



Unit 1, Abridge House
5 Turner Avenue, Bentley WA 6102
Phone: (08) 9472 3055 Fax: (08) 9472 3155
Email: info@fifwa.asn.au
www.forestindustries.com.au

7 November 2012

Mr Gordon Graham
Director
Conservation Commission of Western Australia
Locked Bag 104
Bentley Delivery Centre WA 6983

Submission: Draft Forest Management Plan 2014-2023

Dear Mr Graham,

The Forest Industries Federation of WA (FIFWA) is the association for the timber industry in Western Australia. FIFWA is representative of almost all of the major companies and businesses that operate in the WA timber industry, including the native timber harvest and haul operators and processors. After extensive consultation, this submission is made on behalf of those FIFWA members directly involved in the native timber sector of the industry and on behalf of the processors of State owned plantation estate resource, (see Appendix 3). Whilst we make this industry submission we understand some of our members will also be making individual submissions to emphasise points of particular importance to their own businesses.

We would like to thank you for the opportunity to comment on the Draft Forest Management Plan 2014-2023, and note that while we are supportive of a number of initiatives in the plan we also raise several concerns, particularly in relation to specified management options and various changes in silvicultural practice which we see as having potential adverse impacts on the commercial viability of the timber industry. We have made a number of recommendations (see Appendix 1) as well as outlined our view in relation to the management options presented in the draft (see Appendix 2).

If required we are more than willing to provide additional information or answer any questions the Conservation Commission may have in respect to the industry submission.

Sincerely,

Melissa Haslam B.Sc(Hons)
Executive Director.



FOREST INDUSTRIES FEDERATION (WA) Inc.

Submission

Draft Forest Management Plan 2014 – 2023

1. Introduction

Prior to the introduction of the current Forest Management Plan 2004-2013 the timber industry was adversely affected by several significant changes in government policy. Initially the 1999 Regional Forest Agreement (RFA) implemented by the State and Commonwealth Governments introduced a number of changes to the management of the Western Australian South West Forests. These changes resulted in the first of many cuts in the available timber resource to the industry. Subsequent changes in management directives for both the karri and tingle forests resulted in further cuts in timber yields before the catastrophic introduction of the then state governments 'protecting our old growth forests' policy in 2001. The introduction of the 'protecting the old growth forests' policy, implemented through the current Forest Management Plan (FMP), resulted in the instant cessation of logging in old growth forests, as well as in a large area of regrowth forests. This had an immediate and hard hitting affect not only on the timber industry itself but on the many South West communities that are reliant on the industry, evident by the numerous business closures, recorded job losses and significant population declines experienced in each of these towns. Worse, was that the Social and Economic Impact Report, detailing this information and the importance of the industry in regional South West communities was not produced until after the Draft FMP 2004-2013 was finalised.

In total, a combination of policy changes from 1999 to 2001 reduced the total sawlog volume available to the industry from 700,000 cubic metres to approximately 190,000 cubic metres. It should be noted that as a consequence of these changes not only was the reduction in timber volume very significant but the reduction in log quality was dramatic.

With the introduction of the 2004-2013 FMP came a range of new forest management procedures, many of which were largely a 'desktop construct' and as such were untried before their implementation, such as the then Soil Dryness Index (SDI) later modified with minimal improvement to the Trafficability Index (TI). These new forest management prescriptions had far reaching cost implications for the industry, which were totally unanticipated. This in combination with the fact that the sawmills were operating at levels far below the capacity of their equipment and dealing with resource of dramatically reduced size and quality, resulted in a major economic challenge for the timber industry.

It took several years for the timber industry to recover from the pressures described above and did so through various renegotiations of contractual arrangements; some of the remaining mills were able to increase their intake to assist with the scale of economy, others invested in new equipment and many sought out new timber markets for their products. Additionally it took a long time to restore investor confidence in the industry, and FIFWA members are concerned that any further reductions in the scale of the industry will erode this confidence to an irreparable level.

It is important to understand that the task of restoring financial viability to the industry took several years and ongoing commerciality is absolutely dependent on continued access to resource at the current levels, as a minimum. Sawmilling viability is dependent upon three strongly inter-related factors being; log input, log quality and log supply cost. **Any further reductions in either the available volume or in log quality, or increases to unit costs of production will result in mill closures.**

The current timber industry is largely based on the value adding requirements set by the previous labor State Government. High quality timber products can only be produced from good quality sawlogs. The proposal under the new FMP 2014-2023 to increase the volume of low grade logs/‘bole logs other than first and second grade sawlog’ are of absolutely no value to the current sawmill industry, focused on value adding.

Lessons learnt from the implementation of the current FMP 2004-2013 have been many. The industry is now particularly concerned with the introduction of any new ‘desktop constructs’ in forest management practices which add additional process and therefore cost to operations, especially where they are completely untried and no cost benefit analysis has been undertaken. This submission will address each of these in turn. The industry is also extremely sensitive to any change which would reduce further the land base of state forest and therefore reduce the sustainable yield to the industry. It is also important to note that over-precautionary assumptions factored into resource modelling calculations can result in a similar outcome on sustainable yield and this submission will also address the industry concerns in this respect.

FIFWA is seeking an increase in access to first and second grade sawlog to help secure the viability of the current industry, and has determined the best way to achieve this through a series of recommendations and management options as detailed in this submission and as summarised in appendix 1 and 2 respectively.

2. Sustainable Yield

It has always been a concern to industry that in setting the sustainable yield this and previous FMP’s have always addressed as a first priority the principles of Ecological Sustainable Forest Management (ESFM) (without consideration to the requirements of a viable timber industry) after which the fallout volume provides the basis for the sustainable yield and therefore the ‘allowable cut’ of timber to the industry. This method applied over several consecutive plans has resulted in a position where most of the ESFM principles have been reached and in many instances vastly exceeded and those proposed under this draft FMP may be considered a nice surplus to requirements but certainly are not essential to the protection and maintenance of the biodiversity of the forest. Conversely the timber industry has been reduced to a level where any further reductions in either log volume or log quality will result in mill closures. Maintenance of a viable timber industry should be a stated objective when determining the sustainable yield.

