's assessment included consideration of the most recent dataset(s) available for long-term projections.

It is expected that when the proposed 2014 reports on climate change referred to on the IPCC and CSIRO websites become available, these will be included in the proposed evaluation of research, monitoring, audits and adaptive management referred to in management activity 128 of the Proposed FMP.

Lack of adequate data

Some appellants contended that there is a lack of adequate, independently peer-reviewed science on the ecological impacts of logging activities informing the Proposed FMP, and a failure to include all of the known contemporary scientific, environmental and economic evidence.

It is noted that the need for further and ongoing research was acknowledged in relation to the Current FMP. The then Minister for the Environment's appeal determination of appeals lodged against the EPA's report and recommendations for the Current FMP states:

Based on a precautionary approach, the EPA emphasised the importance of adaptive management and adequate monitoring and research through the life of the Plan. With this in mind, the Minister considers that the need exists to continue to review the state of knowledge in relation to the impact of silvicultural practices on biodiversity. On this basis, it would be appropriate for a review of the state of knowledge using an expert panel to be conducted in the second half of the operation of the Plan, which draws on knowledge gathered in the first half of the Plan, with a particular emphasis on silvicultural practices and their impact on biodiversity.

It is noted that the preparation of the Proposed FMP took into account recommendations from the mid-term and end-of-term audits of performance of the Current FMP (Commission, 2008 and 2012a) and the EPA's review of those audits (EPA, 2010b and 2012b) insofar as the Climate Change Expert Panel investigated the impact of climate change on the productive capacity and health and vigour of the south-west forests (Maher *et al*, 2010), the Silviculture Review Expert Panel reviewed silvicultural practices in various south west forest types (Burrows *et al*, 2011), and the Sustained Yield Expert Panel considered (among other things) whether the calculations for sustained yields were sufficiently robust, flexible, and factored in uncertainties associated with a drying climate and volume estimates (Ferguson *et al*, 2013).

It is noted from the reference lists contained in the reports of these expert panels that each of the reviews had regard to published studies and reviews relevant to their terms of reference. It is also noted that appellants contended that there is extensive research being undertaken and numerous published scientific papers relevant to the various aspects of native forest management that do not appear to have been taken into account in the preparation of the Proposed FMP.

The Proposed FMP includes a number of management activities identifying the need for further and/or ongoing research (including 19, 20, 21.1, 24, 27.5, 29, 32.5, 33, 55, 72 and 80, described in full in Appendix 3 of this report).

It is understood that it is the usual approach of the EPA, when requiring a proponent to prepare an environmental review, to place reliance on studies undertaken by other qualified persons.

In Report 1483 the EPA advised that the Proposed FMP builds on the Current FMP that was previously assessed by the EPA and is based on sound science and conservative assumptions. Report 1483 acknowledges that both the Proposed FMP and the Sustained Yield Expert Panel (Ferguson *et al*, 2013) identify the need for various research to support ESFM. The EPA has identified the need for further research in a number of areas, consistent with the findings and outcomes of previous reviews and studies, and has recommended both in Report 1483 and in its advice on the appeals that further research into those areas is undertaken.

During a meeting with the Office of the Appeals Convenor, the EPA indicated that it was satisfied that the management actions in the Proposed FMP, if implemented in a timely manner, would ensure that relevant scientific research would be undertaken to guide adaptive management.

Noting the EPA's advice, it is considered that the EPA has had appropriate consideration for the adequacy of the data informing the Proposed FMP in its assessment.

It is recommended that a program is developed, in consultation with scientists in relevant organisations and departments, to extend forest monitoring programs to include a greater focus on the impacts of soil compaction, key climate change indicators, a greater diversity of forest types, and a greater range of threats to the forests.

Threatened species

Some appellants were concerned that the EPA has not given sufficient consideration to threatened species and their habitats, or to significant flora. During meetings some appellants questioned why a number of species had become threatened since the implementation of the Current FMP.

In its review of the Commission's mid-term audit of the Current FMP, the EPA acknowledged that biodiversity values continue to be under substantial threat from various diseases and pests, climatic variation largely reflected in declining rainfall and rising temperatures, mining and wood removal, recreational use, fire, and land management practices (EPA, 2010b).

In its end-of-term audit of the Current FMP (Commission, 2012a), the Commission noted that since 2004 (when the Current FMP was implemented), 12 flora species and six fauna species have moved to a higher category of threat. The Commission submitted that:

None of these changes are attributed to the consequence of management activities. Reasons include the translocation of a recovery population of a critically endangered flora species within the FMP area and an international review of the conservation status of the Australasian bittern.

...

Predation by foxes and cats is thought to be the reason for the decline in woylies and disease that renders them vulnerable to predation may also play a role. ...

The Conservation Commission is satisfied that changes in taxonomic status for the brush-tailed phascogale and the red-tailed black cockatoo are not a reflection of the implementation of the FMP and that declines in woylie populations are not limited to those areas covered by the FMP and are not a result of management activities. ...

The Proposed FMP includes the following management activities in respect to the management of threatened (and other) species and their habitats (KPIs 1-5 also relate):

- 10 The Department will maintain a list identifying threatened and priority species of flora and fauna, and threatened and priority ecological communities.
- 11 The Department will where practicable, develop, review and implement recovery plans for selected threatened species and ecological communities.

- 12 The Department, the FPC and other proponents where required by the Department, will undertake prescribed burning and timber harvesting having regard to the Fauna Distribution Information System.
- 13 **(Plantations):** The FPC will advise the Department of its planned harvesting and management activities within plantations, and where those activities may impact on threatened species and threatened or priority ecological communities, the FPC will propose and the Department will approve the conditions for access (also see activity 76 in the 'Productive capacity' chapter). ...
- 15 The Department, the FPC and other proponents where required by the Department, will:
 - 15.1 include reference to requirements for the protection of key habitat for listed threatened species in their relevant codes of practice and other guidelines
 - 15.2 apply agency procedures so that the presence and type of biodiversity values are appropriately recorded, accessible to staff and considered prior to operations taking place
 - 15.3 apply procedures and set appropriate conditions to seek to ensure that biodiversity values are effectively protected during permitted disturbance activities
 - 15.4 promote awareness and understanding of the importance of protection and appreciation of the value of biodiversity among staff, proponents, operators and visitors.

In respect to threatened species, in Report 1483 the EPA indicated that proposed changes to silvicultural guidelines would result in improved habitat retention at a local scale, including black cockatoo habitat in harvested areas, if followed. The EPA noted the exclusion of timber harvesting from a system of Forest Conservation Areas, informal reserves and fauna habitat zones to maintain biodiversity and ecological processes at a landscape unit. The EPA also acknowledged the limitations of FORESTCHECK in respect to rarer flora and fauna (as discussed previously in this report).

In its advice the EPA accepted that biodiversity values continue to be under substantial threat from a range of influences, however did not agree that timber harvesting and burning conducted under the Current FMP has resulted in the changed conservation status of threatened fauna. The EPA considered that the Proposed FMP provides adequate strategies for impacts that can be managed, and makes allowances for those threats that cannot be directly managed. The EPA also considered that review of silvicultural guidelines, consideration of the Fauna Distribution Information System, recovery plans for selected threatened species and ecological communities, and temporary selective timber harvesting, indicate that detailed biological surveys would not be required prior to timber harvesting.

In its response the Commission advised that the Proposed FMP provides strategies to support the range of natural biodiversity that exists, and that biodiversity can be conserved by a forest management regime that embeds silvicultural operations in a mosaic of connected areas where no harvesting occurs, and where specific measures are applied to conserve important habitat elements at the local scale in areas where harvesting does occur.

Noting the EPA's advice, it is considered that the EPA had consideration for threatened species in its assessment. It is also noted that the inclusion of timeframes around some of the management activities in the Proposed FMP would provide certainty that management activities would be undertaken and relevant research programs initiated.

Fauna habitat zones and habitat trees

Some appellants were concerned that the EPA has not given sufficient consideration to the refined extent of fauna habitat zones, and considered there to be an inadequate retention of habitat trees (including marri) within harvested areas. Conversely, some appellants were of the view that the need for fauna habitat zones and for some types of habitat trees has not been sufficiently proven.

In accordance with actions in (and audits of) the Current FMP, a series of Sustainable Forest Management guidelines was initiated by the (then) CALM and (former) DEC. It is understood that some of these are currently undergoing revision by the DPaW. In respect to the retention of habitat trees and fauna habitat zones the guidelines state as follows:

- In respect to the retention of habitat trees:
 - jarrah forest: an average of five 'primary' habitat trees per ha on all harvested areas (CALM, 2004a), with preference be given to retaining trees that include nests of threatened fauna, retaining large marri (>70 cm diameter with senescent crown) in addition to other habitat tree retention requirements, and retaining habitat trees in groups (DEC, draft 2012);
 - pure karri forest: an average of two 'secondary' habitat trees per ha (CALM, 2005);
 - mixed karri/jarrah forest: an average of five 'primary' habitat trees (with jarrah and marri being the preferred species), plus an additional two 'secondary' habitat trees in clear-felled coupes where marri has not been retained (CALM, 2005); and
 - wandoo forest and woodland: an average of three 'veteran' (>50 cm diameter at breast height) and/or large 'intermediate' (25-50 cm diameter at breast height) habitat trees per ha on all harvested areas (CALM, 2004b);

where 'primary' habitat trees as those with that have a moderate to high probability of bearing hollows [features attractive to wildlife particularly for hollow nesting birds and animals], and 'secondary' habitat trees as those that have a lower probability of bearing hollows but provide for the sustained availability of hollows through time and contribute to structural diversity in the harvested coupe; and

- In respect to fauna habitat zones, the (former) DEC published *Guidelines for Protection of the Values of Informal Reserves and Fauna Habitat Zones* guideline (DEC, 2009a) and *Guidelines for the Selection of Fauna Habitat Zones* (DEC, 2010b).

In its reviews of the mid-term and end-of-term audits of performance of the Current FMP, the EPA considered that the following matters relating to fauna habitat would need to be addressed during the preparation of the next FMP:

- improving the application of fauna habitat zones and the importance of ecological linkages through State forest areas (EPA, 2010b).

The Silviculture Review Expert Panel (Burrows *et al*, 2011) noted the importance of retaining legacy (mature forest) habitats. The Panel acknowledged that tree hollows are typical legacy habitats that take many decades to form, and could become limiting in forests harvested for timber or cleared for mining. The Panel considered that the value of retaining primary habitat trees, in conjunction with temporary exclusion areas and other biodiversity conservation measures, in mitigating acute impacts on arboreal fauna has been demonstrated through the Kingston Study and FORESTCHECK monitoring. The Panel recommended:

- that the value of fauna habitat zones as refugia and sources of recolonisation post logging be assessed either by a separate study, or as part of the FORESTCHECK monitoring protocol, particularly given a range of proposed silvicultural changes to further a) retain legacy habitat elements and b) improve connectivity (Recommendation 3); and
- that the specifications be revised for retention of individual habitat trees on clear-felled karri coupes to reflect a preference for retention of small clumps of trees where possible (Recommendation 16).

The Proposed FMP includes the following management activities in respect to the management of threatened (and other) species and their habitats (KPIs also 1-5 relate):

14 The Department will:

- 14.1 seek to maintain a broad range of forest ages, structures and compositional diversity at the landscape scale to provide resilience, flexibility to respond through

- adaptive management and a basis for the expression of variable and relative impacts of climate-related changes 42
- 14.2 conduct its operations having regard to *Goals for Understorey Structural Diversity*, which are to be prepared by the Department in consultation with the Conservation Commission
 - 14.3 as required, identify and, following consultation with the Conservation Commission, implement at relevant scales, management strategies that are designed to promote the adaptation of forest ecosystems, processes and individual biota to climate-related changes, consistent with biodiversity conservation and the maintenance of, or minimisation of impact on, other forest values
 - 14.4 review the conservation reserve system, as necessary, to seek to ensure ongoing comprehensiveness, adequacy and representativeness, depending on the extent of any further significant changes to, or fragmentation of, forest ecosystems. ...
- 16 The Department will revise relevant documents pertaining to fire management to seek to ensure that where practicable, its prescribed burning and bushfire operations consider appropriate measures to minimise loss of legacy habitat elements.
 - 17 The Department will:
 - 17.1 revise the *Guidelines for Selection of Fauna Habitat Zones*, in consultation with the Conservation Commission, to be consistent with the settings included in this plan
 - 17.2 finalise the location of fauna habitat zones according to the *Guidelines for Selection of Fauna Habitat Zones*
 - 17.3 publish a map each year on its website depicting the status of all fauna habitat zones, which identifies and explains any changes arising during the previous year.
 - 18 The Department, and other proponents where required by the Department, will conduct their operations in indicative fauna habitat zones, and in fauna habitat zones, in accordance with the *Guidelines for Protection of the Values of Informal Reserves and Fauna Habitat Zones*.

It is noted that management activities 14.2 and 17.1 relate to preparation and/or revision of guidance materials. Noting that other operations are to have regard to these guidance materials, and in particular noting that the preparation of *Goals for Understorey Structural Diversity* was intended to be an outcome of the Current FMP, it is strongly recommended that management activities 14.2 and 17.1 include completion dates.

Appellants' concerns in respect to the apparent lack of science guiding the proposed minimum size of 50 ha for fauna habitat zones, are acknowledged. It is understood from discussions with the Commission and DPaW officers that it is intended that the smaller areas be located in areas of bauxite mining.

In Report 1483 the EPA acknowledges the refinement of the network of fauna habitat zones in the Proposed FMP to cover a smaller area and a greater range of sizes, and considered these changes to be consistent with maintaining a network of habitats to recolonise disturbed areas.

The EPA advised that fauna habitat zones can be rotated (within the timber harvesting regime) over time as alternative areas of regenerating forest are able to replace their purpose. The EPA advised that, although no studies have been undertaken to demonstrate the value of fauna habitat zones or established a minimum viable size, it considers fauna habitat zones to be a prudent management measure. The EPA also advised that fauna habitat zones are unlikely to ever be totally isolated from surrounding forest, that the reduced minimum size would not comprise their intended function as refugia and recolonisation sources.

Noting the EPA's advice, the silvicultural guidelines and the management activities in the Proposed FMP, it is considered that the EPA had appropriate consideration for fauna habitat zones and habitat trees in its assessment.

Old-growth forests

Some appellants were concerned about proposed change to the nomination process for old-growth forest. In addition, some appellants were concerned that areas of old-growth forests, and of forest with old-growth characteristics (with or without dieback), are still being logged.

The Proposed FMP includes the following management activities in respect to the nomination, assessment and recording of old-growth forests:

- 6 The Department will:
 - 6.1 publish a map each year on its website depicting the extent and status of old-growth forest, which identifies and explains any changes arising during the previous year
 - 6.2 review planning processes for disturbance activities on all land categories for uniformity of approach for assessment of old-growth forest status, consistent with that used in areas subject to proposed timber harvesting
 - 6.3 develop a procedure to identify and demarcate old-growth forest in consultation with the Conservation Commission.
- 7 The Conservation Commission will maintain the system of public nominations and assessment of unmapped old-growth forest until the procedure referred to in activity 6.3 is finalised. Following finalisation of the procedure referred to in activity 6.3, the Department will manage the system of public nominations and assessment of unmapped old-growth forest.

The Proposed FMP indicates that the public nomination process for old-growth forests will continue while the DPaW develops a procedure to refine methods for the identification and demarcation of old-growth forests in consultation with the Commission (consistent with an outcome of the end-of-term audit of the Current FMP), and that when the procedure is finalised the system for nomination and assessment of old-growth forests will be transferred to the DPaW.

Report 1483 acknowledges that the legacy category of 'Areas previously classified as old-growth forest' will no longer be recognised under the Proposed FMP, and that the public nominations process for old-growth forest is proposed to be administered by the DPaW. In its advice the EPA considered the proposed change to the assessment process of old-growth forests to be largely an administrative handover. The EPA also considered that the criteria by which old-growth forests are classified has not changed from the Current FMP.

During a meeting the Commission clarified that under the proposed administrative changes it is intended that the public will continue to be able to nominate areas of old-growth forests.

Noting the Commission's advice that the proposed change would not impact the public nomination process, the EPA's view that the proposed change is administrative is supported.

Notwithstanding, to provide clarity, it is recommended that a management activity is added that requires, within the first quarter of the implementation of the FMP, the development of a procedure to identify and demarcate old-growth forest.

Formal and informal reserves

Some appellants were concerned that the EPA has not given sufficient consideration to formal and informal reservations and the impacts of reservation. Some appellants considered that areas proposed to become reserves should be protected to ensure they will not be harvested for timber.

In its reviews of the mid-term and end-of-term audits of performance of the Current FMP, the EPA considered that the following matters relating to formal and informal reserves would need to be addressed during the preparation of the next FMP:

- it is the expectation that the next FMP will renew government commitment to all the reserves previously committed to, acknowledging that recommitment also carries with it obligations to resolve issues delaying the establishment of reserves and for all government agencies to support and facilitate reserve establishment (EPA, 2012b).

It is noted that the Proposed FMP includes the following management activities in respect to the management and protection of formal and informal reserves:

- 1 The Department will initiate and/or progress the processes required for the land category changes proposed by this plan by:
 - 1.1 undertaking fine scale reserve design for the formal reserves proposed in this plan
 - 1.2 consulting with relevant agencies and the Conservation Commission, then advising the Minister for Environment on final reserve boundaries.

(Note minor amendments to the boundaries of reserves shown on Map 5 and Map 2 may result from the fine scale reserve design and consultation processes required to establish these reserves.)
- 2 The Department will manage the areas proposed by Appendix 1 for inclusion in a national park, nature reserve or conservation park and vested in the Conservation Commission, consistent with their proposed land category and purpose and relevant Department policies until such time as they are formally created.
- 3 The Department will cooperate with relevant agencies in relation to the establishment of a comprehensive, adequate and representative reserve system outside the RFA area, through relevant programs.
- 4 The Department will manage the areas proposed by Appendix 5 to be classified as forest conservation areas and vested in the Conservation Commission, consistent with their proposed classification and purpose and relevant Department policies until such time as they are formally classified. Timber production in these areas will not be permitted, but other productive activities, such as firewood collection, may be allowed, on an area by area basis, unless an area management plan expressly precludes it.
- 5 The Department, the FPC and other proponents where required by the Department, will conduct their operations within the informal reserve types shown in Appendix 11, in accordance with the Department's *Guidelines for the Protection of Values of Informal Reserves and Fauna Habitat Zones*.

In respect to the interim protection of areas awaiting reservation, it is noted that the Proposed FMP states that areas proposed for inclusion in a national park, nature reserve or conservation park (management activity 2) or proposed to be classified as forest conservation areas (management activity 4) will be managed by the DPaW consistent with their proposed land category and purpose until such time as they are formally created or classified.

In respect to additions to the Whicher Scarp National Park, Report 1483 notes that the Proposed FMP proposes the addition of 4.020 ha to the Whicher Scarp National Park. It is understood from the EPA's advice and the Proposed FMP that 4,020 ha of State Forest and Timber Reserves is to be reclassified as National Park, which includes 2,370 ha of the Whicher Scarp ecosystem type.

In respect to reservations being in excess of the CAR reserves system target, Report 1483 notes that the Proposed FMP further contributes to the reservations proposed through the RFA and the Current FMP. The Commission acknowledged that the level of reservation, when fully implemented, will exceed the minimum level set by the Commonwealth. In its advice the EPA considered that there are many reasons why additional areas of forest should be protected, given the biodiversity values and the potential future threats.

In respect to reservations not being finalised under the Current FMP, the Commission advised that the lack of progress was noted in the EPA's review of the end-of-term audit of performance of the Current FMP (EPA, 2012b), and that these proposed reservations are included in the Proposed FMP. It is understood that finalisation of the reservations is subject to discussions between and endorsement by multiple agencies, and is likely to take some time.

It is noted that the reference to Appendix 5 of the Proposed FMP in management activity 4 appears to be a typographical error, and that the relevant reference is likely to be Appendix 1. It is recommended that this error, and any other minor typographical, grammatical or formatting errors identified, be amended.

Soil compaction

Some appellants were concerned that the EPA did not adequately consider the impacts of soil compaction.

The Silviculture Review Expert Panel (Burrows *et al*, 2011) considered soil conservation to be paramount to ESFM, and noted that studies on the impact of timber harvesting on soil compaction have shown an increase, with the mean bulk density of undisturbed and disturbed soil being 0.71 g/cm⁻³ and 0.85 g/cm⁻³ respectively, with localised areas on harvested coupes being considerably more compacted.

The Proposed FMP includes the following management activity in respect to the management of operations involving the use of heavy vehicles and the level of soil damage resulting from timber harvesting activities (KPI 9 also relates):

- 41 The Department, the FPC and other proponents where required by the Department, will conduct their operations involving the use of heavy vehicles in a manner that is in accordance with the *Soil and Water Conservation Guideline*, the *Manual of Procedures for the Management of Soils Associated with Timber Harvesting in Native Forests* and the *Manual for the Management of Surface Water*.

In Report 1483 the EPA recommends that the Minister give consideration to the merit of extending forest monitoring programs (including FORESTCHECK) and public reporting of outcomes, in consultation with scientists, to include key climate change indicators, a greater diversity of forest types, a full range of threats to the forests, and a greater focus on the impacts of soil compaction.

In its advice the EPA recommended that the Minister considers assigning a higher priority to adequately funded research into the long-term impact associated with the compaction of soil from timber harvesting and any additional measures that should be applied to timber harvesting, within the first few years of the Proposed FMP. During discussions with the Office of the Appeals Convenor, the Commission indicated that the need for prioritised research is acknowledged and supported.

Noting the EPA's advice and the concern raised, it is strongly recommended that a program is developed in consultation with scientists in relevant organisations and departments, to extend forest monitoring programs (including FORESTCHECK) to include a greater focus on the impacts of soil compaction, as well as key climate change indicators, a greater diversity of forest types, and a full range of threats to the forests.

It is also recommended that management activity 42 is amended to include a target completion/publishing date within the first quarter of the implementation of the FMP for the revision of relevant subsidiary documents pertaining to rehabilitation requirements for major extraction tracks and landings, and roads and tracks no longer required.

Conclusion for Ground 1

Considering all of the information available in respect to this ground of appeal, it is recommended that this ground be allowed to the extent that:

- a management activity is added that requires, within the first quarter of the implementation of the FMP, the establishment of a process to identify and deliver research priorities, in collaboration with research institutions and relevant organisations as required; and the development and implementation of a program which commits to timeframes to extend forest monitoring programs (including FORESTCHECK) to include a greater focus on the impacts of

soil compaction, key climate change indicators, a greater diversity of forest types, and a greater range of threats to the forests;

- management activity 20 is amended to include a target completion date within the first quarter of the implementation of the FMP for the extension of the FORESTCHECK monitoring program;
- noting that other operations are to have regard to this guidance material which was intended to be an outcome of the Current FMP: management activity is amended 14.2 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the preparation of *Goals for Understorey Structural Diversity*;
- management activity 17.1 is amended to include a target completion/publishing date within the first quarter of the implementation of the FMP for the revision of *Guidelines for Selection of Fauna Habitat Zones*;
- management activity 42 is amended to include a target completion/publishing date within the first quarter of the implementation of the FMP for the revision of relevant subsidiary documents pertaining to rehabilitation requirements for major extraction tracks and landings, and roads and tracks no longer required;
- noting that the Proposed FMP contains a section on stakeholder involvement, and includes a number of management activities relating to consultation with stakeholders (including 21.3, 36, 94, 133 and 134, described in full in Appendix 3 of this report): a management activity is added that requires, within the first quarter of the implementation of the FMP, the development of a communications strategy that identifies, among other things, the establishment of topical advisory groups and stakeholder reference groups (as identified throughout the FMP) to assist in providing opportunities for the community, and relevant non-government organisations and government agencies, to participate in and to inform the implementation of the Proposed FMP;
- a management activity is added that requires, within the first quarter of the implementation of the FMP, the development of a procedure to identify and demarcate old-growth forest;
- amend management activity 4 to reference the correct Appendix; and
- amend any other minor typographical, grammatical or formatting errors identified within the Proposed FMP as appropriate.

It is also recommended that the Minister considers assigning a higher priority to adequately funded research into the long-term impact associated with the compaction of soil from timber harvesting and any additional measures that should be applied to timber harvesting, within the first few years of the Proposed FMP, consistent with the EPA's recommendation.

Noting that the *WA Environmental Offsets Policy* (2011) outlines compensatory actions to address the significant residual environmental impacts resulting from a development or activity, it is recommended that the Minister consider seeking industry support to fund scientific research into the effects of native forest timber harvesting activities, and in particular soil compaction, by way of indirect offsets.

Ground 2: Productive capacity

Many appellants considered that the EPA has not adequately assessed the impacts of sustained yield, allowable cut and upper limit. Some appellants considered that the volume of wood has been seriously overestimated, and that the calculation of sustained yield is flawed. Several appellants were concerned that the increased area of forest that would need to be impacted to achieve the allowable cut is up to double the area in the Current FMP, and would result in about a quarter of the 'productive' forest being logged, and that as a result the Proposed FMP cannot deliver ESFM. Appellants also asserted that there was a lack of opportunity for the public to review the methods and data used to calculate the sustained yield figures. Some appellants disagreed with the recommendation that the upper limit be approved by the Minister. Specific issues raised were:

- The EPA has failed to assess the impacts of sustained yield and allowable cut.
- Because of the excessive allowable cut, the large area of forest that would have to be logged to produce it and the environmental damage caused by logging, the Proposed FMP cannot deliver ESFM. The area of forest that would have to be logged for the lower level of average annual allowable cut (15,500 ha) and for the upper limit of average annual allowable cut (20,500 ha) was not mentioned in the Draft FMP. The allowable cut is up to double the current average area logged under the Current FMP (8,600 ha). If the lower level of average annual allowable cut is achieved then 155,000 ha of forest would be cut over by 2023, and that if the upper limit is achieved then 205,000 ha of forest would be cut over by 2023, which amounts to almost one quarter of all the forest available for logging resulting in the whole area could be logged within about 40 years.
- The Proposed FMP does not comply with the principles of ESFM as required under section 19 of the CALM Act.
- The sustainability of the Minister-approved upper limit is not proven or justified in the Proposed FMP, and appears to be driven by economic factors rather than environmental best practice.
- It is unacceptable for the Proposed FMP to set out two levels of logging. It appears that the environmental implications of extracting the upper level have not been examined by the EPA. The EPA should be prioritising environmental implications and not market considerations. The environmental implications of the increase have not been taken into account by the EPA.
- Access to upper harvest limits should be automatic and not subject to further process in Ministerial approval when all requirements under the FMP have been satisfied. The upper limit allowable cut was calculated by the (former) DEC on the basis that the harvested volume is sustainable, and this has been calculated factoring in conservative safety margins and buffers.
- The upper limits of the average annual allowable cut, which are recommended for Ministerial approval, should be rejected and removed from the Proposed FMP. The EPA should concern itself with the environmental impacts of such a massive allowable cut.
- The (former) DEC seriously overestimated the volume of wood the forests produce and clearly the allowable cut is unsustainable. The Auditor General found that the FPC removed an average on 19% less product than was forecast (OAG, 2013; p.16). Despite the current annual allowable cut of first and second grade jarrah sawlogs being 131,000 cubic metres, in 2011-12 the FPC sold only 42,000 cubic metres.
- The EPA failed to properly assess the significant factor of areas impacted to be substantially increased as a result of implementing the Proposed FMP. The FMP would allow a significant increase in the area to be impacted by logging activities, which appear to not have been assessed by the EPA. As the yield of forest products per hectare diminishes the area of impact will be substantially increased, and although this is reflected in figures provided in the Proposed FMP it appears to have been overlooked by the EPA which stated in its report that logging levels would remain similar to those under the Current FMP.

- There has been a failure to incorporate the effects of clear-felling for bauxite mining into impact of harvesting in the northern jarrah forest. Annual harvest plans required under the FMP give no detail of the amount to be harvested from mine areas. Because of clear-felling there is a higher yield per hectare than in normal logging.
- The Proposed FMP foreshadows potential new mining operations in the south-west forests. The Sustained Yield Expert Panel indicates that the identification and verification of the net productive area of forest is a fundamental component of the inventory system because all subsequent volume estimates relate to the area so identified (Ferguson *et al*, 2013). About 1,000 ha of forest is destroyed by bauxite mining each year, and several existing and proposed exploration licences are likely to result in further mining leases.
- The EPA's recommendations in respect to the sustainability of logging in low and medium rainfall zones are inconsistent with the EPA's previous advice to the Minister (Report 1362) in respect to the Commission's mid-term audit of the Current FMP (Commission, 2008), which states that it is most unlikely that the jarrah forest in the low and adjacent medium rainfall areas, particularly in the northern forest, can continue to contribute to the jarrah sustained yield and also be consistent with ESFM. There is no evidence in the documentation regarding the Proposed FMP to suggest that the situation has improved.
- Appendix 6 of the Proposed FMP does not give the area of jarrah, karri and wandoo forest available for logging, as is provided in Appendix 8 of the Current FMP.
- Marri trees are not protected under the Proposed FMP. Both levels [allowable cut and the upper limit] run contrary to the proposal to protect more marri trees.
- Salvage logging can have profound negative impacts on ecological processes and biodiversity and will rarely, if ever, contribute in a direct or positive way to ecological recovery. The EPA has approved the proposal to conduct 'salvage logging' of trees killed by fire, drought or dieback (Proposed FMP, p.92; EPA Report, p.5) mainly on economic grounds, but this should be rejected on environmental grounds.
- Historical overcutting of the forest, and current method of clear-felling. There is uncertainty about the future of the forests, particularly with respect to climate change.

EPA advice

The EPA advised that it has considered the environmental impacts of the 'upper limit allowable cut' and concluded that it would meet its environmental objectives. However, the EPA also advised the Minister that it is aware of likely economic and social consequences that are outside the domain of the EPA's expertise and powers to consider and so has recommended that the Minister be the decision-maker in this instance. The EPA advised that it considers that it would be best for any such decision to be made by the Minister, who is able to take into account social and economic consequences, rather than leave such a decision to an environmental agency such as the DPaW.

The EPA advised that the 'upper limit available cut' has been derived from the same modelling process used to calculate sustained yield as the 'allowable cut' and which the EPA considers to be appropriate and rigorous. The EPA advised that both harvesting levels are derived from modelling using the same environmental inputs and constraints, that is, the 'sustained yield' in each case is only calculated once allowances have been made for the maintenance of biodiversity (i.e. areas set aside in formal conservation and in Forest Conservation Areas, exclusion of most of the informal reserves, and application of silvicultural measures to limit local impacts). In addition, the EPA advised that both also use the same climate modelling and tree growth modelling assumptions, and that it is only the assumptions regarding market utilisation of forest products that are varied between the modelling used to derive the 'upper limit allowable cut' and the 'allowable cut'. The EPA advised that its confidence in the process for deriving the 'upper limit allowable cut' was stated in Report 1483 (first paragraph on p.13), however, given the misunderstanding that many appellants seem to have, the EPA was of the view that in hindsight this could have been made clearer.

The EPA advised that having assessed the environmental impacts of the both proposed levels of harvesting, it provided advice to the Minister on how to deal with an aspect that is beyond the scope of the EPA's role to consider. The EPA submitted that in the event that any proposal is put forward to access the 'upper limit allowable cut', it believes there may be a number of flow-on social and economic consequences, for example, utilisation of lower quality or smaller sized wood products could be dependent on the development of veneer/plywood/laminated processing facilities, increased export of woodchips, or use as feedstock for biomass energy generation. The EPA considered that such changes to the timber utilisation industry would need to consider the long-term economic viability of such industries and whether such industries would have a social licence to operate. With regard to the social licence to operate, the EPA advised that it is aware that some sections of the community do not consider the use of native wood products in providing feedstock to pulp mills or biomass energy generators as an acceptable end use. The EPA advised that the Government would also need to consider the economic implications from any long-term commitments to any of the industries described above, especially where the social licence to operate may change over time, and that in this respect it should be noted that the last major change to the timber harvesting and milling industry as a result of the Current FMP, required a significant investment from the State to address the associated economic and social consequences. Being aware of potential socio-economic issues beyond its capacity to assess, the EPA advised that it has made a recommendation for the Minister to consider, regarding a decision-making process to address these issues (i.e. that the Minister, not the DPaW, makes such decisions).

The EPA advised that the modelling used to derive the 'sustained yield' takes into account the areas harvested each year and the rotation length for different trees (approximately 150-200+ years for jarrah and 80-100+ years for karri). Further, the EPA advised that because there can be multiple partial harvest events (e.g. thinning) in forest areas between establishment and final harvest (e.g. gap release regeneration) it is not possible to use the area subject to harvest in one 10-year period to simply extrapolate that every tree in the forest would be harvested in a certain time period (e.g. 40 years).

