

KOREELAH STATE FOREST AUDIT

Dailan Pugh, North East Forest Alliance, June 2013.



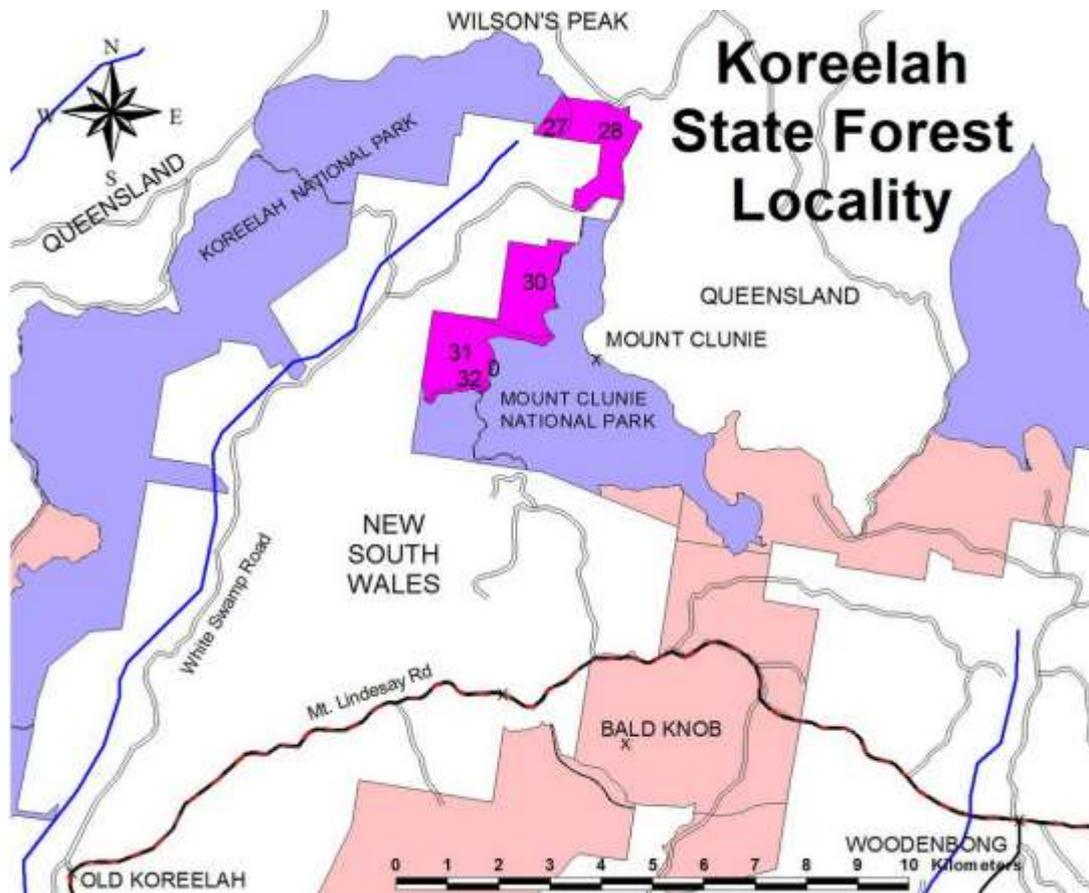
The World Heritage Listed Wilson's Peak occurs at the junction of the McPherson and Great Dividing Ranges. Koreelah SF is located to its east along the McPherson Range (to the right on the foreground ridge in photo.), which forms the Queensland – NSW border and provides a vital wildlife corridor.



Three months ago this was tall oldgrowth forest dominated by trees hundreds and thousands of years old, since then 76% of these ancient trees have been removed and the rainforest understorey trashed. Next it will be burnt with a hot fire, killing surviving rainforest plants and encouraging invasion by vines and introduced lantana, thereby initiating Bell Miner Associated Dieback, as has occurred in similar nearby stands that were logged in 1990.

Forestry Corporation commenced logging in compartments 27, 28, 30, 31 and 32 of Koreelah State Forest in March 2013. These compartments, particularly 27 and 28, represent an essential link for the movement of forest fauna between the World Heritage listed rainforest parks of the Border Ranges to the east and those of the Main Range to the west. While they have been extensively disturbed by past logging, some significant stands of tall oldgrowth forest remain and are now being logged, and remnant trees from the original forest are being targeted for removal throughout these forests.

These forests have extremely high biodiversity and conservation values that are now being degraded. Past logging has already resulted in invasion by the weed lantana and enabled Bell Miner Associated Dieback to gain a foothold. Both these Key Threatening Processes will spread further through these forests as a result of these operations and the total disregard by Forestry Corporation for the consequences of their actions.



The North East Forest Alliance undertook a brief inspection of Koreelah SF on 10 May 2013 to reconnoitre for a proposed audit. While we were only there for half a day we identified numerous problems. On 12 May 2013 NEFA wrote to Mr Nick Roberts, Chief Executive Officer, Forestry Corporation of NSW, asking him to take action to stop the apparent blatant disregard for environmental laws and threatening processes continuing.

Nick Roberts dismissed our concerns. The Environmental Protection Authority (EPA) subsequently undertook a brief assessment and similarly dismissed our concerns regarding identification of Koala habitat and habitat tree retention.

NEFA engaged the services of Landmark Ecological Services' zoologist David Milledge and botanists Andrew Murray, Annette McKinley and Barbara Stewart for a weekend audit on 8 and 9 June 2013. Half a day was spent assessing the area and one day spent measuring trees and searching for Koala scats on two transects. It was thus a brief audit and the outcomes are only indicative of the problems that exist.

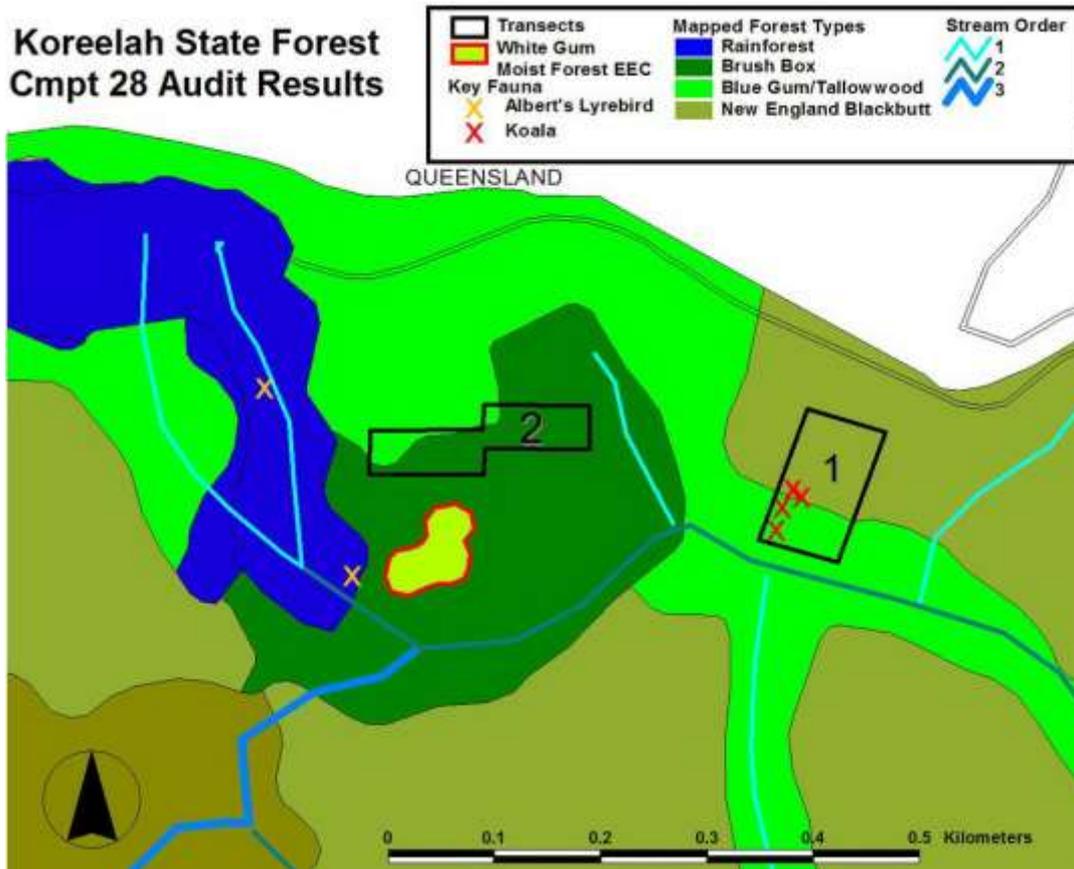
This report has been prepared hurriedly in order to provide our results to the responsible Ministers as quickly as possible in the hope that they will intervene to stop the worst excesses of the Forestry Corporation.