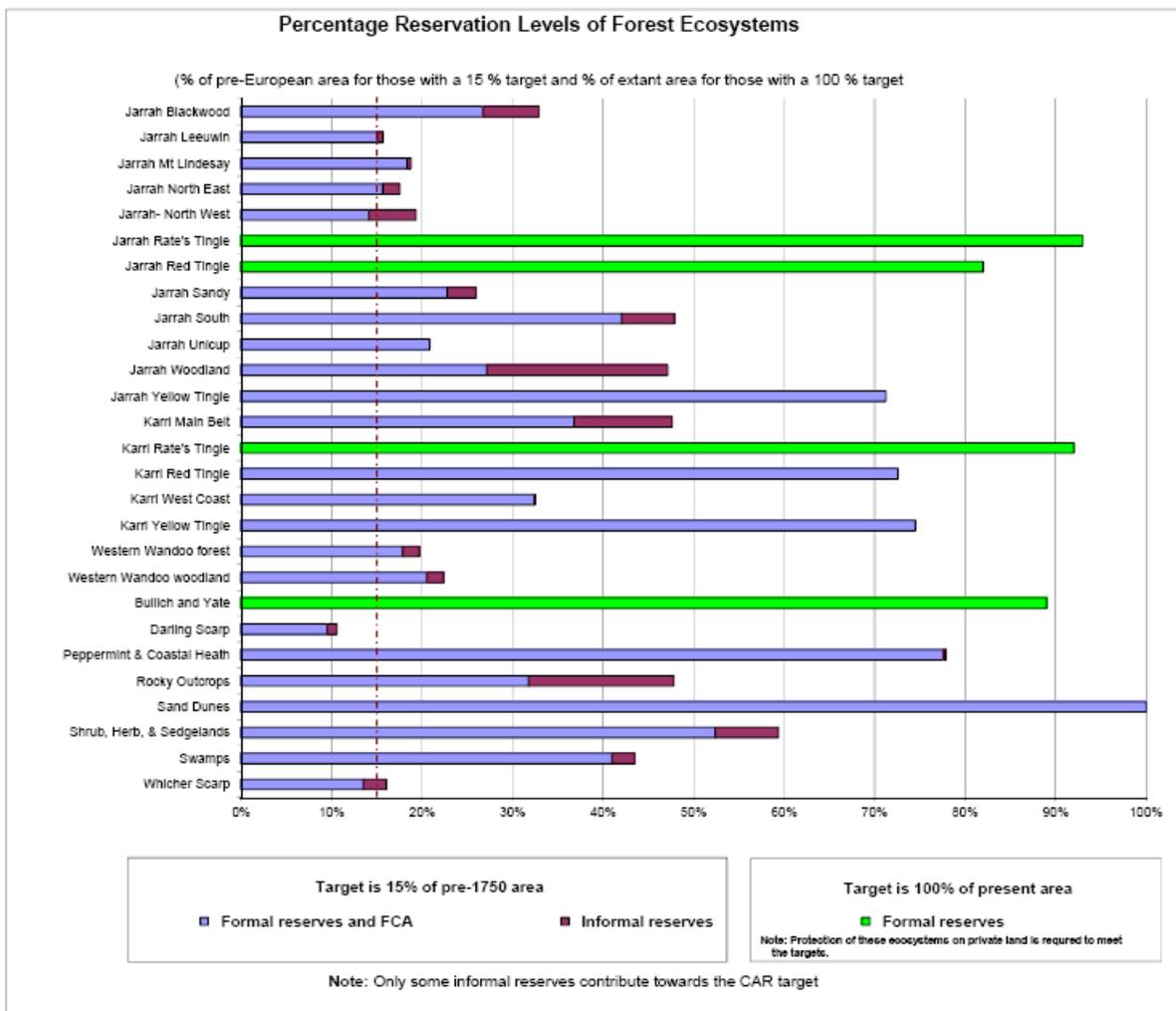
Recommendation 1: Maintaining the viability of the established timber industry should be a stated objective and taken into consideration when determining the sustainable yield.

3. Forest Reservation

As recognised in the Draft FMP 2014-2023 ‘Maintaining the land base or area of forested land is a fundamental first step toward maintaining its productive capacity..’(Pg. 99).

This being said, under the current FMP 2004-2013 significant additions were made to the existing reserve system and if fully implemented the reserve systems for almost every forest type will greatly exceed the minimum standard set under the ‘Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System’ (CAR) for Forests in Australia. Using this ‘JANIS’ criteria the target for forest reservation is set at 15% of pre -1750 forested area. In Western Australia we exceed this target in virtually every forest type. This is clearly demonstrated by the Draft FMP 2014-2023, pg. 33. Figure 1: reservation against CAR target for Forest ecosystems, a copy of which has been inserted below to emphasise the point being made.

Figure1: Reservation against Car Target for Forest Ecosystems. Draft FMP 2014-2023 pg. 33



The forest is over-reserved. Unnecessary over-reservation has reduced the land base and therefore the sustainable yield for timber production. Over reservation is particularly damaging to the industry in the southern jarrah and karri forests and there is no reason why

the level of reservation should not be scaled back in these forest types to provide a greater resource base to the industry whilst still meeting environmental reservation targets.

Recommendation 2: Over-reserved forest types which do not contain old growth forests should be returned to the state forest land base for timber production. Particularly in the southern forests where reservation is 2 or 3 times CAR requirements

Forest proposed for formal reserve classification which has been rejected by the state government on the basis that they are over significant mining tenements and therefore unlikely to ever be accepted into the formal reserve system should also be returned to state forest classification and made available for timber harvesting.

Recommendation 3: Forest proposed and not accepted for formal reserve classification due to potential future mining projects, should be returned to state forest land base for timber production.

3.1 Proposed Additional Reserves: Whicher National Park

Having clearly demonstrated the importance of maintaining land base to sustain the production capacity of the forest and further demonstrating the absurd amount of over reservation in Western Australia's forests (see chapter 3: Forest Reservation), it is with utter disbelief the timber industry observes a proposal for further reservation, with additions to the Whicher National Park.

The industry is strongly opposed to the reservation of any forest type above the 15 % target of pre- 1750 forest area as set under the Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve System (CAR) reserve system.

Further, it is understood that the Whicher area was previously a part of the Blackwood system, an area with more than 20% of the forest type already represented in formal reserves with additional reservation to this system also proposed (2590 ha of National Park, 1100ha Nature reserve, 3750ha Conservation Park and 8240ha Forest Conservation Area). Naming a separate ecosystem automatically generates a requirement for a 15% pre-European settlement forest reserve target. This occurs out of a classification mechanism and has nothing to do with the forest conservation value.

Once the RFA boundary was extended to include the full extent of the Darling scarp and Whicher scarp ecosystems it increased the area required to reach the 15% target. Therefore the additional reservation proposed for the Whicher scarp is merely an accounting artefact rather than a genuine need for conservation, and its forest type is more than adequately represented in the Blackwood system.

Depending on the intent, there is potentially an infinite number of other areas that could be separated out as new 'forest ecosystems' or create expansions to existing 'forest ecosystems' if the Whicher logic was followed. FIFWA is strongly opposed to this method used to create additional reserve.

Recommendation 4: There should be no further increase in forest reservation.

Recommendation 5: There should be no additions to the Whicher National Park.

3.2 Forest Conservation Areas

Another category of forest reserve that is strongly opposed by the timber industry is 'forest conservation areas'. This reserve classification has been created to allow for all disturbance activities except for timber harvesting. It is irrational to have a reserve type that allows for mining but not timber harvesting.

It is claimed that the priority for the management of these areas is the maintenance of biodiversity. It is therefore completely illogical to allow other disturbance activities such as wildflower picking, apiculture, craftwood and possibly firewood collection to occur when they are all entirely unmanaged and unsupervised activities.

For example, it is such unmanaged and unsupervised activities that have proven to be the most damaging in relation to the spread of dieback. The end of term audit report of the FMP 2004-2013 pg. 123 states:

"Breaches in hygiene were mostly attributed to extensive illegal entry into protectable areas following an operation, particularly for public firewood collection. In some instances illegal access for firewood collection has resulted in unauthorised tracks being pushed into protectable areas".

It is unmanaged/unsupervised activities not timber harvesting with approved hygiene management plans that cause the greatest threat to the biodiversity values of a forest.

There is no basis to discriminate against timber harvesting in forest conservation areas where mining and unmanaged disturbance activities are allowed.

Recommendation 6: Timber harvesting should be allowed, as all other disturbance activities are allowed for, in forest conservation areas. There is no need to discriminate against the timber industry on this basis.

