

North East Forest Alliance Submission to the IFOA

Dailan Pugh, North East Forest Alliance, 13 July 2018

The farcical submission process for the Regional Forest Agreement proves that the NSW Government has no intent to pay any attention to anything we have to say. We know that we are wasting our time bothering to make a submission to the Integrated Forestry Operational Approval (IFOA) as you have made up your mind and don't care what we have to say. Never-the-less we are again making a submission so that at least our grave concerns with your winding back of environmental protections is documented.

Unfortunately we ran out of time to complete this submission to the desired standard, and many sections are only superficially covered. Though as everything we have submitted in the past has had no discernible affects on outcomes it is probably just a waste of time going into any more detail. This document has not been proof read.

The NSW Government has repeatedly asserted that the new IFOA would result in *no net change to wood supply and no erosion of environmental values*, nor reductions in the CAR reserve system. The EPA has reiterated these promises, adding *Existing RFA commitments to the protection of old growth, rainforest, rare noncommercial forest types and the Forest Management Zone (FMZ) layer will be maintained unchanged*.

Contrary to these promises the intent for north-east NSW is to increase wood supply, remove numerous protections for NSW's threatened species, koalas, oldgrowth & rainforest, habitat trees and waterways, and degazette oldgrowth and potentially rainforest in informal reserves (part of the Comprehensive Adequate and Representative Reserve System) for logging. This proves that the promises of a succession of Environment Ministers and the EPA were not to be trusted. They lied to us.

Then Minister for the Environment, Robyn Parker (29/10/2013) assured environment groups that:

I can advise you that as a part of the remake of the coastal IFOAs, the NSW Government is seeking to improve the framework's efficiency and enforceability with no erosion of environmental outcomes, and maintain the commitments made under the Regional Forest Agreement and NSW Forest Agreements.

Then Minister for the Environment, Rob Stokes (2/6/2014) again promised:

The objectives of the coastal IFOA remake are to improve the clarity and enforceability of the IFOAs as well as reducing the cost of implementation and compliance. The NSW Government is committed to achieving these objectives with no erosion of environmental values.

Then Minister for the Environment, Mark Speakman (31/7/2015) reiterated this promise:

As you are aware, the IFOA remake is being undertaken with the commitment that any changes will not erode environmental values, nor impact on existing wood supply obligations. Reconciling these two goals is not easy, but it is one that I am determined to pursue. Given NEFA's history and its

The EPA (2014) state:

The objectives of the IFOA remake are to reduce the costs associated with implementation and compliance and improve the clarity and enforceability of the IFOAs. The NSW Government is committed to delivering these objectives with no net change to wood supply and no erosion of environmental values.

The key principles that will guide the remake of the coastal IFOAs and underpin the new IFOA are:

- *The IFOA remake will not affect commitments made under the Regional Forest Agreements (RFAs) and NSW Forest Agreements.*
- *The new IFOA will not change the Comprehensive, Adequate and Representative reserve system.*

...

The broad landscape-based habitat protection network established by the RFAs and previous licence conditions will be retained. This includes:

- *Existing RFA commitments to the protection of old growth, rainforest, rare noncommercial forest types and the Forest Management Zone (FMZ) layer will be maintained unchanged.*

The new IFOA dramatically weakens and removes environmental protections. Despite claims that the new IFOA is intended to improve the efficiency and enforceability of the IFOA, we find that the enforceability of the remaining conditions has been dramatically reduced and that the new IFOA is more complicated and confusing than the current IFOA.

The separation of the IFOA into the Conditions and Protocols is strongly objected to because the protocols can be changed at the whim of the Environment Protection Authority (EPA) and the Forestry Corporation. Not one word in the Protocols has any permanence and there is thus no guarantee that they will deliver even the reduced protection they promise. There is no required public accountability at all, they can do what they want.

In general we submit that the NSW Government needs to:

1. Recognise that the Regional Forest Agreements have failed to deliver environmental protection or industry security.
2. Recognise that the benefits of non-timber forest values are vital for the future of regional economies and ecosystems.
3. Establish the Great Koala National Park as an immediate priority.
4. Commit to a just transition out of native forest logging on public land and the transfer of public forests to protected areas when the RFAs expire.
5. Ensure that public forests are managed for the public good (ie: tourism, environmental repair, carbon sequestration and storage, wildlife habitat, provision of clean, abundant water)
6. Stop planning to log areas protected as habitat for threatened species, Koalas, oldgrowth forest, rainforest and stream buffers.
7. Stop increasing logging intensity and legalising clearfell logging along the North Coast of NSW.
8. Stop propping up the rapacious native forest logging industry at the cost of species extinction, logging dieback, reduced stream flows and water quality decline and sustainable forest based jobs.
9. End the logging of public native forest and complete the transition of the timber industry to 100% plantations.
10. Transfer all existing subsidies from native forest logging into native forest restoration.

In summary NEFA's concerns with the IFOA are that:

1. Informal Reserves and Excluded Areas.

The Minister's promises, reflected in the EPA (2014) promise that "*Existing RFA commitments to the protection of old growth, rainforest, rare non-commercial forest types and the Forest Management*

Zone (FMZ) layer will be maintained unchanged" must be honoured. There must be no opening up of Informal Reserves and/or Special Management Zones for logging.

All existing exclusion areas outside Informal Reserves, including owl landscape areas must be retained and not be allowed to be remapped to move them to areas logged over the past 20 years.

2. Oldgrowth and Rainforest

The intent to log oldgrowth forest and rainforest protected as part of the CAR reserve system for the past 20 years is strongly objected to. The claimed shortfalls in sawlogs used to justify this are believed to be fraudulent, particularly because the data identify a surplus of 16,577 m³ per annum of high quality sawlogs (HQL) above the claimed current allocations of 220,423 m³ per annum, and because NRC refused to take into account resources from hardwood plantations which are predicted to provide an increasing volumes of of HQL as yields from native forests decline over time (see section 9 of this submission), The NRC's claimed need to log rainforest and oldgrowth protected for the past 20 years is based on a lie.

Forestry Corporation's yield projections are so grossly and deliberately over-stated that once oldgrowth logging resumes, claims of yield shortfalls will be used to log ever-increasing areas of oldgrowth to avoid compensation claims. This does seem to be the deliberate intent.

The NRC have comprehensively done over oldgrowth by changing the criteria and methodology for mapping it and changing the methodology for identifying and assessing its reservation status, in the process mapping 88% of oldgrowth out of existence and increasing the area of oldgrowth claimed to have met targets by 42%. The outcome of these multiple attacks is that of the 103,000 ha of protected oldgrowth on State forests, up to 58,600ha (57%) may be opened up for logging using the NRC's criteria and methodology.

There are currently 81,567ha of mapped rainforest protected within the north-east NSW Informal Reserve system. The NRC trial resulted in 62% of mapped rainforest being mapped out of existence. Based on this 50, 571 hectares of mapped rainforest could be opened up for logging.

The NRC's trial remapping of oldgrowth and rainforest displays all that is wrong with the process, it fails to recognise that most of the oldgrowth was inadequately reserved, ignored the presence of inadequately reserved forest ecosystem, ignored that their criteria are inadequate to identify oldgrowth of many ecosystems and resorts to lying to claim that "new" oldgrowth is identified.

The Natural Resources Commission have dramatically changed both the criteria for identifying oldgrowth forest and rainforest and the methodology for mapping them, with their trial resulting in 88% of mapped HCV oldgrowth and 62% of mapped rainforest being identified for logging. The revised criteria and methodology being used to remap oldgrowth and rainforest out of existence is inconsistent with the original criteria and methodology applied in the Comprehensive Regional Assessment and the application of these reduced criteria and methodologies is objected to.

NRC have misrepresented the criteria applied to identify High Conservation Value Oldgrowth Forest by failing to recognise that this included both High Quality Habitat Oldgrowth Forest for 21 threatened fauna and high "summed irreplaceability". All oldgrowth and rainforest must be assessed based on the full suite of environmental values and reserve targets they contribute to the Comprehensive, Adequate and Representative reserve system, not just rorted oldgrowth targets.

These oldgrowth forests were identified as part of the Comprehensive, Adequate and Representative reserve system and counted as contributing to reserve targets for oldgrowth, forest ecosystems, national estate, fauna, flora and Centres of Endemism in the 2000 Regional Forest Agreement. Mapped HCV oldgrowth forests in the Upper North East are also legally protected as a heritage item under the NSW Heritage Act 1977. An additional 20,000 ha of oldgrowth was included in Special Management Zones in 2003.

No oldgrowth forest or rainforest should be logged. Irrespective of definitions, those forests mapped as oldgrowth and rainforest are of immense value as the most intact stands of forests left on State Forests as they have escaped the intensive logging of the past 20 years. The eucalypt stands have a high number of hollow-bearing trees that provide the nests and dens essential for a plethora of hollow-dependant animals and numerous mature trees that provide the abundant browse, nectar and seeds that are essential food resources for a multitude of species. Our rainforests have outstanding biodiversity and a multitude of unique plants and animals. They are irreplaceable assets of immense importance for the maintenance of populations of forest dependent species throughout State Forests. They provide important refugia and stepping stones between our national parks.

3. Stream Buffers

Headwater streams are of overwhelming importance for catchment health as this is where most of the interaction between the terrestrial and aquatic realms occurs. Water quality, biodiversity, and ecological health of freshwater systems depend on functions provided by headwater streams.

Adequate stream buffers around the headwaters of our river systems are vital for their health. The NSW Government, nor the EPA, have made any attempt to assess the effectiveness of any buffer widths, and now intends to reduce their already patently inadequate buffers around headwater streams from 10m down to 5m without having made any attempt what-so-ever to assess the impacts.

The scientific evidence is that we should be establishing buffers at least 30m wide around our headwater streams. Riparian buffers in the vicinity of threatened species who depend on this habitat must be expanded to encompass the full extent of the habitat utilised.

The proposal to reduce buffers in headwater catchments down to 5m is strongly opposed. It is outrageous that the EPA are going to make such a fundamental change, which it is obvious will result in exponentially increased impacts, and yet they have made no attempt to assess environmental consequences. They have been proposing this for years, so it is not as if they didn't have time, they just couldn't be bothered.

All riparian buffers, and riparian habitat for threatened species, protected over the past 20years, is vital habitat because it has escaped the intensifying logging of at least the past 20 years, though often much longer, and must remain protected. This was the unanimous view of the expert panel and is a fundamental requirement.

The IFOA must be altered to at least meet the promise that 10m riparian buffers will be implemented on all streams in the intensive logging zone in catchments less than 20ha.

4. Tree Retention

The intent to reduce hollow-bearing tree retention requirements and the removal of requirements for recruitment trees is strongly objected to. The aim should be to restore hollow-bearing trees throughout the forests as quickly as possible, to this end the aim should be to

- retain all hollow-bearing trees throughout forests, and retain the next largest trees to increase the retention rate up to at least 5 of the largest and healthiest trees per hectare where insufficient hollow-bearing trees are available.
- retain two sound and healthy mature/late mature recruitment trees for every hollow-bearing tree retained.

The older a tree gets the more browse, nectar and seeds they provide for wildlife. Once eucalypts are over 120-180 years old they begin to provide the small hollows needed by a plethora of native wildlife for denning, nesting and shelter. Though it is not until they are over 220 years old that they provide the larger hollows required by species such as owls, cockatoos and gliders. They may live for 300-500 years, sometimes longer.

By removing the need to retain 8 hollow-bearing trees per hectare in forests with Greater Glider densities >1 per hectare, and records of threatened owls, and the need to retain the next largest tree (and count it as a hollow-bearing tree) in the non-regrowth zone if there are less than 5 hollow-bearing trees per ha, the EPA is significantly reducing the retention requirements for hollow-bearing trees and this is strenuously opposed. This will have a significant impact on the nationally vulnerable Greater Glider and a host of other species, it is a massively retrograde act.

While largest old hollow-bearing trees are not of much interest to the industry, the recruitment trees and eucalypt feed trees are of the utmost interest as these constitute a high proportion of the remaining large high quality sawlogs. It is therefore not surprising that the most widespread and frequent breaches found by the EPA and NEFA are the logging of the large mature trees required to be retained as recruitment and/or nectar feed trees. Because these represent the best sawlogs the Forestry Corporation does everything they can to avoid protecting them, either by refusing to select any or by selecting trees that are too small, deformed or damaged to meet requirements.

The EPA have proven themselves totally unwilling to take any meaningful regulatory action in response to these most common breaches, meaning that as large sawlogs dwindle the logging of recruitment and/or nectar feed trees has increased. Now in a despicable act the EPA has absolved itself of any liability by removing any requirements to protect recruitment or nectar feed trees.

It is bad enough that the EPA have reduced retention requirements for hollow-bearing trees, though it is inexcusable that they are so bereft of ecological comprehension and care that they are removing the need to retain and protect recruitment habitat trees to replace the hollow-bearing trees as they die. This bastard act says a lot about the ineptitude of the EPA. For years they have been half-heartedly defending the need to protect recruitment trees, though have never taken meaningful action for the legally inadequate retention and protection of recruitment trees despite finding it one of the most frequent illegal acts perpetuated by the Forestry Corporation. Now they are rewarding the Forestry Corporation for their decades of illegal activities by changing the law to allow them to cut down all recruitment trees. This act by the EPA is an environmental crime of the worst kind - it is a pity that they can't be prosecuted as there is no excuse for their environmental vandalism.

The size thresholds for protecting giant trees are too large. All trees greater than or equal to one metre diameter should be retained and protected as a matter of urgency.

The removal of the need to protect eucalypt feed trees is opposed. The requirement to protect sound and healthy mature/late mature individuals of the most important nectar producing eucalypt species must be restored, with at least 5 per hectare protected throughout forests and the protection of all mature and late mature eucalypt feed trees within potential habitat of Regent Honeyeaters and Swift Parrots.

It is well recognised that it is essential to retain mature trees because of the abundant nectar they provide for a multitude of species, most notably the Critically Endangered Regent Honeyeater and nationally Endangered Swift Parrot, identified as the 7th and 13th most threatened birds in Australia.

The National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (2011) identifies the loss of mature trees and the abundance of nectar they provide for the Swift Parrot as a major threat, recommending as a prescription "*the retention of all trees 60cm DBH or greater, together with at least 5 trees per hectare from a mixture of other age classes (30-40cm, 40-50cm and 50-60cm DBH) to ensure continuity of food resources over time*". It is therefore astounding that the NSW EPA has identified both the Critically Endangered Regent Honeyeater and nationally Endangered Swift Parrot as adequately protected and totally removed the existing need to protect any mature trees, most notably the 5 mature nectar feed trees currently identified as required to limit impacts on these species,

Given the illegal removal of the tens of thousands of mature recruitment and nectar feed trees that has occurred over the past 2 decades, and the severe shortage of large mature trees throughout our forests, the retention of all remaining mature trees over 60cm dbh is strongly supported.

It is astounding that the EPA are removing any punishment for damaging retained trees. Rather than being fined or prosecuted, now all the Forestry Corporation need to do is select another tree from those they have retained as a replacement - and there is no prohibition on it already being damaged. The current prohibition against damaging retained habitat trees must be retained and strengthened, with meaningful regulatory action taken to reduce its widespread occurrence. Weakening regulatory responses will just encourage more damage.

5. Threatened Species

The need to undertake pre-logging surveys and apply appropriate protections for all threatened species currently requiring prescriptions must be fully restored. Surveys and the identification of exclusion areas, including wildlife and habitat tree clumps, must be undertaken by independent experts.

As a matter of urgency the effectiveness of prescriptions need to be monitored and adjusted to achieve explicit performance criteria.

6. Koalas

The removal of the need to look for and protect high quality Koala habitat is strongly objected to. The identification and exclusion of logging from occupied core Koala habitat across all land tenures has to be the highest priority if the ongoing decline in Koalas is to be halted. Surveys to identify occupied high quality Koala habitat needs to be undertaken by independent experts with the full extent of resident Koala home ranges excluded from logging.

In order to reverse the decline it is essential that protection be extended to previously occupied high quality habitat, habitat linkages between core habitat, and present and future climate refuges.

Searches for all trees utilised by Koalas (with observations of Koalas, Koala scats and/or distinctive Koala scratch marks) need to be undertaken ahead of logging, with all utilised trees protected.

7. Bell Miner Associated Dieback

This is the most depressing forest issue. Over the past decades lantana and dieback have been spreading through our forests in the wake of logging and the responsible forest agencies do nothing to stop it. As the forests die the Forestry Corporation hit them harder and harder - ignoring their own research that shows they are aggravating it more and more. Their tame lapdogs, the EPA, sit on the sidelines pretending to do something while they do nothing at all as the tragedy unfolds around them. This is a tragic abuse of duty of care by both Government agencies.

The EPA must heed the evidence and recognise that logging is a primary cause of Bell Miner Associated Dieback.

Logging must be excluded from all forests affected by, and susceptible to, Bell Miner Associated Dieback. Urgent rehabilitation must be required for all forest areas affected by Bell Miner Associated Dieback.

Areas affected by Bell Miner Associated Dieback must be excluded from the FRAMES timber modelling.

Not that anyone is listening.

8. Logging Intensity

The proposed 140,000ha North Coast Intensive Zone is strongly opposed. Clearfelling must not be allowed.

The proposal to increase logging intensity in the rest of the forests, where the minimal basal area required to be retained is 10m² ha in the "regrowth" zone and 12m² ha in the non-regrowth zone is strenuously opposed.

In accordance with the current rules the minimum basal area retention must be increased to at least 20 m²/ha across all forests.

9. Logging Volumes

NSW Agencies are claiming that based on Forestry Corporation's modelling that an average yield of 237,000 m³ of high quality sawlogs are available from north east NSW's native forests and plantations for the next 100 years. This is 16,577 m³ per annum above the claimed current allocations of 220,423 m³ per annum, with this also representing 33% of the timber we bought back from Boral at such a high cost.

Based on claims of resource short-falls the EPA agreed to major wind-backs of environmental protections, including increasing logging intensity, removing protections for mature trees, reducing buffers on headwater streams, and removing protections for most threatened species. Then again based on resources the Natural Resources Commission (NRC) intervened to side with the Forestry

Corporation against the EPA to further increase logging intensity, increase the size of clearfells, slash retention rates for Koala feed trees, and increase the size of old trees that can be logged. And finally, based on an unjustified NRC guesstimate that there would be a shortfall in commitments from north-east NSW of 7,600 to 8,600 cubic metres of high quality sawlogs per annum due to protections for Endangered Ecological Communities and Koalas, the NRC proposes opening up protected oldgrowth and rainforest for logging.

Given that the current surplus of HQL is 16,577 m³ per annum and the NRC's reduction is at most 8,600 m³ per annum, there is no justification for logging oldgrowth and rainforest, and many other environmental wind-backs can be restored. The IFOA must be renegotiated based on current timber commitments with the restoration of environmental protections.

It is outrageous that the NRC also excluded hardwood plantations from their resource projections as these contribute to commitments of HQL given in Wood Supply Agreements, and the volumes available from them are increasing over time while volumes from native forests are declining. By excluding plantations the NRC concocted a false resource shortfall to justify logging oldgrowth forest, rainforest, koala feed trees, and larger trees, as well as increasing logging intensity. Their pretence of the need to slash environmental protections to satisfy inflated logging volumes is fraudulent. The NRC, EPA and Forestry Corporation have all been asked to explain and none of them will, they are colluding to hide the truth.

An inquiry needs to be held into why NSW Government agencies were allowed to collude to fraudulently use unjustified claims of resource shortfalls to justify the massive wind-back in environmental protections.

In 2014 the New South Wales Government paid Boral \$8.55 million to buy back 50,000 m³ per annum of high quality sawlogs, claiming it was necessary to reduce cutting rates down to a long-term sustainable level. Despite this mover 2016 and 2017 the total cut of HQL was 40,368 (9%) above allocations, the Forestry Corporation have been continuing to log at the levels they were logging large sawlogs before the 2014 Boral buy-back. Why over the past 2 years did we reallocate 40,368 m³ to sawmillers that we paid Boral \$742,770 to buy back? How much of this overcut has been re-allocated to Boral?

Since the WSA's were originally issued in 1998 the then commitments for 269,000 m³ of large high quality sawlogs and veneer logs per annum from north east NSW have almost halved down to 138,347m³ per annum because of gross resource over-estimations and over-allocations. It is thus the height of absurdity for the new IFOA to use the totally discredited 1998 yield estimates to set the cap on logging operations.

It is a total nonsense to use cutting limits that have been totally discredited as constituting *authorised* limits for the IFOA. These are outrageously high and a nonsense. The volumes must be reduced down to, at a maximum, 138,347m³ of large high quality sawlogs and veneer logs per annum (allowing for balancing overcuts and undercuts) to be consistent with current commitments and the Minister's promise. There needs to be additional constraints added to limit the overall cut of high quality sawlogs to 220,423 m³ pa. The need for this is proven by the recent gross over-logging.

The Forestry Corporation (2018) have issued an Expression of Interest for new Wood Supply Agreements (WSAs) for 416,851 tonnes per annum of low quality sawlogs and residual logs (logs over 10cm diameter and 2.4m long) from north east NSW's native forests and plantations (58% of the total log resources predicted to be produced), which the EOI states they intend to issue in June

2018. These volumes assume that the new logging rules have been approved. The NRC (2018) identify that annual salvage log, pulpwood and residue sales average 300,000, so these new WSA represent a 39% increase above current cut. NEFA strongly objects to any new Wood Supply

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BACKGROUND INFORMATION

The NSW Government promised that the new IFOA would result in "*no net change to wood supply and no erosion of environmental values*", and that they "*will not change the Comprehensive, Adequate and Representative reserve system*".

Since 2013 a succession of Environment Ministers, Robyn Parker (29/10/2013) Rob Stokes (2/6/2014) and Mark Speakman (31/7/2015), have repeatedly reassured environment groups that the IFOA would result in no erosion of environmental values.

As well as re-iterating these promises, the EPA (2015) promised that "*Existing RFA commitments to the protection of old growth, rainforest, rare non-commercial forest types and the Forest Management Zone (FMZ) layer will be maintained unchanged*"

They lied.

1. Informal Reserves and Excluded Areas.

On State Forests there are currently significant areas excluded from logging as Informal Reserves and designated as Forest Management Zones 1, 2 and 3, These are primarily comprised of HCV oldgrowth forest (over 10ha) and rainforest (over 2ha), though also include wilderness, wetlands, major rock outcrops, heathlands, rare non-commercial forest types, and steep unloggable areas.

These are designated as part of the State-Commonwealth Comprehensive Adequate and Representative Reserve System and counted as contributing towards targets for all entities, most notably national targets for forest ecosystems, oldgrowth, wilderness and national estate.

These are mostly designated as Special Management Zones and protected under the NSW Forestry Act, requiring parliamentary approval to undo them.. The SMZ also include 20,000 ha of additional areas of non-HCV oldgrowth nominated by NEFA in 2003.

The FMZ zone 3B is allowed to be logged under special prescriptions intended to protect their conservation values, though in practice there is no consideration of their values and they are treated as just another part of the logging area, including being subject to illegal intensive logging. This was detailed in NEFA's submission to the RFA but was ignored.

The NSW Government is now intending on remapping the oldgrowth forest and rainforest with the intent of removing areas remapped as not being oldgrowth or rainforest from the reserve system and making them available for logging (see section on oldgrowth and rainforest). They are intending on only considering their contributions to oldgrowth targets while ignoring their contribution to other reserve targets.

There are additional areas outside the FMZs that are mapped for protection including: stream buffers, 40m and 80m wide 'ridge and headwater habitat' (wildlife corridors), owl landscape areas (additional areas identified as required as owl habitat), Endangered Ecological Communities, additional areas of rainforest (including unmapped rainforest), unmapped rock outcrops and unmapped wetlands.

There are also requirements to undertake pre-logging surveys for a range of threatened species and either require increased tree retention around records, or most often to establish exclusion areas around them. Generally these are considered to encompass 3.4% of the loggable area, though more thorough and expert surveys do significantly increase the required retention. It is important to recognise that where exclusion areas are required they can not be counted towards habitat tree retention and other such requirements. A minority of species will still require surveys and habitat protection, and previously protected (carry-over) areas for Squirrel Glider, Brush-tailed Phascogale and Koala high-use areas (where not since logged) are required to be retained.

Existing owl landscape areas are not defined and thus not protected under the IFOA. The EPA have said they will rectify this error, though prompting is required.

As an alternative to most threatened species provisions the Forestry Corporation is required (Protocol 22) to retain 'wildlife clumps' over 1ha encompassing 5% of the loggable area within a 'local landscape area' (an area identified by the Forestry Corporation that is less than 1,500ha). These can include areas that would otherwise be required to be retained such as unmapped rocky outcrops, cliffs, heath and scrub, wetlands, as well as "carry-over" exclusion areas, and habitat trees. As noted by the EPA "*it is anticipated most wildlife clumps will be made up of 'carry over exclusion zone' – being large exclusion zones previously applied for koalas, squirrel gliders and phascogales or the specified habitat features*". So they are not intended to protect anything additional to other requirements. There are a range of selection criteria, though as only one of those needs to be met, it is open to the Forestry Corporation to choose virtually any area they want. With few requirements for surveys for threatened species these in no way compensate for the current needs to identify and protect occupied habitat for a range of threatened species.

In addition to wildlife clumps, there are also requirements to retain 'Tree retention clumps' between 0.1 and two hectares in size encompassing 5% of the loggable area of a compartment in the coastal ('regrowth') forests and 8% of the loggable area of escarpment ('non-regrowth') forests. These must prioritise the retention of hollow-bearing trees and potential future hollow-bearing trees. These can similarly include areas otherwise required to be protected.

So in summary 10 to 13% of the loggable area is required to be permanently excluded from logging, which can include any other areas or trees required to be excluded from logging.. They are meant to improve landscape connections between other retained patches of vegetation or as 'habitat islands' within a large cutover area, though this is not a requirement. The trade-off is to remove most protections for locations of threatened species, remove specific requirements to protect recruitment and eucalypt feed trees, and to increase logging intensity in 87-90% of the loggable area. Note that the current requirement for intensive logging (AGS) is to protect 10% of the area, so there are no real compensatory gains.

The Remake of the Coastal Integrated Forestry Operations Approvals Final Report Threatened Species Expert Panel Review reports the EPA representative Brian Tolhurst (one of the 10 experts who answered questions) as stating:

The spacing of clumps across the harvestable area will conceivably be much greater than the distances between scattered individual retained trees and will have a significant impact on many arboreal species. For gliding mammal species these distance will be of critical importance – 30 m is the current reported average glide distance for Squirrel and Yellow-bellied Gliders and canopy gaps over 40 m would start to become barriers for regular and safe movement. For Koalas significantly separating the forest canopy will increase their time

spent on ground and thus increase their exposure to terrestrial predation. In areas with records of these and similar arboreal species, wide scale intensive harvesting regimes would not be appropriate. For many small forest birds and microbats this would also be the case. Additional scattered trees between the clumps to provide some level of forest canopy connectivity would be necessary.

2. Opening up Oldgrowth Forest and Rainforest for Logging.

As part of their new Integrated Forestry Operations Approval (IFOA) the NSW Government is proposing to subject mapped oldgrowth forest and rainforest protected for the past 20 years to a review process that is intended to make large areas of oldgrowth and rainforest on State Forests available for logging in order to increase logging by an initial 8,600 cubic metres of high quality sawlogs per annum on the north coast.

The EPA (2014) committed to maintaining the protection of old growth forest, rainforest and rare non-commercial forest types and to maintaining the FMZ layer unchanged.

The broad landscape-based habitat protection network established by the RFAs and previous licence conditions will be retained. This includes:

- *Existing RFA commitments to the protection of old growth, rainforest, rare noncommercial forest types and the Forest Management Zone (FMZ) layer will be maintained unchanged.*

As noted by the Natural Resources Commission (NRC):

Existing old growth forest and rainforest protections were considered an 'agreed' setting when the Commission provided its previous Coastal IFOA advice in December 2016.

This all changed when NRC claimed to have identified there would be a shortfall in commitments from north-east NSW of 7,600 to 8,600 cubic metres of high quality sawlogs per annum due to protections for Endangered Ecological Communities and Koalas. To make up this claimed shortfall the Government decided to log oldgrowth and rainforest protected in the reserve system.

The claimed shortfalls are believed to be fraudulent, particularly because the data identify a surplus of 16,577 m³ per annum of high quality sawlogs (HQL) above the claimed current allocations of 220,423 m³ per annum, and because NRC refused to take into account resources from hardwood plantations which are predicted to provide an increasing volumes of of HQL as yields from native forests decline over time (see section 9 of this submission), The NRC's claimed need to log rainforest and oldgrowth protected for the past 20 years is based on a lie.