The EPA advised that there is currently no harvesting data suggesting a trend of diminishing returns of timber from the south-west forests or an overestimation of timber the forests produce, and that the variations in area to be harvested in one 10-year period to the next for a similar 'allowable cut' are largely caused by the history of past harvesting events and the effect that this has on the present age class and structure of the forest. The EPA also advised that for the period 2014-23 there will be thinning of more young regrowth and mine-site rehabilitation as a result of past management and disturbance, and that therefore the variations do not reflect a general trend of reduced yield per hectare from the forest. The EPA referred to the Auditor General's report (OAG, 2013), which notes that the Commission's mid-term audit of the Current FMP (Commission, 2008) found that on average 9% more product was removed from the forest than was forecast and that more recent figures show an average of 19% less product is being removed than was forecast. Further, the EPA advised that the Auditor General's report goes on to explain the reasons for differences; the EPA considered that none of these reasons are suggestive of a long-term trend of unsustainable harvesting. In addition, the EPA advised that there are a number of operational reasons why the FPC may not sell the full volume of timber provided for under the 'allowable cut'. Given that the limits imposed on harvesting levels are maximums not to be exceeded, the EPA was of the view that the fact that less is taken should not be surprising, and neither does it lead to any additional environmental impacts, or demonstrate a diminishing return or overestimation of timber in the forests.

The EPA advised that current and possible future mining proposals are adequately dealt with under the Proposed FMP, and that existing mining projects such (such as ALCOA and Worsley bauxite mining operations) are already factored into the modelling used to calculate the 'sustained yield'. The EPA advised that the Proposed FMP notes that possible future mining operations are subject to separate approvals processes under the *Mining Act 1978* and possibly the EP Act, and that the DPaW and the Commission would provide advice on any proposed operations consistent

with the FMP. The EPA was also of the view that should any such operations ultimately be approved, then these would be factored into future calculations of the 'sustained yield'.

The EPA considered the approach adopted for the salvage of wood products is reasonable and did not give direct consideration to economic factors in forming this view. The EPA was of the view that the proposed approach allows the DPaW to decide not to count the salvage against the allowable cut when to do so would discourage the use of this resource and prevent the actions needed to promote regeneration from taking place.

Proponent response

The Commission advised that it has a statutory responsibility (section 19(1)(i) of the CALM Act) to advise the Minister on the production and harvesting, on a sustained yield basis, of forest produce throughout the State.

The Commission advised that it has carefully reviewed the advice of the DPaW as independently assessed by the Sustained Yield Expert Panel (Ferguson *et al*, 2013) and resolved to accept the allowable cut and 'upper limit', the latter being subject to the independent review of whether or not the proposal to access additional timber is consistent with the woodflow modelling for the plan and any revised inventory information.

The Commission indicated it had expressed a keen interest in understanding the rationale for and the impact of the increased cutover area contemplated by the Proposed FMP. The Commission supported the EPA's recommendation that the Minister give consideration to the merit of reserving any approval decision for increasing harvesting levels beyond the allowable cut and up to the 'upper limit' for the Minister (EPA, 2013c), while acknowledging that the 'upper limit' concept is based on progression towards 'full' markets and utilisation, designed to provide the native forest timber industry with guidance to support the development of new or restructured wood processing facilities, which may take some years to materialise.

The Commission advised that the Proposed FMP was amended from the Draft FMP to include a discussion on why the cutover area is anticipated to be larger than during the Current FMP, and relates to the greater proportion of lower yielding forest types and silvicultural treatments likely to be included in areas harvested during the period of the plan. This includes the thinning of more of the young regrowth and minesite rehabilitation that now exists as a result of past management and disturbance.

The Commission advised that, during the development of the Proposed FMP, it expressed concern on issues relating, particularly, to soil compaction as a result of timber harvesting and the monitoring of soils and the micro-organisms contained therein, given their critical role in the maintenance of healthy ecosystems. The Commission acknowledged that the protection of soil during timber harvesting and other disturbance operations has been an area of considerable development during the Current FMP, as noted in the mid-term and end-of-term audits of performance of the Current FMP (Commission, 2008 and 2012a), and advised that it intends to monitor, through its auditing function, the DPaW's ongoing achievement of outcomes as outlined in the DPaW's *Soil and Water Conservation Guideline* (DEC, 2009) and *Manual of Procedures for the Management of Soils Associated with Timber Harvesting in Native Forests* (DEC, 2010b).

The Commission advised that it also plans to monitor, as part of its auditing function, the specific issues of concern raised by the Sustained Yield Expert Panel (Ferguson *et al*, 2013) during the term of the FMP, acknowledging specifically areas of further research.

The Commission also provided the following advice in response to concerns raised in regards to productive capacity:

- Government policy supports a sustainable native forest products industry managed in accordance with the principles of ESFM and the Proposed FMP provides for a native forest products industry, which utilises a range of log types.

- Sustained yield has been calculated and allowable cut determined based on the settings adopted in the Proposed FMP. While the area likely to be cut-over does represent an increase compared to the Current FMP, the overall volumes of harvested timber are broadly similar, so volumes harvested from a unit area will be lower and the forest will be more lightly cut and therefore have less impact on factors such as soil compaction.
- The results reported in the Auditor General's report (OAG, 2013) have been incorporated into the calculation of sustained yields and allowable cuts for the Proposed FMP.
- The report of the Sustained Yield Expert Panel (Ferguson *et al*, 2013) states (under Recommendation 5.1):

The Panel endorses the research done to develop adjustments for climate change for jarrah and karri forests for FMP14. The Panel recommends that further research on the impact of climate change of the productive forest estate should be pursued in the course of the next Plan, noting that any refinements to the approach need to be consistent with the processes used in monitoring and scheduling of yields" and concluded: "The Panel believes that, subject to the implementation of earlier recommendations regarding improvements or changes to the processes involved in calculating the sustained yield, that the 1. Structure, operation and outputs from the woodflow models are robust and flexible enough for computing the sustained yields and other wood availability figures included in the proposed FMP; 2. Uncertainty associated with a drying climate has been adequately factored into the sustained yield calculations; 3. Level of provision for other risks and uncertainty associated with the volume estimates are appropriate; and 4. Calculations incorporate suitable adjustments for the operational feasibility of obtaining the strategic woodflows.

- There are a range of potential benefits to improved utilisation of the available wood resources, including improved capacity to adapt to climate change with benefits for ecosystem health and water supply for consumptive use, a greater contribution to climate change mitigation, improved silvicultural outcomes, increased sawlog production, and greater socio-economic benefits. As with most other natural resources, the portion that can be converted to highest value product is a limited part of the total.
- There are existing plantations within the Proposed FMP area.
- Appendix 8 provides data on levels of reservation so it was considered appropriate that it not include data on area available for timber harvesting.
- Social, economic and environmental issues have been considered in the process of developing the Draft FMP and Proposed FMP. A socio-economic study was undertaken and focussed on the economic and social significance of the timber harvest and wood processing industry, by accessing relevant information and in consultation with industry. The report from this study was published at the same time as the Draft FMP was released for public comment.
- Mineral and petroleum operations on land to which the Proposed FMP applies are approved and largely governed by processes managed by other government agencies under legislation such as the CALM Act, *Mining Act 1978* and State Agreements (Proposed FMP Appendix 2).
- The Proposed FMP provides a range of management activities that are relevant to the roles of the Commission and the DPaW in the management of the land, including processes associated with approvals, oversight of current operations, development of rehabilitation requirements and post-hand back management of rehabilitated sites.
- Mining and rehabilitation following mining is largely regulated by legislation and mechanisms other than the CALM Act and its associated management plans and therefore this matter is considered to be out of scope of the appeals process. Mining proposals are subject to environmental impact assessment in accordance with the EP Act. Harvest planning takes into account the likely volumes of wood products that will be generated from mine clearing which is usually about 10-15,000 cubic metres per year of jarrah sawlogs, plus other wood products. The number of harvest coupes in the northern jarrah forest is significantly less than it would be in the absence of bauxite mining because wood from mine clearing contributes to the allowable cut. Wood removed as a result of mine clearing is accounted for in relation to the allowable cut for both sawlogs and non-sawlog material. Changes are proposed to be made to silviculture

where there is an interaction between bauxite mining and timber harvesting: (1) the timing of silvicultural treatments will be managed to prevent greater than 40 per cent of the landscape scale area being in the establishment to immature developmental stages at any one time; (2) schedule thinning of the non-mined forest to reduce water use during times when more than 20 per cent of the landscape scale area is in establishment and juvenile stages during the mined site rehabilitation process; (3) manage the local scale management unit to retain the structural indicators of biodiversity; and (4) carry out variable density thinning on rehabilitated mine sites to increase structural diversity and reduce water use.

- The EPA explored in some detail, the implications of the upper level with the Commission and the DPaW. The Proposed FMP includes management activity 61 which provides condition on access to the 'upper limits' subject to approval by the DPaW, in consultation with the Commission, considering whether or not the proposal remains consistent with the woodflow modelling for this plan and any revised inventory information. Sustained yields and availability of other bole volume were calculated using two fundamental and separate calculations: (i) assuming the continuation of current markets for wood products and (ii) an assumption that 'full' markets and the maximum utilisation of jarrah and marri other bole volume applies from the commencement of this plan in 2014. Keeping all other assumptions the same, this woodflow modelling provides an upper limit that could be approached should new markets arise during the period of the Proposed FMP. The upper limits for the annual allowable cut have been calculated from the woodflow arising as a consequence of the sawlog sustained yields, adjusted by the 'safety margins' of 10% for jarrah and 15% for karri as recommended (Recommendation 8.1) by the Sustained Yield Expert Panel (Ferguson *et al*, 2013).
- The Commission and the DPaW do not object to the EPA recommendation that approval to access the 'upper limits' is subject to approval by the Minister, rather than approval by the DPaW. However, the approvals process for access to the 'upper limits' should not revisit issues that have been addressed in the process of developing the FMP, but rather focus on consistency with the woodflow modelling for this plan and any revised inventory information.
- As noted in the Draft FMP (p.25) and Proposed FMP (p.24), the pricing and allocation of harvested forest products is beyond the scope of the FMP.
- A streamlined approval process so that salvage can be undertaken in a timely way is supported in the Proposed FMP. It is intended that the decision to salvage any affected areas and determine if any salvaged wood will count towards allowable cut, be based on a case-by-case evaluation by the DPaW of the likely public benefit. In doing so, the DPaW would consider the costs and ability of affected areas to successfully regenerate and/or be successfully rehabilitated in the absence of salvage harvest, and provide for a range of ESFM values.

Consideration

A common over-arching view shared by many appellants was that the Proposed FMP has been prepared under the assumption that the logging of native forests will continue. Most appellants contended that the Proposed FMP has a strong focus on logging activities as the primary use of native forests, and does not provide much weight to other current uses of the forest such as for honey production and tourism.

Many appeals raised concern that the EPA has not adequately assessed the impacts of sustained yield and allowable cut, and that the area of forest that would need to be impacted to achieve these levels would be significantly greater than the area impacted under the Current FMP. Some appellants considered that the volume of wood has been seriously overestimated, and that the calculation of sustained yield is flawed. Some appellants were concerned about the allowable cut of marri trees (being a habitat tree and subject to decline).

In considering these appeals, and as noted in the EPA's advice, current government policy supports a sustainable native forest products industry managed in accordance with the principles of ESFM. It is noted that the Commission acknowledged that the Proposed FMP has been prepared to align with this position.

Section 56 of the CALM Act states that in preparing an FMP the Commission shall have the objective of achieving or promoting the purpose for which the land is reserved, and in particular (in the case of State forest) to achieve the optimum yield in production consistent with the satisfaction of long-term social and economic needs.

In respect to timber production, under section 19 of the CALM Act the Commission is required, among other things, to:

- advise the Minister on the application of the principles of ESFM (listed in Appendix 1) in the management of (i) State forest and timber reserves; and (ii) forest produce throughout the State (subsection (1)(h)); and
- advise the Minister on the production and harvesting, on a sustained yield basis, of forest produce throughout the State (subsection (1)(i)).

Area of forest available for timber harvesting

In respect to the net area of forest available for harvesting, Report 1483 states that under the Proposed FMP, about 62% of over 2.5 million ha of lands vested in the Commission within the Proposed FMP boundary are proposed to be protected or managed primarily for conservation, and that the remaining 38% is available for other uses including timber harvesting.

It is noted that the percentages stated in Report 1483 include vegetation types that are not forests. Using the figures in table in Section 2.2 of the (former) DEC's *Sustained yield information sheet series* (DEC, 2012a) and the (slightly different) figures in Table 2.1 of the Sustained Yield Expert Panel report (Ferguson *et al*, 2013) and the, the amount of forest vegetation available for timber harvesting is closer to 45% (or in the order of 849,000 ha).

It is noted that both reports calculate the total area of each forest type available for timber production to be approximately 48% for jarrah, 34% for karri and 24% for wandoo.

Calculation of sustained yield

Forest yield and the sustainability of timber harvesting have been the subject of many studies and reviews over the history of logging in WA. During meetings many appellants tabled various articles, studies and papers on a range of matters relating to the sustainability of timber harvesting. Some appellants were concerned that the calculation of sustained yield was based on an overall area that included forest within low rainfall zones (jarrah and karri forests receiving less than 600 mm and 1,000 mm (respectively) of rain per annum), and did not take into account factors such as fire, drought or frost. Some appellants submitted that the threshold limit for karri has been reduced from 1,000 mm to 900 mm per year in the Proposed FMP with no explanation.

It is understood that the calculation of sustained yield is complex and based on factors including the net area of forest available for harvesting, attributes of the forests (e.g. species, age and size class, growth and mortality rates, and effects of soils, climate, pests, diseases, natural disturbances and management history), monitoring outcomes (e.g. inventory plots and FORESTCHECK), methods of silviculture, Woodstock™ software, and statistical estimations. The Proposed FMP states that the calculation of sustained yield excluded areas including informal reserves and temporary exclusion zones (e.g. fauna habitat zones), areas mapped as drought-affected, areas that are too steep, and areas used as minor roads of landings.

The *Sustained Yield Information Sheet Series* (DEC, 2012a) states that the (former) DEC (now DPaW), FPC, Commission, Minister for Forestry, Minister for Environment, and EPA are involved in the process of calculating, approving and regulating sustained yield. The Series also notes that scheduling of timber harvesting operations (woodflow) is undertaken for the sustained yield to ensure that various forest management objectives are adequately catered for.

The Sustained Yield Expert Panel reported on the process used in the calculation (not the *setting*) of sustained yield (Ferguson *et al*, 2013). It is noted that in conducting its review, the Panel had regard to published studies and reviews, including the findings of the Climate Change Expert Panel (Maher *et al*, 2010) and the Silviculture Review Expert Panel (Burrows *et al*, 2011), and for a large number of submissions in response to the Draft FMP.

The Panel noted that the (former) DEC has a tendency toward a conservative approach, and one of its 24 recommendations was that sustained yield should be based on the 'best' estimation with adjustment by way of a safety margin. Other recommendations included the need for further climate change analyses, dieback research and the calculation of sustained yield of wandoo and marri by means other than Woodstock™, and the comment that the ten-year duration of the Proposed FMP is too long and that a five year duration would be more appropriate to enable the FMP to adapt to shocks such as major fires, cyclones, pest or disease outbreaks, and global trade and economic change (Ferguson *et al*, 2013). The Panel concluded:

... subject to the implementation of earlier recommendations regarding improvements or changes to the processes involved in calculating the sustained yield, that the

1. structure, operation and outputs from the woodflow models are robust and flexible enough for computing the sustained yields and other wood availability figures included in the Proposed FMP;
2. uncertainty associated with a drying climate has been adequately factored into the sustained yield calculations;
3. level of provision for other risks and uncertainty associated with the volume estimates are appropriate; and
4. calculations incorporate suitable adjustments for the operational feasibility of obtaining the strategic woodflows.

It is understood from the Panel's report that a safety margin is designed to protect the DPaW and/or FPC "... *against the possibility that the calculated value is an overestimate that would place any dependent contractual arrangement at risk from the inability to supply the committed amount*". The Panel recommended safety margins of 10% for jarrah and 15% for karri. It is understood from the Panel's report that these safety margins are based on risks associated with episodic events (e.g. fire), factors affecting growth rates, scheduling and markets.

In its reviews of the mid-term and end-of-term audits of performance of the Current FMP, the EPA considered determining values for sustained yield of forest products to be a key issue to be addressed in the Proposed FMP. In particular, the EPA considered that the following matters relating to productive capacity would need to be addressed during the preparation of the FMP:

- the environmental implications of whole bole logging and removal in the jarrah forest (e.g. Yabberup block) and whether the impacts arising from that approach have been adequately considered, including public concern (EPA, 2010b);
- the whole issue of the sustainable yield of jarrah, karri and other species in the forest; many submissions argued that the levels should be reviewed immediately while others want current levels to be maintained during the life of this plan (EPA, 2010b);
- associated with this are growth rates of potential log trees and also the effectiveness of regeneration following treatment of State forest areas (EPA, 2010b); and
- a review of silvicultural policies and practices within an ESFM framework that reflects current and reasonably foreseeable environmental conditions, including the practice of 'notching' of trees and aesthetic and conservation implications of different thinning regimes (EPA, 2010b).

It is noted that the Proposed FMP, in the section 'Sustained yields for the plan' (p.89), includes an explanation around why climate change projections, even with the projected impact of 'high severity' climate change conditions on growth rates, have not resulted in a proportional reduction to the sustained yield or availability of other bole volume. The Proposed FMP includes the following management activities in respect to the calculation of sustained yield and allowable cut (KPIs 15-17 also relate):

- 57 The Conservation Commission, the Department and the FPC will make submissions in relation to development proposals (including, but not limited to, proposals for infrastructure development, extraction of minerals and petroleum resources, development of geothermal energy and, the geological storage of greenhouse gases) forwarded to them for comment or advice, with a view to:
 - 57.1 seeking to minimise the permanent loss of native forests and plantations available for wood production and/or impacts on their integrity as a result of development
 - 57.2 seeking the replacement of native forests and plantations not replanted or permanently lost to development, consistent with relevant legislation and government policies
 - 57.3 promoting the construction of infrastructure such as roads, pipelines and other utilities at common locations, such as infrastructure corridors, while minimising construction in sensitive areas.
- 60 The total quantity of logs removed, calculated over the 10-year life of the plan, shall not exceed 10 times the average annual allowable cut stipulated in Tables 4 and 5, and 11,000, 13,000 and 12,000 cubic metres equivalent for wandoo, blackbutt and sheoak, respectively.
- 68 The FPC, and other proponents where required by the Department, will monitor and record the areas over which each different silvicultural or other treatments are applied in each year and provide suitable information on this to the Department in a format and at times required by the Department.
- 69 The Department will maintain a process to verify the information and retain the data referred to in activity 68.
- 72 The Department will continue to refine the data and methodology used for the sustained yield calculations by maintaining and enhancing the quality and coverage of the datasets, and the methodology, used in sustained yield calculations.

In Report 1483 the EPA noted that sustained yield was estimated by application of sophisticated modelling using data from forest inventory plots, predicted climate change and impacts on tree growth rates, woodflow scheduling and other factors, and was subject to an independent review (in this case by Ferguson *et al*, 2013). On this basis the EPA was satisfied that the calculation of sustained yield was appropriate and rigorous.

In its advice the EPA acknowledged that there are gaps in the available information, and that further research is required to inform future FMPs. In Report 1483 the EPA recommends (among other things) that the Minister notes that the EPA supports the use of an independent expert panel to examine the underlying data, structure and function of the model (WoodstockTM) to calculate the sustained yields of wood products.

Noting the EPA's advice, it is considered that the EPA had consideration for the calculation of sustained yield in its assessment of the Proposed FMP.

It is recommended, however, that a management activity is added that requires, as part of the mid-term performance review, a review of the sustained yield calculations to take into account updated monitoring and research results, the need for amendments to enable the FMP to adapt to episodic events such as major fires, cyclones, and pest or disease outbreaks (as identified by the Sustained Yield Expert Panel (Ferguson *et al*, 2013)), and the need for further research to support ecologically sustainable forest management.

Average annual allowable cut

Table 1 provides a comparison of the average annual allowable cuts in the Current FMP and Proposed FMP. The Proposed FMP acknowledges that the area cutover for the period of this FMP is likely to be greater than for the Current FMP because there is a greater proportion of lower yielding forest types and silvicultural treatments likely to be included in areas harvested during the period of this FMP. This is also reflected in the Commission's response to the appeals.

Table 1: Comparison of average annual allowable cuts in Current FMP and Proposed FMP

Product	Current FMP (m ³)	Proposed FMP (m ³)	Change
Jarrah first and second grade sawlogs	131,000	132,000 (across 13,500 ha)	↑ 1,000
Other jarrah other bole logs	534,000	292,000	↓ 242,000
Karri first and second grade sawlogs	54,000	59,000 (across 2,000 ha)	↑ 5,000
Other karri other bole logs	117,000 (increased to 160,000 in 2011)	164,000	↑ 4,000
All marri bole logs	196,000	140,000	↓ 56,000
Wandoo sawlogs	1,300	1,100 *	↓ 200
Blackbutt sawlogs	1,600	1,300 *	↓ 300
Sheoak sawlogs	1,900	1,200 *	↓ 700

Source: Ferguson et al, 2013; DEC, 2012a (* extrapolated from Proposed FMP management activity 60)

Management activity 60 of the Proposed FMP limits the total quantity of logs removed, calculated over the proposed ten-year duration, to ten times the average annual allowable cut. In addition, KPI 16 relates to removal of log products compared to the allowable cut.

In Report 1483 the EPA noted that allowable cut is based on the sustained yield and incorporates a safety margin for risks to the yield, such as fire, cyclone, drought, pests and disease.

During a meeting with the Office of the Appeals Convenor, the EPA indicated that it was satisfied that the allowable cuts are within the sustained yield calculation.

Given the information above, it is considered that the EPA had regard to the allowable cut in its assessment of the Proposed FMP.

Upper limits

Many appellants expressed considerable concern about the Proposed FMP's reference to 'upper limits' of allowable cut.

The Proposed FMP contains the following statements in respect to the provision for upper limits:

Provision is also made for the potential levels of yield that would arise from improved utilisation of available wood resources, particularly through the development of markets for lower grade logs. ...

The sustained yield of jarrah and karri sawlogs calculated for this plan informs the setting of an 'allowable cut' for those products, which in turn provides an upper limit to the quantity that the FPC can contract to supply for the period of this plan. These upper limits are also set for the lower grade logs, or 'other bole volume', that are made available as a consequence of the harvesting of sawlogs and the silvicultural treatment of stands to promote growth, ecosystem health and/or achieve other aims of management. ...

Accordingly, the sustained yields and availability of other bole volume has also been calculated using an assumption that 'full' markets and the maximum utilisation of jarrah and marri other bole volume applies from the commencement of this plan in 2014. Keeping all other assumptions the same, this woodflow modelling provides an upper limit that could be approached should new markets arise during the period of this plan. Table 6 presents the upper limits calculated in this manner. ...

The upper limits stated in the Proposed FMP refer to jarrah/marri forests only, and are:

- jarrah first and second grade sawlogs: an additional 28,000 m³ per annum (or 21% increase) on the average annual allowable cut of 132,000 m³;
- other jarrah other bole logs: an additional 229,000 m³ per annum (or 78% increase) on the average annual allowable cut of 292,000 m³;
- all marri bole logs: an additional 114,000 m³ per annum (or 81% increase) on the average annual allowable cut of 140,000 m³; and
- an additional 5,000 ha area cutover per annum (or 37% increase) within the jarrah forest on the 13,500 ha area cutover per annum to achieve the average annual allowable cut.

It is understood that 'other bole logs' generally provide low value products such as woodchips. It is noted that there is no upper limit specified for karri logs.

The Proposed FMP includes the following management activity in respect to upper limits:

- 61 In addition to the amount referred to in activity 60, the FPC may seek to enter into contracts to supply up to the quantities stipulated in Table 6, in order to provide for improved utilisation of available wood resources, silvicultural outcomes and socio-economic benefits. Any proposal to increase the average annual yield of logs above the quantities stipulated in Tables 4 and 5 is to be approved by the Department, in consultation with the Conservation Commission, considering whether or not the proposal remains consistent with the woodflow modelling for this plan and any revised inventory information.

The Sustained Yield Expert Panel states in its report "*The sustained yield, after adjustment for a safety margin, becomes the ceiling for the allowable cut*" (Ferguson *et al*, 2013) (emphasis added).

The Proposed FMP contains the following statements in the 'Productive capacity' section:

The sustained yield of jarrah and karri sawlogs calculated for this plan informs the setting of an 'allowable cut' for those products, which in turn provides an upper limit to the quantity that the FPC can contract to supply for the period of this plan. ...

There is a hierarchical relationship between the sustained yields, the annual allowable cut, and the likely level of wood available for contracts to be issued under this plan: ...

- the annual allowable cut for the 10 years of the plan is typically equivalent to the sustained yield, but can be a lesser figure which is reduced to provide for any factors not directly provided for in the sustained yield calculation, such as any safety margins for future losses arising from catastrophic bushfires, drought, pest and disease events ...

In Report 1483, the EPA noted that the upper limits have been derived from the same modelling process used to calculate sustained yield as the allowable cut, and concluded that the upper limit would meet its environmental objectives.

During a meeting with the Office of the Appeals Convenor, the EPA advised that it was satisfied that the upper limits are within (and do not exceed) the sustained yield calculation, and that the upper limit would meet its environmental objectives.

The graphs contained within the FPC's *Annual Report 2011-12* indicate that the annual harvest of bole volume (including first and second grade sawlogs) for jarrah, karri and marri since 2007 was consistently below (significantly so, in the case of jarrah and marri) the allowable cuts stated in the Current FMP, for the following reasons:

The lower actual harvest levels for jarrah and marri are due to a lack of markets for low-grade logs. The karri harvest was consistent with the allowable average sustained yield level of bole volume under the FMP due to the inclusion of non-bole material (crown logs). ...

The average annual level of sawlogs harvest is consistent with the allowable quantities in the FMP. The quantity of jarrah sawlogs harvested in 2011-12 was below the allowable cut reflecting reduced customer demand for sawlog during the year. ...

While noting the EPA's advice that the upper limits would meet its environmental objectives, on the basis of the identified need for further research and adaptive management, and noting the increase in allowable cuts from the Current FMP and the FPC's reporting of lower timber yields in previous years, and noting that the upper limits cater for potential future markets that do not currently exist, it is considered that the requirement for upper limits are not necessary at this time. Given the uncertainty and the significant public concern surrounding upper limits, it is recommended that the upper limits, and the corresponding management activities and KPIs, are excluded from the Proposed FMP.

However should the Minister determine to retain the upper limits in the Proposed FMP, it is considered appropriate that the decision to approve harvesting levels beyond the average annual allowable cut up to the upper limit be made by the Minister, consistent with, and for the reasons given in, the EPA's recommendation. In this case, it will be necessary to amend management activity 61 of the Proposed FMP.

Salvage logging

Some appellants were concerned about the Proposed FMP's references to salvage logging. The appellants contended that salvage logging is purely an economic exercise to retrieve timber from areas damaged by an episodic event (such as drought or fire), which has ecological impacts, and which is not factored into the allowable cut.

It is noted that the *Silvicultural Practice in the Karri Forest* guideline (CALM, 2005) contains a section relating to the management of karri forest following fires of different intensity, which (for karri stands defoliated by high intensity fire) includes the removal of damaged trees and replanting.

It is also noted that the *Draft Silviculture Guidelines for Jarrah Forest* (DEC, Draft 2012) contains guiding principles that promote the retention of patches of standing dead trees in areas where sawlogs are to be salvaged, and strategies for managing regrowth damaged by fire, disease or pests including through salvage subject to measures to maintain resilience.

The Proposed FMP includes the following management activities in respect to the salvage of forest products:

- 73 The Department will:
 - 73.1 facilitate the recovery from areas available for timber harvesting of forest produce generated by management activities the primary purpose of which is not wood production
 - 73.2 determine, based on case-by-case proposals from the FPC, if wood arising from salvage harvests associated with unplanned disturbance events, will count toward the allowable cut. The Department will take into account the likely public benefit, considering the safety margin incorporated into the calculation of sustained yields, and the costs and ability of affected areas to successfully regenerate and/or be successfully rehabilitated and provide for a range of ESFM values, in the absence of a salvage harvest

- 73.3 develop a guidance document to assist with the timely planning and approval of salvage harvest operations associated with unplanned disturbance events. ...
- 86 The Department will:
- 86.1 regulate the supply of other forest produce through the administration of relevant licensing legislation
 - 86.2 maintain and, where appropriate, prepare guidelines for the management of other forest produce
 - 86.3 where reasonable and practicable, monitor supply patterns for signs of non-sustainability
 - 86.4 work, where applicable in conjunction with the FPC, to implement trials in selected areas for supply of public firewood
 - 86.5 facilitate the salvage of other forest produce generated by management activities the primary purpose of which is not wood production, or natural events where salvage activities can contribute to regeneration and rehabilitation and do not significantly increase the level of disturbance or the risk of environmental impacts to the forest area.

In its advice the EPA considered the approach adopted for the salvage of wood products to be reasonable, and that including salvage in the allowable cut would discourage the use of this resource and prevent the actions needed to promote regeneration from taking place. The EPA indicated that to count salvage against the allowable cut would discourage the use of the resource and prevent actions needed to promote regeneration.

The Commission advised that the decision to allow the salvage of forest products and the determination of whether salvaged wood will count towards allowable cut would be done on a case-by-case basis by the DPaW, and that the DPaW's decision in this regard would consider the costs and ability of affected areas to successfully regenerate and/or be successfully rehabilitated in the absence of salvage harvest and provide for a range of ESFM values.

It is noted that salvage is an unknown quantity based on unplanned events, and that economic matters are largely outside the scope of the EPA's assessment. It is also noted that management activities in the Proposed FMP indicate that the DPaW will determine on a case-by-case basis if wood arising from salvage harvests will count toward the allowable cut.

Noting the EPA's and the Commission's advice, it is expected that the guidance materials referred to in management activities 73 and 86 relating to salvage of timber and other forest produce will ensure that salvage operations are conducted in a manner that ensures that environmental impacts are managed as for planned timber or other forest produce harvesting activities, such as requiring the retention of primary habitat trees for fauna.

Other forest uses

Many appellants were of the view that the Proposed FMP should have greater focus on forest uses other than timber harvesting. The appellants' view is acknowledged.

In respect to other forest uses, it is noted that the Proposed FMP includes a section 'Other forest produce' which considers other uses of the forest for public firewood, burls, craftwood, wildflowers, seeds, honey, and recreation and tourism, and basic raw materials, and a number of management activities relating to these (including 86, 87, 100, 101, 102, 109, 110, 111, 112, 113, 114, 115 and 116, described in full in Appendix 3 of this report).

In Report 1483 the EPA acknowledges that the Proposed FMP has been prepared to manage a diverse number of values and uses within the forests.

Conclusion for Ground 2

Considering all of the information available in respect to this ground of appeal, it is recommended that this ground be allowed to the extent that:

- a management activity is added that requires, as part of the mid-term performance review, a review of the sustained yield calculations to take into account updated monitoring and research results, the need for amendments to enable the FMP to adapt to episodic events such as major fires, cyclones, and pest or disease outbreaks (as identified by the Sustained Yield Expert Panel (Ferguson *et al*, 2013)), and the need for further research to support ecologically sustainable forest management; and
- the upper limits and corresponding management activities and KPIs are removed from the Proposed FMP; or alternatively management activity 61 is amended so that any proposal to increase harvesting levels beyond the average annual allowable cut up to the upper limit is to be approved by the Minister for Environment.

It is expected that the guidance materials referred to in management activities 73 and 86 relating to the salvage of timber and other forest produce will ensure that any salvage operations are conducted in a manner that ensures that environmental impacts are managed as for planned timber or other forest produce harvesting activities, such as requiring the retention of primary habitat trees for fauna.

