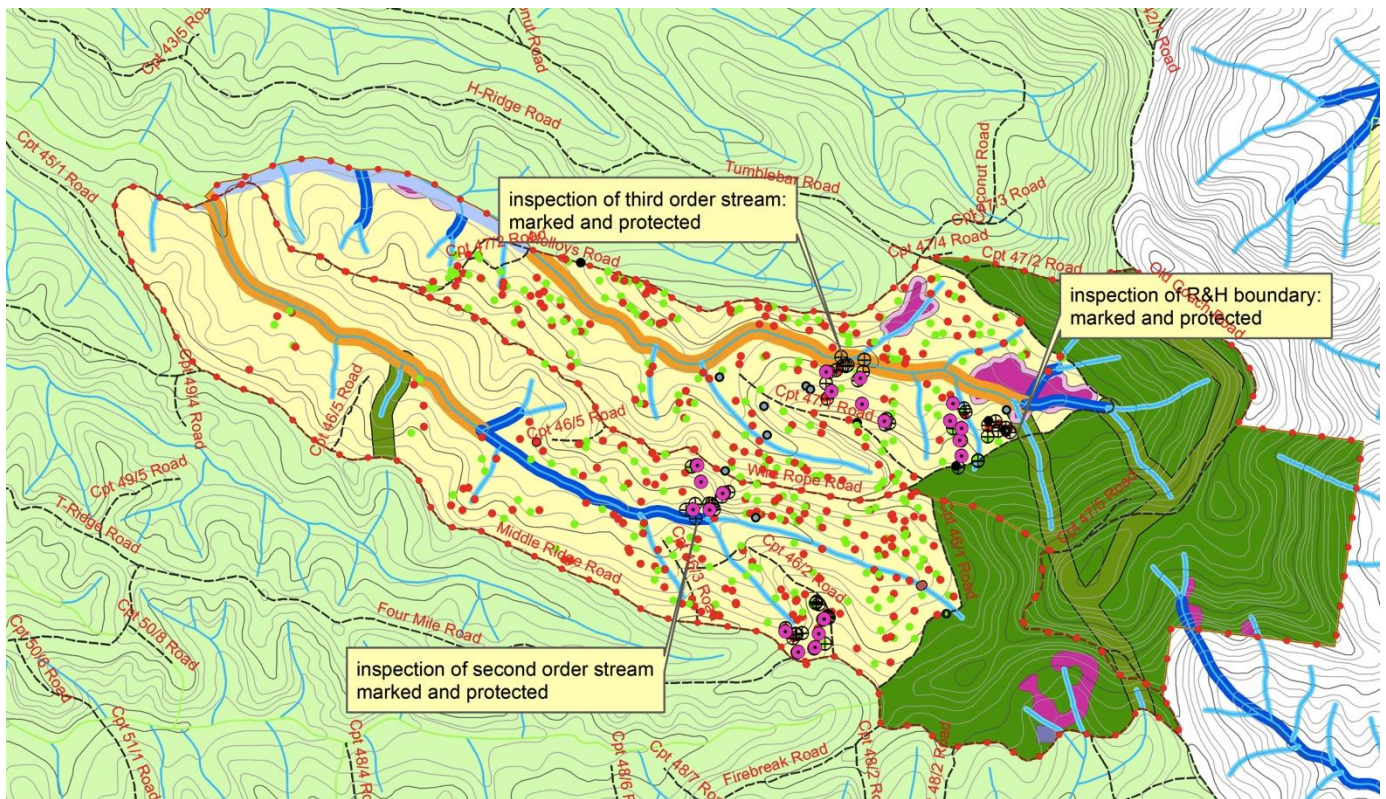


EPA AUDIT REPORT – CROWN FOREST

NORTH BROOMAN STATE FOREST, COMPARTMENTS 46 AND 47

Auditee:	Forestry Corporation NSW
Audit scope:	North Brooman State Forest, compartments 46 and 47 (see Map 1 , below). The field audit took 1 day to complete.
Region:	Southern Region
Date/Audit timing:	10 August 2016
Lead EPA auditor:	Dinka Dekaris
Assisting EPA auditors:	Pete Lezaich
Justification of audit:	Post-harvest audit focussing on EPA compliance priority areas
Audit objectives:	<ol style="list-style-type: none"> 1. Determine compliance with Southern Region IFOA conditions 2. Determine compliance with relevant planning conditions that relate to threatened species surveys 3. Communicate compliance and non-compliances to FCNSW. 4. Outline requirements for any necessary follow-up action.
Audit criteria:	<ul style="list-style-type: none"> • Condition 5.1E TSL (Marking-up of boundaries of environmentally sensitive areas) • Condition 5.4 TSL (Rainforest protection) • Condition 5.6 TSL (H&R retention, selection and protection) • Part 5(11) IFOA (Basal Area Retention) • Schedule 4 EPL (Snig track drainage)
Summary of Operations	<p>From the harvesting plan:</p> <p>“The STS tract for IFOA purposes includes the 285Ha harvest area (resource unit 1) of Compartments 46 & 47 as indicated on the HPOM. The STS tract is a predominantly mixed aged forest and will be harvested under a heavy single tree selection (STS) regime. The objective within the STS tract for this operation is to remove 45% of the basal area to create canopy openings for regeneration, whilst retaining and minimising damage to young regenerating stems, seed trees, habitat and recruitment trees.</p> <p>Resource unit 2 (1 Ha) is a predominantly mature forest that will be excluded from harvesting due to viability and access constraints.</p> <p>It is envisaged that the next harvesting operation in this compartment would be on average 30 years’ time.”</p>

AREAS ASSESSED: H & R PLOTS, RIPARIAN PROTECTION ZONES, RAINFOREST AND RIDGE AND HEADWATER



Map 1: Areas inspected during the EPA audit on 10 August 2016, compartments 46 and 47, North Brooman State Forest. The pink circles show locations of plots (25m radius) used to assess H and R trees and basal area. The circles with crosses represent the rest of the waypoints recorded (see Table 1 in the Appendix for details). The map also shows marked H trees (red dots) and R trees (green dots) that Forestry Corporation of NSW provided to the EPA to assist with the audit.