Forestry Corporation's yield projections are so grossly and deliberately over-stated that once oldgrowth logging resumes, claims of yield shortfalls will be used to log ever-increasing areas of oldgrowth to avoid compensation claims. This does seem to be the deliberate intent.

These forests were identified and mapped in a rigorous process under the supervision of all agencies and key stakeholders in an open and transparent process involving an Old Growth Expert Panel in 1998 and after an extensive process informed by experts. Only those oldgrowth forests that were identified as high quality habitat for 21 threatened old-growth dependant species and/or were identified as having a high priority for protection based on multiple reserve targets (summed

irreplaceability) were identified as High Conservation Value (HCV) Oldgrowth Forest. The derived High Conservation Value oldgrowth, rainforest and wilderness on State Forests were protected from logging in management zones in 1999, most being included in Special Management Zones protected under the *Forestry Act 1916*.

These were identified as part of the Comprehensive, Adequate and Representative reserve system and counted as contributing to reserve targets for oldgrowth, forest ecosystems, national estate, fauna, flora and Centres of Endemism in the 2000 Regional Forest Agreement. Mapped HCV oldgrowth forests in the Upper North East are also legally protected as a heritage item under the NSW Heritage Act 1977. An additional 20,000 ha of oldgrowth was included in Special Management Zones in 2003.

The change in definitions proposed by the government seeks to implement the protocols used for Private Native Forestry oldgrowth mapping to apply on State Forest tenures. The Office of Environment and Heritage has been responsible for reviewing oldgrowth and rainforest mapping on private lands and have proven themselves to be un-trustworthy, with mapped oldgrowth and rainforest wrongly deleted. A previous independent review of the PNF protocol [Webster \(2010\)](#) found that *"the protocol implementation is working very well for rainforest"*, but that implementation for *"old-growth is highly variable and problematic and has apparently resulted in some areas of old-growth being potentially available for harvest"*

The Natural Resources Commission have dramatically changed both the criteria for identifying oldgrowth forest and rainforest and the methodology for mapping them, with their trial resulting in 88% of mapped HCV oldgrowth and 62% of mapped rainforest being identified for logging. The NRC have particularly targeted stands dominated by brushbox and turpentine for exclusion from both rainforest and identification as oldgrowth (because oldgrowth trees of these species don't typically display senescence). The new proposed definitions of old growth does not encompass the range of ecological, aesthetic and cultural values in the currently agreed and accepted definition of oldgrowth and has failed to adequately assess levels of disturbance based on structural maturity as recommended by the JANIS criteria.

On behalf of the NRC, the Forestry Corporation have identified some 14,600 hectares of oldgrowth they consider they could log under the new rules to realise 212,000m³ of high quality sawlogs, and some 4,900 ha of rainforest to log for 90,000m³ of timber.

The NRC fraudulently claim to have identified "new" oldgrowth that was not previously mapped in order to encourage support for their remapping, though most of their "new" oldgrowth was in fact previously mapped as oldgrowth, just that it wasn't included as HCV oldgrowth. It is deliberately deceptive to claim these stands as "new" oldgrowth.

The opening up of protected oldgrowth for logging involves opening up areas included in the informal reserve system for a multitude of conservation values. It is not just an attack on oldgrowth, it is an attack on the State and Commonwealth's agreed Comprehensive, Adequate and Representative Reserve System. As noted by the NRC:

While technically feasible, remapping and rezoning will be challenging. Nearly all north coast old growth forests are protected by Parliament under a 'special management zone' and are also protected under Forest Management Zones (FMZ) 2 and 3a as informal reserves or exclusion zones. Furthermore, old growth forests under the current HCVOG spatial data set for the upper north east region are listed as a state significant heritage item.

The NRC proposal is to compensate for reductions in the reserve system with additions of "*steep slopes, threatened ecological communities and other non-commercial forest areas*".

Irrespective of definitions, those forests mapped as oldgrowth and rainforest are of immense value as the most intact stands of forests left on State Forests as they have escaped the intensive logging of the past 20 years,. The eucalypt stands have a high number of hollow-bearing trees that provide the nests and dens essential for a plethora of hollow-dependant animals and the mature trees that provide the abundant browse, nectar and seeds that are essential food resources for a multitude of species, They are irreplaceable assets of immense importance for the maintenance of populations of forest dependent species throughout State Forests. They provide important refugia and stepping stones between our national parks.

2.1. Background

When NEFA was established in 1989 it was primarily a coming together of groups actively trying to protect areas of oldgrowth forest throughout north-east NSW. Our principal goals were the protection of oldgrowth forest, rainforest, wilderness and threatened species.

Oldgrowth forests are those in a near-natural state dominated by relatively large old trees, often with hollows utilised as dens and nests by a large diversity of animals. They naturally contain a variety of age classes (young, mature, senescent) and some may have been selectively logged provided the structure is relatively intact.

As NEFA campaigned to protect oldgrowth forest, the debate often revolved around whether a particular area was oldgrowth or not, with the then Forestry Commission often in denial. In 1992 the Commonwealth Resource And Conservation Inquiry (RAC 1992) singled out oldgrowth for protection, recommending either a '*rapid cessation of all logging operations within [oldgrowth] forests*' or that forest management agencies "*identify and rank old-growth forests in terms of their full range of values*" so "*that after adequate protection of examples of old-growth forests some old growth may be available for logging*".

The National Forest Policy (1992) required that "*relevant State agencies will, as a matter of high priority, undertake assessments of forests for conservation values, including old-growth values*" and that a "*comprehensive, adequate and representative reservation system to protect old-growth forest and wilderness values will be in place by the end of 1995*". Oldgrowth forest is defined to be "*ecologically mature forest where the effects of disturbances are now negligible*".

NEFA became frustrated with the NSW's unwillingness to map oldgrowth forest, so as a demonstration NEFA was the first organisation in NSW to systematically map oldgrowth forests (in Wild Cattle Creek) using the Aerial Photographic Interpretation (API) methodology pioneered in East Gippsland (Edwards 1994).

It wasn't until the election of the Carr Labor Government in 1995, with a promise to protect all high conservation oldgrowth forest, that a process for implementing the national forest policy was initiated. Following an interim process involving the broad mapping of oldgrowth forest the Comprehensive Regional Assessment (CRA) was commenced.

For the CRA oldgrowth and rainforest mapping involved undertaking a \$2 million project to map rainforest and forest structure by API (at a 1:25,000 scale). Rainforest was ecologically defined, which allowed for eucalypt and Brush Box emergents up until the stage where a closed rainforest

canopy becomes completely obscured by the emergents (approximately 35% crown cover). For non-rainforest the relative proportion of young, mature and senescent trees, and other attributes, were mapped, which were combined with site productivity and disturbance history to derive oldgrowth forest under the guidance of an Old Growth Expert Panel.

This project was initiated and overseen by the Environment and Heritage Technical Committee (EHTC) comprising State and Commonwealth agencies, industry, unions and conservation groups. It was thus subject to a high degree of involvement and scrutiny by all parties in an open and transparent process.

For the North East NSW Regional Forest Agreement (RFA) each forest ecosystem (aside for rainforest) was set a reserve target in accordance with the Commonwealth's JANIS (1997) forest reserve criteria for the amount of oldgrowth remaining, basically requiring protection of a baseline of 60% of whatever oldgrowth was left. "High Quality Habitat Old Growth" (HQHOG) was created by intersecting modelled high quality habitat for 21 oldgrowth dependent species (selected by fauna experts) with mapped oldgrowth, and assigned a target of 100%.

The Commonwealth Government blocked all recommendations by the Old Growth Expert Panel, supported by the EHTC, to increase targets to 100% for rare and vulnerable oldgrowth types. Targets were set according to the remaining extent across all land tenures. As an outcome of the RFA only a small percentage of oldgrowth ecosystem targets were met (see the NE RFA Appendices 1a and 1b).

Outside the reserve system a subset of oldgrowth was identified for protection as High Conservation Value Oldgrowth under criteria decided by the NSW agencies. This is comprised of HQHOG, and oldgrowth forest identified as having a high 'summed irreplaceability' value based upon the sum of the reserve targets and reserve priorities of all the entities within it. These forests were high priorities for inclusion in the reserve system because of a multitude of values irrespective of the presence of oldgrowth.

In November 1998 the NSW Premier announced the RFA outcome which included that identified "high conservation value" (HCV) oldgrowth would be protected on public land outside the reserve system. This was restricted to patches over 10ha. Smaller areas and non HCV oldgrowth was available for logging. All mapped rainforest was also protected.

Mapped HCV oldgrowth, rainforest and wilderness in State Forests was mapped as Forest Management Zones 2 and 3A. Forest Management Zones can be amended or revoked by the Minister for Forests at any time. The most common 'protected' zones do not allow logging, but do allow on-going roading, mining, burning and grazing (Anon 1999c) and are not actively managed for conservation.

The Integrated Forestry Operations Approval (IFOA) regulates activities that can occur in these 'informal reserves', with specific requirements for mapped HCV oldgrowth and rainforest. Management Plans were required for each of the larger areas by 2002, though without being complied with this requirement was dropped in 2003 and Forestry Corporation allowed to construct roads through them at their discretion.

Forest Management Zones 1 (flora reserves), 2, 3A and 3B (management by special prescription) were classed as the 'Informal reserve system' in the RFA and counted as contributing to the RFA targets for oldgrowth, forest ecosystems and national estate in the NE RFA, as well as the fauna,

flora, and centres of endemism targets. These became part of the Comprehensive, Adequate and Representative Reserve System.

Even with the counting of informal reserves, the Government's Summary of Achieved Targets (Anon. 1999c, Attachment 2) for ecosystems and oldgrowth, identified "*In the Upper North East Region there are 162 forest ecosystems and 144 old growth ecosystems... [reserves] will leave 103 forest ecosystems below target, of which 74 are ranked highly vulnerable, and 118 old growth forest ecosystems below target, of which 76 are ranked highly vulnerable*", and "*In the Lower North East Region, there are 198 forest ecosystems and 169 old growth ecosystems. [reserves] will leave 115 forest ecosystems below target, of which 87 are ranked highly vulnerable, and 110 old growth ecosystems below target, of which 56 are ranked highly vulnerable*".

Due to an ongoing campaign by conservationists, in the lead-up to the NSW State elections in March 2003, the ALP announced that it would protect a further 65,000 hectares of public forests (MR 'Premier Carr Announces Protection for Forest Icons', 2 March 2003). This included 45,000 hectares contained in 15 "icon" areas that were transferred to formal reserves and 20,000 hectares of oldgrowth forest that was transferred to Special Management Zones protected from logging (*National Parks Estate Reservation Act 2003*). The protection of the 20,000 hectares of non-HCV oldgrowth meant that all large areas of mapped oldgrowth remaining on State Forest tenure in north-east NSW were finally protected. The reduction in hardwood resource was claimed to have been compensated by the removal of "buffers on buffers", which had prohibited the felling of trees into informal reserves, thereby making more timber available.

Some 310,000 hectares (most) of these informal reserves are now included in Special Management Zones which are protected from logging under the *Forestry Act 1916*.

HCV Old Growth forest as mapped in the Upper North East Region is included on the NSW State Heritage Register and is legally protected as a heritage item under the NSW Heritage Act 1977.

The NSW Government is intending to now allow for the remapping of oldgrowth forest and rainforest with the intent of making CRA mapped rainforest and oldgrowth available for logging.

NEFAs past experience with reviews of oldgrowth mapping has shown that they result in large areas of oldgrowth being logged. The experience with the rorting of the "stump count" review method applied in the Interim Assessment Process led agencies and the Government not to allow for review of mapped boundaries in the RFA.

This is not the outcome for private forests. Under DECCW's Old Growth and Rainforest Private Native Forestry assessment protocols a private landowner can request a review of oldgrowth and rainforest as mapped in the CRA. A 2010 internal review of DECCW's (now OEH) methodology for remapping oldgrowth forest found it was fundamentally flawed and that a significant amount of the mapped oldgrowth was being wrongly deleted. [Webster \(2010\)](#) found that "*the protocol implementation is working very well for rainforest*", but that implementation for "*old-growth is highly variable and problematic and has apparently resulted in some areas of old-growth being potentially available for harvest*". Transect assessments resulted in PNF old-growth classification in 4 out of 5 areas that were not correctly identified by DECCW assessments as being old-growth, 80% of the time OEH were getting it wrong.

NEFA considered that by then over 8 thousand hectares of mapped oldgrowth forest were likely to have been remapped as not being oldgrowth, and thus been made available for logging, in

numerous 15 year Property Vegetation Management Plans. The reviewer hoped that improved imagery and hardware, combined with fieldwork, and regular peer review would increase the accuracy and reliability of DECCWs remapping.

In November 2012 NEFA attended a field day organised by EPA aimed at showcasing how OEH had improved their oldgrowth field assessments, though it revealed a fundamentally flawed field assessment process that was strongly criticised by all stakeholders, as well as ongoing mapping problems. OEH had still not rectified the manifest deficiencies in their remapping.

In 2013, on a private property at Whian Whian areas of CRA mapped rainforest were remapped at the request of the EPA and Forestry Corporation by the Office of Environment and Heritage (OEH) as not being rainforest. The OEH remapping did not make sense as it did not follow obvious vegetation boundaries, remapping clearly obvious rainforest as either cleared land or part of the logging area.

NEFA (Pugh 2014) engaged our own API expert and undertook transects which proved that significant areas of rainforest qualifying as the State Endangered Lowland Rainforest and nationally Critically Endangered Lowland Rainforest of Subtropical Australia had been deleted in the remapping, and a road constructed through it and a number of threatened plants. It is astounding that nowhere in the process of remapping the rainforest and constructing a road through it did the EPA, OEH or Forestry Corporation recognise that the rainforest they were dealing with is an Endangered Ecological Community.

Despite the comprehensive and detailed evidence we presented (Pugh 2014) the EPA refused to investigate our complaint about the erroneous rainforest remapping. When we submitted a freedom of information request (GI(PA) Act) both the EPA and OEH refused to provide any documents on their remapping on the grounds that there was "*a public interest consideration against disclosure of information*" because the remapping of public data by a public agency was "*personal information*" and its release may cause harm to a person.

The mapping unit of OEH has also come under strong criticism internally and externally for its secrecy and unreliable vegetation mapping (Campbell 2012, Hunter 2016, Benson 2016). Given their history, unreliability and unaccountability, NEFA has no confidence in the OEH remapping of oldgrowth forest.

For this submission only Compartment 167 of Clouds Creek State Forest was able to be subject to a ground assessment, with this once again showing that the oldgrowth had been wrongly deleted.

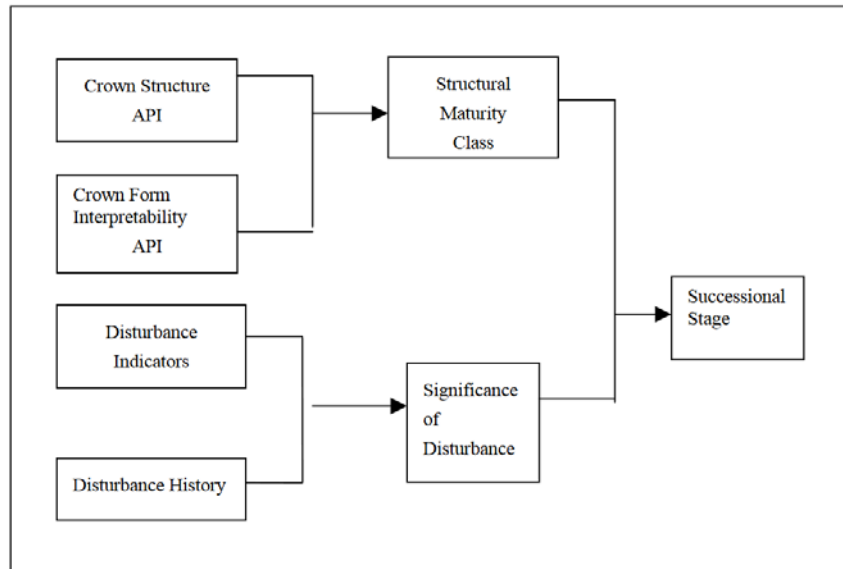
2.2. CRA Oldgrowth Mapping Criteria

For the Comprehensive Regional Assessment oldgrowth forest was mapped in an open and transparent process initiated and overseen by the Environment and Heritage Technical Committee (EHTC), and with the guidance of an Old Growth Expert Panel.

Forest successional stages (oldgrowth, disturbed oldgrowth, mature, disturbed mature, young and recently disturbed) were identified based on ecological maturity determined by the relative proportions of senescent and regrowth trees visible from aerial photographs, adjusted to account for the visibility of senescence between species, and the significance of disturbances as evidenced by mapping (logging and burning history) and from aerial photographs.

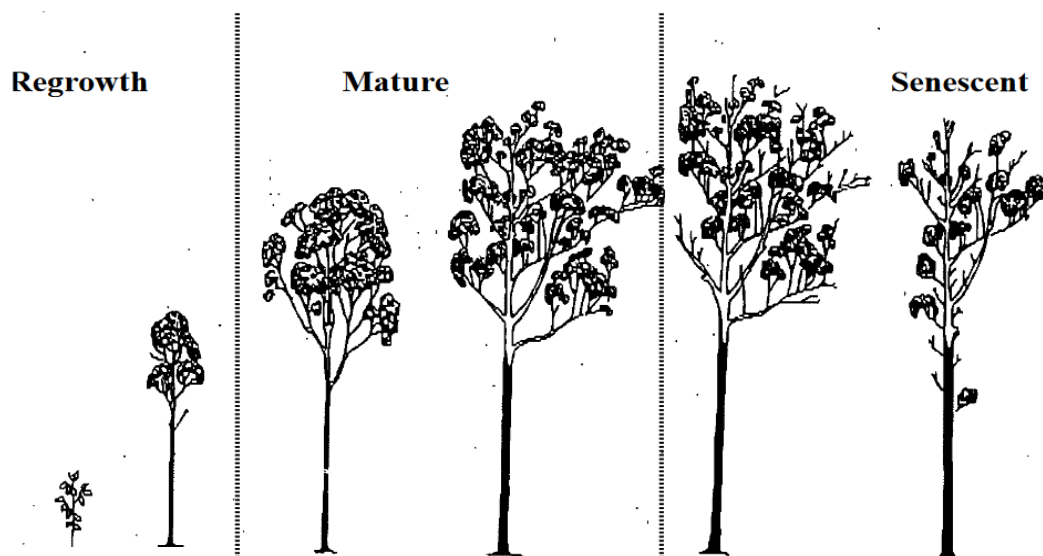
As identified by Resource and Conservation Division (1999):

The reliability of aerial photographic interpretation of growth stage details varies according to species, site conditions, quality of photography and interpreter experience and skill.



Process of identifying the successional stage of the mapped forest patches (DEC 2004).

Mapping was undertaken across public and private lands using 1:25,000 aerial photographs to identify the proportion of regrowth, mature and senescent tree crowns visible within patches of forests (polygons) with the same characteristics. The relative proportions of visible crowns of regrowth and senescent trees was used to indicate 'structural maturity'.



Characteristics associated with different growth stages and discernible from API of 1:25,000 colour photography (DEC 2004).

Some species display obvious evidence of age in their canopies, with dead and broken branches, and so are readily discernible from aerial photographs. Though some other species don't develop obvious dead branches in their canopies as they age, therefore more reliance needs to be put on the size and shape of their crowns in order to identify oldgrowth stands. As noted by the Resource and Conservation Division (1999):

Three interpretability classes were recognised; Easy, Difficult, and Special Case. ... Species assigned to the easy interpretability class exhibited a Jacobsian growth habit of trees. There generally was a resultant high confidence (across all site qualities) of interpreters in discriminating between the regrowth, mature and senescent growth stages for these species. Species assigned to the difficult interpretability class exhibited a Non - Jacobsian growth habit of trees and there was generally a resultant low confidence (across all site qualities) of interpreters in discriminating between the mature and senescent growth stages. The influence of site conditions on interpretability is pronounced for this interpretability class

TABLE. CLASSIFICATION OF FOREST ECOSYSTEMS TO INTERPRETABILITY CLASSES (RCD 1999)

Interpretability Class	UNE / LNE Forest Ecosystem
Easy	2, 7, 8, 11, 19, 20, 25, 26, 28, 29, 31, 32, 34, 36, 40, 44, 42, 45, 46, 48, 49, 52, 57, 59, 60, 62, 65, 67, 68, 69, 70, 72, 74, 78, 80, 81, 82, 83, 84, 85, 87, 88, 89, 90, 91, 92, 93, 94, 95, 100, 101, 102, 104, 105, 107, 110, 111, 117, 118, 123, 124, 127, 134, 135, 137, 138, 146, 148, 150, 152, 153, 154, 155, 156, 158, 162
Difficult	3, 6, 12, 13, 14, 15, 17, 21, 23, 27, 30, 33, 35, 37, 38, 39, 41, 43, 47, 50, 51, 54, 55, 56, 53, 61, 63, 73, 75, 79, 86, 97, 98, 99, 103, 106, 108, 109, 113, 114, 115, 116, 119, 122, 126, 128, 129, 130, 131, 133, 132, 139, 140, 145, 147, 157, 163
Special Case	5, 10, 16, 18, 22, 64, 66, 76, 77, 96, 112, 120, 121, 125, 141, 142, 143, 151, , 169 ,

On native State Forests (at that time) 45% of State Forests were identified as having easy interpretability, 43% were identified as having difficult interpretability and 12% were considered special case. The outcome was that higher levels of regrowth and lower percentages of senescent trees were accepted for the difficult interpretability classes:

TABLE: CRAFTI CROWN FORM AND GROWTH STAGE, INTERPRETABILITY & FOREST STRUCTURAL MATURITY CLASS CONVERSIONS (RCD 1999)

CRAFTI Crown Form Code & Growth Stage proportion				Structural Maturity Class	
General (Available over all tenures)	Regrowth	Senescing	Mature	Easy Interpretability Class	Difficult Interpretability Class
tA	0-10	30-100	0-70	Senescing	Senescing
tB	0-10	10-30	60-90	Older	Senescing
tC	0-10	0-10	80-100	Mature	Senescing
sA	10-30	30-100	0-60	Senescing	Senescing
sB	10-30	10-30	40-80	Older	Senescing
sC	10-30	0-10	60-90	Mature	Senescing
e	30-100	0-70	0-70	Young	Young

Disturbances were assessed from a combination of mapped disturbance histories (logging, burning, grazing) and a variety of indicators identified from aerial photographs: growth stage, relative stand density and specific disturbance indicators (logging, canopy gaps, weeds, dieback, roads etc). Disturbances were combined with the senescing growth stages to identify negligibly disturbed forests that qualified as candidate old-growth forest.

TABLE. DERIVATION OF OLD-GROWTH STATUS FOR UNE CRA REGION (RCD 1999)

Forest Structural Maturity Class	Old-growth Status (Derived Successional Stage)	
	Significant Disturbance level	Negligible Disturbance level
Senescing Forest	Disturbed Old Forest	Candidate Old-Growth Forest
Mature Forest	Disturbed Mature Forest	Mature Forest
Young Forest	Young Forest	Young Forest

Recently Disturbed Forest	Post - photo logged areas	not applicable
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Given that the NRC (2018) have decided to restrict oldgrowth to the classes tA and tB they have automatically excluded large areas of the difficult to interpret forest types from oldgrowth, without any review. Tables M and N in RCD (1999) show that by restricting oldgrowth to growth stages tA and tB it automatically deletes some 13% of oldgrowth forest in north-east NSW without any review.

2.3. NRC Remapping of Oldgrowth and Rainforest

The NRC decided to adopt the existing protocols that apply for the discredited remapping of oldgrowth and rainforest on private land, noting "*the Commission considers the PNF protocol is an appropriate foundation for remapping old growth forest in state forests, which was partly informed by candidate old growth mapping*".

The key issue is that they are only "*partially informed by candidate old growth mapping*". There are major changes in the identification criteria, with a significant narrowing of the criteria to automatically exclude large areas of previously mapped oldgrowth.

The trial remapping of oldgrowth and rainforest is simply a comparison of one technical mapping code definition with an entirely different definition, and has little to do with genuine API 'mapping errors', as has been claimed by the government as justification for this process. It is misleading to report that a 78% reduction in old growth spatial area across the trial site is a reflection of the mapping accuracy of the original data when a completely new and abridged technical definition is applied. In short, it is by limiting the definition dramatically that the trial has lead to oldgrowth forests 'disappearing' off the map. The reference to mapping errors is largely a smokescreen for an Orwellian change in definitions.

The NRC have engaged the discredited API branch of OEH to remap oldgrowth and rainforest using different decision rules and methodologies than were applied in the CRA. The clear intent is to wipe as much oldgrowth and rainforest off the map as possible.

The NRC repeatedly display their ignorance of the CRA process. For example they state "The JANIS criteria were established in 1993 by the JANIS Technical Working Group", when they were not adopted until after a far more convoluted process in 1997. Similarly they refer to "*For example, the extra 110,000 hectares of old growth protected as part of the 'icon' decision increases the numerator while the denominator remains the same as it was in the 1999 assessment*", though only a total of 65,000 ha of forest was protected at that time, with only some 20,000ha specifically protected because it was oldgrowth.

2.3.1. Oldgrowth Remapping

The NRC have comprehensively done over oldgrowth by changing the criteria and methodology for mapping it and changing the methodology for identifying and assessing its reservation status, in the process mapping 88% of oldgrowth out of existence and increasing the area of oldgrowth claimed to have met targets by 42%. The outcome of these multiple attacks is that of the 103,000 ha of protected oldgrowth on State forests, up to 58,600ha (57%) may be opened up for logging using the NRC's criteria and methodology..

The NRC have decided to apply the discredited mapping Protocol developed for Private Forests to public forests. This limits the growth stages that categorise their new oldgrowth to tA and tB, which encompass forests mapped with 0-10% Regrowth and >10% senescent trees visible from aerial imagery, which is a subset of the criteria used to map oldgrowth in the Comprehensive Regional Assessment.

It also needs to be recognised that the decision rules relating to >10% senescence and <10% regrowth (tA and tB) were specifically derived for attributes visible on the 1:25,000 'wet film' aerial photographs available at that time. The high-resolution ADS40 imagery now being used allows for greater visibility of under-canopy trees, and thus far more regrowth trees are visible than is the case with 1:25,000 aerial photos. It is plainly wrong to use decision rules developed for 1:25,000 aerial photos for very different imagery that allows a higher proportion of regrowth to be viewed. New mapping rules need to be developed specifically for ADS40 imagery that allows for a higher threshold for regrowth.

Changing the old growth definition without expert input is not a scientific and transparent way to assess and protect true old growth forests. Furthermore, it is completely unacceptable for the government to adopt the PNF protocols as a valid public land definition for old growth forest when they have been heavily discredited in the past. A simple spatial analysis shows that the PNF definition mapping codes equates to approximately 55% of the previous 'COG' spatial areas. The PNF protocol and re-mapping process has in the past been subject [to a quality assurance review](#) by the NSW Government due to serious concerns from the community and the review exposed serious flaws with the protocols.

The outcome of the review, by experts commissioned by the Department of Environment, Climate Change and Water showed that under the PNF Protocols there had been areas of PNF old growth forest made available for harvesting and that re-assessments were inconsistent and subjective. The Quality Assurance report states *The implementation of old-growth is highly variable and problematic and has apparently resulted in some areas of old-growth being potentially available for harvest* (Executive Summary - <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/pnf/ogrfreviewgeneral.pdf>).

The definition of old growth forest should reflect the definitions in the National Forest Policy and the JANIS criteria and encompass all elements including the biological, aesthetic and cultural values, including the functioning habitat from structural diversity across the landscape and the social values. The JANIS criteria explicitly defines that negligible disturbance effects will be evident in most forests by a significant proportion of trees with age – related features and a species composition characteristic of the ecologically mature forest ecosystem. The JANIS criteria recommends that structural, floristic and functional qualities should be the main focus in ecologically mature forests to assess negligible disturbance. This trial appear to apply an approach that rules out forest with minimal disturbance that no longer impacts on the structural and functional qualities of the ecologically mature forest . This is a major component of the new definition and the underlying criteria that has unmapped the existing old growth areas.

The proposed change to the minimum polygon size for mapping old growth is presented in the report as a way of 'adding' old growth into protection. In many of the examples given, it is likely that the 'new' 2ha polygons were actually part of a much larger polygon with a continuous crown pattern and less than 50% disturbance. Under this criteria, even with the application of the PNF protocol these areas would still qualify for old growth. The concern is that this will enable small patches to

be "cherry-picked" out of much larger stand with the intervening areas made available for logging. The introduction of the 2ha polygon size to protect tiny areas of forest that meet a significantly reduced code definition of old growth will be subject to increased edge effects and likely to be impacted by adjacent logging practices – this is a poor approach to protection within a compartment harvesting area.