Ground 3: Climate change and carbon cycles

Most appellants were highly concerned about the impact that a changing climate will have on the ability of forests and their inhabitants to recover from timber harvesting activities, particularly in low rainfall areas. Some appellants considered that the EPA did not have regard to its own findings in respect to these matters in reviews of the Commissions audits. Some appellants considered that additional management was required in reserved areas. Some appellants considered that the EPA should have recognised the value of the forests as a carbon store, and should have assessed carbon sequestration. Specific issues raised were:

- There are insufficient corridors for fauna to move through the forests, particularly in response to climate change. Climate change is causing the eastern and northern parts of the south-west forests to become hotter and drier, having detrimental impacts on forest health and the functioning of ecosystems, and that as a result fauna need to move to the south and west in order to survive.
- The EPA failed to properly assess the significant factor of fragmentation of forest ecosystems increasing vulnerability to climate change as a result of implementing the Proposed FMP.
- The Proposed FMP has failed to provide for a network of ecological corridors or linkages between forest areas impacted by logging, which it considered will be critical in adaptation of ecosystems and species to a changing climate, and contended that the Proposed FMP makes no provision or allowance for a systematic approach regarding fauna habitat connectivity, or retention of corridors to provide for species migration required for climate adaptation.
- Climate change is causing the south-west forests to dry out and is a basic cause of widespread tree decline, and that fauna and flora will need to migrate if they are to survive, so corridors and suitable habitat will be required.
- Because of climate change, especially decreasing rainfall, and the impacts of pests and diseases, especially increasing numbers of fungal pathogens, forest that is logged now will not regrow to its present size, health and structure so logging cannot be 'sustainable'. Trees being logged now will not regrow to their former size and structure because rainfall has decreased by 15% since the mid-1970s and the models for climate change in the South-West indicate rainfall will continue to decrease by up to 60%. The findings of the Sustained Yield Expert Panel claim "*The findings suggest that there is little impact on sustained yield over the next 50 years, so there is time to refine knowledge and adapt to those changes without incurring undue stress on timber production and associated biodiversity and water values*" (Ferguson *et al*, 2013; p.31) and "*Allied to this [economic] issue is the choice of the period that the FMP is to cover, presently 10 years. The Panel believes that this period is too long and that a five-year period would be more appropriate to enable the plan to adapt to shocks, such as major fires, cyclones or pest or disease outbreaks and global trade and economic change. To some degree this thinking has already been embodied in mid-term audits and reviews, so the proposed change is hardly radical*" (Ferguson *et al*, 2013; p.50).
- Protection should be given to jarrah and karri forests currently receiving less than 600 mm and 1,000 mm (respectively) of rain per annum, and to jarrah and karri forests projected by an independent body such as the IPCC to receive less than 600 mm and 1,000 mm (respectively) of rain per annum by 2030.
- The Proposed FMP should be re-written so that it takes full account of climate change and its interactions with major fires, cyclones and pest and disease outbreaks for the next ten years.
- The EPA seems to have not taken into consideration its own conclusions from its advice to the Minister (EPA, 2010b) on the Commission's mid-term audit of the Current FMP (Commission, 2008) that:

It is most unlikely that the jarrah forest in the low and adjacent medium rainfall areas, particularly in the northern forest, can continue to contribute to the jarrah sustained yield and also be consistent with ecologically sustainable forest management (ESFM).

- The impacts of logging on climate change have not been addressed adequately in the Proposed FMP or EPA report and recommendations.
- Given the advancing state of climate change, the level of cut allowable under the Proposed FMP (doubling the amount under the existing FMP) would undermine ecological sustainability of forests in question. Forests affect the rain cycle and store carbon, and over-harvesting would result in further drying of the south-west, which in turn would weaken forests and increase fire risk. Adequate assessment of all carbon emissions from timber harvesting and burning and release of soil carbon under the Proposed FMP should be undertaken, The Proposed FMP to be reviewed every year or two as climate change increasingly affects how the forests should be managed.
- There is inadequate precaution in relation to climate change. The EPA has assessed that the threat from a drying climate is significant and a major risk to both water and environmental values, and has acknowledged that the proposed regime of thinning of State forest is appropriate to ameliorate this risk, however the EPA has not recommended measures to manage the risk to parks and reserves within the Proposed FMP area.
- Reserved areas have already been shown to be more vulnerable than State forest with about 15,000 hectares killed by drought in 2010-11. A precautionary thinning programme should be extended to tenures other than State forest. Monitoring of the impacts of a drying climate on biodiversity should be extended over all tenures within the Proposed FMP area.
- The EPA's view that "*The proposed FMP 2014-2023 continues the establishment of a system of formal reserves and protected areas which will eventually comprise approximately 62% of the native forest ecosystem*" ignores observational scientific evidence that reserved forest areas are no less vulnerable to fire damage, nor better protected against adverse biodiversity outcomes, than areas subject to management activities. The EPA's view that "*Climate change and carbon cycles. Climate change is likely to affect the forest into the future, primarily through decreased rainfall, but higher temperatures and frost events may also have impacts, such as pests, disease, tree mortality or a changed fire regime*" assumes that calling a forest a national park will protect it from the adverse effects of lower rainfall caused by local climate change, and fails to understand that, unless there is a dramatic increase in fuel reduction burning regimes, its detailed environmental restrictions will be to no avail because uncontrolled wildfires in high fuels will destroy biodiversity. Legislation should be amended to provide for thinning in national parks and nature reserves when reliable scientific evidence demonstrates the need for sustainability, or to revoke the reservations and return those areas to responsible State forest management. The Proposed FMP is deficient in regard to applied fire as a tool for better forest management.
- There is a high risk that the so-called 'sustainable yield' is not, in fact, sustainable, and may lead to serious and irreversible damage to native forests, including loss of threatened flora and fauna species. The Proposed FMP and supporting document cite a CSIRO and Bureau of Meteorology (**BOM**) joint report from 2007 several times, however in the last five years the CSIRO has recorded new information of clear and present significance to the south-west forests. This suggests that the current 'sustainable yield' level is not necessarily based on the most up to date science, and shows just how fast the science is changing in this area.
- The issues of climate change, reductions in rainfall, increased disease and pests, and the response requirements of forest managers have not been addressed in any fair, reasonable and evidential terms. Logging is now evidenced to be a contributing factor for a reduction rainfall in each micro forest area. All forest management duties should be restored to the DPaW with the primary management emphasis being one of conservation, parks and reserves, tourism development and habitat and fire management.
- The proposal to log karri forest for predominantly woodchips is both uneconomic and will adversely affect climate change through the release of CO₂ (carbon dioxide). Tasmanian bluegum plantations would be a better source of woodchips both economically and environmentally.

- There has been inadequate appreciation of adaptive management. The use of adaptive management as a tool is referred to in the Proposed FMP, particularly in the discussions on climate change, but without any acknowledgement that this is necessarily linked to a sound monitoring system to support the modelling.
- Given the unique role forests can play in managing global carbon cycles as well as the economic opportunities arising from the sale of carbon credits, maintaining and enhancing the carbon sequestration and storage potential of south-west forests must be a primary goal of the FMP. The information provided in the Proposed FMP on carbon pollution from planned forest management activities is selective and misleading, and the failure to disclose significant carbon emission sources resulting from the proposal is unacceptable, and constitutes a direct breach of the EPA's *Guidance Statement for Minimising Greenhouse Gas Emissions* (EPA, 2002) and the requirement for maintenance of global carbon cycles as required under the ESFM principles established in the RFA.
- Recent scientific research demonstrates that Australia's native forests sequester more carbon than other forests, which suggests that carbon carrying capacity should be a key environmental factor in considering decisions about native forest use. The EPA's suggestion that more information be sought on this matter over the course of the next ten year plan and after logging occurs is inadequate.
- The value of Western Australia's south-west forests as a carbon store should be recognised, accounted for and prioritised above conflicting uses.
- A carbon inventory of the areas proposed for logging should be developed.
- The EPA failed to properly assess the significant factor of greenhouse gas emissions and sequestration impacts of implementing the Proposed FMP. The south-west forests are a globally significant carbon sink, and logging operations permanently degrade the carbon storage capacity of these forests resulting in greenhouse gas emissions. The EPA has accepted a form of accounting for greenhouse gas emissions. The accounting provides for permanent carbon sequestration in native forest timber products, although the products do not meet the requirements for permanence under United Nations Framework Convention on Climate Change (**UNFCCC**) internationally agreed carbon accounting standards.
- Any investigations into opportunities that may arise from an emerging carbon economy for forest carbon storage, should take into account the full carbon cycle of the production forest, crediting changes in the carbon balance over the forests full life cycle. Limiting accounting to the term of a ten-year FMP would produce a distorted result.
- The EPA's view that "... *All other things being equal, a mature unharvested forest is expected to have a higher density of carbon storage per hectare than a forest managed for timber production*" is a distortion of reality. The IPCC supported the thinning of forests, stating "*In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustainable yield of timber, fibre or energy from the forest, will generate the largest sustained (carbon) mitigation benefit*" in its Fourth Assessment Report (IPCC, 2007). The FORESTCHECK ten-year-long monitoring is demonstrating there are no notable negative environmental outcomes from jarrah forest harvesting activities.

EPA advice

The EPA considered that the Proposed FMP provides appropriate responses to the short-to-medium term impacts expected from climate change and commits to developing the additional information that will be needed to have an informed debate on the best way of managing the long-term impacts of climate change.

The EPA advised that the system of formal and informal reserves developed to maintain biodiversity also incorporate the principles of connectivity and so will assist in flora and fauna adapting to climate change by movement, insofar as flora and fauna are able to use this adaption mechanism. The EPA also noted that the remainder of the forest (those areas available for other

uses, including timber harvesting) will also provide corridors for movement, since at any particular time almost all of this area will be covered with native vegetation in various stages of forest development.

The EPA advised that the ability of the forests to contribute to a 'sustained yield' of timber under the influence of a changed climate is explicitly addressed in the calculation of 'sustained yield'. The EPA also advised that the calculation of 'sustained yield' uses the high climate change severity projections for climate (to 2070) published by the CSIRO in 2007 and also makes a number of conservative assumptions regarding tree growth to address the uncertainties inherent in any modelling, and that although the CSIRO may have provided more recent publications on the current climate, the 2007 dataset is still the most recent dataset for longer term projections that could be used in modelling. The EPA considered that this is an area where understanding is changing relatively fast is one of the reasons that a number of precautionary conservative assumptions have been made in the modelling, and that it should also be noted that conservative assumptions used in the calculation of 'sustained yield' for the Current FMP have been demonstrated to be conservative when forest inventory plots were remeasured later on.

With regard to the EPA's previous statements on the 'low and adjacent medium rainfall areas', the EPA advised that this matter was explicitly addressed in Report 1483 (page 14). The EPA advised that it now has a better understanding of this issue that largely addresses its earlier concerns, but has still highlighted it as area that should be periodically reviewed.

The EPA advised that there are currently many opinions on the best way to manage the forests adaptation to the long term impacts of climate change, but it would be hasty to commit to any particular approach without a better understanding of the subject. The EPA considered that in the long-term, changes to the structure of the forests due to climate change will depend on the final climate change outcome (should it stabilise) and the response of particular forest ecosystems to the final climate outcome. The EPA noted that appellants put forward a couple of approaches to long-term management based on their assumptions of how they expect the forest to adapt to climate change in the long-term. The EPA advised that one approach assumes that the existing forests will either be able to maintain their current structure or gradually shift to a new, but similar, structure, and that their preferred method of management is to protect these forests from logging on the basis that regenerated forests will not regrow to the present size, health, and structure. Further, the EPA advised that another approach assumes that without active management (thinning) forests will either collapse or be a risk of total destruction through bushfires, and that this approach is advocated across the entire forest, including formal conservation areas. The EPA advised that given that climate change and the forests ultimate response to changes will not be complete for centuries and that there is currently insufficient information on what the final forests state might be and how it might move into that final state (gradually, or through a number of collapses and recoveries), the EPA has recommended that monitoring be expanded to detect any trends due to climate change and other threatening processes. The EPA was of the view that this would allow a better understanding to be developed on the best approach to manage the forests adaption to the long term impacts of climate change which would then inform future FMPs.

The EPA advised that it supports the intention to report on carbon stores in the next forest management plan and to investigate opportunities that may arise from an emerging carbon economy. The EPA expected that in reporting on carbon stores, technical issues such as carbon accounting standards will be addressed. The EPA also noted that since the forests are not large net emitters of greenhouse gases, so the EPA's *Guidance Statement for Minimising Greenhouse Gas Emissions* is not directly relevant. In addition, the EPA advised that this guidance is under review given the changed policy context at Commonwealth and State levels.

Proponent response

As discussed under Ground 1, the Commission advised that the best available/most recent rainfall data and IOCI/CSIRO climate projections were used in developing the Proposed FMP. In addition, the Commission advised that the 'high severity' climate change projection (Commission, 2012c) was used in developing sustained yields relative to the Proposed FMP.

The Commission referred to the Proposed FMP, and noted that while the impact of climate change may not be obvious in the ten-year period of the Proposed FMP, it is important that it be monitored and its impact on productive capacity, biological diversity, hydrology and ecosystem health, in particular, be considered in ongoing strategic planning and operational practices. The Commission also advised that adaptive management to enhance resilience will likely be of increasing importance and there needs to be flexibility to respond as new information becomes available.

The Commission advised that because some indigenous biota is restricted to narrow ranges, climate change is a key threatening process affecting their survival. The Commission considered that monitoring remains important, and through the Proposed FMP the DPaW will seek to maintain and extend the key forest biodiversity monitoring program, FORESTCHECK. The Commission advised that the EPA has noted that it considers FORESTCHECK to be an important program and supports its extension to cover other forest types, other threats to the forest and possibly other parameters such as soil micro-organisms (following the 2007-2012 FORESTCHECK assessment).

The Commission advised that analysis of data from the second five years of data collection (2007-2012) will further examine those taxa that were recorded at low abundance during the first five years of data collection, and that the EPA has acknowledged its awareness that, by its design, FORESTCHECK is not well suited to measuring the impacts of rare flora and fauna species and that more species specific research, rather than monitoring, may be needed to form conclusions on rarer species (Ibid. p.9). The Commission noted that the EPA's recommendation under Section of Report 1483 supports this conclusion (Ibid. p.21), and that the DPaW has acknowledged that genomics may also offer potential to better understand biodiversity and impacts of disturbance on biodiversity, and as this technology develops, the DPaW will look to employ it.

In addition, the Commission advised that, at the same time, the DPaW is developing guidelines to provide a framework for coordinating its broader forest monitoring activities and research into many aspects of forest management is ongoing, and that the Proposed FMP includes a broader range of biological monitoring to support reporting on revised KPIs (particularly KPIs 1- 8).

The Commission advised that the Proposed FMP provides for the Commission to continue its role in conducting audits on particular aspects of the implementation of the FMP and the formal mid-term and end-of-term performance reviews. The Commission also advised that these reviews, published by the Commission, include analysing results, identifying underlying causes and developing recommendations to improve performance and may result in an evaluation of the need to revise management practices and/or amendments to the plan according to the EP Act.

The Commission also advised that the Proposed FMP acknowledges that the analysis of the total carbon cycle during the life of the plan was somewhat incomplete, however, management activities proposed in the Proposed FMP seek to minimise unnecessary emissions and maximise bio-sequestration, subject to the overall goals of the plan. The Commission noted that the DPaW has made a commitment to seek to maintain a forest carbon science capability, report on carbon stores in the next draft forest management plan and investigate opportunities that may arise from an emerging carbon economy.

The Commission also noted that the EPA, in its report and recommendations, advises the Minister that the EPA supports the use of an independent expert panel to examine the underlying data, structure and function of the model (WoodstockTM) to calculate the sustained yield of wood products (Ibid. p.19).

The Commission also provided the following advice in response to concerns raised in regards to climate change and carbon cycles:

- The decrease in rainfall has led to a decrease in the spread of *Phytophthora cinnamomi* which is the major forest pathogen. The allowance for this in the calculation of sustained yield, has contributed to the increased sustained yield relative to the previous FMP (all things being equal). The Sustained Yield Expert Panel (Ferguson *et al*, 2013) found that the uncertainty associated with a drying climate had been adequately factored into the sustained yield calculations. As acknowledged in the Proposed FMP (pp.10 and 45), impacts from various factors may be cumulative and/or interact in ways that are not always well understood. Also, as stated in the Proposed FMP (p.72):

Given current knowledge and uncertainties of the likely magnitude and result of changes to climate from increases in atmospheric levels of [greenhouse gasses], it is considered the management activities proposed throughout the proposed plan encompass an appropriate range of broad precautionary actions. ... Adaptive management to enhance resilience will likely be of increasing importance and there needs to be flexibility to respond as new information becomes available.

The Proposed FMP includes a comprehensive range of measures to manage existing and potential diseases, as outlined in the 'Ecosystem health and vitality' chapter. The following comments in EPA Report 1483 are also relevant:

In its report on the mid-term audit, the EPA expressed doubt that the jarrah forest in low and adjacent medium rainfall areas – particularly in the northern forest – could continue to contribute to the jarrah sustained yield. This was based on declining timber yield from the northern jarrah forest and on conservative assumptions for productive growth in these areas. In the recent review of silvicultural guidelines (Burrows *et al*. 2011) the panel found that, while growth rates in these areas are lower, the decline in timber production from these forests is mainly a consequence of harvesting history. The EPA also now better understands the conservative nature of modelled growth rate assumptions and that, even with such assumptions, jarrah forests in low and adjacent medium rainfall areas have the potential to contribute to the jarrah sustained yield.

- The potential consequences of climate change are summarised in the Draft FMP and an appropriate, broad range of precautionary measures to address climate change is included (in various sections) in the Draft FMP and Proposed FMP. The Sustained Yield Expert Panel (Ferguson *et al*, 2013) stated:

6. the uncertainty associated with a drying climate has been adequately factored into the sustained yield calculations. ...

The Panel endorses the research done to develop adjustments for climate change for jarrah and karri forests for FMP14. The Panel recommends that further research on the impact of climate change of the productive forest estate should be pursued in the course of the next Plan, noting that any refinements to the approach need to be consistent with the processes used in monitoring and scheduling of yields.

- Ecosystem services such as carbon storage, water cycling and biodiversity habitat have been addressed in the Draft FMP and Proposed FMP. Carbon storage is addressed in the chapter on climate change and carbon cycles, water cycling in the chapter on soil and water, and biodiversity habitat in the chapter on biological diversity.
- Tasmanian blue gums planted on private land are beyond the scope of the FMP.
- The Draft FMP included carbon stock estimates, which address the effects of native forest harvesting and regrowth and the effects of climate change. The best available inventory, climate change, growth and carbon stock models were used in deriving the estimates in the Draft FMP and Proposed FMP (pp.72-73 and 77-78). A net increase in forest carbon stocks is estimated given the age structure of the forest estate. The potential consequences of climate change are summarised in the Proposed FMP (pp.73-75). KPIs in the Proposed FMP relate to knowledge of trends in climate and adaptive response, and improving knowledge of forest carbon stores to assist in progressive improvement in reporting on forest carbon stocks.

- The Draft FMP and Proposed FMP include estimates of above and below ground live tree carbon stocks, together with management activities for future reporting of carbon stocks, including establishing and measuring plots to improve precision of estimates. Full life-cycle analysis was not feasible for this FMP.

Consideration

Many appellants were highly concerned about the impact that a changing climate will have on the ability of forests and their inhabitants to recover from timber harvesting activities, particularly in low rainfall areas. Some appellants considered that the EPA should have recognised the value of the forests as a carbon store, and should have assessed carbon sequestration.

Two considerations in respect to climate change in this case are:

- impacts of implementing the Proposed FMP (emissions and rainfall); and
- impacts of climate change on the ability of the forests to recover from the implementation of the Proposed FMP.

Impacts to local water regimes are discussed under Ground 6. Greenhouse gas emissions are discussed under Ground 7.

Impacts of climate change

In 2008 the (former) DEC commissioned MBAC Consulting Group to consider current best practice in incorporating mitigation and adaptation responses to the effects of climate change in forest management planning. The consultant's report *Best Practice in Incorporating Climate Change into Forest Management Planning* was published in October 2008 as part of the DEC's Sustainable Forest Management series. The consultant made five recommendations, which highlighted the need for further scientific analysis of the impacts of climate change.

In their reports, the Climate Change Expert Panel (Maher *et al*, 2010) and the Silviculture Review Expert Panel (Burrows *et al*, 2011) recognised that the south-west of WA has experienced a decline in rainfall since the 1970s and increases in temperature. The Climate Change Expert Panel recommended additional items to increase the resilience and mitigate the vulnerability to climate change of forests subject to harvesting. The Silviculture Review Expert Panel considered that the greatest threat to the future health of these forests is the declining rainfall associated with a changing climate, and the consequent decline in the levels of groundwater and soil water storage generally.

The Sustained Yield Expert Panel (Ferguson *et al*, 2013) also recommended that further research on the impact of climate change on the productive forest estate should be pursued in the course of the next FMP. However, the Panel concluded that the uncertainty associated with a drying climate has been adequately factored into the sustained yield calculations of the Proposed FMP.

In its reviews of the mid-term and end-of-term audits of performance of the Current FMP, the EPA considered climate change to be a critical matter to be addressed in the Proposed FMP. In particular, the EPA considered that the following matters would need to be addressed during the preparation of the next FMP:

- the implications to the health of the forest ecosystems under changing conditions, including a drying climate, in the short to long term (EPA, 2010b);
- whether continued logging in the low and adjacent medium rainfall zones, especially in the northern forest, would meet ESFM principles and objectives (EPA, 2010b);
- under a drying climate, whether management of the forest to promote higher stream flows for water supply is realistic and environmentally desirable (e.g. Wungong catchment trial and research) (EPA, 2010b); and

- the impacts of climate change will be addressed in the next FMP (EPA, 2012b).

The Proposed FMP states that knowledge about the potential cumulative and entwined effects of changing climate on the various values and processes is incomplete, and that modelling of sustained yield and its review by the Sustained Yield Expert Panel incorporated the latest climate change projections by CSIRO (2007).

The Proposed FMP acknowledges concerns raised about the vulnerability and health of the eastern and northern jarrah forests, and indicates that this may remain a concern and their contribution to the yield will be reviewed as further monitoring and information becomes available.

In the chapter 'Climate change and carbon cycles' the Proposed FMP acknowledges that in WA's south-west, the impact of climate change has been most apparent in a substantial drying trend, with significant decreases in rainfall, streamflow and groundwater levels recorded in the last 40 years, and that the latter has been particularly evident in the northern jarrah forest and has been associated with a 15 per cent reduction in rainfall since the mid-1970s. The Proposed FMP (p.72) also acknowledges predictions by the IOCI in respect to further decreases in rainfall and increases in summer and winter temperatures.

In the chapter 'Ecosystem health and vitality' the Proposed FMP acknowledges concerns raised about the vulnerability and health of the eastern and northern jarrah forests, particularly in the face of future climate change. The Proposed FMP notes that while it is recognised that regeneration in lower rainfall areas is slow but effective and that these areas can contribute to wood yields, this may remain a concern and will be reviewed as further monitoring and information becomes available.

The Proposed FMP also refers to climate change in the chapter 'Productive capacity' in respect to the sustained yield calculations. In summary, the Proposed FMP recognises that WA is experiencing a drying trend, however suggests that the impact of climate change may not be obvious in the FMP's ten-year duration. The Proposed FMP recommends monitoring and further research into the impacts of climate change, and need for adaptation and mitigation.

In respect to adaptive management, it is noted that within the chapter 'Plan implementation and management' the Proposed FMP contains a section on adaptive management, which notes that proposed operations may be adapted as new knowledge becomes available and that adaptive management will be a key component of the management system that implements the FMP, and includes management actions 121-127 relating to monitoring and evaluation of performance.

The Proposed FMP includes the following management activities in respect to climate change (KPIs 12-14 also relate):

- 55 The Department will:
 - 55.1 remain abreast of current knowledge and contemporary management approaches in relation to climate change and its possible impacts on native ecosystems and sustained yield
 - 55.2 seek to identify climate-impact refugia and implement strategies to maintain their values, where practicable
 - 55.3 seek to maintain a forest carbon science capability and contribute to the understanding of strategic climate change information and its impact on ESFM, and work collaboratively with other agencies and institutions on matters of mutual interest
 - 55.4 report on carbon stores in the next draft forest management plan
 - 55.5 incorporate climate change prediction into future planning for the management of land to which the plan applies, where reasonable and practicable
 - 55.6 contribute to State and national policy development on climate change adaptation and mitigation

- 55.7 investigate opportunities that may arise from an emerging carbon economy
 - 55.8 periodically review guidelines for silviculture and fire management with a view to incorporating techniques that recognise the contribution of the areas covered by the plan to global carbon cycles, consistent with other mitigation and adaptation strategies and achievement of other silvicultural objectives and goals for forest management.
- 56 The FPC will:
- 56.1 **(Plantations):** remain abreast of current knowledge and contemporary management approaches in relation to climate change and its possible impacts on plantations
 - 56.2 seek to encourage the use of wood harvested from native forests and plantations to maximise greenhouse mitigation benefits. ...

It is noted that in 2013 the National Climate Change Adaptation Research Facility released its *Terrestrial Report Card 2013: Climate change impacts and adaptation on Australian biodiversity* (NCCARF, 2013). The report card considers what has happened, what is happening and what is likely to happen in respect to the physical environment, classes of fauna and plants, within Australia and within specific ecosystems. The report card also identifies knowledge gaps. The key findings include that average annual temperatures have increased nearly 1° Celcius over the past 100 years, changes that are consistent with a climate change 'signal' are already discernible at the genetic, species, community and ecosystem levels, population losses and species extinctions are predicted through a variety of direct and indirect impacts, and climate change will likely interact with other stressors already experiences by biodiversity.

In Report 1483 the EPA acknowledged that climate change is likely to affect the forest through decreased rainfall, higher temperatures and frost events. The EPA noted comments made by the Silviculture Review Expert Panel in respect to a drying and warming trend and that growth rates may be lower. The EPA supported the Commission's and (former) DEC's strategies for building resilience, and the introduction of other adaptive measures. The EPA also acknowledged the need for further research to predict the impacts of climate change on forest structure and composition, and recommended reviewing and extending monitoring programs (such as through remote sensing and extensions to FORESTCHECK). The EPA also expressed doubt that the jarrah forest in low and adjacent medium rainfall areas could continue to contribute to the jarrah sustained yield. The EPA recommended (among other things) that the Minister notes that the EPA supports the explicit incorporation of climate change predictions into planning for the management of the whole forest.

The Commission acknowledged the EPA's advice that more species specific research, rather than monitoring, may be needed to form conclusions on rarer species and their response to climate change. The Commission advised that the DPaW is developing guidelines to provide a framework for coordinating its broader forest monitoring activities and research.

In its advice the EPA considered that the system of formal and informal reserves incorporate the principles of connectivity and will assist in flora and fauna adapting to climate change. In addition the EPA noted that the forest (available for other uses including timber harvesting) will provide corridors for movement, since at any particular time most of the forest will contain native vegetation in various stages of forest development.

In its advice the EPA was also of the view that the forests' ultimate response to climate changes will not be complete for centuries and that there is currently insufficient information to inform this matter. The EPA recommended that monitoring be expanded to detect any trends due to climate change and other threatening processes to provide a better understanding of the best approach to manage the forests adaption to the long term impacts of climate change.

Noting the EPA's advice which also considered the management activities in the Proposed FMP, it is considered that the EPA had consideration for the impacts of climate change, the ability of the forests (and their inhabitants) to cope with climate change, and adaptive management, in its assessment. The matter of whether climate change should be a separate environmental value for assessment is a matter for the EPA to determine.

It is recommended that management activities relating to research commitments are amended to include timeframes to provide certainty that they will be achieved in a timely manner in order to inform the Proposed FMP, review of the sustained yield calculation and adaptive management.

Impacts of timber harvesting activities on rainfall

Some appellants expressed concerns about the impact that logging activities will have on local and regional climates (in particular rainfall).

During meetings with the Office of the Appeals Convenor, appellants provided published scientific papers and anecdotal observations that support the view that rain clouds generally form over vegetated areas and not (so much) over cleared areas.

In its advice the EPA considered that relatively small areas are cleared at any one time and it would be difficult to conclude that timber harvesting has as great an effect on the local climate as clearing for development or agriculture. The EPA also suggested that if research substantiates such impacts, the issue could be considered in future FMPs.

The Commission noted that the Draft FMP refers to the work of the IOCI which has studied the causes of climate change in the region and state that rainfall reductions are explained by large hemisphere shifts in atmospheric circulation, and to numerous studies which have investigated the effects of timber harvesting on micro-climate, which have informed development of the Draft FMP and subsidiary guidance documents.

It is noted that the *Silvicultural Practice in the Karri Forest* guideline (CALM, 2005) indicates that the maximum clear-fell patch size within karri forest harvesting operations is 20 ha in regrowth (60-80 year old) forest and 40 ha in mature forest.

It is also noted that the *Silvicultural Practice in the Jarrah Forest* guideline (CALM, 2004a) indicates that selective harvesting is undertaken within the jarrah forest rather than clear-fell. It is understood from verbal information obtained through meetings with appellants that patch size in jarrah forest is generally up to 100-150 ha.

Noting the above, it is acknowledged that timber harvesting may result in impacts to the local climate through the reduction of vegetative cover. However the EPA's view that it would be difficult to conclude that timber harvesting has as great an effect on the local climate as clearing for development or agriculture is noted.

Noting the gap in knowledge, it is recommended that collaborative research be undertaken to determine the impacts of climate change (which may include the effects of timber harvesting on local climate), as recommended under Ground 1

Carbon storage

The (former) DEC published the report *Estimating native forest carbon stocks* (DEC, undated) to describe the approach adopted for the development of the Draft FMP. In the report the (former) DEC noted that comprehensive carbon accounting for native forests is complex and throughout Australia is challenged by a lack of suitable data and predictive models (particularly in respect to soil carbon and below-ground biomass components), and advised that the scope of its work therefore was focused on estimating the above-ground component of live standing trees for which reliable, consistent data was available and for which sampling had covered most of the forests.

In its response the Commission advised that the Proposed FMP acknowledges that the analysis of the total carbon cycle during the life of the plan was somewhat incomplete, however proposed management activities seek to minimise unnecessary emissions and maximise bio-sequestration. The Commission also noted that the DPaW has made a commitment to seek to maintain a forest carbon science capability, report on carbon stores in the next draft forest management plan and investigate opportunities that may arise from an emerging carbon economy.

As noted above, the Proposed FMP includes management activities 55.4 and 55.7 in respect to carbon stores and investigating opportunities that may arise from an emerging carbon economy.

Also as noted above, in Report 1483 the EPA advised that it supports the commitment to investigate opportunities that may arise from an emerging carbon economy on forest carbon storage. The EPA noted that the Proposed FMP sets out what uses are permitted in various parts of the south-west, and considered that these uses will help determine the amount of carbon stored in the terrestrial environment (vegetation and soils). The EPA was of the view that, all other things being equal, a mature un-harvested forest is expected to have a higher density of carbon storage per hectare than a forest managed for timber production. The EPA also considered that the continued use of the south-west forests for multiple uses is expected to see the existing density of carbon storage maintained with no significant degradation of terrestrial environmental quality.

Noting the EPA's advice, it is considered that the EPA had consideration for forest carbon stocks in its assessment. Alternative uses of the forest, including for carbon credits, are discussed under 'Other Matters'.

Conclusion for Ground 3

Considering all of the information available in respect to this ground of appeal, it is recommended that this ground be allowed to the extent that collaborative research be undertaken to determine the impacts of climate change (which may include the effects of timber harvesting on local climate), as recommended under Ground 1.

It is also recommended that the sustained yield calculation is reviewed with regard to updated climate change and other information, as recommended under Ground 2.

Ground 4: Ecosystem health and vitality

Many appellants were concerned about the impacts of *Phytophthora* sp. dieback on flora and fauna, and the risk of spread by timber harvesting activities. Some appellants expressed concerns about marri decline. Some appellants were of the view that prescribed burning regimes were inadequate. Specific issues raised were:

- The Proposed FMP has not taken this issue seriously, despite significant government agency and independent advice on the matter. Forests currently free of *Phytophthora* sp. dieback should be protected from activities that could introduce it.
- The Proposed FMP fails to address the issue of tree decline and its impact on forest health and the viability of logging operations in native forests.
- The Proposed FMP fails to address the need for research into the effects of logging operations on tree decline (spread of pathogens including *Phytophthora* sp., *Quambalaria* sp. and *Armillaria* sp., reduction of forest floor and understorey, fire regimes, loss of genetic diversity within declining species, etc.), and the impact that tree decline will have on sustainable yields in the future.
- The logging and poisoning of marri trees should be suspended subject to further research. The impact of tree decline on forest health and sustainable yields should be addressed before the Proposed FMP is approved.
- There has been an increase in both the risk of damage and actual damage to ecosystems and communities under the fire management regime as currently practiced, and contended that the EPA's Report 1483 fails to recognise the extent of damage that is likely to occur under the Proposed FMP as a result of wildfires. Specific targets for prescribed burning should be established to reduce fuels to levels, and for the provision of adequate resourcing and policy support to achieve those targets.
- Neither the Commission nor the EPA has addressed the issue of fire management. The (former) DEC's fire policy and practices are not protecting life, biodiversity or property. Fire management should be given to independent ecologists and wildfire risk assessors.
- Given the findings in the Commission's 2012 biodiversity outcomes of prescribed burning in the southern forests, it is evident that the (former) DEC's prescribed burning is not meeting the required biodiversity outcomes even though the EPA's 2004 review of the (then) CALM's fire policies and management practices recommended that, in planning the annual burn program, assessment of fire requirements for biodiversity outcomes be given first consideration. The appellant sought for the Commission and the EPA to conduct an independent review of the (former) DEC's failed fire management.

EPA advice

The EPA advised that the long-term impact of dieback upon the health of the forests is still a matter of concern to it and other environmental agencies, however, in the last ten years of research there have been no major advances in the management of this disease and so the proposed management remains the same, and that for this reason there is no specific discussion of dieback in Report 1483. The EPA considered that some slowing of the predicted rate of spread as a result of reduced rainfall is of little consolation given the large areas of forest that remain at risk to this disease in the long term.

The EPA advised that, similarly, the use of fire as a management tool to promote regrowth, maintain and protect habitats, and to prevent loss of life and property, also remains the same in the Proposed FMP as it is in the Current FMP. The EPA advised that in the absence of evidence of any significant impacts to forest ecosystems from the current (and proposed) use of fire, it has not recommended any changes to current prescribed burning system.

