



Report and recommendations of the Environmental Protection Authority



Proposed Forest Management Plan 2014-2023

Conservation Commission of Western Australia

Report 1483

July 2013

Public Environmental Review Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
31/3/12	Level of assessment set	
27/4/12	Environmental Scoping Document (ESD) released for public review	4
14/5/12	Public review period for ESD closed	2
20/6/12	Final ESD approved	4
15/8/12	Environmental Review Document (ERD) released for public review	9
8/11/12	Public review period for ERD closed	12
15/4/13	Final Proponent response to ERD issues raised	23
1/7/13	Publication of EPA report	11
15/7/13	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority met its timeline objective in the completion of the assessment and provision of a report to the Minister.



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Chairman

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Note: As of 1 July 2013 the forest management functions of the Department of Environment and Conservation will undertaken by the new Department of Parks and Wildlife.

Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposed plan of the Conservation Commission of Western Australia for management of the south-west forests for the next ten years (2014-23).

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- the key environmental factors identified in the course of the assessment; and
- the EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures, if any, to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the EP Act.

Key environmental factors and principles

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:

- (a) Flora and vegetation, and Terrestrial fauna;
- (b) Terrestrial environmental quality; and
- (c) Hydrological processes.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 2 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

- (a) The precautionary principle;
- (b) The principle of intergenerational equity; and
- (c) The principle of the conservation of biological diversity and ecological integrity.

Summary

The EPA assessed the proposed Forest Management Plan 2014–2023 dated April 2013 (the proposed FMP 2014-2023) which applies to land vested in the Conservation Commission within the Swan, South West and Warren regions of the Department of Environment and Conservation, and the lands collectively referred to as 'Redmond' forest block within the South Coast Region (refer to Figure 1 and Appendix 4).

The plan has been prepared by the Conservation Commission of Western Australia under the *Conservation and Land Management Act 1984* to manage a diverse number of values and uses within the south-west forests for the next ten years.

The proposed FMP 2014-2023 builds on an existing forest management plan (2004-2013) that was previously assessed by the EPA, and is based on sound science and conservative assumptions. It has been subject to a high level of public scrutiny and the EPA has questioned the Commission and its assisting agency (the Department of Environment and Conservation (DEC)) in depth on a number of aspects of the plan and issues raised through public submissions.

It is acknowledged that forest management is a complex and contentious subject with contested views on many issues, including among the scientific community.

Flora, vegetation and fauna

The proposed FMP 2014-2023 continues the establishment of a system of formal and informal reserves and protected areas which will eventually comprise approximately 62% of the native forest ecosystem.

Under the proposed plan, approximately 4,020 hectares (ha) of the Whicher Scarp will be added to the conservation estate as a national park. This is consistent with the values of the area recognised by the DEC and the EPA. There will also be changes to areas set aside as Fauna Habitat Zones and some areas protected for amenity values (Travel Route Zones) in line with the objectives of these zones.

The remaining 38 per cent of south-west forests - located in State Forests and Timber Reserves - is available for uses including recreation and tourism, wildflower picking, honey production, collection of basic raw materials, craftwood and firewood, as well as timber harvesting.

Timber harvesting is allowed under the *Conservation and Land Management Act 1984* and is governed by silviculture¹ guidelines. Limits on the volume of timber that can be harvested are determined under principles of ecologically

¹ The theory and practice (silvicultural practices) of managing the establishment, composition, health, quality and growth of forests and woodlands to achieve specified management objectives.

sustainable forest management. The FMP 2014-2023 proposes changes to some silviculture guidelines, including improvements to the retention of important cockatoo habitat in harvested areas.

Harvesting limits are determined through complex and sophisticated modelling of 'sustained yields' (timber harvest volumes that can be maintained into the future within the constraints of conservation area protection and silviculture guidelines) that conservatively model the effects of climate change and many other factors. The allowed limits also include a safety margin for risks to the sustained yield such as fire, cyclone, drought, pests and disease. This modelling has been independently reviewed by experts in this field and found to be a robust model that adequately considers associated risks and uncertainty.

In reviewing the 'sustained yield' process the EPA has questioned why modelled yields have not decreased in response to the reduced rainfall and higher temperatures associated with climate change. The DEC advised that this is primarily because:

- calculation of the sustained yields for the previous FMP already incorporated adaptive settings and provision for future reduced yields under a drying climate;
- the relative contribution of future growth to the sustained yield varies between forest categories and this moderates the potential impacts from a drying climate on overall wood availability ; and
- while the models suggest a progressive decline in growth rates of trees over the very long term, some growth is still maintained so that timber yields are therefore impacted at a comparatively slower rate.

The proposed FMP 2014-2023 details two sets of values for the limits on harvesting; a default 'allowable cut' and a possible 'upper limit allowable cut' (refer to Tables 2, 3, and 4 of this report). The default value is based on modelling that assumes the current markets for other bole volume². The 'upper limit allowable cut' is based on modelling a full utilisation of wood resources by the timber industry and would require further consideration of proposals demonstrating that industry would use lower quality or smaller sized wood products.

While the EPA accepts that the process for determining the 'sustained yield' is rigorous and subject to independent expert review and that the limits are consistent with Ecologically Sustainable Forest Management, it is of the view that decisions to allow increases over the default value of 'allowable cut' should not be made without the consideration of the full suite of environmental, economic, and social consequences.

In particular, some utilisation of lower quality wood products for uses such as wood chipping and biomass fuel might not meet broader community expectations. The EPA therefore advises that this should be a decision for the

² Bole log products not meeting first or second grade sawlog standards.

Minister for Environment, who can take into account a broader range of societal matters.

The EPA also notes that the *FORESTCHECK* program has been established along lines recommended by the EPA and others and is providing useful information on the monitoring of long-term effects of timber harvesting. The EPA notes that this and other programs are to be extended and reviewed over the life of the FMP 2014-2023 and has provided advice on particular aspects that should be considered in these programs.

Terrestrial environmental quality

The EPA notes that there are different views on whether the forests should be managed to maximise carbon storage or to allow continuation of a timber harvesting industry. Under the proposed FMP 2014-2023 the Conservation Commission commits to investigate opportunities that may arise from an emerging carbon economy for forest carbon storage. The EPA supports this commitment.

The EPA also recommends that uncertainty regarding the long term impacts associated with the compaction of soil from timber harvesting be considered when extending forest monitoring programs (including *FORESTCHECK*).

Hydrological processes

The proposed FMP 2014-2023 makes allowance for proposals to be developed for the purpose of increasing water production through the thinning of forest catchments. While there are currently no plans to carry out such activities on a large scale, the plan sets out a regulatory framework to ensure that approved proposals must maintain forest values. Managing the water balance in the forests in a drying climate is critical and forest thinning may well be needed to protect ecosystem health and other values.

Other advice

The EPA recommends that the Conservation Commission considers the merit of establishing a stakeholder reference group to assist in providing opportunities for the community, and relevant non-government organizations and government agencies to participate in the implementation of the FMP 2014-2023.

Such a stakeholder reference group would need to draw on a broad pool of knowledge, experience and skills from the Noongar people, recreation, tourism and conservation interests, the timber industry, south-west communities, research institutions, and relevant government departments.

As the establishment of such a reference group would be a major challenge and require a large commitment of time and resources, the Conservation Commission would need to give serious consideration to the merits of this approach over other stakeholder involvement strategies, and competing

statewide priorities, before making a decision. In the experience of the EPA, stakeholder groups are a worthwhile investment.