The application of the NRCs new oldgrowth mapping methodology in their trial areas had the effect of ***"Across all the sites where old growth decreased, the aggregated area of old growth forest reduced by 88 percent"***.

NRC provided a table depicting their revised oldgrowth assessments. It was readily apparent that they have rorted the CRA process by combining oldgrowth in the Upper North East CRA region with oldgrowth in the Lower North East CRA region to derive targets across both regions, rather than retaining targets for each region. This is a fundamental change which contravenes the RFA process and has significantly affected regional target achievement

NRC state:

A total of 63 forest ecosystems in the upper north east and 84 forest ecosystems in the lower north east originally met RFA obligations to protect at least 60 percent of old growth forest in the reserve system. Any reassessment process should ensure these targets are maintained.

The NRC maintain *"The rapid assessment followed the original process used to derive old growth targets in 1999, although spatial datasets were updated to reflect changes to the reserve system since 1999"*. This is incredibly misleading as the NRC do not identify that they have aggregated oldgrowth targets across both regions. This fundamental change should have been clearly identified, and should not have been allowed.

The NRC identify that they have *"included some protections on private land since 2000, such as voluntary conservation agreements"*. Appendix 6 elaborates that they have included *"Crown reserves with a clear biodiversity protection intent"* and *"conservation agreements or regional property agreements on private land"* though they fail to identify the full range of land categories included, their extent and the levels of meaningful protection they provide to oldgrowth forest.

JANIS identifies that:

The CAR reserve system comprises areas of both public and private land that are reserved specifically for conservation purposes, and where the tenure of the reserved areas is secured by legislation or other methods appropriate for the area concerned

JANIS identifies that:

In situations where it is not possible or practicable to include conservation values into Dedicated Reserves, it is appropriate for areas to be reserved under other secure tenure or management arrangements (e.g., within approved forest management plans). In practice such areas should be set aside specifically for conservation purposes and meet the following principles:

- *they are established in approved management plans and managed accordingly;*
- *there is an opportunity for public comment on changes to reserve boundaries;*
- *they are able to be accurately identified on maps;*
- *they are of an area and design sufficient to maintain the values they seek to protect.*

And for private land JANIS requires:

The NFPS establishes that the CAR reserve system should in the first instance be selected from public land. ...

A number of strategies are appropriate for protecting biodiversity on private land, ranging from purchase of priority areas to the development of incentives for the establishment of mechanisms to ensure protection, such as covenants on leasehold and freehold lands. For example, a covenant should be binding on successors in title and that appropriate management intent should be demonstrated before the area concerned could be considered to be part of the CAR reserve system.

The NRC are effectively attempting to swap oldgrowth forest protected in Informal Reserves on public land for oldgrowth provided with nebulous protection on other Crown lands and on private land. These other tenures provide lesser level of protection than those oldgrowth forests currently in informal reserves on State Forests, which is a lesser level of protection than they currently have. From the limited information provided it is impossible to tell whether these have the required level of protection The NRC has not *demonstrated* that *the areas concerned could be considered to be part of the CAR reserve system* This shoddiness should be considered unacceptable in a professional assessment,

The NRC claim that with their additional areas they have increased the area of oldgrowth considered to be reserved by 10%.

As a result of the NRCs target resetting there is a significant difference between the area of oldgrowth on State Forest identified as being over-target, increasing from 46,886 ha identified in the CRA to 66,606 ha identified by the NRC (2018 Table 3), which is a 42% increase, with a 63% increase in the Upper North East and 13% increase in the Lower North East,

Oldgrowth on State Forest, showing commercial and low-commercial oldgrowth, with the loggable area identified on the basis of 88% being mapped away.

Region	Oldgrowth Total (ha)	Oldgrowth Over Target Commercial			Oldgrowth Over Target Low Commercial				
		Loggable (ha)	Loggable (%)	Loggable (%)	Loggable (ha)	Loggable (%)	Loggable (%)		
UNE	61372	2289	9	20151	32.8	2144	9	18875	30.8
LNE	41746	6565	1568	5777	13.8	8	13805	33.1	
TOTAL	103118	2946	4	25928	25.1	3713	7	32681	31.7

(note there is a discrepancy between the figures for commercial forests identified here and those provided in figure 11 which has not been resolved)

Based on the data used to derive the NRC map "Figure 11: Location of commercial and non-commercial old growth forest ecosystems within north coast state forests that exceed the 60 percent JANIS old growth target" presented above, and the potential loss of 88% in the remapping process, the potential loss of oldgrowth forest is massive. There are currently over 103,000 ha of protected

oldgrowth on State forests, of which up to 58,600ha (57%) may be opened up for logging using the NRC's criteria and methodology.

2.3.2. Misrepresenting Mapped Oldgrowth

It is unbelievable that the NRC pretend that the subset of mapped oldgrowth identified as HCV Oldgrowth is the only oldgrowth that was mapped in the CRA. They use this misrepresentation to repeatedly claim they found significant areas of "new" oldgrowth where none was mapped, for example summarising "*In four of the 13 sites, the reassessment identified old growth forest but largely outside the currently mapped areas ... At one site, the reassessment found old growth forest where there is currently none mapped*". A review of the mapping clearly shows that oldgrowth was previously mapped in the vast majority of areas the NRC claim to have found "new" oldgrowth forest (there were only a few small exceptions and these were not subject to ground truthing). The problem is that they were not identified as HCV Oldgrowth and subsequently protected..

The NRC's pretence that the subset of mapped oldgrowth forest identified as HCV oldgrowth is the oldgrowth as mapped in the CRA is astounding and deliberately misrepresents the truth in order to mislead the reader into thinking that there is something to gain from their remapping. The NRC repeated claims to have mapped "new" oldgrowth where it wasn't identified before are mostly blatant lies intended to help justify their remapping of oldgrowth out of existence.

As another example the NRC claim "*More accurate mapping of old growth forest and rainforest will increase the protection of environmental values. Under the existing settings, between 0 percent and 15 percent of old growth forest was protected at some sites, while between 85 percent and 100 percent of actual old growth forest was not protected and therefore potentially harvestable*".

It is intentionally misleading of NRC to pretend that the reason the additional oldgrowth was not protected was because it was not mapped as oldgrowth, when in reality it was already mapped as oldgrowth, though it was not protected because it did not meet the criteria for HCV.

I asked the NRC about this: "*Why did you limit your comparison to just HCV Oldgrowth, rather than all mapped oldgrowth, particularly when most of your "new" oldgrowth was already actually mapped as oldgrowth?*"

Though the NRC (intentionally?) missed the point, responding "*The HCVOG layer is considered the best available information on OG reserved on state forests, and is the basis for the statutory recognised special management zones. The previous CRAFTI mapping project identified 'candidate' OG, which an expert review at the time was found was inaccurate and recommended steps to improve*".

2.3.3. High Conservation Value Oldgrowth Forest

On State Forests a subset of oldgrowth was identified for protection as High Conservation Value Oldgrowth under criteria decided by the NSW agencies. This is comprised of High Quality Habitat Oldgrowth (HQHOG), and oldgrowth forest identified as having a high 'summed irreplaceability' value based upon the sum of the reserve targets and reserve priorities of all the entities within it. These forests were high priorities for inclusion in the reserve system because of a multitude of values irrespective of the presence of oldgrowth.

The NRC acknowledge the criteria of HQHOG, though ignore it in their assessment. Though they seem to be oblivious to the 'summed irreplaceability' criteria and neither mention it or do anything to consider the multitude of values that contributed to the identification of High Conservation Value Oldgrowth forest.

CRA reserve Target Achievement of Forest Ecosystems occurring within NRC remapped oldgrowth forest.

	API Interpretability	Ecosystem Target Achievement in Formal Reserves (2004)	Original Oldgrowth Target Area	OEH Percent Oldgrowth in Formal Reserves 2004	NRC Percent Old Growth reserved (all) (revised)
UNE					
33 Dry Foothills Spotted Gum	Easy	100	23,960	54.9	44.8
34 Dry Grassy Blackbutt-Tallowwood	Easy	74%	689	77.9	70.6
48 Escarpment Scribbly Gum-Apple	Easy	100%	1923	54.5	100
55 Foothills Grey Gum-Spotted Gum	Difficult	87%	897	64	79.3
59 Gorge Ironbark-Grey Gum	Easy	100	16307	74.4	NA
67 High Elevation Ferny Blackbutt	Easy	100	1194	76.9	100
84 Mid North Coast Wet Brushbox-Tallowwood	Easy	100	1891ha	98.2	100
89 Moist Foothills Spotted Gum	Easy	100	8,467	60.7	77.2
93 Montane Stringybark-Gum	Easy				100
100 Northern Grassy Sydney Blue Gum	Easy	66	1958	100	NA
103 Northern Wet Brushbox	Difficult	100	2844	93.2	NA
105 Nymboida Tallowwood-	Easy	100	770	100%	73

Turpentine						
106 Open Coastal Brush Box	Difficult	88.3	1116	58.7	72	
109 Open Shrubby Brushbox- Tallowwood	Difficult	100	4207	62.5	81.5	
135 South Coast Tallowwood-Blue Gum	Easy	100	770	100	84	
153 Wet Coastal Tallowwood- Brushbox	Easy	25.3	187	42.8	68.7	
157 Wet Shrubby Brushbox- Tallowwood	Difficult	100	1403	100	100	
LNE						
32 Dry-Foothills Blackbutrt- Turpentine	Easy	61.7	5092	39.5	90.5	
34 Dry Grassy Blackbutt- Tallowwood	Easy	37.3	5620	38.3	70.6	
36 Dry Grassy Tallowwood-Grey Gum	Easy	89.1	34606	54.3	98.3	
65 Heathy Scribbly Gum	Easy	100	7178	100	100	
67 High Elevation Ferny Blackbutt	Easy	100	7177	100	100	
83 Mid Elevation Wet Blackbutt	Easy	100	983	68.4	100	
103 Northern Wet Brushbox						NA
106 Open Coastal Brushbox	Difficult	91.8	8142	77.4	72	
112 Paperbark	Special Case	99.5		?	0	
155 Wet-Foothills Blackbutrt- Turpentine	Easy	100	4882	60.8	100	
157 Wet Shrubby Brushbox-	Difficult	100	7410	98	100	

Tallowood

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The first decision step in NRCs remapping is:

Does the special management zone within the compartment have a majority of forest ecosystems exceeding old growth targets?

The NRC ignore the presence of inadequately reserved oldgrowth ecosystems within their criteria and in their trial areas. Seven of the 13 trial areas have no or minor areas with oldgrowth ecosystems achieving targets, though in keeping with their shoddy assessment they ignore these inadequately reserved ecosystems. Two of the areas contain oldgrowth ecosystems that are likely to be below regional oldgrowth ecosystem targets, yet these are masked by the NRCs aggregations of regions. Four areas include difficult to interpret forest ecosystems which limits their identification as oldgrowth because of NRCs reduced mapping criteria. Six of the areas have forest ecosystems below JANIS ecosystem targets, though again NRC ignore this. In four areas NRC falsely pretend to have mapped "new" oldgrowth forest, though it was mapped in the CRA.

Bizarrely, the NRC report invents a new category of older forest values that it is calling 'high quality habitat', but without any clear definitions and without any clear outcomes as to how it will be managed. They indicate in the pathway in Figure 22 that such areas may be made available for logging as FMZ3b. They suggest this could be the outcome for an area like Clouds Creek 167 – which even they acknowledge has areas of up to 40% senescence and which is a vital corridor connecting two parts of the CAR reserve system. In short, this is a fop which offers no genuine protection.

The proposed environmental values assessment is flawed and appears to have cherry picked small parts of the Biodiversity Assessment Method (BAM) which is now the standard for assessment of impacts due to land clearing, logging or development. There can not be an adequate assessment of impact of proposed logging in protected areas with only a handful of features that appear to be selected from the BAM because they are simple and easy to assess during field assessment. This is yet more evidence that the framework for reassessment has simply been designed as a convenient tool for releasing protected areas to harvesting. The assessment of environmental values presented in Appendix 5 falls far short of a proper assessment of the impact to the revocation of protected areas in the CAR reserve system.

There are a multitude of values that contributed to these oldgrowth forests being identified as HCV oldgrowth though the NRC ignore all these.

The NRC's assessment is shoddy, inadequate and amateurish. If this is anything like what they are intending to do as a pretence for opening up oldgrowth forest for logging then it has no hope.

2.3.4. Rainforest

There are currently 81,567ha of mapped rainforest protected within the north-east NSW Informal Reserve system. The NRC trial resulted in 62% of mapped rainforest being identified for logging. Based on this 50, 571 hectares of mapped rainforest could be opened up for logging.

The proposed rainforest definition allows for rainforest ecosystems with increased emergents to become available for logging. This overturns previous ecological definitions and is a quantum leap backwards for a state that first moved to protect rainforest in 1982.

The NRC have similarly used a different definition of rainforest than what was applied in the CRA, with NRC noting:

... the current definition of rainforest used in the PNF protocol differs from the one used to identify rainforest in the Comprehensive Regional Assessments (CRAs) undertaken for the RFAs. The primary difference is that the PNF definition excludes areas with emergent non-rainforest species that exceed 30 percent of the upper crown cover. The PNF definition currently uses the following definition of rainforest:

'Rainforest is tree-dominated vegetation where the tree stratum (over 3 metres in height) which has the greatest crown cover has rainforest species making up 50 percent or more of the crown cover, except where non-rainforest emergent species (including brushbox and turpentine) occur and exceed 30 percent or more of the upper stratum crown cover. Rainforest includes all areas of rainforest mappable at a 1:25,000 scale. Rainforest also includes areas exceeding 0.5 hectares as isolated clumps or linear strips of rainforest trees.'

There is a simpler rainforest definition used for private properties that encompasses both rainforest (as defined in the RFA) and Lowland Rainforest. The 2004 DEC/DIPNR Field Guide "Identification of Rainforest" defines rainforest as:

Rainforest is tree-dominated vegetation where the tree stratum with the greatest crown cover (not necessarily the tallest stratum) has rainforest species making up 50% or more of the crown cover. This stratum is usually, but not always, closed (with a projective foliage cover greater than 70%).

The Field Guide also specifies that "*species such as Brush Box (Lophostemon confertus) and Blackwood (Acacia melanoxylon) are rainforest species*".

2.3.5. Difficult to interpret Growth Forms

It is important to recognise that trees react differently to ageing, displaying varying levels of senescing identifiable as dead branches visible in their crown when they reach old age. Some tree species show no visible evidence of senescence in their crowns. This needs to be taken into account when mapping oldgrowth as was done in the CRA. The NRCs mapping ignores this requirement, effectively excluding many oldgrowth forests from being mapped.

On behalf of NCC, John Edwards and myself attended an EPA workshop on oldgrowth delineation in the Private Native Forestry PVP process on 22 November 2012. It was alarming that OEH's Science Division (SD) were refusing to map oldgrowth of species not displaying senescent characteristics typical of Blackbutt. I reported to the EPA (Pugh 2012):

Growth-staging is based on the typical growth stages of Blackbutt and the presence of dead branches and uneven crowns in senescent trees. These are what are used to define oldgrowth trees and thus oldgrowth forests. These characteristics are shown to varying degrees by eucalypts, but not by non-eucalypts such as Brush Box, Turpentine and some Angophoras. This has been identified as a key issue for over 20 years in the north-east forests. Despite this, SD still had no decision rules for identifying oldgrowth stands of these forest types. ...

...

Given that SD have no decision for forest types showing atypical growth forms there are real concerns that significant stands of oldgrowth forests, particularly those dominated by Brush Box and Turpentine, are being missed. It was recommended that decision rules to delineate the oldgrowth stage for these species be developed urgently.

It is disgusting that the current rules still do not allow for species not displaying obvious signs of senescence in their canopies. This was the reason that the CRA adopted different API decision rules for different interpretability classes (which OEH seem not to understand). The refusal to rectify the decision rules all these years later displays a high level of antipathy towards protecting oldgrowth forest.

I asked NRC about this: "Given your reliance upon just tA and tB how have you accounted for forest ecosystems dominated by trees displaying a Non - Jacobsian growth habit and thus not readily exhibiting evidence of senescence in their crowns? Are these automatically discounted?". OEH science responded on behalf of NRC:

The current PNF protocol requires the classification to consider only tA or tB classes. ... OEH recognise that non-Jacobsian growth forms are typically discounted from consideration for old growth status. The original CRAFTI manual that the PNF protocol was derived from, did not deal with non-Jacobsian Old Growth either. This situation would have been an issue for some of the original CRA mapping. In practice, OEH take account of location and species in determining growth stage characteristics and have tried to address non-Jacobsian issues where they arise such as Brushbox communities. The issue of atypical growth forms can be considered during the development of the refined assessment method for the future work".

It is absolutely incredible that for over a decade OEH science have simply been refusing to identify oldgrowth stands which have a high proportion of species (i.e. Brush Box, Turpentine and some Angophoras) not exhibiting obvious senescence. They told me in 2012 that they would rectify the problem, and now they are saying they may rectify it sometime in the future, meanwhile they are merrily remapping oldgrowth forest as non-olgrowth so that it can be logged. OEHs antipathy towards oldgrowth is extreme, and has been a significant factor responsible for the deletion of some oldgrowth stands in the NRC reassessment..

2.3.6. Disturbance

The old growth definition should not be reduced to reflect old growth forest with no evidence of human occupation but broadened to allow for a definition that encompasses the ecological and scientific values of these highly diverse structural forests including the habitat values for hollow dependant threatened species. The CRA old growth expert panel defined negligible disturbance as disturbance which allowed the forest to remain structurally intact and functional as ecologically mature forest.

As noted by the NRC:

Evidence of human interaction with forests may be important for social definitions of old growth, but is less important for ecological definitions. Given the history of human interaction with forests on the north coast, it is likely that a number of forests that display structural traits of old growth have been previously disturbed

It was also concerning that from the brief field inspection on 22 November 2012 of 2 sites selected by OEH it was apparent that:

"The selection of field transects and plots for verification is extremely problematic as they are chosen subjectively and in at least one case (if not both) plots were located outside the mapped polygon. The assessment of significant disturbance appeared to have been wrongly assessed on one of the three plots inspected within mapped oldgrowth and another was dubious. Based on the small sample reviewed it is not considered that field verification is undertaken in a rigorous or objective manner".

The field inspection of compartment 167 in Clouds Creek State Forest undertaken for this submission confirms that the transect methodology employed by OEH is still grossly inadequate and misleading.

2.4. Review of NRC Trial Sites

The NRC states:

The pilot process was applied to 13 sites in total. Three were assessed in December 2017, using both desktop and field validation components. A further 10 sites were assessed in January 2018, seven using both desktop and field components, and three via desktop assessment only, due to access issues, work health and safety considerations, and time constraints.

It is apparent that the 13 sites selected for review by NRC were chosen subjectively, specifically because they were considered to have mapping errors. Eight were specifically chosen by the Forestry Corporation because they considered that the oldgrowth was over-mapped. As most of these were the worst examples that the Forestry Corporation could find they can in no way be considered representative sites and it is therefore invalid for NRC to extrapolate from them to make assumptions about the overall mapping as if they were randomly selected representative sites. The NRC should know better.

It is inexplicable as to why the NRC chose these trial areas as most of them don't satisfy the claimed basic criteria of being mostly below oldgrowth ecosystem targets. Four areas have no forest oldgrowth ecosystems that achieve NRC targets, and 3 only have a minority of oldgrowth ecosystems achieving targets. At least one other is likely to have a minority of oldgrowth ecosystems achieving regional targets, except for the NRC ignoring regional boundaries. Four include difficult to interpret forest ecosystems. Six have forest ecosystems below JANIS ecosystem targets, though NRC ignore this. Four falsely pretend to have mapped "new" oldgrowth forest, Specifically:

- No ecosystems achieve NRC oldgrowth targets: **Ewingar State Forest** Cmpts 635 and 637, **Kangaroo River State Forest** Cpt 234, **Lower Bucca State Forest** Cpt 600, **Mistake State Forest** Cpt 341
- Minority of ecosystems achieve NRC oldgrowth target: **Dalmorton State Forest** Cmpt 406 (1), **Clouds Creek State Forest** Cpt 167 (1), **Nambucca State Forest** Cpts 320 and 321
- Majority of ecosystems achieve NRC oldgrowth targets: **Wild Cattle Creek State Forest** Cpt 515, **Irishman State Forest** Cpt 205 (?), **Kippara State Forest** Cpt 18, **Bellangry State Forest** Cmpt 11 (?)
- All ecosystems achieve NRC oldgrowth targets: **Clouds Creek State Forest** Cpt 124, **Girard State Forest** Cpt 52

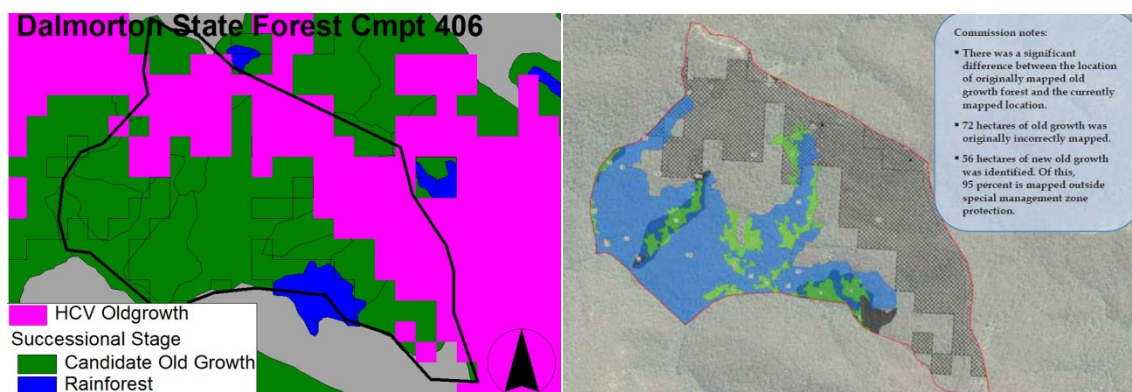
- Includes Forest Ecosystems below ecosystem targets: **Clouds Creek State Forest** Cpt 167, **Lower Bucca State Forest** Cpt 600, **Mistake State Forest** Cpt 341, **Nambucca State Forest** Cpts 320 and 321, **Kippara State Forest** Cpt 18, **Bellangry State Forest** Cmtpt 11.
- Contain difficult to interpret ecosystems: **Ewingar State Forest** Cmpts 635 and 637, **Kangaroo River State Forest** Cpt 234, **Lower Bucca State Forest** Cpt 600, **Irishman State Forest** Cpt 205

A brief review of the NRC sites identifies:

Girard State Forest Cpt 52. No site visit conducted, so no validation. 7ha of "new" oldgrowth identified (below the 10ha threshold) though with no ground-truthing. Questionable as to why this was included as it had no mapped oldgrowth. Originally mapped as tA and tB, presumably not counted as oldgrowth because of forestry disturbance history. Entirely 93 Montane Stringybark-Gum, which achieves NRC oldgrowth ecosystem targets,

Ewingar State Forest Cmpts 635 and 637. No site visit conducted, so no validation. 47ha of oldgrowth identified, 253 ha deleted - mixture of tA and tB. No ground-truthing. FE 33 Dry Foothills Spotted Gum, some 89 Moist Foothills Spotted Gum, some 109 Open Shrubby Brushbox-Tallowwood. Open Shrubby Brushbox-Tallowwood is a difficult to interpret ecosystem and would have affected outcomes. None of these oldgrowth ecosystems are considered by NRC to be adequately reserved for oldgrowth.

Dalmorton State Forest Cmpt 406. Claimed that 72ha of oldgrowth was incorrectly mapped and 56 ha of "new" old growth identified. This is incorrect as almost the whole compartment was originally mapped as oldgrowth - tA and tB, though only part was included as HCV Oldgrowth. NRC simply re-mapped an existing area of oldgrowth outside the HCV oldgrowth. Logging history (Manhist, WRS) has the whole compartment logged in 1979. Mostly FE 33 Dry Foothills Spotted Gum, some 89 Moist Foothills Spotted Gum, some 157 Wet Shrubby Brushbox-Tallowwood, 103 Northern Wet Brushbox. Only Wet Shrubby Brushbox-Tallowwood is considered by NRC to be adequately reserved for oldgrowth, with Northern Wet Brushbox unassessed by NRC.



LEFT: Original mapping of oldgrowth forest and HCV Oldgrowth. RIGHT: NRCs remapping (blue is oldgrowth).

The NRC lie when they state "*There was a significant difference between the location of originally mapped old growth forest and the currently mapped location*". While it is correct

that they mapped less oldgrowth than originally, none of the area mapped by them had not been mapped before.

Clouds Creek State Forest Cpt 167. Claimed that 102 hectares of oldgrowth incorrectly mapped. Mapped as sA, tB and tA. Manhist has it unlogged while WRS has it logged 1985. Mostly FE 33 Dry Foothills Spotted Gum, some 89 Moist Foothills Spotted Gum, 48 Escarpment Scribbly Gum-Apple, 59 Gorge Ironbark-Grey Gum, 100 Northern Grassy Sydney Blue Gum. Northern Grassy Sydney Blue Gum is an inadequately reserved forest ecosystem. Only Escarpment Scribbly Gum-Apple is considered by NRC to be adequately reserved for oldgrowth, with Gorge Ironbark-Grey Gum and Northern Grassy Sydney Blue Gum unassessed by NRC.

The transect is placed in an area that is not representative of other areas in the compartment. However, almost the entire oldgrowth area has been removed based on that transect. There is an extremely high level of senescence indicating high quality old growth habitat and function in this compartment. The compartment is located within a large area of protected landscape corridor extending from Nymboi-Binderay national Park in the South to Hortons Creek Nature Reserve in the north. Other areas within this currently protect corridor appear to have similar levels of habitat values, old growth and a high density of hollow bearing trees. This corridor is a highly functional, representative and essential part of the existing CAR reserve system and should not be compromised given the current conservation status of hollow dependant fauna.

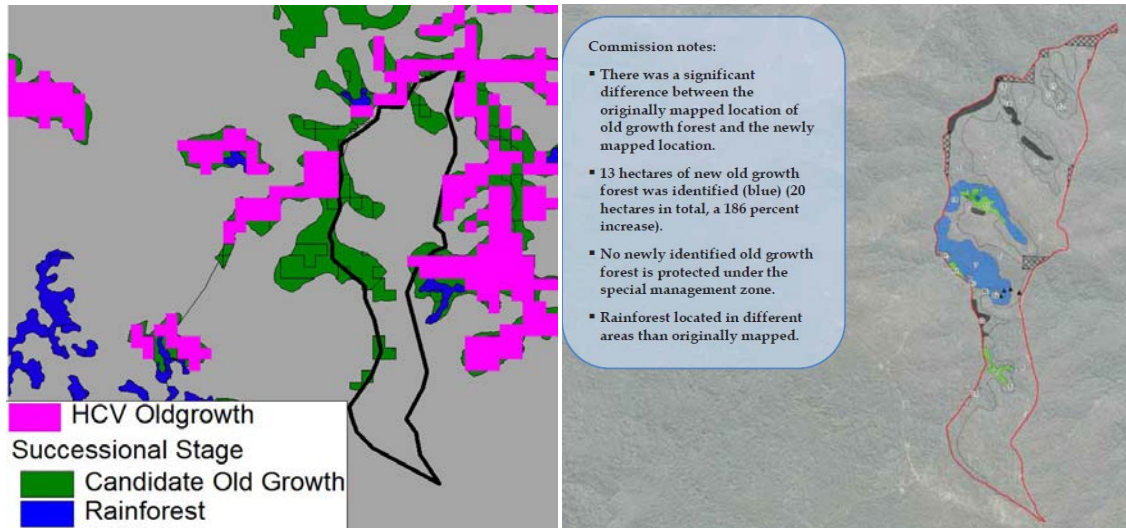
(see Field truthing of Clouds Creek 167 below)

Clouds Creek State Forest Cpt 124. 12 ha oldgrowth retained, 79ha deleted. Mapped sA (including retained og) and tA, some tB. Manhist and WRS have logged 1985. Mostly 84 Mid North Coast Wet Brushbox-Tallowwood, some 67 High Elevation Ferny Blackbutt. Both considered by NRC to be adequately reserved for oldgrowth.

The transect was placed in area that was not representative of the mapped oldgrowth area.