In summary our complaints are that Forestry Corporation:

- Has failed to undertake the required searches for Koala scats during marking-up and have consequently failed to identify that compartments 27 and 28 are Intermediate Use Koala Areas, failed to mark and retain the required Koala feed trees, and have logged at least one Koala High Use Area.
- Has failed to undertake adequate surveys for Albert's Lyrebird, failed to recognise their obvious presence, and have logged riparian areas that should have been protected for this species.
- Have logged 6 hectares of oldgrowth Brushbox forest with a well developed rainforest understorey, with logging planned for a further 17 hectares. Such forests should not be logged. Logging within the stand was also around twice the maximum intensity allowed by the IFOA.
- Have retained inappropriate trees to satisfy Hollow-bearing and Recruitment tree requirements and have not retained the required numbers of Recruitment trees.
- Have not identified, and subsequently logged into, a stand of the Endangered Ecological Community White Gum Moist Forest.
- Have shown a blatant disregard for the Key Threatening Processes of lantana invasion and Bell Miner Associated Dieback and are facilitating their spread through the forest, including into the Endangered Ecological Community White Gum Moist Forest.

Mr. Milledge (Appendix 1) concluded:

Consequently, as TSL prescriptions designed to protect the habitats of the Marbled Frogmouth, Albert's Lyrebird and Koala from logging are only triggered by records of these species, and my records of Albert's Lyrebird and Koala (plus others) indicate that the prescriptions that should have been implemented were not, I consider that adequate and seasonally appropriate surveys (including Koala mark-up searches) should be undertaken before further logging occurs. This will ensure that core habitats of these three species in the compartments are provided with some level of protection.

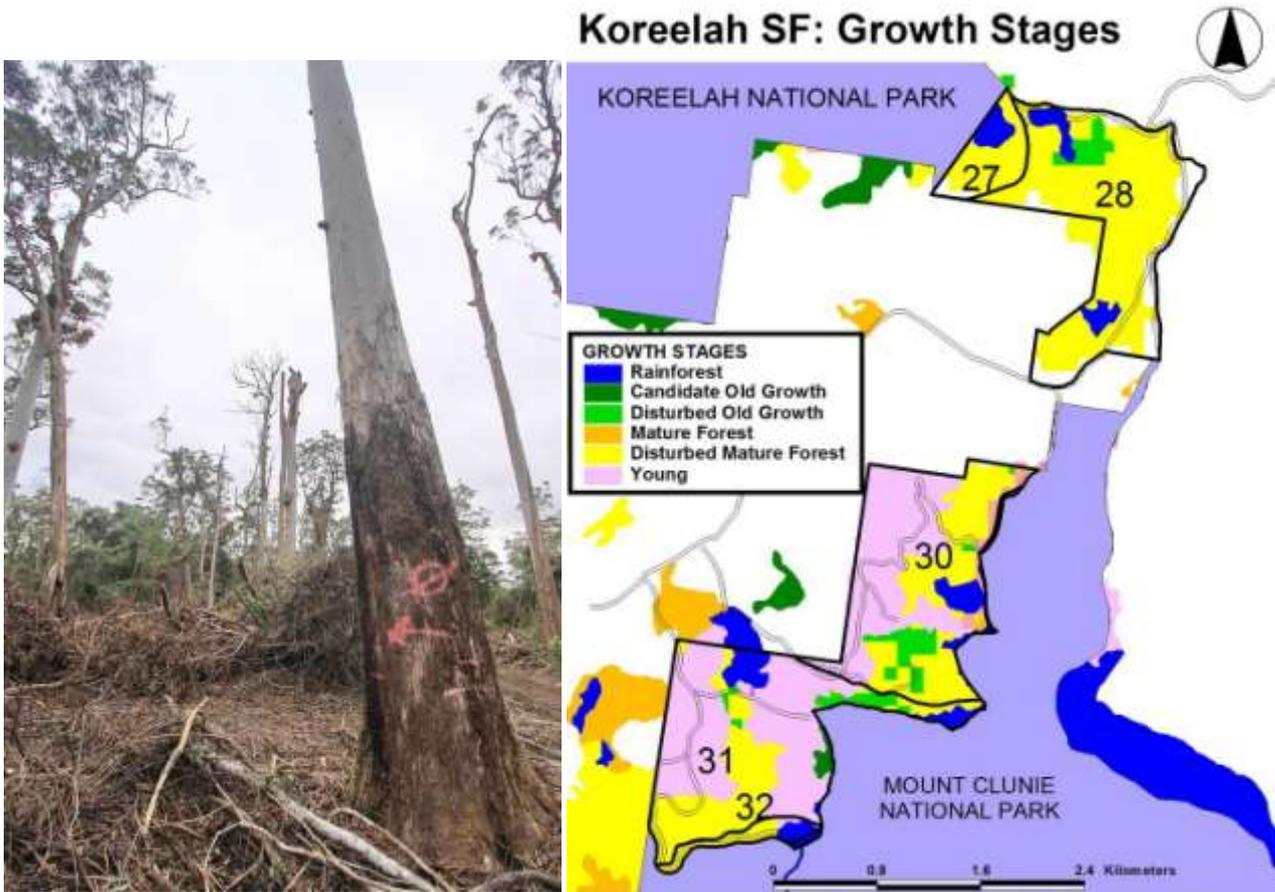


Left: a pair of Land Mulletts were squashed when the log they lived under was pushed into the bush for no apparent reason. Right: one of the few trees retained within the oldgrowth Brush Box forest.

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1. METHODOLOGY



(Right) Growth stages mapped in the CRA showing the location of “disturbed” oldgrowth forest. (Left) Destroyed oldgrowth forest in compartment 28.

The poor weather and limited time precluded a comprehensive assessment. Half a day was spent rapidly checking over the area on Saturday afternoon and all day Sunday was spent completing two transects. The EPA (after years of pressure from NEFA to adopt a transparent and repeatable process) have adopted standardised transects as a means of auditing habitat tree retention. Transects are 250m long and 40m wide (1ha) and are meant to be selected through a randomised process, with one transect per 100ha of the net logging area.

Only compartment 27 and the northern portion of compartment 28 have been logged at this stage, so this limited where we could establish transects. We also thought it appropriate to separate the oldgrowth stand from the mature stands. Within the mature stands there are significant differences in structure due to some stands being subject to ringbarking (Timber Stand Improvement – TSI) of all big old trees, and because of differences in site productivity and forest ecosystems. Because of time constraints we were only able to undertake one transect in the oldgrowth and one in a TSI mature stand.