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AUDIT FINDINGS - OVERVIEW

A summary of EPAs findings are shown in the table below.

IFOA condition	Non-compliances	Compliances	Not Determined
5.1E TSL - Marking-up	0	1	0
5.6 TSL – H & R tree retention	1	0	0
5.6 TSL - H tree selection	0	17	0
5.6 TSL - R tree selection	5	6	0
5.6 TSL - H & R tree protection	16	12	0
Part 5(11) IFOA - Basal Area	0	0	1
5.7 TSL – Riparian Habitat Protection	0	3	0
5.4 TSL – Rainforest Mapping and Protection	0	2	0
TOTALs	22	41	1

AUDIT RECOMMENDATIONS

Action Details	Non-compliance Code*	Target/Action Date
5.6(e) Recruitment tree retention Failure to retain sufficient recruitment trees is a recurring issue in FCNSW logging operations and consequently, a serious breach of the TSL. Despite EPA's repeated requests for action, no action plan has been developed to date. The EPA requires FCNSW to find the cause of the problem and to take all measures necessary to ensure that sufficient numbers of recruitment trees are retained across all logging areas, consistent with the TSL.	This non-compliance has a red risk category. The likelihood of environment harm is certain, because there are insufficient recruitment trees being retained and because habitat resources are scarce in the regrowth zone (i.e. the trees selected for retention have been cut). The scale of harm is moderate.	Action on this issue must start immediately and must continue until the EPA is satisfied that there is no further risk of non-compliance.
5.6(e) i-v Recruitment tree selection FCNSW continue to mark small and immature trees as recruitment trees, contrary to the requirements of the TSL. The EPA notes that this is a recurring issue in FCNSW operations. No action plan has been developed to date, to address the issue. FCNSW must train all staff to ensure that recruitment trees are selected to be retained across the compartment having as many of the characteristics listed in the TSL condition 5.6e i-v, and consistent with the requirements of the R tree definition.	This non-compliance has a red risk category. The likelihood of environment harm is certain, because of the scarcity of resources in the regrowth zone and because poor selection of recruitment trees impacts on future habitat directly (i.e. smaller trees have far less potential to form hollows than larger trees of the same species). The scale of harm is moderate, based on the number of trees affected.	Action on this issue must start immediately and must continue until the EPA is satisfied that there is no further risk of non-compliance.