Wild Cattle Creek State Forest Cpt 515. 112ha of oldgrowth deleted. Mapped tA. Mostly 84 Mid North Coast Wet Brushbox-Tallowwood, 67 High Elevation Ferny Blackbutt, 105 Nymboida Tallowwood-Turpentine, 157 Wet Shrubby Brushbox-Tallowwood, 135 South Coast Tallowwood-Blue Gum. Nymboida Tallowwood-Turpentine and South Coast Tallowwood-Blue Gum considered by NRC to be inadequately reserved for oldgrowth.

Kangaroo River State Forest Cpt 234. 13ha of "new" oldgrowth identified. These two stands were mostly mapped as tA, candidate oldgrowth with negligible disturbance in the CRA and were probably not protected because less than 10 ha. Mostly 33 Dry Foothills Spotted Gum, 89 Moist Foothills Spotted Gum. 106 Open Coastal Brush Box, 55 Foothills Grey Gum-Spotted Gum. All NRC inadequately reserved oldgrowth ecosystems. Open Coastal Brush Box and Foothills Grey Gum-Spotted Gum difficult to interpret.

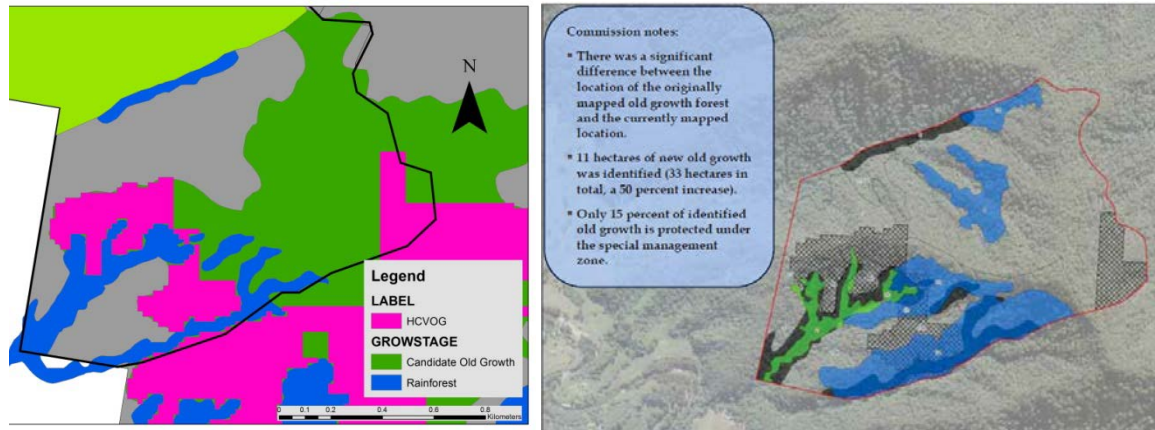


LEFT: Original mapping of oldgrowth forest and HCV Oldgrowth. RIGHT: NRCs remapping (blue is oldgrowth).

The NRC lie when they state "There was a significant difference between the location of originally mapped old growth forest and the currently mapped location" and "13 hectares of new old growth forest was identified (blue) (20 hectares in total, a 186 percent increase)". While it is correct that they mapped a thin sliver of oldgrowth that had originally not been mapped (below threshold size), most of the area mapped by them had not been mapped before.

Lower Bucca State Forest Cpt 600. 85ha of oldgrowth deleted. Mapped as tC and HCV oldgrowth. Mostly 106 Open Coastal Brush Box, 55 Foothills Grey Gum-Spotted Gum, some 153 Wet Coastal Tallowwood-Brushbox, 89 Moist Foothills Spotted Gum. Foothills Grey Gum-Spotted Gum is an inadequately reserved forest ecosystem. Open Coastal Brush Box and Wet Coastal Tallowwood-Brushbox are difficult to interpret, and are inadequately reserved forest ecosystem. All NRC inadequately reserved oldgrowth ecosystems,

Irishman State Forest Cpt 205. This was a desktop only assessment with no field validation. Part of a larger area mapped tA and sA, only part of which was translated to HCV in the FMZ zoning. Mostly 155 Wet Foothills Blackbutt-Turpentine, some 83 Mid Elevation Wet Blackbutt, 67 High Elevation Ferny Blackbutt, 106 Open Coastal Brushbox, and 157 Wet Shrubby Brushbox-Tallowwood. . Open Coastal Brush Box and Wet Shrubby Brushbox-Tallowwood are difficult to interpret. Wet Foothills Blackbutt-Turpentine, Mid Elevation Wet Blackbutt are identified by NRC as meeting oldgrowth ecosystem targets, though are unlikely to on a regional basis. High Elevation Ferny Blackbutt and Wet Shrubby Brushbox-Tallowwood meet NRC oldgrowth targets.



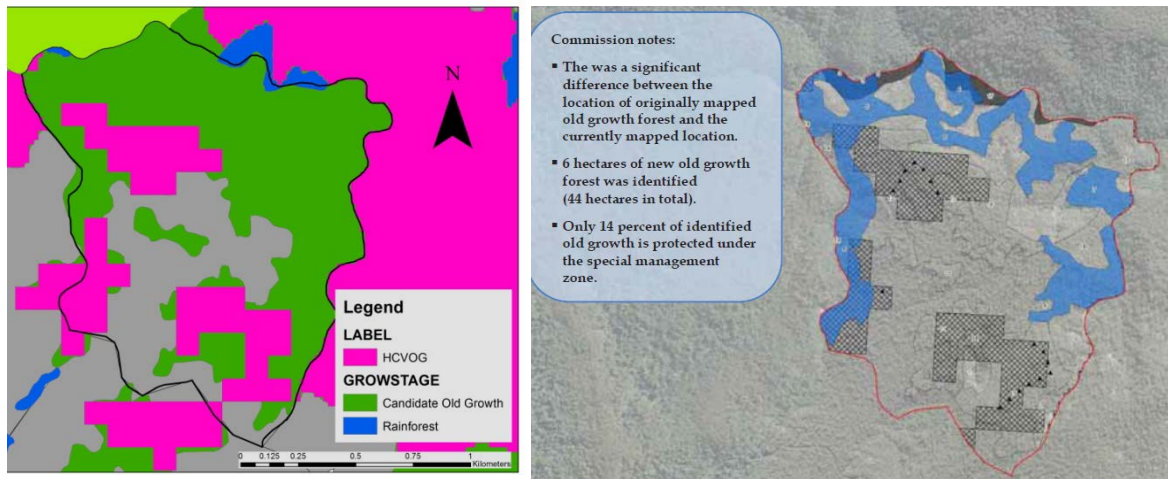
LEFT: Original mapping of oldgrowth forest and HCV Oldgrowth. RIGHT: NRCs remapping (blue is oldgrowth).

The NRC lie when they state *"There was a significant difference between the location of originally mapped old growth forest and the currently mapped location"* and *"11 hectares of new old growth was identified (33 hectares in total, a 50 percent increase)"*. While it is correct that they mapped some "new" oldgrowth than originally, only a small part of the area claimed as "new" by them had not been mapped before.

Mistake State Forest Cpt 341. 2ha of oldgrowth deleted. Part of a larger area mapped tA and tB, only part of which was translated to HCV in the FMZ zoning. Ridiculous sample, 3 small parts of a larger stand in adjacent compartment with gridcell boundary - likely just an artefact. Mostly 36 Dry Grassy Tallowwood-Grey Gum. Dry Grassy Tallowwood-Grey Gum is an inadequately reserved forest ecosystem and does not meet NRC oldgrowth ecosystem targets..

Nambucca State Forest Cpts 320 and 321. 130ha of oldgrowth deleted. Mostly sA, some tA. Mostly 34 Dry Grassy Blackbutt-Tallowwood, some 65 Heathy Scribbly Gum and 112 Paperbark. Dry Grassy Blackbutt-Tallowwood is an inadequately reserved forest type. Heathy Scribbly Gum only one to meet NRC oldgrowth ecosystem targets.

Kippara State Forest Cpt 18 6ha of "new" oldgrowth identified (44ha in total). All the "new" oldgrowth was mapped as oldgrowth in the original mapping - tB, though only a subset was chosen as HCVOG. FE Deleted mostly 67 High Elevation Ferny Blackbutt, Added mostly 121 Rock, some 155 Wet-Foothills Blackbutrt-Turpentine, 32 Dry-Foothills Blackbutrt-Turpentine. Dry-Foothills Blackbutrt-Turpentine is an inadequately reserved forest ecosystem. High Elevation Ferny Blackbutt and Wet-Foothills Blackbutrt-Turpentine meet NRC oldgrowth ecosystem target.



LEFT: Original mapping of oldgrowth forest and HCV Oldgrowth. RIGHT: NRCs remapping (blue is oldgrowth).

The NRC lie when they state "*There was a significant difference between the location of originally mapped old growth forest and the currently mapped location*" and "*6 hectares of new old growth forest was identified*". While it is correct that they mapped less oldgrowth than originally, none of the area mapped by them had not been mapped before.

Bellangry State Forest Cmpt 11. All oldgrowth deleted. Mapped as tB. FE Deleted mostly 67 High Elevation Ferny Blackbutt, some 155 Wet-Foothills Blackbutrt-Turpentine, 32 Dry-Foothills Blackbutrt-Turpentine. Dry-Foothills Blackbutrt-Turpentine is an inadequately reserved forest ecosystem. High Elevation Ferny Blackbutt meets NRC oldgrowth ecosystem target. Wet-Foothills Blackbutrt-Turpentine meets NRC oldgrowth ecosystem target, though it is unlikely to meet regional target.

2.4.1. Field truthing of Clouds Creek 167

As part of this assessment, we ground truthed the re-mapping conducted in the NRC trial at Clouds Creek 167. Our field work confirmed that the areas that were re-mapped were predominantly oldgrowth forest dominated by senescent trees. The assessment of disturbance in the NRC field transect appears to be flawed, and inconsistent even with the PNF protocol. The protocol indicates that older logging is only significant there are stumps greater than 40cm dbh which is accompanied by *visible* disturbance to the canopy in the form of canopy gaps plus regrowth clusters or native pioneers or woody weeds. The NRC recorded numerous points in their transect as significant disturbance, however our field work which intersected their transect in a number of places, revealed older logging of non-dominant, smaller stems at a low density. In the majority of cases, this was not visible disturbance to the canopy, frequently included stumps <40cm dbh and was not associated with visible canopy gaps and regrowth.

The NRC report itself admits that this compartment had >40% senescence. Our fieldwork revealed that it was largely dominated by trees between 1m dbh up to 2m dbh. In the vast majority of the area, disturbance was negligible. The vast majority of the area clearly meets the JANIS definition of oldrowth forest. Below are a number of photos taken during the field trip which reveal the high levels of senescence, the outstanding habitat value, and the small size of many of the older stumps.







Caption: Very small stumps from old logging, very large senescent trees still standing.

3. Stream Buffers

Headwater streams are of overwhelming importance for catchment health as this is where most of the interaction between the terrestrial and aquatic realms occurs. The science is that we should be establishing buffers at least 30m wide around these headwater streams. The NSW Government's intent is to reduce already inadequate buffers around headwater streams from 10m down to 5m.

The riparian zone is the interface between a stream (and other waterbodies) and land through groundwater, subsurface flows and flooding. The riparian zone can be considered to encompass the entire extent of a stream's floodplain. Riparian vegetation has a direct influence on streams and is influenced by streams.

Hansen *et. al.* (2010) note:

The riparian zone (riparia) is the interface between aquatic and terrestrial environments (Naiman and Décamps, 1997) and it mediates the flow of energy, and physical and biotic vectors between the two (Lake, 2005, Naiman et al., 2005). Consequently, riparia are often environments of exceptionally high diversity. The importance of intact riparian zones is universally acknowledged as critical to aquatic-terrestrial ecosystem function and ultimately, to waterway health.

Riparian vegetation is enhanced by increased soil moisture, increased humidity and nutrients from flood events. They provide resources for a broad range of fauna, especially during droughts. Numerous species are primarily associated with riparian habitats for at least part of their life-cycles, this includes a multitude of plants and invertebrates, most frogs and tortoises, some lizards and birds, and a few mammals (ie Platypus, Water Rat and Fishing Bat). Riparian vegetation also regulates the health and functioning of aquatic ecosystems, is the basis of aquatic food chains in upper catchments, and provide the branches and logs that structure many instream habitats for numerous aquatic invertebrates and many fish.

The health of streams is directly related to the health and functioning of riparian vegetation. Riparian buffers serve several functions:

- shading of streams and minimising fluctuations in water temperatures
- reducing the volumes of overland flows entering streams
- trapping sediments and associated pollutants moving from upslope towards streams
- maintenance of stable stream banks and channels;
- providing wood, leaf litter, fruits, flowers, insects and other resource inputs to streams;
- maintenance of habitat requirements for many aquatic and terrestrial species; and,
- provide corridors for the movement of a suite of terrestrial species.

The key threatening process declaration under the *Fisheries Management Act 1994* for 'degradation of native riparian vegetation along New South Wales water courses' states:

1. Riparian vegetation refers to the vegetation fringing water courses and can be defined as any vegetation on land which adjoins, directly influences, or is influenced by a body of water. Riparian habitats thus include land immediately alongside large and small creeks and rivers, including the river bank itself; gullies and dips that sometimes run with surface water; areas around lakes; wetlands on river floodplains that interact with the river in times of flood.

...

4. Degradation of riparian vegetation has a major influence on stream ecosystems by;

- *Increasing the amount of sediment and nutrients reaching streams as runoff, and increasing light penetration of the water body. These inputs have the combined effect of smothering benthic communities and increasing harmful algal growth.*
- *Reducing the inputs of organic carbon, via leaves, twigs, and branches. Terrestrially derived carbon inputs are the major energy source in most stream ecosystems.*
- *Reducing the amount of large woody debris entering the aquatic ecosystem and thereby negatively impacting on habitat and spawning sites of several vulnerable and endangered species listed under the Fisheries Management Act, 1994.*
- *Destabilising river banks.*
- *Reducing the amount of overhanging riparian vegetation resulting in a loss of shade and shelter for fish.*

Hansen *et. al.* (2010) consider"

Disturbance and modifications to catchments through clearing vegetation for agriculture and grazing of livestock have resulted in extensive degradation of riparian zones and their adjacent waterbodies. This is predominantly through increased transfer of nutrients, sediment and pollutants into streams, exacerbated bed and bank erosion, and loss of in-stream and terrestrial biodiversity via degradation of riparian and aquatic vegetation and loss of important habitat structure such as large wood.

From their review of the importance of the riparian zone to freshwater fish, Pusey and Arthington (2003) note:

Given the number and importance of links between riparian and lotic ecosystems, it is not surprising that spatial and temporal variation in fish assemblage composition and characteristics (i.e. species richness, abundance, biomass) have been linked to variation in riparian cover ... or that fish communities are adversely affected by riparian destruction and recover only when riparian integrity is re-established ...

Pusey and Arthington (2003) identify a large variety of known and potential impacts on fish as a consequence of changes to riparian vegetation, summarising in part that:

Impacts associated with changes in light quality range from increased egg and larval mortality due to increased ultraviolet (UV) B irradiation and a decreased ability to discriminate between potential mates to increased conspicuousness to predators. ... The interception of terrestrial sediments and nutrients by the riparian zone has important consequences for stream fish, maintaining habitat structure, water clarity and food-web structure. Coarse organic matter donated to the aquatic environment by the riparian zones has a large range of influences on stream habitat, which, in turn, affect biodiversity and a range of process, such as fish reproduction and predation. Terrestrial matter is also consumed directly by fish and may be a very important source of energy in some Australian systems and under certain circumstances.

Hansen *et. al.* (2010) recognise “*Maximising lateral and longitudinal extent of intact riparian zones, starting in the headwaters, provides the best protection for the waterway*”. There is no maximum width for riparian buffers, though there are minimum widths below which the likelihood of significant impacts should be considered unacceptable.

Regrettably, while there have been a variety of studies that help inform the design of riparian buffers, there has been insufficient studies to assess the effectiveness of various buffer widths in protecting various values in Australia. From their review of the scientific literature Hansen *et. al.* (2010) concluded that research “*is inadequate and thus hinders development of meaningful management guidelines for maintaining or restoring aquatic-terrestrial ecosystems*”, lamenting “*the opportunities to gain new information from existing management programs are frequently overlooked*”. Given that NSW Government agencies espouse “adaptive management”, the failure to rigorously assess the effectiveness of buffer strips in over 40 years since the Standard Erosion Guidelines were first adopted is reprehensible.

Unfortunately, because logging has been constrained in riparian zones in the past they are now sought after for logging by the timber industry. Management of riparian zones is therefore a political issue. Ecological requirements are usually severely compromised by the quest for resources.

It is along the smallest streams and drainage lines where most of the interaction between terrestrial and aquatic environments occurs. Small headwater streams generally drain catchments smaller than two square kilometres and can constitute over 75% of the stream length in a drainage basin (Barmuta *et. al.* 2009).

Lowe and Likens (2005) consider:

Everywhere on Earth, streams and rivers occur in hierarchical networks resembling the branching pattern of a tree, with smaller branches joining to form larger branches as water travels from uplands to lakes, estuaries, and seas. The finest branches of these networks, beginning where water flowing overland first coalesces to form a discernible channel, are

called headwater streams. ... because of their small size, these streams are often missing from maps that guide the management of natural resources.

...

There is growing evidence that the water quality, biodiversity, and ecological health of freshwater systems depend on functions provided by headwater streams, which are similar in their importance to the fine branches of the human respiratory system in the lung.

...

Headwaters are a source of life. They are critical habitat for rare and endangered freshwater species, and guardians of many downstream resources and ecosystem services on which humans rely ...

Small headwater streams are where most of the inputs of energy, sediments, nutrients and pollutants from the adjacent terrestrial environment occurs. These streams are often ephemeral or intermittently flow, yet they can harbour endemic invertebrates - many with highly restricted distributions (Barmuta *et. al.* 2009).

Barmuta *et. al.* (2009) consider:

*For forested headwaters in upland areas, the streams tend to be steep, with a stair-step longitudinal profile, and the catchments are subject to unpredictable land-slips or debris flows. Hydrologically, the permanent streams tend to derive a greater proportion of their modal flows from groundwater than downstream segments, and they tend to be shallow with slow water velocities (Gomi *et al.* 2002). Because of their small size and large contact with the adjacent terrestrial habitat, flows are responsive to runoff events ...*

...

In forested areas, the riparian vegetation usually forms a closed canopy, and most of the energy for the in-stream food web is provided by allochthonously-derived inputs of leaf litter (often termed CPOM: coarse particulate organic matter), and leaching of this material yields large quantities of dissolved organic matter (DOM) which can be augmented by direct inputs from interflow, groundwater or overland flow. The DOM pool can be up to 10 times greater than the pool of particulate organic matter and it provides energy and nutrients to in-stream biofilms that form the basal food resource for many invertebrate consumers ...

Hansen *et. al.* (2010) state:

The best opportunity for mitigation of catchment-scale disturbances is by the protection or rehabilitation of headwater systems due to their demonstrated capacity for greatest regulation of water quality and highest contribution to regional biodiversity”.

...

*Erosion in headwater areas makes a disproportionately high contribution to waterway sedimentation and elevated nutrient levels (Lowe and Likens, 2005, Naiman *et al.*, 2005). Ephemeral streams also contribute large amounts sediment and nutrients that are mobilised during storm events (Wenger, 1999, Fisher *et al.*, 2004)*

Davies and Nelson (1993) note that “*the role of first-order streams in sediment transport from hillslopes experiencing accelerated erosion has long been recognised*”. concluding that “*enhanced fine sediment movement in streams as a result of logging is most likely to occur owing to disturbance of headwater stream channels*”.

Croke and Hairsine (1995) note “*in general it is agreed that buffer strips should extend to the springhead or runoff confluence point of any sub-catchment and should be well upstream of any*

existing channel or streambed, since flow will occur at a higher point in the catchment once the forest has been cleared.”

Despite the headwaters of catchments warranting the greatest protection, in current practice buffer strips along streams increase in size with stream size. Bren (1999) notes that the problem with this is that “compared to more rigorous methods this under-protects the stream head, but overprotects divergent areas downstream. A method based on a constant ratio of upslope contributing area to buffer area gave the widest buffers at the stream head and buffers of diminishing width as one moved downstream.” Bren notes that having relatively wider buffers for the smaller headwater streams “makes sense hydrologically but is probably politically unacceptable.”

Munks (1996) reviewed the available literature to recommend buffer widths for various functions.

Munks (1996) Recommended buffer widths for various functions of riparian vegetation

Function of the Riparian Vegetation	Recommended Buffer Width (from edge of bank)
Water Quality, Sediment, Pollutants etc.	20-50m (streams) 40-100m (rivers)
Bank Stabilisation	10 m + (rivers and streams)
Provision of habitat for terrestrial animals	50-60 m (rivers)
Provision of food, habitat and protection of stream fauna	30-100 m (streams)

Based on her review Munks (1996) recommend minimum buffer widths for streams.

Table 3.5. Munks (1996) recommended minimum buffer widths for streams:

Type of River or Stream	Minimum width from stream bank*
Main Rivers	40 m
Creeks and streams from the point where their catchment exceeds 100 ha	30 m
Small streams with a catchment of 50 to 100 ha	30-50 m
Small streams, tributaries, gully and drainage lines which only carry surface water during periods of heavy rainfall	30 m

* If the slope of adjacent land running down to the stream is greater than 10%, the recommended width is increased to 50m.

Munks (1996) also considers that “adequate widths of riparian vegetation for fauna protection needs to be species-specific.”

Hansen *et. al.* (2010) undertook a meta-analysis of >200 riparian studies and recommended riparian buffer widths of between 30 and 200 m dependant on land use intensity and the management objective. Hansen *et. al.* (2010) considered forestry operations and grazing at low stocking rates (<5 Dry Sheep Equivalents/ha/annum all stock) as being relatively low impact. Though the impacts of logging operations vary with the logging intensity, slopes and soils.

Hansen *et. al.* (2010) Minimum width recommendations for Victorian riparian zones based upon available scientific literature and adjusted using expert opinion, where appropriate, to account for known differences between Victorian and international systems. All widths are in metres.

Landscape context	Land Use Intensity	Land Use Intensity	Land Use Intensity	Wetland/lowland floodplain/off-	Steep catchments/cleared
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/Management Objective	High	Moderate	Low	stream water bodies	hillslopes/low order streams
Improve water quality	60	45	30	120	40
Moderate stream temperatures	95	65	35	40	35
Provide food and resources	95	65	35	40	35
Improve in-stream biodiversity	100	70	40	Variable*	40
Improve terrestrial biodiversity	200	150	100	Variable*	200

* Variability in width is related to the lateral extent of hydrological connectivity and thus, any recommendation will be site specific.

In forestry planning stream buffers are usually applied to act as sediment and nutrient filters for subsurface and overland flows (i.e. Barling and Moore 1994). They are more effective for removing sediment than nutrients from the flow and are more effective at removing coarse rather than fine sediments (i.e. Barling and Moore 1994). They are also most effective when the flow is shallow, slow, and enters the strip uniformly along its length (i.e. Barling and Moore 1994). Barling and Moore (1994) note that *“in hilly terrain flow rapidly concentrates, producing higher flow velocities and larger flow depths that can rapidly submerge the vegetation and significantly reduce the effectiveness of the filter strip”*.

Croke and Hairsine (1995) categorised streamside buffers as Streamside Reserves (no logging or machinery disturbance) and Filter Strips (logging, but no machinery disturbance), and made recommendations for their minimum widths along streams and around wetlands based primarily on controlling overland flows of sediments. All their buffers are classed as Streamside Reserves except for those on drainage lines.

Table 3.6. Croke and Hairsine’s (1995) recommended “Minimum Streamside Reserve and Filter Strip Widths according to stream type”

Type of River or Stream	Minimum widths
Rivers, Lakes and Streams used for water supply	100 m
Creeks and streams from the point where their catchment exceeds 100 ha	40 m
Small streams with a catchment less than 100 ha	30 m
Temporary streams flowing more than 1 in 5 years and carries water for some time (weeks) after rainfall.	20 m
Drainage lines carrying water only during or immediately (hours, days) after rainfall	10 m
Permanent springs, swampy ground, wetlands and bodies of standing water	30 m

Croke and Hairsine (1995) note that Streamside Reserves must be:

“extended beyond the minimum widths wherever necessary according to a field assessment of the size and flow of the stream or spring, the size and nature of the soak, swampy ground or body of standing water; the nature of the surrounding topography and soil type, the

intensity and magnitude of the harvesting operation; the riparian habitat value; and the proximity and physical design of any water supply take-off and distribution system.”

Croke and Hairsine consider that extensions of Streamside Reserve widths must “be determined according to soil type, hazard class slope, and other climatic and geomorphic variables relevant to the region”.

Croke and Hairsine (1995) also emphasise that “It is crucial when defining buffer strips in the field that all sources of runoff generation are included within the buffer strip zone. It is essential to incorporate the ‘saturated zone’, which is the area along the stream or drainage line that is permanently saturated (eg swampy ground) or becomes saturated (eg seepage area) with the onset of rain”. They consider that “this is recognisable through the existence of saturated soil or presence of a vegetation associated with frequently saturated soil”.

The EPA state:

To ensure this increased protection does not impact on the sustainable supply of timber, the draft Coastal IFOA proposes to reduce the width of protections on headwater streams in some areas from 10 metres to 5 metres. In areas where there is important fish habitat or where more intensive harvesting is proposed, all headwater streams will retain their original 10 metre protection.

For north east NSW (except possibly the intensive zone) the new rules are that all headwater streams in catchments less than 20ha will have buffers reduced from mostly 10m to 5m (except where it is Class 1 Aquatic Habitat). Class 1 Aquatic habitat will be mapped - it is currently defined as having a threatened fish recorded within 2km upstream or 5km downstream of the site of the proposed works. The current requirement to increase riparian protection within 100km upstream of threatened fish (Class 2 Aquatic Habitat) will be removed.

This will have significant impacts on riparian habitat, stream quality, and aquatic species. For example on State Forests across the Clarence and Richmond valleys, Pugh (2016) estimated that over 7,000 kilometres of vital headwater streams in catchments less than 20ha will have their buffers cut by at least 50% down to 5m wide. With the inclusion of riparian areas protected for threatened animals the reduction is likely to be over 10,000 ha. This is the loss of some 35% of existing riparian buffers (outside 'informal reserves'), a 24% reduction due to changes in stream buffers and an additional 11% reduction due to the loss of protections around records of threatened fauna.

The Remake of the Coastal Integrated Forestry Operations Approvals Final Report Threatened Species Expert Panel Review reports all experts who commented as opposing the opening up of protected riparian areas protected for the past 20 years for logging. For example Brad Law, DPI Forestry, stated:

“In some areas where areas once mapped as riparian buffers are no longer identified then there would be a loss of habitat protected for the past 20 year period. Given the intensity of operations over the last 10 years, it would be important to try to ensure these areas remain protected“

The EPA representative Brian Tolhurst stated:

“No further loss or impact on the retained riparian areas that have been protected to date under the existing rule set should occur. The expert panel agreed that these areas were the few areas seen on the site visit that still retained habitat elements and the diversity, form and structure of a native forest.

...

I am not convinced that the proposed riparian buffers are adequate for ecological protection of these features. The widths seem to have been generated to deliver no net loss of available harvestable area rather than driven by an appropriate buffer for the size/importance of the feature".

The claim is made that 10m buffers will be retained on headwater streams within the intensive logging zone, but Table 6a only identifies 5m buffers as being required, The IFOA must be altered to meet the promise that 10m riparian buffers will be implemented on all streams in catchments less than 20ha.

4. Tree Retention

The older a tree gets the more browse, nectar and seeds they provide for wildlife. Once eucalypts are over 120-180 years old they begin to provide the small hollows needed by a plethora of native wildlife for denning, nesting and shelter. Though it is not until they are over 220 years old that they provide the larger hollows required by species such as owls, cockatoos and gliders. They may live for 300-500 years, sometimes longer.

By removing the need to retain 8 hollow-bearing trees per hectare In forests with Greater Glider densities >1 per hectare, and records of threatened owls, and the need to need to retain the next largest tree (and count it as a hollow-bearing tree) in the non-regrowth zone if there are less than 5 hollow-bearing trees per ha , the EPA is significantly reducing the retention requirements for hollow-bearing trees and this is strenuously opposed. This will have a significant impact on the nationally vulnerable Greater Glider and a host of other species, It is a massively retrograde act.