On 9 June we established two transects with the aim of assessing habitat tree retention within a mature stand and within the disturbed oldgrowth. The aim was to sample a randomly chosen transect 250m long by 40m wide as per the EPA’s methodology. Within these stands the transects were chosen randomly, though the starting points and transect directions were influenced by a need to avoid impenetrable logging debris. Within both stands the species, growth stage, diameter (dbh) and condition of all retained hollow-bearing and recruitment trees, along with the diameters

and heights of all stumps that were likely to qualify as such, were recorded. Within the mature stand we also assessed all primary Koala feed trees for evidence of mark-up searches and Koala scats, though this was not possible in the oldgrowth due to the extensive disturbance and logging debris.

Transect 1 was located within mature forest, typed as Blue Gum/Tallowwood (47) and New England Blackbutt (163). The starting point was preselected to run downhill from the vicinity of log dump 3, with the actual starting point influenced by accessibility. Only a 125 m x 40 m length was able to be implemented before reaching the filter strip, as it is yet to be logged across the stream it was decided to complete the transect by running parallel back to the logging dump – effectively resulting in auditing of a block 125mx80m (1 ha). This site had not been visited before, though our brief assessment of nearby forest was the primary basis for our original claim that no Koala scat searches had been undertaken.

Transect 2 was located in oldgrowth Brush Box forest. The start point and bearing were chosen to avoid the most impenetrable logging debris. After 100m the transect had to be shifted sideways by 20m to avoid impenetrable debris. The transect was ended at 200m due to rainforest we assumed to be the exclusion zone (though it was not marked). The effective area assessed was thus 200x40m (0.8 ha). It was intended to assess the oldgrowth Brush Box, though our lack of familiarity with the site resulted in our transect extending into Blue Gum-Tallowwood forest that had been subject to logging. On our preliminary assessment we had walked past the starting point for this transect, though the bulk of the transect had not been visited before. We thus consider that this transect is a reasonable representation of the oldgrowth Brush Box stand, particularly if those records falling within the disturbed mapped Blue Gum/Tallowwood are excluded.

The nett loggable area of compartment 28 is 148 ha. Under the EPA's auditing methodology this area would require 1.5 randomly chosen 250x40m transects. We consider that, as we have stratified according to forest structure and because of the marginal results, an additional transect within mature forest is required to more accurately assess hollow-bearing and recruitment tree retention across the stand.

2. KOALAS

The Harvesting Plans document 28 Koala records in these compartments, with 2 records in compartment 28. The compartments comprise "preferred forest types" for Koalas. Three primary browse trees occur in the compartments: Tallowwood *E. microcorys*, Grey Gum *E. spp.* and Forest Red Gum *E. tereticornis*.

The NSW Recovery Plan for the Koala (DECCW 2008) identifies that the loss and degradation of habitat is the most significant threat facing NSW koala populations. Koalas have been found to have a preference for mature trees of specific species in the size range 30-80cm (DECCW 2008). In the Comprehensive Regional Assessment, undertaken jointly between the Commonwealth and NSW Governments in north-east NSW, a significant threat to Koalas was identified (Environment Australia 1999) as "*Logging that fails to retain stems in the 30-80 DBH size class*".

The Threatened Species Licence 5.2.2 requires that in compartments which contain preferred forest types, marking-up must be conducted at least 300 metres in advance of harvesting operations, with primary browse trees inspected at ten metre intervals with **thorough** searches around the base of trees for Koala scats (faecal pellets).

In the area we inspected on 10 May 2013 we saw no sign that anybody had inspected trees at ten metres intervals and thoroughly searched around their bases for Koala scats. We observed a large number of primary browse trees (in this case Tallowwood) that had been cut down with no evidence of searching around their bases.

On 12 May 2013 NEFA wrote to Mr Nick Roberts, Chief Executive Officer, Forestry Corporation of NSW, that:

As at Royal Camp, despite numerous Koala records, preferred forest types, and the identification of the area as an Intermediate Use area, in the places we checked nobody is bothering to mark Koala feed trees, search for Koala scats ahead of logging or identify Koala High Use Areas. We had hoped that after exposing this at Royal Camp that either you or the EPA would ensure that Koala prescriptions were properly implemented in future. It is shameful that it is continuing.

On the 15 May 2013 Nick Roberts responded that:

Contrary to your assertion, only compartments 30 and 31 are deemed Intermediate Koala Use areas. Compartment 27 and 28, where harvesting is currently underway, are not assessed as Intermediate Koala Use. Despite this and again contrary to your assertion, koala feed trees have been identified and marked for retention in the current harvest area despite there being no requirement to do so under the TSL, thus FCNSW is exceeding Licence requirements.

Further, the Supervising Forest Officer and a recent FCNSW audit group has spent a considerable amount of time in the area searching for evidence of koalas, finding only low numbers of koala scats, insufficient to trigger the High Use Area provision of the TSL. If you have evidence to the contrary then we would be very interested in the data to better understand how you arrived at such an outcome.

The EPA undertook a subsequent inspection and concurred with the Forestry Corporation's claims that they were undertaking adequate surveys for Koalas.

Transect 1 was chosen to audit Koala mark up searches. The stand is dominated by Sydney Blue Gum and Tallowwood, with some New England Blackbutt and Grey Gum. These represent preferred forest types for Koalas. Of these trees, Tallowwood and Grey Gum are identified as "Primary Browse Trees" for Koalas. Within this one hectare area at least 100 trees should have been thoroughly searched for Koala scats around their bases, with Tallowwood and Grey Gum primarily targeted.

Within our 1 hectare transect we recorded 36 primary browse trees, being 34 Tallowwoods and 2 Grey Gums. 20 of these were 30cm dbh or larger. While logging debris and soil disturbance hampered searching for scats, all but 2 were able to be searched around a significant portion of their bases by us. It was evident that, as far as we could tell, not a single one of the trees we located had been searched by anyone before us - as evidenced by the intact litter. Of the Tallowwoods, 2 were stumps and 3 had been broken off by having trees dropped on them. Both Grey Gums had conspicuous Koala scratches.

In one part of the transect we found 4 Tallowwoods with Koala scats (30, 5, 4, and 2) under them. The high use tree with 30 scats under it also had 2 smaller scats indicating the presence of a mother and juvenile. This is considered to be a conservative estimate as logging had apparently taken place 2-3 months ago (meaning that many scats may have already decomposed – which they appeared to do fairly quickly) and because searching was hampered by logging debris.



Koala scats found on Transect 1, on the left 30 Koala scats found under one tree, on the right are two scats (lower left) found under this Tallowwood. Note the presence of large and small scats indicating the presence of a mother and baby, larger scats found under one tree suggested the presence of a large male. Also note the advanced decay of most scats which indicates both that they don't last long in this moist environment and that they vacated the area when it was logged.

TRANSECT 1: TREES FOUND WITH KOALA SCATS

MARKED	SPECIES	DBHOB (cm)	Number of Scats	GDA REF.	
	Tallowwood	35	2	6873424	453973
	Tallowwood	40	4	6873403	453967
	Tallowwood	30	30	6873435	453989
H	Tallowwood	80	5	6873443	453981

The identification of an “intermediate use area” for Koalas is, in part, defined as “a single compartment where Koala scats have been detected under two of any ten consecutive trees searched within that single compartment”. Contrary to Forestry Corporation’s denials, it is evident that compartment 28 would have been identified as an intermediate use area long ago had they bothered undertaking the required scat searches. Now that it has been identified as an intermediate use area by us, 10 primary browse trees must be retained and marked for retention per 2 hectares where available.