Action Details	Non-compliance Code*	Target/Action Date
<p>5.6(h) Hollow bearing & recruitment tree protection</p> <p>No action plan has been developed to date to ensure that retained trees are protected as per TSL condition 5.6h (i and ii). The EPA notes that the issue is recurring and any actions taken have not been sufficient. FCNSW must take more active measures to (1) educate its contractors about the need to protect retained trees; (2) supervise logging operations more vigorously to ensure compliance; (3) improve systems processes and undertake any other changes necessary to address the problem of tree protection.</p>	<p>This non-compliance has an orange risk category. The likelihood of environment harm is likely, because of large amounts of debris associated with modern logging operations. Damage to tree crowns and bark is also more likely with mechanised logging. The EPA notes that there is an increased risk of fire damage due to the large amounts of debris. At present, the scale of harm is moderate (considering rate of incidence and sensitivity of environment receptor).</p>	<p>Action on this issue must start immediately and must continue until the EPA is satisfied that there is no further risk of non-compliance.</p>

AUDIT FINDINGS - FIELD COMPONENT

1. Tree Retention / Mark-up

This part of the audit focused on retention of hollow-bearing trees (H trees), recruitment trees (R trees), feed trees and any other trees that must be retained under the relevant IFOA / TSL conditions. For the purposes of this audit, the following requirements apply:

- At least five hollow-bearing trees must be retained per hectare, **where they occur** (Condition 5.6(d) of the TSL);
- For each retained hollow-bearing tree, one recruitment tree must be retained (Condition 5.6(e) of the TSL);
- Retained H and R trees **must be marked** for retention (Condition 5.6(h)(iii) of the TSL).

Comment and Evidence

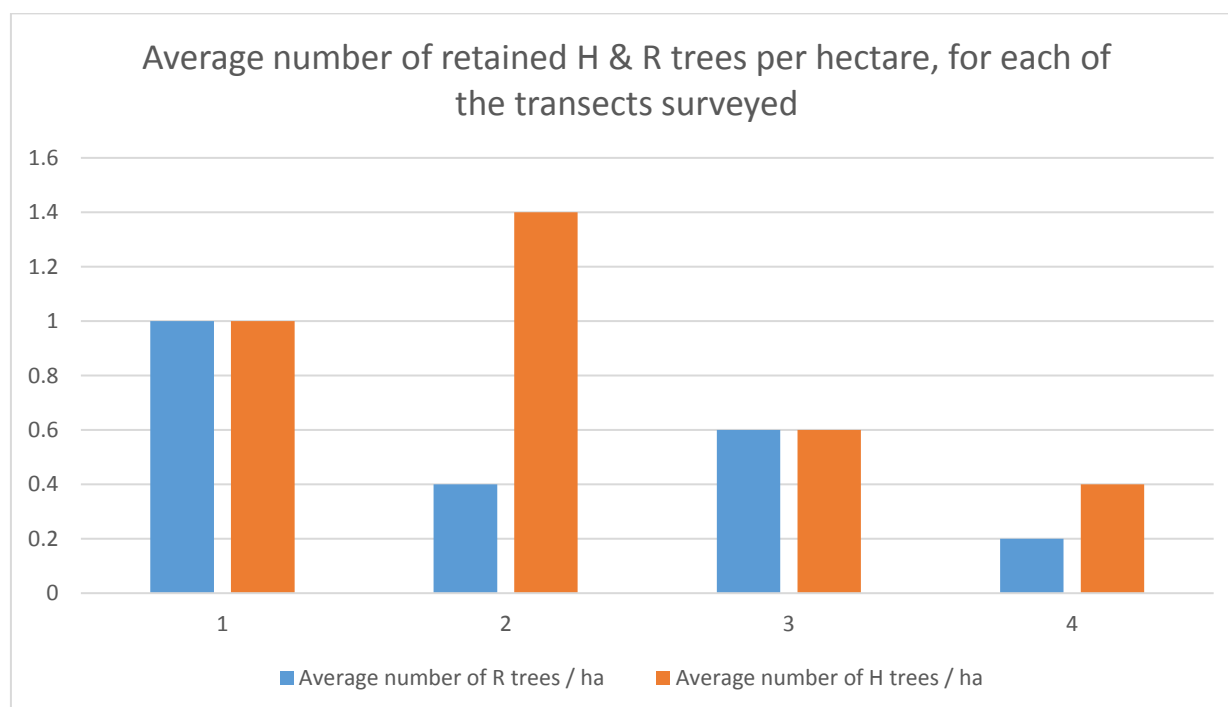
The EPA found that FCNSW was **not compliant** with the above conditions in all areas assessed. In particular, the EPA found there were insufficient Recruitment trees marked to satisfy Condition 5.6(e). This finding is based on a survey of twenty separate plots within the harvested areas (see Table 1 in the Appendix to this report). The total area surveyed was 4 hectares. Within this area, the EPA counted seventeen (17) marked H trees and eleven (11) marked R trees. This equates to the following retention rates per hectare:

Retention rate (H trees):	4.8 trees per hectare
Retention rate (R trees):	2.3 trees per hectare

As seen on the chart below, the average number of retained H and R trees per hectare are roughly equal in two out of the four transects. In the remaining two transects (transects 2 and 4), the number of hollow-bearing trees is significantly larger, contrary to the TSL.

Number of compliances / non-compliances

In line with the TSL conditions, a **single (1) non-compliance** was recorded in relation to tree retention for the purposes of the audit. This non-compliance is a high environment risk (red risk code).



2. Hollow-bearing Trees: Selection

This part of the audit focused on selection of hollow-bearing trees (H trees) that must be retained under Condition 5.6 of the Southern Region TSL. For the purposes of this audit, the following requirements apply:

- In selecting hollow-bearing trees, priority must be given to those trees which exhibit evidence of occupancy by hollow dependent fauna and trees which contain multiple hollows or hollows of various sizes;
- Hollow-bearing trees must have as many of the following characteristics as possible:
 - Belonging to a cohort of trees with the largest dbhob
 - Good crown development
 - 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;

Comment and Evidence

The EPA found that FCNSW was **compliant** with the above conditions in all areas assessed. This finding is based on the assessment of seventeen (17) marked hollow-bearing trees.

Table 2 in the “Data Tables and Figures” part of this report details the assessment of marked H and R trees recorded during the audit. As can be seen from the table and the graph below, the retained hollow-bearing trees had all of the characteristics listed in the TSL. The EPA noted that the trees were evenly scattered through the area surveyed. The retained hollow-bearing trees also represented a range of species found in the area, with Spotted Gum comprising the largest percentage as the dominant, hollow-forming species. The break down of species for H and R trees combined is shown in the pie chart on the next page.