3.3 Old Growth Forest

The industry is supportive of the proposal by the Conservation Commission to credit the accuracy of the data used by the Department of Environment and Conservation (DEC) to determine the status of old growth forests.

In 1997-2001 areas that were reclassified from old growth to non-old growth ended up in a separate classification termed 'old growth under review'. Since this time the industry has been unable to access areas of 'old growth under review' even though they had been originally reclassified as non- old growth by the Department of Environment and Conservation.

It is a sensible suggestion given the Conservation Commission has now reviewed the data of over ¼ of this area and discovered 94% accuracy, confirming the non-old growth status of these areas, the Conservation Commission now credit the accuracy of the departments data and return areas of 'old growth under review' to the real status of 'non-old growth forest'.

Recommendation 7: The Conservation Commission should accredit the DEC data used to determine the status of old growth forest and reclassify all areas of 'old growth forest under review' as 'non-old growth forest'.

Forest originally classified as 'old growth' which was subsequently found not to be old growth has under the current FMP 2004-2013 been given the dubious informal reserve status of 'areas previously classified as old growth forest', and as an informal reserve type were excluded from timber harvesting.

It is therefore sensible to suggest abolishing the dubious informal reserve category of 'areas previously classified as old growth forest', potentially making these areas available for timber harvesting.

Recommendation 8: Abolish the informal reserve type 'areas previously classified as old growth'.

Additionally it is proposed that when areas mapped as old growth forest are found not to be old growth forest or any other type of informal reserve then they will no longer be recognised as such. The industry is strongly in favour of this logical proposal. This should also take into account the 100,000ha of regrowth forest that was put into formal reserves by the Gallop Labor government in 2001 without any consultation or assessment of the conservation values of these areas.

Recommendation 9: Mapped areas of old growth found not to be old growth should be relinquished from the informal and formal reserve systems.

The current process allowing public nominations of old growth forest is being abused to disrupt harvesting operations. Nominations must be received within 2 months of being published on a 3 year plan. Contrary to this requirement set by the Conservation Commission nominations have been accepted at any time. This loophole has been targeted by forest protestors to disrupt the orderly harvesting planning of coupes. The industry is strongly of the view that late nominations should not be accepted.

Management options

The industry acknowledges the management options presented to review previously unmapped old growth forest. However it appears management options have been omitted and in the interest of fairness there should be consideration given to a process of nominating for non- old growth forest in areas mapped as old growth.

Further, areas of old growth forest are very likely to be identified during the coupe assessment prior to harvesting in any event, however there is no process which would automatically identify wrongly mapped old growth forest as non-old growth, making a nomination process for non- old growth more imperative than the converse.

The industry is supportive of a system of nominating both for old growth and non-old growth forest in an equitable way.

An adaptation of management option 2 –*to modify the public nomination process by maintaining public nominations but transfer the administration to the department*, could be considered so long as;

- (a) An equal process to nominate for non- old growth is established, and
- (b) Nominations for old growth forest are not to be accepted late, holding up harvest planning.

Recommendation 10: A process to be established to allow for the nomination of non –old growth forest previously mapped as old growth.

3.4 Travel Routes

The industry supports the proposed redistribution of selected travel routes streamlining road networks, resulting in an additional 510 hectares no longer recognised as informal reserves (220 hectares of karri, 270 hectares of jarrah forest and 20 hectares of yellow stringy bark).

Recommendation 11: Redistribute and streamline travel routes as proposed in the Draft FMP 2014-2023.

3.5 Munda Bididi Trail

Despite the fact that there is no current designated travel route associated with Munda Bididi trail the need to maintain all available land base to sustain the production capacity of the forest significantly outweighs the arguments presented to introduce informal reserves along the Munda Bididi Trail to protect visual amenity. Furthermore visual amenity can easily be managed by way of temporary trail diversions as suggested under management option 1.

Management options

The industry is strongly opposed to any further reservation (see recommendation 4) and therefore support the adoption of Management option 1 – no change: *apply conditions to disturbance activities and utilise temporary trail diversions to manage temporary use conflicts.*

4 Fauna Habitat Zones

The industry through FIFWA strongly opposed the introduction of Fauna Habitat Zones (FHZ). FHZ's were introduced to the current FMP 2004-2013 very late in the process, well after the public consultation meetings and were based on very little science. Although drawing on some aspects of the Kingston study, the theory of these patches failed to take into account the low level of impact current harvesting methods have on the forest. Moreover the theory failed to account for the substantially increased number of habitat trees, and the fact that in almost every case the actual FHZ is completely surrounded by forest (and not 'islands amid a desert of logging' as they were portrayed).

FIFWA has pressed at every stage for an assessment of the practical value of these zones, but this has been consistently refused by the Conservation Commission, which could be considered strong evidence that those responsible for their introduction had no confidence that they would fare well under scrutiny.

As no assessment has ever been carried out, no evidence has ever been produced to indicate that FHZ's have any beneficial effect on biodiversity. Further it should be emphasised that even in the scientific panel's report titled: 'Review of silviculture in forests of the south-west Western Australia', they made the following recommendation (3):

"The value of fauna habitat zones as refugia and sources of recolonisation post logging should 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".

Whilst there is no evidence of any environmental benefit, FHZ's have had a huge detrimental effect on the economic and social aspects of the FMP, effectively removing up to 20% of the forest available for harvest, areas which contain the most commercially valuable trees.

These detrimental effects have been exacerbated by the treatment of FHZ's in calculating the sustainable yield. FIFWA was informed that all of the FHZ's selected in the current FMP 2004-2013 would ultimately be available for future harvesting as other regrowth forests were continually reaching the 120 year level necessary to replace these zones. That is, the FHZ's would be a temporary management measure rather than a permanent reservation. FIFWA argued that if this were the case, the area of FHZ's should not be deducted from the long-term sustainable yield, as all the trees currently in the zones would be available for harvest within the 175 year timeframe of the sustainable yield projection. This argument was referred to the Mathematics Department of UWA by the Conservation Commission who agreed with this theory in part, but determined that a level of offset was required.

Despite all of this, the full area of all the FHZ were deducted from the long term sustainable yield in the current Plan 2004-2013 and this method has been carried over to the Draft FMP 2014-2023. This effectively gives FHZ's the status of permanent reserve, which was never the intent.

Recommendation 12: Fauna Habitat Zones should be eliminated from the Plan. However, if any are retained, they should not be deducted in their full volume from the sustainable yield calculations. They should not be deducted at all from the sustainable yield calculations, or at most be counted at a properly calculated level of offset.

Management options

For reasons stated above the industry is strongly of the view Fauna Habitat Zones should be entirely withdrawn from the draft FMP 2014-2023. However, if a select few zones are retained a modified version of management option 2 –*to refine networks of FHZ's* could be considered so long as;

- a) The volume of timber contained within the FHZ's are not deducted from the sustainable yield calculations, or as a minimum off set at the appropriate level.

5 Modifications to Silvicultural Practice

Before discussing the many modifications and changes to silvicultural practice which FIFWA view as having potential adverse impact on process and therefore cost to the industry, it should be noted that one key guiding principle curiously missing from the draft silvicultural guidelines for both the jarrah and karri forest is the management goal to produce timber. It would appear that in the drafting of the guiding principles the Department has overlooked the central reason for any silvicultural management in state forest, and that is to produce sawlogs.

Recommendation 13: Silvicultural guidelines to be amended to incorporate guiding principle; managing the forest to produce future sawlogs.