In summary, the EPA has provided advice on some aspects of implementation of the 'proposed' FMP and how the next FMP could be developed, but is otherwise supportive of the proposed plan.

The EPA has therefore concluded that the proposed FMP 2014-2023 in its current form would meet the EPA's objectives for the key environmental factors assessed and as such it recommends no proposal-specific conditions.

Recommendations

The EPA recommends the Minister for Environment notes that:

1. The EPA assessed the proposed plan of the Conservation Commission of Western Australia for management of the south-west forests for the next ten years (Appendix 4);
2. The factors set out in Section 3 of this report are the factors which the EPA considers to be the key environmental factors identified in the course of its assessment of this proposal;
3. The EPA has concluded that the proposed Forest Management Plan 2014-2023 meets its environmental objectives for the key environmental factors assessed;
4. The EPA recommends that the proposed Forest Management Plan 2014-2023 may be implemented;
5. The EPA does not recommend any conditions to which the implementation of the proposal should be subject, as reflected in the recommended Ministerial Statement (Appendix 3);
6. Pursuant to section 44(2a) of the *Environmental Protection Act 1986*, the EPA advises the Minister that the EPA, in particular, supports:
 - the continued establishment of a system of formal and informal reserves and protected areas which will eventually comprise approximately 62% of the native forest ecosystem, including the proposed addition of 4,020 ha of the unique Whicher Scarp forest ecosystem into the conservation estate as a national park;
 - the on-going implementation of a range of measures to protect and maintain the biodiversity values of the whole forest, including the review, development and implementation of recovery plans for threatened species, such as the black cockatoo species, and greater retention of marri habitat trees in areas where there are relatively fewer 'legacy' habitat elements, such as tree hollows;
 - 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 disease;

- 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;
 - the commitment to investigate opportunities that may arise from an emerging carbon economy for forest carbon storage;
 - the explicit incorporation of climate change predictions into planning for the management of the whole forest; and
 - the recognition of Noongar culture and heritage in the implementation of the plan.
7. Pursuant to section 44(2a) of the *Environmental Protection Act 1986*, 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 in research institutions and other government agencies, 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.
 - reserving any approval decisions for increasing harvesting levels beyond the 'allowable cut' (as set out in Tables 2 and 3 of this report and up to the 'upper limit allowable cut' in Table 4) for the Minister for Environment, as the Minister is in a position to more fully consider on behalf of society the environmental and socio-economic implications of progressing towards 'full' markets and maximum utilisation of jarrah, karri, and marri volumes.

Contents

	Page
Summary and recommendations	i
1. Introduction and background	1
2. The proposal	3
3. Key environmental factors and principles.....	7
3.1 Flora and vegetation, and Terrestrial fauna	7
3.2 Terrestrial environmental quality	16
3.3 Hydrological processes	17
3.4 Environmental principles	18
4. Recommendations.....	18
5. Other advice	20

Figures

Figure 1: Area covered by the proposed FMP 2014-2023	6
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Tables

Table 1: Summary of key plan characteristics.....	4
Table 2: Average annual allowable cut (cubic metres) of first and second grade jarrah and karri sawlogs for the period 2014-2023	10
Table 3: Average annual allowable cut (cubic metres) of other bole volume for the period 2014-2023	11
Table 4: Upper limits for the average annual allowable cut (cubic metres) of sawlogs and other bole volume for the period 2014-2023.....	12

Appendices

1. References
2. Summary of identification of key environmental factors and principles
3. Recommended Ministerial Statement and nominated Decision-Making Authorities
4. Proposed Forest Management Plan 2014-2023
5. Summary of submissions and proponent's response to submissions
6. Independent expert panel review of sustained yield calculations

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the key environmental factors and principles for the proposed plan of the Conservation Commission of Western Australia (the Conservation Commission) for management of the south-west forests for the next ten years (2014-2023).

In the past, the EPA has assessed a number of management plans for the south-west forests or parts of the south-west forests. The most recent and relevant was the EPA's assessment of the current Forest Management Plan 2004-2013 (EPA 2003). The proposed Forest Management Plan (proposed FMP 2014-2023), the subject of this assessment, builds on the 2004-2013 plan taking into account the conclusions of the mid- and end-of-term audits on the implementation of the current plan carried out by the Conservation Commission (Conservation Commission 2008 and 2012) and the EPA's reports on those audits (EPA 2010 and EPA 2012).

In February 2012, the Conservation Commission referred a proposal for a ten-year forest management plan to the EPA and the EPA determined to assess it at the level of a Public Environmental Review, with a two-week public review of the proponent-prepared Environmental Scoping Document and a 12-week public review of the draft FMP 2014-2023 document.

The decision to formally assess the FMP 2014-2023 was based on the EPA's past involvement in forest management plans and the level of assessment chosen reflected the high level of public interest in the management of the south-west forests.

A draft Environmental Scoping Document for this proposal was released for public comment in May 2012 and approved by the EPA in July 2012. The draft FMP 2014-2023 was released for public review from 15 August 2012 until 7 November 2012. This public review period fulfilled requirements under the *Conservation and Land Management Act 1984* and the *Environmental Impact Assessment Administrative Procedures 2010* (current at the time).

During the public review the Conservation Commission received more than 5,000 separate submissions. While most (88%) of these were either pro-forma submissions or submissions in support of various organised campaigns, this still reflects a high level of interest in the management of the south-west forests. The main themes from the submissions are set out in Appendix 5 together with the Conservation Commission's response to submissions.

In responding to submissions the Conservation Commission has used an approach developed for other management plans, classifying submissions on the basis of whether they raise issues that require a change to the draft FMP 2014-2023 or not, and responding accordingly. The EPA notes the high level

of public interest in this assessment and has used the issues raised in submissions to guide its own assessment of the plan.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. Recommendations to the Minister for Environment are provided in Section 4. Section 5 provides other advice by the EPA and Section 6 presents the EPA's recommendations.

The proposed FMP 2014-2023 is attached as Appendix 4.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

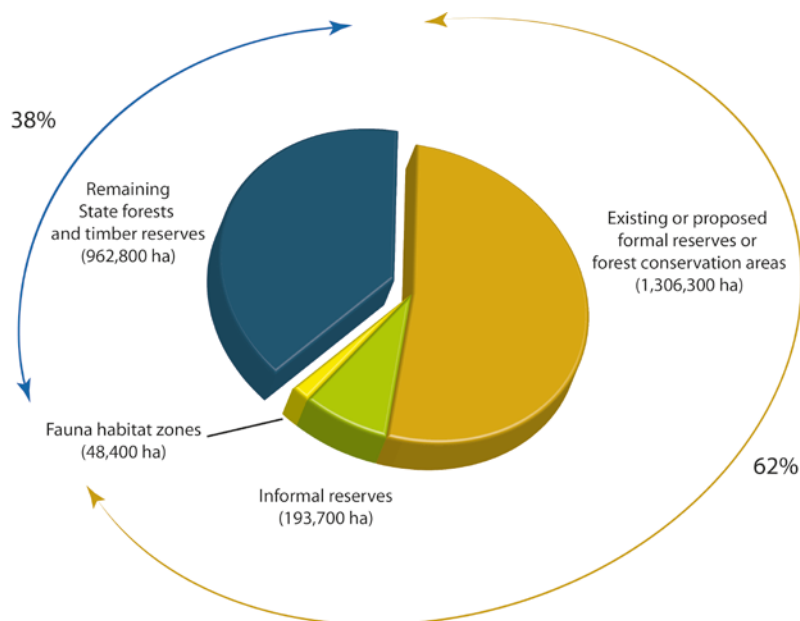
2. The proposal

The proposal is the proposed Forest Management Plan 2014 – 2023 (April 2013) which applies to land vested in the Conservation Commission within the Swan, South West and Warren regions of the Department of Environment and Conservation, and the lands collectively referred to as 'Redmond' forest block within the South Coast Region (refer to Figure 1 and Appendix 4). Within this area, the plan specifically applies to:

- State Forest and Timber Reserves, including State Forest classified as a Forest Conservation Area;
- Nature Reserves, National Parks, Conservation Parks and other land referred to in section 5(1)(g) and (h) of the *Conservation and Land Management Act 1984* that has a conservation purpose; and
- State Forest and Timber Reserves planted with exotic species.