While largest old hollow-bearing trees are not of much interest to the industry, the recruitment trees and eucalypt feed trees are of the utmost interest as these constitute a high proportion of the remaining large high quality sawlogs. It is therefore not surprising that the most widespread and frequent breaches found by the EPA and NEFA are the logging of the large mature trees required to be retained as recruitment and/or nectar feed trees. Because these represent the best sawlogs the Forestry Corporation does everything they can to avoid protecting them, either by refusing to select any or by selecting trees that are too small, deformed or damaged to meet requirements.

The EPA have proven themselves totally unwilling to take any meaningful regulatory action in response to these most common breaches, meaning that as large sawlogs dwindle the logging of recruitment and/or nectar feed trees has increased. Now in a despicable act the EPA has absolved itself by any liability by removing any requirements to protect recruitment or nectar feed trees.

It is bad enough that the EPA have reduced retention requirements for hollow-bearing trees, though it is inexcusable that they are so bereft of ecological comprehension and care that they are removing the need to retain and protect recruitment habitat trees to replace the hollow-bearing trees as they die. This bastard act says a lot about the ineptitude of the EPA. For years they have been half-heartedly defending the need to protect recruitment trees, though have never taken meaningful action for the legally inadequate retention and protection of recruitment trees despite finding it one of the most frequent illegal acts perpetuated by the Forestry Corporation. Now they are rewarding the Forestry Corporation for their decades of illegal activities by changing the law to allow them to cut down all recruitment trees. This act by the EPA is an environmental crime of the worst kind - it is a pity that they can't be prosecuted as there is no excuse for their environmental vandalism.

It is astounding that the EPA are removing any punishment for damaging retained trees. Rather than being fined or prosecuted, now all the Forestry Corporation need to do is select another tree from those they have retained as a replacement - and there is no prohibition on it already being damaged.

4.1. *Habitat trees*

Old trees are the primary storehouses of carbon, provide essential hollows for animals to nest and den in, provide the most abundant nectar and seed, and are of the highest aesthetic appeal. These values appreciate with age. Since European settlement most of our oldest trees have been lost, with only scattered old trees left across agricultural lands and within logged forests. Those surviving are of immense value.

Numerous Australian animals depend on the food and shelter provided by old trees for their survival. Lindenmayer *et. al.* (2014) consider “*The irreplaceable roles of large old trees make them a “keystone structure”—a disproportionately important provider of resources crucial for other species”*.

A plethora of forest animals depend upon the trunk and branch hollows provided by big old trees for their survival. In NSW at least 46 mammals, 81 birds, 31 reptiles and 16 frogs, are reliant on tree hollows for shelter and nests, of these, 40 species are listed as threatened on Schedule 1 and Schedule 2 of the Threatened Species Conservation Act (NSW Scientific Committee 2007). Animal species that use tree hollows include most possums and gliders, numerous bats, various ducks, most owls, Australian Owlet-nightjar, tree creepers, tree martins, all cockatoos, most parrots, some kestrels and falcons, Laughing Kookaburras, some kingfishers, Dollarbirds, and various lizards and snakes.

Seventy species (28%) of vertebrates use hollows in north-east NSW (Gibbons & Lindenmayer 2002). The loss of the hollows provided by large old trees has been identified as a primary threat to a variety of priority species in north east NSW (Environment Australia 1999, Appendix 1); 4 mammals (non-flying), 20 bats, 3 birds, 2 frogs, 3 reptiles and 4 snakes. Numerous other species have been identified as threatened by the loss of other resources (i.e. seeds, nectar, nest sites) provided in greater abundance by older trees and many by the increased transpiration of young trees and consequent reductions in water availability (Environment Australia 1999).

Animals do not select hollows at random; factors such as entrance size and shape, depth, degree of insulation and location greatly affect the frequency and seasonality of hollow use. Many species use multiple hollows which they move between, for example a Brush-tailed Phascogale has been found to use 27-38 different hollows (Gibbons & Lindenmayer 2002). Brigham *et. al.* (1998) found that Owlet-nightjars move approximately 300m between roost sites every 9 days on average, with individuals using 2-6 different cavities over 1-4 months, noting “*our results suggest that birds may be loyal to a group of 2-6 trees in a relatively confined area*”.

A single hollow may be used by more than one species in a year, sometimes concurrently. Many species will exclude other individuals of the same species from the vicinity of their nesting hollows, some may only defend a few metres around their nest while others may defend a clump of trees (Gibbons & Lindenmayer 2002), and many are territorial with defended territories of a few hectares or hundreds of hectares. A few species prefer to nest colonially in clumps of trees (Gibbons & Lindenmayer 2002). Fewer arboreal marsupials have been recorded from sites where hollow-

bearing trees are clumped compared to being evenly distributed, which has been attributed to social and territorial behaviour (Gibbons & Lindenmayer 2002).

Gibbons and Lindenmayer (2002) documented that relatively undisturbed woodlands contain 7–17 hollow-bearing trees per hectare, and undisturbed temperate and sub-tropical eucalypt forests 13–27 per hectare. Only some hollows have appropriate entrance sizes and depths for fauna, with only 43-57% of hollows found to be used by fauna, and 49-57% of hollow-bearing trees used (Gibbons and Lindenmayer 2002). Large dead trees are utilised by many animals, representing 18-19% of hollow-bearing trees on some sites (Gibbons and Lindenmayer 2002).

Based on a number of assumptions, various estimates of the numbers of hollow-bearing trees occupied by vertebrate fauna have been made, with 6-13 per hectare in north east NSW, 4.5-9 per ha in south-east Queensland, and 7-14 per ha in East Gippsland (Gibbons & Lindenmayer 2002). Based on their estimates Gibbons & Lindenmayer (2002) assumed that *“hollow-bearing trees in forests are likely to be occupied at a rate of around 6-15 per hectare”*.

Once the availability of hollows becomes limiting competition with more aggressive species, introduced birds (ie Common Myna and Common Starling) and the European Honey Bee can exclude the more vulnerable species. For example, the Greater Glider has been found to be absent from sites supporting less than 6 hollow-bearing trees per hectare (Gibbons & Lindenmayer 2002).

As noted by the NSW Scientific Committee (2007):

The density of hollow-bearing trees required to sustain viable populations of vertebrates is a function of the diversity of competing fauna species at a site, population densities, number of hollows required by each individual over the long-term, and the number of hollows with suitable characteristics occurring in each tree. These factors vary spatially among habitats and temporally throughout the year with, for example, the demand for nests increasing greatly during the spring breeding season (Calder et al. 1983). Accurately estimating hollow requirements in a given habitat is currently difficult due to the lack of this baseline information,

Losses of large old trees is a world-wide problem, as noted by Lindenmayer et. al. (2012) *“populations of large old trees are rapidly declining in many parts of the world, with serious implications for ecosystem integrity and biodiversity. ... Just as large-bodied animals such as elephants, tigers, and cetaceans have declined drastically in many parts of the world, a growing body of evidence suggests that large old trees could be equally imperilled”*.

The NSW Scientific Committee (2007) has identified *Loss of Hollow-bearing Trees* as a Key Threatening Process. The maintenance of large old hollow-bearing trees in perpetuity is the single most important requirement for the survival of the numerous animal species that rely on their hollows for denning, nesting or roosting. Despite minimum requirements being specified for the retention of hollow-bearing trees there is a war of attrition being waged against them because the Forestry Corporation regard hollow-bearing trees as a waste of space rather than an environmental asset.

The small numbers of mature trees required to be protected for their abundant nectar and to grow into the hollow-bearing trees of the future are being logged as the Forestry Corporation become increasingly desperate for large sawlogs To maintain continuity of supply of these resources by such long lived organisms it is essential to ensure that there are enough small hollow-bearing trees to replace the large hollow-bearing trees when they die, and enough strong and health mature trees

to develop into the hollow-bearing trees of the future. It needs to be recognised that many trees die along the way, so increased retention of smaller trees is need to ensure that sufficient trees survive into the next age class. The persistence of a multitude of animals, and the health of the forest, depends on maintaining and restoring hollow-bearing trees in perpetuity.

Retention of Hollow-bearing (H) trees and recruitment (R) trees (to grow into the hollow-bearing trees of the future) are key requirements of the Threatened Species Licence to mitigate logging impacts on an array of native animals in eucalypt forests (see nefa.org.au/old_trees). For decades NEFA have been battling to get improved protection for large hollow-bearing trees and the recruitments needed to sustain them, and the vital hollows they provide, into the future. NEFA has identified poor and inadequate selection and protection of habitat trees as a problem in all our audits.

The current habitat tree retention rules per hectare are for the retention of 5 hollow-bearing trees (where they remain), and one of the next largest trees as recruitment trees for each hollow-bearing tree. Natural forests have 13–27 hollow-bearing trees per hectare so this is a major reduction in resources. The retention of just one recruitment tree for each hollow bearing tree means that not enough will survive to replace the hollow-bearing trees as they die. In forests with Greater Glider densities >1 per hectare, and records of threatened owls, 8 hollow-bearing trees per hectare need to be retained, though just 5 recruits. In the non-regrowth zone if there are less than 5 hollow-bearing trees per hectare then the next largest tree needs to be retained and counted as a hollow-bearing tree to make the numbers up to 5.

Since making habitat trees a compliance priority in 2013 the EPA have found that poor selection and retention of habit trees is the most frequent and widespread breach of the Threatened Species Licence that they find. For example in their 6 proactive audits undertaken in the Upper North East region in 2015 they assessed a total of just 7.9ha for habitat tree retention, with just 43 H trees and 51 R trees assessed, and yet identified 36 breaches. For these widespread and frequent breaches the only regulatory action they took was to require 11 Action Plans, time and time again.

This followed on from the EPA (Gregory Abood, 13 August 2014) finding the previous year, from an audit of 6 forests in the Upper North East, that:

Key Audit Findings

Recruitment – failure to select trees most likely to provide hollow bearing resource continuity

EPA audits found a common trend that appropriate recruitment trees were not retained in accordance with the Threatened Species Licence (TSL) requirements. For example, in Dalmorton State Forest, trees were felled belonging to a cohort of trees with the largest diameter at breast height over bark (dbhob) contrary to the TSL requirements. For example, of the required ten recruitment trees (2 hectare assessment area) 6 trees from the cohort of trees with the largest dbhob were felled. Stumps of 85; 78; 78; 70; 66; 60 cm DBHOB (6 trees) were all belonging to a cohort of trees with the largest dbhob compared to the R trees retained in the assessed area being 83; 76; 60; 57; 54; 51; 51; 51; 51; 49; 49; 46; 46; 42.5; 36. Most notably, differences in trees removed versus those retained ranged up to 49cm (i.e. R tree 36cm vs stump 85cm at 1.3m). The EPA audit recorded clear examples of non-compliances with trees felled within 10m of marked and retained R trees including a Spotted Gum 46cm R tree and four adjacent Spotted Gum trees felled 75cm, 71cm, 60cm, 58cm DBHOB. Similar findings were recorded at Kangaroo River State Forest with for example an 81cm DBHOB tree felled and the largest R tree retained was 62cm and smallest R tree 46cm DBHOB (in the assessed area). Trees belonging to a cohort of trees with the largest dbhob were felled.

Proper selection is critical to achieve compliance and the intent of the condition. The retention of recruitment trees that belong to a cohort of trees with the largest DBHOB is important. Larger size class trees maintain biodiversity, diversity of forest structure and form, forest health and the productive capacity of these forest ecosystems. Larger size class trees are more likely ensure continuity of hollow bearing forest resources. Continuity of these resources is the key to sustain biodiversity elements of ecologically sustainable forest management (ESFM). Removing the next largest size class increases the risk of a hollow bearing resource gap in time. A future resource gap would acutely impact on biodiversity. The presence, abundance and size of hollows are positively correlated with tree basal diameter, which is an index of age. As such, tree dbhob is, in turn, a strong predictor of occupancy by vertebrate fauna and is the primary reason why largest diameter is stated within the TSL conditions. Harvesting trees that belong to a cohort of trees with the largest dbhob will impact on the capacity of this forest ecosystem to function in the future.

For these too they just required an Action Plan. It is clear that the Forestry Corporation can breach requirements as frequently as they like without any meaningful consequences and that the EPA refuse to increase consequences or penalties for repeat offences. This lack of enforcement seems to have led to deteriorating compliance, with the deliberate poor selection of recruitment habitat trees a common and widespread occurrence. Our recent audits have also found a significantly worsening situation with regards to reckless damage to habitat trees.

In compartments 359 and 361 of Cherry Tree State Forest the Forestry Corporation were required to retain 8 H trees and 5 R trees per hectare. NEFA (Pugh 2015) found that the required numbers of habitat trees were not being retained, noting:

Across the 3.3 hectares marked habitat tree retention was 4.5 H trees/ha and 3.9 R trees/ha, both of which are significantly below the requirements for this compartment. Three trees marked as R trees were observed to have hollows (AMG 476107, 6798517, 476055, 6798553, 476038, 6798553), with re-assignment of these trees as H trees, habitat tree retention was 5.5 H trees/ha and 3.0 R trees/ha. It is evident that retention of hollow-bearing trees was well below the 8 per hectare required and that there were additional hollow-bearing trees available for retention that were logged.

Similarly it is evident that the required numbers of R trees were not retained, and that most marked trees did not satisfy retention requirements. There were abundant stumps in the size range 50-100cm from logging, making it evident that most (if not all) of the largest cohorts of trees that should have been retained as R trees were logged. Only 5 of the marked R trees were accepted as reasonable choices, though these were still small trees and did not belong to the largest cohort of trees as evidenced by stumps. This is a retention rate of only 1.5 R

trees per hectare. When considered with the significant logging damage to retained trees, the outcome is extremely bad.

Based on this sample, with the reassignment of some R trees as H trees and discount of R trees we considered unsuitable choices, NEFA found:

By extrapolation of the results from site 3 across the nett area of compartments 359 and 361 (allowing for reclassification of R trees with hollows to H trees) , there are some 1,670 H trees and 460 suitable R trees retained. This means there are shortfalls of some 780 (32%) in the required number of H trees and some 1070 (70%) in the required number of R trees. By extrapolation of the results from site 4, across the nett logging area of compartment 360, some 320 H trees and 90 appropriate R trees are likely to have been retained. This means there are some 60 more H trees retained than required and a shortfall of some 170 R trees.

In total there is likely to be a shortfall of some 720 (27%) H trees and 1,240 (69%) R trees across the whole logging area. The failure to protect some 2000 (44%) of the required habitat trees is very significant.

In the EPA's subsequent response (Michael Hood 21 December 2016) they identify they assessed 21 hectares and (without discounting R trees that did not satisfy retention requirements) found retention of recruitment trees adequate but that only 6.95 hollow-bearing trees per hectare were retained, giving a shortfall of 275 hollow-bearing trees for just compartment 359, though they included Forestry Corporation data, to conclude the shortfall is just 172 hollow-bearing trees. The EPA did record inappropriate selection of recruitment trees as an offence though failed to document its extent or discount inappropriate trees when identifying retention rates. The EPA state:

*The analysis reflected over page has been conducted for **compartment 359 alone** where the EPA has decided to apply a conservative approach to condition 6.9d which requires 8H/ha. The net harvest area for compartment 359 is 262ha. In effect there was a requirement of 2096 hollow bearing trees, and 1310 recruitment trees for this area.*

Tree Retention Results

*Based on extrapolation, if the retention rate trend was maintained across the rest of compartment 359 (i.e. across the remaining 230 hectares) there would be a shortfall of hollow bearing tree of approximately **172 trees or approximately 0.75 hollow bearing trees per hectare**. This was calculated based on EPA retention rate of 6.8H/ha plus FCNSW retention rate of 7.5h/ha = 7.25H/ha retained on average. The EPA notes that recruitment tree retention rates were 6.25R/ha, more than 1 recruitment tree per hectares more than the minimum required rates. This analysis is based on 32 hectares of assessed area, equivalent to 12% sampling intensity.*

Despite finding a significant shortfall in the required retention of hollow-bearing trees, the EPA only issued an Official Caution.

NEFA's has outstanding complaints regarding habitat trees from audits of Sugarloaf State Forest, Gibberagee State Forest and Gladstone State Forest, given the EPA's new interpretation we expect them to do similarly do nothing what-so-ever about habitat trees in those forests.

The intent of the new IFOA is to just require up to 5 hollow bearing trees per hectare (where they survive) and to remove the requirement to retain recruitment trees (except where they fall within habitat tree clumps). This is a significant reduction in hollow-bearing trees (in non-regrowth areas

and Greater Glider habitat) and a near total loss of the recruitment trees essential as the hollow-bearing trees of the future. This will have huge long-term impacts on hollow-dependant fauna.

The current retention requirements are that recruitment trees are required to be a "live tree of a mature or late mature growth stage ... that is not suppressed prior to harvesting and appears to have good potential for hollow development and long term survival", and "belong to a cohort of trees with the largest dbhob" be scattered throughout the logging area, and have "good crown development" and "minimal butt damage".

Natural forests are usually multi-aged with cohorts of different sized trees resulting from past disturbance events (usually wildfire). They thus allow for succession as existing hollow-bearing trees die and collapse. Logging targets many of the mature trees for removal, leaving a potential hiatus in replacement trees capable of providing tree-hollows when existing ones collapse or burn. As noted by Gibbons and Lindenmayer (2002):

Hollow-bearing eucalypts are extremely long-lived 'organisms'. Eucalypts typically have a life span of 300-500 years, and dead trees may provide hollows for a further 100 years. The age at which they 'reproduce' hollows (typically 150-250 years) represents one of the slowest 'reproductive cycles' for any organism. Failure to replace hollow-bearing trees as they are lost will result in prolonged temporal gaps in the resource that will not only reduce the area of suitable habitat for hollow-using fauna, but could also fragment populations of species unable to occupy areas lacking hollows. The dispersal of hollow using species also will be impaired".

Lindenmayer et. al. (2014) recognise that:

... drivers of large old tree loss can create a "temporary extinction," that is, a prolonged period between the loss of existing large old trees and the recruitment of new ones (Gibbons et al. 2010b). The length of a temporary extinction may vary (e.g., 50 to 300+ years) ... Temporary extinction has the potential to drive species strongly dependent on large old trees to permanent local or even global extinction. In other cases, existing large old trees may be doomed to eventual extinction because the animals that dispersed their seeds have disappeared".

...

Policies must be implemented long before problems result from the loss of large old trees. This is because, unlike many other organisms with a shorter life history, once old trees are gone, it can take centuries to restore them.

In natural forest there is a self thinning process that results in significant mortality as trees mature (Mackowski 1987, Smith 1999). Though there is also a high likelihood of mortality due to other factors. As noted by Mackowski (1987 p124) "the frequent occurrence of fire in this site height blackbutt forest precludes a 100% chance of survival - a proportion will be damaged, or weakened, or burnt down by each fire. These trees are also subject to the risk of lightning and windstorm damage."

Logging significantly increases tree mortality. After logging the retained trees are more vulnerable to windthrow and post-logging burning (Saunders 1979, Recher, Rohan-Jones and Smith 1980, Mackowski 1987, Smith and Lindenmayer 1988, Milledge, Palmer and Nelson 1991, Smith 1991a, Gibbons and Lindenmayer 2002). Gibbons and Lindenmayer (2002) note "studies consistently show that the number of hollow-bearing trees that occurs on logged sites is negatively associated with the

number of harvesting events”, and “logging may result in a pulse of mortality among retained trees after each cutting event”.

In all audits undertaken by NEFA some trees marked for retention as hollow-bearing trees and recruits have been found to have been damaged in the logging, had the soil compacted around their roots, or are already burnt out at the base and unlikely to remain standing for long. Many trees retained as recruits are found to be too young, deformed or suppressed and unlikely to develop into hollow-bearing trees. Logging debris are often left stacked against the bases of retained trees, forming funeral pyres for post-logging burns. (see **Protecting Habitat Trees**)

In Mountain Ash and Alpine Ash forests Gibbons and Lindenmayer (2002) identify that 18% of the total population of hollow-bearing trees collapsed over a 5 year period (3.6% per annum). Gibbons and Lindenmayer (2002) also report that “14% and 37% of trees retained on logged sites were killed 2-5 years after low- and high-intensity slash burning respectively”, and that the probability of a retained tree surviving after a single logging event was 0.63.

Parnaby *et. al.* (2010) assessed the impacts of a single low-intensity prescription burn in the Piliga forests on hollow-bearing trees, finding mean collapse rates of 14% to 26%, noting “*The collapse of burnt, hollow-bearing trees on individual plots ranged from 0 to 50%, and exceeded 20% on 13, of the 29 plots*”.

On top of logging and prescribed burning induced mortality natural disturbance regimes still apply, though these too are accentuated by logging impacts, for example in south-east NSW 87% of retained trees were killed following a wildfire (Gibbons and Lindenmayer 2002).

This problem is also recognised by the NSW Scientific Committee (2007):

Trees retained during harvest are susceptible to damage from logging operations and post-harvest burning, or can suffer poor health owing to changes in abiotic conditions (Gibbons and Lindenmayer 2002). Consequently, retained trees are prone to early mortality, especially with repeated exposure to harvesting events over their lifespan. Prescriptions for forestry operations also stipulate that young trees are retained for long-term replacement of hollow-bearing trees, typically with one recruit for every hollow-bearing tree. The age structure in natural forests, where recruitment and loss of mature trees is at equilibrium, indicates that only a small proportion of younger trees survive to reach maturity. A ratio of one-to-one will be inadequate in itself to sustain the stipulated minimum densities of hollow-bearing trees in harvested areas

To maintain habitat trees in perpetuity there is a necessity to account for natural and logging/burning induced tree-deaths when prescribing retention rates for both hollow-bearing trees and recruitments sufficient to maintain the prescribed number of habitat trees over long time frames (Recher, Rohan-Jones and Smith 1980, Mackowski 1984, 1987, Recher 1991, Scotts 1991, Traill 1991). Mackowski 1987 assessed the retention requirements for all age classes to maintain 3 hollow bearing trees per hectare in blackbutt forests after accounting for natural mortality, extrapolating from this, to maintain each hollow-bearing tree >100 cm dbh it is necessary to retain 5.2 trees 20-100 cm dbh to account for natural attrition.

TABLE 4.5. COASTAL BLACKBUTT RETENTION RATES REQUIRED TO MAINTAIN 10 HABITAT TREES PER TWO HECTARES IN PERPETUITY. The assumption is made that there will be 50% mortality of recruitment trees every 80 years. Adapted from Mackowski 1987.

Diameter (dbh) cm.	Age yrs	Time-span in size class yrs	Mackowski's requirements for	Requirements to retain 10 Hollow-
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			3 Habitat Trees per Hectare over 100cm	bearing Trees per Two Hectares
20-60	16-68	52	11.5	38.3
60-100	68-144	76	4	13.3
100-140 ^A	144-224	80	2	6.6
140-180 ^B	224-304	80	1	3.3

A - stage at which hollows suitable for small wildlife form.

B - stage at which hollows suitable for large wildlife form.

Mackowski (1984) considered *"The general pattern of hollow formation in many gum type eucalypts, ironbarks, bloodwoods and stringybarks is similar to that described for Blackbutt. Tallowood and Brushbox have similar crown architecture characteristics to Blackbutt but have substantially different suites of organisms involved in the succession towards hollows, leading probably to much older age at hollow formation."*

Many forests have been denuded of habitat trees. To enhance such forests for nature conservation and maintenance of ecosystem functioning they need to be managed for the return of adequate stockings of habitat trees (Mackowski 1987). Mackowski (1987 p134) states *"where adequate hollow trees have not been retained in the past, a greater proportion of larger recruits should be selected (rather than evenly distributed between 60 & 100 cm dbhob) to facilitate the early return of hollow trees and the immigration of hollow dependant wildlife if it occurs nearby."*

Hollow-bearing trees, and with them hollow-dependent species, have already been decimated within vast tracts of forests. The problems such fauna are facing is expected to exponentially worsen as the few remaining large old hollow-bearing trees (in both forests and pastoral lands) die-out without replacement trees being available. The full ramifications of irreversible changes already set in place will take a century or more to become fully manifest.

Lindenmayer *et. al.* (2014) warn *"Existing policies are failing. New policies and management actions are required to conserve existing large old trees, provide for their recruitment, and maintain an age structure for tree populations that ensures a perpetual supply of large old trees thereby sustaining the critical functional properties that such trees provide. Without urgent action this iconic growth stage and the biota and ecological functions associated with it are in danger of being seriously depleted or even lost in many ecosystems"*.

On public lands trees over 100 years old have survived the worst ravages of the industrial logging and widespread clearfelling that has increasing occurred on State Forests since the 1950s. Such trees are in the stages of developing hollows and are a rare and valuable wildlife resource. As well as being important for sustaining populations of hollow-dependent fauna, such trees are part of our natural heritage and the relatively few that remain should be retained.

Lindenmayer *et. al.* (2014) consider *"A critical step in large old tree management is to stop felling them where they persist and begin restoring populations where they have been depleted"*.

The proposed requirements are woefully inadequate:

The licence (Condition 70) requires the retention of 0.1-2ha "Tree retention clumps" totalling 5% of the **base net area** in each **compartment** in the **regrowth zone** and 8% of the **base net area** in each **compartment** in the **non-regrowth zone. These are to be focussed on habitat trees.**

The licence (Condition 71) requires that all **hollow-bearing trees** must be retained in the **net harvest area** in the **intensive harvesting zone, with only "a minimum of five hollow-bearing trees** retained in each hectare of **net harvest area** in accordance with **Protocol 23: Tree retention in the selective harvesting zone"**.

It is bad enough that the EPA have reduced retention requirements for hollow-bearing trees, though it is inexcusable that they are so bereft of ecological comprehension and care that they are removing the need to retain and protect recruitment habitat trees to replace the hollow-bearing trees as they die. This bastard act says a lot about the ineptitude of the EPA. For years they have been half-heartedly defending the need to protect recruitment trees, though have never taken meaningful action for the legally inadequate retention and protection of recruitment trees despite finding it one of the most frequent illegal acts perpetuated by the Forestry Corporation. Now they are rewarding the Forestry Corporation for their decades of illegal activities by changing the law to allow them to cut down all recruitment trees. This act by the EPA is an environmental crime of the worst kind - it is a pity that they can't be prosecuted as there is no excuse for their environmental vandalism.

Eucalypt Feed Trees

Loyn (1985) considers species most reliant upon old growth to be those utilising old trees for feeding, such as some honeyeaters and mistletoebirds which feed on mistletoe nectar or fruit, some insectivorous birds which feed from old eucalypt bark or among canopy foliage and some arboreal mammals which feed on sap and invertebrates from large eucalypt trunks and branches or on canopy foliage in tall eucalypts.

Older trees produce significantly more flowers and seeds than young trees and thus are of particular importance to fauna relying on these food sources. For Mountain Ash trees Ashton (1975) found:

The mature forest produced 2.15-15.5 times as many flowers as the pole stage trees, and 1.5-10 times as many as the spar stage forest. Estimates of the fruit set following the late autumn flowering of 1954 indicate that that of the mature forest was 1.6 times as great as that in the spar stage forest and 3.5 times as great as that in the pole stage forest.

The abundance of flowers and seeds provided by trees directly affects their suitability for foraging by animals. For example, Kavanagh (1987) found that Yellow-bellied Gliders mainly used medium to large trees for feeding on flowers (as well as sap and honeydew) because they had the greatest number of flowers on which to forage for nectar. Similarly Koch (2003) found that south-eastern Red-tailed Black-Cockatoos preferentially selected stringybark trees with larger girth and canopy volume as these were correlated with crop size. He considered that the abundance of seed directly affected breeding success.

There are currently requirements to retain 3 mature eucalypts per hectare of species known to produce copious nectar as "eucalypt feed trees". This retention increases to 5 'eucalypt feed trees' per hectare in compartments with nectivorous Swift Parrot, Regent Honeyeater or Black-chinned Honeyeater records. These trees provide vital resources to a plethora of nectar-feeders, that are nowhere near as abundant in regrowth stands. The proposal is to remove any need to protect 'eucalypt feed trees'.

The TSL (7b vii) allows that instead of undertaking surveys as a default:

Swift Parrot and Regent Honeyeater: *At least ten eucalypt feed trees must be retained within every two hectares of net logging area. These trees must be marked for retention.*

Where retained eucalypt feed trees also meet the requirements of hollow-bearing tree or recruitment trees, the retained eucalypt feed tree can be counted as a hollow-bearing tree or recruitment tree. Where a Swift Parrot or Regent Honeyeater is observed feeding, the tree in which it is feeding must be retained.