5.1 Retention of dead standing trees

There is no evidence to demonstrate any major habitat or biological value of dead standing trees. Conversely the safety concern to industry of being forced to work amongst dead standing trees is considerable. On the 28 August 2012 a contractor was killed by such a falling dead tree.

Harvesting contractors in consultation with the Forest Products Commission determine the best way to deal with dead and hazardous trees as the professionals with the knowledge to understand how best to manage the situation. Ecological considerations have no place in this decision making process.

There will never be an environmental consideration that outweighs the safety of our logging contractors. This proposal must be removed from the Draft FMP.

Further it is a contradictory objective considering a proposal in later chapters of the Draft FMP 2014—2023 to salvage timber from areas effected by natural disturbance.

Recommendation 14: Remove the proposal to retain dead standing trees.

5.2 Determining the extent of disturbance/ temporary exclusion areas

One proposed modification to silvicultural practice in both the jarrah and karri forests which is strongly opposed by FIFWA can be viewed in the draft FMP pg. 42, as follows;

“Using temporary exclusion areas in areas where harvesting and follow-up treatments achieve target stand density, in areas around mine site rehabilitation, in areas where there is intensive removal of non-sawlog material, in forest blocks isolated in agricultural landscape and to provide linkage with mature forest in informal reserve”.

The Expert Panel Report ‘A review of silviculture in forests of South West Western Australia’ States:

“The extent of mining and planned silvicultural treatment will be limited to a maximum of 60% of the local scale management unit. Gaps may be harvested in temporary exclusions areas once the regeneration forest reaches the mature forest development state (70years)”.

Firstly, the nominated time of 70 years is clearly a desktop construct, there is no justification for this, nor is there any reference to this in the draft FMP so it is unclear exactly what the intent is. Secondly, it should be appreciated that if adopted the retention of Temporary Exclusion Areas (TEA’s) for 70 years would effectively make them permanent reserves, and the industry is strongly opposed to this.

The extent of mining and planned silvicultural treatment being limited to 60% of the local scale management unit is untenable, and is evidently yet another ‘desktop construct’ which

has been proposed without consideration to the effect on sustainable yield nor to the operative constraints and costs it creates.

The nominal 60% limit has been picked up in the Silvicultural guidelines (under Guiding principle 3) *“Shelterwood or dieback selective cuts may only be applied to a maximum of 60% of the local scale area”*.

The cost implication to industry of such a proposal is predicted to be significant. No such proposals should be included in the draft FMP without a demonstrated benefit ascertained through a thorough cost benefit analysis. The Conservation Commission simply have not done this and are unaware to the implications this proposal will entail.

FIFWA is intensely opposed to any changes in silvicultural practice that are untried and accepted without the necessary cost benefit analysis being completed.

Recommendation 15: Proposed changes to silvicultural practice should be subject to thorough cost benefit analysis and in -field trials before being considered for adoption in the FMP 2014-2023.

Recommendation 16: Proposed changes to temporary exclusion areas including the setting of untried nominal limits of 60% for silvicultural treatment should be removed entirely from the FMP.

5.3 Retaining mid storey shrubs

The draft FMP proposes *“retaining the mid storey shrubs and small tree species in jarrah forest except where it is deemed essential for the establishment and survival of regenerating over-storey species”*.

In blocks managed for timber production the goal is always to regenerate over-storey species, for future sawlogs. This should not be compromised by romanticised ideas of leaving mid storey species untouched. Scientifically the proposal is flawed, as it will only serve to replace one forest type with another, undoubtedly resulting in a forest dominated by Banksia and Allocasuarina to the detriment of over –storey species.

Recommendation 17: Proposed changes in silvicultural guidelines to retain mid-storey species should be removed. A goal of regenerating future sawlogs should be prioritised.

5.4 Retention of Marri trees

The draft FMP proposes (pg. 42- 43)

“...large senescing marri trees (greater than 70 centimetres in diameter with a senescent crown) be retained in the jarrah forest, in addition to the existing requirement for habitat tree retention. In areas of the jarrah forest where large marri are relatively low in abundance (Darkin Towering, Eastern Blackwood, Eastern Dissection, Eastern Murray, Monadnocks Uplands Valleys, North Eastern Dissection, Northern Sandy Depression, Northern Upper Plateau, North Western Dissection, North Western Jarrah, Redmond Siltstone Plain), all marri 50 to 70 centimetre diameter with a healthy crown and all marri greater than 70 centimetre diameter, will be retained where practicable”.

It is accepted that there is a need to protect large senescing Marri trees for black cockatoo habitat. This being said it is unnecessary to advocate for their retention in addition to the existing requirements for habitat retention, as most, if not all would have been reserved under this prescription at any rate and it is not necessary to introduce a requirement to retain additional habitat trees over and above current practice.

Generally it is not anticipated that the proposal will have any significant impact on production in the northern and eastern forests as proposed in the draft FMP. However it should be considered that the retention of all Marri trees 50-70 centimetres in diameter in any of the southern forest areas would interfere with sawlog production. The intent in this regard should be made clear.

It should also be acknowledged that while the conservation challenges facing the various species of black cockatoo have become a popular subject in 2012, none of these factors impacting upon black cockatoos can be attributed to timber harvesting. A study into the response of birds to silviculture in the jarrah forest clearly demonstrates that *“there was little evidence of any substantial effect of silvicultural treatments on avian community structure or on individual bird species”* and *“...most bird species in jarrah forest have a high threshold level of tolerance to disturbance. It is likely that the rapid regeneration of dominant tree species after harvesting and associated fire, the patchiness of treatments at the landscape scale, the high degree of connectivity of harvested and burnt forests with forests not recently harvested or burnt and the retention of habitat trees in the most heavily harvested (gap release) forests all conduce to dampen local – scale impacts and conserve the avifauna in relation to home range and normal movements of its constituent bird species”.* (Abbott *et al.* 2011).

Recommendation 18: Support the protection of senescing marri trees greater than 70cm in diameter, but not in surplus to existing requirements for habitat tree retention.

Recommendation 19: It should be stipulated that southern forests will be exempt from the proposal to retain all marri trees 50-70cm in diameter, as this will impact on sawlog production.

5.5 Retention of dieback resistant trees

The main change proposed in the draft FMP regarding dieback management is stated as;

“In areas of high dieback impact, trees or groups of trees demonstrating resistance will be retained as will trees which exhibit resistance in the face of high insect pressures.” pg. 248.

Further the silvicultural guidelines stipulate;

“On sites expressing high disease impact, restricting harvesting and vehicle access to exclude areas where the live basal area is less than 18m²/ha” and

“Where site characteristics predict high disease impact on un-protectable forest areas a basal area of at least 15m² of live trees will be retained”.

There is no basis upon which to exclude harvesting and vehicle access in areas where the live basal area is less than 18m²/ha. This is yet another proposed change that has been added to the draft FMP without any consideration to the far reaching implications this will have on the timber industry. Many dieback affected stands provide a large proportion of the volume to the timber industry; this particular stipulation will severely impact upon accessibility to the forest and in turn affect yield and supply to sawmills.

Further the objective is contradictory, as it would impede the effective thinning of a high proportion of the forest area nominated in later chapters of the Draft FMP -forest management for water production.

Recommendation 20: The proposal to restrict harvesting and vehicle access in dieback affected areas where the live basal area is less than 18m²/ha should be removed completely from the Draft FMP.