The identification of a “Koala high use area” effectively requires the trigger of a high use Koala tree and then the location of three consecutive trees with Koala scats within 100 metres:

“Koala high use area” means an area where any of the following features are located:

- i. Three out of any ten consecutive trees inspected are found to have Koala scats beneath them; OR*
- ii. a sighting of Koala; OR*
- iii. a tree with more than 20 Koala scats beneath; OR*
- iv. any trees with Koala scats of two distinctly different sizes beneath;*

AND

- i. where the subsequent star search locates at least an additional three out of any ten consecutive trees inspected as having Koala scats beneath them.*

The Threatened Species Licence 6.14 (c)(i) states “Specified forestry activities are prohibited from within all Koala high use areas. A 20 metres wide exclusion zone must be implemented around the boundary of Koala high use areas”.

We located a high use tree and three consecutive trees with Koala scats under them despite the logging debris, churning of soil, and the time since Koalas were forced out of the area, and we believe that before the logging it is highly likely that significantly more evidence would have been present. Based on our results, Dr. Steve Phillips of Biolink (pers. comm.) is confident that this is a Koala High Use Area and should have been protected. We are thus similarly confident that this would have been a Koala High Use Area.



Tallowwood stumps, adjacent to the transect and within what should have been identified as a Koala High Use Area and thus excluded from logging.

Given that we randomly chose one hectare out of 148 within the nett logging area for our search we can confidently predict that numerous other Koala High Use Areas are likely to occur within these compartments. Our random searches around other tallowwood trees and stumps elsewhere in Compartment 28 have failed to find any that were subject to searching by anybody else.

We found 6 Koala High Use Areas in Royal Camp State Forest, two of which were logged without scat searches after we had identified the first 4, and while the EPA was supposedly actively investigating our complaints. Given the EPA's failure to take action in relation to Royal Camp almost a year later, it is not surprising that Forestry Corporation continue to log without looking while the EPA turn a blind eye.

It is apparent that neither Forestry Corporation nor the EPA can be trusted to ensure that IFOA prescriptions for minimal protection of Koala habitat are faithfully applied. This emphasises the need for an independent assessment to identify core Koala areas on State Forests in this region so that they can be excluded from logging.

3. ALBERT'S LYREBIRD

These compartments, particularly 27 and 28, represent an essential link for the movement of wet forest fauna between the World Heritage listed rainforest parks of the Border Ranges to the east and those of the Main Range to the west. They are particularly important to facilitate the movement of wet forest fauna, such as Albert's Lyrebird, between these otherwise isolated World Heritage

Areas. It is thus extremely important that the minimalist prescriptions for these species are implemented in these forests.

Prior to our survey Forests NSW had identified 7 records for Albert's Lyrebird in compartments 27 and 31 and none in compartment 28 or 30.

During our brief audit of compartment 28 Albert's Lyrebird was heard calling in or near the mapped rainforest on two occasions. As the records were some 200m apart, this is expected to be the same individual:

E453311, N6873510, bird calling 70m down slope, 8 June 2013.

E453616, N6873361, calling 50m to west, 9 June 2013

Given that Albert's Lyrebird have a loud and distinctive call that they utter throughout the day at this time of year, it is expected that they were calling regularly while mark up and logging operations were undertaken. We heard it calling on both days that we were there, which highlights the failure of the supervising forester and the logging contractors to either recognise or acknowledge their presence.

The Threatened Species Licence requires:

6.7 Albert's Lyrebird *Menura alberti*

Where there is an Albert's Lyrebird record within a compartment, or within 300 metres outside the boundary of the compartment, the following must apply:

- a) An exclusion zone of at least 20 metres wide must be implemented on both sides of all first order streams within 300 metres of the record.*
- b) An exclusion zone of at least 30 metres wide must be implemented on both sides of all second order streams within 300 metres of the record.*

Regrettably, Forestry Corporation's inadequate survey and lack of expertise failed to identify this location and so the required 10m increases in stream buffers were not applied and this core habitat for the Albert's Lyrebird was logged where it extended outside the mapped rainforest.

Implementation of this prescription around the records we found would have resulted in an additional 0.5 ha of the oldgrowth brush box, along with other riparian habitat, being excluded from logging. Forestry Corporation has recently commenced logging on the other side of the creek and this is proposed to extend to within 300m of the record of 9 June 2013.

It is apparent that Forestry Corporation's failure to detect Albert's Lyrebird in compartments 28 and 30 is due to lack of effort, lack of expertise and lack of will. It is evident that further surveys are likely to detect further records (of this or other individuals) that will require more extensive protections of riparian vegetation in the area yet to be logged.

4. OLDGROWTH FOREST

During NEFA's brief inspection of 10 May we were dismayed to find that about 6 hectares of what had apparently been a magnificent stand of oldgrowth Brush Box forest had been trashed. The stand was dominated by Brush Box, Tallowwood and Blue Gum trees from 1m to over 2m diameter and over 40m tall, proving that they were many hundreds of years old, with some in excess of a thousand years old. As noted by Forestry Corporation (Forestry Commission 1981) *"in Terania creek ... brush box were found from 100 years to 1500 years for trees 1.7 m dbh and some around 2 m dbh near 2000 years."*

Brush is the colloquial name for rainforest; Brush Box is thus literally Rainforest Box. In relation to Brush Box Francis (1929) notes *"it is very common on the borders of scrub and forest country and in places where these two types of vegetation intermingle"*. Baur (1965) notes that Brush Box *"appears to form an intermediate stage in the replacement of certain eucalypt types ... by rainforest. ...In some areas where the dominant vegetation is of rainforest, this Brush Box type forms a distinct community along the periodically burnt ridges."*

Due to their economic bias, foresters adopted a restrictive definition for mapping rainforest that excluded most rainforest with emergent Brush Box (except in coastal areas) or eucalypts. When the Forestry Commission agreed to protect rainforest they had mapped at Terania Creek, the focus of the dispute shifted to rainforest with Brush Box and eucalypt emergents that were still proposed for logging. Conservationists and ecologists claimed that where it had a rainforest understorey Brush Box was rainforest, the Forestry Commission denied this. It was logging of the Brush Box rainforests that was the focus of the 1979 Terania Creek blockades. The debate has continued as Forestry Corporation still excludes forests dominated by Brush Box from their rainforest protocol.

Throughout this oldgrowth stand the rainforest understorey appears to have been variably developed, with extensive areas so well developed that they were ecologically rainforest.





The rainforest component of the stand is obvious.



In the midst of this oldgrowth stand, and surrounded by a well developed rainforest understorey, a Brush Box being engulfed by a stangler fig is counted as a Hollow-bearing tree.



Other strangler figs were not so lucky.

While the status of parts of the stand as rainforest may have been debateable, there is no doubt that it was oldgrowth forest. The Brush Box stand was mapped as “Disturbed Oldgrowth Forest” in the CRA process. Our Transect 2 (see below) was intended to sample a representative sample of the oldgrowth Brush Box stand, though it ended up extending into the mapped Blue Gum-Tallowwood stand.

Within Transect 2 we located 4 trees marked as Hollow-bearing Trees and 5 marked as Recruitment trees, 1 large senescent Brush Box had also been retained, though was unmarked, and 32 large recent stumps of trees that were within the same size range. Within this area there were 8 old stumps from previous logging.