Similarly eucalypt feed trees are required to be "*mature or late mature individuals*" of select nectar producing species. In practice eucalypt feed trees are often taken to be a subset of recruitment trees, though they come into their own in forests with low numbers of hollow-bearing, and thus recruitment, trees. Theoretically they are also important for directing required tree retention towards important nectar feed trees,

The need to retain nectar feed trees is important for a multitude of species, though of particular importance are the Regent Honeyeater and Swift Parrot. Researchers at Australia's Threatened Species Recovery Hub (Geyle *et. al.* 2018) recently identified that Regent Honeyeater has a 57% chance of extinction within the next 20 years and that Swift Parrot has a 31% chance of extinction within the next 20 years, ranking them the 7th and 13th most threatened birds in Australia.

Regent Honeyeater (*Anthochaera phrygia*, previously *Xanthomyza phrygia*) is listed as Critically Endangered under the EPBC Act. The 2016 National Recovery Plan for the Regent Honeyeater identifies "*It is important to identify and retain trees that produce relatively high levels of nectar. In some areas where there has been a history of removal of large trees, regent honeyeaters often select the largest available trees of the 'key' species*".

The Swift Parrot *Lathamus discolor* is listed as 'Endangered' under the EPBC Act. The first national recovery plan was adopted in 2002. A revised recovery plan was made in 2011. The National Recovery Plan for the Swift Parrot *Lathamus discolor* (2011) states:

Based on current knowledge of the ecology and distribution of the Swift Parrot the persistence of this species is mainly threatened by loss and alteration of habitat from forestry activities including firewood harvesting, clearing for residential, agricultural and industrial developments, attrition of old growth trees in the agricultural landscape, suppression of forest regeneration, and frequent fire. The species is also threatened by the effects of climate change, food and nest source competition, flight collision hazards, psittacine beak and feather disease, and illegal capture and trade.

Forestry activities, including firewood harvesting result in the loss and alteration of nesting and foraging habitat throughout the Swift Parrot's range ... The harvesting of mature box-ironbark woodlands of central Victoria and coastal forests of New South Wales for forestry reduces the suitability of these habitats for this species by removing mature trees which are preferred by Swift Parrots for foraging and that provide more reliable, as well as greater quantity and quality of food resources than younger trees (Wilson and Bennett 1999; Kennedy and Overs 2001; Kennedy and Tzaros 2005)

The most relevant action is under **Manage and protect nesting and foraging habitat.:**

2.1b. *Provide recommendations for the revision and update of forestry prescriptions to reflect the most recent habitat information available in Victoria and New South Wales*

DSE and OEH are identified to provide recommendations for revision of prescriptions for Swift Parrots when forestry licence agreements are due for renewal in each state.

It is specified under **Management practices:**

Where forestry operations continue to occur within foraging habitats on the mainland, logging prescriptions should include the retention of all trees 60cm DBH or greater, together with at least 5 trees per hectare from a mixture of other age classes (30-40cm, 40-50cm and 50-60cm DBH) to ensure continuity of food resources over time.

The Recovery Plan states in relation to Action 4(c), 'Monitoring the effectiveness of management prescriptions in conserving habitat in production forests', that:

In NSW detailed recommendations for improving prescription measures for Swift Parrot habitat have been provided repeatedly for inclusion during threatened species license reviews. However this information, including published scientific information, has not been accounted for in any prescriptions to date. Limited compliance monitoring of prescriptions is likely to be undertaken as part of a general audit process, however this does not include identifying inadequacies of the prescriptions.

It is well recognised that it is essential to retain mature trees because of the abundant nectar they provide for a multitude of species, most notably the Critically Endangered Regent Honeyeater and nationally Endangered Swift Parrot, identified as the 7th and 13th most threatened birds in Australia.

The National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (2011) identifies the loss of mature trees and the abundance of nectar they provide for the Swift Parrot as a major threat, recommending as a prescription "*the retention of all trees 60cm DBH or greater, together with at least 5 trees per hectare from a mixture of other age classes (30-40cm, 40-50cm and 50-60cm DBH) to ensure continuity of food resources over time*". It is therefore astounding that the NSW EPA has identified both the Critically Endangered Regent Honeyeater and nationally Endangered Swift Parrot as adequately protected and totally removed the existing need to protect any mature trees, most notably the 5 mature nectar feed trees currently identified as required to limit impacts on these species,

Given the illegal removal of the tens of thousands of mature recruitment and nectar feed trees that has occurred over the past 2 decades, and the severe shortage of large mature trees throughout our forests, the retention of all remaining mature trees over 60cm dbh is strongly supported.

Damaging Habitat Trees

NEFA has also found that trees required to be retained and protected are also often illegally damaged during logging, though again the EPA refuse to do anything about it. For example, NEFA found that 22% of retained trees were illegally damaged by being sideswiped by machinery or carried logs, or by having trees dropped on them, in Cherry Tree SF. The EPA repeatedly said they would take legal action after their inspection confirmed our complaint, though in the end they did nothing at all on the spurious grounds that they couldn't prove forestry had caused the damage.

On NEFA's first visit to Cherry Tree SF on 8 March 2015 we complained to the Environment Minister, the EPA and the Forestry Corporation that retained habitat trees were suppressed, damaged, had debris placed around them, and did not appear to satisfy retention requirements. We hoped that by highlighting the obvious problems up-front that those responsible may make some attempt to fix them. To our disappointment our second visit on the 24 August revealed that these problems were ongoing and that there was no apparent improvement.

Because of our concerns that the EPA were once again not competently investigating our complaints about retention of habit trees and damage to them, in NEFA's audit of [Cherry Tree State](#)

[Forest](#) (Pugh 2015) we focussed on undertaking a systematic audit of habitat trees, recording their locations and providing photographs of them, assessing a total of 50 hectares, and concluding:

A total of 168 marked H and R trees were found to have been damaged and/or were inappropriate choices in the 14% of the logging operation assessed, with a total of 233 breaches of selection and retention requirements documented within that area.

By extrapolation of these results across the net harvest area it is expected that over 520 marked H and R trees are likely to have suffered significant physical damage during the logging operation, with 220 of these with logging debris left around them, along with debris left around an additional 460 habitat trees. In total we project that some 1,200 H&R trees are likely to be damaged or inappropriately selected in the logging operation, with over 1,600 breaches of habitat tree selection and retention requirements. This is considered to be a conservative estimate as less than 80% of the breaches are likely to have been identified in Sites 1 and 2.

In the NEFA (Pugh and Sparks 2016) [Audit of Sugarloaf State Forest](#) we again undertook a rapid systematic audit of 37ha documenting 25 hollow-bearing trees (H) and 26 marked recruitment (R) trees that had been damaged, 4 hollow bearing trees that had been logged, excessive debris left around 6 H trees and 10 R trees, and 32 marked recruitment (R) trees that failed to satisfy the selection criteria. By extrapolation we identified that across the logged area over 160 H trees (marked and unmarked) and 145 R trees are likely to have been physically damaged by the logging, with excessive debris left around over 30 H trees and 55 R trees, and 178 R trees likely to have been inappropriately selected.

There is a remarkable consistency between our findings from Cherry Tree and Sugarloaf State Forests as in both areas we recorded a logging damage (to butt, trunk and canopy) rate of 1.5 habitat trees per hectare (with half these H trees and half R trees).

When the EPA (Michael Hood 21 December 2016) provided their "final" response to our Cherry Tree audit they deferred consideration of our complaints regarding roading and logging in the EEC Lowland Rainforest and damage to habitat trees. They thereafter told us they were considering legal action, and even requested high resolution images of all the habitat tree breaches we had identified. They strung us along for almost a year before telling us (Michael Hood, 1 December 2017) that they would take no regulatory action at all. Despite the EPA confirming our complaints for Cherry Tree State Forest from their sample, they refused to take any action what-so-ever for the widespread damage to habitat trees on the spurious grounds that they couldn't prove that the Forestry Corporation caused the damage, or that indeed someone else may have sneaked in there while logging was underway (presumably with a bulldozer and chainsaw) and caused the damage:

Inspections conducted by EPA officers identified 22 trees with crown damage, 51 trees with butt damage and 49 trees that appeared to have debris greater than one metre in height within a five metre radius. These observations were subsequently the subject of further investigations.

Although it is likely the damage to the trees and the debris were as a result of harvesting operations, the EPA would be required to prove beyond reasonable doubt that each individual instance of damage or debris was as a result of an action by those undertaking the harvesting operation. The investigation was unable to obtain evidence that satisfied this requirement beyond a reasonable doubt nor could it obtain evidence that would rebut a defence that the damage was caused by some other means.



It is obvious when habitat trees have been damaged during logging yet the EPA now claim that they cannot prove that this is logging damage, or that it may have been caused by some unknown persons. LEFT: One of numerous marked habitat trees knocked by machinery when a snig track was created up to its base. RIGHT: One of many habitat trees obviously damaged by having trees dropped on it, with the debris left around it and surrounding stumps clearly showing the source of the debris. No regulatory action was taken for these or hundreds of similar breaches.

Having spent many days auditing the operation and documenting trees that had been obviously damaged during logging NEFA considers that it is easy to identify the cause of the damage from machinery tracks, locations of tree stumps and the position of cut off tree heads, Given that drainage works are implemented after each area is logged it was not possible for another person (as the EPA suggested to me) to sneak in there later, and the proposition that someone could operate in there unnoticed while logging is underway is preposterous.

For the 122 offences the EPA found in Cherry Tree they took no action what-so-ever, not even requesting an Action Plan. Indeed with this new interpretation it seems that will never be able to take an action again unless the Forestry Corporation first admits that they committed the offence, It is evident from the Forestry Corporation's response to all of the EPAs 2015 audits that they rarely admit anything.

Now they have codified this do-nothing approach into the new IFOA. If the Forestry Corporation damage a retained tree they firstly need to try to replace it with a comparative tree, if they can't find one then they need to pick a mature tree with a healthy crown (though it too may be damaged). If they can't find one of them then who knows, but at least the Forestry Corporation can no longer be held to account for their reckless logging.

The need to protect habitat trees from damage and debris, and a 5m buffer, must be re-instated.

Giant Trees

There is a requirement that all "*giant*" blackbutt and alpine ash over a 1.6m diameter at stump height over bark (DSHOB) and for all other species all "*giant*" trees over 1.4m DSHOB be retained. The NRC (2016) again over-rode the EPA who were advocating a "*Minimum 135 centimetres blackbutt, Minimum 120 centimetres all other species*". As noted by the NRC these size thresholds were specifically chosen because "*proposed size thresholds likely to have limited impact on wood supply (no net change to wood supply)*".

All such trees are the largest trees and thus should have been retained under the present prescription, though in practice the Forestry Corporation continued to log them whenever they thought they could get away with it. At least this stops such blatant roting, though all trees over a metre diameter should be retained as such large trees are becoming increasingly rare.

The Remake of the Coastal Integrated Forestry Operations Approvals Final Report Threatened Species Expert Panel Review reports the EPA representative Brian Tolhurst as stating:

All trees greater than or equal to 100 cm dbh should be retained and protected as a matter of urgency. Not only do these provide the best opportunity to develop the large hollows required by many species they also provide more flowers, fruit, nectar and seed along with nesting opportunities for large birds such as raptors. At this stage of the harvesting cycles across coastal NSW all remaining large trees are part of a limited resource and are critical for many threatened species and populations to survive. There is known clear deficit of hollow bearing trees in the forested coastal landscapes of NSW.

5. Threatened Species

Currently, for north-east NSW pre-logging surveys are required to identify locations of 36 threatened animal species, and provide various protection around them - ranging from increased feed trees up to 20ha exclusions for Brush-tailed Phascogale. Pre-logging surveys are also required for 316 threatened plant species, with most species requiring either 20m or 50m exclusion areas around records.

The draft Coastal IFOA proposes to "*reduce the need to locate threatened species through costly and ineffective surveys*", though "*proposes that 'targeted surveys' still be required to cater for some species not suited to the multi-scale landscape approach*".

In north-east NSW the intent is to remove the need to survey for and apply prescriptions to protect 22 threatened animals (9 mammals, 6 birds, 6 frogs and 1 reptile), with prescriptions only retained for 14 species. Some examples of lost protections around records of threatened fauna are:

- 20ha exclusion areas: Brush-tailed Phascogale.
- 8ha exclusion areas: Squirrel Glider.
- 30m riparian buffers on 1st and 2nd order streams within 200m: Golden-tipped Bat, Fleay's Frog, Giant Barred Frog, Stuttering Frog.
- 50m around records or inhabited wetlands: Green and Golden Bell Frog, Littlejohn's Tree Frog.
- 50m around dens and retain 15 mature feed trees within 100m of observations/200m of calls: Yellow-bellied Glider.

- Retain 10 mature eucalypt feed trees per 2ha in compartment: Regent Honeyeater, Swift Parrot, Black-chinned Honeyeater.

In north-east NSW 228 species of threatened plants (72%) will lose all protection and 28 species (9%) will have reduced protection. Most species either required 20m or 50m exclusion areas around records. Of the 91 species currently requiring 50m buffers (ie 0.79ha) around records, 79 will have all protection removed and the rest will have buffers reduced to 20m (i.e. 0.13ha).

A total of 60 threatened plants will still require limited surveys and limited protection ranging from Roadside Management Plans up to 20m exclusions.

Prescriptions were originally determined by negotiations between the NPWS and the Forestry Corporation, with many subsequently removed or reduced (none were increased). Despite claims of adaptive management, over the past 20 years there has been no monitoring undertaken to test the effectiveness of prescriptions. The agencies don't care how well they work, or what will be the consequences of reducing or removing them.

Threatened species exclusions are considered to represent an average of 3.4% of the logging area, though NEFA surveys do find many more locations of threatened species and do significantly increase exclusion areas. Protected areas would substantially increase if independent surveys were required.

Where there are records of previously protected areas for Squirrel Glider, Brush-tailed Phascogale and Koala high-use areas, that have not been subsequently logged, under the new IFOA they are intended to be protected by inclusion in 'wildlife clumps'. Though no new areas will be protected for these species.

6. Koalas

Since 1997 the Forestry Corporation have been required to thoroughly search for Koala scats ahead of logging and establish 20m exclusion zones around Koala High Use Areas (the buffer was reduced from 50m to 20m in 1998). Where some evidence of Koalas are found the compartment is identified as 'intermediate use' and 5 Koala feed trees per hectare are required to be retained (though there is no minimum tree size).

In 2012 NEFA caught the Forestry Corporation halfway through logging a Koala High Use Area and about to log 4 others in Royal Camp State Forest. They weren't looking before they logged. When they started logging nearby they still didn't look and logged another high use area.

The Forestry Corporation had been refusing to do the searches with the thoroughness required to identify Koala high use areas for 15 years. After Royal Camp the EPA briefly tried to make the Forestry Corporation do thorough searches, but soon gave up and agreed with the Forestry Corporation to abandon pre-logging searches and rely on modelled habitat instead.

The NRC (2016) identify that only "*Around 200 hectares of koala high use area has been protected over the past 15 years and tree retention requirements have been triggered on around 33 percent of compartments (130,000 hectares)*". NEFA accepts that the relatively low identification of Koala High Use Areas partially reflects the collapse of Koala populations on the north coast, though considers it also reflects the ongoing refusal by the Forestry Corporation to thoroughly search for Koala scats ahead of logging.

In 2016 the EPA undertook a project overseen by an expert panel to review various approaches to map potential Koala habitat, with extensive groundwork to test the mapping. The project found that neither modelling nor ecosystem mapping were accurate enough to identify the *"occurrence of feed trees and therefore habitat class at the level of detail required for management in state forests"*, with the panel unanimously agreeing that *"the primary intent and focus should be to identify the location, distribution and extent of areas that are supporting extant/resident koala populations"*.

Despite the conclusion from their study that modelling is too inaccurate for regulation at the scale of individual logging operations, the EPA funded DPI Forestry (Law *et. al.* 2017) to develop a model. This was intersected with an OEH (2016) likelihood model to identify high/high, moderate/high and moderate/moderate quality Koala habitat.

Because of differences between the EPA and Forestry Corporation the Natural Resources Commission (2016) was directed to resolve a prescription based on a *"modest increase in tree retention rates aim to minimise impacts on wood supply to best possible extent while recognising Government's policy initiatives and targeted investment in Koalas as an iconic species (no net change to wood supply)"*.

The EPA (NRC 2016) proposed a retention rate of *"25 trees per hectare in High/high quality habitat, 20 trees per hectare in High/moderate quality habitat, and 15 trees per hectare in Moderate/moderate quality habitat"*. The NRC over-rode the EPA to support a retention rate proposed by the Forestry Corporation specifying *"10 healthy trees per hectare with cell based application in High/high quality habitat, 5 trees per hectare with compartment wide application in High/moderate or moderate/moderate cells over 25 percent or more of compartment"*.

Under the new prescriptions Koala browse trees are required to be greater than 20 cm diameter at breast height (DBH) (30cm DBH outside the north coast). The EPA (NRC 2016) proposed that *"retain trees with minimum 25 centimetre diameter DBHOB, prioritising primary browse species, then secondary browse species."* The NRC over-rode the EPA to support the Forestry Corporation, deciding *"retain trees with minimum 20 centimetre diameter DBHOB, retaining trees where available with 50 percent primary browse species"*.

The outcome is a map of very restricted highest quality Koala habitat and a broad map of compartments with more than 25% "moderate" quality Koala habitat. In the high quality habitat the requirement is to retain up to 10 browse trees >20cm DBH per hectare in the vicinity, and in moderate quality habitat the proposed requirement is to retain up to 5 browse trees >20cm DBH per hectare.

It is evident that the EPA list of feed species fails to include numerous browse species. This means that where there are less than 5 or 10 browse trees per hectare, alternative unlisted browse trees are allowed to be logged rather than retained.

43% of the mapped high quality Koala habitat on State Forests is within the North Coast Intensive zone and thus intended for clearfelling. Illegal logging in these forests over the past decade has focussed on replacing Koala feed trees with Blackbutt.

The methodology for applying the models is very simplistic and appears intended to reduce the identification of high quality habitat requiring higher tree retention rates. For example, Royal Camp and Carwong State Forests which have been identified by the EPA to be source Koala habitat with Koala occupancy of 58% and 80% respectively, are ranked as being very high on the OEH

Likelihood Map, but only Moderate on the DPI Forestry map. So these important Koala habitats will only qualify for Koala Prescription 2 and the retention of 5 browse trees per ha.

In abandoning any measures to ascertain whether Koalas are present in an area, the EPA have deliberately abandoned any measures to identify and protect resident Koala populations and will instead often provide their limited protection to uninhabited and unsuitable habitat while allowing logging of the best habitat left. The Forestry Corporation can now log high-use koala habitat at their whim.

Despite north-coast Koala populations crashing by 50% over the past 15-20 years, in part due to the logging of core Koala habitat and the loss of mature feed trees through logging, the Forestry Corporation and EPA are removing the need to identify and protect occupied Koala habitat. They are prioritising the protection of virtual Koalas over real Koalas, while targeting half of the high quality modelled habitat for the most aggressive logging and conversion into quasi-plantations. This is clearly not compliant with the Commonwealth Conservation and Management Strategy and NSW Recovery Plan requirements.

7. Bell Miner Associated Dieback

Bell Miner Associated Dieback (BMAD) occurs when canopy trees are removed allowing lantana to dominate the understorey. It is logging-induced ecosystem collapse. It was first recognised in the 1940s, though in recent decades has been spreading, along with lantana, at an alarming rate, likely exasperated by increasing water stress due to climate change. In some State Forests up to 60% of the eucalypt forests are affected. It occurs throughout coastal NSW.

I appreciate that NSW agencies do everything they can to ignore the issue of logging dieback (BMAD), even going so far as to ignore my invitation to see it for themselves as part of the consultation process - preferring to sit around twiddling their thumbs instead. It is the inconvenient truth that they don't want to know about. Though for me it is heartbreaking to go out into forests I know and love and to have watched them sicken and die over the past 25 years while all my pleas for action to redress its spread go ignored. As the forests die the Forestry Corporation hit them harder and harder - ignoring their own research that shows they are aggravating it more and more. Their tame lapdogs, the EPA, sit on the sidelines pretending to do something while they do nothing at all as the tragedy unfolds around them. This is what I regard as the most tragic abuse of duty of care by Government agencies I have come across in all my years of environmental activism. All that I can do is to vainly try to make them see what is an unfolding environmental catastrophe before it is too late.

My [most recent report](#) documents the nature of the problem and gives some case studies from the Border Ranges Region. It is included as part of this submission,

When the NSW Scientific Committee listed BMAD as a Key Threatening Process in 2008 they considered it was initiated on sites "*where tree canopy cover has been reduced by 35 – 65 % and which contain a dense understorey, often of Lantana camara*". Many researchers have reached the conclusion that it is initiated by logging.

Yet again the most recent review by Silver and Carnegie (2017) for OEH found that the literature supports that logging is primary cause of dieback - without clearly saying so. The process of BMAD has been identified for over 20 years, and the process is once again confirmed to be:

1. Reduction in density of overstorey canopy, or creation of gaps in the overstorey results in an increase in density of understorey plants, particularly the weed lantana ➤
2. Lantana outcompetes and suppresses native species, creating a dense understorey which is ideal for nesting by Bell Miners (Bellbirds) ➤
3. Aided by the open overstorey, Bell Miners aggressively mob other bird species (and predators and diurnal arboreal species) to exclude them from their territories ➤
4. The reduction in predators of the sap-sucking psyllids, coupled with the preferential feeding of Bell Miners on the psyllids sugary coatings (lerps) leaving the psyllids intact, enables populations of psyllids to proliferate ➤
5. Psyllids primarily feed on the leaves of eucalypt trees causing defoliation. The trees use their carbohydrate stores to produce new foliage with the young leaves even more attractive to psyllids ➤
6. Repeated defoliation depletes tree's carbohydrate stores, allowing for an increase in attack by secondary pests (such as wood-borers) and disease, and causing trees to sicken and die. Once a tree's carbohydrate stores are sufficiently depleted they may be unable to recover.

Regrettably NSW Agencies abhor the precautionary principle and try to ignore what is staring them in the face.

DPI - Forestry recently used helicopter sketch-mapping to identify 44,777ha of BMAD north from Taree. Though comparison with other mapping indicates that there is something like double this area affected.

In 2005 (Stone *et.al.* 2005) a collaborative process by NSW Agencies used high resolution multi-spectral imagery (DMSI) to map BMAD across 30,000ha of the Richmond Range.

For the study 24 ground plots were assessed. which confirmed "*an apparent relative association between unhealthy eucalypt crown condition, higher site fertility (i.e. higher soil ammonium content and a low soil carbon to nitrogen ratio), high shrub cover, low tree crown cover and high bell miner density*".

For the entire 30,000 ha Richmond Range study area the results provided the following areas within each category.

Category	Percent area	Total area (ha)
Healthy sclerophyll tree crowns	30%	9,000
Mildly affected (slightly stressed) trees crowns *	20%	6,000
Moderately to severely BMAD affected trees	29%	8,700
Mesic vegetation including rainforest species and visible lantana (healthy)	7%	2,100
Non tree features (shadow, water, soil and grassland/pasture)	14%	4,200

The study notes "*We believe that the area classified as having healthy sclerophyll crowns is a slight under estimation while the area classified as slightly affected by Bell miner associated dieback may be a small over-estimation. This is due, in part, to the influence of the dry grassy understorey in the thinner Spotted gum stands which can influence the cumulative spectral response obtained by the DMSI. In addition, the classification process might also be detecting some of the ridge-top Spotted*

gum stands that may have been mildly stressed from drought at the time of image acquisition (August 2004)".

This study provides the best data available to ground truth both the 2004 and 2018 mapping. It shows that both aerial visual sketch-mapping exercises grossly under-estimated the extent of BMAD. The Richmond Range study identified 14,700 ha (49%) as being affected by BMAD, compared to the 2018 aerial visual sketch-mapping only identifying 5,600 ha as affected within the same area, and even with the additional areas identified in the 2004 aerial mapping the combined total is just 10,000 ha (33%). So it appears that the aerial 2018 visual sketch-mapping is grossly under-estimating BMAD by some 62%, and that even when the two aerial visual sketch-mapping exercises are combined they still understate the extent of BMAD by some 32%.

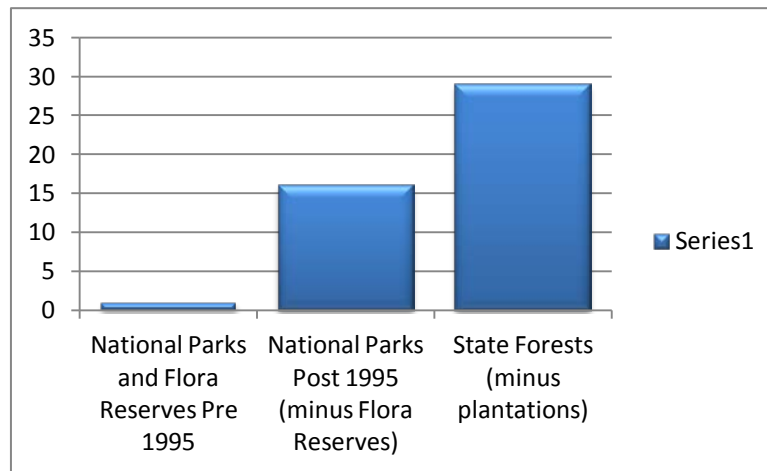
[Pugh \(2018\)](#) undertook a review of the two DPI Bell Miner Associated Dieback mapping exercises undertaken in the NSW section of the Border Ranges Biodiversity Hotspot, and the 2017 Government literature review, and concluded:

- Logging that initiates or promotes BMAD contravenes the basic principles of Ecologically Sustainable Forest Management.
- There has variously been some 37,000 hectares of forests mapped as affected by BMAD in the two DPI exercises in the Border Ranges region, with BMAD concentrated in the west of the region on the Richmond, Capeen, Tooloom, McPherson and Main Ranges, but extending to near the coast in Byron Shire.
- Around half the BMAD recently mapped north of Taree occurs in the Border Ranges, identifying it one of the worst dieback affected forest areas in Australia.
- Some 9% of the region's remnant forests have been mapped as BMAD affected, with this increasing to 27% of forests on State Forests.
- Around 1% of the older reserves created before 1995 are affected by BMAD, though this increases up to 16% of reserves that were being logged up until they were made into reserves in the forest reform process (mostly 1995-1999), and up to 29% of current State Forests (excluding plantations). BMAD clearly increases with logging history.
- There are 5 broad forest ecosystems with 20-43% of their extent affected. On State Forests 7 broad forest ecosystems have 40-56% of their extent affected.
- On State Forests BMAD affects 40% of the Endangered Ecological Community (EEC) Grey Box-Grey Gum Wet Sclerophyll Forest, 35% of the EEC White Gum Moist Forest and 31% of the EEC Lowland Rainforest.
- On State Forests BMAD affects 1,852ha (28%) of high and very high quality Koala habitat identified as occurring.
- It is alarming that there have only been 3 monitored trials of BMAD treatments in north east NSW and that the outcomes for the two trials on State Forests have been largely suppressed and ignored.

A major thrust of the Forestry Corporation and the EPA is to create the pretence that BMAD has nothing to do with forestry. One way of doing this is to claim that because BMAD occurs on National Parks, it can't have anything to do with logging. It is a convenient and effective excuse for inaction.

In order to properly consider the tenure claim, for the Border Ranges region a simple comparison was made of National Parks (and Flora Reserves) created before 1995, National Parks created after 1995 (mostly created from State Forests from 1995-1999 as part of the forest reform process) and current State Forests (excluding plantations). It is clear that most of the BMAD on National Parks is

in parks that were being logged up until their creation as part of the forest reform process (post 1995). It is also clear that the ongoing logging of State Forests has dramatically increased BMAD over the past 20 years.



Percentage of public tenures now affected by BMAD in the Border Ranges Region. Note the trends of increasing BMAD with increasing logging over time.

NEFA has been attempting to have BMAD addressed for 25 years, with concerted attempts over the past 9 years to have logging stopped in affected and susceptible public forests met by Government Agency obfuscation *and inaction*

The IFOA intends to allow the ongoing logging of BMAD affected forests, subject to some basic simplistic acknowledgement of its presence by FC. It will only require an operational plan to subjectively identify "*the occurrence and susceptibility of the operational area to Bell Miner associated dieback*", and where this is identified "*details of each management action to be implemented in the operational area to mitigate the impact or further spread of Bell Miner associated dieback*". This amounts to nothing more than a subjective cursory assessment and allows for their current protocol of targeting all trees affected by BMAD to be targeted for removal to continue.

Though what is most concerning is that rehabilitation work is only required when forest is on its last legs: "*Regeneration to achieve the standards in this protocol is only required for harvested areas where the natural floristic composition exists at a basal area of less than 14 square metres per hectare (14 m²/ha)*". 14m² is bummer all (for example intact high site quality forest can have an average basal area of 47m² per ha, and in better forests 60m²), and it can be made up of dead and dying trees.