Recommendation 21: Changes to retain additional trees in dieback affected areas should be subject to a cost benefit analysis and infield trails to determine the real impact on industry before being considered for inclusion in the FMP 2014-2023.

5.6 Varying rotation lengths for karri regrowth stands

It is understood that the available resource from karri two-tiered and even aged regrowth forest is declining and a transition into a larger volume of second thinning sourced from 1970 karri regrowth forest is required. This being said the industry requires a longer lead in time under the next FMP to deal with the changing resource. Handling and processing young karri will require new capital investment at the mills as well as time to develop and generate new markets for the resource.

There is currently no support to increase the rotation length for some of the regrowth karri stands regenerated from the 1930's.

Recommendation 22: Not to increase the rotation length of regrowth karri stands regenerated from the 1930's.

5.7 Retaining a selection of mature and senescent trees and large logs in the karri forest

Whilst the draft FMP proposes several modifications to silvicultural practice in the karri forest and provides a very brief explanation of each under appendix 14, the actual proposed silvicultural guidelines for karri forests have not been produced.

It is impossible for the industry to provide comment on the potential impact of a proposed change without being able to see the details of the proposal. For example the draft FMP states "*some senescent trees are proposed to be retained in the karri forest both in clearfell and thinning operations to enhance structural complexity*" (pp. 252). Without the accompanying guidelines the details of the proposed treatment are unknown. Is the intent is to retain 1 or 20 trees per hectare? It is therefore impossible to estimate what the impact will be on production.

Given the draft silviculture guidelines for karri forests have not been produced during the public comment period for the draft FMP, the industry cannot accept blindly the proposed changes. On this basis FIFWA is strongly opposed to any change in the silvicultural guidelines for karri forests.

Recommendation 23: No proposed change to karri forest silvicultural practice should be accepted as the guidelines have not been produced in conjunction with the release of the draft FMP for public comment. The industry must be given opportunity to assess the impact of any proposed change on operations and production prior to implementation.

6 Soil

The Soil Dryness Index (SDI) later modified with minimal improvement to the Trafficability Index (TI) was another untested addition to the current FMP 2004-2013. This concept was untried prior to its implementation and the theory when put into practice had catastrophic consequences for the industry. Harvesting operations came to a grinding halt at the first sign of rain while departmental staff (both DEC and FPC) tried to work through the bureaucratic disaster. Logging contractors were forced to stop work in dry conditions simply because it had rained where the gauge was located, which may have been tens of kilometres away.

The industry through FIFWA has at every opportunity called for a review of the Trafficability Index which continues to be plagued with problems, causing harvesting delays for the logging contractors and associated supply issues for the mills throughout winter. Further the

current system, with its lengthy administrative process between the two departments generates a huge cost burden, most of which is ultimately paid by the industry. Under the prescriptions of the modified TI the FPC must still apply for an approval to harvest under moist soil conditions for each and every block where is predicted it will be necessary prior to winter each year. Before issuing an approval the DEC requires a detailed management plan for every individual block from the FPC, which is then individually assessed. This whole process is lengthy and costly and in FIFWA's view completely unnecessary. The entire situation is made worse for the logging contractors when a block does not carry an approval to harvest under moist soil conditions. In these circumstances logging contractors may only operate when $TI > 250$, a measure which is only provided to the contractors via the DEC from the Bureau of Meteorology, after a data –quality check, at approximately 11am on the actual working day in dispute. This entire model is overly bureaucratic and unnecessary, prediction-based models will always fail unless they are resourced to a level which far outweighs their benefits.

A return to an outcomes based model is absolutely essential. In a similar self- regulatory fashion to other resource based industries the required environmental outcome of the operation should be the responsibility of the industry. This would also address the cost burden to industry of having two government departments overseeing operations.

FIFWA is astounded that after so many requests to discuss the options for soil management the Draft FMP 2014-2023 failed to provide an alternative.

Recommendation 24: An outcomes based model for soil management should replace the current Trafficability Index.

7 Water

The industry acknowledges the South West of Western Australia is experiencing the effects of a drying climate, and this has potential implications for the health of the forest. It is recognised that forestry has a key role to play in managing these forests in the most efficient way to help reduce water stress and promote a healthy forest. The Draft FMP discusses in some detail the benefits of forest management in a drying climate and proposes several management options to increase harvesting and thinning regimes but only to achieve a water production objective. While there is need to examine options for water production it is curious the proposal only applies to catchment areas covered by the Land Management Units (LMU) Central Jarrah and North Western Jarrah, at most treating 3% of the area covered by the plan. It should be questioned why if the benefits of forestry under a drying climate are so well understood are these same principles not being applied to the whole forest area, including highly valued conservation forest and southern forests also dying under severe water stress. If not for a water production objective these forests should still be managed to promote forest health under a drying climate or they will be lost.

In examining the proposed management options for water production the industry raises several main concerns;

Firstly it is proposed that the initial treatment would involve “*reducing stand density to a leaf area index of not less than .06 (about 8-10 square metres per hectare of basal area)*” (draft FMP pg76). A requirement based on Treatment Area 4 of the Wungong catchment trials. It is considered inappropriate to use the prescriptions applied at Wungong over the proposed forest area as this would create a requirement to retain all larger trees reducing the LAI by the removal of smaller material. A preference to retain larger trees would impact on the actual sawlog yield realised whilst increasing the production of lower grade non – sawlog material that is without a market.

It should be emphasised again that the silvicultural prescriptions proposed will severely limit the volume of high quality sawlog from these catchments, and as a result the sawlog that is produced will be of marginal size and quality and will have a depleted commercial value to the timber industry. A large volume of marginal size and quality sawlogs to sawmills will also affect their product mix and potentially their overall viability.

Further when a sawlog of marginal size and quality is transported over a great distance the cost of producing and delivering this sawlog can outstrip its commercial value.

FIFWA reiterates: Any further reductions in either volume or log quality or increases to unit costs of production will result in mill closures.

The silvicultural prescriptions proposed will also result in an enormous volume of lower grade non-sawlog material which is of absolutely no value to the current industry and as such is without a market. This raises the pertinent question of what will happen to this large volume of lower grade forest product?

Management options

A variation of management option 2- ‘*silviculture for water production*’ could be considered if:

- a) Treemarking prescriptions are reviewed with a focus on high quality sawlog production.
- b) The proposed silvicultural treatment was limited so the upper slopes would not be treated

7.1 Sustained Yield and Water Production

The application of the 'silviculture for water production' management option is claimed to require a reduction in the sustainable yield for jarrah. The reason for this is stated on page 107 of the draft FMP 2014-2023;

'This would generate a much higher volume of sawlogs from this area during the plan period than would be the case under 'routine' harvesting. This would propagate a drop in supply in later decades...'

As the purpose of this management option is for water production, FIFWA would suggest the use of a 'non-declining yield' is an inappropriate measure and should be reviewed. Simply the 'non-declining yield' is too inflexible to cater for present needs under a management option for water production. It would be unacceptable if the application of this concept ended up limiting the ability of the management option, designed to promote forest health, to be fully implemented.

There should be no reduction in the sustainable yield of the draft FMP 2014-2023 through the implementation of a management option for water production. Conversely there should be more flexibility in the allowable harvest to cater for the likelihood of further mortality rates in the forest due to ongoing water stress. Further there is no justification to reduce the sustainable yield as, actual sawlog yield is unknown, there is no commitment from the Water Corporation at this stage to either implement or maintain the program nor is there any approval for water production thinning at this stage.