Under the *Conservation and Land Management Act 1984* the Commission has specific functions regarding the provision of advice to the Minister on the application of ecologically sustainable forest management and on the production and harvesting of forest produce on a sustained yield basis.

Under the proposed FMP 2014-2023, 1,548,400 ha (62%) of the 2,511,200 ha of lands vested in the Conservation Commission are proposed to be protected or managed primarily for conservation purposes (either as formal reserves, Forest Conservation Areas, various categories of informal reserves, or Fauna Habitat Zones). The remaining 962,800 ha (38%) are available for other uses including timber harvesting, public collection of firewood, burl and craftwood, wildflowers and seed, and honey production, within an ecologically sustainable forest management framework.



Key aspects of the plan are summarised in Table 1.

Table 1: Summary of key plan characteristics

Element	Description
134 Management Activities <i>“Operations proposed to be undertaken (management activities)”</i>	Proposed activities throughout the life of the plan.
24 Key Performance Indicators	Performance targets against which auditing and reporting will be carried out.
264 reserve proposals	To create new formal reserves for conservation purposes or to change the category of reserves. A number of these are carried over from the current FMP 2004-2013. These are set out in Appendix 1 of the proposed FMP 2014-2023
A network of Fauna Habitat Zones	A map of the proposed Fauna Habitat Zones as a result of refinement through the proposed FMP 2014-2023 is on the Conservation Commission’s website.
Limits on the volumes of timber harvesting (allowable cut)	Based on calculations of sustained yield and set out in Tables 4, 5 and 6 of the proposed FMP 2014-2023.

Since the draft FMP 2014-2023 was released for public review, changes have been made to the plan, primarily in response to submissions. Some of these changes were to decide upon particular options presented in the draft plan.

The main changes or options chosen are:

- **Travel Route Zones** — makes proposed changes to the Warren Region and adopts Option 2 for the Munda Biddi Trail. Option 2 was to apply Travel Route Zones to certain parts (460 ha) of the trail.
- **Old-growth forest nomination** — Option 2 has been chosen which maintains the nomination process, but has it administered by the DEC rather than the Conservation Commission.
- **Phased harvesting requirements** — Requirements will be removed from the Swan and South West regions and parts of the Warren Region. However, the general planning process for timber harvesting will be revised to address the potential for salinity impacts in partially cleared catchments identified by the Department of Agriculture and Food as having a high salinity risk.

- **Fauna Habitat Zones (FHZ)** — The FHZ network has been refined along similar lines to Option 2 in the draft FMP 2014-2023, but also giving a higher weighting to allocation of areas with lower levels of reservation.
- **Silviculture for water production** — Option 2 has been chosen, which provides for silviculture for water production subject to the approval of catchment management plans.
- **Salvage of wood products** — The DEC will determine, based on a case-by-case basis, if wood arising from salvage harvests will count toward the allowable cut. The DEC will take into account the likely public benefit, considering the costs and ability of affected areas to successfully regenerate and/or be successfully rehabilitated and provide for a range of Ecologically Sustainable Forest Management values, in the absence of salvage harvest.
- **Public firewood collection** —The DEC (and where applicable in conjunction with the FPC), will implement trials in selected areas of the three management options. Subject to the results, the DEC may seek to progressively reduce public firewood areas.
- **Timber harvesting volumes** — Sustained yield calculations have been made based on the options/settings outlined in the draft FMP 2014-2023 and these calculations have been reviewed by an independent expert panel. Details of the proposed ‘allowable cut’ are discussed in Section 3.1 of this report.

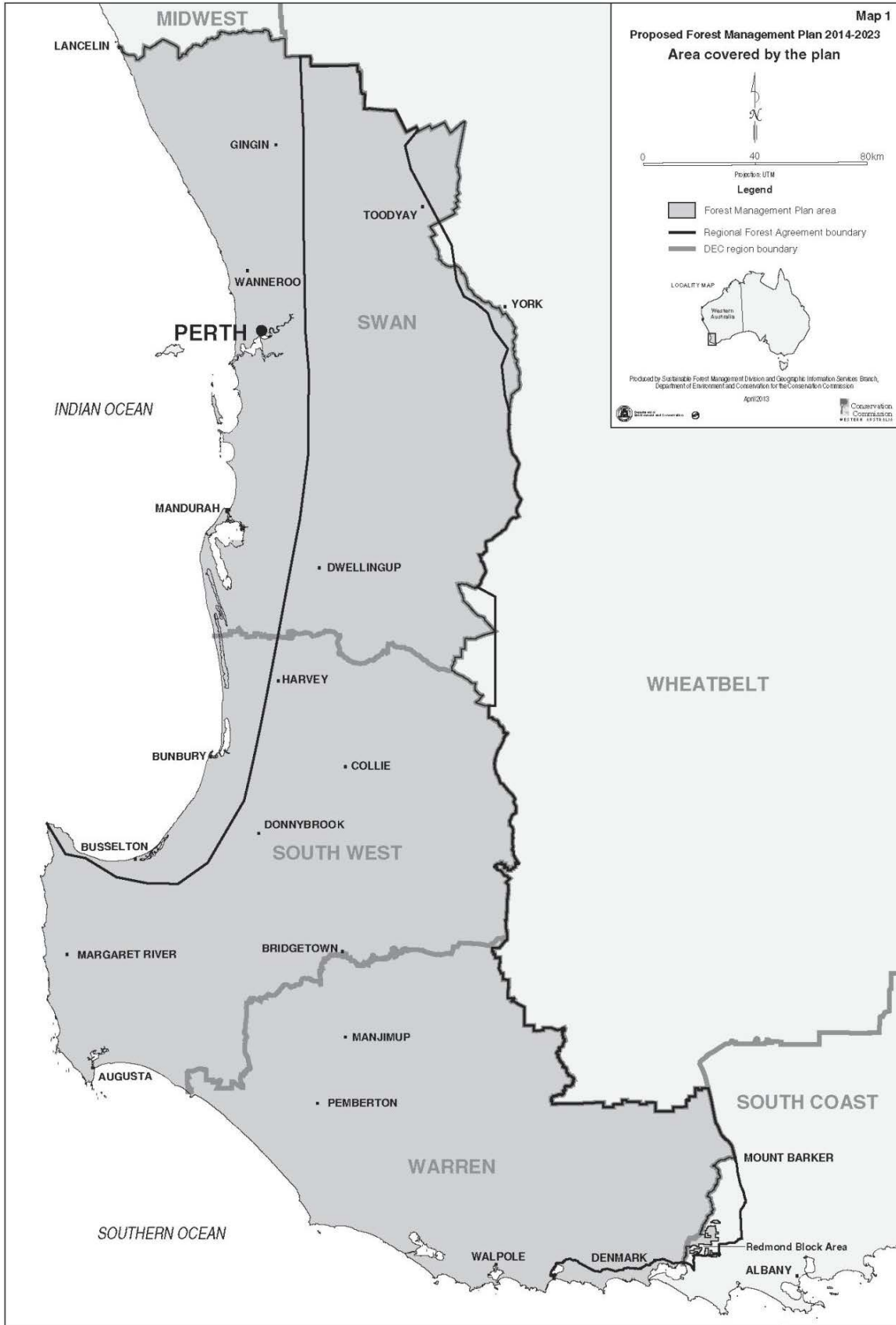


Figure 1: Area covered by the proposed FMP 2014-2023

3. Key environmental factors and principles

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report is summarised in Appendix 2. The reader is referred to Appendix 2 for the evaluation of factors not discussed below. A number of these factors, such as Inland waters environmental quality, Air quality, Heritage, and Amenity, are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 2 provides sufficient evaluation.