Harvested areas are defined to be "*The portion of the operational area that has been subject to harvesting operations or forest products operations as part of the current forestry operation*". It is only areas subject to "active" logging that require rehabilitation. The extensive areas of degraded forests with no or little millable timber can simply be excluded from "active" logging and will never require rehabilitation.

This is yet another attempt to do nothing to redress the problem while allowing the Forestry Corporation to go on degrading our public native forests. It is sickening - particularly for our forests.

8. Logging Intensity

Under the current IFOA two logging regimes are allowed: Single Tree Retention (STS) and Australian Group Selection (AGS). STS is the only logging regime currently practiced.

The current intensive logging regime (Australian Group Selection) limits the size of cleared patches to 0.25 hectare (50m by 50m), and requires logging be excluded from 10% of the net logging area.

Current requirements for Single Tree Retention are for 60% of the basal area (area of the cross section of a tree trunk) of the trees in a harvesting area, including all trees under 20cm diameter, to be left after a logging operation.

In a natural forest basal area can vary from as low as 18m² ha on a low productivity site, up to 47m² ha on a high quality site (Smith 2000), with up to 60m² on better quality sites, The NRC effectively identify the basal area range as 17-40m² per hectare, identify the current 60% retention requirement as equivalent to the retention of 10 to 24 m² per hectare. The classic study on Blackbutt Forests by Florence recommended retention of a minimum basal area of 22m² per hectare.

The proposal is to establish 3 zones where logging is only limited by basal area retention. These will be a 140,000ha North Coast Intensive Zone covering Coastal forests south from Grafton to Taree, a coastal "regrowth" zone and an escarpment "non-regrowth" zone.

The proposed North Coast Intensive Zone is for alternative coupe logging, with coupes limited to 45ha. 10% of the loggable area is required to set aside as wildlife or habitat tree clumps. For 90% of the loggable area there are no minimum basal area retention requirements. Retention of up to 5 remaining hollow-bearing trees per hectare, and koala feed trees (within modelled habitat) require retention - preferably within wildlife and habitat tree clumps. So if the tree retention requirements have been met in the clumps (which is likely) then they will effectively be no constraints on most of the 90%, meaning that large areas can be clearfelled with at best a few small retained trees. Up to 2,200ha is allowed to be intensively treated each year, with clearfelled patches of 45ha (60 ha clearfells will be allowed for the first 2 years).

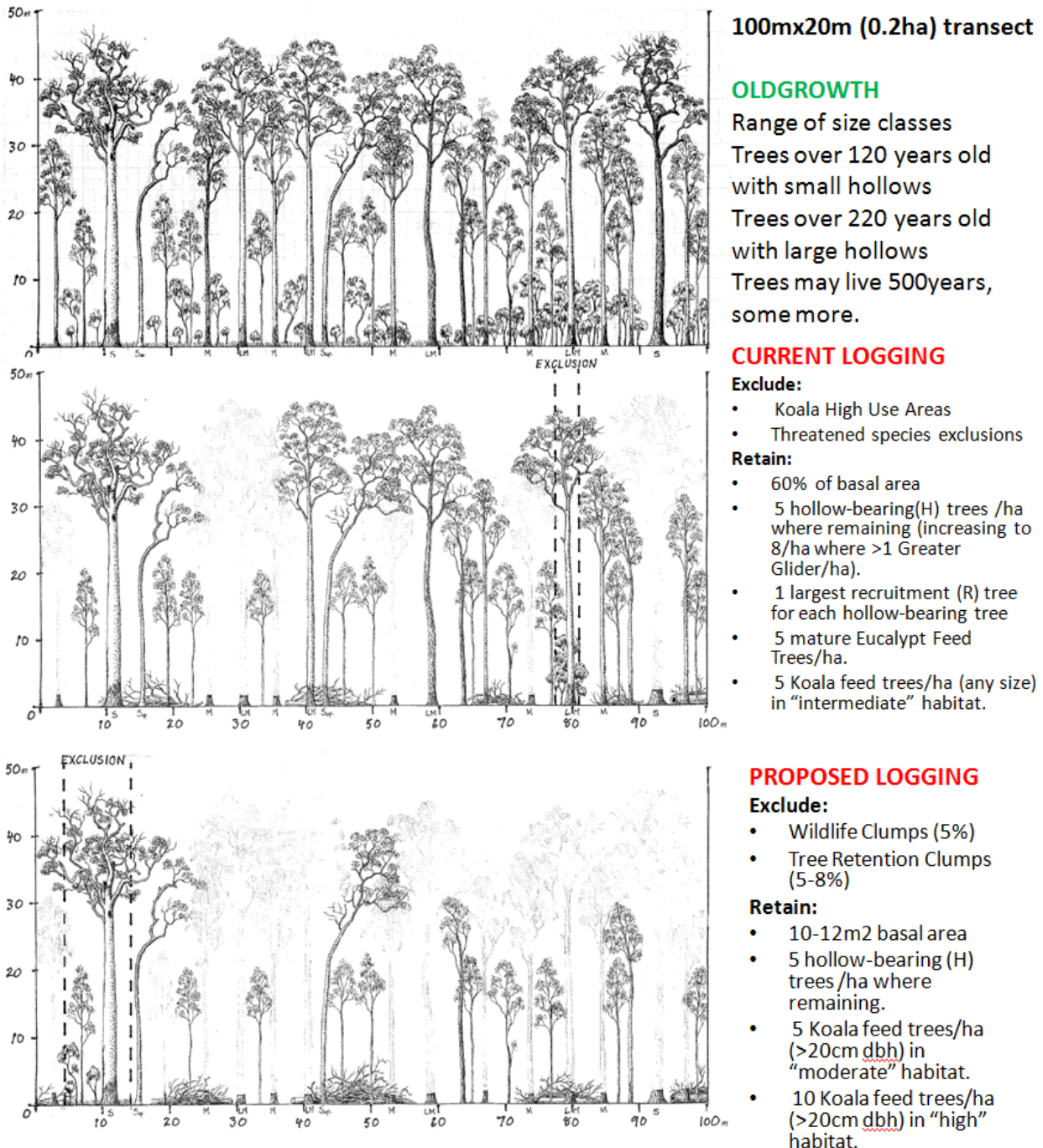
The EPA (NRC 2016) argued the baseline for intensive logging should be Australian Group Selection, though never-the-less argued for maximum 30ha clearfells with 21 years between clearfells and 10 years between adjacent clearfells. The Forestry Corporation wanted 60 ha clearfells with 14 year return times and 7 years between adjacent clearfells. The NRC went with 45 ha clearfells, 21 year return times and 10 years between adjacent clearfells. Though the Forestry Corporation will just do what they want.

Since 2006 the Forestry Corporation have been practicing an illegal form of Single Tree Selection called "Regeneration Single Tree Selection" where they have been taking up to 90% of the basal area. NEFA have been complaining about this for years, leading the EPA (2016), on behalf of the Environment Minister, to admit this *"is not consistent with the definition and intent of STS (Single Tree Selection) in the Integrated Forestry Operations Approval (IFOA) as well as FCNSW's own silvicultural guidelines."*

Despite its illegality the NRC (2016) consider that as the Forestry Corporation have been practicing "Regeneration Single Tree Selection" since 2007 they would adopt this as **Current harvesting practice** to reference proposed changes against. They give the parameters as *"no upper coupe*

size limit, coupes range in size from 5 hectares to over 100 hectares, 4 harvest cycles, 7 year average gap, 21 years until all harvested". This is a big difference from 60% basal area retention and retention of all trees <20cm., which is the current regime that the EPA recommended should be the benchmark.

Selective Logging



**Differences between logging regimes when applied to a natural oldgrowth forest.
Based on a 100m x 20m transect (0.2ha)**

Under the new rules 10% of the loggable area in the "regrowth" zone, and 13% of the loggable area in the non-regrowth zone will be required to be set aside in as wildlife or habitat tree clumps. The only limit on selective harvesting in the remaining 87-90% is that in the regrowth zone the minimal

basal area required is 10m² ha and in the non-regrowth zone 12m² ha. The EPA (NRC 2016) recommended basal area retention of 12 and 14m² ha respectively though they were over-ridden by the Natural Resources Commission.

The new rules allow for logging intensity to increase on better sites, with as little as 16-25% of the basal area retained in the better quality forests. This is well below expert recommendations.

The Remake of the Coastal Integrated Forestry Operations Approvals Final Report Threatened Species Expert Panel Review reports the EPA representative Brian Tolhurst (one of the 10 experts who answered questions) as stating:

Sustainable forest management requires maintenance of forest stand structure complexity and heterogeneity to allow for biodiversity conservation. This key point seems to have been given up on in this review process with harvesting practices proposed that will severely degrade these forests to an artificial and simplified arrangement with severely reduced and limited biodiversity values.

I think this remake is an interventionist approach to remedy a situation that has evolved through poor and desperate practices adopted to meet an unsustainable wood supply agreement at significant expense to the environment and the people of NSW. Continuing down this path will have long term deleterious environmental outcomes for the public forests of NSW in order to limp across the line and meet the final years of the wood supply agreements. This will be entirely at the expense of these forests. Recovery to some level of 'natural' ecological function will be decades and centuries, possibly without many species that will not survive this current and ongoing impact.

... The intensive harvesting has clearly moved the coastal state forests from being multiple use forests with significant biodiversity values to that of purely production forests more in line with plantations. I don't believe this is an appropriate outcome or use of these crown lands that was ever envisaged.

... Removal of standing trees below a basal area of around 18 - 20m²/ha will reduce the structure of these native forests to such a simple form that the ecological processes will be severely diminished or non-functioning. Even in the best case scenario it will take many decades or even centuries of recovery for any level of native forest ecological function to be restored after this intensity and scale of impact.

A typical healthily stocked Blackbutt forest could be expected to have a basal area of around 30 - 40 m²/ha. Currently under the IFOA a 40% removal would limit the minimum basal area retention of 18 m²/ha in the worst case scenario.

9. Logging Volumes

The NSW Government repeatedly promised that the new IFOA would result in "*no net change to wood supply and no erosion of environmental values*",

With the NSW Government now proposing to log oldgrowth forest and rainforest, increase logging intensity, introduce clearfelling, reduce buffers on headwater streams, and remove protections for most threatened species on public land in north-east NSW, it is clear that they lied to us.

The Government justified all these environmental wind-backs on the grounds that they promised the industry that they would not impact on existing wood supply obligations, and it is clear that this took precedence.

It is hard to fathom exactly what the current wood supply from north-east NSW is. Every document relating to current supply levels of high quality sawlogs (m³ per annum) from native forests and hardwood plantations in north-east NSW are very different: in 2015 in response to a question to Nick Roberts the Forestry Corporation stated that current allocations were 192,471, in 2017 the EPA reported that as at 2015 they were 179,600, in 2018 the Forestry Corporation released an Expression of Interest that identified current commitments as 168,812 and now the EPA and NRC claims they are 220,423.

For most of June NEFA sought replies from EPA, NRC and Forestry Corporation to specific questions about wood commitments from north-east NSW. It wasn't until July that partial responses were put on the EPA's website, and 9 July before I received specific responses to my questions. I am still trying to get information on the basis for NRC identifying a reduction of 8,600m³ of high quality sawlogs compared to commitments.

Based on claims of resource short-falls the EPA agreed to major wind-backs of environmental protections, including increasing logging intensity, removing protections for mature trees, reducing buffers on headwater streams, and removing protections for most threatened species.

Then, on the grounds of resource shortfalls, the Natural Resources Commission (NRC) intervened to side with the Forestry Corporation against the EPA to further increase logging intensity, increase the size of clearfells, slash retention rates for Koala feed trees, and increase the size of old trees that can be logged.

Even then the NRC claimed that "*it is not possible to meet the Government's commitments around both environmental values and wood supply*" maintaining there would be a shortfall in commitments from north-east NSW of 7,600 to 8,600 cubic metres of high quality sawlogs per annum due to protections for Endangered Ecological Communities and Koalas. To make up this claimed shortfall the Government decided to log oldgrowth and rainforest protected in the reserve system.

9.1. The Current Commitments

After an inordinate delay, with repeated questioning, I was supplied with the following data for current allocations of high quality sawlogs from north east NSW:

High Quality Product Allocation (m3)	North Coast
Large Sawlogs (>40 cm)	127,145

Small Sawlogs (<40 cm)	46,096
Poles	31,600
Veneer	11,202
Girders	4,150
Piles	260
Total	220,423

In addition to this I was provided with indicative other timber product volumes sold under a range of supply agreements (tonnes)

High Quality Log Volume sold under parcel sales*	~10,000
Low Quality Logs	~220,000
Pulp/Firewood	~100,000
Grand Total	~550,000

As identified above there are major discrepancies between this data and other publicly available data (which I have asked to be explained), though for the purposes of this submission I will accept it at face value.

NEFA does not accept that the Forestry Corporation providing parcel sales in addition to allocations is a wise move in light of all the concerns about over-allocations and do not consider them a legitimate "existing wood supply obligation". The industry has expressed considerable concern with current and future resource availability as identified by the NSW Department of Primary Industries (2017), who also commented that "*Some customers expressed concern that FCNSW is selling logs that should be used to meet existing supply commitments to customers without WSAs*".

9.1.1. Increasing the Cut to Create a Shortfall

After being informed that the IFOA was based on modelling that 237,000m³ per annum of High Quality Sawlogs (HQL) are available, I expressed concerns (19 June 2018) to NRC that this was a significant increase in commitments. The NRC (pers comm 20/06/2018) assured me that "*The Commission has not reported or made any claim that there will be an increase in wood supply arising from the coastal IFOA remake. The Government's twin commitment requires no net change to wood supply.*" Though the actual cut over the past 2 years seems to indicate that the Forestry Corporation has already increased supply.

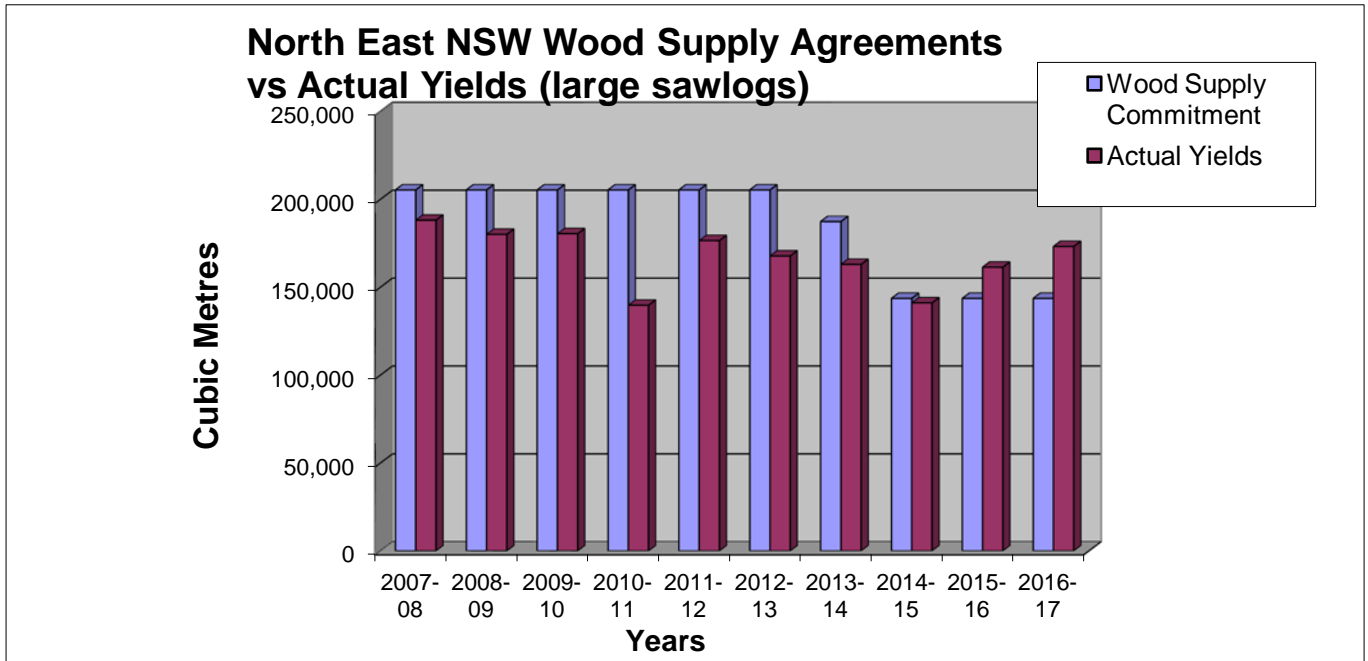
Over the 2 years 2016 and 2017 the average cut of HQL per annum was far in excess of the 220,423 allocations:

- 227,400 m³/annum from native forests
- 13,207 m³/annum from plantations
- TOTAL 240,607 m³/annum.

Two interesting facts emerge, the total cut was 40,368 (9%) above allocations, and plantations only provided just 5.5% of the cut. The Forestry Corporation seem to be doing parcel sales well in excess of what is claimed or allowed.

The Forestry Corporation claim the allocations for large sawlogs (including veneer and girder) have been around 143,657 since the buyback, though in 2016 and 2017 the Forestry Corporation logged 161,389 m³ and 173,178 m³ of large sawlogs respectively. It is apparent that aside from one year

the Forestry Corporation have been continuing to log at the levels they were logging large sawlogs before the 2014 Boral buyback. It seems the buyback has been a very expensive exercise to enable the Forestry Corporation to go on over-logging public forests. Of course the more they log now, the greater the shortfall in later years and the greater the volumes of oldgrowth forest they can claim to need to log to make up the difference.

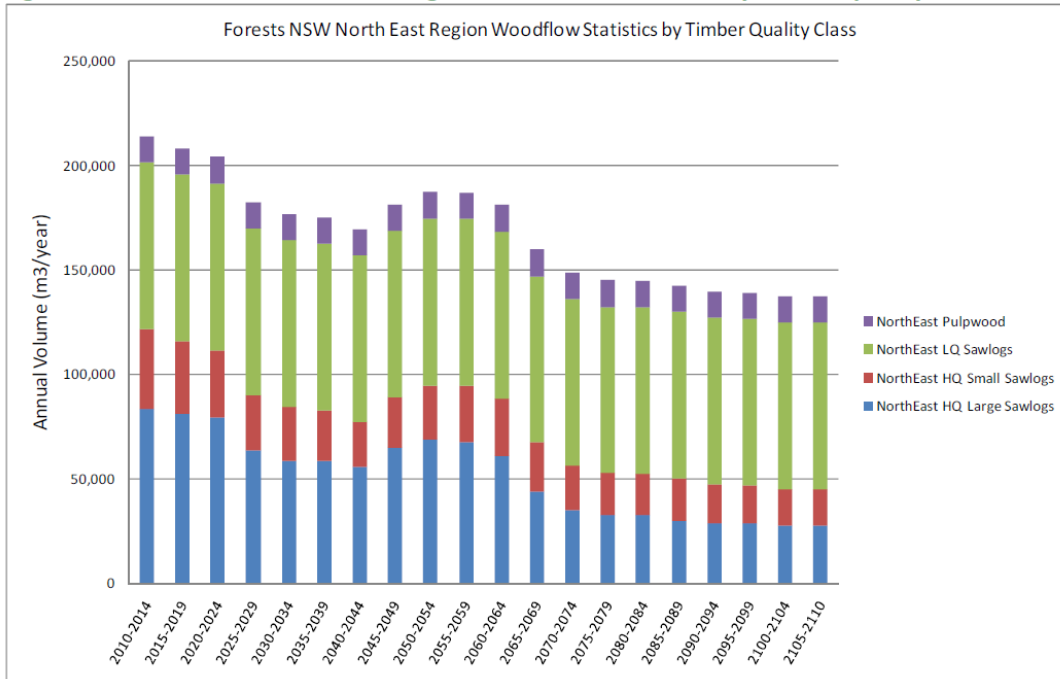


9.1.2. Bringing Forward the Cut to Increase future Shortfalls

NSW Agencies are claiming that based on Forestry Corporation's modelling that an average yield of 237,000 m³ of high quality sawlogs are available from north east NSW's native forests and plantations for the next 100 years. This is 16,577 m³ per annum above the claimed current allocations of 220,423 m³ per annum, with this also representing 33% of the timber we bought back from Boral at such a high cost.

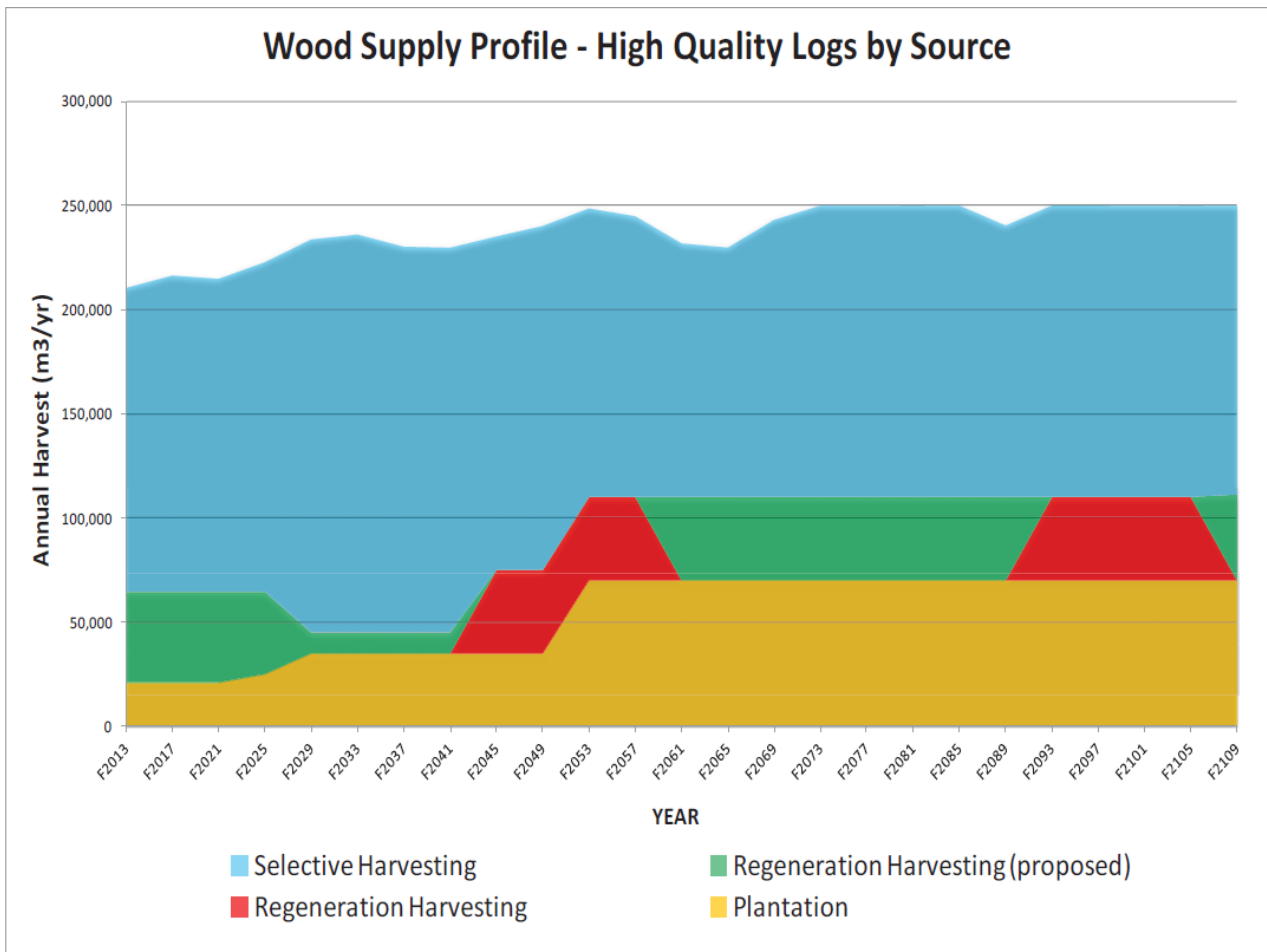
This is a very rosy picture compared to the Forestry Corporation's 2010 modelling (which was published without any supporting information).

Figure 7: Forests NSW North East Region wood flow statistics by timber quality class



Forests NSW yield estimates for native forest regions, November 2010

The 'North Coast Resource Assessment Summary 2015' is the only publicly available data on Forestry Corporations current modelling, and this is vague and simplistic. There no ability to identify how the yields were derived and what the future annual availability is aside from in two graphs. This is the same data as provided in the NRC report:.



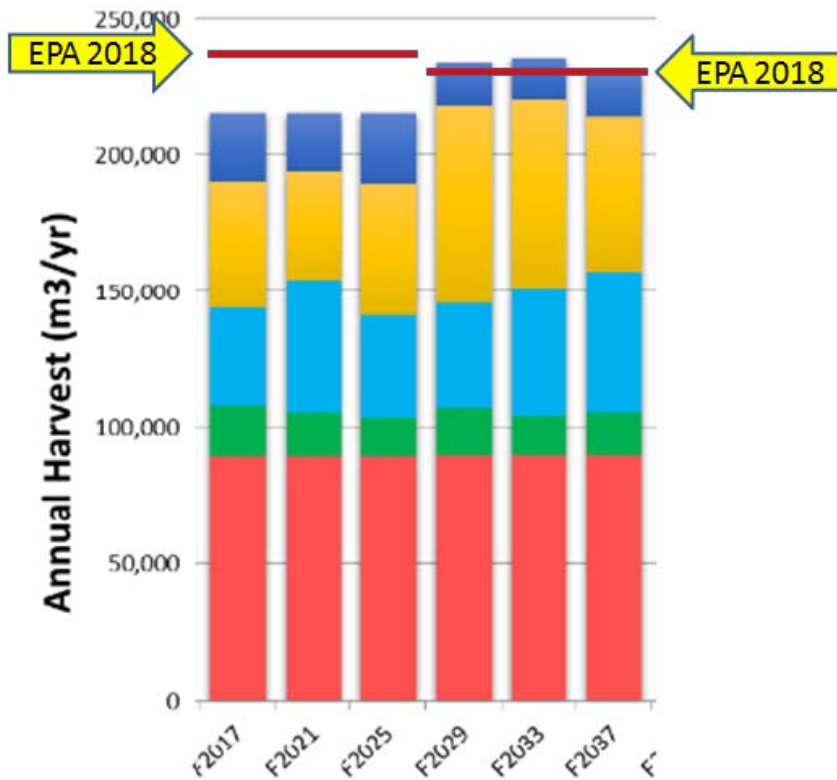
I was told by the EPA/NRC that the Forestry Corporation modelling for HQL over the 2017-2028 period is

- 210,600m³/annum from native forests
- 26,100 m³/annum from plantations.
- TOTAL 236,700 m³/annum.

And over the 2029-2040 period (12 years) is

- 193,600m³/annum from native forests
- 36,500 m³/annum from plantations.
- TOTAL 230,100 m³/annum.

There are significant differences between the modelled yields identified in the limited literature and those now claimed to be available over the next 24 years. For the period 2017-2028 the published data (that NRC claims to be relying on) identifies a total volume of HQL of around 215,000 m³ per annum, yet the EPA/NRC now claim it is 236,700 m³/annum, This is an increase in total volume over the 12 years of 260,400m³, over a year's supply. Conversely for the 2029-2040 period the published data is more comparable, identifying a total volume of HQL of around 231,000m³ per annum, with the EPA/NRC now claiming it is 230,100 m³/annum. No explanation is available for these gross differences.



Comparison of 2015 claimed volumes of available timber volumes (from FCNSW 2015 Fig3) with those now claimed by EPA in correspondence to NEFA. Note the significant increase over the period of 2017-2028.

I was shocked to see that the modelled volumes the EPA, NRC and Forestry Corporation now claim to be relying on is so different from the published data they also all claim to be relying on. Though I shouldn't be surprised as this is normal in the murky and secretive world of resource modelling and allocations. It is little wonder that no one has faith in Forestry Corporation's modelling as they can just change it at their whim to suit whatever outcome they are after at the time.

Given that it has taken over a month to squeeze this limited data out of them, all that I can now do is accept their latest claims. Based on these claims, theoretically over the 2017-2028 period there would be a surplus of 20,184 m³ per annum of HQL above allocations, and over the 2029-2040 period there would be a surplus of 9,677 m³ per annum above allocations. This equates to a total volume of 358,332 m³ (1.6 years supply), plus growth, that can theoretically be reallocated to reduce shortfalls in later years. The NRC and Forestry Corporation's manipulation of the data to increase short-term yields, and the apparent increase in cutting rates over the past 2 years to make sure there is no carryover, appear intended to create a shortfall later in the cutting cycle to justify logging oldgrowth forest.