Recommendation 25: Review the basis for calculating the sustainable yield under a management option for water production.

8 Carbon

The estimates of forest carbon stores in the Draft FMP include projections which suggest changes in above and below ground carbon stocks would increase under both scenarios 1 and 2. However it suggested the *'the net increase is likely to be higher under scenario 2 due to less wood being removed from both the jarrah and karri forests'* (Draft FMP pg. 93). It is unclear exactly how this conclusion was reached, however it is likely to be the result of a limited timescale.

To maximise total carbon abatement the full lifecycle of a forest and the products derived from it must be taken into account. It is well known that a sustainably managed forest with periodic timber harvesting continues to increase the total carbon mitigation effect through the accumulation of carbon in multiple carbon stores. This is supported by strong evidence from the international scientific community, demonstrated in the 4th assessment report of the International Panel on Climate Change 2007 (IPCC) which states:

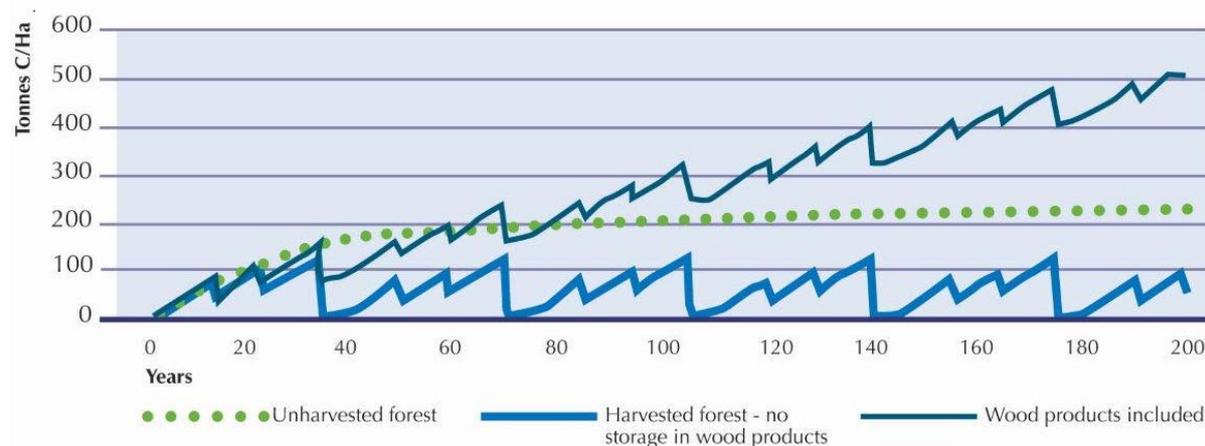
'A sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks while producing an annual sustainable yield of timber, fibre and energy from the forest, will generate the largest sustained mitigation benefit'.

A recent study by the New South Wales Department of Primary Industries also found *'Managed, multiple use production forests have the capacity to store carbon on site; produce wood products that continue to store carbon off-site; provide substitutes for more GHG-intensive building products; minimise the need for GHG intensive imports and produce residues that can be used to generate renewable energy displacing fossil fuels. **The data show total GHG emission abatement and carbon storage from a multiple use production forest exceed the C storage benefit of a conservation forest**'* (Ximenes et al 2012).

The methodology used to calculate the carbon value must take into account the dynamic nature of the forest over its full life cycle. Native production forests have long rotation lengths. Crediting changes in the carbon balance over a 10 year period (such as for the Forest Management Plan) captures only a fraction of the forest life cycle and fails to account for the carbon sequestration and storage of a sustainably managed production forest. The use of a short timescale leads to a considerable bias in favour of not harvesting the forest.

Figure 2 demonstrates the result different accounting methods can have on the outcome of determining the carbon value of harvested and unharvested forests. While Figure 2 is based on a representative pine plantation, the principles used can easily be applied to native forestry operations. It is evident that when the carbon stored in timber products is included the accumulation of carbon builds over successive harvests. Therefore overtime (80 years or more) the total carbon sequestered from a sustainably managed forest outstrips the carbon storage capacity of an undisturbed forest.

Figure 2: Carbon storage in harvested and unharvested forests.



Forest and Wood Products Research and Development Corporation (2006). Forests, Wood and Australia's Carbon Balance

FIFWA notes the intention of the Conservation Commission to report on forest carbon stores in the next draft FMP, and emphasises the importance of taking into consideration

the dynamic nature of the forest over its full life cycle including, accounting for the carbon stored in the wood products produced from these operations. Taking account of all factors over a greater time is the only way to truly ascertain the full carbon sequestration benefit of production forests.

Recommendation 26: Reporting forest carbon stores should be based on projections over the full lifecycle of the production forest, taking into account the carbon stored in the resulting timber products and not be limited to the 10 years of a single FMP.

9 Salvaged Wood

How to deal with the wood from areas ordinarily available for timber harvesting, lost through major disturbances, is a topic of particular interest to the industry.

FIFWA strongly disagrees with the view that all salvaged material should count towards the allowable harvest, especially where this timber (which may be of marginal economic value to the industry) replaces other sources of higher quality timber the industry would have otherwise had access to. And there is no need to count this timber in the allowable harvest as the sustainable yield calculations have already been discounted for the effect of these disturbances.

Equally it is expected that under a drying climate there may be an increase in mortality of mature trees through drought and fire. The commercial use of these trees should be encouraged and facilitated.

Currently there is an exceptional number of approvals which need to be gained before a salvage operation can proceed, this is proving to be a barrier to rapid recovery. The commercial value of the sawlog declines rapidly after the event that killed the tree and being able to access these sawlogs quickly is essential. A stream-lined approval process needs to be developed to assist in salvage.

Recommendation 27: A stream-lined approval process needs to be developed to assist in salvage.

Management options

FIFWA is supportive of the adoption of management option 2: *'not all salvaged material to count towards the allowable cut'*.

10 Plantations

It is with alarm FIFWA observes a significant reduction in pine plantation estate from 59,000ha to 52,000ha during the term of the current FMP. Moreover it is anticipated that a combination of factors including; drought, fire and a decision not to replant the Gngangara pine plantation will further reduce the total plantation estate to little more than 40,000ha over the next 10 years. It should be reiterated that under current State Agreement Acts, there is an ongoing commitment to supply pine sawlogs to producers and to maintain the plantation estate to meet these contractual obligations.

It should be noted that page 31 of the draft FMP makes a passing reference of the apparent removal of several plantation estates '*.....including the progressive removal of the Gngangara, Pinjar and Yanchep pine plantations and subsequent rehabilitation and land use in these areas*'. FIFWA is of the understanding that the plantation over the Gngangara mound will not be replanted to meet certain water management objectives however, FIFWA is unaware of any directive not to replant the Yanchep or Pinjar plantations.

Recommendation 28: The reference to permanently remove and rehabilitate the Pinjar and Yanchep plantations should be removed from the draft FMP.

FIFWA is supportive of the stated objectives 51 through 53, seeking to maintain plantation estate, replant forest not permanently lost to development and replanting areas of clearfelled state owned hardwood plantations with softwood plantations. Further the industry would encourage the government to actively invest in new plantation establishment to avoid a large gap developing in the supply of softwood resource to the processors.

Recommendation 29: Expand on management activities 51 pg. 100 of the draft FMP to; seek out mechanisms to encourage investment in new softwood plantation establishment.