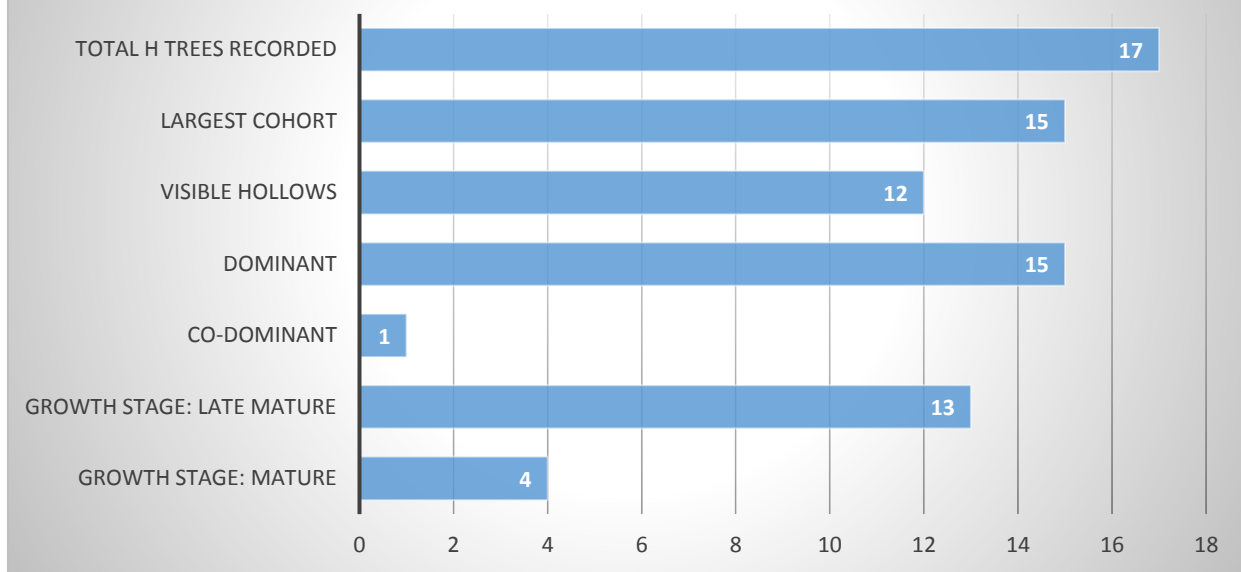
Number of compliances / non-compliances

When assessing trees for selection criteria, the EPA records a separate finding of compliance / non-compliance for each tree assessed. Accordingly, for the purposes of this audit the EPA recorded a total of 17 compliances with regard to the selection of hollow-bearing trees.

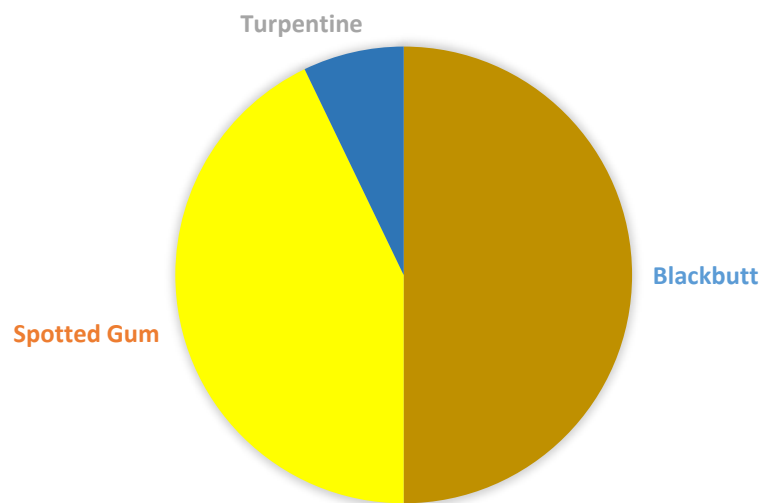


Photo 649: a marked hollow-bearing tree, belonging to the largest cohort and displaying hollows. This tree has been heavily damaged by fire, but it has a healthy crown with sufficient longevity to satisfy the TSL requirements.

Count of retained H trees displaying the characteristics listed in the TSL



RANGE OF SPECIES REPRESENTED BY THE RETAINED H AND R TREES



3. Recruitment Trees: Selection

This part of the audit focused on selection of recruitment trees (R trees) that must be retained under Condition 5.6 of the Southern Region TSL. For the purposes of this audit, the following requirements apply:

- Recruitment trees must have as many of the following characteristics as possible:
 - Belonging to a cohort of trees with the largest dbhob
 - Good crown development
 - 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;
- Recruitment trees should not have developed hollows. The TSL defines a Recruitment tree as “a live tree of a mature or late mature growth stage within the net logging area that is not suppressed prior to harvesting and has **good potential for hollow development** and long term survival.”