It is interesting that over the 2017-2028 period 11% of the HQL resource is expected to come from plantations, and over the 2029-2040 period 16% is expected to come from plantations. For north-east NSW Appendix K of the RFA review states:

Over the 2004 to 2014 period, FCNSW has harvested timber from the following sources: native forests within state forests supplied 85% of high quality timber in the North East RFA region, hardwood plantations within state forests supplied 14%, and private native forestry provided the remaining 1%.

9.1.3. Industry concerns about the Shortfall

Aside from this apparently deliberate manipulation, the unreliability of Forestry Corporation's modelling is legendary. As well as conservation groups, few sawmillers have any faith in it. For example the NSW Department of Primary Industries (2017) states:

Despite assurances that FCNSW is able to meet its future supply volumes on the North Coast, most customers indicated a lack of confidence and/or awareness of FCNSW resource projections. Customers on both the North and South Coast raised concern that areas of forest are being over cut in some instances to manage supply commitments.

Despite the buybacks the 2018 North Coast NSW Private Native Forest Primary Processors Survey Report found the sawmill owners were still pessimistic about the volumes of timber available.

Of the millers surveyed 24% considered log yields from State Forests will decline over the next couple of years, one commenting "FC been over logging for a long time. SF NSW- logs getting smaller & lower quality".

The DPI Primary Processors Survey Report identifies

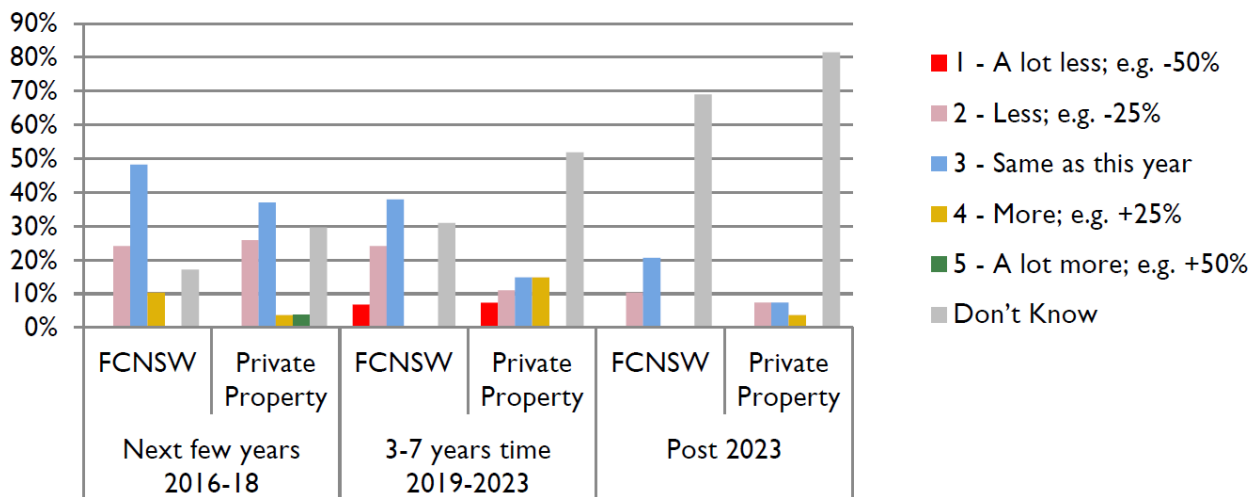


Figure 8 Views of primary processors on future log supplies

Many millers appear to be expecting major problems with declining supply from public lands after the expiry of their current allocations in 2023. One miller commenting "Very concerned - cliff coming needs addressing soon. Too many people chasing logs and in industry".

NSW Department of Primary Industries (2017) states:

A buyback of WSAs could be considered as a precursor to a reallocation of the resource. ... GHD considers that an allocation in the order of 15,000 m³ might be adequate for a buyback to adjust for all these considerations and potentially rationalise the industry or allow a new entrant, however, this would be subject to the development of a full business case.

... GHD recommends that the NSW Government consider a further WSA buyback to reduce the current allocation.

GHD has reviewed the current North Coast supply commitments against delivery volumes by species and concludes that a buyback in the order of 15,000 m³ is targeted.

The 2018 North Coast NSW Private Native Forest Primary Processors Survey Report reports "*Interestingly, respondents reported buying larger volumes of pulp and 'other' grade logs than was sold to them by FCNSW*". Accepting that "*Survey capture of poles and piles was poor due to processors declining to be interviewed*", the data show a variety of discrepancies, which seems to indicate that timber reputedly sold by the FC as salvage grade is being purchased as high quality sawlogs, pulpwood and "other". Given that only 83% of sales are accounted for, this discrepancy is likely to be far more significant. An explanation should be required.

Table 6 Surveyed capture of FCNSW hardwood log sales on the north coast

Log grade group	Purchases (m ³) reported by respondents	Annual volume (m ³) sold by FCNSW (av. June 2014-June 2016)	Percentage surveyed
HQ FC native (large & small sawlogs, veneer grade and girders)	213,486	201,200	106%
Poles FC (poles and piles)	5,620	27,403	21%
Salvage grade FC	126,338	201,204	63%
Pulp FC	22,708	14,634	155%
Other (miscellaneous, unknown & firewood) FC	15,028	13,223	114%
Total	383,181	457,665	83.7%

9.1.4. Paying out Boral to address the Shortfall

In 2014 the NSW Minister for Primary Industries, Katrina Hodgkinson, announced the decision to pay Boral \$8.55 million to buy back 50,000 m³ of timber allocations (actually 49,000) annually for the next nine and a half years, reducing their WSA to 116,000m³ p.a. Some 40,000 is to be blackbutt, leaving Boral with a minimum of 58,000 m³ p.a. of blackbutt sawlogs. The Minister claimed this was necessary "*to reduce the harvest of high-quality saw logs on the North Coast to ensure the long-term sustainable supply of timber from the region's forests*".

Boral's WSA was extended from December 2023 to December 2028, giving them an additional 5 years allocation. This means that the Government paid \$8.55 million to buy back a total of 465,500 m³ of sawlogs (9.5 years), while giving the company an additional 580,000 m³ of sawlogs for free. Boral also had their preferential allocation of Blackbutt extended further into a period of dramatically declining yields, enhancing their stranglehold on available yields.

The EPA's NSW Regional Forest Agreements Implementation Report 2004–2014, Appendix K Timber production in NSW RFA regions', claims the buyback "*reduced annual allocations of HQ sawlogs from 230,000 m³ to about 179,600 m³*". The EPA and NRC have repeatedly refused to explain why this figure is so different from their recent claims that commitments of HQL are 220,423. Even accepting the recent claim of current commitments, the evidence is that for the past 2 years the Forestry Corporation have cut an average of 20,184m³ p.a. of HQL above allocations (40% of the volumes bought back), and are saying that available yields are 16,577 m³ above allocations (33% of the volumes bought back).

The cost of the Boral buyback equates to \$18.40 per m³. (not including giving more timber back to them). The Forestry Corporation are now saying that over the next 100 years there is a total of 1,657,700 m³ above allocations available. Why did NSW taxpayers spend \$8,55 million to buy back timber when the Forestry Corporation's modelling is effectively saying there was no need to. Why over the past 2 years did we reallocate 40,368 m³ to sawmillers that we paid Boral \$742,770 to buy back?

9.1.5. Pretending there has Never been any Shortfall.

Absurdly the new IFOA is allowing the removal of 269,000 m³ p.a. large high quality sawlogs per annum from north-east NSW, which was the original 1998 gross over-estimate. Why retain it as it is totally divorced from reality?

The Conditions state:

13.1 The forestry operations authorised by this approval, subject to the forestry operations being carried out in accordance with this approval, are:

(a) harvesting operations:

...

*iv. that are carried out in an area where the maximum volume of **timber product** specified in **Table 8 of Schedule 2** for that area has not been met or exceeded in the financial year in which the **harvesting operations** are carried out;*

133.5 Timber volume limits contained in Table 8 will be maintained to align with the NSW Regional Forest Agreements (as current from time to time).

Table 8: Criteria for each area, identifies for the north east "Harvesting operations are forestry operations if the harvesting operations produce the following timber products":

Upper North East

High quality large sawlogs and large veneer logs, produced in the following quantities:

- (i) no more than 136,250 m₃ (that is, 109,000 m₃ + 25% of 109,000 m₃) per financial year; and*
- (ii) no more than 572,250 m₃ (that is, 109,000 m₃ x 5 + 5% of that total) in each 5-year period commencing 1 July 2018; and*
- (iii) no more than 2,180,000 m₃ (that is, 109,000 m₃ x 20) over the duration of this approval.*

Lower North East

High quality large sawlogs and large veneer logs, produced in the following quantities:

- (i) no more than 200,000 m₃ (that is, 160,000 m₃ + 25% of 160,000 m₃) per financial year; and*
- (ii) no more than 840,000 m₃ (that is, 160,000 m₃ x 5 + 5% of that total) in each 5-year period commencing 1 July 2018; and*
- (iii) no more than 3,200,000 m₃ (that is, 160,000 m₃ x 20) over the duration of this approval.*

It is a total nonsense to use cutting limits that have been totally discredited as constituting *authorised* limits for the IFOA. These are outrageously high and a nonsense. The volumes must be reduced from the proposed 269,000 m³ of large high quality sawlogs and veneer logs per annum from north east NSW down to, at a maximum, 138,347m³ pa (allowing for balancing overcuts and

undercuts) to be consistent with current commitments and the Minister's promise. There needs to be additional constraints added to limit the overall cut of high quality sawlogs to 220,423 m³ pa.

In 1998 sawlog volumes were guaranteed to sawmill owners for free for 20 years in Wood Supply Agreements. In 2000 the NSW and Commonwealth Governments' signed the Regional Forest Agreement for North East New South Wales (Upper North East and Lower North East Regions) (Anon2000), which states:

Under the Sustainable Wood Supply Strategy, NSW agrees to supply 129,000m³ per annum for 20 years in the Upper North East Region and 140,000 m³ per annum in the Lower North East Region of High Quality Large Sawlogs and Large Veneer Logs. Annually, approximately 20,000 m³ of High Quality Large Sawlogs and Large Veneer Logs allocated in the Upper North East Region will be sourced from the Lower North East Region over the period of the Agreement.

...

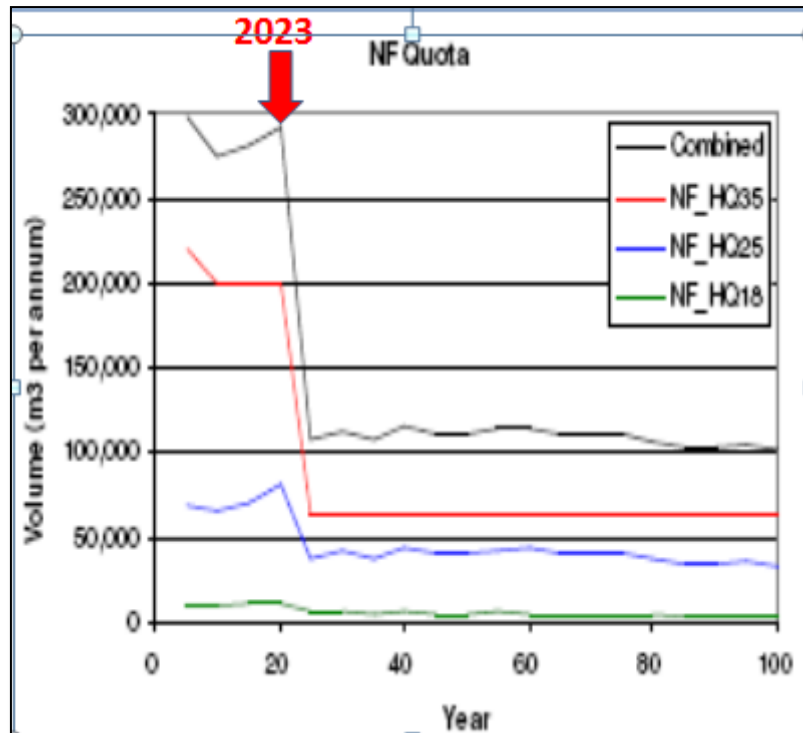
... It is estimated that the 100 year supply levels after 2018 will average approximately 70,000 m³ per annum in the Upper North East Region and 113,500 m³ per annum in the Lower North East Region of High Quality Large Sawlogs and Large Veneer Logs from existing native forests and Plantations on State forests and other land owned by SFNSW, assuming harvesting under existing terms and conditions.

It soon became apparent that timber volumes were over-estimated when Forestry NSW's 2002 North Coast Timber Supply Monitoring Estimate found that "actual yield was 87 per cent of predicted".

In 2002 Jerry Vanclay (Southern Cross University) undertook a desktop "Review of Projected Timber Yields for the NSW North Coast", concluding "it is evident that the harvest able to be sustained during the next 20 years is 220,000 m³/year at most ... In the longer term (21-100 years), production from native forests is expected to range between 175 and 110,000 m³/year, and will need to be supplemented from hardwood plantations."

2002 North Coast Timber Supply Monitoring Estimates of large high quality sawlogs compared to FRAMES 1998 (From Vanclay 2002)

Item & Source	RFA-FRAMES	NCTS Monitoring
Short-term yield (20 yrs)	269,000 m ³ /yr	220,000 m ³ /yr
Medium-term yield (21-40 yrs)	183,500 m ³ /yr	175,000 m ³ /yr
Average Long-term yield (41-100 yrs)	183,500 m ³ /yr	110,000 m ³ /yr



Modelled Native Forest high quality sawlog availability from 2003 (From Forests NSW 2004).

In 2003/4 volumes were reduced but extended to 2023, after which yields were expected to decline dramatically. EPA (2017) NSW Regional Forest Agreements Implementation Report 2004–2014, Appendix K Timber production in NSW RFA regions, states in relation to large high quality sawlogs:

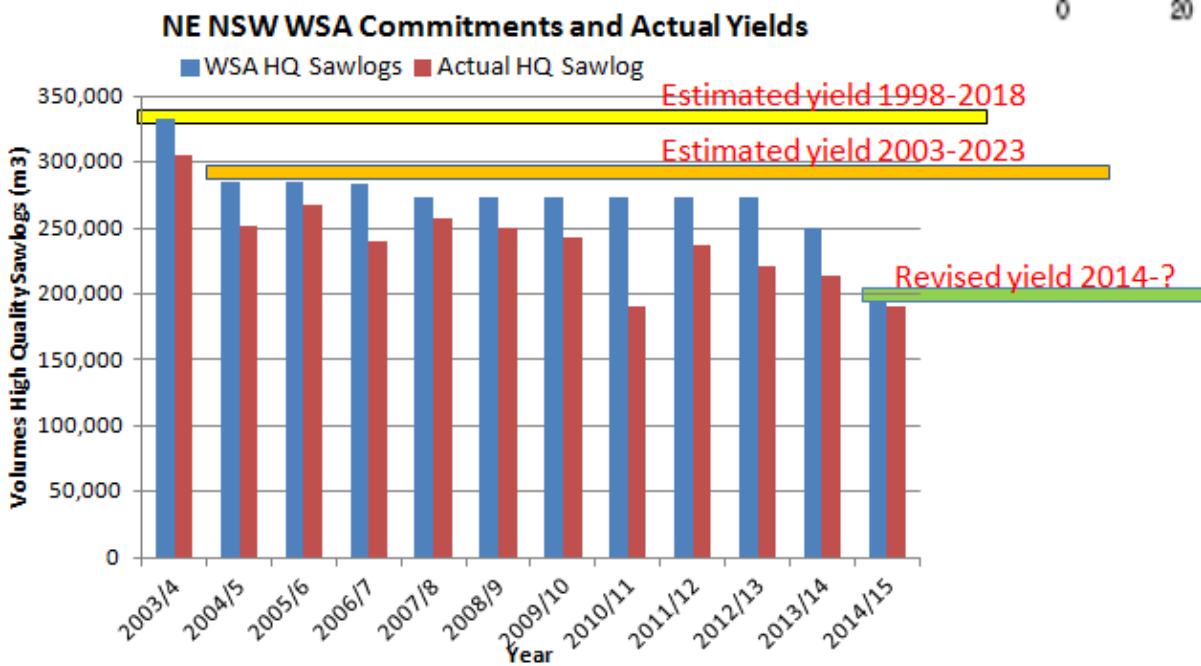
In 2004, the then Forests NSW undertook a review of wood resources on the North Coast. This review provided a revised sustained yield volume of 222,000 m³ for the first five years and then 200,000 m³ from Year 6 to Year 20.

After year 20 (ie 2023) yields of high quality sawlogs (large and small) were intended to reduce by over 50%. The Government removed the need for a yield review in 2006 and the clause from the WSAs that allowed yields to be adjusted in line with revised resource assessments.

It was clear that the new WSA were grossly unsustainable and it soon became apparent that Forests NSW couldn't honour the commitments. In 2006 Forests NSW had to pay Boral \$550,000 in compensation for 34,000m³ of high quality large sawlog they were unable to supply during 2004-2006. In 2010 Boral Timber commenced legal proceedings against Forests NSW for failure to supply commitments every year since 2006, though the outcome is confidential.

For large high quality sawlogs in 2006 Forests NSW purchased 2,000m³ per annum of a WSA for \$500,000. In 2007 Forests NSW purchased a WSA for 10,194m³ per annum for \$2,277,000. In 2012 the Forestry Corporation spent an undisclosed sum buying a WSA from Boral for 23,723 m³.per. annum. In 2014 the NSW Government spent \$8.55 million buying back some 50,000m³ p.a. of Boral's WSA, of which some 43,700m³ was large HQL.

The Forestry Corporation (Annual Report 2014-15) also acknowledges it "... may have onerous contracts in relation to wood supply agreements for native forest timber", for which the present value of the contract is negative.



Committed and Actual yields of large and small high quality sawlogs from North East NSW.

For north-east NSW Appendix K of the RFA review (EPA 2017) states:

Figure 7 shows that the total HQL and HQS harvested in the North East RFA region was below the RFA commitment level each year of the 2004 to 2014 period.

While the North East RFA provides for an annual harvest of 269,000 m³, the North East region WSA commits FCNSW to provide considerably lower volumes. This variance is due to improvements to FRAMES and sustainable yield calculations that were made after the North East RFA was signed.

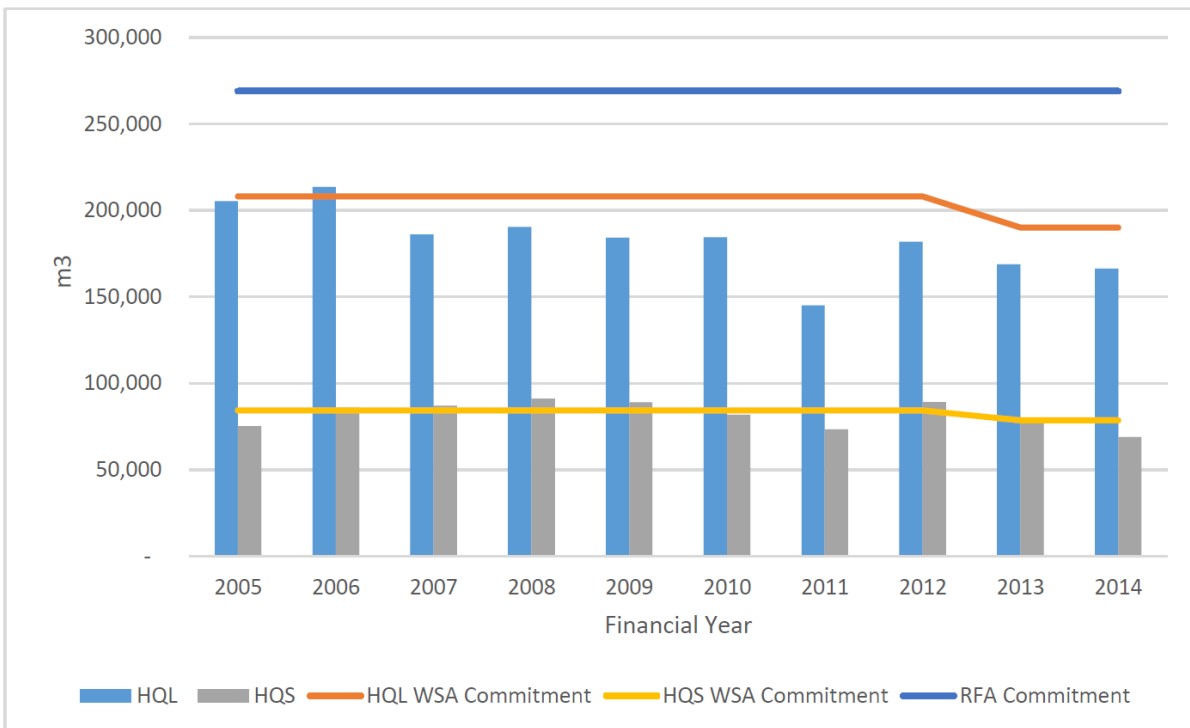


Figure 7 from EPA (2017): High quality large and high quality small timber production from North East RFA region combined from July 2004 to June 2014

Despite the buybacks and yield reductions, by 2012 sawmillers were openly expressing concerns about future timber yields, proposing that national parks needed to be opened up for logging to meet expected shortfalls after the expiry date of the original Wood Supply Agreements in 2018, as well as the expiry of the new agreements in 2023. Even after the Boral buyback these same concerns of overcutting and the unreliability of the Forestry Corporation's over-estimations persist today as shown by the NSW Department of Primary Industries (2017) Primary Processors Survey Report discussed above. There is further to go. The GHD (2017) NSW Department of Primary Industries report *concluded "that a buyback in the order of 15,000 m³ is targeted"*.

Since the WSA's were originally issued in 1998 the then commitments for 269,000 m³ of large high quality sawlogs and veneer logs per annum from north east NSW have almost halved down to 138,347m³ per annum because of gross resource over-estimations and over-allocations. It is thus the height of absurdity for the new IFOA to use the totally discredited 1998 yield estimates to set the cap on logging operations.

The definitions of small and high quality sawlogs given in the Protocols (p162) fail to differentiate between large and small HQL, defining them both as having a centre diameter of 40cm. Contrary to what is claimed a high quality small sawlog has a centre diameter between 30 cm and 40 cm.

9.1.6. Creating further future Shortfalls

Without waiting for the new rules to be adopted the Forestry Corporation have completed an Expression of Interest for 416,851 tonnes per annum of low quality sawlogs and residual logs from north east NSW's native forests and plantations (58% of the total log resources predicted to be produced), which they intend to be issued in June 2018.

In 2017 the NSW Department of Primary Industries (2017b) identified that around one million tonnes of residual logs are available for burning for electricity in north east NSW. This included 400,000 tonnes of residue logs from public native forests and 186,000 tonnes from hardwood plantations. They proposed the establishment of wood-burning power stations at Bulahdelah, Kempsey and Grafton.

Residual logs were described as having a minimum diameter of 10cm and length of 2.5 metres.

The Forestry Corporation (2018) are already trying to pre-empt the RFA Review by issuing an Expression of Interest (EOI) for 416,851 tonnes per annum of low quality sawlogs and residual logs from north east NSW's native forests and plantations. In the EOI issued on 16 March 2018 the Forestry Corporation (2018) identify the total volumes in green metric tonnes as:

Timber Type	Volumes (GMT)
HQ Sawlogs committed	185000
Low Q Sawlogs committed	132249
Low Q Sawlongs uncommitted	95001
pulp/residue	321850

(Note that the EPA 2017 note "Salvage and pulp products are typically sold by weight, i.e. tonnes. The average conversion of m³ to tonnes is 110%", this would give the committed volume of HQ sawlogs as 168,812 m³).

Residual logs will have a minimum diameter of 10cm and length of 2.4m.



Figure 2 – Regrowth Salvage and Residue Grade Log, Figure 3 – Plantation Residue and Salvage Grade Sawlog (Forestry Corporation 2018)

The resources on offer in this EOI represent about 58% of the total log resources to be produced from the north coast and tableland hardwood regrowth and plantation forests each year. The remaining 42% is comprised of other high and low quality logs which are already committed to existing timber processors under long term wood supply contracts.

The NRC (2018) identify that annual salvage log, pulpwood and residue sales average 300,000, so these new WSA represent a 39% increase above current cut.

The Forestry Corporation are proposing that these new WSA are issued in June 2018 for 10 years (until 2028), and are targeted at the export market. These new WSA are predicated upon the yet unauthorised intensive logging regimes and reduced environmental protections proposed in the new IFOA, as well as dubious resource assessments.

9.2. The NRC Claimed Shortfalls.

Throughout the deliberations of the EPA and the Forestry Corporation the emphasis has always been on minimising environmental protections to ensure no reduction in timber yields. There were numerous reductions in environmental constraints that were agreed between the agencies, such as:

- the establishment of a 140,000 intensive logging zone,
- increased logging intensity,
- the reduction of buffers on headwater streams from 10m down to 5m,
- removal of minimum retention requirements for recruitment habitat trees and mature eucalypt nectar feed trees,

- removal of the need to survey for most threatened species, and the removal of most species specific prescriptions.

There were a variety of issues that the agencies were not able to agree on (NRC 2016), for which the Natural Resources Commission (NRC) mostly sided with the Forestry Corporation against the EPA on the basis of resource shortfalls, including:

- minimum area of landscape exclusions within logging areas
- minimum numbers and size of trees to be retained for Koalas
- minimum sizes of "giant trees" to be retained
- size of patches allowed for clearfelling
- minimum basal area retention under "selective" logging

Even then the NRC claim that *"it is not possible to meet the Government's commitments around both environmental values and wood supply"* maintaining there would be a shortfall in commitments from north-east NSW of 7,600 to 8,600 cubic metres of high quality sawlogs per annum due to protections for Endangered Ecological Communities and Koalas. To make up this claimed shortfall the Government decided to log oldgrowth and rainforest protected in the reserve system.

Nowhere in their documents do the NRC say what timber volumes they base these conclusions on. In response to enquiries they initially stated that their considerations have been based on high quality sawlog commitments from north-east NSW's native forests and hardwood plantations of 237,000m³ per annum. They later changed this to state that their *"assessment was based on ~180,000 m³/pa harvest volume (avg over 100 years) supplied from the native forest estate only"*.

It has been hard to fathom exactly what the basis is for the claimed shortfall. The best explanation appears to be that the 8,600m³ shortfall is the average decline per annum in modelled yields of HQL from native forests assessed by NRC to occur over a hundred year period, the explanation given is:

The 180,000 figure represents an average contribution from Native Forests for the full 100 year modelled wood supply timeframe. It was only used to represent wood supply over the full 100 year period for the wood supply impact analysis and should not be extrapolated to represent any other specific period.

As identified above there is an inexplicable difference between the data provided in NRCs (2016) report and the modelled data they now claim to have relied on. For the period 2017-2028 the published data (that NRC claims to be relying on) identifies a total volume of HQL of around 215,000 m³ per annum, yet the EPA/NRC now claim it is 236,700 m³/annum (a total volume over the 12 years of 260,400m³, over a year's supply). It is also apparent that for at least the past 2 years the Forestry Corporation have been logging well in excess of allocations.

In order to help justify their preference for logging oldgrowth and rainforest the NRC had to massage the figures further by excluding plantation timber, in the full knowledge that *"the proportion of high quality timber available from plantations increases over time"*, while the proportion from native forests is decreasing. By excluding plantations the NRC concocted a false decline in future sawlogs.

The EPA identify that the claimed impacts are an estimate that *"were not modelled in FRAMES"* and *"any shortfall in wood supply will need to be verified before any rezoning as a means to address wood supply shortfalls and meet the Government's twin commitments"*.

Using both native forests and plantation hardwoods the agencies now claim that 237,000m³ per annum of high quality sawlogs is available for the next 100 years. This represents an excess of at least 17,000 m³ above current commitments. Given that NRC are claiming there will only be a shortfall of 8,500m³ compared to modelled availability. It is clear that according to the NRC and Forestry Corporation's figures that there is no need to log oldgrowth forest or rainforest to meet commitments.

It is outrageous that the NRC are excluding plantations from their projections, to justify logging oldgrowth forest, rainforest, koala feed trees, and larger trees, as well as increasing logging intensity. Their pretence of the need to slash environmental protections to satisfy inflated logging volumes is fraudulent. The NRC, EPA and Forestry Corporation have all been asked to explain and none of them will, they are colluding to hide the truth.

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