11 Socio-Economic Benefits

The timber industry has always been a steadfast and significant employer, especially in the regional South West communities of Western Australia. Many of these communities were in fact founded on the back of the timber industry, and have supported generations of families who hold in high esteem their associated cultural heritage. When the previous Labor government introduced the 'protecting the old – growth forest policy', implemented through the current FMP 2004-2013, instant devastation was inflicted upon these communities, the aftermath of which can still be witnessed today.

Towns such as Manjimup were severely impacted, experiencing significant population decline, which despite all the promises the new 'eco-tourism industry' would bring, never recovered.

Despite the substantial reduction of the timber industry from 2001-2003, the socio-economic benefits of the industry to our regional South West communities are still

significant, and have been discussed in some detail in the 'Social and Economic Impact Assessment on the Potential Impacts of Implementation of the *Draft Forest management Plan 2014-2023* (2012) (SEIA).

Local government areas (LGA's) such as Manjimup, Nannup, and Bridgetown –Greenbushes still have a high dependency on the timber industry, with up to 18.8% of the population employed by the industry. The Social and Economic Impact Assessment (SEIA) identifies a number of potential impacts which could arise from further reductions in the scale of the timber industry, such as; mill closures, loss of direct jobs, closure of local businesses, further decline in local population, potential loss of local services such as schools and hospitals, substantially reduced property values, and subsequent loss of future local investment.

The SEIA clearly states *'The indicative lower volume of the draft FMP represents a reduction in the volume of first and second grade jarrah sawlogs of 26,000m³ per annum (approximately 20%) compared to the level allowed in the current FMP. It is the opinion of the consultant that a reduction in volume of this magnitude is highly likely to result in the closure of at least one of the larger sawmills, either in the locality of Manjimup, Greenbushes or Nannup'* (SEIA (2012) pp. xiii).

Further the SEIA identified that it is not only volume but log quality and production costs that also influence the viability of the industry, *'...the viability of sawmilling is a function of input volume, log quality and log supply cost. These factors are strongly inter-related.... The information provided, as an indication of the draft FMP, only considers input volume and therefore only part of the viability equation facing native timber sawmilling and related industries, and consequent impacts to associated communities'* (SEIA (2012) pp. 10). A point reiterated several times by FIFWA throughout this submission.

Fortunately these catastrophic consequences can be avoided with an increase to the allowable cut. The SEIA concluded that under the upper wood volumes indicated in the Draft FMP *'... the viability of the sawmilling sector may be marginally improved as any increase in available volume would reduce unit production costs...additional sawlog volumes would provide stability to the industry and would reduce the likelihood of further business closures and job losses'* (SEIA (2012) pp. xiii).

12 Conclusions

In conclusion, it is essential when setting the sustainable yield under the FMP 2014-2023 the Conservation Commission take into consideration the requirements for a viable timber industry. This includes assessing the full impact of every proposal in the draft FMP on the entire supply chain. If logging contractors cannot conduct a commercial harvest operation and if sawmillers are unable to profitably mill the resource the entire system will fail.

It must be reiterated that the viability of the industry is dependent upon three strongly inter-related factors being; log volume, log quality and log supply cost. **Any further reductions in either the available volume or in log quality, or increases to unit costs of production will result in mill closures.**

Additionally it must be made clear that many of the proposed changes in the silvicultural guidelines have been added without a cost benefit analysis. Each of these carry an unknown cost, which if implemented without trial will likely have a devastating effect on the entire industry. FIFWA is strongly opposed to the introduction of any new desktop constructs in forest management practices without a thorough cost benefit analysis, and without completing appropriate infield trials. Areas of particular concern include; changes to temporary exclusion areas (to limit silvicultural treatment to 60% of the local scale area), retention of mid story shrubs, additional retention of marri trees, and restricting harvesting in areas where the live basal area is less than 18m²/ha, to name a few.

The industry is also extremely sensitive to any changes which would reduce further the land base of state forest and therefore reduce the volume of sawlogs to the industry. FIFWA is strongly opposed to any further reservation and look to this next FMP to return some of the land base to state forest by adopting recommendations 2,3,5,6,8,9,10,11 and 12.

FIFWA is seeking an increase in the allocation of first and second grade sawlogs to help secure the viability of the current native timber industry. Additionally FIFWA is seeking a commitment to expand the current state owned plantation estates to ensure ongoing resource supply to the softwood processors. The best way to achieve these objectives has been demonstrated through a series of recommendations and management options as detailed in this submission and as summarised in appendix 1 and 2 respectively.

Appendix 1: Summary of Recommendations

Reference	Recommendation
Recommendation 1	Maintaining the viability of the established timber industry should be a stated objective and taken into consideration when determining the sustainable yield.
Recommendation 2	Over-reserved forest types which do not contain old growth forests should be returned to the state forest land base for timber production. Particularly in the southern forests where reservation is 2 or 3 times CAR requirements
Recommendation 3	Forest proposed and not accepted for formal reserve classification due to potential future mining projects, should be returned to state forest land base for timber production.
Recommendation 4	There should be no further increase in forest reservation.
Recommendation 5	There should be no additions to the Whicher National Park
Recommendation 6	Timber harvesting should be allowed, as all other disturbance activities are allowed for, in forest conservation areas. There is no need to discriminate against the timber industry on this basis
Recommendation 7	The Conservation Commission should accredit the DEC data used to determine the status of old growth forest and reclassify all areas of 'old growth forest under review' as 'non-old growth forest'
Recommendation 8	Abolish the informal reserve type 'areas previously classified as old growth'
Recommendation 9	Mapped areas of old growth found not to be old growth should be relinquished from the informal and formal reserve systems
Recommendation 10	A process to be established to allow for the nomination of non –old growth forest previously mapped as old growth
Recommendation 11	Redistribute and streamline travel routes as proposed in the Draft FMP 2014-2023.
Recommendation 12	Fauna Habitat Zones should be eliminated from the Plan. However, if any are retained, they should not be deducted in their full volume from the sustainable yield calculations. They should not be deducted at all from the sustainable yield calculations, or at most be counted at a properly calculated level of offset
Recommendation 13	Silvicultural guidelines to be amended to incorporate guiding principle; managing the forest to produce future sawlogs.
Recommendation 14	Remove the proposal to retain dead standing trees
Recommendation 15	Proposed changes to silvicultural practice should be subject to thorough cost benefit analysis and in -field trials before being considered for adoption in the FMP 2014-2023.
Recommendation 16	Proposed changes to temporary exclusion areas including the setting of untried nominal limits of 60% for silvicultural treatment should be removed completely from the FMP.