Comment and Evidence

The EPA found that FCNSW was **not compliant** with the above conditions in all areas assessed. The EPA recorded a total of five (5) non-compliances relating to the selection of Recruitment trees. These non-compliances are of high environmental risk (red risk code).



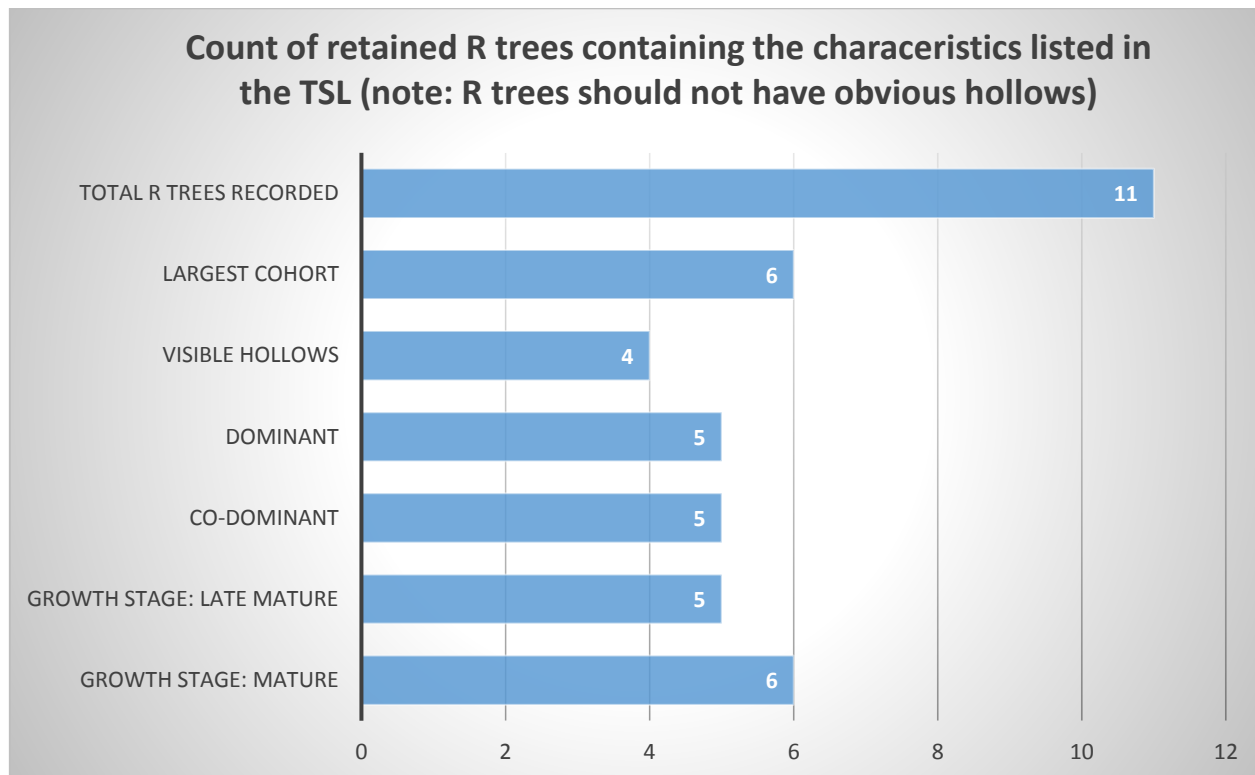
Photo 583: Recruitment tree with obvious large hollows (circled).

Table 2 in the Appendix to this report details the assessment of marked H and R trees recorded during the audit. As seen from the table and the graph below, four (4) of the marked R trees had well developed, large hollows (see photo 583, left). Under the TSL definition, these trees would have been more appropriately selected as hollow-bearing trees. In addition, five of the retained R trees were too small or under-developed to satisfy the requirements of the TSL – in particular the requirements regarding largest cohort and good crown development. See chart below for more detail.