SIZE CLASSES OF RETAINED AND LOGGED TREES ON TRANSECT 2 (note that the diameters of stumps have not been adjusted to account for stem taper and thus dbhob, though they are indicative of size classes)

	<80cm	80-99cm	100-119cm	120-139cm	140-159cm	160-179cm	180-199cm	>200cm	TOTALS
Retained Tree	1	1	4		2	2			10
Recent Stump	2	9	10	4	4	1	1	1	32

Our 0.8 hectare sample of this stand had a stocking of 42 large old trees, which equates to a stocking of 52 oldgrowth trees per hectare. This is an extremely high stocking of big old trees and well above average stockings for high productivity oldgrowth forests. All of the old stumps were in or near the mapped Tallowwood/Blue Gum stand indicating that it had been subject to significant disturbance in the past. Even with the inclusion of these disturbed areas the stand would have satisfied the oldgrowth definition of “*ecologically mature forest where the effects of disturbances are now negligible*”.

Thus we conclude that the Brush Box stand had not been subject to significant disturbance and was oldgrowth forest. We estimate that 6 hectares of tall oldgrowth Brush Box forest was logged.

Before this recent logging the overstorey was largely comprised of old trees, with only a few younger trees in a marginal old disturbed area (which were logged). Of the 43 large old overstorey trees present before logging, 76% were removed. When combined with the extensive bulldozing of understorey trees it is apparent that well in excess of the claimed 40% of basal area was removed within this stand of oldgrowth forest. NEFA does not consider it reasonable for Forests NSW to increase logging intensity so dramatically within oldgrowth forest, particularly given the problems with lantana invasion and Bell Miner Associated Dieback evident in more heavily logged adjacent stands to the west.

There is another 5 ha of Brush Box forest mapped as disturbed oldgrowth within the nett logging area in compartment 31, and about 12 ha in compartment 30. This should not be allowed to be logged.

5. OLDGROWTH TREES

A plethora of forest animals depend upon the trunk and branch hollows provided by big old trees for their survival. Approximately 20% of the Australian bird fauna, 75% of arboreal marsupial fauna and an undetermined proportion of the bat, reptile and invertebrate fauna are dependent on the hollows provided by old trees for roosts, nests and shelter.

Generally speaking, small hollows begin to develop once a eucalypt is over 100 years old, and the large hollows required by many species after a tree is over 200 years old. Depending on the species and site conditions trees may live for 300 to over a thousand years old, providing their lives are not cut short. In order to provide for hollows through time it is necessary to protect those trees with existing large hollows, as well as sufficient trees in the next age class to replace them when they die, and trees in the next age class to replace the replacements.

The NSW Scientific Committee has identified *Loss of Hollow-bearing Trees* as a Key Threatening Process, stating:

... The presence, abundance and size of hollows is positively correlated with tree trunk diameter, which is an index of age. Hollows with large internal dimensions are the rarest and occur predominantly in large old trees, which are rarely less than 220 years old. Larger, older trees also provide a greater density of hollows per tree. As such, large old hollow-bearing trees are relatively more valuable to hollow-using fauna than younger hollow-bearing trees. The latter are important as a future resource.

Mature and old hollow-bearing trees offer other valuable resources. Mature trees provide more flowers, nectar, fruit and seeds than younger trees, and a complex substrate that supplies diverse habitats for invertebrate populations. When hollow-bearing trees collapse or shed limbs they also provide hollow logs that serve as important foraging substrates and shelter sites.

The distribution of hollow-bearing trees depends on tree species composition, site conditions, competition, tree health and past management activities. Hollows occur at varying densities; undisturbed woodlands typically contain 7–17 hollow-bearing trees per hectare, undisturbed temperate forests 13–27 per hectare and old-growth wet and dry sclerophyll forest of south-east Queensland typically contains 35 and 37 hollow-bearing trees per hectare. ...

...

In forests managed for timber and firewood production, silvicultural practices have greatly reduced the density of hollow-bearing trees, especially where repeated harvesting events have occurred. ...

Even when trees are retained during harvest they are susceptible to damage from logging operations and post-harvest burning, or can suffer poor health owing to changes in abiotic conditions. Consequently, retained trees are prone to early mortality, especially with repeated exposure to harvesting events over their lifespan. In addition, the average age of hollow-bearing trees in harvested areas will continue to decrease as the few remaining very old trees die. ...

The highest priority action for this KTP is “Adopt appropriate policies for recruitment tree ratios with a stipulated minimum retention density in areas of forestry operations”.

It is also the large old trees that are disproportionately significant as storehouses of carbon in forests (Roxburgh *et.al.* 2006, Mackey *et. al.* 2008).

The Threatened Species Licence was altered in March to include a revised prescription for the retention of Hollow-bearing and Recruitment trees. Condition 5.6 now states:

a) *The following definitions apply for the purpose of this condition:*

- i. “Hollow-bearing tree” means a live tree in the net logging area where the base, trunk or limbs contain hollows, holes and cavities that have formed as a result of decay, injury or other damage. Such hollows may not be visible from the ground; but may be apparent from the presence of deformities such as burls, protuberances or broken limbs, or where it is apparent the head of the tree has been lost or broken off.*
- ii. “Recruitment tree” means a live tree of a mature or late mature growth stage (using the modified Jacobs growth stage assessment as depicted in schedule 3) within the net logging area that is not suppressed prior to harvesting and appears to have good potential for hollow development and long term survival.*

...

d) *Within the Regrowth Zone the following requirements for retention of Hollow-bearing trees apply:*

- i. A minimum of five hollow-bearing trees must be retained per hectare of net logging area. Where this density of hollow-bearing trees is not available all hollow-bearing trees within the net logging area must be retained.*
- ii. In selecting hollow-bearing trees for retention, priority must be given to any hollow-bearing trees which exhibit evidence of occupancy by hollow dependent fauna and trees which contain multiple hollows or hollows of various sizes.*
- iii. Hollow-bearing trees must be selected with the objective of retaining trees having as many of the following characteristics as possible:*
 - belonging to a cohort of trees with the largest dbhob,*
 - good crown development, (Note: this does not restrict the selection of trees with broken limbs consistent with the hollow-bearing tree definition).*
 - minimal butt damage,*
 - represent the range of hollow-bearing species that occur in the area,*
 - located such that they result in retained trees being evenly scattered throughout the net logging area.*

e) *Within the Regrowth Zone, for each hollow-bearing tree retained in (d) above, a recruitment tree must be retained. Recruitment trees must be selected with the objective of retaining trees having as many of the following characteristics as possible:*

- i. belong to a cohort of trees with the largest dbhob,*
- ii. located such that they result in retained trees being evenly scattered throughout the net logging area*
- iii. good crown development,*
- iv. minimal butt damage,*
- v. represent the range of hollow-bearing species that occur in the area.*

On our initial inspection it appeared to us that there was a low stocking of hollow-bearing trees within the mature forests and that only minimal retention of hollow-bearing trees was occurring in the oldgrowth forest. We thus assumed that when averaged across the compartment there would be a significant deficiency in retention rates. It was also apparent that many of the trees chosen did not satisfy the quality requirements. Our other concern is that in the “regrowth zone” the marking of hollow-bearing trees as Recruitment trees can reduce overall tree retention as less hollow-bearing trees means less recruitments.