It is the EPA's opinion that the following key environmental factors for the proposal require detailed evaluation in this report:

- (a) Flora and vegetation, and Terrestrial fauna;
- (b) Terrestrial environmental quality; and
- (c) Hydrological processes.

The above key environmental factors were identified for assessment of the proposal and took into consideration the draft FMP 2014-2023 document and the submissions received, in conjunction with the proposal characteristics set out in Table 1.

Details on the key environmental factors and their assessment are contained in Sections 3.1 - 3.3. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

- (a) The precautionary principle;
- (b) The principle of intergenerational equity; and
- (c) The principle of the conservation of biological diversity and ecological integrity

3.1 Flora and vegetation, and Terrestrial fauna

The EPA's objectives for these factors are:

- *Flora and vegetation – to maintain representation, diversity, viability and ecological function at the species, population and community level; and*

- *Terrestrial fauna – to maintain representation, diversity, viability and ecological function at the species, population and assemblage level*

Aspects of the proposed FMP 2014-2023 relevant to this factor are the conservation of flora and fauna within the forests through a reserves system, the management of direct impacts from timber harvesting (including determining the level of harvesting), and consideration of threats to forest health and vitality.

Biodiversity

Flora, vegetation, and fauna throughout Western Australia are protected through a system of reserves for conservation, and recovery plans for species/communities under threat.

In the south-west of the State, forest management plans have been part of this system, identifying additional areas to be included in reserves. The proposed FMP 2014-2023 further contributes to the comprehensive, adequate, and representative system of formal conservation areas developed through the Regional Forest Agreement and the current FMP 2004-2013.

It also proposes the addition of approximately 4,020 ha of the Whicher Scarp to the conservation estate as a national park. This would provide for conservation of what is now recognised as a separate forest ecosystem. The EPA supports the creation of the Whicher National Park as it will protect the values of the area previously identified by the DEC (Keighery *et al.* 2008) and the EPA (EPA 2009).

The impacts of timber harvesting on the forest within State Forests and Timber Reserves are managed by excluding harvesting operations from a system of Forest Conservation Areas, informal reserves, and Fauna Habitat Zones to maintain biodiversity and ecological processes at a landscape unit level, and by silviculture guidelines to limit the impacts at a local level.

The proposed FMP 2014-2023 carries forward the Forest Conservation Areas set under the current FMP and makes minor changes to some informal reserves. The Travel Route Zones in the Warren Region have been reviewed based on changed patterns of usage and new Travel Route Zones proposed for the Munda Biddi bicycle trail.

The EPA notes the reasons for these changes and that the net result is a very small reduction in area covered by the Travel Route Zones (approximately 50 ha). The EPA also notes that throughout the period of the current forest management plan, all of the known areas of old-growth forest have been protected in formal reserves, Forest Conservation Areas, and informal reserves and that processes have been developed for the identification and demarcation of old-growth forest.

Given this, the EPA accepts the proposition to no longer recognise the legacy category of 'Areas previously classified as old-growth forest' and have the

DEC administer public nominations of old-growth forest once the procedures for assessment have been formalised and finalised.

The proposed FMP 2014-2023 also sets out a refinement of the network of Fauna Habitat Zones established under the current FMP. This refinement gives a 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 refined network covers a smaller area (48,400 ha compared with the existing 52,673 ha) and a greater range of sizes (as small as 50 ha in areas affected by bauxite mining). The EPA considers that the basis for these changes is consistent with the overall purpose of Fauna Habitat Zones in that a network will be maintained to provide a source of habitat for fauna to recolonise disturbed areas at a landscape scale.

The EPA also notes that some changes are proposed to silvicultural guidelines to improve habitat retention at a local scale. In line with recommendations of a review of the silvicultural guidelines (Burrows *et al.* 2011), changes will be made to silviculture guidelines to improve the retention of important cockatoo habitat in harvested areas. This is in addition to the continued use of databases to identify areas containing threatened and priority flora and fauna so that they can be considered when planning for any disturbance (including timber harvesting) and conditions applied where necessary.

The EPA notes that a long term monitoring program (*FORESTCHECK*) of a type considered by the EPA in the assessment of the current FMP 2004-2013, has been established.

Initial results indicate that timber harvesting in the jarrah forest can be managed to prevent long-term impacts on those parameters of biodiversity that were measured (vascular flora, macrofungi, lichens, bryophytes, mosses, macroinvertebrates, birds, and terrestrial vertebrates).

The EPA considers *FORESTCHECK* to be an important program and supports its extension to cover other forest types, other threats to the forests, and possibly other parameters such as soil microorganisms, following the 2007-2012 *FORESTCHECK* assessment.

The EPA is aware that, by its design, *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.

Productive capacity

The proposed FMP 2014-2023 sets the level of timber harvesting for the next 10 years based on a calculation of the 'sustained yield'. The EPA notes that the 'sustained yield' 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).

The ‘sustained yield’ is estimated by application of sophisticated modelling using data from forest inventory plots, predicted climate change and impacts on tree growth rates, woodflow scheduling, and many other factors. The DEC’s calculation of ‘sustained yield’ is also subject to review by an independent expert panel (Ferguson *et al.* 2013).

The EPA therefore considers the process for determining the level of allowable timber harvesting through the calculation of a ‘sustained yield’ to be appropriate and rigorous.

The proposed FMP 2014-2023 defines an ‘allowable cut,’ which is the default value that would apply and assumes the level of utilisation of wood resources by the timber industry remains the same as that recorded during the period of the current FMP 2004-2013.

The ‘allowable cut’ is based on the ‘sustained yield’ derived with this assumption and incorporates a safety margin for risks to the yield such as fire, cyclone, drought, pests and disease.

The ‘allowable cut’ set out in the proposed FMP 2014-2023 is shown in Tables 2 and 3.

Table 2: Average annual allowable cut (cubic metres) of first and second grade jarrah and karri sawlogs for the period 2014-2023

	Species	
	Jarrah (m ³)	Karri (m ³)
Average annual allowable cut	132,000	59,000

Notes:

1. An annual sawlog sustained yield of 146,000 m³ for jarrah and 70,000 m³ for karri was computed from Woodstock™ woodflows, and assumes that the standard of silvicultural outcomes, sawlog utilisation and limited markets for jarrah and karri lower grade logs recorded during the previous FMP, continue indefinitely.
2. The average annual allowable cut is the sustained yield adjusted by a ‘safety margin’ of 10 per cent for jarrah and 15 per cent for karri, as recommended by the Independent Expert Panel. Such adjustments for risk will vary over time and may also be addressed or offset through contract or commercial arrangements.
3. The operationally achievable component of the allowable cut is largely a matter for the FPC.