The EPA advised that it has recommended that reporting on overall health of the forests and any evident trends needs to be improved. The EPA expected that this would provide the community with a better understanding of the forests and greater confidence in their proposed management into the future. In addition, the EPA advised that as noted in Report 1483 during the period of the Current FMP, there have been episodic events affecting forest health, but the forests appear to have recovered and there has been no overall trend of declining health.

Proponent response

The Commission advised that the Proposed FMP recognises the range of issues that can affect ecosystem health and acknowledges that impacts from these factors can be cumulative and/or may interact in ways that are not always well understood.

The Commission also advised that possible impacts on native vegetation ecosystems as a result of climate change are anticipated to include changes in flowering cycles, seed production and species distribution. In addition, the Commission advised that monitoring of forest and vegetation condition within the plan area will be undertaken by the DPaW through various activities, including biological surveys, FORESTCHECK, dieback mapping, evaluation of prescribed burns, inventory, operational monitoring and assessments undertaken related to performance indicators.

The Commission noted that the Proposed FMP also acknowledges that climate change has implications for biodiversity and ecosystem processes through changed levels of moisture, temperature and carbon dioxide potentially affecting the biota through possible changes in regeneration, growth and reproduction, and indirectly through the interaction with changing fire frequency, fire scale, fire intensity and fuel dynamics. The Commission also advised that the Proposed FMP notes that management of prescribed fire regimes includes monitoring the effects on biodiversity to provide for a system that facilitates adaptation to the effects of climate change, and was of the view that a well-planned, proactive prescribed burning program will play a vital role in protecting a range of forest values, including biodiversity, communities, and the management of greenhouse emissions. The Commission advised that management activities have been included in the Proposed FMP to deliver the goal of seeking to use and respond to fire in a manner that promotes the maintenance of ecosystem health and vitality.

The Commission also provided the following advice in response to concerns raised in regards to ecosystem health and vitality:

- A comprehensive range of measures to manage invasive species (pests, weeds and diseases including dieback) and address climate change is included in the Proposed FMP and has included consideration of advice from Government agencies and independent sources, together with comments provided on the Draft FMP. Uninfested areas are protected by a range of measures.
- Patterns in fuel loads were acknowledged in the Draft FMP, and retained in the Proposed FMP. Fuel loads are factored into the DPaW's prescribed burn planning. The DPaW's approach to prescribed burning is outlined in the Draft FMP and Proposed FMP. Management of fuel loads through prescribed burning has been shown to be an effective means of reducing the risks posed by bushfire. The Proposed FMP includes two KPIs related to fire management. In addition KPI 6 has a performance measure of the area of forest by fuel age classification.
- Resourcing is beyond the scope of the plan.
- The factors impacting ecosystem health and vitality of natural areas within the area covered by the Proposed FMP are identified in the Draft FMP and Proposed FMP, along with a summary of the potential consequences of climate change. The Proposed FMP has been developed in line with the principles of ESFM as detailed in the CALM Act, including biodiversity conservation and ecosystem health, which are fundamental considerations. As acknowledged in the Draft FMP and Proposed FMP, impacts from various factors may be cumulative and/or interact in ways that are not always well understood.

- Ecologists contribute to the DPaW's fire management program. The Office of Bushfire Risk Management has a role to independently assess risks associated with fire management.
- Extensive research and knowledge transfer has been conducted and the Draft FMP included management activities (retained in the Proposed FMP) that seek to ensure that this continues. Research and long-term monitoring of the effects of timber harvesting on biodiversity, including that conducted through the DPaW's major monitoring program, FORESTCHECK, shows that its impacts on the biodiversity groups monitored, are relatively transient (Abbott and Williams, 2011). Also, monitoring of regeneration of forest following harvesting by the FPC and the DPaW (including through FORESTCHECK) has found that regeneration is being effectively achieved across both the karri and jarrah forests.

Consideration

Pests and diseases

Many appellants asserted that the Proposed FMP has not had sufficient regard for the impacts of *Phytophthora* sp. dieback on flora and fauna and the risk of spread by timber harvesting activities, or for tree decline generally.

In its reviews of the mid-term and end-of-term audits of performance of the Current FMP, the EPA considered that the following matters relating to pests and diseases would need to be addressed during the preparation of the next FMP:

- the full impacts and management of forest diseases, including all *Phytophthora* species in jarrah, marri and tuart forest and *Armillaria* in karri forest, and other pests (EPA, 2010b); and
- the Commission's report [*Performance assessment of Phytophthora dieback management on lands vested in the Conservation Commission of Western Australia*, published December 2010] is expected to guide the preparation of the next FMP (EPA, 2012b).

The Silviculture Review Expert Panel (Burrows *et al*, 2011) noted that whilst the jarrah forest generally displays a level of resilience to climate change there are emerging areas of concern around the impacts of climate change in combination with other factors. The Panel also noted that the health of marri is deteriorating across the south-west, and was of the view that the next FMP will need to consider these and other aspects of ecosystem health. In respect to pests and diseases, the Panel recommended:

- that *Phytophthora* dieback management guidelines be updated to address other *Phytophthora* species and to reflect changes in *Phytophthora* activity likely with changes in the seasonality and intensity of rainfall (Recommendation 8); and
- that guidelines be established for the management of pests and diseases of significance to all forest trees and forest ecosystems, and that research should be undertaken where knowledge gaps are insufficient to inform management decisions (Recommendation 10).

The Proposed FMP contains separate sections on pests and diseases, which outline the policies under which the DPaW operates in its management of these matters. The Proposed FMP includes the following management activities in respect to these matters (KPI 8 also relates):

- 27 The Department, and other proponents where required by the Department, will:
 - 27.1 maintain surveillance and recording systems, including where appropriate remote sensing, for monitoring pests that are known to have a significant impact on ecosystem health and vitality
 - 27.2 work collaboratively with other agencies and land managers, as appropriate, to identify priority pests using risk-based procedures for determining their relative importance
 - 27.3 work collaboratively with other agencies and land managers, as appropriate, to prepare incursion management plans for priority pests which are not yet present

- 27.4 use planning procedures and operational controls to identify the relative importance of areas for protection, and to minimise the risk of spread and impacts from priority pests already present;
- 27.5 seek to identify and protect, including through use of planning procedures and operational controls, individuals and populations of native flora and fauna that show resistance to pests
- 27.6 where reasonable and practicable, implement control programs for priority pests, and encourage the coordinated involvement of Government, industry, the community and other land managers in addressing these pest species, including through facilitating knowledge transfer, awareness raising and capacity building.
- 28 The Department will seek to maintain the *Western Shield* program so as to reduce predation pressure on threatened and priority species of fauna.
- 29 The Department will seek to maintain a pest science capability and work collaboratively with other agencies and institutions on matters of mutual interest.
- 30 The FPC will take appropriate steps to minimise the risk that seedlings it obtains from its own and other nurseries are free from pests that could be transported into the forest with planting stock.
- 31 **(Plantations):** The FPC will:
 - 31.1 in conjunction with other agencies, maintain surveillance and recording systems for the presence of *Sirex* wood wasp, European house borer and other priority pests, compatible with those of the Department 54
 - 31.2 use planning procedures and operational controls to minimise the risk of introduction, spread and impacts from priority pests, and where reasonable and practicable, implement control programs for priority pests
 - 31.3 seek to identify and protect, including through use of planning procedures and operational controls, individuals and populations that show resistance to pests
 - 31.4 take appropriate steps to minimise the risk that seedlings it obtains from its own and other nurseries are free from pests that could be transported into the forest with planting stock.
- 32 The Department, and other proponents where required by the Department, will:
 - 32.1 maintain surveillance and recording systems, including where appropriate remote sensing, for monitoring forest diseases and syndromes that are known to have a significant impact on ecosystem health and vitality
 - 32.2 work collaboratively with other agencies and land managers, as appropriate, to identify priority forest diseases and syndromes using risk-based procedures for determining their relative importance
 - 32.3 work collaboratively with other agencies and land managers, as appropriate, to prepare incursion management plans for identified causal agents which are not yet present
 - 32.4 use planning procedures and operational controls to identify the relative importance of areas for protection, and to minimise the risk of spread and impacts from priority forest diseases and syndromes already present
 - 32.5 seek to identify and protect, including through use of planning procedures and operational controls, individuals and populations of native flora and fauna that show resistance to disease
 - 32.6 where reasonable and practicable, implement control programs for priority diseases, and encourage the coordinated involvement of Government, industry, the community and other land managers in addressing these, including through facilitating knowledge transfer, awareness raising and capacity building
 - 32.7 undertake targeted training programs and implement an accreditation process for staff, contractors and operators involved in disturbance activities, to support consistent and effective implementation of guidelines, standards and procedures for mapping, planning, supervision and operational controls for management of *Phytophthora* dieback disease.

- 33 The Department will seek to maintain a diseases and syndromes science capability and work collaboratively with other agencies and institutions on matters of mutual interest.
- 34 The FPC will take appropriate steps to minimise the risk that seedlings it obtains from its own and other nurseries are free from diseases that could be transported into the forest with planting stock.
- 35 **(Plantations):** The FPC will:
 - 35.1 in conjunction with other agencies, maintain surveillance and recording systems for priority forest diseases and syndromes, compatible with those of the Department
 - 35.2 use planning procedures and operational controls to minimise the risk of priority disease introduction, spread and impacts, and where reasonable and practicable, implement control programs for priority diseases
 - 35.3 seek to identify and protect, including through use of planning procedures and operational controls, individuals and populations that show resistance to disease
 - 35.4 take appropriate steps to minimise the risk that seedlings it obtains from its own and other nurseries are free from pathogens that could be transported into the forest with planting stock.

In Report 1483 the EPA noted that episodic events (pest, drought and frost events) have had impacts on the health of the forests in particular areas, but mostly the forest has recovered. The EPA recommended (among other things) that the Minister notes that the EPA supports the identification of management activities to address key threats to the health and vitality of the forest, such as the spread of weeds, pests and diseases.

In its advice the EPA considered that the long-term impact of dieback upon the health of the forests is still a matter of concern to environmental agencies, and that as there have been no major advances in dieback management the matter has not been specifically discussed in Report 1483. The EPA was of the view that the slowing of the rate of dieback spread due to declining rainfall is of little consolation given the large areas of forest at risk. The EPA recommended that reporting on overall health of the forests and any evident trends needs to be improved.

Noting the recommendations of the Silviculture Review Expert Panel, it is understood from officer-level advice from the DPaW that the management of pests and diseases ecosystems (including *Phytophthora* spp. dieback) has been incorporated into revised silvicultural guidelines. In respect to the EPA's recommendation, it is expected that improved reporting on overall health of the forests and any evident trends (particularly in respect to *Phytophthora* spp. dieback) will be achieved through extensions to forest monitoring programs, as recommended under Ground 1.

Fire

Some appellants were of the view that current burning practices have resulted in an increased risk of damage to ecosystems and communities, that fire management was not addressed by the Commission or the EPA, and that prescribed burning targets are required.

The Proposed FMP contains a section on fire, in which it is noted that the DPaW's fire management approach is underpinned by legislation and guided by policies. The Proposed FMP includes the following management activities in respect to fire management (KPIs 6-7 also relate):

- 21 The Department will:
 - 21.1 maintain a competent and sufficient capability in fire management, including prescribed fire, bushfire risk mitigation, detection and suppression
 - 21.2 seek to maintain a fire science capability and work collaboratively with other agencies and institutions on matters of mutual interest

- 21.3 consult with stakeholders and the community on the planning and implementation of prescribed burning and other fire management programs to:
- develop community understanding of, support for and collaboration in, fire management
 - enable constructive discussions and deliberations on fire management approaches
- 21.4 undertake an annual prescribed burning program in a manner that:
- seeks to address the risk presented by bushfire to the ecological, social, cultural and economic values occurring on lands managed by the Department, and the risk presented by bushfire emanating from land it manages moving into surrounding land
 - considers any specific ecological, silvicultural, social, cultural and other identified management objectives in areas subject to planned burning
 - seeks to minimise emissions of greenhouse gases while achieving fuel reduction objectives so as to avoid major emissions arising from periodic catastrophic bushfires
 - maintains or enhances the conservation of biodiversity by maintaining or enhancing the diversity of understorey vegetation structure and composition that facilitates a diversity of habitat opportunities
 - creates and utilises new knowledge in an adaptive management framework
 - is assessed against stated objectives for the program and stated objective(s) and success criteria for individual burns
- 21.5 undertake bushfire suppression and recovery operations in a manner that has regard to fire operations guidelines
- 21.6 through training programs, where appropriate, develop staff and contractor competency to assist with management of environmental issues associated with bushfire suppression and recovery operations.
- 22 The FPC will:
- 22.1 collaborate with the Department in determining appropriate risk mitigation strategies to be applied to land managed by the Department, and in particular, the State's native and plantation timber resources
- 22.2 as agreed between the agencies, make provision for funding to the Department to enable the Department to control the risk to acceptable levels, so far as is reasonable and practicable.

In its advice the EPA considered that the use of fire as a management tool is the same in the Proposed FMP as it is in the Current FMP, and that in the absence of evidence of significant impacts to forest ecosystems from current fire regimes, it has not recommended any changes.

Noting the management activities in the Proposed FMP, and the EPA's advice, it is considered that the EPA has given appropriate consideration to this matter, and that prescribed burning and fire management is adequately provided for in the Proposed FMP. However it is noted that there is scope for ongoing research and improvement in this area, and it is expected that this will be achieved through the implementation of management activities 21 and 22.

Conclusion for Ground 4

Considering all of the information available in respect to this ground of appeal, and the management activities contained in the Proposed FMP relevant to pests and diseases and fire, it is recommended that this ground be dismissed.

TERRESTRIAL ENVIRONMENTAL QUALITY

The EPA's objective for the key environmental factor terrestrial environmental quality is:

Terrestrial Environmental Quality: To maintain the quality of land and soils so that the environment values, both ecological and social, are protected.

Ground 5: Soil salinity

Some appellants were concerned about land degradation resulting from timber harvesting activities, in particular salinity. Specific issues raised were:

- Continued and increased logging risks increasing soil salinity, destroying valuable farming land and infrastructure for many years to come. Dryland salinity is widespread and is caused by clearing native vegetation.

EPA advice

The EPA advised that timber harvesting only has a short-term impact on groundwater rise (leading to dryland salinity) compared to permanent clearing, and that for this reason phased harvesting requirements were applied to particular regions in the FMP area, to prevent too much of a catchment being harvested at one time and causing a rise in groundwater. The EPA noted, however, that as a consequence of reduced rainfall and declining groundwater levels some regions are now at less risk of salinisation and phased harvest requirements have been relaxed in these areas.

Proponent response

The Commission provided the following advice in response to concerns raised in regards to salinity:

- Results of monitoring reported in the end-of-term audit of performance of the Current FMP (Commission, 2012a) showed that streams in fully-forested catchments remained fresh with low stream salinity.
- Appendix 14 in the Draft FMP outlined the range of different silvicultural methods utilised for different species and in differing conditions, and historic changes to these methods.
- The silviculture guidelines address ESFM criteria at a local scale and are based on considerable research, experience and monitoring, and are currently being revised in the light of the findings of the Silviculture Review Expert Panel (Burrows *et al*, 2011).
- Salinity problems in the Wellington Dam and in agricultural areas are a consequence of clearing for agriculture on lands other than those vested in the Commission.
- The map of salt sensitivity zones is in the Draft FMP (p.79) and the map of high salt risk areas is available via the weblink in the Draft FMP (p.78).
- Proposed changes to phased harvesting are supported by the (former) DEC and the Silviculture Review Expert Panel (Burrows *et al*, 2011) (as noted in Draft FMP, pp.77 and 78).
- The (former) DEC has followed up comments from the Department of Agriculture and Food (WA) and the Proposed FMP has been amended.

Consideration

Some appellants were concerned about land degradation resulting from timber harvesting activities, in particular salinity.

The Silviculture Review Expert Panel (Burrows *et al*, 2011) was of the view that the impact of climate change on threatening processes (such as salinity, *Phytophthora* and various insect pests) is not clear, however considered it can be inferred that a reduced water balance and drop in groundwater levels will reduce the impact of salinity. The Panel recommended (from a water quality perspective):

- due to reduced rainfall and lower groundwater levels associated with climate change, and consequent reduced salinity risk, phased harvesting in lower rainfall areas of the jarrah and karri forest in the Swan and South-West (former) DEC administrative regions is not warranted, however ongoing monitoring of groundwater should continue so that management can respond should there be a return to a wetter climate (Recommendation 11).

Although the Proposed FMP does not appear to specifically address the issue of dryland salinity, it includes management activities 41-45 (and KPI 9) relate to soil damage associated with the use of heavy vehicles, and management activities 51-53 (and KPI 10) relate to salinity in the context of water quality.

In its advice the Commission was of the view that, based on monitoring results and mapping, timber harvesting activities were unlikely to cause or exacerbate salinity. The Commission also advised that changes to phased harvesting are proposed, and that silviculture guidelines are being revised.

In Appendix 2 of Report 1483, under the factor 'Inland waters environmental quality', the EPA noted that the Proposed FMP has reviewed the risk of salinity impacts as a result of recent and projected rainfall and that this has led to a relaxation of the phased harvesting requirements in the (former) DEC's Swan and South West regions and part of the Warren Region. The EPA also noted that the planning process for timber harvesting is to be revised so that in partially cleared catchments categorised by the Department of Agriculture and Food WA as having a high salinity risk, there is a requirement to address the potential for adverse effects of salinity of streams.

In its advice the EPA was of the view that timber harvesting has a short-term impact on groundwater rise (leading to dryland salinity) as it does not constitute permanent clearing.

Noting the above advice, it is considered that the EPA had appropriate regard for the issue of salinity in its assessment. It is therefore recommended that this ground of appeal be dismissed.

HYDROLOGICAL PROCESSES

The EPA's objective for the key environmental factor hydrological processes is:

Hydrological Processes: To maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.

Ground 6: Silviculture for ecosystem health/water production

Some appellants expressed concerns about the Proposed FMP's support of 'silviculture for ecosystem health' and 'silviculture for water production', and the impacts that logging activities have on rainfall and local and regional climates. Specific issues raised were:

- The proposal to kill trees and understorey vegetation to increase run-off into streams and dams using glyphosate or any other method is not scientifically credible and causes environmental damage.
- Since the Water Corporation no longer regards surface water as a potential source of water, the DPaW should not consider killing trees in an attempt to increase runoff.
- The impact of reducing leaf area index on rainfall was not considered for 'silviculture for water production'. There is substantial research showing that land clearing causes rainfall to decline. The Proposed FMP should recognise that forestry activity has reduced rainfall in the south-west region and take this into consideration with regards to clearing, hydrology, temperatures and rainfall. The relationship between clearing and rainfall decline should be noted in the Wungong Catchment Trial section, and the EPA's ability to meet hydrological conditions should take both previous and likely rainfall reduction into consideration.
- The Proposed FMP fails to recognise the important role that forests play in producing and securing rainfall in the south-west. Recent research by Mark Andrich and Jorg Imberger (Andrich and Imberger, 2012) has found that 50-80% of rainfall decline in the south-west over the last 40 years has been caused by local land clearing for agriculture and timber harvesting, not climate change.
- The EPA failed to properly assess the significant factor of impacts of deforestation on rainfall as a result of implementing the Proposed FMP.
- Continued and increased logging will reduce annual rainfall and water in catchments. Demand for water in Western Australia is increasing by about 3% a year. Rainfall in WA (especially in the south-west) is declining by about 2.5% and runoff is declining by about 4%. A key contributor to rainfall is leaf area and a key contributor to controlling runoff is the forest. A fall in biomass will adversely affect precipitation and water capture.
- Interactions between tree density and rainfall have profound implications for forest and ecosystem health, as well as for public water utilities, agriculture and other water users, and should have been considered by the Commission and the EPA. Recent studies estimated that half of the decline in south-west rainfall to date can be attributed to deforestation.
- The impact of deforestation on rainfall has not been included in its effect on local climate and biodiversity. Pitman *et al* (2004) showed that up to 50% of the decline in rainfall in south-west WA was a result of deforestation. Even though the mechanisms behind landuse-climate interaction are known the effect of removing trees on local and regional climate has not been considered in the Proposed FMP, and nor has the expected change in local rainfall caused by removing trees been considered with regards to hydrology or biodiversity.
- Rainfall will continue to reduce with the new upper limit proposal.
- The FPC and the Minister for Forestry should expedite a broadscale commercial thinning program in the drought-affected northern regrowth jarrah forest to restore the health and vitality of the forest and increase the flow of water. Thinning should also be allowed in national parks and reserves when reliable scientific evidence demonstrates the need for sustainability.

EPA advice

The EPA advised that although there are no proposals under consideration or anticipated at this time, the Proposed FMP does include the possibility for large scale management of parts of the forests for water production. The EPA also advised that any such proposal would have to be approved by the DPaW and would be subject to a regulation through a catchment management plan, and that where appropriate, issues such as maintenance of cockatoo habitat and management of the use of herbicides are expected to be addressed through this process. In addition, the EPA advised that at this time 'silviculture for ecosystem health' is not being promoted as a broadscale measure to prevent the inevitable consequences of climate change as it would only be expected to be operationally or economically feasible over a very small proportion of the area covered by the plan.

The EPA advised that given that timber harvesting only reduces the cover of native vegetation over a relatively small portion of the forests at any one time, it is difficult to conclude that it has as great an effect on the local climate as land clearing for land development or agriculture. The EPA also advised, however, that should the results of recent research suggest an appreciable impact from timber harvesting, and this then be confirmed by other studies, then it would be an issue that could be taken up in future FMPs.

Proponent response

The Commission noted that the Proposed FMP provides for proposals to be considered for 'silviculture for water production', but advised that any proposed silvicultural treatments would firstly need to be within the parameters of silviculture guidance prepared by the DPaW in consultation with the Commission and would be subject to the preparation of catchment management plans. The Commission also advised that management activity 48 provides the basis upon which any proposal for silviculture for water production could be considered, however, and acknowledging that woodflow from this source has not been explicitly included in the sustained yield calculations or projections of other bole volume available, the Commission will continue to express its interest and concern in relation to 'silviculture for water production' proposals and activities.

The Commission advised that the option of 'silviculture for ecosystem health' involves the use of silvicultural treatments to enhance water availability to identified areas, such as surface water dependent ecosystems, groundwater dependent ecosystems or over-stocked regrowth forest, in order to improve the resilience of these ecosystems [to assist forests to adapt to climate change].

The Commission also advised that, as noted in the Proposed FMP, the practice of managing vegetation density to enhance ecosystem health is only expected to be operationally or economically feasible over a very small proportion of the area covered by the plan, and suggested that areas that could be targeted for treatment include:

- areas with a high stand density that are subject to damage by insects or disease (except dieback) and where a reduction in stand density is likely to reduce damage by insects or disease;
- catchments where a reduction in stand density is likely to maintain groundwater levels and streamflows so that these catchments can act as refuges from the hydrologic impacts of climate change;
- the protection of granite outcrops from the impacts of high intensity bushfire through stand density management and prescribed burning of surrounding areas; and
- specific refugia, threatened flora communities and ecological communities that are at risk from the hydrologic effects of climate change.

The Commission also provided the following advice in response to concerns raised in regards to surface water and rainfall:

- Silvicultural practices only use herbicides for approved uses, subject to relevant legislation and codes of practice.
- Stream reserves are not available for commercial timber harvesting.
- Appellants refer to material that supports the contention that land clearing leads to changes in physical processes that influence rainfall and may explain a part of the observed reduction in rainfall in south-west Western Australia. The scale of land clearing in south-west Western Australia, together with impact of clearing on native vegetation, is completely different from the proposed 'silviculture for water production' and 'silviculture for ecosystem health'. The Proposed FMP does not seek to encourage land clearing, but has a goal and a number of management activities that seek to maintain the net area of native forests and plantations. The Draft FMP refers to the work of the IOCI, in which the DPaW has been a partner. IOCI has studied the causes of climate change in the region and state that rainfall reductions are explained by large hemisphere shifts in atmospheric circulation. Numerous studies have investigated the effects of timber harvesting on micro-climate, which have informed development of the plan and subsidiary guidance documents.
- The Draft FMP included an outline of the range of issues that would need to be considered in a catchment management plan (Appendix 15).

Consideration

Some appellants expressed concerns about the Proposed FMP's support of 'silviculture for ecosystem health' and 'silviculture for water production'.

As discussed under Ground 3, the Silviculture Review Expert Panel (Burrows *et al*, 2011) considered that the greatest threat to the future health of these forests is the declining rainfall associated with a changing climate, and the consequent decline in the levels of groundwater and soil water storage generally. The Panel acknowledged that many of the once perennial streams within the jarrah forest have stopped flowing, and groundwater levels have lowered dramatically.

It is noted that the Panel was of the view that forests with a high component of regrowth trees (or a high sap wood area-to-basal ratio) have a higher water demand than forests dominated by mature and over-mature trees, and considered that there is increasing evidence that the jarrah forest structure (in particular reforested areas with high leaf area index) is contributing to the decline in groundwater.

It is also noted that the Panel considered that, while all jarrah forest ecosystems will probably benefit from silvicultural measures that reduce water stress, management should focus in the higher rainfall zones as water yield is likely to be improved in these areas. The Panel was of the view that reducing the density of the forests at above 10 m² per ha (to avoid a proliferation of regeneration in the absence of ongoing treatments) at a catchment or sub-catchment level should improve the water balance at these scales. Notwithstanding, the Panel acknowledged that this would require economic and environmental assessments. The Panel advised that it supported an adaptive management approach to better understanding complex and interacting processes.

It is noted that the *Draft Silvicultural Guideline for Jarrah Forest* (DEC, Draft 2012) contains a guiding principle to "*Promote ecosystem health and vitality through silvicultural treatment*" that refers to 'silviculture for ecosystem health' as an adaptive action for mitigating the effects of reduced rainfall and higher temperatures on the jarrah forest and associated ecosystems.

The Draft FMP included a plan identifying the Canning, Wungong, Serpentine, North Dandalup, South Dandalup, Samson, Stirling and Harris catchments as areas within which 'silviculture for water production' could be applied.

It is noted that the Proposed FMP includes the following management activities in respect to the management of water (KPIs 10-11 also relate):

- 46 The Department, the FPC and other proponents where required by the Department, will conduct their operations in accordance with silviculture guidelines, the *Guidelines for the Protection of the Values of Informal Reserves and Fauna Habitat Zones*, and the *Soil and Water Conservation Guideline*.
- 47 The Department may undertake or approve 'silviculture for ecosystem health' to enhance water availability to identified areas, such as surface water dependent ecosystems, groundwater dependent ecosystems or over-stocked regrowth native forest, in order to improve the resilience of these areas.
- 48 The Department will consider proposals for 'silviculture for water production' on the following basis:
 - 48.1 Where proposed silvicultural treatments are outside of parameters provided for in the Department's silviculture guidance, proponents will need to prepare and have approved by the Department, specific silviculture guidance.
 - 48.2 The Department will require the preparation of a catchment management plan where proponents seek to apply such silvicultural practices, or where it is considered by the Department that an excessive proportion of the forest in the catchment may be left in the juvenile and immature stages of development as a result of a proposal. The catchment management plan(s) will require approval by the Department, which will consult with the Conservation Commission and Department of Water, and where applicable, the relevant water utility. Approved catchment management plans will be made publicly available.
- 49 The Conservation Commission, in consultation with the Department, will develop a position statement to provide guidance when proposals to take water from land to which the plan applies are considered.
- 50 The Department:
 - 50.1 will provide advice and assistance to organisations seeking access to the potential sub-surface aquifers and surface reservoirs located on land to which the plan applies
 - 50.2 will facilitate access to land to which the plan applies for the purposes of water extraction and the development of associated infrastructure for public water supply purposes where this is consistent with the CALM Act
 - 50.3 will take and use water sustainably from land to which the plan applies
 - 50.4 may issue permits, after consultation with the Conservation Commission, for the sustainable taking of water from land to which the plan applies.
- 51 The Department, the FPC and other proponents where required by the Department, will conduct their operations in accordance with phased harvesting requirements for the moderate salt sensitivity part of the Department's Warren Region (see Map 7).
- 52 The Department will revise the planning process for timber harvesting, so that in partially cleared catchments there is a requirement to address potential effects on salinity of streams on other land that is categorised by the Department of Agriculture and Food WA as having a high salinity risk, so as to avoid potential adverse impacts.
- 53 **(Plantations)**: The FPC will conduct its plantation operations in a manner having regard to the guidelines for water protection in the *Code of Practice for Timber Plantations* (2006).
- 54 **(Plantations)**: The Department may require the preparation of catchment management plans where proponents seek to apply silvicultural or other practices that, in the view of the Department, could result over time, in a significant reduction in flow to surface or groundwater reservoirs. Catchment management plans require approval by the Department, which will consult with the Conservation Commission and Department of Water, and where applicable, the relevant water utility. Approved catchment management plans will be made publicly available.

In its advice the Commission noted that silvicultural practices only use herbicides for approved uses, subject to relevant legislation and codes of practice.

In its response the Commission advised that the intent of 'silviculture for water production' and 'silviculture for ecosystem health' is to assist forests to adapt to climate change, and that the Proposed FMP includes management activities that specify the conditions under which implementation of these treatments could proceed. The Commission also advised that any proposed treatments would need to be within the parameters of DPaW/Commission silviculture guidance, and would be subject to the preparation of catchment management plans.

In Report 1483 the EPA noted that the total area of catchments that might be suitable for 'silviculture for water production' total 52,700 ha, and that the main concern is whether the impacts of thinning would have unacceptable impacts on fauna habitats and biodiversity. The EPA also noted that the benefits are yet to be demonstrated (though the Wungong Catchment Trial), and that there are no proposals under active consideration.

In its advice the EPA advised that any thinning proposals to increase surface water runoff would be subject to departmental approvals, which the EPA expects would include consideration of impacts of herbicides and impacts to black cockatoo habitats.

Appellants' concerns in respect to this matter are acknowledged. However noting the above advice from the Commission and the EPA, it is considered that the EPA has appropriately considered the Proposed FMP's references to silviculture for water production and ecosystem health in its assessment.

Notwithstanding, considering all of the information available in respect to this ground of appeal, it is recommended that this ground be allowed to the extent that:

- management activity 49 is amended to include a target completion/publishing date within the first quarter of the implementation of the FMP for the development of a position statement to provide guidance when proposals to take water area considered.

NON-KEY ENVIRONMENTAL FACTORS

Ground 7: Air quality

Some appellants were concerned about greenhouse gas emissions resulting from timber harvesting activities, including from soil, trees, vehicles and processing. Specific issues raised were:

- Continued and increased logging will increase greenhouse gasses in the atmosphere, which in turn will bring about an increase in ambient temperatures, droughts, rise in sea levels and loss of flora and fauna due to loss of habitat.
- The Australian Greenhouse Office estimates that land clearing contributes 13% to Australia's total greenhouse gas emissions.
- IPCC researchers have found that a one degree increase in global temperature will reduce stream flow by 15% and a four degree increase in air temperature will bring about extreme changes like heat waves, shifting rainfall patterns and changing sea levels.
- The EPA has not applied the precautionary principle to its assessment of greenhouse gas emissions. The Draft FMP provided for carbon assessments to be conducted *during* the FMP, which would then be incorporated only in the *next* FMP in a decade's time, which is out of step with the precautionary principle that dictates that an impact should not be allowed to occur in the absence of full scientific knowledge that the impact will be environmentally acceptable.
- The EPA has failed to require proper, peer-reviewed and scientifically defensible assessment of the greenhouse gas emissions resulting from the implementation of the Proposed FMP. This is in breach of the EPA's *Guidance Statement for Minimising Greenhouse Gas Emissions* (EPA, 2002) which requires a nationally agreed greenhouse gas accounting methodology to be used by proponents.
- The EPA should assess all carbon emissions from activities under the Proposed FMP, including from logging and burning activities and emissions from release of soil carbon.
- The Minister should ensure that all carbon emissions from proposed activities under the Proposed FMP are properly assessed before its implementation.

EPA advice

The EPA advised that, in regard to sustainable logging, forests are not large greenhouse gas emitters and so the EPA did not consider this to be a key environmental factor. The EPA advised that greenhouse gas emissions from the decomposition of discarded timber and harvesting vehicles would be more than compensated for by carbon dioxide absorbed to provide new tree growth in harvested areas. The EPA also advised that any full accounting would need to take into account the fate of the harvested timber which would depend on the carbon accounting standards that are used.

Proponent response

The Commission provided the following advice in response to concerns raised in regards to air quality:

- The Draft FMP included carbon stock estimates, which address the effects of native forest harvesting and regrowth and the effects of climate change. The best available inventory, climate change, growth and carbon stock models were used in deriving the estimates in the Draft FMP. A net increase in forest carbon stocks is estimated given the age structure of the forest estate. The potential consequences of climate change are summarised in the Proposed FMP (pages 73-75). New KPIs have also been developed for the Proposed FMP relating to knowledge of trends in climate and adaptive response, in addition to the key performance indicator included in the Draft FMP regarding improving knowledge of forest carbon stores (which has been retained in the Proposed FMP).