Recommendation 17	Proposed changes in silvicultural guidelines to retain mid-storey species should be removed. A goal of regenerating future sawlogs should be prioritised
Recommendation 18	Support the protection of senescing marri trees greater than 70cm in diameter, but not in surplus to existing requirements for habitat tree retention.
Recommendation 19	It should be stipulated that southern forests will be exempt from the proposal to retain all marri trees 50-70cm in diameter, as this will impact on sawlog production.
Recommendation 20	The proposal to restrict harvesting and vehicle access in dieback affected areas where the live basal area is less than 18m ² /ha should be removed completely from the Draft FMP.
Recommendation 21	Changes to retain additional trees in dieback affected areas should be subject to a cost benefit analysis and infield trails to determine the real impact on industry before being considered for inclusion in the FMP 2014-2023.
Recommendation 22	Not to increase the rotation length of regrowth karri stands regenerated from the 1930's.
Recommendation 23	No proposed change to karri forest silvicultural practice should be accepted as the guidelines have not been produced in conjunction with the release of the draft FMP for public comment. The industry must be given opportunity to assess the impact of any proposed change on operations and production prior to implementation.
Recommendation 24	An outcomes based model for soil management should replace the current Trafficability Index.
Recommendation 25	Review the basis for calculating the sustainable yield under a management option for water production.
Recommendation 26	Reporting forest carbon stores should be based on projections over the full lifecycle of the production forest, taking into account the carbon stored in the resulting timber products and not be limited to the 10 years of a single FMP
Recommendation 27	A stream-lined approval process needs to be developed to assist in salvage.
Recommendation 28	The reference to permanently remove and rehabilitate the Pinjar and Yanchep plantations should be removed from the draft FMP.
Recommendation 29	Expand on management activities 51 pg. 100 of the draft FMP to; seek out mechanisms to encourage investment in new softwood plantation establishment

Appendix 2: Summary of Preferred Management Options

Component	FIFWA Preferred Management option
Silviculture for Water Production within selected water catchments	A variation of management option 2- 'silviculture for water production' could be considered if: <ul style="list-style-type: none"> a) Treemarking prescriptions are reviewed with a focus on high quality sawlog production. b) The proposed silvicultural treatment was limited so the upper slopes would not be treated
Expanded thinning program within older jarrah dominant stands rehabilitated following mining	Supported.
Increase the rotation length for some regrowth karri stands generated in the 1930's	Not to increase the rotation length of regrowth karri stands regenerated from the 1930's.
Establish additional reserves within the Whicher Scarp ecosystem	There should be no additions to the Whicher National Park. Refer to section 2.1
Not classify as informal reserve those areas previously classified as old-growth forest that are confirmed as not old –growth	Strong support for this proposal. Mapped areas of old growth found not to be old growth should be relinquished from the informal reserve system.
Review previously un-mapped old growth forest	An adaptation of management option 2 – <i>to modify the public nomination process by maintaining public nominations but transfer the administration to the department</i> , could be considered so long as; <ul style="list-style-type: none"> (a) An equal process to nominate for non- old growth is established, and (b) Nominations for old growth forest are not to be accepted late, holding up harvest planning.
Incorporate revised travel routes locations in Warren Region	Support to redistribute and streamline travel routes as proposed in the Draft FMP 2014-2023.
Incorporate a partial buffer on the Munda Bididi trail	The industry is strongly opposed to any further reservation and therefore support the adoption of Management option 1 – no change: <i>apply conditions to disturbance activities and utilise temporary trail diversions to manage temporary use</i>

	<i>conflicts.</i>
Redistribute and reduce the size of some Fauna Habitat Zones	<p>The industry is strongly of the view Fauna Habitat Zones should be entirely withdrawn from the draft FMP 2013-2023. However, if a select few zones are retained a modified version of management option 2 –<i>to refine networks of FHZ's</i> could be considered so long as;</p> <p>a) The volume of timber contained within the FHZ's are not deducted from the sustainable yield calculations, or as a minimum off set at the appropriate level.</p>
Account for the effects of Climate Change	Adopt a medium climate change severity modelling approach.

Appendix 3: FIFWA Members represented in the preparation of this submission

- Appadene Forest Products Pty Ltd
- Auswest Timbers
- BE and DM Wilson
- CG and KL Rowney
- Dawson Contracting
- Giovanetti Transport
- Herdigan Logging
- Inglewood Products Group
- M & B Sales
- Middlesex Mill
- Nannup Timber Processing
- Plantation Logging
- Saunders Mill
- Simcoa
- Softwood Logging Services
- South West Haulage Company
- The Laminex Group
- The Palcon Group Pty Ltd
- Thompson and Tylor
- Top Timber Trading
- WA Plantation Resources (Wapres)
- Warren Forest Services Pty Ltd
- Wesbeam
- Wespine Industries Pty Ltd
- Whiteland Milling
- Whittakers Timber Products
- Yornup Mill (Greenacres)

References

- Abbott, I. and Williams, M.R., (2011). Silvicultural impacts in jarrah forest of Western Australia: synthesis, evaluation and policy implications of the FORESTCHECK monitoring project 2001 – 2006. *Australian Forestry* 2011, Vol 74 (4), pp 350-360.
- Abbott, I. Liddelow, G. Vellios, C. Mellican, A. Williams, M. (2011). The response of birds to silviculture in Jarrah (*eucalyptus marginate*) forest: The FORESTCHECK Monitoring project 2001-2006. *Australian Forestry* 2011, Vol 74 (4), pp 328 -335.
- Bradshaw, F.J. and Matiske, E.M. (1997). Forest Ecosystem mapping for the Western Australian RFA. Report to the Steering Committee for the Regional Forest Agreement in Western Australia.
- Burrows, N. Dell, B. Neyland, M. and Ruprecht, J. (2011). Review of Silviculture in Forests of south-west Western Australia. Report to Department of Environment and Conservation.
- Commonwealth of Australia (1997). Nationally Agreed Criteria for the Establishment of a Comprehensive, Adequate and Representative Reserve (CAR) System for Forests in Australia. A Report by the Joint ANZECC/MCFFA National Forest policy Statement Implementation Sub-Committee. Australian Government Publishing Service, Canberra.
- Conservation Commission of Western Australia (2004). Forest Management Plan 2004-2013. Perth, Western Australia.
- Conservation Commission of Western Australia (2008b). Forest Management Plan 2004-2013 mid- term audit of performance report. Perth, Western Australia.
- Conservation Commission of Western Australia (2010). Performance assessment of Phytophthora dieback management on lands vested in the Conservation Commission of Western Australia. Perth, Western Australia.
- Conservation Commission of Western Australia (2012). Forest Management Plan 2004-2013 end- term audit of performance report. Perth, Western Australia.
- EPA (2010a). Forest Management Plan 2004-2013: Mid-term audit of performance report. Report 1362, Environmental Protection Authority, Perth, Western Australia, August.
- EPA (2012). Forest Management Plan 2004-2013: End-term audit of performance report. Report 1443, Environmental Protection Authority Perth, Western Australia, June.
- Ferguson, I., Adams, M., Bradshaw, J., Davey, S., McCormack, R., and Young, J. (2003). Calculating sustained yield for the Forest Management Plan (2004–2013). Stage 3 Report. Report for the Conservation Commission of WA by the Independent Panel, Conservation Commission WA, p. 46.

Forest and Wood Products Research and Development Corporation (2006). Forests, Wood and Australia's Carbon Balance, pp. 11.

International Panel on Climate Change (IPCC) (2007). Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer (eds), Cambridge University Press.

URS (2012). Social and Economic Impact Assessment of Implementation of the Draft Forest Management Plan 2014-2023. Prepared for the Conservation Commission of Western Australia and the Department of Environment and Conservation. URS Australia, Perth.

Ximenes, F. George, B Cowie, A. Kelly, G. Williams, J. Levitt, G. and Boer, K. (2012). *Harvested forests provide the greatest ongoing greenhouse gas benefits- does current Australian policy support optimal greenhouse gas mitigation outcomes?*. Report prepared through an alliance between NSW Department of Primary Industries, University of New England, Forests NSW and NSW Department of Trade and Investment.