On 12 May 2013 NEFA wrote to Mr Nick Roberts, Chief Executive Officer, Forestry Corporation of NSW, that:

As at Royal Camp, most of the forest is young with few hollow-bearing trees, interspersed with patchy stands of “disturbed oldgrowth”, mostly dominated by Brush Box, Tallowwood and Blue Gum hundreds of years old, with relatively high densities of hollow-bearing trees. The TSL requires that most, if not all, of these ancient trees be retained when densities are averaged across the stand. Regrettably many of these trees are being felled in contravention of the TSL. As at Royal Camp the retention prescriptions are being intentionally rorted by large old hollow-bearing trees being marked as recruits in a deliberate attempt to reduce recruitment tree retention requirements. We are particularly disappointed that this is continuing after we previously brought it to the attention of both you and EPA.

On the 15 May 2013 Nick Roberts responded that retention requirements had been met, claiming that:

The intent of the TSL is not to retain HBTs in aggregated clusters to offset lower occurrences elsewhere in the harvesting area. ...

Provided the retained recruitment HBTs show potential for hollow development and long term survival, there is no reason ‘old hollow-bearing trees’ cannot be retained as recruitment HBTs.

On previous audits NEFA has complained of numerous instances where clusters of Hollow-bearing Trees have been marked for retention while being clearfelled elsewhere in large parts of the net logging area. Both the Forestry Corporation and the EPA claimed that this practice is acceptable because retention needs to be averaged across the net logging area of the compartment and thus it is allowable to retain low numbers in one area provided higher numbers are retained in another area. We find it hypocritical for Forestry Corporation to now claim that even if there are inadequate densities in most of a compartment they don’t need to retain higher numbers where they occur so that the required densities are retained when averaged across the stand.

We also question Forestry Corporation’s claim that there is “no reason” why “old hollow-bearing trees” cannot be retained as recruitment Hollow-bearing Trees. Contrary to Nick Robert’s claim the TSL has always specified that Recruitment trees should be selected from the *mature or late mature growth stage* which are generally not old hollow-bearing trees. The intent of this is to retain sound growing trees that will mature into Hollow-bearing Trees as the existing Hollow-bearing Trees die

and collapse. The intent is to provide a supply of Hollow-bearing trees in perpetuity, so that as one dies another is ready to fulfil that role. If two trees of the same age are retained then they are likely to die at around the same time and there will be no tree left to provide the needed hollows. It is alarming that after all these years that Forestry Corporation can display such profound ignorance of such a basic requirement.

NEFA requests EPA to provide clear guidance on the application of these prescriptions and to make a ruling on the above claims made by Forestry Corporation.

To assess tree retention NEFA undertook two transects within compartment 28.

Within the disturbed oldgrowth Brush box and mature Blue Gum/Tallowwood on Transect 2 we located 4 trees marked as Hollow-bearing Trees and 5 marked as Recruitment trees, 1 large senescent, but unmarked, Brush Box, and 32 large recent stumps of trees that were within the same size range. This stand apparently had a well developed rainforest understorey, except in parts of the Blue Gum-Tallowwood where heavily disturbed in older logging.



Beginning of Transect 2 in logged oldgrowth forest in compartment 28.

While the retention rate of hollow-bearing trees within this transect was adequate, two of the trees chosen for retention had extensive butt damage and are unlikely to survive for long. With so many large old trees with no evident butt damage to choose from these were bad choices. Similarly there are likely to have been better choices with healthy crowns. These problems have been exasperated by the stacking of debris within 5m of one of the trees.

TRANSECT 2: MARKED AND UNMARKED HABITAT TREES RETAINED

MARKED	SPECIES	GROWTH STAGE	DBHOB (cm)	BUTT DAMAGE Y/N	POOR CROWN Y/N	DEBRIS >1m within 5m Y/N	GDA REF.	
H	Blue Gum	Senescent	106	Y	Y	N	6873498	453770
H	Brush Box	Senescent	117	N	Y	Y	6873510	453757
H	Brush Box	Senescent	174	Y	N	N	6873491	453674
H	Blue Gum	Senescent	155	N	Y	N	6873477	453645
R	Blue Gum	Senescent	105	N	Y	N	6873509	453772
R	Brush Box	Late Mature	96	N	N	Y	6873504	453711
R	Tallowwood	Senescent	140	N	N	N	6873485	453646
R	Brush Box	Senescent	71	N	Y	N	6873461	453663
R	Brush Box	Senescent	170	Y	Y	Y	6873512	453630
unmarked	Brush Box	Senescent	100	N	N	Y	6873504	453748



This defective Brush Box (left) with a diameter of 174 cm was retained, while next to it a giant Brush Box with a diameter of 235 cm (right - the largest tree on the transect), and no butt damage, was felled.

It is recognised that the retention of recruitment trees in this stand would have been problematic as most trees are likely to have been senescent with few mature and late mature trees to choose from. Though the choice of one of the recruitment trees was obviously a bad selection, as it had extensive butt damage and a poor crown and is unlikely to survive the post logging burn due to debris being left around it. Another of the recruitment trees had poor crown development and is likely to be a suppressed tree and thus a poor choice for a recruitment tree.



Marked Recruitment tree (Transect 2) showing significant butt damage, two trunks, poor crown and abundant debris. It does not satisfy retention requirements and is unlikely to survive the post-logging burn.



Examples of large hollow-bearing trees marked as Recruitment trees on Transect 2.

The problems with poor selection of habitat trees were found to be common throughout the stand. Our sample is thus representative of a general disregard for the intent of this prescription. This is most obvious when trees with significant butt damage are retained and when recruitment trees are suppressed or defective. These are trees unlikely to survive for long or to develop into the Hollow-bearing Trees of the future. In many cases there were obviously more appropriate choices to satisfy retention requirements and Forestry Corporation repeatedly chose inappropriate trees because they had no timber value.



A Blue Gum and Brush Box have fused together. Forestry Corporations labelling of one as a Hollow-bearing Tree and the other as a recruitment tree displays their contempt for implementing the intent of the TSL.



An ancient Tallowwood, presumably identified as an H tree, was cut down with “damage replace” written on the stump, and an arrow pointing to another Tallowwood with “replacement” written on trunk. The second tree had already been marked as an H tree so it did not make up for what was lost. To satisfy Koala feed tree requirements all Tallowwood within this oldgrowth stand would have had to be protected if it had already been identified as an Intermediate Koala Use Area.



(Left) Within the oldgrowth stand a defective tallowwood has been retained as a Hollow-bearing tree while larger and sounder trees have been felled. (right) Nearby (outside the oldgrowth) another H Tallowwood has debris pushed around its base ready for burning.

Within the mature forest on Transect 1 we located 4 trees marked as Hollow-bearing Trees and 1 marked as a Recruitment tree. 1 unmarked senescent Grey Gum had also been retained. Hollow-bearing Tree retention within this transect is marginal, though with the unmarked Grey Gum all potential hollow-bearing trees appear to have been retained. A further sample of these logged mature forests is required to get a better indication of hollow-bearing tree retention. It is apparent that retention of Recruitment trees is extremely poor and that four of the larger trees removed should have been retained as Recruitment trees. The one recruitment tree retained had poor crown development and appeared to have been suppressed and thus was unlikely to have been the best choice for a recruitment tree.

TRANSECT 1: MARKED AND UNMARKED HABITAT TREES RETAINED

MARKED	SPECIES	GROWTH STAGE	DBHO B (cm)	BUTT DAMAG E Y/N	POOR CROWN Y/N	DEBRIS >1m within 5m Y/N	GDA REF.	
H	Blue Gum	Senescent	89	N	N	N	6873441	454043
H	New England Blackbutt	Late Mature	78	N	N	N	6873451	454018
H	Grey Gum	Senescent	48	N	Y	N	6873389	453966
H	Tallowood	Late Mature	80	N	N	N	6873443	453981
R	New England Blackbutt	Mature	62	N	Y	N	6873510	454015
unmarked	Grey Gum	Senescent	56	N	Y	N	6873398	454018

If our transects are taken as being indicative of the overall logged parts of the compartments, it is evident that more of the large old trees within the oldgrowth should have been retained to satisfy Hollow-bearing tree requirements as they are the largest trees in the compartment. Similarly far more mature and late mature trees should have been retained in the mature forest to provide the hollow-bearing trees of the future.