Table 3: Average annual allowable cut (cubic metres) of other bole volume for the period 2014-2023

	Species		
	Jarrah (m ³)	Karri (m ³)	Marri ³ (m ³)
Average annual allowable cut	292,000	164,000	140,000

Notes:

1. The annual allowable cut is the woodflow arising as a consequence of the sawlog sustained yields, adjusted by the 'safety margins' of 10 per cent for jarrah and 15 per cent for karri as recommended by the Independent Expert Panel. However, following bushfires the other bole volume log grades can generally be either salvaged or are downgraded to lower product categories. The jarrah figures include approximately 37,000 cubic metres per year arising from the first thinning of rehabilitated minesites, which would not be generated if thinning of these areas did not proceed during the plan period.
2. The operationally achievable component of the allowable cut is largely a matter for the FPC.
3. The marri figure is total bole volume, which is inclusive of any sawlogs recovered from harvesting operations.
4. Other bole volume of wandoo, blackbutt and sheoak will also be made available in quantities that will vary depending on the structure and mix of forest accessed during the period of the plan.

In reviewing the 'sustained yield' estimates, the EPA sought from the DEC clarification of how climate change impacts are taken into account in 'sustained yield' calculations, giving attention to explaining why predictions of reduced rainfall do not necessarily translate into a proportional decrease in sustained yield. The DEC advised that:

"The allowable cuts for jarrah and karri sawlogs under this plan have not altered substantially from the previous FMP, despite the calculations for this plan explicitly incorporating the projected impact of 'high severity' climate change conditions on tree and stand growth. There are a number of reasons why the projected decreases in rainfall and rising temperature have not resulted in a proportional reduction to the sustained yield or availability of other bole volume:

- *The calculation of the sustained yields for the previous FMP already incorporated major adaptive settings and provision for future reduced yields under a drying climate. Some of these assumptions were believed to be precautionary, and monitoring to 2012 has shown this to be the case. For example, no future growth on the 1990 inventory was assumed for the two-tiered jarrah forest when calculating the sustained yields for the previous plan, whereas the remeasurement of the inventory indicated substantial growth and sawlog yield had accrued to 2012. Similarly, the revised rates of future spread of *Phytophthora dieback* across the forest indicate a marked slow-down in spread and hence modelled impact on yields relative to the previous plan calculations.*
- *The relative contribution of future growth to the sustained yield woodflow varies between forest categories. This moderates the potential impacts from a drying climate on overall wood availability. For example, in the jarrah two-tiered forest, most of the sawlog yield for the next few decades is already standing and available, and because no sawlog growth is assumed in the modelling beyond 2023, a drying climate has little impact.*

In the karri regrowth forest, the impact of reduced growth is more than offset by a substantial increase in available yields as the large areas of karri regenerated since 1970 start to contribute to sawlog yields.

- *Because the sustained yield calculation for this plan assumes no net growth from jarrah two-tiered forests beyond 2023, the impact of a progressively drying, warmer climate on sawlog yields is mainly on the regrowth jarrah forests. However, while the models suggest a progressive decline in growth rates of trees and stands over the very long term, some growth is still maintained so that the timber yields (which are the sum of the accrued growth over time) are impacted at a comparatively slower rate.”*

The EPA also notes that the independent expert panel review of the DEC’s calculation of ‘sustained yield’ (Ferguson *et al.* 2013) has concluded that it is based on a robust model that adequately factors in associated risks and uncertainty.

The EPA accepts the proposed level of harvesting as being consistent with Ecologically Sustainable Forest Management and notes that the ‘sustained yield’ process is rigorous and subject to independent expert review. This follows satisfactory explanations as to why the modelling results differ from previous modelling in relation to the expected impacts of climate change.

However, the proposed FMP 2014-2023 introduces the concept of an ‘upper limit allowable cut’ that is based on assumptions of changes in the timber harvesting industry, and would require further approval by the DEC, in consultation with the Conservation Commission. The ‘upper limit allowable cut’ is based on the assumption of full utilisation of wood resources by the timber industry with a similar safety margin.

It is proposed that the ‘upper limit allowable cut’ volume would only be available in the case of the specific approval of proposals by the DEC (in consultation with the Conservation Commission) and would be contingent on demonstration that industry conditions do change and that lower quality or smaller sized wood products are used. The ‘upper limit allowable cut’ set out in the proposed FMP 2014-2023 is shown in table 4.

Table 4: Upper limits for the average annual allowable cut (cubic metres) of sawlogs and other bole volume for the period 2014-2023

Log product category	Species		
	Jarrah (m ³)	Karri (m ³)	Marri ² (m ³)
Sawlogs ¹	160,000	59,000	-
Other bole volume ²	521,000	164,000	254,000

Notes:

1. First and second grade sawlogs (or equivalent).
2. The marri figure is total bole volume, which is inclusive of any sawlogs recovered from harvesting operations.

While the EPA is satisfied with the process by which the 'upper limit allowable cut' has been calculated, it believes that Government should maintain oversight of potential flow-on social and economic consequences of allowing such change. 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 recommends that any approval decisions for harvesting levels beyond the 'allowable cut' should be reserved for the Minister for Environment, who is in a position to fully consider on behalf of society the environmental and socio-economic implications of progressing towards 'full' markets and maximum utilisation of jarrah, karri, and marri volumes.

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.

The Conservation Commission and the DEC have begun investigating forest vulnerability to climate change and have set out strategies for building resilience, many of which are already incorporated in forest management for other reasons (for example, a network of formal and informal conservation areas that also provide connectivity for vegetation and fauna values).

The proposed FMP 2014-2023 also introduces other adaptive measures, such as relaxing constraints on seed sources for rehabilitation where there may be benefit to using drought-resistant varieties in areas of reduced rainfall. The EPA therefore considers that appropriate precautionary measures have been proposed for the next ten years.

Other measures may be needed in the longer term, but these would need to be guided by research initiated in the short-to-medium term. There is currently insufficient knowledge to predict with greater certainty what the final impacts of climate change on forest structure and composition will be and whether other adaptive management measures may become necessary or feasible. It is therefore important to develop an improved understanding of the likely future state of the forest as a result of climate change. This would guide forest management planning in coming decades.

The EPA believes that monitoring key trends in forest health and initiating relevant research over the next ten years is an important step to developing this understanding. To this end, it recommends extending *FORESTCHECK* and remote sensing programs.

In reviewing and extending monitoring programs (including *FORESTCHECK*) to include climate change trends and other forest types (refer to advice under the 'biodiversity' heading) the EPA recommends that the DEC consult scientists in

research institutions and other government agencies, as it did in the original development of *FORESTCHECK*.

The EPA also notes that the recent review of the silviculture guidelines (Burrows *et al.* 2011) considered that:

“... forest management to achieve a better water balance in a drying climate is a most critical issue facing forest managers now and in the future. As a consequence of a drying and warming trend since the 1970s, and a legacy of predominantly heavily stocked regrowth forests, these ecosystems are experiencing acute water stress.

If this issue is not addressed as a matter of priority, then the consequences will be undesirable, probably irreversible, and will likely compromise efforts to achieve ESFM. Silviculture has a pivotal role in addressing this issue.”

In reviewing and extending monitoring programs this view should be examined by other scientists to determine whether this should be a priority for broad scale adaptive management measures in future forest management plans and, if so, what research would be necessary to support it.