Consideration

Some appellants considered that the EPA should have assessed greenhouse gas emissions resulting from timber harvesting activities, carbon sequestration or carbon credits, and by not doing so is in breach of its *Guidance Statement for Minimising Greenhouse Gas Emissions* (EPA, 2002) and the requirement for maintenance of global carbon cycles as required under the ESFM principles established in the RFA. Some appellants also considered that the EPA accepted a form of accounting for greenhouse gas emissions that does not meet the requirements for permanence under UNFCCC internationally agreed carbon accounting standards.

The Proposed FMP contains a number references to greenhouse gas emissions from timber harvesting activities, decrease in leaf area and vegetation health as a result of pests and diseases, and the end-use of wood products. It also includes the following management activities which refer to greenhouse gas emissions:

- 8 The Conservation Commission and the Department will make submissions in relation to development proposals (including, but not limited to, proposals for infrastructure development, extraction of minerals and petroleum resources, development of geothermal energy and the geological storage of greenhouse gases) forwarded to them for comment or advice, with a view to:
 - 8.1 seeking to minimise the permanent loss of native vegetation and/or impacts on its integrity as a result of development
 - 8.2 otherwise, seeking to offset losses of native ecosystems arising from development, in line with the *WA Environmental Offsets Policy*
 - 8.3 promoting the construction of infrastructure such as roads, pipelines and other utilities at common locations, such as infrastructure corridors, while minimising construction in sensitive areas. ...
- 21 The Department will:
 - 21.1 maintain a competent and sufficient capability in fire management, including prescribed fire, bushfire risk mitigation, detection and suppression
 - 21.2 seek to maintain a fire science capability and work collaboratively with other agencies and institutions on matters of mutual interest
 - 21.3 consult with stakeholders and the community on the planning and implementation of prescribed burning and other fire management programs to:
 - develop community understanding of, support for and collaboration in, fire management
 - enable constructive discussions and deliberations on fire management approaches
 - 21.4 undertake an annual prescribed burning program in a manner that:
 - seeks to address the risk presented by bushfire to the ecological, social, cultural and economic values occurring on lands managed by the Department, and the risk presented by bushfire emanating from land it manages moving into surrounding land
 - considers any specific ecological, silvicultural, social, cultural and other identified management objectives in areas subject to planned burning
 - seeks to minimise emissions of greenhouse gases while achieving fuel reduction objectives so as to avoid major emissions arising from periodic catastrophic bushfires
 - maintains or enhances the conservation of biodiversity by maintaining or enhancing the diversity of understorey vegetation structure and composition that facilitates a diversity of habitat opportunities
 - creates and utilises new knowledge in an adaptive management framework
 - is assessed against stated objectives for the program and stated objective(s) and success criteria for individual burns

- 21.5 undertake bushfire suppression and recovery operations in a manner that has regard to fire operations guidelines
 - 21.6 through training programs, where appropriate, develop staff and contractor competency to assist with management of environmental issues associated with bushfire suppression and recovery operations. ...
- 56 The FPC will:
- 56.1 (**Plantations**): remain abreast of current knowledge and contemporary management approaches in relation to climate change and its possible impacts on plantations
 - 56.2 seek to encourage the use of wood harvested from native forests and plantations to maximise greenhouse mitigation benefits.
- 57 The Conservation Commission, the Department and the FPC will make submissions in relation to development proposals (including, but not limited to, proposals for infrastructure development, extraction of minerals and petroleum resources, development of geothermal energy and, the geological storage of greenhouse gases) forwarded to them for comment or advice, with a view to:
- 57.1 seeking to minimise the permanent loss of native forests and plantations available for wood production and/or impacts on their integrity as a result of development
 - 57.2 seeking the replacement of native forests and plantations not replanted or permanently lost to development, consistent with relevant legislation and government policies
 - 57.3 promoting the construction of infrastructure such as roads, pipelines and other utilities at common locations, such as infrastructure corridors, while minimising construction in sensitive areas.

It is noted that the EPA identified air quality as a factor which was relevant to its assessment of the Proposed FMP, but the EPA did not consider air quality to be a key environmental factor warranting discussion and evaluation (refer Appendix 2 of Report 1483).

The EPA advised that it did not consider forests to be large greenhouse gas emitters in regard to logging, as greenhouse gas emissions from wood decomposition and harvesting vehicles would be compensated by carbon dioxide absorption by regrowing forests. As such the EPA did not consider its *Guidance Statement for Minimising Greenhouse Gas Emissions* (EPA, 2002), which the EPA advised is under review, to be directly relevant in this case.

The EPA also advised that it did not evaluate or assess alternatives such as carbon credits, although it supports further reporting on such opportunities/alternatives including the intention to report on carbon stores and to investigate opportunities that may arise from an emerging carbon economy. The EPA also noted that any full accounting would need to take into account the fate of the harvested timber which would depend on the carbon accounting standards that are used.

The Commission advised that the Draft FMP included carbon stock estimates, and noted that the Proposed FMP contains KPIs relating to knowledge of trends in climate and adaptive response, and improving knowledge of forest carbon stores. The Commission estimated a net increase in carbon stocks given the age structure of the forest estate.

It is acknowledged that forest uses in accordance with the Proposed FMP would result in emissions to the environment. Noting the EPA's advice that emissions arising from the harvesting of timber would be offset by the regrowth of the forest, and noting the management activities in the Proposed FMP, it is considered that the EPA was justified in concluding that air quality was not a key environmental factor in this case. It is therefore recommended that this ground of appeal be dismissed.

Ground 8: Heritage

Some appellants considered that the EPA did not have sufficient regard to heritage matters. Specific issues raised were:

- The EPA failed to properly assess the significant factor of impact on Aboriginal cultural values. There has been no attempt by the proponent to undertake a comprehensive or detailed assessment of the Aboriginal cultural values of the Proposed FMP area prior to the calculation of timber yield, instead the Commission plans to undertake cultural values assessment during the planning of logging activities. This approach assumes that logging activities are compatible with the maintenance and protection of Aboriginal cultural values.
- There is a contradiction between Aboriginal cultural significance and the proposed continuation of logging in native forests, given the Proposed FMP acknowledges the importance of the forest to the Noongar people.
- The quote on page 3 of the Proposed FMP is insulting to people of all races. The quote could also be interpreted as a misleading attempt to insinuate that the rights and wishes of the indigenous custodians of this land have been adequately considered in the Proposed FMP.
- There should have been more consideration given to the impacts of logging activities on European cultural heritage.

EPA advice

The EPA advised that it understands that the DPaW (assisting the Commission) has engaged with and consulted Traditional Owners in developing the Proposed FMP. The EPA also noted that there is a commitment to develop a program for assessment of areas of the plan area for their importance for Noongar culture and heritage, and to identify appropriate opportunities for joint management of areas within the FMP area.

The EPA advised that it is not aware of the Noongar people forming a view that proposed (or past) logging activities are incompatible with culture values and that large areas should be removed from the calculation of sustained yield.

Proponent response

The Commission provided the following advice in response to concerns raised in regards to Aboriginal heritage:

- A goal of the Proposed FMP is to protect and maintain Noongar cultural heritage and the plan includes a number of management activities to give effect to this goal, including a management activity to prevent material adverse effects on Noongar culture and heritage from proposals. The Proposed FMP identifies Noongar heritage values and threats to these values. The Proposed FMP was developed following considerable consultation with a range of Noongar representatives.
- The comments were provided courtesy of the South West Aboriginal Land and Sea Council (as noted in the Proposed FMP), as part of the consultation process undertaken with Noongar people during development of the plan.

Consideration

Some appellants considered that the EPA did not have sufficient regard to heritage matters (both Aboriginal and European).

The EPA identified heritage as a factor which was relevant to its assessment of the Proposed FMP, but the EPA did not consider heritage to be a key environmental factor warranting discussion and evaluation (refer Appendix 2 of Report 1483).

Two of the key findings and considerations in the end-of-term audit of the Current FMP (Commission, 2012a) for future management in respect to natural and cultural heritage are:

The Department has a formal Memorandum of Understanding with the South West Aboriginal Land and Sea Council, which is the native title representative body for the FMP area.

The majority of registered Aboriginal and non-Aboriginal heritage sites have not been disturbed. However, the target of no disturbance of a registered site without formal approval was not achieved as one non-Aboriginal site was disturbed without that approval.

It is understood that numerous submissions were received on the Draft FMP in respect to Aboriginal heritage. The Commission's responses to those submissions are provided in the *Analysis of Public Submissions* document (Commission, 2013a). As a result of the submissions the Commission made amendments to the Draft FMP in the preparation of the Proposed FMP to reference Noongar culture and heritage throughout the document, and revised the heritage chapter with input from Noongar representatives (Commission, 2013a). In addition, the Commission advised that:

- the Proposed FMP includes various measures to broaden the involvement of Noongar people, including a process for ongoing evaluation of Noongar culture and heritage values, reference to Noongar intellectual property, and management activities that seek to prevent material adverse effects on Noongar culture and heritage values from disturbance activities;
- negotiation for the South West Native Title settlement is considering areas where joint management might be applied; and
- guidance documents for implementation of amendments to the CALM Act are under development and will seek to implement the amendments in an effective (Commission, 2013a);

The Proposed FMP includes the following management activities in respect to Aboriginal and other Australian heritage (KPI 20 also relates):

- 94 The Department, and other proponents where required by the Department, will seek to prevent material adverse effects on Noongar culture and heritage in the plan area by:
 - 94.1 where required, working with appropriate and representative Noongar groups and relevant agencies to identify cultural and heritage values and sites and gain their input into the management of these
 - 94.2 facilitating access by Noongar people for Noongar customary purposes subject to the CALM Regulations
 - 94.3 community consultation, involvement in decision-making and surveys that are to be undertaken in accordance with Department policies and guidelines that are to be developed as required by activity 95
 - 94.4 ensuring compliance with the provisions of the *Aboriginal Heritage Act* by having regard to the State Government's *Cultural Heritage Due Diligence Guidelines* and conducting operations in a manner that is in accordance with Department policies and guidelines that are to be developed as required by activity 95.
- 95 The Department will develop, or maintain and update policies and guidelines on joint management, customary activities and Noongar heritage, as required, and will work with appropriate and representative Noongar groups to identify appropriate opportunities for joint management of areas within the plan area.
- 96 The Department, and other proponents where required by the Department, will facilitate cross-cultural awareness and interpretive activities to inform and educate relevant staff, contractors and the wider community about Noongar culture and heritage values.
- 97 The Conservation Commission and the Department will develop a program for assessment of areas of the plan area for their importance for Noongar culture and heritage, and the Department, and other proponents where required by the Department, will progressively undertake this assessment, in consultation with relevant stakeholders and agencies.

- 98 The Department will:
- 98.1 develop and implement appropriate policies, guidelines, manuals or instructions for management of other Australian cultural heritage, as required, that consider and, where necessary, align with the *Heritage Tourism Strategy for Western Australia*, *State Cultural Heritage Policy*, Government Heritage Property Disposal Process, and the Burra Charter
 - 98.2 use agency procedures that seek to ensure that the presence and type of heritage places are appropriately recorded, accessible to staff and considered prior to operations taking place
 - 98.3 maintain a central database of other Australian heritage places and values
 - 98.4 use agency procedures and set appropriate conditions as a part of Department approval processes to seek to ensure that heritage places are effectively protected during permitted disturbance activities
 - 98.5 promote awareness and understanding of the importance of protection and appreciation of the value of heritage places among staff, proponents, operators and visitors.
- 99 The Department, the FPC and other proponents where required by the Department, will:
- 99.1 conduct their operations in a manner that has regard to approved heritage management policies, guidelines, manuals or instructions
 - 99.2 cooperate with Commonwealth and State agencies, local governments and non-statutory organisations in relation to other Australian cultural heritage identification and conservation.

Noting the above and the EPA's advice on these matters, it is considered that the EPA was justified in concluding that heritage was not a key environmental factor in this case. It is therefore recommended that this ground of appeal be dismissed.

Ground 9 Amenity

Some appellants were concerned about the visual impact of timber harvesting activities. Specific issues raised were:

- Natural beauty is one of the most compelling qualities in Western Australia, and previous logging in the south-west has scarred the landscape.
- The jarrah, karri and marri forests are an integral feature of the beauty of the South West region, and the loss of forests and view of logging operations will damage the aesthetic appeal.

EPA advice

The EPA advised that areas of high scenic value are generally excluded from logging, usually in National Parks or Travel Route Zones. The EPA also advised that while logging does have a large adverse effect on visual amenity at a particular site for a number of years, this impact is localised, not permanent and affects a relatively small proportion of the forests at any one time.

Proponent response

The Commission provided the following advice in response to concerns raised in regards to visual amenity:

- Visual amenity has been considered in the plan – refer to Proposed FMP pages 116-117 (and proposed management activities 103 and 104).

Consideration

Appellants' concerns about the visual impact of timber harvesting activities are noted.

The Proposed FMP contains a section that addresses visual amenity, with the aim of protecting and maintaining scenic quality, visual amenity and sense of place, and refers to the retention of buffers along travel route zones. It also includes the following management activities which refer to the implementation of visual landscape management principles in landuse planning, codes of practice, operational guidelines and relevant manuals:

- 103 The Department, the FPC and other proponents where required by the Department, will:
 - 103.1 maintain and implement a visual landscape classification and management system
 - 103.2 review where necessary and implement guidelines for the application of visual landscape management principles in land-use planning, codes of practice, operational guidelines and other relevant manuals
 - 103.3 make submissions in relation to development proposals that may impact on visual landscapes on land to which the plan applies that are forwarded to them for comment or advice, with a view to seeking to reduce the effect of any proposed activity on the visual quality of the landscape.
- 104 **(Plantations)**: The FPC will consider the impact of plantation operations on the visual quality of the landscape and where reasonable and practicable, will conduct those operations in a manner that seeks to reduce their impact on the visual quality of the landscape.

In Report 1483 the EPA identified amenity as a factor which was relevant to its assessment the Proposed FMP, but the EPA did not consider amenity to be a key environmental factor warranting discussion and evaluation (refer Appendix 2 of Report 1483). The EPA noted that restrictions on activities are set out in *Guidelines for Protection of the Values of Informal Reserves and Fauna Habitat Zones* (DEC, 2009).

While a buffer to public areas is not specified in the Proposed FMP, the EPA's advice that areas of high scenic value are generally excluded from logging, and that while logging has a large adverse effect on visual amenity at a particular site for a number of years, the impact is localised and not permanent, is noted.

In respect to recovery timeframes from a visual amenity perspective, it is noted that this is a subjective matter dependent on the observer's criteria around what constitutes 'recovery'.

It is considered that the EPA was justified in concluding that amenity was not a key environmental factor in this case. It is also considered that management activities 103 and 104 in the Proposed FMP are adequate to manage the impacts of proposed forestry activities on amenity. It is therefore recommended that this ground of appeal be dismissed.

PLAN IMPLEMENTATION AND MANAGEMENT

Ground 10: Implementation, compliance, etc

Most appellants were highly concerned that the EPA did not recommend conditions in the event that the Proposed FMP is implemented. Other matters raised by appellants in respect to implementation and compliance included the ten-year duration of the Proposed FMP, consideration of the Auditor General's findings and of adaptive management. Some appellants disagreed with the EPA's recommendation for stakeholder reference groups. Specific issues raised were:

- There are serious problems with compliance, yet the EPA has declined to recommend that any conditions be imposed on implementation of the FMP when these would be the only legally binding provisions that could ensure compliance by government agencies.
- The EPA should have considered governance concerns raised in the Auditor General's report, which found that forest mismanagement and poor practices by contractors is widespread, and that forest management activities and decisions undertaken by the DPaW, FPC and the Commission lack the transparency and accountability that would be required in order to have confidence that these processes were being performed adequately.
- The EPA should have considered its advice to the Minister on the mid-term and end-of-term audits of performance of the Current FMP (EPA, 2010b and 2012b) in respect to the governance model, and lack of compliance and enforcement,
- The EPA's failure to set conditions is an abrogation of its statutory responsibilities, especially in light of there being no other legally binding and enforceable mechanisms to ensure compliance with the Proposed FMP. By not recommending implementation conditions for the Proposed FMP, the EPA has failed to ensure that an appropriate and effective compliance and enforcement regime will be established to manage the impact of forest management activities on biodiversity and other environmental values. In the absence of Ministerial implementation conditions, logging would be undertaken with no effective regulatory oversight or compliance enforcement. The lack of implementation conditions does not inspire confidence in future management practices.
- The Proposed FMP, with regards to KPIs, performance targets and review, should be subject to similar implementation conditions as for the Current FMP. There appears to be no legal requirement on the Commission to implement the mid-term and end-of-term performance reviews referred to in the Proposed FMP. A number of conditions should be imposed on the implementation of the FMP, including an audit program, compliance reporting, and management by the DPaW and FPC.
- An independently accredited and audited adaptive management system should be established to ensure that forest management activities do not have an unacceptable impact on social, ecological and cultural values of the forests.
- Given the rapidly changing climatic conditions and their unpredictable impacts on growth rates, disease and fire in the forests, the FMP 2014 should be reviewed after five years.
- The implementation statement should include a condition that the FMP be reviewed by 31 December 2019, which coincides with the current expiry date of the RFA.
- The establishment of stakeholder reference groups (as recommended by the EPA) is an unnecessary addition to a highly regulated process. The consultation process in regards to the development of the Proposed FMP was rigorous and extensive, and provided several opportunities for community stakeholders to have input. The Proposed FMP is shrouded with planning processes and audit requirements, allowing further opportunities for stakeholders to have input. Further process could be disruptive to the orderly planning and preparation of harvesting coupes.

- The Proposed FMP assumes that the FPC has the ability to direct the environmental and financial management of native timber harvesting in south-west forests, an assumption which is not supported by either the FPC's Annual Reports or the Auditor General's report. There should be a tightening of compliance regulations in the Proposed FMP to minimise further breaches of compliance, and postponement of the approval of the Proposed FMP until an independent investigation and audit of the FPC's accounts and ability to conduct the financial and environmental management of native timber harvesting in south-west forests.
- The EPA should be the statutory authority to guard, protect and maintain the integrity of forest systems and the resident species that depend on them, and future generations will condemn the EPA and today's society if the forest ecosystems are knowingly and deliberately exploited and degraded resulting in species extinction.
- The DER should regulate the native forest timber industry and properly resourced to carry out this function, instead of the DPaW.
- The Minister for Forestry should be responsible for State forests.
- The EPA's new approach for identifying significant factors and not recommending conditions for activities managed by other government agencies, undermines environmental protection, the scheme and objects of the EP Act, and the EPA itself.
- There is a conflict of interest to the extent that the Commission is both the proponent of the Proposed FMP and also the agency which has notional responsibility (though no regulatory powers) for monitoring and enforcing compliance with the Proposed FMP. Where the Proposed FMP requires subsidiary guidelines or documents to be developed, these are the responsibility of the Commission, and in the case of the Current FMP, many of these have simply not been completed or put into practice. With no oversight by an independent authority, the Commission has no obligation to comply with their own plans.
- The EPA should have considered the exemptions from both State and Commonwealth wildlife protection laws and regulation under Part IV of the EP Act.

EPA advice

The EPA advised that while the regulatory framework for FMPs is complicated, the EPA considers that the existing system of having an environmental agency (DPaW) overseeing planning and operations of the FPC and its contractors, and having the overall effectiveness of the FMP reviewed by a statutory environmental advisory body (Commission), should give the community confidence that ecologically sustainable forest management is being applied properly. The EPA also noted that the interagency arrangements between the DPaW and the FPC are to be formalised in writing to clarify and improve the current arrangements during the period of the Proposed FMP.

The EPA advised that it has not recommended any conditions on the Proposed FMP because there were no major aspects of the Proposed FMP that it considered needed to be amended before it is considered and approved by the Minister. The EPA noted that the conditions imposed on the Current FMP under Part IV of the EP Act were restricted to making changes to the FMP before transmittal to the Minister, setting a date for submission of the mid-term and end-of-term audits of performance, and requiring the EPA to provide a report on the these audits. The EPA advised that these conditions did not regulate the on-ground management of the forests (including regulation of timber harvesting) which is done through lower levels of planning, guidance documents, and contracts, and that in effect, once the Current FMP was approved by the Minister on 10 December 2003, the previous Ministerial Statement with conditions (Ministerial Statement 641) had the same level of enforceability as would the recommended Ministerial Statement in Appendix 3 of Report 1483 (with no conditions), with the exception of the requirements on the mid-term and end-of-term audits of performance.

The EPA also advised that under the Proposed FMP the Commission is committed to undertaking mid-term and end-of-term performance reviews (management activities 130 and 131). The EPA advised that it has decided not to set a date for these reviews and has not committed itself to provide a report to the Minister on these reviews, and that the timing of the reviews is a matter for the Commission to determine. The EPA also advised that if, at the time of the performance reviews, the EPA should it decide or be requested by the Minister to have a role in the reviews, then the EPA could always do this by providing advice under section 16(e) of the EP Act.

The EPA advised that it is not aware of any major breaches of the Current FMP leading to significant, unacceptable environmental impacts that would require an additional level of regulation over the Proposed FMP. The EPA advised that the mid-term and end-of-term performance reviews provide a public process through which the implementation of the FMP is judged against KPIs and any shortfalls are addressed. The EPA noted that over the period of the Current FMP there have been shortfalls against KPIs, but most of these have been issues that have resulted in sub-optimal performance rather than significant impacts to the environment, for example, a number of guideline documents were not prepared by their due dates, but there has not been any major exceedances of permitted harvesting levels (the 'allowable cut'). The EPA advised that most of the non-compliance issues alluded to by appellants relate to the on-ground work of harvesting contractors that result in breaches of guidelines and harvesting plan requirements, which are usually dealt with by Work Improvement Notices issued by the DPaW. Further, the EPA advised that these breaches are at a much lower level than the FMP itself operates at, although sometimes consolidated statistics on these are used in FMP KPIs (e.g. the level of soil damage resulting from timber harvesting, previously KPI 21). The EPA was of the view that environmental conditions under Part IV of the EP Act would not be able to deal with the low-level breaches and the mid-term and end of term reviews provide an adequate process for dealing with implementation shortfalls at the higher level.

The EPA advised that it supports the proposed actions to address the key findings of the Auditor General's report *Supply and Sale of Western Australia's Native Forest Products*. The EPA noted that none of these actions require changes to the Proposed FMP or the imposition of environmental conditions under Part IV of the EP Act.

In addition, the EPA advised that given that the FMPs are subject to mid-term reviews of performance and that forest management works to timescales of decades rather than years, there would not seem to be much advantage to moving to a full review of FMPs every five years. Further, the EPA advised that the DPaW is the agency where the Sustainable Forest Management Division resides and so is the most appropriate agency to monitor implementation of the Proposed FMP.

The EPA advised that it has recommended that the Commission consider the merits of establishing a stakeholder reference group and provided reasons why it considers that, on balance, it would be a worthwhile initiative. The EPA noted that ultimately this is a decision for the Commission to make, taking into account the views of the community, including those expressed by appellants.

Proponent response

The Commission advised that the EPA, in its report, acknowledged that it had previously noted public concern about the need for legally binding and enforceable requirements on government agencies and industry in relation to the implementation of the FMP and, when changes to legislation were being considered, supported this approach. The Commission was of the view, however, that in the absence of any changes to the legislation, the EPA considered that the existing system of having an environmental agency (the DPaW) overseeing planning and operations of the FPC and its contractors and having the overall effectiveness of the FMP reviewed by a statutory environmental advisory body (the Commission) should give the community confidence that ESFM is being applied properly (Ibid. p.20).

The Commission advised that the Proposed FMP details the processes by which performance against the Proposed FMP will be assessed (through monitoring, auditing, checking and identification and reporting of non-conformance), and that to support an assurance to continuous improvement the Proposed FMP provides a commitment to increasing knowledge and undertaking adaptive management to address identified gaps or potential future gaps using tools such as research and benchmarking against other similar operations.

The Commission also advised that management reviews occur at planned intervals, most significantly the mid-term and end-of-term performance reviews conducted by it, and that a management review tool has also been developed by it in anticipation of the commencement of the Proposed FMP to monitor and manage implementation of the operations proposed to be undertaken.

The Commission advised that the community can contribute to the management of land vested in the Commission for environmental, economic and social outcomes, and that the extent of community engagement is guided by the DPaW's *Policy Statement 1: Department of Parks and Wildlife – key documents*.

In addition, the Commission advised that the Proposed FMP was amended from the Draft FMP to include text that more clearly outlines the responsibilities of the Commission, the DPaW and the FPC in relation to land vested in the Commission, and includes diagrammatic representation of the relationship in Appendix 4 which aims to clarify the roles of each organisation.

The Commission also provided the following advice in response to concerns raised in regards to implementation and management:

- The FMP is intended to be a CALM Act management plan, and as such is established to enable specified management activities during its life. The CALM Act provides for a management plan for State forest and timber reserves to have a purpose of native forest timber production on a sustained yield basis.
- Social, economic and environmental issues have been considered in the process of developing the Proposed FMP to ensure the full range of forest uses are included. The socio-economic study identified the social and economic significance of the timber harvest and wood processing industry, by accessing relevant information and consultation with industry.
- The Proposed FMP uses the CALM Act definition of 'forest products'. Carbon has been considered in the chapter on Carbon cycles and climate change. The CALM Act principle of 'achieving an optimum yield in production' relates to exotic species not native forests.
- The CALM Act stipulates that forest management plans will be for a maximum period of ten years.
- The matter of governance is addressed in the Proposed FMP in detail in the 'Plan implementation and management' chapter. The Commission may conduct audits on particular aspects of the implementation of the FMP, either itself or through parties it might engage, and will make these publicly available. In addition to these audits, formal mid-term and end-of-term reviews will be undertaken by the Commission and reported to the Minister. The Proposed FMP includes a range of revised KPIs that more comprehensively cover matters addressed in the Proposed FMP. The Proposed FMP includes changes to inter-agency arrangements that will seek to enhance compliance with plan requirements. The Commission, and independent auditors of FPC's *Environmental Management System/Australian Forestry Standard*, conduct third party performance reviews and audits. The DPaW approves and monitors operations undertaken by the FPC. The DPaW also undertakes internal audits, which are carried out by Management Audit Branch. The CALM Act and the *Forest Products Act 2000 (FP Act)* give these agencies defined responsibilities for forest management (the DPaW) and harvest of forest products (the FPC). The DPaW and the Commission are answerable to the Minister so conditions placed on the implementation of the plan by the Minister are unnecessary.

- The Proposed FMP sets the framework for resource allocation and allows for priorities to be addressed during the life of the plan. However, resourcing is beyond the scope of the plan.
- The merits of stakeholder reference groups are acknowledged, but experiences within this State and other jurisdictions are that these groups are costly to manage both in financial terms and staff time, and are most effective when they have a specific issue to address within a specific timeline. Groups with wide ranging representation also tend to find it difficult to arrive at consensus and hence in providing agreed recommendations. The merits of this approach over other stakeholder involvement strategies would also need to be weighed up against other priorities for agency resources in the south-west and throughout the State.

Consideration

Many appellants were concerned about the EPA's recommendation not to impose conditions in the Ministerial Statement in the event that the Proposed FMP is implemented. Many appellants were concerned about a lack of governance around timber harvesting activities in respect to the protection of environmental values.

Identification of governance issues

The issue surrounding governance of a management plan was recognised in appeals objecting to the EPA's report and recommendations on the Current FMP (EPA, 2003). As noted in the then Appeals Convenor's report for those appeals, by its nature an FMP is a broad level document that applies over a large area and over a long period of time, and will necessarily leave the detail of some operational matters for later determination by those implementing the FMP. Notwithstanding, the then Minister for the Environment's appeal determination of those appeals states:

Many appeals related to the need for a high level of on-ground compliance of forest operations with the requirements of the Plan and improved supervision of forest practices and appropriate enforcement of breaches of operational requirements. The Minister considers that the PFMP provides an appropriate framework for forest management practices and binds both the FPC and CALM to operate in accordance with its requirements. The Plan also provides for improvements in terms of requirements for forestry practices.

The incorporation of requirements for forestry contracts by the FPC, to include specific provisions relating to environmental standards and on-ground practices, and the provision of penalties for non-compliance is, however, seen as important, and the Minister will request the Minister for Agriculture, Forestry and Fisheries to ensure that the FPC incorporate provisions into forestry contracts relating to performance requirements for environmental management standards and associated operational actions, along with the application of a range of appropriate penalties for noncompliance. ...

The Minister also considers that a high level of transparency in terms of reporting and the provision of information relating to the Plan by all involved agencies is important in improving community confidence in the successful implementation of the Plan. Additionally, a strong focus on supervision and compliance and clear accountability for matters such as regeneration of forest and thinning, where there is a direct link to sustainable yield, is critical in the delivery of environmental outcomes at an operational level.

In its reviews of the mid-term and end-of-term audits of performance of the Current FMP, the EPA considered governance to be a critical matter to be addressed in the Proposed FMP. In particular, the EPA considered that the following matters would need to be addressed during the preparation of the next FMP:

- governance over forest planning, management and operations – the existing statutory roles and responsibilities of the Commission, the (former) DEC and the FPC in relation to the FMP need to be reviewed and improved (EPA, 2010b);
- compliance by contractors with the FMP, and their relationship with FPC in terms of compliance and enforcement (EPA, 2010b); and

- in the absence of changes to legislation, the FMP will need to identify other arrangements that provide transparency, accountability, and enforcement of compliance with the FMP (EPA, 2012b).

It is noted that in its *Annual Report 2011-12* the FPC identified no instances of significant non-compliance with the Proposed FMP in 2011:

There were no instances of significant non-compliance recorded during the 2011 calendar year. The Department of Environment and Conservation environmental audit released in December 2011 reported a high level of compliance (99.7 per cent) with the requirements for protection of informal reserves during timber harvesting operations. The same audit also reported a high level of compliance with habitat tree marking and retention requirements.

The end of term audit of the FMP was published by the Conservation Commission on 30 March 2012. This also indicates a high level of compliance by FPC with the environmental requirements of the FMP.

It is also noted that the Auditor General's report identified a general lack of transparency and accountability in the implementation of FMPs in practice through harvesting and subsequent sale of timber, and instances of wastes and breaches of environmental standards (OAG, 2013).

It is noted that Appendices 2 (pp.144-146) and 5 (pp.149-153) of the Proposed FMP outline the legislation, policies and key documents relevant to the Proposed FMP, and that Appendix 4 of the Proposed FMP provides a governance framework. The Proposed FMP also states "*Where significant conformance issues are identified, the Department formally notifies the proponent and requests remedial action*".

Enforcement of these governance mechanisms is considered to provide a level of protection from unauthorised logging activities, although it is noted that the Auditor General's report and the EPA's review of the Commission's mid-term and end-of-term audits of the Current FMP both identify inadequacies regarding compliance with and enforcement of the Current FMP.

Governance under the Proposed FMP

In the event that the Proposed FMP is implemented, there is a need to ensure that all forest-related activities are undertaken in a manner consistent with the Proposed FMP. There is also a need to ensure that the management activities are followed through and KPIs are met.

As noted previously in this report, it is understood that the management activities stated in the Proposed FMP will bind the agencies to which it refers under the CALM Act.

As with the Current FMP, the Proposed FMP will operate to constrain the operations of the DPaW and the FPC by virtue of the provisions of the CALM Act and the *Forest Products Act 2000*, which impose legally binding duties on those bodies. To ensure these duties are undertaken, there is currently a hierarchy of supervision levels and audit for harvesting operations that includes:

- contractor supervisors, who make regular checks against a standard checklist in the *Contractors' Timber Harvesting Manual* at the operational level;
- supervisors from the FPC, who are also required to check operations against a standard checklist from the *Contractors' Timber Harvesting Manual*;
- DPaW also undertakes operational checks at the District level;
- DPaW's Management Audit Branch also conducts audits of a sample of operations undertaken by both the DPaW and the FPC; and
- the level of on-ground compliance with the harvest Plan is also assessed by the Commission, which has a role in the independent audit of the levels of compliance with environmental protection measures.

As raised in the (then) Appeals Convenor's report for appeals objecting to the EPA's Bulletin 1113 on the Current FMP (EPA, 2003), worthy of consideration is the incorporation of requirements for forestry contracts to include specific provisions relating to environmental standards and on-ground practices, and the provision of penalties for non-compliance.

The Proposed FMP contains a chapter 'Plan implementation and management' which includes 18 management activities relating to implementation (management activities 117-120), monitoring and evaluation of performance (management activities 121-127), review and improvement (management activities 128-132), and stakeholder involvement (management activities 133-134) (KPI 24 also relates).

During discussions with the Office of the Appeals Convenor, the DPaW advised that its compliance investigations (in accordance with management activity 131) following each of the mid-term and end-of-term performance reviews undertaken by the Commission (in accordance with management activity 130) would be captured in a single report for each review for submission to the Minister once completed (in accordance with management activity 132).