Forestry Corporation has not implemented the intent or the letter of Condition 5.6 of the TSL. The problem is that we have found this same situation in every forest we have audited. This is the most critical prescription for a range of forest fauna and yet the EPA repeatedly refuses to take any meaningful action to rectify it. That their softly-softly approach is not working is self evident.



(left) crown of a Blue Gum hundreds of years old showing the numerous broken branches and large hollows necessary for large-hollow dependent fauna (right) a 20 or so year old Blue Gum fallaciously marked as a recruitment tree - more suitable mature trees were cut down in its vicinity.

6. WHITE GUM MOIST FOREST

Two Key Threatening Processes occur in the compartments and are ignored in the Harvesting Plans. Both are being aggravated by the logging:

- Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners
- Invasion, establishment and spread of Lantana (*Lantana camara* L. *sens. lat*)

In the CRA Dunn's White Gum was identified as a "Rare" ecosystem and set a reserve target of 100%. To date only 534 hectares have been reserved and thus only 55% of its national reserve

target has been met. It is threatened by Bell Miner associated eucalypt forest dieback, frequent fire, weed invasion, and grazing.

NSW Scientific Committee's (2008) final determination for listing *White Gum Moist Forest* as an Endangered Ecological Community states:

11. *White Gum Moist Forest has undergone changes in structure, including loss of hollow-bearing trees, as a consequence of timber harvesting. Its dominant tree species are valuable commercial timber species and much of the community is currently in a state of regrowth after past logging activity. Benson and Hager (1993) estimated that less than 10% of the E. dunnii forest they surveyed was in an 'old growth' state and that 87% of the trees they sampled had a diameter at breast height of less than 0.5 m. Logging operations continue in stands of the community on state forest and private land, which account for approximately two-thirds of the remaining suitable habitat (DEC 2007). For example, recent logging of the community has been reported in Beaury State Forest (DEC 2007).*

...

12. *White Gum Moist Forest is threatened by forest eucalypt dieback associated with over-abundant Bell Miners and psyllids (Wardell-Johnson et al. 2006, DEC 2007). This complex process is associated with substantial changes in community composition and structure, including the defoliation and eventual death of canopy eucalypts, increased densities of mid-stratum plant species and decline in diversity of small forest birds. ...*

....

13. *White Gum Moist Forest is also potentially threatened by grazing and inappropriate fire regimes. Cattle grazing is practiced in large areas of freehold and leasehold eucalypt forest in north-east NSW, including White Gum Moist Forest. Frequent burning of the understorey is carried out as part of forest management for both cattle production and timber production.*

...

14. *Clearing activity, forest dieback, grazing, frequent burning and other disturbances accelerate the invasion of weeds into White Gum Moist Forest. Principal weed species include Lantana camara, Ochna serrulata and Senna septemtrionalis. Lantana camara was recorded in 40% of 43 documented sites of White Gum Moist Forest, and dominated the mid stratum at most of these sites. Infestations of this species have been implicated in forest eucalypt dieback (Wardell-Johnson et al. 2006). The invasion and establishment of exotic species in White Gum Moist Forest results in a large reduction in the ecological function of the community. 'Invasion, establishment and spread of Lantana camara' is listed as a Key Threatening Process under the Threatened Species Conservation Act 1995.*

On 12 May 2013 NEFA wrote to Mr Nick Roberts, Chief Executive Officer, Forestry Corporation of NSW, that:

A stand of the EEC Dunns White Gum has had at least one White Gum felled within it and been disturbed by machinery.

On the 15 May 2013 Nick Roberts acknowledged the presence of the presence of the mapped stand of Dunn's White Gum in compartment 31, though denied the logging of a stand in compartment 28, responding that:

...in the current harvest area there are individual and isolated occurrences of Dunn's White Gum (Eucalyptus dunnii), these have not been found to occur in stands (as you suggest), thus these individual trees do not dominate the sclerophyll canopy and therefore do not meet the definition of a White Gum Endangered Ecological Community (EEC).

Contrary to Nick Robert's claims, a stand of Dunn's White Gum, where they clearly dominate the rainforest understorey, occurs within the mapped oldgrowth in compartment 28. 10 trees were recorded as comprising the stand, though as time precluded a thorough assessment there may be more. One tree head was found on the ground though its stump couldn't be located amongst the logging debris. Other trees may also have been felled.

Dunns White Gum recorded within the unmapped stand in compartment 28

DIAMETER (cm)	GDA REF.	
42	6873410	453664
22	6873414	453660
55	6873410	453657
36	6873411	453656
74	6873408	453652
144	6873379	453641
168	6873366	453632
115	6873361	453616
110	6873371	453657
95	6873379	453659



(Left) stand of mature White Gum Moist Forest (right) head of logged Dunn's White Gum.



Logging debris within White Gum Moist Forest, ready for burning and lantana invasion.

This remnant stand of White Gum Moist Forest is particularly significant as what is left of it is a natural stand dominated by large old trees and, so far, free of lantana and Bell Miner Associated Dieback. It will require removal of logging debris and extensive rehabilitation works if it is to avoid further degradation.

There is a much larger mapped stand of Dunn's White Gum in compartment 31. Unfortunately it is mostly regrowth and has significant problems with lantana invasion and a dense population of Bell Miners. It also extends outside the mapped boundaries. Nearby Blue Gum Forest is suffering from Bell Miner Associated Dieback and this is highly likely to spread into the White Gum Moist Forest if an extensive logging buffer is not applied. Even then it will likely require lantana control works if it is not to succumb to BMAD, particularly given the high populations of Bell Miners already present.

7. BELL MINER ASSOCIATED DIEBACK

NEFA considers that in the UNE Bell Miner Associated Dieback is typically associated with heavily logged forests where much of the overstorey has been removed and the understorey invaded by lantana. While we recognise that there are a variety of confounding factors we consider heavy

logging to be the primary factor responsible for its current extent. Our concern is that the range of secondary factors are being used to confuse the issue and frustrate required responses.

NSW Scientific Committee's (2008) final determination for listing 'Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners' as a Key Threatening Process notes that:

Broad-scale canopy dieback associated with psyllids and Bell Miners usually occurs in disturbed landscapes, and involves interactions between habitat fragmentation, logging, nutrient enrichment, altered fire regimes and weed-invasion (Wardell-Johnson et al. 2006). At present, no single cause explains this form of dieback, and it appears that 'Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners' cannot be arrested by controlling a single factor. Over-abundant psyllid populations and Bell Miner colonies tend to be initiated in sites with high soil moisture and suitable tree species where tree canopy cover has been reduced by 35 – 65 % and which contain a dense understorey, often of Lantana camara (C Stone in litt.).

...Increased light intensity associated with canopy reduction promotes the growth of the expanding foliage preferred by psyllids as well as understorey growth which is also influenced by altered fire regimes. Increased understorey growth, particularly of the invasive weed Lantana camara, suppresses eucalypt regeneration and provides enhanced shelter and safer nest sites for Bell Miners.