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. Nevertheless, with the impacts of climate change expected to increase over time, this is an issue that should be monitored and periodically reviewed into the future, particularly from an ecosystem health perspective.

Ecosystem health and vitality

The EPA considers that the current approach to reporting on the overall health of the forest and any evident trends needs to be improved. This would form an important context for enhanced community understanding of forest management and the utility and effectiveness of the FMP.

The EPA notes that the main finding of the DEC’s current reporting on forest health is that the vegetation cover index (as a surrogate for forest health) has remained stable for most areas during the period of the current FMP. Episodic events (pest, drought and frost events) have had impacts on the health of the forest in particular areas, but mostly the forest has recovered.

With climate change likely to affect forests to a greater degree into the future, it will be even more important to provide public information about overall forest health. The EPA believes that this can be facilitated by the recommended expansion and extension of forest monitoring to detect any trends due to climate change and other threatening processes.

Summary

Having particular regard to:

- (a) the adequacy of the existing and proposed conservation system (formal conservation areas, Forest Conservation Areas, Fauna Habitat Zones, and informal reserves) and refinements made in the proposed FMP 2014-2023;
- (b) the proposed management of the impacts of timber harvesting within the remaining areas;
- (c) the setting of limits on harvesting through a rigorous modelling process that has been subject to independent expert review; and
- (d) appropriate precautionary measures that are already in place, or are proposed, to address the impacts of climate change in the next ten years,

it is the EPA's opinion that the EPA's environmental objectives for Flora and Vegetation, and Terrestrial Fauna can be met by the proposed FMP 2014-2023. However, the EPA recommends that the Minister for Environment give consideration to the merit of:

- extending forest monitoring programs (including *FORESTCHECK*) and public reporting of outcomes, in consultation with scientists in research institutions and other government agencies, to include:
 - key climate change indicators,
 - a greater diversity of forest types; and
 - a full range of threats to the forests..
- reserving any approval decisions for increasing harvesting levels beyond the 'allowable cut' (as set out in Tables 2 and 3 of this report and up to the 'upper limit allowable cut' in Table 4) for the Minister for Environment, as the Minister is in a position to more fully consider on behalf of society the environmental and socio-economic implications of progressing towards 'full' markets and maximum utilisation of jarrah, karri, and marri volumes.

3.2 Terrestrial environmental quality

The EPA's environmental objective for terrestrial environmental quality is to *maintain the quality of land and soils so that the environment values, both ecological and social, are protected.*

The proposed FMP 2014-2023 sets out what uses are permitted in various parts of the south-west forests. These uses will help determine the amount of carbon stored in the terrestrial environment (vegetation and soils).

Choices about the multiple uses of forests can affect the amount of carbon storage in the vegetation and soils of the forest, which in turn affects the concentration of greenhouse gases in the atmosphere. 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.

Some submissions on the draft forest management plan contend that the best long-term use of native forests would be to manage them for conservation, thereby gaining environmental benefits as well as economic benefits arising from increased carbon storage in a carbon economy, rather than just the economic benefits of timber harvesting.

The EPA must assess those uses put forward under the proposed FMP 2014-2023 and determine if they meet its environmental objectives. In this context, the continued use of the south-west forests for multiple uses (in particular, the use of State Forests and Timber Reserves for timber production) is expected to see the existing density of carbon storage maintained with no significant degradation of terrestrial environmental quality.

The EPA notes and is supportive of the proposals in the FMP 2014-2023 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 also notes that published scientific articles have raised the uncertainty of long term impacts associated with the compaction of soil from timber harvesting (Whitford and Mellican, 2011). This is a matter that could usefully be considered when extending forest monitoring programs (including *FORESTCHECK*).

Summary

Having particular regard to:

- (a) the multiple uses proposed for the south-west forests under the FMP 2014-2023; and
- (b) the undertaking to report on carbon stores and investigate opportunities that may arise from an emerging carbon economy;

it is the EPA's opinion that the EPA's environmental objective for terrestrial environmental quality can be met by the proposed FMP 2014-2023. However, the EPA also believes that future forest management planning could be improved through consideration of the long term impacts associated with the compaction of soil from timber harvesting, when extending forest monitoring programs (including *FORESTCHECK*).

3.3 Hydrological processes

The EPA's environmental objective for hydrological processes is to *maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.*

The proposed FMP 2014-2023 includes the possibility for large scale management of parts of the forests for water production. Silviculture treatments could be applied to catchments with the aim of increasing recharge of surface and groundwater systems by reducing the uptake of water by vegetation. This would normally require silvicultural treatments beyond the standard silviculture practices to thin vegetation to lower densities. The total area of catchments that might be suitable for such treatments is about 52,700 ha.

The proposed FMP 2014-2023 allows for the possibility of silviculture for water production. In addition to potential increases in water production, such thinning of the forest could also provide water for the environment in a drying climate and so may offset some changes of climate change for aquatic ecosystems.

The main concern regarding silviculture for water production is whether the impacts of forest thinning to reduce the Leaf Area Index to levels where there would be a viable increase in water yield would have unacceptable impacts on fauna habitats and biodiversity within the forests.

At the current time, the benefits of silviculture for water production have yet to be demonstrated (though the Wungong Catchment Trial) and there are no proposals under active consideration. Any proposals for silviculture for water production would therefore need to include comprehensive monitoring requirements to prove both the benefits of the proposal and to monitor the ecological uncertainties.

The proposed FMP 2014-2023 establishes a regulatory system through the preparation and evaluation of catchment management plans (which would include monitoring). Therefore, the EPA concludes that while there are no firm water production proposals at this stage, the proposed FMP 2014-2023 makes provision for proposals to be developed and provides a regulatory regime that ensures any approved proposal would maintain forest values.

Summary

Having particular regard to:

- (a) proposed regulation of any silviculture for water production through approved catchment management plans;

it is the EPA's opinion that the EPA's environmental objective for hydrological processes can be met by the proposed FMP 2014-2023.

3.4 Environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act. The following principles were considered by the EPA in relation to the proposal:

- (a) The precautionary principle;
- (b) The principle of intergenerational equity; and
- (c) The principle of the conservation of biological diversity and ecological integrity.

Appendix 2 contains a summary of the EPA's consideration of the principles.

4. Recommendations

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and on the conditions and procedures, if any, to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

The EPA recommends the Minister for Environment notes that:

1. The EPA assessed the proposed plan of the Conservation Commission of Western Australia for management of the south-west forests for the next ten years (Appendix 4);
2. The factors set out in Section 3 of this report are the factors which the EPA considers to be the key environmental factors identified in the course of its assessment of this proposal;
3. The EPA has concluded that the proposed Forest Management Plan 2014-2023 meets its environmental objectives for the key environmental factors assessed;
4. The EPA recommends that the proposed Forest Management Plan 2014-2023 may be implemented;
5. The EPA does not recommend any conditions to which the implementation of the proposal should be subject, as reflected in the recommended Ministerial Statement (Appendix 3);
6. Pursuant to section 44(2a) of the *Environmental Protection Act 1986*, the EPA advises the Minister that the EPA, in particular, supports:

- the continued establishment of a system of formal and informal reserves and protected areas which will eventually comprise approximately 62% of the native forest ecosystem, including the proposed addition of 4,020 ha of the unique Whicher Scarp forest ecosystem into the conservation estate as a national park;
 - the on-going implementation of a range of measures to protect and maintain the biodiversity values of the whole forest, including the review, development and implementation of recovery plans for threatened species, such as the black cockatoo species, and greater retention of marri habitat trees in areas where there are relatively fewer 'legacy' habitat elements, such as tree hollows;
 - 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 disease;
 - the use of an independent Expert Panel to examine the underlying data, structure and function of the model (Woodstock™) to calculate the sustained yields of wood products;
 - the commitment to investigate opportunities that may arise from an emerging carbon economy for forest carbon storage;
 - the explicit incorporation of climate change predictions into planning for the management of the whole forest; and
 - the recognition of Noongar culture and heritage in the implementation of the plan.
7. Pursuant to section 44(2a) of the *Environmental Protection Act 1986*, 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 in research institutions and other government agencies, 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.
 - reserving any approval decisions for increasing harvesting levels beyond the 'allowable cut' (as set out in Tables 2 and 3 of this report and up to the 'upper limit allowable cut' in Table 4) for the Minister for Environment, as the Minister is in a position to more fully consider on behalf of society the environmental and socio-economic implications of progressing towards 'full' markets and maximum utilisation of jarrah, karri, and marri volumes.