The DPaW also advised that, in respect to the EPA's recommendation that public reporting be extended to include publication of all relevant compliance matters, the annual reports prepared by the DPaW and the FPC include this type of information.

In its advice the EPA was of the view that, with the exception of the requirements for mid-term and end-of-term performance audits and reviews, the conditions in Ministerial Statement 641 for the Current FMP do not manage on-ground activities and effectively have no enforceability.

While there are no Ministerial conditions recommended, advice obtained during the investigation of the appeals indicated that the management activities are binding under the CALM Act and therefore that the Commission's commitment to undertake mid-term and end-of-term performance reviews is binding irrespective of Ministerial conditions under the EP Act.

It is also noted that the draft Ministerial Statement in Appendix 3 of Report 1483 refers to the implementation of the Proposed FMP dated 13 April 2013. It is considered that any changes to the management activities within the Proposed FMP as a result of this appeals process could appropriately be required through the imposition of conditions in a Ministerial Statement under the EP Act.

Noting the above, it is recommended that priority management activities are amended to include timeframes to provide certainty that they will be achieved in a timely manner. It is also recommended that the draft Ministerial Statement in Appendix 3 of Report 1483 be amended to include a condition requiring any changes to the management activities within the Proposed FMP subject to the Minister's determination of the appeals.

Matters relating to the RFA and Commonwealth referral are discussed under Ground 11.

Conclusion for Ground 10

Considering all of the information available in respect to this ground of appeal, it is recommended that this ground be allowed to the extent that:

- management activity 118.1 is amended to include a target completion/publishing date within the first quarter of the implementation of the FMP for the preparation of a regulation policy to confirm the regulatory framework around timber harvesting;
- amend management activity 118.2 to include the target completion date of 31 December 2014 for the development and implementation of formal working arrangements between the DPaW and the FPC;

- amend management activity 121 to include a target completion date within the first half of the implementation of the FMP for the development of a protocol for each KPI in the Proposed FMP to specify how the measurement of each KPI will be undertaken;
- management activity 126.4 is amended to include a target completion date within the first quarter of the implementation of the FMP for the preparation of an adaptive management policy; and
- amend management activity 130 to include target dates for the completion of the mid-term and end-of-term performance reviews, and to require that the reviews are made publicly available on completion.

ASSOCIATED PROCESSES AND CONSIDERATIONS

Ground 11: Regional Forest Agreement and Commonwealth processes

Some appellants considered that the exemption afforded by the RFA from referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) to be invalid because the duration of the Proposed FMP extends beyond the duration of the RFA. Some appellants were of the view that the EPA should have referred the Proposed FMP to the Commonwealth, and that the EPA is in breach of the bilateral agreement. Specific issues raised were:

- The exemption from Commonwealth Government assessment of the Proposed FMP's impacts on threatened species listed under the EPBC Act is invalid because: (a) standards for the assessment and protection of threatened species have significantly changed since the RFA came into effect to reflect the increasing level of threat to these species; (b) there is significant evidence that logging activities have already had a significant impact on threatened species; and (c) the ten-year duration of the Proposed FMP extends five years beyond the 2019 term of the RFA.
- While the Proposed FMP refers to the RFA throughout, several RFA annual reports are missing from the Commonwealth website and are not available on the DER or DPaW websites. Reporting obligations under the RFA should be met before the implementation of a new FMP, so that consideration of how RFA objectives are being met can inform the process of developing the new FMP.
- There was a failure to comply with the State/Commonwealth bilateral agreement on environmental impact assessment, and failure refer controlled actions for assessment under the EPBC Act (RFA/EPBC Act assessment exemption invalid; and FMP actions outside the scope of the RFA/EPBC Act assessment exemption). The Commission and the EPA have failed to submit the FMP for assessment by the Commonwealth Government under the EPBC Act, even though the FMP contains a number of controlled actions that should be assessed, and that this is a breach of the bilateral agreement. The exemption from EPBC Act assessment for 'forestry activities' provided by the RFA rests on the assumption (made at the time of the RFA) that these activities did not have a significant impact on EPBC-listed species and other 'matters of national environmental significance', but is now invalid given that: (a) standards for the assessment and protection of threatened species have significantly changed since the RFA came into effect to reflect the increasing level of threat to these species; (b) there is significant evidence that logging activities have already had a significant impact on threatened species; and (c) the RFA has not been reviewed as required. In addition, even if the RFA exemption is considered valid, the FMP should still be referred to the Commonwealth Government for assessment under the EPBC Act as it contains significant activities that lie outside the scope of the RFA exemption: (a) the FMP contains actions that have significant impacts on MNES which are outside the scope of 'forestry actions', such as controlled burning not undertaken for forestry purposes; (b) the FMP extends management activities beyond the term of the RFA, which expires before the end of the FMP.

EPA advice

The EPA advised that any requirements under the EPBC Act and the RFA are outside of the scope of the EPA's assessment of the Proposed FMP under the EP Act. The matters raised by the appellants are matters for the Commonwealth Government to consider, should they have merit.

Proponent response

The Commission provided the following advice in response to concerns raised in regards to associated processes and considerations:

- The RFA does not exempt the Proposed FMP from the requirements of the *Wildlife Conservation Act 1950*. Forestry operations are deemed to have met Commonwealth

requirements under the EPBC Act for threatened flora, fauna and ecological communities. It is not considered necessary to refer the Proposed FMP.

Consideration

Appellants' concerns that the exemption afforded by the RFA from referral of the Proposed FMP under the EPBC Act is invalid because the duration of the Proposed FMP extends beyond the expiry date of the RFA, and because the EPBC Act threatened species (and other matters of national environmental significance) listing and protection requirements have been updated since the RFA came into effect, are acknowledged.

In respect to the RFA, according to the (former) DEC website:

The WA RFA is a 20-year agreement between the State and Commonwealth governments on the future use and management of the forests of WA's South-West, subject to five-yearly reviews.

It meets each of the three main objectives of the RFA process:

- to protect environmental values in a world class system of national parks and other reserves, based on nationally agreed criteria;
- to encourage job creation and growth in forest-based industries, including wood products, tourism and minerals; and
- to manage all native forests in a sustainable way.
- For the environment, it establishes a world class reserve system which is Comprehensive, Adequate and Representative of the forests' biodiversity, old growth, and other natural and cultural values.

Clause 23 of the RFA states:

The Commonwealth, in signing the Agreement, confirms that its obligations under the [former Commonwealth *Environment Protection (Impact of Proposals) Act 1974*; repealed by the EPBC Act] have been met. The Commonwealth also confirms that, under the administrative procedures of the [EPBC Act], any activities covered by the Agreement, including the five-yearly review and report in accordance with Clauses 36 and 37 and minor amendments to the Agreement, will not trigger further environmental impact assessment under the [EPBC Act].

It is also noted that clause 6 of the RFA allows for the RFA to be extended for a further period.

Notwithstanding, the EPA's advice that matters relating to the EPBC Act and the RFA are outside the scope of its assessment of the Proposed FMP, is noted.

However, during discussion with the Office of the Appeals Convenor, the Commission indicated that if the duration of the RFA is not extended, it is aware that it may have referral responsibilities under the EPBC Act relating to matters of national environmental significance. It is therefore recommended that this ground of appeal be dismissed.

Ground 12: Forest products end use

Many appellants considered that the EPA should have assessed the end use of forest products resulting from timber harvesting, particularly in respect to sustainability and allowable cut, methods of harvesting, and potential future biomass energy production. Specific issues raised were:

- Although logging for first and second grade sawlogs for high value products is the pretext for logging, most of the wood produced is wasted on low value products. Based on sawn timber recovery rates given by the FPC, as little as 15% of the wood from the native forest logs sold by the FPC becomes sawn timber, and this includes hundreds of thousands of timber railway sleepers, and that reports from sawmillers say that the recovery rate for what the FPC is selling as first and second grade sawlogs is as low as 28%. Woodchips, firewood, charcoal, railway sleepers or biomass fuel are not acceptable uses for our native forest trees.
- Socio-economic considerations are one of the principles of ESFM and the Commission has a section on the topic and a KPI relating to value-adding: "*Performance measure: Quantity of product by the level/extent of local value adding*" (p.114). However the *Analysis of Submissions* states: "*End-use of harvested logs is beyond the scope of the plan*" (Commission, 2013a; pp.88 and 95).
- Research to be undertaken into redevelopment of the ecotourism industry to promote natural biodiversity in place of wood products.
- The end uses of forest products should be taken into account to see whether the State is getting optimum value from our native forests.
- Markets are being sought for large amounts of low-grade logs. The Government's consideration to sell native forest logs to be burnt to produce electricity is another way to prop up a non-viable forestry industry. The use of native timber for electricity production should not be allowed. Plantations to be used for biomass, wood-chipping, etc, instead of native forests.
- There are flaws with the approach that has been taken in the Proposed FMP regarding the use of forests, with log production the only use given full consideration without adequate regard for its impacts. The Proposed FMP places too great an emphasis on the extractive use of forests as a management objective at the expense of other management outcomes such as ecosystem health, maintenance of biological diversity and protection of cultural values; makes the mistake of defining 'forest products' only as timber and fibre without adequate investigation of other more profitable and sustainable uses or models of forest resource utilization (such as carbon sequestration services); and fails to optimize the economic and social value derived from forests by continuing an established high volume-low value resource utilisation model. The Proposed FMP has failed to satisfy the CALM Act principle of achieving an optimum yield in production by restricting production to only wood products, and failing to undertake a comprehensive assessment of all possible forest utilisation options in order to identify the optimal option. The Proposed FMP should be amended to comply with the relevant legislation, including undertaking a thorough analysis of all forest management and forest use options to identify the socially, environmentally and economically optimal option.
- Logging levels should reflect the vastly reduced legitimate need for timber products. Given the fact that we no longer need jarrah and karri for building as once we did and given the fact that the vast majority of logs are used for low end product use such as woodchips, firewood, charcoal for Simcoa operations and railway sleeper production, there is no real need to continue the destructive practice of broadscale logging.
- The EPA failed to consider the significant factor of downstream impact of new biomass electricity industry as a result of implementing the Proposed FMP. The Proposed FMP establishes the possibility of a new native forest fuelled biomass energy industry which would accept large volumes of 'low grade material', however the impact of such an industry has not been assessed. Biomass energy generation has significant environmental impacts including carbon pollution and air pollution, which should be assessed as part of any proposal to supply native forest resources for such an industry.

EPA advice

The EPA advised that it has assessed the Proposed FMP which sets allowed levels of timber harvesting, broken down into timber of different types and classes, and has assessed the proposed levels of harvesting and concluded that the process used to derive them is rigorous and that the EPA's environmental objectives can be met at these levels of harvesting. The EPA advised that the scope of its assessment does not deal with the end-use of the harvested products, only the impacts of harvesting itself.

The EPA also advised that with regard to fuels for the biomass energy industry, any proposal for a downstream industry based on forest products would be subject to the normal requirements of the EP Act, including formal assessment should the proposal have potentially significant environmental impacts.

Proponent response

The Commission provided the following advice in response to concerns raised in regards to forest products end use:

- The Proposed FMP encourages use for the highest value, but this is largely outside the scope of the Proposed FMP. Utilisation of felled trees is monitored by the DPaW. The end use of harvested logs is beyond the scope of the Proposed FMP.

Consideration

Appellants' concerns in regard to the end use of forest products resulting from timber harvesting, particularly in respect to sustainability and allowable cut, methods of harvesting, and potential future biomass energy production, are noted.

The EPA's advice that it has assessed the proposed levels of harvesting and concluded that the process used to derive them is rigorous and that its environmental objectives can be met, and that there would be a requirement to formally assess any proposal which potentially has significant environmental impacts, is noted.

Noting the EPA's advice that the end-use of the harvested products is outside the scope of its assessment and therefore not part of its report and recommendations, and the Commission's advice that the end use of harvested logs is beyond the scope of the Proposed FMP, it is recommended that this ground of appeal be dismissed.

Ground 13: Socio-economic matters

Some appellants considered that the EPA should have considered socio-economic factors insofar as they relate to the need for native forest timber harvesting and affect other forest uses. Specific issues raised were:

- The Proposed FMP provides a weak socio-economic case for native forest logging and lack of full sustainability, especially economic scrutiny. The stated socio-economic case for the continued native forest timber industry is feeble. There is no mention or quantification of the taxpayer subsidy, or the major loss of conservation, tourism potential, carbon storage or other environmental and social values which will result from continued logging. A full, independent economic assessment of the Proposed FMP and the native forest timber industry is required.
- Continued and increased logging will reduce tourist numbers (and income) to the south-west; many who come to see the third tallest forests in the world; it will also negatively impact income spread in the region.
- There has been a lack of balanced consideration of social factors. The continuation of 'business as usual' is obviously a political consideration to support a non-viable native forest timber industry. There is no concomitant consideration of appeals to support an ex-timber town's concern and efforts to build a new future based on its past and remaining forest legacy.
- The EPA's support for the "*ongoing implementation of a range of measures to protect and maintain biodiversity values of the whole forest*" is without consideration to the social and economic implications of these decisions. A range of measures proposed in the Draft FMP carry a cost impediment to the native forest timber industry, which has not been assessed against the social and economic requirements of the Proposed FMP. A thorough cost-benefit analysis is required.
- The Proposed FMP is skewed towards the use of forests for log production without consideration of the inherent impacts. There is too great an emphasis on managing forests for extractive purposes with little regard for the consequences for ecosystem health a, the maintenance of biodiversity and protection of cultural values.
- There has been a failure to fully describe and report on economic alternatives to traditional logging and how perilous the condition of the forest is and how its ecological whole is harmed. The true value of the forest left unlogged has not been determined. A comprehensive social, economic and environmental assessment has not been undertaken.
- Our most valuable resource is our pristine forests in their existing state. As the world becomes more populated and polluted those areas that remain pristine will bring visitors for numerous reasons, and the forests cut down is a short term, bad financial decision. Thought be given to our children's and our grandchildren's future. We will be remembered for making decisions that will make irreparable change to our environment.

EPA advice

The EPA advised that its assessment of the Proposed FMP was, and could only be, focussed on the environmental impacts of the proposal. The EPA advised that while the Proposed FMP included information on the socio-economic benefits of the FMP, this was done to meet the Commission's role to provide advice to the Minister on the application of the principles of ecologically sustainable forest management, and that this information was not taken into consideration by the EPA in its assessment.

The EPA also advised that where biophysical impacts could affect social values, such as amenity, these were addressed in Report 1483.

Proponent response

The Commission provided the following advice in response to concerns raised in regards to socio-economic matters:

- The Commission and the DPaW note that the suggestion that any recommendations out of this appeals process should consider the socio-economic implications of the recommendation is consistent with the application of the principles of ESFM.
- Social, economic and environmental issues have been considered in the process of developing the Draft FMP and Proposed FMP. An independent socio-economic study was undertaken and focussed on the economic and social significance of the timber harvest and wood processing industry, by accessing relevant information and in consultation with industry. The report from this study was published at the same time as the Draft FMP was released for public comment.

Consideration

Some appellants considered that the EPA and the Commission have not had sufficient regard for the social and economic matters associated with native forest logging, and that the Proposed FMP provides a weak case for continued logging by an industry that appears to be in decline. The appellants were of the view that an economic assessment of the full value of the forest left standing is required.

The Commission's advice that an independent socio-economic study was undertaken of the Draft FMP, is noted.

The socio-economic study (URS Australia, 2012) primarily focused on native forest wood resources (based on the wood volumes stated in the Draft FMP), with a secondary focus on other forest uses including craftwood, mineral resources, water resources, tourism and recreation, basic raw materials, apiculture (honey production), floriculture (cut flower) and seed industries, biotechnology, and public firewood. The review did not assess the extent of impacts as a result of changes to government policy and their management implications, or caused by changes in forest productivity as a result of external factors such as climate change.

Notwithstanding, the EPA's advice is noted that the EPA's assessment is limited to consideration of the environmental impacts associated with the Proposed FMP referred to it, and that socio-economic considerations are therefore largely outside the scope of the EPA's assessment, it is recommended that this ground of appeal be dismissed.

OTHER MATTERS

Some appellants made submissions regarding matters that are not directly related to the EPA's report and recommendations. The appellants' concerns in respect to these matters are noted below.

Independence, conflicts of interest, collusion

Several appellants raised issues related to the EPA's independence in undertaking its assessment, perceived conflicts of interest and collusion, consideration of alternatives to native forest timber harvesting, and adequacy of public consultation. Specific issues raised were:

- The EPA's assessment was insufficiently independent of the Commission and ignored widespread public concern and evidence of the risks of environmental harm. The EPA's consideration of these matters was superficial, and the recommended implementation statement is inadequate. The Proposed FMP should undergo a rigorous and fully independent expert assessment.
- There should be an independent environmental impact statement, which should be subject to public scrutiny before any more forest is removed.
- Some officers in positions of influence within the DER and the DPaW, and associated with the Minister, have backgrounds in forestry and have biased opinions in favour of the native forest timber industry. These officers may influence decision making processes. The Minister should consider the possibility that these officers may have conflicts of interest with a view to resolving the issue, and consider the credibility of advice that has been subject to this influence.
- The DPaW has a conflict of interest in undertaking self-assessment of the impacts of forest management on biodiversity using its own FORESTCHECK system.
- The EPA has colluded with the Commission to cover up these issues and ignore its own earlier findings, with the almost certain result that many tens of thousands of hectares of jarrah forest will be intensively logged with no prospect of ever recovering their former ecological or other environmental values.
- The EPA has colluded with the Commission to a forest-swap deal to 'compensate' the native forest timber industry for the proposed protection of part of the Whicher forest (+4,020 ha) by reducing the area set aside in the fauna habitat zones (-4,273 ha). Such trade-offs are not "consistent with the overall purpose of fauna habitat zones" and it is dishonest of the EPA to say otherwise.

EPA's advice

The EPA advised that due to the nature of the proposal, it being a management plan for the south-west forests, the EPA is unable to assess alternatives outside of the Proposed FMP that some appellants would like considered. The EPA considered that many of the points raised in this ground of appeal relate to alternative uses for the forests that appellants believe should have been considered in preference to those presented in the Draft FMP and Proposed FMP, and that these points also lead to accusations of conflicts of interest, lack of independence, and collusion between government agencies and the EPA. The EPA advised that while the Draft FMP did put forward alternatives for some aspects of management on the issue of timber harvesting, no alternative was proposed, and it was only the level of harvesting that was to be decided through calculation of 'sustained yields'. The EPA also advised that appellants are correct to the extent that government sets the general direction of the FMP (though legislation and policy) and then it is role of the proponent (the Commission assisted by the DPaW) to deliver a plan that meets its environmental requirements within that policy framework. The EPA noted that in assessment, it is then the EPA's role to assess the Proposed FMP against its environmental objectives.

The EPA advised that, therefore, while alternative FMPs based on other policies (such as no harvesting of native forests) could be developed which may also meet the EPA's environmental objectives, the EPA must report on the Proposed FMP submitted to it, and that the appellants feel deprived of the opportunity to influence government policy is not a failing of the assessment process. The EPA advised that its recommendation for a stakeholder reference group that maintains a constant dialogue between interested and qualified parties throughout the life of the FMP, if taken up, may go some way to addressing the appellants' concerns that that are excluded from shaping the direction of the FMP. The EPA noted that ultimately, however, appellants would need to influence government policy directly to in order to achieve their aims.

The EPA advised that it does not believe that it has abrogated its statutory responsibility in its assessment of the Proposed FMP. The EPA advised that it has assessed the factor of "Flora and Vegetation, and Terrestrial Fauna" and considered the impacts of the Proposed FMP on biodiversity. In addition the EPA advised that through the assessment it has questioned the proponent on aspects of management and modelling and been provided with satisfactory answers. The EPA advised that it is not aware of any forest-swap deal: the Whicher National Park and the refinement of fauna habitat zones were two separate issues. The EPA also noted previous reports and opinions, including its own, but advised that it has based its report to the Minister on the understanding that it has gained through the assessment process and its own assessment of the proposal against its environmental objectives. The EPA advised that having concluded that the Proposed FMP would meet its environmental objectives without the need of amendment, it has not recommended any conditions. The EPA advised that it recommends that the Minister make any decisions on proposals to access 'upper limit allowable cut' because it considers the Minister is able to take into account the full suite of environmental, social, and economic considerations when making a decision.

Proponent's response

The Commission provided the following advice in response to concerns raised in regards to these matters:

- The process of developing the next FMP initially included a referral document and a scoping document under the EP Act. A Draft FMP was then prepared and released, consistent with the scoping document, for the purpose of public consultation under both the CALM Act and EP Act. Public comments were considered and analysed and a Proposed FMP prepared following public comment.
- The EPA assessed the Proposed FMP under the EP Act, plus the submissions and responses to those submissions on the Draft FMP, and has considered them independently.
- Based on the interactions with the EPA during this process, the Commission and the DPaW are of the view that the EPA has fulfilled its responsibilities.
- Timber harvesting is managed by the FPC, not the DPaW, who is the regulator of this activity. Consequently, the DPaW is not undertaking self-assessment and does not have a conflict of interest.

Appeals Convenor's advice

It is noted that there is a perception of collusion and conflict of interest, largely as the EPA, the Commission and the DPaW, as well as the provisions under the CALM Act (under which the Proposed FMP was prepared) and the EP Act (under which the EPA's assessment was undertaken), fall under the State Government Environment portfolio. However it is expected that public reporting of outcomes, stakeholder engagement, and improved transparency, may help to alleviate some of these concerns.

Alternatives to timber harvesting

A number of appeals raised the matter of alternatives to native forest logging. Some appellants were of the view that there had been a failure to fully describe and report on economic alternatives to traditional logging. During meetings with the Office of the Appeals Convenor, several appellants expressed strong objections to the lack of consideration given in the Proposed FMP to other uses of the forest, including as tourism, use of plantation timbers, and carbon credits. Specific issues raised were:

- The Proposed FMP fails to provide a fair and independent assessment of alternatives to industrialised logging in the State's native forests, and alternatives should be considered. Native forests are already over-cut and logging is not sustainable. The Commission was not provided with the scope to formulate a management plan that did not include a business-as-usual approach to forest management.
- An alternative philosophy to that established by the former Department of Conservation and Land Management should be adopted. The Proposed FMP should be developed to limit further damage, to restore sustainability to forest ecosystems for the long term, and allow time for recovery to parts that have been depleted and degraded.
- An immediate independent assessment should be undertaken of the process by which the Commission is empowered to formulate and propose a holistic, adaptive and inclusive approach to management of the forests of the south-west. The Commission should produce a thoroughly researched and truly sustainable FMP that is not founded on an assumption of continued logging.
- There is no provision in the Proposed FMP to transition all logging from native forests to plantations. A wood production industry plan should be developed that will complete this transition.
- Protecting the State's south-west forests will create greater value to Western Australia than selling the trees as timber, woodchips and firewood. Ecotourism is a viable option for forests, and that forestry workers could be re-deployed to managing introduced species.
- The EPA's support of the Proposed FMP is flippant. The evaluation of environmental impacts using international independent environmental impact statement reviewed scientific standards should be undertaken. More tree planting should be undertaken.

EPA's advice

The EPA noted that the proposal being assessed by it is a management plan for the south-west forests, and so the consideration of management options is somewhat different from that of a typical proposal, where the main purpose of the proposal is something other than environmental management. The EPA advised that in a typical proposal, options for environmental management are considered by the proponent in the context of their compatibility with the actual proposal, environmental effectiveness, and cost, and that it then assesses the proposal and any proposed management against its environmental objectives. The EPA advised that in the case of the Proposed FMP, it assessed a particular management plan that, by its nature, has already excluded some management alternatives (e.g. cessation of native timber harvesting, or a large expansion of the area available for timber harvesting), and that while many appeals (and submissions on the Draft FMP) come from a position of promoting a profoundly different management approach, its assessment is restricted to investigating criticisms of the proposed management (i.e. the Proposed FMP) with regard to its environmental objectives, not evaluating the merits of alternative management approaches put forward by others. The EPA also noted that many of the alternative management approaches are largely based on different opinions and philosophical positions on forest management and so lack the background data provided in the Proposed FMP and have not been subject to the same level of scrutiny. The EPA considered that even if they were within the scope of the EPA's assessment, it would be difficult for the EPA to assess their relative environmental merits, let alone the social and economic merits that government would need to consider.

The EPA's response in respect to the previous matter is relevant. The EPA also advised that its assessment is of the Proposed FMP submitted by the proponent and so does not evaluate or assess alternatives, such as the use of forests for economic carbon credits, although the EPA does support further reporting on such opportunities/alternatives so that there can be public discussion of these in lead up to the formulation of the future FMPs.

Appeals Convenor's advice

Appellants' concerns are noted. It is acknowledged that the native forests lend themselves to a range of alternative uses, including ecotourism and carbon credits.

Appellants referred to the Australian National University's Centre for Climate Law and Policy's analysis of the carbon credits that could be generated by stopping all harvesting in south-west native forests. The analysis findings were published in report *Carbon credits from Western Australia's multiple use public native forests: a first pass assessment* in November 2012 (Macintosh, 2012), and concluded that the ~850,000 ha of forests could generate a number of different types of carbon credits and price scenarios, the most notable of which are (non-cumulative) forest management credits and Kyoto-Australian carbon credit units, with a calculated annual value of between \$16 million and \$438 million (Macintosh, 2012).

As noted under Ground 3, the Proposed FMP includes management activities 55.4 and 55.7 in respect to carbon stores and investigating opportunities that may arise from an emerging carbon economy, and in Report 1483 the EPA advised that it supports this commitment.

Notwithstanding, the EPA's advice is noted that the consideration of alternatives was not within the scope of the EPA's assessment.

Identification of key environmental factors

Many appellants were of the view that the EPA did not assess all of the environmental factors relevant to the proposal. Some appellants noted that the EPA assessed different environmental factors in its assessment of the Current FMP.

Appeals Convenor's advice

Bulletin 1113 on the Current FMP states that the EPA identified two environmental factors (a) biodiversity, and (b) ecologically sustainable forest management.

Report 1483 states that the EPA identified three key environmental factors (a) flora and vegetation, and terrestrial fauna, (b) terrestrial environmental quality and (c) hydrological processes. The EPA also identified four additional relevant factors (inland waters environmental quality, air quality, heritage, and amenity), however did not consider these to be key factors warranting discussion and evaluation.

As discussed previously in this report, it is understood that the EPA's assessment of the Proposed FMP was in accordance with the Administrative Procedures.

Objects and principles of the EP Act

Some appellants submitted that the EPA did not adhere to the principles in the EP Act. Some appellants noted that the EPA had regard to different principles in its assessment of the Current FMP. Specific issues raised were:

- The EPA ignored the precautionary principle by ignoring the concerns of 35 scientists in respect to the impact on logging operations on biodiversity and climate change.

- The EPA has not had proper regard for principle 4 in undertaking its assessment of the Proposed FMP. The EPA did not consider the value of ecosystem services provided by native forests, particularly in respect to carbon storage, water cycling and biodiversity habitat. The EPA did not consider the full life-cycle costs of the production of native forest products in the form of lost ecosystem services.
- The EPA has not applied the precautionary principle to its assessment of sustainable yield and impacts to the survival of native forests and their inhabitants.

EPA's advice

With regard to environmental principles, the EPA advised that it assessed a Proposed FMP that set out a specific management regime, and that it was not within the scope of the assessment to consider alternative management regimes and compare them in terms of environmental benefits and cost, assets and provision of ecosystem services. The EPA advised that as stated before, the issue of greenhouse gas emission is not a major concern for the management of forests and so the precautionary principle is not relevant in this regard.

Appeals Convenor's advice

Section 4A of the EP Act lists five principles which are to guide the implementation of the EP Act with the object of protecting the environment of the State.

Bulletin 1113 on the Current FMP states that the EPA had regard to the principles related to sustainability, precautionary approach, intergenerational equity, biodiversity conservation and ecological integrity, and pricing and valuation.

Report 1483 states that the EPA had regard to the principles related to precautionary approach, intergenerational equity, and biodiversity conservation and ecological integrity. Appendix 2 of Report 1483 outlines the EPA's reasons for considering or not considering each of these principles; it is noted that the EPA did not consider the principles related to sustainability or pricing and valuation to be relevant in this case.

Scientists' Statement

Some appellants contended that the EPA did not consider the views of 35 prominent scientists and experts in respect to concerns raised about the future of the forest ecosystems of south-west WA. Specific issues raised were:

- The Scientists' Statement (2013) outlines concerns that the south-west forests are under enormous stress from historical over-clearing, destructive fires, mining, forest diseases, climate change and drought, and recommends seven measures that should be incorporated into the Proposed FMP. The scientists' claims and recommendations should be investigated thoroughly before the Proposed FMP is implemented.

Appeals Convenor's advice

On World Environment Day on 5 June 2013, the *Scientists' Statement on Protection of Western Australia's South-west Forests* was published, containing views on threats to the native forests and the impacts of continued industrial-scale logging, and a list of 35 prominent scientists and experts who are claimed to endorse the Statement. The Statement also contains a list of measures recommended to be incorporated into the next FMP:

- critical habitat for threatened species including forest that retains the structure of the original forests should be urgently protected from degradation and loss;
- additional corridors for fauna movement should be urgently incorporated into the conservation reserve system to link refuge areas;

- forests currently free of *Phytophthora cinnamomi* should be protected from activities that could introduce dieback;
- jarrah forests receiving less than 600 mm of rain per annum, and jarrah forests projected to receive less than 600 mm of rain per annum by 2030 should be protected;
- karri forests receiving less than 1,000 mm of rain per annum, and karri forests projected to receive less than 1,000 mm of rain per annum by 2030 should be protected;
- water in rivers, streams, wetlands and aquifers should be protected from the impacts of logging and clearing; and
- the value of WA's south-west forests as a carbon store should be recognised, accounted for and prioritised above conflicting uses.

During a discussion with the Office of the Appeals Convenor the EPA advised that of the 35 scientists listed in the Statement, few made submissions. The EPA also advised that while the Statement was not provided earlier in the assessment process for its consideration, the matters raised in the Statement were also raised in other submissions received in respect the Draft FMP and were therefore considered.

It is noted that the list of measures recommended in the Statement is consistent with many of the outcomes sought by appellants. Noting the EPA's advice, it is considered that the matters raised in the Statement were considered by the EPA.

Accounting analysis

Some appellants considered that a full accounting analysis should be undertaken in respect to timber harvesting industry costs. Specific issues raised were:

- The full costs to the State of native forest logging should be calculated and publicly reported as well as its costs to other industries so that a true assessment can be made of its economic value. The FPC, DPaW and Commission incur huge costs from native forest logging, and logging and associated burning cause economic damage to other, potentially sustainable industries (beekeeping, wine making, tourism and recreation).
- The economic values realised from the harvested timber product by the FPC are questionable and at odds with normal accounting practices, and this issue needs to be addressed to account for the economic position of the responsible managers and to properly inform the Minister prior to any decision being made. In addition, the Commission should require the FPC to resubmit the accounts using normal accounting practices, and an audit of the FPC should be undertaken and a new report reflecting normal accounting practices be provided to the EPA, prior to any Ministerial decision being made.

Appeals Convenor's advice

Appellants' concerns are noted. In this case economic considerations were not within the scope of the EPA's assessment. It is noted that the Proposed FMP includes management actions around socio-economic matters relating to the forest products industry

Readability of the Proposed FMP

Some appellants were of the view that the Proposed FMP could be easier to read. Specific issues raised were:

- There has been insufficient time allowed to assess the 80-page sustained yield report (and other documents) released at the same time as the Proposed FMP was published, which have raised concerns that should be addressed.

- The Proposed FMP is difficult to read, and should be divided into chapters, sections and numbered paragraphs like the report on sustained yield.
- Further clarification of intentions is required. Many statements appear to have loopholes, for example (emphasis added): "*The plan proposes activities at the whole of forest scale for the purpose of seeking to develop an improved understanding of the biodiversity of forest regions and the response of forest ecosystems to natural and human induced disturbance, with a view to improving forest management practices*" (page 38) and "*The previous FMP included actions to protect significant flora species and the end-of-term audit (Commission 2012a) found that not all of these actions had been fully implemented. It is intended that these be implemented progressively as resources permit*" (page 37). An "act first and assess the damage later" perspective will result in negative consequences.
- The Proposed FMP should refer to 'fire' rather than 'bushfire', as flora and fauna don't distinguish between prescribed burns and wildfires.

Appeals Convenor's advice

It is noted that the EP Act specifies a 14-day appeals period for EPA report and recommendations. For many proposals this would be sufficient time, but for a proposal with the complexities and volume of material of the Proposed FMP it is noted that the statutory period in which to lodge an appeal is inadequate for a full consideration of all matters.

In respect to the formatting of the Proposed FMP, appellants' concerns are noted. Formatting was not a matter assessed by the EPA, it is a matter for the Commission to consider in finalising the Proposed FMP.