Stone *et. al.* (1995) investigated the increasing incidence of dieback associated with colonies of Bell Miner and found that it is the wet sclerophyll types (46, 49, 53, 54 and to a lesser extent 60) which contain the most seriously affected species, with canopy dieback most prevalent in stands of Sydney blue gum growing on moist sites with a dense mesophilic understorey. They found that *"the vast majority of plots (97%) had been exposed to some degree of logging and were on their second or third rotations"* and hypothesised that *"A possible long-term explanation of why the dieback problem may be increasing, is that the proportion of moist sclerophyll forest being exposed to selective logging is increasing throughout the State."*

On our initial site inspection we identified an area of Bell Miner Associated Dieback in compartment 31. Past logging has facilitated the dominance of Bell Miners in the partially mapped stand of Dunn's White Gum, and also caused BMAD in the unmapped stand of Sydney Blue Gum in the vicinity of proposed log dump 16 of compartment 31.

On this audit we found BMAD in compartment 27 and heard numerous Bell Miners in one part of Compartment 30 which suggests BMAD may be present there also.

On 12 May 2013 NEFA wrote to Mr Nick Roberts, Chief Executive Officer, Forestry Corporation of NSW, that:

As at Royal Camp the harvesting plan fails to recognise significant occurrences of Bell Miner Associated Dieback and proposes logging in and adjacent to affected areas with no special provisions to avoid aggravating the problem and facilitating its spread through adjacent stands. We observed an area of affected Blue Gum (with regrowth and lantana from previous logging), with numerous dead and dying trees, and a logging dump proposed to be constructed in the middle of it. I am particularly disappointed that you have allowed this to continue after we showed you the consequences in Yabbra SF.

On the 15 May 2013 Nick Roberts responded that:

The Integrated Forestry Operations Approval (IFOA, and specifically the TSL) does not prescribe any particular activity from harvesting areas affected by Bell Miner Associated

Dieback (BMAD). FCNSW is of the opinion that infrequent disturbance, particularly by burning, is a primary cause of BMAD. The current harvesting operation, and any associated post-harvest burning and re-planting, provides a level of understorey disturbance to permit overstorey regeneration and regrowth of a more healthy forest.

The IFOA (2.7.1) requires that in carrying out forestry operations "SFNSW must give effect to the principles of ecologically sustainable forest management as set out in Chapter 3 of the document entitled, "ESFM Group Technical Framework".

Principle 1 is: *Maintain or increase the full suite of forest values for present and future generations across the NSW native forest estate.* Relevant specific criteria are:

3.2.1.2 The productive capacity and sustainability of forest ecosystems

- maintain ecological processes within forests (such as the formation of soil, energy flows and the carbon, nutrient and water cycles, fauna and flora communities and their interactions);
- maintain or increase the ability of forest ecosystems to produce biomass whether utilised by society or as part of nutrient and energy cycles;
- ...
- ensure the effects of activities/disturbances which threaten forests, forest health or forest values are without impact, or limited.

3.2.1.3 Forest ecosystem health and vitality

- ...
- ensure the effects of activities/disturbances within forests, their scale and intensity, including their cumulative effects are controlled and are benign;
- restore and maintain the suite of attributes (ecological condition, species composition and structure of native forests) where forest health and vitality have been degraded.

The IFO (4.26) also requires:

SFNSW must ensure that the scale and intensity at which it carries out, or authorises the carrying out of, forest products operations in any part of the Upper North East Region, does not hinder the sustained ecological viability of the relevant species of tree, shrub or other vegetation within the part.

NEFA is concerned that if additional logging is allowed in or near areas affected by BMAD that it will encourage invasion by lantana, facilitate dominance of the fauna by Bell Miners and thus cause the dieback and death of retained trees. This proved to be the case in compartment 163 of Yabbra SF where BMAD killed most retained habitat trees and expanded into exclusion areas. Forestry Corporation is basing their refusal to manage for this problem on superstition. They refuse to revisit their trials in the nearby Mt. Lindesay SF and assess the long term effectiveness of their management approach.

It is essential that dieback areas and Bell Miner distribution be mapped prior to logging and assessed over time post logging. Until proper scientific trials are undertaken and an effective post-logging management regime identified then logging of affected and susceptible forests should be avoided.



Bell Miner Associated Dieback in Compartment 31. Note the presence of lantana in the understorey and the poor crowns.

8. APPENDIX 1:



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On the weekend of 8-9 June 2013 I undertook a reconnaissance of Compartments 27, 28 and 30 in Koreelah State Forest. Records were obtained (on the basis of calls heard) of a Sooty Owl in Compartment 30 (MGA co-ords E451967, N6869248) and Albert's Lyrebird in Compartment 28 (70m east of MGA co-ords E453311, N6873510; 50 west of MGA co-ords E453616, N6873361). Records of the Koala were also obtained in Compartment 28 on the basis of scats under two Tallowwoods (MGA co-ords E453973, N6873424 – 2 scats; MGA co-ords E453967, N6873402 – 4 scats).

In addition, other observers found Koala scats at the bases of two additional Tallowwoods nearby (MGA co-ords E6873435, N453989 – 30 scats; E6873443, N453981 – 5 scats).

From my assessment of the habitats present, I concluded that suitable habitat for the Sooty Owl was present throughout Compartments 27, 28 and 29, particularly in stands of old-growth wet eucalypt forest and in riparian forest along all 1st, 2nd and 3rd order streams. Old-growth stands in Compartment 28 contained many senescent Sydney Blue Gums with expansive trunk and spout hollows that appeared particularly suitable for Sooty Owls as roost and nest sites, and as den sites for some of their arboreal marsupial prey species.

Suitable habitat for Albert's Lyrebird was observed throughout Compartments 27 and 28, mainly comprising stands of mature and old-growth wet eucalypt forest with a well-developed rainforest understorey and extensive litter development. Suitable habitat for Albert's Lyrebird also occurred along the 1st, 2nd and 3rd order streams in these compartments and along some 1st, 2nd and 3rd order streams in Compartment 30.

Suitable habitat for the Koala was present throughout all compartments as three of their favoured food tree species, comprising Tallowwood, Large-fruited Grey Gum and Sydney Blue Gum, were dominant, co-dominant and sub-dominant in a high proportion of stands. Scat searches were only conducted in one area (above) but scratches on the trunks of Large-fruited Grey Gums and Sydney Blue Gums indicated Koala occurrence is widespread in the compartments.

An examination of records of the Sooty Owl and Albert's Lyrebird contained in the Threatened Species Licence Pre-logging and Pre-roading Survey Report (TSL Report) provided by the Forestry Corporation of NSW (for undertaking logging in Compartments 27, 28, 30 and 31, Koreelah State Forest) suggests that surveys for these two species have been inadequate to establish their distribution in the compartments. Similarly, surveys for the Marbled Frogmouth also appear to have been inadequate as suitable habitat occurs

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in rainforest and riparian stands (along 2nd and 3rd order streams) within Compartments 27, 28 and 30, yet this species was only recorded in Compartment 31.

An examination of records of the Koala in the TSL Report shows a total of 28 records in Compartments 28, 30 and 31, yet observations during the current reconnaissance suggest mark-up searches (as per the Threatened Species Licence (TSL)) were not undertaken for this species and no high use or intermediate use areas appear to have been identified and marked on the ground.

Consequently, as TSL prescriptions designed to protect the habitats of the Marbled Frogmouth, Albert's Lyrebird and Koala from logging are only triggered by records of these species, and my records of Albert's Lyrebird and Koala (plus others) indicate that the prescriptions that should have been implemented were not, I consider that adequate and seasonally appropriate surveys (including Koala mark-up searches) should be undertaken before further logging occurs. This will ensure that core habitats of these three species in the compartments are provided with some level of protection.



David Milledge

11 June 2013