5. Other advice

Plan implementation and management

The EPA has previously noted (EPA 2003) 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.

However, in the absence of any changes to legislation, the EPA considers that the existing system of having an environmental agency (the DEC) overseeing planning and operations of the Forest Products Commission and its contractors, and having the overall effectiveness of the FMP reviewed by a statutory environmental advisory body (the Conservation Commission), should give the community confidence that ecologically sustainable forest management is being applied properly.

The EPA notes that the Office of the Auditor General is currently auditing *Supply and Sale of WA's Native Forest Products* and that this is an appropriate process for review and recommending improvements to current policies, procedures and practices.

In addition, the EPA also considers that having expert and independent reviews of silviculture guidelines and the 'sustained yield' calculations also provides useful and necessary balances and checks.

The EPA notes that the mid-term and end-of-term audits are made available to the public as are many other reports and approvals given under the FMP (e.g. old-growth forest maps and nomination assessments) and that this provides a level of public accountability.

In order to further build trust and confidence in the implementation of the forest management plan, the EPA recommends that the Conservation Commission and the DEC extend their public reporting to include publication of all relevant compliance matters, such as incident reports.

The EPA recommends that the Conservation Commission consider the merit of establishing a stakeholder reference group to assist in providing opportunities for the community, and relevant non-government organisations and government agencies to participate in the implementation of the FMP 2014-2023.

Such a stakeholder reference group would need to draw on a broad pool of knowledge, experience and skills from the Noongar people, recreation, tourism and conservation interests, the timber industry, south-west communities, research institutions, and relevant government departments.

As the establishment of such a reference group would be a major challenge and require a large commitment of time and resources, the Conservation Commission would need to give serious consideration to the merits of this approach over other stakeholder involvement strategies, and competing

statewide priorities, before making a decision. In the experience of the EPA, stakeholder groups are a worthwhile investment.

The EPA also notes that both the proposed FMP 2014-2023 and the sustained yield expert panel report (Ferguson *et al.*, 2013) identify the need for various pieces of research to support ecologically sustainable forest management. The Conservation Commission has provided an initial response to the recommendations of the sustained yield expert panel which acknowledges areas of further research.

The EPA recommends that a process be put in place under the auspices of the Conservation Commission and led by the DEC with input from research institutions to identify research priorities and collaborate on delivery of research programs. The DEC's *A Strategic Plan for Biodiversity Conservation Research 2008-2017* and the proposed Western Australian Biodiversity Institute are relevant to this recommendation.

Appendix 1

References

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Conservation Commission 2008, *Forest Management Plan 2004-2013 Mid-term audit of performance report*, Conservation Commission of Western Australia, Perth, Western Australia, 24 December 2008.

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Ferguson I, Dell B, and Vanclay J, 2013, *Calculating the sustained yield for the south-west native forests of Western Australia*, Report for the Conservation Commission of Western Australia, Perth, Western Australia, March 2013.

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Whitford K R and Mellican A E, 2011. *Intensity, extent and persistence of soil disturbance caused by timber harvesting in jarrah (Eucalyptus marginata) forest on FORESTCHECK monitoring sites*, Department of Environment and Conservation, Dwellingup, WA, Australia.

Appendix 2

Summary of identification of key environmental factors and principles

The EPA identified the following preliminary key environmental factors through its assessment which, at the conclusion of the assessment, were not considered to be key environmental factors warranting discussion and evaluation in the EPA's assessment report.

Factor and EPA objective	Activities and Potential impacts	Relevant legislation and policy	Assessment and, management and mitigation of impacts
Inland Waters Environmental Quality			
<p>To maintain the quality of groundwater and surface water, sediment and/or biota so that the environmental values, both ecological and social, are protected.</p>	<p>Disturbance activities near watercourses that could affect water quality through pollution or erosion.</p> <p>Timber harvesting in areas that could affect water balances to the extent that saline groundwaters could rise and affect vegetation and surface water quality.</p>		<p>The informal reserve category of 'River and Stream Zones' restricts activities on these areas. These restrictions are set out in <i>Guidelines for Protection of the Values of Informal Reserves and Fauna Habitat Zones</i> under the proposed FMP 2014-2023</p> <p>The EPA notes that the proposed FMP 2014-2023 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.</p> <p>The phased harvesting requirement will be removed in the DEC's Swan and South West regions and part of the Warren Region. The phased harvesting requirement for other parts of the Warren Region will be retained. 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 on salinity of streams.</p>

Air Quality			
<p>To maintain air quality for the protection of the environment and human health and amenity.</p>	<p>Greenhouse gas emissions from activities within the forest. Primarily the emissions from machinery involved in timber harvesting.</p> <p>While forests are generally neutral with respect to greenhouse gas emissions (absorption generally balance emissions), fire management can change emission characteristics.</p>		<p>The EPA considers that the emissions from vehicles used in management of the forests (including harvesting) are relatively small, and do not require separate assessment.</p> <p>The frequency, extent, and timing of planned burning operations can alter the emission characteristics of gases that would otherwise occur through natural wildfires and vegetation decay. However, this is a relatively small effect when compared with the overall carbon dioxide balance within a forest and is therefore secondary in importance to the other objectives of planned burning, which include protection of human life and property, maintenance of a diverse range of habitats (mosaic burns), and regeneration of forest structure (regeneration burns).</p>
Heritage			
<p>To ensure that historical and cultural associations are not adversely affected.</p>	<p>Active management and multiple use of the forests has the potential to disturb land of importance to the Noongar people.</p>	<p><i>Aboriginal Heritage Act 1972.</i></p>	<p>The EPA notes that any impact on Aboriginal heritage sites within the forests are subject to management through the <i>Aboriginal Heritage Act 1972</i>.</p> <p>The EPA understands that the DEC (assisting the Conservation Commission) has engaged with and consulted Traditional Owners in developing the proposed FMP 2014-2023. The EPA also notes that there is a commitment to develop a program for assessment of areas of the plan area for their</p>

			importance for Noongar culture and heritage, and to identify appropriate opportunities for joint management of areas within the plan area.
Amenity			
To ensure that impacts to amenity are reduced as low as reasonably practicable.	Disturbance activities within the forest (e.g. resource extraction and timber harvesting) have the potential to degrade areas of high scenic value.		<p>Most of the high scenic value areas are generally expected to occur in National Parks and other areas set aside for conservation, and therefore are managed either in accordance with specific management plans (that include amenity considerations) or are excluded from timber harvesting operations.</p> <p>Travel Route Zones identify other areas of State Forests and Timber Reserves that have high scenic value. Timber harvesting is generally prohibited in these areas (some thinning or salvage that will allow visual quality to be enhanced in the long term is allowed). Restrictions on activities are set out in are set out in <i>Guidelines for Protection of the Values of Informal Reserves and Fauna Habitat Zones</i> under the proposed FMP 2014-2023</p>