Public consultation during assessment

Some appellants were of the view that consultation on the development of the Draft FMP and Proposed FMP was inadequate, and that the Commission and the EPA did not have sufficient regard to the large numbers of submissions made. In addition, some appellants asserted that information supporting the Proposed FMP should have been published when it was available instead of at the same time as the EPA's Report 1483 to enable public review. Some appellants were also of the view that the EPA has wrongly stated that the Proposed FMP was subject to a high level of scrutiny, submitting that the only scrutiny available to the community has been the three-month submission period on the Draft FMP, and the two-week appeals period on the EPA's report and recommendations.

EPA's advice

The EPA advised that the Proposed FMP was assessed at the level of a PER, with the greatest opportunity for public involvement (two week public comment period of the Environmental Scoping Document, and a 12 week public comment period on the PER/Draft FMP document).

Appeals Convenor's advice

It is understood that the EPA followed its normal public process to assess the Proposed FMP, which is outlined below:

- the Commission released the Draft FMP for public comment as required under the CALM Act;
- the Commission facilitated discussions with stakeholders;
- the Commission provided submissions received on the Draft FMP to the EPA;
- the Commission provided its response to submissions to the EPA;
- the Commission amended the Draft FMP, and submitted the Proposed FMP to the EPA;
- the EPA released the Proposed FMP for public comment as required under the EP Act;

- the EPA facilitated discussions with stakeholders; and
- the EPA published its report and recommendations, along with supporting information.

Perth and Peel Regional Sustainability Planning and Strategic Assessment

Late in the appeals investigation an appellant requested that a report on the population viability assessment of Carnaby's cockatoo, commissioned by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (**DSEWPaC**) as part of a strategic assessment of the Perth and Peel regions, be taken into account as part of its appeal insofar as it relates to impacts to threatened species.

By way of background, in July 2011 the WA Ministers for Planning and Environment and the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities agreed to undertake a strategic assessment of the Perth and Peel regions. The strategic assessment is being led by the WA Department of Premier and Cabinet (**DPC**) in partnership with the DSEWPaC. At a State level the DPC is working closely on the strategic assessment with the Department of Planning, (former) DEC and Office of the EPA (DPC, undated).

It is noted that the DSEWPaC website advises:

Since August 2011, the Australian and Western Australian governments have collaborated to deliver a strategic assessment of future urban development in the Perth and Peel regions of Western Australia. ...

The key challenge facing these regions is how to respond to population and economic growth whilst managing impacts to the environment. This need has prompted the Western Australian and Australian governments to collaborate on a strategic assessment of the regions. Through providing funding for critical research, regional sustainability planning enables more effective decision making about protection of environmental assets and land use planning. ...

The Carnaby's Cockatoo PVA [Population Viability Analysis] research project will collate best available information from experts and published literature to fill knowledge gaps in relation to Carnaby's Cockatoo, for the strategic assessment of the Perth and Peel regions. The study will develop and test a model to help provide a more robust scientific basis for decision making in relation to potential development and conservation scenarios in relation to this species. The contract has been awarded to Parsons Brinckerhoff Australia. The report and PVA model is scheduled to be provided by the end of June 2013.

It is understood that the scope of the strategic assessment relates to development and change in landuse, and that forestry activities were not within that scope.

It is acknowledged that timber harvesting activities combined with development in the Perth and Peel regions may have cumulative impacts on the extent of available fauna habitat.

The EPA's advice under Ground 1 that timber harvesting results in temporary, selective removal of native vegetation (with management applied to promote rehabilitation) rather than permanent, broadscale clearing, is noted. It is also recommended under Ground 1 that the Proposed FMP commits to the extension of forest monitoring programs (including FORESTCHECK) to include a greater focus on a greater diversity of forest types and a greater range of threats to the forests, and this will have regard to Carnaby's cockatoo and its habitat requirements.

CONCLUSION AND RECOMMENDATION

In undertaking this appeals investigation, the Office of the Appeals Convenor was conscious of the unique aspects of this proposal, and why it has attracted a significant number of appellants from a diversity of backgrounds and locations.

Through this process the Office of the Appeals Convenor was left in no doubt as to the level of concern of the appellants. The interactions between the ability of the forests to recover from the timber harvesting activities to which the Proposed FMP refers in the face of a drying and warming climate is complex and challenging. It is appreciated that a number of appellants may have had some difficulties interpreting the information used to inform the preparation of the Proposed FMP, particularly given the limited timeframe of the appeals period for examination of such material. Nevertheless, issues were expressed in cogent terms and with considerable force.

During the course of this investigation it became evident that there is a great deal of information available about the impacts of native forest timber harvesting, the changing climate, threats to biodiversity and other related matters. Nevertheless, there still appear to be significant knowledge gaps to be filled to support ESFM. These have been acknowledged by the EPA, and it has noted priority areas in its report to the Minister. The EPA was of the view, however, that the Proposed FMP can meet the EPA's objectives for the key environmental factors assessed, and its views were not altered by any material submitted through the appeals process.

The Office of the Appeals Convenor has considered the grounds raised in the appeals, spoken and/or met with many of the appellants, in some cases more than once; and held discussions with the EPA and the Commission/DPaW regarding the issues and concerns raised and investigated possible ways in which the protection of the environment might be enhanced if the Proposed FMP is implemented. Overall, given the information considered in respect to the appeals, it is considered that the EPA has appropriately assessed the Proposed FMP in accordance with its Administrative Procedures. Noting the EPA's acknowledgement of gaps to be filled to support ESFM, if the Proposed FMP is to be implemented a number of changes are recommended to it via a Ministerial Statement, with the intention of improving environmental outcomes.

Noting also that the Proposed FMP states that the various parts of the plan will be implemented progressively according to available resources (including funding and capacity), it is recommended that priority be given to the timely implementation of management activities relating to:

- guidelines, policies or other materials referred to in other management activities;
- matters that were intended to be completed during the term of the Current FMP;
- matters that are fundamental to the implementation of the Proposed FMP; and
- matters that were raised as significant/important in audits and reviews of the Current FMP and/or in the preparation of the Proposed FMP.

It is therefore recommended that the Minister allows the appeals to the extent that the Ministerial Statement contains conditions requiring changes to priority management activities in the Proposed FMP to strengthen the operational commitments, as follows:

Performance monitoring and evaluation:

- amend management activity 121 to include a target completion date within the first half of the implementation of the FMP for the development of a protocol for each KPI in the Proposed FMP to specify how the measurement of each KPI will be undertaken;
- amend management activity 130 to include target completion dates for the mid-term and end-of-term performance reviews, and to require that the reviews are made publicly available on completion;

Further and ongoing research:

- add a management activity that requires, within the first quarter of the implementation of the FMP, the establishment of a process to identify and deliver research priorities, in collaboration with research institutions and relevant organisations as required; and the development and implementation of a program which commits to timeframes to extend forest monitoring programs (including FORESTCHECK) to include a greater focus on the impacts of soil compaction, key climate change indicators, a greater diversity of forest types, and a greater range of threats to the forests;
- amend management activity 20 to include a target completion date within the first quarter of the implementation of the FMP for the extension of the FORESTCHECK monitoring program;
- add a management activity that requires, as part of the mid-term performance review, a review of the sustained yield calculations to take into account monitoring and research results, the need for amendments to enable the FMP to adapt to episodic events such as major fires, cyclones, and pest or disease outbreaks (as identified by the Sustained Yield Expert Panel (Ferguson *et al*, 2013)), and the need for any further research to support ecologically sustainable forest management;

Guidance documents and policies:

- amend management activity 14.2 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the preparation of *Goals for Understorey Structural Diversity*;
- amend management activity 17.1 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the revision of *Guidelines for Selection of Fauna Habitat Zones*;
- amend management activity 42 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the revision of relevant subsidiary documents pertaining to rehabilitation requirements for major extraction tracks and landings, and roads and tracks no longer required;
- amend management activity 49 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the development of a position statement to provide guidance when proposals to take water area considered;
- amend management activity 118.1 to include a target completion/publishing date within the first quarter of the implementation of the FMP for the preparation of a regulation policy to confirm the regulatory framework around timber harvesting;
- amend management activity 126.4 to include a target completion date within the first quarter of the implementation of the FMP for the preparation of an adaptive management policy;
- add a management activity that requires, within the first quarter of the implementation of the FMP, the development of a procedure to identify and demarcate old-growth forest;

Stakeholder engagement:

- add a management activity that requires, within the first quarter of the implementation of the FMP, the development of a communications strategy that identifies, among other things, the establishment of advisory groups and stakeholder reference groups (as identified throughout the Proposed FMP) to assist in providing opportunities for the community, and relevant non-government organisations and government agencies, to participate in and to inform the implementation of the FMP;

Related items:

- amend management activity 118.2 to include the target completion date of 31 December 2014 for the development and implementation of formal working arrangements between the DPaW and the FPC;

- remove the upper limits and corresponding management activities and KPIs from the Proposed FMP; or alternatively amend management activity 61 so that any proposal to increase harvesting levels beyond the average annual allowable cut up to the upper limit is to be approved by the Minister for Environment;
- amend management activity 4 to reference the correct Appendix; and
- amend any other minor typographical, grammatical or formatting errors identified within the Proposed FMP as appropriate.

Noting the EPA's subsequent advice under section 106 of the EP Act, it is also recommended that the Minister considers assigning a higher priority to adequately-funded research into the long-term impact associated with the compaction of soil from timber harvesting and any additional measures that should be applied to timber harvesting.

Noting that the *WA Environmental Offsets Policy* (2011) outlines compensatory actions to address the significant residual environmental impacts resulting from a development or activity, it is recommended that the Minister consider seeking industry support to fund scientific research into the effects of native forest timber harvesting activities, and in particular soil compaction, by way of indirect offsets.

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APPENDIX 1: PRINCIPLES OF ESFM

Pursuant to section 19 of the *Conservation and Land Management Act 1984*, the various functions of the Commission include to advise the Minister on the application of the principles of ecologically sustainable forest management in the management of (i) State forest and timber reserves; and (ii) forest produce throughout the State. For this purpose the principles of ecologically sustainable forest management are:

- that the decision-making process should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations; and
- that if there are threats of serious or irreversible environmental damage, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation; and
- that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations; and
- that the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and
- that improved valuation, pricing and incentive mechanisms should be promoted.

APPENDIX 2: OBJECTS AND PRINCIPLES OF THE EP ACT

Objects and principles of the *Environmental Protection Act 1986* (as stated in section 4A).

- 1 *The precautionary principle*

Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, decisions should be guided by –

 - (a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and
 - (b) an assessment of the risk-weighted consequences of various options.
- 2 *The principle of intergenerational equity*

The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- 3 *The principle of the conservation of biological diversity and ecological integrity*

Conservation of biological diversity and ecological integrity should be a fundamental consideration.
- 4 *Principles relating to improved valuation, pricing and incentive mechanisms*
 - (1) Environmental factors should be included in the valuation of assets and services.
 - (2) The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement.
 - (3) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes.
 - (4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.
- 5 *The principle of waste minimisation*

All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.

APPENDIX 3: MANAGEMENT ACTIVITIES AND KEY PERFORMANCE INDICATORS

Summary of management activities and key performance indicators in the Proposed FMP.

Biological diversity

CAR formal reserve system

1. The Department will initiate the processes required for the land category changes proposed by this plan by:
 - 1.1 undertaking fine scale reserve design for the formal reserves proposed in this plan
 - 1.2 consulting with relevant agencies and the Conservation Commission and then advising the Minister for Environment on final reserve boundaries.
2. The Department will manage the areas proposed by Appendix 1 for inclusion in a national park, nature reserve or conservation park and vested in the Conservation Commission, consistent with their proposed land category and purpose and relevant Department policies until such time as they are formally created.
3. The Department will cooperate with relevant agencies in relation to the establishment of a comprehensive, adequate and representative reserve system outside the RFA area, through relevant programs.

Forest conservation areas and informal reserves

4. The Department will manage the areas proposed by Appendix [1] to be classified as forest conservation areas and vested in the Conservation Commission, consistent with their proposed classification and purpose and relevant Department policies until such time as they are formally classified. Timber production in these areas will not be permitted, but other productive activities, such as firewood collection, may be allowed, on an area by area basis, unless an area management plan expressly precludes it.
5. The Department, the FPC and other proponents where required by the Department, will conduct their operations within the informal reserve types shown in Appendix 11, in accordance with the Department's *Guidelines for the Protection of Values of Informal Reserves and Fauna Habitat Zones*.
6. The Department will:
 - 6.1 publish a map each year on its website depicting the extent and status of old-growth forest, which identifies and explains any changes arising during the previous year
 - 6.2 review planning processes for disturbance activities on all land categories for uniformity of approach for assessment of old-growth forest status, consistent with that used in areas subject to proposed timber harvesting.
7. The Conservation Commission will maintain the system of public nominations and assessment of unmapped old-growth forest until the procedure referred to in activity 6.3 is finalised. Following finalisation of the procedure referred to in activity 6.3, the Department will manage the system of public nominations and assessment of unmapped old-growth forest.

Integrating biodiversity management across the plan area

8. The Conservation Commission and the Department will make submissions in relation to development proposals (including, but not limited to, proposals for infrastructure development, extraction of minerals and petroleum resources, development of geothermal

energy and to the geological storage of greenhouse gases) forwarded to them for comment or advice, with a view to:

- 8.1 seeking to minimise the permanent loss of native vegetation and/or impacts on its integrity as a result of development
 - 8.2 otherwise, to offset losses of native ecosystems arising from development, in line with the *WA Environmental Offsets Policy*
 - 8.3 promoting the construction of infrastructure such as roads, pipelines and other utilities at common locations, such as infrastructure corridors, while minimising construction in sensitive areas.
9. The Conservation Commission and the Department will:
- 9.1 liaise with the Departments of Mines and Petroleum and State Development and relevant mining, petroleum and other companies in relation to land management and encourage them to act in a manner that is consistent with the plan
 - 9.2 seek to minimise the impact of mining and petroleum operations on important areas, such as key habitat for threatened species, and those with a high productive capacity for timber production, and key recreation sites
 - 9.3 provide advice and, where appropriate, assistance to industry and government agencies in relation to the effects of mining and petroleum operations on native ecosystems, the means by which those effects may be reduced (including through retention of ecological linkages between unmined areas throughout mine envelopes, to link with adjacent native vegetation areas outside mine envelopes) and the appropriate rehabilitation of native vegetation as those operations are completed (including through appropriate mine closure plans)
 - 9.4 explore with the relevant agency mechanisms to recover the costs of providing that advice and assistance, other costs incurred as a result of proponents' operations, and any additional costs that may be associated with post hand-back management.
10. The Department will maintain a list identifying threatened and priority species of flora and fauna, and threatened and priority ecological communities.
11. The Department will where practicable, develop, review and implement recovery plans for selected threatened species and ecological communities.
12. The Department, the FPC and other proponents where required by the Department, will undertake prescribed burning and timber harvesting having regard to the Fauna Distribution Information System.
13. **(Plantations):** The FPC will advise the Department of its planned harvesting and management activities within plantations, and where those activities may impact on threatened species and threatened or priority ecological communities, the FPC will propose and the Department will approve the conditions for access (also see activity 76 in the 'Productive capacity' chapter).
14. The Department will:
- 14.1 seek to maintain a broad range of forest ages, structures and compositional diversity at the landscape scale to provide resilience, flexibility to respond through adaptive management and a basis for the expression of variable and relative impacts of climate-related changes
 - 14.2 conduct its operations having regard to *Goals for Understorey Structural Diversity*, which are to be prepared by the Department in consultation with the Conservation Commission

- 14.3 as required, identify and, following consultation with the Conservation Commission, implement at relevant scales, management strategies that are designed to promote the adaptation of forest ecosystems, processes and individual biota to climate-related changes, consistent with biodiversity conservation and the maintenance of other forest values
- 14.4 review the conservation reserve system, as necessary, to seek to ensure ongoing comprehensiveness, adequacy and representativeness, depending on the extent of any further significant changes to, or fragmentation of, forest ecosystems.
15. The Department, the FPC and other proponents where required by the Department, will:
 - 15.1 include reference to requirements for the protection of key habitat for listed threatened species in their relevant codes of practice and other guidelines
 - 15.2 apply agency procedures so that the presence and type of biodiversity values are appropriately recorded, accessible to staff and considered prior to operations taking place
 - 15.3 apply procedures and set appropriate conditions to seek to ensure that biodiversity values are effectively protected during permitted disturbance activities
 - 15.4 promote awareness and understanding of the importance of protection and appreciation of the value of biodiversity amongst staff, proponents, operators and visitors.
16. The Department will revise relevant documents pertaining to fire management to seek to ensure that where practicable, its prescribed burning and bushfire operations consider appropriate measures to minimise loss of legacy habitat elements.
17. The Department will:
 - 17.1 revise the *Guidelines for Selection of Fauna Habitat Zones*, in consultation with the Conservation Commission, to be consistent with the settings included in this plan
 - 17.2 finalise the location of fauna habitat zones according to the *Guidelines for Selection of Fauna Habitat Zones*
 - 17.3 publish a map each year on its website depicting the status of all fauna habitat zones, which identifies and explains any changes arising during the previous year.
18. The Department, and other proponents where required by the Department, will conduct their operations in indicative fauna habitat zones, and in fauna habitat zones, in accordance with the *Guidelines for Protection of the Values of Informal Reserves and Fauna Habitat Zones*.

Increasing knowledge

19. The Department will undertake biological surveys, which will be:
 - 19.1 of priority areas determined in consultation with the Conservation Commission
 - 19.2 used, where appropriate, to assist in evaluating the extent to which biodiversity is being conserved and the need for any review of the reserve system
 - 19.3 recorded in relevant databases that are accessible as appropriate, to other users.
20. The Department will seek to:
 - 20.1 maintain, review in consultation with the Conservation Commission and as appropriate, modify, the species, community and process monitoring program, FORESTCHECK, and seek to extend it
 - 20.2 maintain a research program on ESFM.

KPI 1	Whole of forest condition comprising a mosaic of healthy ecosystems including wetlands, riparian zones, diverse ecotones, old-growth forests, protected areas and regionally significant vegetation within the Interim Biogeographic Regionalisation for Australia sub-regions/bioregion that comprise the Swan, South West and Warren Regions.
• Performance measure	1. Measurement and analysis of changes in spatial extent of healthy ecosystems and spatial extent of lower condition ecosystems from a current state. 2. Measurement and analysis of the increase in area of regionally significant vegetation within the formal reserve system from a current state.
• Performance target(s)	1. No decline in the condition of identified healthy ecosystems listed across the whole of forest. 2. An increase in the formal protection of regionally significant vegetation as identified within the applicable regional nature conservation plans.
KPI 2	Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) listed in the Swan, South West and Warren regional nature conservation plans.
• Performance measure	Measurement and analysis of changes in spatial extent and species richness, composition and abundance and vegetation structure as a function of time and defined by the relevant regional nature conservation plans.
• Performance target(s)	The target condition of TECs and PECs identified as priorities for management in the relevant regional nature conservation plans.
KPI 3	Ramsar and nationally listed wetlands identified in the Swan, South West and Warren regional nature conservation plans.
• Performance measure	Measurement and analysis of changes in spatial extent, vegetation condition, fauna communities and water quality of the wetlands as a function of time and as defined by the relevant regional nature conservation plans.
• Performance target(s)	The target condition of Ramsar and nationally listed wetlands as identified in the relevant regional nature conservation plans.
KPI 4	Threatened flora listed in the Swan, South West and Warren regional nature conservation plans.
• Performance measure	Measurement and analysis of changes in population number and/or size as a function of time and as defined by the relevant regional nature conservation plans.
• Performance target(s)	As defined in the relevant regional nature conservation plans.
KPI 5	Threatened fauna listed in the Swan, South West and Warren regional nature conservation plans.
• Performance measure	Measurement and analysis of changes in population number and/or size as a function of time and as defined by the relevant regional nature conservation plans.
• Performance target(s)	As defined in the relevant regional nature conservation plans.

Ecosystem Health and Vitality

Fire

21. The Department will:

- 21.1 maintain a competent and sufficient capability in fire management, including prescribed fire, bushfire risk mitigation, detection and suppression

- 21.2 seek to maintain a fire science capability and work collaboratively with other agencies and institutions on matters of mutual interest
- 21.3 consult with stakeholders and the community on the planning and implementation of prescribed burning and other fire management programs to:
- develop community understanding of, support for and collaboration in, fire management
 - enable constructive discussions and deliberations on fire management approaches
- 21.4 undertake an annual prescribed burning program in a manner that:
- seeks to address the risk presented by bushfire to the ecological, social, cultural and economic values occurring on lands managed by the Department, and the risk presented by bushfire emanating from land it manages moving into surrounding land
 - considers any specific ecological, silvicultural, social, cultural and other identified management objectives in areas subject to planned burning
 - seeks to minimise emissions of greenhouse gases while achieving fuel reduction objectives so as to avoid major emissions arising from periodic catastrophic bushfires
 - maintains or enhances the conservation of biodiversity by maintaining or enhancing the diversity of understorey vegetation structure and composition that facilitates a diversity of habitat opportunities
 - creates and utilises new knowledge in an adaptive management framework
 - is assessed against stated objectives for the program and stated objective(s) and success criteria for individual burns
- 21.5 undertake bushfire suppression and recovery operations in a manner that has regard to fire operations guidelines
- 21.6 through training programs, where appropriate, develop staff and contractor competency to assist with management of environmental issues associated with bushfire suppression and recovery operations.

22. The FPC will:

- 22.1 collaborate with the Department in determining appropriate risk mitigation strategies to be applied to land managed by the Department, and in particular, the State's native and plantation timber resources
- 22.2 as agreed between the agencies, make provision for funding to the Department to enable the Department to control the risk to acceptable levels, so far as is reasonable and practicable.

- KPI 6 Resilient and healthy forest ecosystems that have an appropriate distribution of fire age that maintains ecosystem condition.
- Performance measure The area of forest by fuel age classification.
 - Performance target(s) Conformance to the theoretical distribution of time since fire for the whole of forest and major LMUs.
- KPI 7 The effectiveness of fire planning and management in meeting objectives for prescribed burning.
- Performance measure 1. The percentage of completed prescribed burns that meet their stated objectives.
2. Development of the relevant regional fire management plans.

- Performance target(s)
 1. 90 per cent of prescribed burns that meet their stated objective.
 2. Completion of the relevant regional fire management plans by mid-term.

Note: This KPI will be reviewed following the mid-term review and performance measures and targets may change to be consistent with regional fire management plans if established at that stage.

Weeds

23. The Department, and other proponents where required by the Department, will:
 - 23.1 maintain surveillance and recording systems for weeds that are known to have a significant impact on ecosystem health and vitality
 - 23.2 work collaboratively with other agencies and land managers, as appropriate, to identify priority weeds using risk-based procedures for determining their relative importance
 - 23.3 work collaboratively with other agencies and land managers, as appropriate, to prepare incursion management plans for priority weeds which are not yet present
 - 23.4 use planning procedures and operational controls to identify the relative importance of areas for protection, and to minimise the risk of spread and impacts from priority weeds already present
 - 23.5 where reasonable and practicable, implement control programs for priority weeds, and encourage the coordinated involvement of Government, industry, the community and other land managers in addressing these, including through facilitating knowledge transfer, awareness raising and capacity building.
24. The Department will seek to maintain a weed science capability and work collaboratively with other agencies and institutions on matters of mutual interest.
25. The FPC will take appropriate steps to minimise the risk that seedlings it obtains from its own and other nurseries are free from weeds that could be transported into the forest with planting stock.
26. **(Plantations):** The FPC will:
 - 26.1 maintain surveillance and recording systems for priority weeds, compatible with those of the Department
 - 26.2 use planning procedures and operational controls to minimise the risk of introduction, spread and impacts from priority weeds, and where reasonable and practicable, implement control programs for priority weeds
 - 26.3 take appropriate steps to control the spread of plantation species beyond plantation boundaries into adjacent native vegetation
 - 26.4 take appropriate steps to minimise the risk that seedlings it obtains from its own and other nurseries are free from weeds that could be transported into the forest with planting stock.

Pests

27. The Department, and other proponents where required by the Department, will:
 - 27.1 maintain surveillance and recording systems, including where appropriate remote sensing, for monitoring pests that are known to have a significant impact on ecosystem health and vitality
 - 27.2 work collaboratively with other agencies and land managers, as appropriate, to identify priority pests using risk-based procedures for determining their relative importance
 - 27.3 work collaboratively with other agencies and land managers, as appropriate, to prepare incursion management plans for priority pests which are not yet present

- 27.4 use planning procedures and operational controls to identify the relative importance of areas for protection, and to minimise the risk of spread and impacts from priority pests already present;
 - 27.5 seek to identify and protect, including through use of planning procedures and operational controls, individuals and populations of native flora and fauna that show resistance to pests
 - 27.6 where reasonable and practicable, implement control programs for priority pests, and encourage the coordinated involvement of Government, industry, the community and other land managers in addressing these pest species, including through facilitating knowledge transfer, awareness raising and capacity building.
28. The Department will seek to maintain the *Western Shield* program so as to reduce predation pressure on threatened and priority species of fauna.
 29. The Department will seek to maintain a pest science capability and work collaboratively with other agencies and institutions on matters of mutual interest.
 30. The FPC will take appropriate steps to minimise the risk that seedlings it obtained from its own and other nurseries are free from pests that could be transported into the forest with planting stock.
 31. **(Plantations):** The FPC will:
 - 31.1 in conjunction with other agencies, maintain surveillance and recording systems for the presence of *Sirex* wood wasp, European house borer and other priority pests, compatible with those of the Department
 - 31.2 use planning procedures and operational controls to minimise the risk of introduction, spread and impacts from priority pests, and where reasonable and practicable, implement control programs for priority pests
 - 31.3 seek to identify and protect, including through use of planning procedures and operational controls, individuals and populations that show resistance to pests
 - 31.4 take appropriate steps to minimise the risk that seedlings it obtains from its own and other nurseries are free from pests that could be transported into the forest with planting stock.

Diseases

32. The Department, and other proponents where required by the Department, will:
 - 32.1 maintain surveillance and recording systems, including where appropriate remote sensing, for forest diseases and syndromes that are known to have a significant impact on ecosystem health and vitality
 - 32.2 work collaboratively with other agencies and land managers, as appropriate, to identify priority forest diseases and syndromes using risk-based procedures for determining their relative importance
 - 32.3 work collaboratively with other agencies and land managers, as appropriate, to prepare incursion management plans for identified causal agents which are not yet present
 - 32.4 use planning procedures and operational controls to identify the relative importance of areas for protection, and to minimise the risk of spread and impacts from priority forest diseases and syndromes already present
 - 32.5 seek to identify and protect, including through use of planning procedures and operational controls, individuals and populations of native flora and fauna that show resistance to disease

- 32.6 where reasonable and practicable, implement control programs for priority diseases, and encourage the coordinated involvement of Government, industry, the community and other land managers in addressing these, including through facilitating knowledge transfer, awareness raising and capacity building
- 32.7 undertake targeted training programs and implement an accreditation process for staff, contractors and operators involved in disturbance activities, to support consistent and effective implementation of guidelines, standards and procedures for mapping, planning, supervision and operational controls for management of *Phytophthora* dieback disease.
33. The Department will seek to maintain a diseases and syndromes science capability and work collaboratively with other agencies and institutions on matters of mutual interest.
34. The FPC will take appropriate steps to minimise the risk that seedlings it obtained from its own and other nurseries are free from diseases that could be transported into the forest with planting stock.
35. **(Plantations):** The FPC will:
- 35.1 in conjunction with other agencies, maintain surveillance and recording systems for priority forest diseases and syndromes, compatible with those of the Department
- 35.2 use planning procedures and operational controls to minimise the risk of priority disease introduction, spread and impacts, and where reasonable and practicable, implement control programs for priority diseases
- 35.3 seek to identify and protect, including through use of planning procedures and operational controls, individuals and populations that show resistance to disease
- 35.4 take appropriate steps to minimise the risk that seedlings it obtains from its own and other nurseries are free from pathogens that could be transported into the forest with planting stock.

- KPI 8 Resilient and healthy forest ecosystems that are not degraded by weeds, pests or disease pathogens.
- Performance measure
 1. Distribution or density of priority weeds.
 2. Distribution or density of priority pests.
 3. Distribution or density of priority diseases.
 4. The number of sampled areas uninfested by *P. cinnamomi* that remain uninfested following an operation and the proportion of operations undertaken with an approved hygiene management plan.
 - Performance target(s)
 1. As defined in the relevant regional nature conservation plans.
 2. As defined in the relevant regional nature conservation plans.
 3. As defined in the relevant regional nature conservation plans.
 4. No planned operations undertaken without an approved hygiene management plan, and less than three per cent of uninfested protectable area to become infested as a result of management activities.

Developing self-sustaining ecosystems

36. The Department will work with industry and relevant government agencies regarding the rehabilitation of areas subject to petroleum and mining activities, including extraction of basic raw materials, by:
- 36.1 for State Agreement operations, working with the Department of State Development, other relevant agencies and industry proponents, and otherwise, working with the Department of Mines and Petroleum, the Office of the EPA and industry proponents, to develop agreed rehabilitation standards and completion criteria, that are subject to review and reflect the intended future management emphasis (also see activity 39)

- 36.2 seeking confirmation from the relevant agency, either directly or through independent verification by suitable parties, that rehabilitated areas meet agreed completion criteria
 - 36.3 exploring mechanisms for payment by proponents of appropriate environmental performance bonds that would be refundable on satisfactory 'hand-back', on a pro-rata basis.
37. The Department, and other proponents where required by the relevant agency, as appropriate, will undertake their rehabilitation operations by:
- 37.1 using natural regeneration where reasonable and practicable, or
 - 37.2 where natural regeneration is not reasonable and practicable, and where data are available on the underlying genetic diversity within rehabilitation species through genetic analysis and an understanding of life history traits, use this information to inform choice of areas from which seed is sourced, or
 - 37.3 where natural regeneration is not reasonable and practicable, and where the information referred to in 37.2 is not available, using as the first preference seed or plants propagated from seed collected from the same LMU as the area to be rehabilitated, or where seed is not readily available from this LMU, then using seed from adjacent LMUs, or
 - 37.4 otherwise, subject to a process of approval by the Department, based on assessment criteria agreed between the Department and the Conservation Commission, using other seed sources, including mixed seed sources, where climate change, impact from damaging agents or some other identified management need requires it.
38. The Department, and other proponents via the Department, will report to the Conservation Commission annually as to the circumstances where seed sources other than those referred to in 37.2 and 37.3 have been used in their rehabilitation operations.
39. The Conservation Commission and the Department expect that consistent with the intended management emphasis, rehabilitation standards and completion criteria for areas subject to mining and petroleum activities, including extraction of basic raw materials, will, among other things:
- be revised from time to time to be consistent with contemporary 'good practice'
 - specify species composition, with the aim of ensuring 'representativeness', and state overstorey stocking and stand density levels to be achieved prior to 'hand-back'
 - specify where necessary, after giving due regard to the habitat values in adjoining unmined areas, that important (missing) habitat elements are returned to the site (appropriately defined in terms of characteristics and spacing/numbers per unit area)
 - include, in addition to current flora and fauna surveys and other routine measurements carried out by proponents, a requirement for forest inventory and data provision that meets the Department's standards
 - define agreed access conditions, including any road closures, taking into account future management requirements, including ongoing fire management.
40. The Department will:
- 40.1 develop guidelines for the appropriate ongoing management of mine site rehabilitation
 - 40.2 in the interim, consider and, as appropriate, recommend or approve the use of management intervention within mine site rehabilitation, to ameliorate the impacts of a changing climate on a range of forest values
 - 40.3 encourage an active adaptive management approach to the management of mine site rehabilitation.

Soil and Water

Soil

41. The Department, the FPC and other proponents where required by the Department, will conduct their operations involving the use of heavy vehicles in a manner that is in accordance with the *Soil and Water Conservation Guideline*, the *Manual of Procedures for the Management of Soils Associated with Timber Harvesting in Native Forests* and the *Manual for the Management of Surface Water*.
42. The Department will revise relevant subsidiary documents pertaining to rehabilitation requirements for major extraction tracks and landings, and roads and tracks no longer required, to ensure these issues are adequately addressed.
43. The Department will revise relevant documents pertaining to fire management to seek to ensure that its bushfire recovery planning considers appropriate measures to minimise erosion from fire containment lines and exposed burnt, steep ground.
44. The Department, the FPC and other proponents where required by the Department, will review subsidiary documents and training programs to ensure that procedures for containment of spills are adequately addressed.
45. **(Plantations):** The FPC will:
 - 45.1 conduct its operations:
 - 45.1.1 in a manner having regard to the guidelines for soil protection in the *Code of Practice for Timber Plantations* (2006)
 - 45.1.2 in accordance with Department requirements where the Department establishes these, and which are to prevail over those referred to in activity 45.1.1
 - 45.2 rehabilitate damaged soil resulting from plantation operations:
 - 45.2.1 in a manner having regard to the *Code of Practice for Timber Plantations* (2006)
 - 45.2.2 in accordance with new requirements where the Department establishes these, and which are to prevail over those referred to in activity 41.2.1.

KPI 9	The level of soil damage resulting from timber harvesting.
• Performance measure	Soil damage as measured by survey, which is to be based on a stratified random sample of harvest cells each year.
• Performance target(s)	Soil damage not to exceed prescribed maximum levels for 95 per cent of harvest cells surveyed, except where the prescribed levels cannot be achieved with the application of good harvest practices.

Water

46. The Department, the FPC and other proponents where required by the Department, will conduct their operations in accordance with silviculture guidelines, the *Guidelines for the Protection of the Values of Informal Reserves and Fauna Habitat Zones*, and the *Soil and Water Conservation Guideline*.
47. The Department may undertake or approve 'silviculture for ecosystem health' to enhance water availability to identified areas, such as surface water dependent ecosystems, groundwater dependent ecosystems or over-stocked regrowth native forest, in order to improve the resilience of these areas.

48. The Department will consider proposals for 'silviculture for water production' on the following basis:
- 48.1 Where proposed silvicultural treatments are outside of parameters provided for in the Department's silviculture guidance, proponents will need to prepare and have approved by the Department, specific silviculture guidance.
- 48.2 The Department will require the preparation of a catchment management plan where proponents seek to apply such silvicultural practices, or where it is considered by the Department that an excessive proportion of the forest in the catchment may be left in the juvenile and immature stages of development as a result of a proposal. The catchment management plan(s) will require approval by the Department, which will consult with the Conservation Commission and Department of Water, and where applicable, the relevant water utility. Approved catchment management plans will be made publicly available.
49. The Conservation Commission, in consultation with the Department, will develop a position statement to provide guidance when proposals to take water from land to which the plan applies are considered.
50. The Department:
- 50.1 will provide advice and assistance to organisations seeking access to the potential sub-surface aquifers and surface reservoirs located on land to which the plan applies
- 50.2 will facilitate access to land to which the plan applies for the purposes of water extraction and the development of associated infrastructure for public water supply purposes where this is consistent with the CALM Act
- 50.3 will take and use water sustainably from land to which the plan applies
- 50.4 may issue permits, after consultation with the Conservation Commission, for the sustainable taking of water from land to which the plan applies.
51. The Department, the FPC and other proponents where required by the Department, will conduct their operations in accordance with phased harvesting requirements for the moderate salt sensitivity part if the Department's Warren Region (see Map 7).
52. The Department will revise the planning process for timber harvesting, so that in partially cleared catchments there is a requirement to address potential effects on salinity of streams on other land that is categorised by the Department of Agriculture and Food WA as having a high salinity risk, so as to avoid potential adverse impacts.
53. **(Plantations):** The FPC will conduct its plantation operations in a manner having regard to the guidelines for water protection in the *Code of Practice for Timber Plantations* (2006).
54. **(Plantations):** The Department may require the preparation of catchment management plans where proponents seek to apply silvicultural or other practices that, in the view of the Department, could result over time, in a reduction in flow to surface or groundwater reservoirs. Catchment management plans require approval by the Department, which will consult with the Conservation Commission and Department of Water, and where applicable, the relevant water utility. Approved catchment management plans will be made publicly available.
- KPI 10 Stream condition and groundwater level within fully forested catchments.
- Performance measure
 - 1. The annual flow weighted mean salinity and the trend for selected gauging stations.
 - 2. Annual streamflow and the trend for selected gauging stations.
 - 3. Depth to groundwater and the trend for selected groundwater monitoring boreholes.

- Performance target(s) 1. No gauging stations with annual flow weighted mean salinity that is not fresh as a result of management activities.
2. No sites with a decline in streamflow as a result of management activities.
3. No decline in groundwater level as a result of management activities. No rise in groundwater level to the extent that it could lead to annual stream salinity not remaining fresh, as a result of management activities.

- KPI 11 Effectiveness of silviculture for water production.
- Performance measure 1. The annual flow weighted mean salinity and the trend for selected gauging stations.
2. Annual streamflow and the trend for selected gauging stations.
3. Depth to groundwater and the trend for selected groundwater monitoring boreholes.
- Performance target(s) 1. No gauging stations with annual flow weighted mean salinity that is not fresh as a result of management activities.
2. No sites with a decline in streamflow as a result of management activities.
3. No decline in groundwater level as a result of management activities. No rise in groundwater level to the extent that it could lead to annual stream salinity not remaining fresh, as a result of management activities.

Climate Change and Carbon Cycles

55. The Department will:

- 55.1 remain abreast of current knowledge and contemporary management approaches in relation to climate change and its possible impacts on native ecosystems and sustained yield
- 55.2 seek to identify climate-impact refugia and implement strategies to maintain their values, where practicable
- 55.3 seek to maintain a forest carbon science capability and contribute to the understanding of strategic climate change information and its impact on ESFM, and work collaboratively with other agencies and institutions on matters of mutual interest
- 55.4 report on carbon stores in the next draft forest management plan
- 55.5 incorporate climate change prediction into future planning for the management of land to which the plan applies, where reasonable and practicable
- 55.6 contribute to State and national policy development on climate change adaptation and mitigation
- 55.7 investigate opportunities that may arise from an emerging carbon economy
- 55.8 periodically review guidelines for silviculture and fire management with a view to incorporating techniques that recognise the contribution of the areas covered by the plan to global carbon cycles, consistent with other mitigation and adaptation strategies and achievement of other silvicultural objectives and goals for forest management.

56. The FPC will:

- 56.1 (**Plantations**): remain abreast of current knowledge and contemporary management approaches in relation to climate change and its possible impacts on plantations
- 56.2 seek to encourage the use of wood harvested from native forests and plantations to maximise greenhouse mitigation benefits.

- KPI 12 Increased knowledge of trends in climate.
- Performance measure 1. Collation of key statistics relating to trends or changes in climate over the plan area.
2. Report on new knowledge gained on the impact of changing climate on values identified in this plan.

- Performance target(s) Trend and knowledge report compiled at mid-term and end-of-term and used to inform reporting on achievement of KPI targets.
- KPI 13 Adaptive response to changing climate.
- Performance measure Report on actions taken to adapt to changing climate.
 - Performance target(s) Adaptive responses to be reported at mid-term and end-of-term.
- KPI 14 Increased knowledge on the amount of carbon stored in forest within lands covered by the plan.
- Performance measure Application of standard carbon measurement protocols within vegetation associations for which there are limited or no data presently available.
 - Performance target(s) Twenty plots established and reported by mid-term and 40 plots by end-of-term.

Productive Capacity

Maintaining forest area

57. The Conservation Commission, the Department and the FPC will make submissions in relation to development proposals (including, but not limited to, proposals for infrastructure development, extraction of minerals and petroleum resources, development of geothermal energy and, the geological storage of greenhouse gases) forwarded to them for comment or advice, with a view to:
- 57.1 seeking to minimise the permanent loss of native forests and plantations available for wood production and/or impacts on their integrity as a result of development
 - 57.2 seeking the replacement of native forests and plantations not replanted or permanently lost to development, consistent with relevant legislation and government policies
 - 57.3 promoting the construction of infrastructure such as roads, pipelines and other utilities at common locations, such as infrastructure corridors, while minimising construction in sensitive areas.
58. **(Plantations):** The FPC will seek to maintain the area of plantation estate required to meet State Agreement Act supply requirements by replanting pines in all suitable areas of State forest and timber reserve that have previously been planted with pines and have been clearfelled, except where not consistent with government policy, and in other areas determined consistent with the agreement ratified under the *Wood Processing (Wesfi) Agreement Act 2000*.
59. **(Plantations):** The FPC will replant areas of clearfelled hardwood plantation to softwood plantations.

Sustained yield from native forests

60. The total quantity of logs removed, calculated over the 10-year life of the plan, shall not exceed 10 times the average annual allowable cut stipulated in Tables 4 and 5, and 11,000, 13,000 and 12,000 cubic metres equivalent for wandoo, blackbutt and sheoak, respectively.
61. In addition to the amount referred to in activity 60, the FPC may seek to enter into contracts to supply up to the quantities stipulated in Table 6, in order to provide for improved utilisation of available wood resources, silvicultural outcomes and socio-economic benefits. Any proposal to increase the average annual yield of logs above the quantities stipulated in Tables 4 and 5 is to be approved by the Department, in consultation with the Conservation

Commission, considering whether or not the proposal remains consistent with the woodflow modelling for this plan and any revised inventory information.

62. The FPC will prepare a timber industry development strategy to align future industry opportunities with the location and log quality mix made available under this plan, and likely under future plans based on woodflow modelling.
63. The removal and sale of forest products of species *other than* jarrah, karri, marri, blackbutt, wandoo and sheoak that become available in small quantities from approved operations, including timber harvesting and mine site clearing, is also permitted.
64. The Department will prepare rolling three-year indicative timber harvesting plans that are to be:
 - 64.1 developed in consultation with the FPC
 - 64.2 consistent with the allowable cut set by this plan and the volumes contracted by the FPC
 - 64.3 approved by the Department
 - 64.4 made publicly available.
65. The FPC will prepare annual timber harvesting plans that are to be:
 - 65.1 developed in consultation with, to the requirements of, and approved by the Department
 - 65.2 consistent with the allowable cut set by this plan and the volumes contracted by the FPC
 - 65.3 made publicly available
 - 65.4 varied at a coupe location or boundary level with the prior approval of the Department.
66. The FPC will prepare coupe level timber harvesting plans, using the Department's planning checklist for disturbance activities, which are to:
 - 66.1 be consistent with annual timber harvesting plans referred to in activity 65 94
 - 66.2 provide sufficient information to enable the Department to evaluate the proposed operations
 - 66.3 be approved by the Department prior to disturbance operations commencing.
67. The FPC and the Department will:
 - 67.1 monitor the quantity of all log categories removed from native forest in each year, separately recording for each of the commercial species the equivalent volume of first and second grade sawlogs, and other log grades
 - 67.2 periodically monitor the grading and removal of sawlogs.
68. The FPC, and other proponents where required by the Department, will monitor and record the areas over which each different silvicultural or other treatments are applied in each year and provide suitable information on this to the Department in a format and at times required by the Department.
69. The Department will maintain a process to verify the information and retain the data referred to in activity 68.
70. When the FPC enters into a contract for the supply of wood other than first and second grade sawlogs, it will provide suitable information on this to the Department in a format and at times required by the Department, to enable the Department to calculate the equivalent

volume of first and second grade sawlogs which would be derived from the quantity, if any, taken under the contract.

71. The Department may use forest produce that becomes available for use from the carrying out of operations to which section 33(1)(cb) of the CALM Act applies, for the purposes of making improvements to any land to which the CALM Act applies.
72. The Department will continue to refine the data and methodology used for the sustained yield calculations by maintaining and enhancing the quality and coverage of the datasets, and the methodology, used in sustained yield calculations.
73. The Department will:
 - 73.1 facilitate the recovery from areas available for timber harvesting of forest produce generated by management activities the primary purpose of which is not wood production
 - 73.2 determine, based on case-by-case proposals from the FPC, if wood arising from salvage harvests associated with unplanned disturbance events, will count toward the allowable cut. The Department will take into account the likely public benefit, considering the safety margin incorporated into the calculation of sustained yields, and the costs and ability of affected areas to successfully regenerate and/or be successfully rehabilitated and provide for a range of ESFM values, in the absence of a salvage harvest
 - 73.3 develop a guidance document to assist with the timely planning and approval of salvage harvest operations associated with unplanned disturbance events.

Exotic species on State forest and timber reserves

74. **(Plantations):** The FPC will manage the silviculture and harvesting of forest products from plantations to optimise yield to meet legislated obligations including relevant State Agreement Acts, and other supply obligations. Where not inconsistent with this, plantations will be managed to take account of recreation use, and seek to minimise adverse impacts on this and other values when undertaking silvicultural operations and harvesting.
75. **(Plantations):** The FPC will prepare annual timber harvesting plans that are to be consistent with the supply requirement referred to in activity 74.
76. **(Plantations):** Where required by the Department, the FPC will prepare compartment level harvesting plans, having regard to the *Code of Practice for Timber Plantations* (2006), and using the Department's planning checklist for disturbance activities, that are to:
 - 76.1 be consistent with annual timber harvesting plans referred to in activity 75
 - 76.2 provide sufficient information to enable the Department to evaluate the proposed operations
 - 76.3 be approved by the Department prior to disturbance operations commencing.
77. **(Plantations):** The FPC will:
 - 77.1 monitor the volume of all log categories removed from plantations in each year, separately recording each of the main commercial species and log grade
 - 77.2 periodically monitor the grading and removal of sawlogs.
78. **(Plantations):** The FPC will conduct its silvicultural operations in accordance with its Plantation Silviculture Guidelines which will be amended from time to time in consultation with the Department.

79. **(Plantations):** The FPC will monitor and record the areas over which each different silvicultural treatment is achieved in each year.
80. **(Plantations):** The FPC will continue to refine the data and methodology used for yield calculations by maintaining and enhancing the quality and coverage of the datasets, and the methodology, used in yield calculations.
81. **(Plantations):** The FPC will:
- 81.1 where it is consistent with government policy, replant areas of plantation that are clearfelled, in accordance with the FPC's plantation management guidelines, as may be revised from time to time
 - 81.2 rehabilitate areas of plantation that are clearfelled and are not to remain as plantation, in accordance with *Guidelines for the Rehabilitation of Plantation Areas* that are to be developed by the Department in consultation with the FPC, the requirements of which will reflect whether or not the FPC has the option to replant.
82. **(Plantations):** The FPC will seek to ensure that appropriate tree breeding programs are maintained to achieve desired plantation outcomes.
83. **(Other exotics):** Where operations are proposed, the FPC, and other proponents where required by the Department, will:
- 83.1 in consultation with the Department, develop annual programs of future silvicultural or other treatments, for stands of trees to promote stand vigour and growth rates, with a view to future rehabilitation of these areas to native vegetation
 - 83.2 assess stand development before silvicultural or other treatments are scheduled, with a view to determining whether those treatments are then required
 - 83.3 undertake or reschedule those proposed silvicultural or other treatments, according to the assessment referred to in activity 83.2 and prevailing and expected market conditions, where relevant.
84. **(Other exotics):** The FPC, and other proponents where required by the Department, will monitor and record the areas over which each different silvicultural or other treatment is applied in each year and provide suitable information on this to the Department in a format and at times required by the Department.
85. **(Other exotics):** The Department may seek proposals to facilitate the rehabilitation of these areas to native vegetation.

Other forest produce

86. The Department will:
- 86.1 regulate the supply of other forest produce through the administration of relevant licensing legislation
 - 86.2 maintain and, where appropriate, prepare guidelines for the management of other forest produce
 - 86.3 where reasonable and practicable, monitor supply patterns for signs of non-sustainability
 - 86.4 work, where applicable in conjunction with the FPC, to implement trials in selected areas for supply of public firewood
 - 86.5 facilitate the salvage of other forest produce generated by management activities the primary purpose of which is not wood production, or natural events where salvage activities can contribute to regeneration and rehabilitation and do not significantly

increase the level of disturbance or the risk of environmental impacts to the forest area.

87. The FPC will, subject to it reasonably expecting to achieve commercial returns, make wood available from integrated timber harvesting operations available to small processors and craftwood artisans, by auction or other appropriate means.

Regeneration and management of harvested native forest

88. The FPC and other proponents will conduct native forest regeneration and tending operations in a manner that is in accordance with the Department's silviculture guidelines.

89. The FPC and other proponents will undertake native forest regeneration operations by:

89.1 using natural regeneration where reasonable and practicable, or

89.2 where natural regeneration is not reasonable and practicable, and where data are available on the underlying genetic diversity within regeneration species through genetic analysis and an understanding of life history traits, use this information to inform choice of areas from which seed is sourced, or

89.3 where natural regeneration is not reasonable and practicable, and where the information referred to in activity 89.2 is not available, using as the first preference seed or plants propagated from seed collected from the same LMU as the area to be rehabilitated, or where seed is not readily available from this LMU, then using seed from adjacent LMUs, or

89.4 otherwise, subject to a process of approval by the Department, based on assessment criteria agreed between the Department and the Conservation Commission, using other seed sources, including mixed seed sources, where climate change, impact from damaging agents or some other identified management need requires it.

90. The Department, and the FPC and other proponents via the Department, will report to the Conservation Commission annually as to the circumstances where seed sources other than those 101 referred to in activities 89.2 and 89.3 have been used in their native forest regeneration operations.

91. The FPC will seek to continue to develop markets, in particular for those log grades which are currently under-utilised, so as to facilitate the timely achievement of silvicultural objectives, as well as socio-economic outcomes.

92. The FPC and other proponents where required by the Department, in consultation with the Department will:

92.1 develop annual programs of future silvicultural treatments for stands of trees to promote stand vigour and growth rates that can be used to produce sawlogs, which are consistent with the silviculture guidelines

92.2 assess stand development when silvicultural treatments are scheduled, with a view to determining whether those treatments are then required

92.3 undertake or reschedule those proposed silvicultural treatments, according to the assessment referred to in activity 92.2 and prevailing and expected market conditions, where relevant.

93. The FPC will monitor and record the areas over which each different silvicultural treatment is achieved in each year and provide suitable information on this to the Department in a format and at times required by the Department.

- KPI 15 The area of native forest and plantations.
• Performance Change in:

measure	<ol style="list-style-type: none">1. Area of native forest and plantations.2. Area of forest by land category, including the net area available for wood production.3. Area of forest cleared.4. Area of forest rehabilitated.
• Performance target(s)	No permanent loss of net area of forested land due to unauthorised activities.
KPI 16	Removal of log products compared to the allowable cut set in this plan.
• Performance measure	<ol style="list-style-type: none">1. Cumulative removals for jarrah and karri first and second grade sawlogs compared to the average annual allowable cut.2. Removal of other bole volume of jarrah and karri (below first and second grade).3. Removal of logs of other species.
• Performance target(s)	<ol style="list-style-type: none">1. The cumulative removals of first and second grade jarrah and karri sawlogs shall not exceed the cumulative average annual allowable cut by more than 10 and five per cent at the end of years 3 and 6 respectively, and three per cent at the end of year 9 of the plan, and the total removals over the 10-year plan period shall not exceed the allowable cut.2. No more than the allowable cut of other bole volume of jarrah and karri, and total bole volume of marri logs over the 10-year plan period.3. No more than the allowable cut of wandoo, blackbutt and sheoak sawlogs to be removed over the 10-year plan period.
KPI 17	Silvicultural outcomes for the area of forest cutover.
• Performance measure	<ol style="list-style-type: none">1. Annual area of each silvicultural outcome for each forest type harvested and/or silviculturally treated.2. Silvicultural practices assessed by monitoring surveys against the requirements as prescribed in the relevant silviculture guidelines, manuals and procedures.
• Performance target(s)	Compliance level of 95 per cent against the prescribed requirements.
KPI 18	Regeneration of harvested areas.
• Performance measure	<ol style="list-style-type: none">1. The time between completion of native forest harvesting of a coupe for regeneration and the completion of post-harvest regeneration treatment.2. The proportion of the sampled annual shelterwood (regeneration establishment) and gap (regeneration release) program that does not meet the acceptable stocking standard.3. The proportion of clearfelled plantation effectively replanted.
• Performance target(s)	<ol style="list-style-type: none">1. For karri and planted jarrah: <input type="checkbox"/> achieve more than 75 per cent of areas treated to be completed within 18 months <input type="checkbox"/> achieve 100 per cent of areas treated to be completed within 30 months and for jarrah which has not been planted: <input type="checkbox"/> achieve 90 per cent of areas treated to be completed within 30 months except in circumstances accepted by the Department.2. No more than five per cent of the area regenerated requiring remedial action.3. No more than five per cent of the area replanted requiring remedial action.
KPI 19	Plantations are managed to meet obligations under State Agreements and production contracts.
• Performance measure	The total annual volume of each log grade delivered compared to supply obligations (arising from State Agreement Act and other contracts applicable during the plan period).
• Performance	As defined in State Agreements and production contracts.

target(s)

Heritage

Noongar culture and heritage

94. The Department, and other proponents where required by the Department, will seek to prevent material adverse effects on Noongar culture and heritage in the plan area by:
- 94.1 where required, working with appropriate and representative Noongar groups and relevant agencies to identify cultural and heritage values and sites and gain their input into the management of these
 - 94.2 facilitating access by Noongar people for Noongar customary purposes subject to the CALM Regulations
 - 94.3 community consultation, involvement in decision-making and surveys that are to be undertaken in accordance with Department policies and guidelines that are to be developed as required by activity 95
 - 94.4 ensuring compliance with the provisions of the Aboriginal Heritage Act by having regard to the State Government's *Cultural Heritage Due Diligence Guidelines* and conducting operations in a manner that is in accordance with Department policies and guidelines that are to be developed as required by activity 95.
95. The Department will develop, or maintain and update policies and guidelines on joint management, customary activities and Noongar heritage, as required, and will work with appropriate and representative Noongar groups to identify appropriate opportunities for joint management of areas within the plan area.
96. The Department, and other proponents where required by the Department, will facilitate cross-cultural awareness and interpretive activities to inform and educate relevant staff, contractors and the wider community about Noongar culture and heritage values.
97. The Conservation Commission and the Department will develop a program for assessment of areas of the plan area for their importance for Noongar culture and heritage, and the Department, and other proponents where required by the Department, will progressively undertake this assessment, in consultation with relevant stakeholders and agencies.

- KPI 20 Consultation and involvement of Noongar people in management of lands covered by the plan.
- Performance measure 1. Establishment of joint management arrangements.
 2. Establishment of local area arrangements and protocols for Aboriginal customary activities.
 3. Consultation with appropriate and representative Noongar groups for management plans.
 - Performance target(s) 1. Establishment of at least six joint management arrangements under the CALM Act by 2023.
 2. Local area arrangements and protocols for Aboriginal customary activities established and implemented within each district of the Department in the plan area by 2023.
 3. Appropriate and representative Noongar groups are consulted and invited to provide input into all management plans.

Other Australian cultural heritage

98. The Department will:
- 98.1 develop and implement appropriate policies, guidelines, manuals or instructions for management of other Australian cultural heritage, as required, that consider and,

where necessary, align with the Heritage Tourism Strategy for Western Australia, *State Cultural Heritage Policy*, Government Heritage Property Disposal Process, and the Burra Charter

- 98.2 use agency procedures that seek to ensure that the presence and type of heritage places are appropriately recorded, accessible to staff and considered prior to operations taking place
 - 98.3 maintain a central database of other Australian heritage places and values
 - 98.4 use agency procedures and set appropriate conditions as a part of Department approval processes to seek to ensure that heritage places are effectively protected during permitted disturbance activities
 - 98.5 promote awareness and understanding of the importance of protection and appreciation of the value of heritage places among staff, proponents, operators and visitors.
99. The Department, the FPC and other proponents where required by the Department, will:
- 99.1 conduct their operations in a manner that has regard to approved heritage management policies, guidelines, manuals or instructions
 - 99.2 cooperate with Commonwealth and State agencies, local governments and non-statutory organisations in relation to other Australian cultural heritage identification and conservation.

Socio-Economic Benefits

Forest products industry

100. The Conservation Commission and the Department will work with the FPC as appropriate and provide input into decision-making processes that may result in a reduced land base or restricted access to land available for timber harvesting activities.
101. The Department will work with the FPC to plan for a source location, log product and wood quality mix that seeks to support a viable forest products industry.

- KPI 21 Social and economic benefits from the timber industry.
- Performance measure 1. Quantity of product by the level/extent of local value adding.
 2. Investment in new processing technologies.
 3. Employment and social benefits as determined by independent sociological study at plan commencement and to enable reporting at mid-term and end-of-term.
 - Performance target(s) 1. All high value sawlog resource processed or value added locally and an increase in low value resource taken on by local markets.
 2. Increased local processing capacity.
 3. Employment and social benefits maintained or increased.

Recreation and tourism

102. The Department will:
- 102.1 maintain understanding of visitor and recreation demand including the knowledge, attitudes and activities of visitors in the area covered by the plan
 - 102.2 continue to support and plan for recreation and tourism, and provide and maintain safe and appropriate recreation and tourism facilities and services, in locations and in a manner that seeks to meet demand and minimise conflicts with other ESFM values
 - 102.3 consider possible additional areas for off-road vehicle use, in consultation with relevant stakeholders

- 102.4 provide for the expansion of camping and caravanning facilities in the area covered by the plan
- 102.5 work with relevant water agencies and utilities in planning for and managing tourism and recreation activities in water catchment areas
- 102.6 monitor and manage visitor use, including through regulating and licensing of appropriate commercial activities
- 102.7 seek to enrich visitor experiences and develop and nurture lifelong connections between the community and natural areas, by providing opportunities to learn, explore and interact with the natural and cultural environment.

KPI 22	Visitation to lands covered by the plan, facilities available for recreation activities and the level of visitor satisfaction.
• Performance measure	1. Number of visits to selected recreational areas. 2. Type and number of recreation and tourism facilities available in the plan area. 3. The satisfaction visitors express with their experience.
• Performance target(s)	1. Level of visitation to be maintained or increased. 2. No target, trends to be reported. 3. Visitor satisfaction to meet or exceed Departmental benchmark.

Visual amenity

103. The Department, the FPC and other proponents where required by the Department, will:
- 103.1 maintain and implement a visual landscape classification and management system
 - 103.2 review where necessary and implement guidelines for the application of visual landscape management principles in land-use planning, codes of practice, operational guidelines and other relevant manuals
 - 103.3 make submissions in relation to development proposals that may impact on visual landscapes on land to which the plan applies that are forwarded to them for comment or advice, with a view to seeking to reduce the effect of any proposed activity on the visual quality of the landscape.
104. **(Plantations):** The FPC will consider the impact of plantation operations on the visual quality of the landscape and where reasonable and practicable, will conduct those operations in a manner that seeks to reduce their impact on the visual quality of the landscape.

Access – roads and bridges

105. The Department will continue to review the strategic access network in consultation with relevant stakeholders.
106. The Department will continue to seek resources to fund essential access infrastructure.
107. The Department, the FPC and other proponents where required by the Department, will where reasonable and practicable, seek to retain, develop and maintain strategic access infrastructure in a manner and at locations that will service multiple needs.
108. The Department, and proponents where required by the Department, will undertake design, construction and maintenance operations for unsealed roads, and progressively rehabilitate redundant roads, in a manner that has regard to the 2009 *Unsealed Roads Manual – Guidelines to Good Practice*, issued by the Australian Roads Research Board and subsequently, have regard to relevant Departmental policy and guidelines, once finalised. The Department will consult with the FPC and other relevant agencies in preparing and revising its policy and guidelines, as appropriate.

- KPI 23 Maintenance of an effective strategic road network within the area covered by the plan.
- Performance measure Access via strategic road network.
 - Performance target(s) Access via strategic road network to be maintained.

Basic raw materials

109. The Department will seek to ensure that all BRM removals from lands vested in the Conservation Commission:
- 109.1 comply with relevant legislation, and policies and guidelines which will be reviewed
 - 109.2 contribute to the ongoing implementation of relevant government strategies, including the *State Gravel Supply Strategy*
 - 109.3 where practicable, are sourced from a network of (fewer) strategic pits, which it will identify in consultation with relevant government agencies and BRM users.
110. The Conservation Commission will require that all BRM removal from land vested in the Conservation Commission are subject to the provision of certified returns to the Department for removals by the government agency or local government authority which has access to and is removing the BRM.
111. The Department, in consultation with the Conservation Commission, will develop management guidelines and processes to allow for sterilised BRM, including that from other land tenures, to be used on land to which the plan applies.
112. The Department, the FPC and other proponents where required by the Department, will contribute to the maintenance of a database of areas from which BRM have been extracted, and will continue to progressively develop plans and works programs for the rehabilitation of these areas to standards agreed with the Department.
113. The Conservation Commission and Department will provide comment or advice in relation to proposals to extract BRM on land to which the plan applies that are forwarded to them, with a view to seeking:
- 113.1 the timely rehabilitation of all pits to acceptable standards as set by the Department, developed in consultation with relevant stakeholders
 - 113.2 that the full cost of rehabilitation of areas from which BRM are extracted is borne by the organisation responsible for the extraction of those materials.

Leases and licences

114. The Department will issue and administer leases and licences for facilities, activities and uses in accordance with the provisions of the CALM Act.
115. The Department will encourage the development of Noongar enterprises within the plan area.

Development of genetic resources (bioprospecting)

116. The Department will:
- 116.1 administer agreements with bioprospecting companies and explore and, as appropriate, enter into other agreements
 - 116.2 contribute to the development of modern bioprospecting legislation.

Plan Implementation and Management

Implementation

117. The Department, and other proponents where required by the Department, will prepare a plan of operations, using the Department's planning checklist for disturbance activities, which is to provide sufficient information to enable the Department to evaluate the proposed operations.
118. The Department will:
- 118.1 as the regulator of timber harvesting activities on the area that is subject to this plan, prepare a regulation policy to confirm the regulatory framework
 - 118.2 in conjunction with the FPC, develop and implement formal working arrangements, consistent with the regulation policy, to among other things, define roles and responsibilities, and establish an agreed process for approving and maintaining the currency of subsidiary documents.
119. The Department, the FPC and other proponents where required by the Department will, through common training and accreditation programs, where appropriate, develop the competency of staff and contractors involved in regulation, planning, supervision and implementation of disturbance operations.
120. The Department will prepare and/or revise subsidiary documents referred to by this plan having regard to the Department's Policy Statement 1: *Department of Environment and Conservation – Key documents*.

Monitoring and evaluation of performance

121. The Department, in consultation with the Conservation Commission, will develop a protocol for each key performance indicator in the plan to specify how the measurement of the key performance indicator will be undertaken.
122. The Department and the FPC will cooperate with the Commonwealth in the implementation of the Montreal Indicators program.
123. The Conservation Commission, Department and the FPC will conduct audits in accordance with their respective annual audit program. Audit programs will be developed with consideration of the potential risk to achievement of the goals of the plan.
124. The Department will report audit results to the Conservation Commission and the FPC and publish a summary of audit results.
125. The FPC will report audit results to the Department and the Conservation Commission and publish a summary of audit results.
126. The Department, and other proponents where required by the Department, will:
- 126.1 seek to address knowledge gaps, including through relevant 'benchmarking' activities and research programs, as appropriate
 - 126.2 work collaboratively with other agencies and institutions on matters of mutual interest
 - 126.3 maintain programs and activities that seek to ensure the expeditious transfer of new knowledge and understanding into improved management approaches and operational practices

126.4 conduct adaptive management projects in a manner that has regard to an adaptive management policy, to be prepared by the Department.

127. **(Plantations):** The FPC will undertake audits based on the potential risk to achievement of the goals of the plan, and which will evaluate the extent to which plantation operations are undertaken in accordance with the plan. Audits will be reported to the Department and the Conservation Commission.

Review and improvement

128. The Conservation Commission and the Department will:

128.1 evaluate the results from research, monitoring, audits and adaptive management projects to determine whether the plan, or guidelines and policies referred to in the plan, should be amended

128.2 amend the plan if required according to the CALM Act

128.3 take action that is reasonable and practicable to address problems identified in management systems.

129. The Department will initiate an expert review of silvicultural practices during the second half of the term of this plan. Among other things, the review will have regard to the results from FORESTCHECK and other research monitoring, audits, and adaptive management projects.

130. The Conservation Commission will undertake mid-term and end-of-term performance reviews of the extent to which management of land to which the plan applies has been undertaken in accordance with the plan, which will include consideration of the extent to which all key performance indicator targets have been achieved. The Conservation Commission will consult with appropriate and representative Noongar groups on the results of these reviews.

131. Where performance targets have not been achieved under activity 130, the relevant agency will investigate the cause and report, through the reports on the mid-term and end-of-term performance reviews, to the Conservation Commission, which will submit the report to the Minister for Environment.

132. The Conservation Commission will:

132.1 evaluate the need for revision of management practices in the context of its assessment and auditing function, in consultation with the Department and where relevant, the FPC

132.2 provide its advice through the reports on the mid-term and end-of-term performance reviews to the Minister for Environment.

Stakeholder involvement

133. The Department will undertake public consultation in relation to the development and review of management policies and guidelines, having regard to Policy Statement 1: *Department of Environment and Conservation - Key documents*.

134. The Department will:

134.1 develop and implement programs that seek to provide the community with educational opportunities and information on management of land that is subject to the plan

134.2 maintain public consultation processes

134.3 provide opportunities for community participation in voluntary activities and educational and social development programs relating to management of land that is subject to the plan

134.4 provide a range of opportunities for volunteers to be involved in land management activities.

- KPI 24 Extent to which the institutional framework supports the conservation and sustainable management of forests.
- Performance measure 1. The preparation and review of guidance documents referred to in the operations proposed by the plan.
 2. Improved scientific understanding of ecosystem characteristics and functions.
 3. Provision of information and opportunities for public involvement, education and awareness as demonstrated by:
 - a. public attendance statistics for key education, awareness and extension programs
 - b. number of volunteers and volunteer hours
 - Performance target(s) 1. Guidance documents to be prepared and/or reviewed as required during the period of the plan.
 2. Scientific understanding targets:
 - a. research projects address identified high priority knowledge gaps
 - b. peer reviewed articles are produced by research projects
 - c. [knowledge] gained is [communicated] to policy makers and operational managers.
 - 3. Public attendance and volunteer contribution to be maintained.