PRINCIPLES		
Principle	Relevant Yes/No	If yes, Consideration
<p>1. The precautionary principle <i>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.</i> <i>In application of this precautionary principle, decisions should be guided by –</i> <i>(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i> <i>(b) an assessment of the risk-weighted consequences of various options.</i></p>	yes	Risks and threats to the forests are identified where full scientific certainty does not exist (e.g. climate change, pest, weeds, disease). Measures have been proposed to manage these risks through the ten-year term of the plan and research topics have been identified to increase scientific understanding so that management may be improved into the future.
<p>2. The principle of intergenerational equity <i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	yes	The process of modelling a 'sustained yield' on which timber harvest limits are based, gives effect to this principle. This limits timber harvesting to levels that provide for ecologically sustainable forest management.
<p>3. The principle of the conservation of biological diversity and ecological integrity <i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	yes	The EPA's assessment of the key environmental factor "flora and vegetation and fauna" deals with the maintenance of biodiversity through a system of reserves and through management of activities in the forest (in particular timber

		harvesting).
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms</p> <p>(1) <i>Environmental factors should be included in the valuation of assets and services.</i></p> <p>(2) <i>The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i></p> <p>(3) <i>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 waste.</i></p> <p>(4) <i>Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i></p>		
	no	The forest management plan deals with what types of activities will be allowed in the forests and the levels of allowed activities and the constraints upon them. It is outside of the scope of a the plan to deal with prices for forest products or the costs of implementing management activities.
<p>5. The principle of waste minimisation</p> <p><i>All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.</i></p>		
	no	The management of forests does not generate significant quantities of waste in the context of this principle.

Appendix 3

**Identified Decision-making Authorities
and
Recommended Ministerial Statement**

Identified Decision-making Authorities

Section 44(2) of the *Environmental Protection Act 1986* specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
1. Minister for Environment	Management Plan Approval under section 60 of the <i>Conservation and Land Management Act 1984</i> .

RECOMMENDED MINISTERIAL STATEMENT

**STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)**

Forest Management Plan 2014-2023

Proposal: Forest Management Plan 2014-2023 (as described in Table 1 of this Statement)

Proponent: Conservation Commission of Western Australia

Proponent Address: Corner Hackett Drive & Australia II Drive
Crawley WA 6009

Assessment Number: 1921

Report of the Environmental Protection Authority Number: 1483

It is agreed that the Proposal described and documented in Table 1 (below) may be implemented.

Table 1: Summary of the Proposal

Proposal Title	Forest Management Plan 2014-2023
Short Description	The proposed Forest Management Plan 2014 – 2023 dated April 2013 which applies to land vested in the Conservation Commission within the Swan, South West and Warren regions of the Department of Environment and Conservation, and the lands collectively referred to as 'Redmond' forest block within the South Coast Region (refer to Figure 1).

Minister for Environment
2013

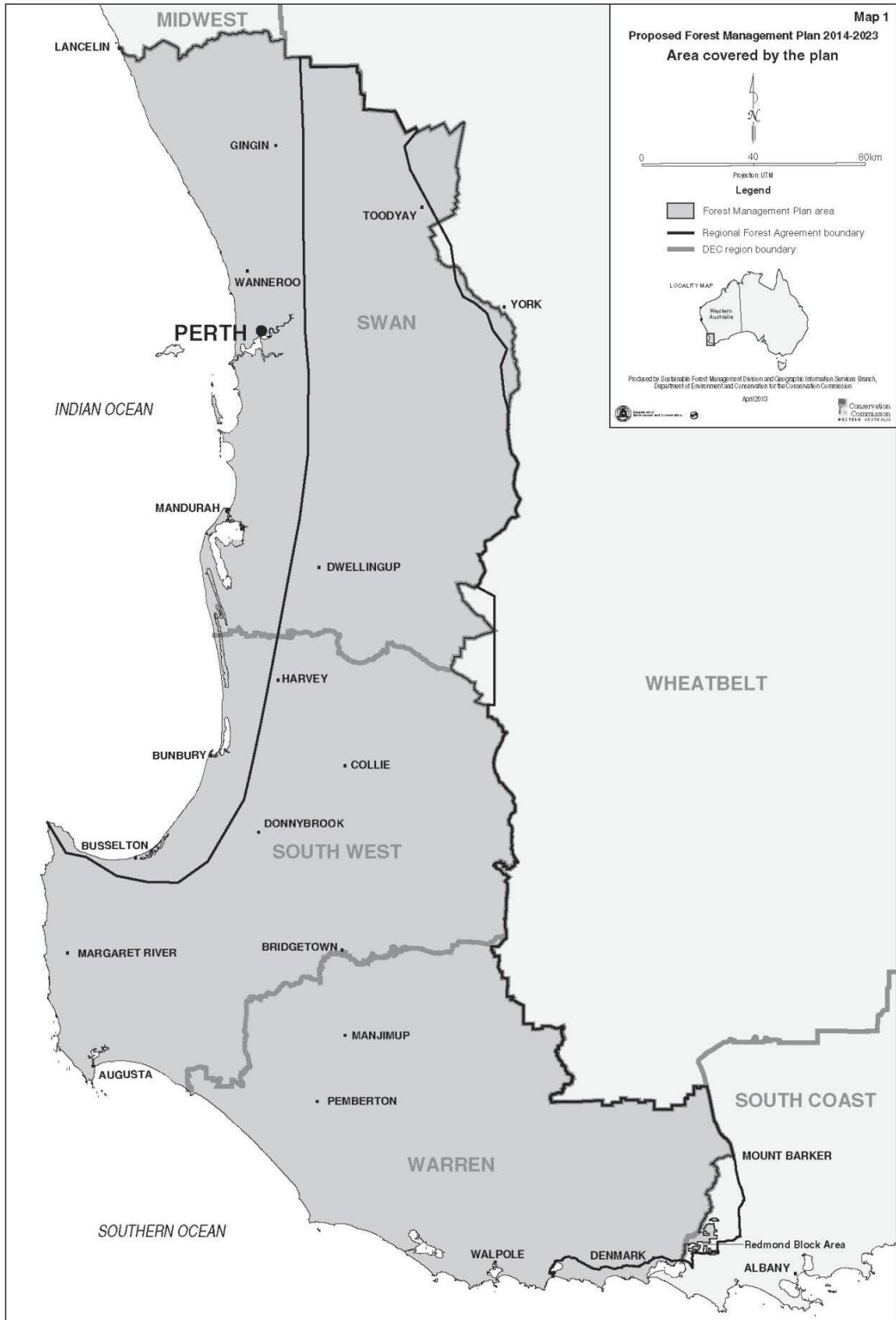


Figure 1: Area covered by the proposed Forest Management Plan 2014-2023

Appendix 4

Proposed Forest Management Plan 2014-2023

Appendix 5

**Summary of Submissions and
Proponent's Response to Submissions**

Appendix 6

Independent expert panel review of sustained yield calculations

These appendices are provided on CD in the printed versions of this report and are available on the EPA's website at www.epa.wa.gov.au