Number of compliances / non-compliances

When assessing trees for selection criteria, the EPA records a separate finding of compliance / non-compliance for each tree assessed. Accordingly, for the purposes of this audit the EPA recorded a total of six (6) **compliances** and five (5) **non-compliances** out of the total 11 marked R trees assessed.

Note: In resource scarce areas within the regrowth zone, it is particularly important that all trees with hollows are marked as H trees. The marking-up of these trees as R trees has resulted in lower numbers of both H and R trees retained across the compartment.



Why is it important?

The EPA considers it important that the required quantity **and quality** of recruitment trees are retained. Retention of recruitment trees – being the largest trees with the greatest potential to develop hollows, as stipulated in the TSL – is an important aspect of Ecologically Sustainable Forestry Management (ESFM). In a regrowth zone in particular, the principal aim of ESFM is to maintain an adequate level of forest structure and form, so as to ensure biodiversity values are maintained.

4. Protection of Retained Trees

This part of the audit focuses on protection of hollow-bearing trees (H trees) and recruitment trees (R trees) that have been marked for retention. Condition 5.6(h) of the Southern Region Threatened Species Licence (TSL) requires damage to trees to be minimised using directional felling. Further to this:

- Debris must not be accumulated higher than 1m within 5m radius of the retained trees,
- Mechanical disturbance to ground and understorey must be minimised to the greatest extent practicable within this five metre radius, and
- Retained trees must not be used as bumper trees during harvesting.

Comment and Evidence

The EPA found that FCNSW was **not compliant** with the above conditions in all areas assessed.

The EPA recorded **sixteen (16)** instances of non-compliance and twelve (12) instances of compliance relating to the protection of retained H and R trees (marked trees only were counted for the purposes of the audit). These non-compliances are of high environmental risk (red risk code). The EPA recorded one instance of operator crown damage to hollow-bearing trees, three instances of debris >1m within 5m (directly against the trees), and twelve instances of soil disturbance within 5m. Regarding recruitment trees, the EPA recorded one instance of operator caused crown damage, no instances of debris >1m



Photos 635 (above) and 637 (below): Retained H tree with debris >1m within 5m of its base.



of

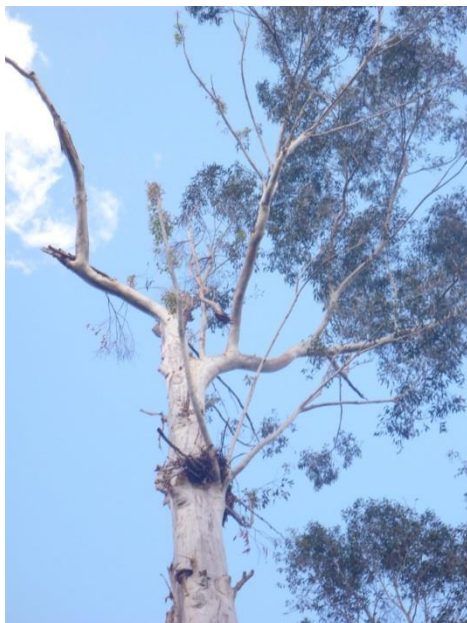


Photo 600: heavy crown damage on a marked H tree caused by logging operations.

within 5m, one instance of a marked R tree being used as a bumper, and eight instances of soil disturbance within 5m.

Number of compliances / non-compliances

When assessing trees for selection criteria, the EPA records a separate finding of compliance / non-compliance for each tree assessed. The finding on non-compliances does not include ground disturbance in the form of snig tracks (**10 in total**), because the snig tracks could have existed prior to harvesting. The EPA notes, however, that the percentage of retained trees affected by ground disturbance is quite high (see pie charts on the next page). Accordingly, harvesting contractors should take care when constructing new snig tracks. Efforts should focus on ensuring that tracks are constructed at least 5m away from marked trees.



Photo 656: marked R tree with damage to the base.
Note that debris has been removed to a distance >5m from the tree.

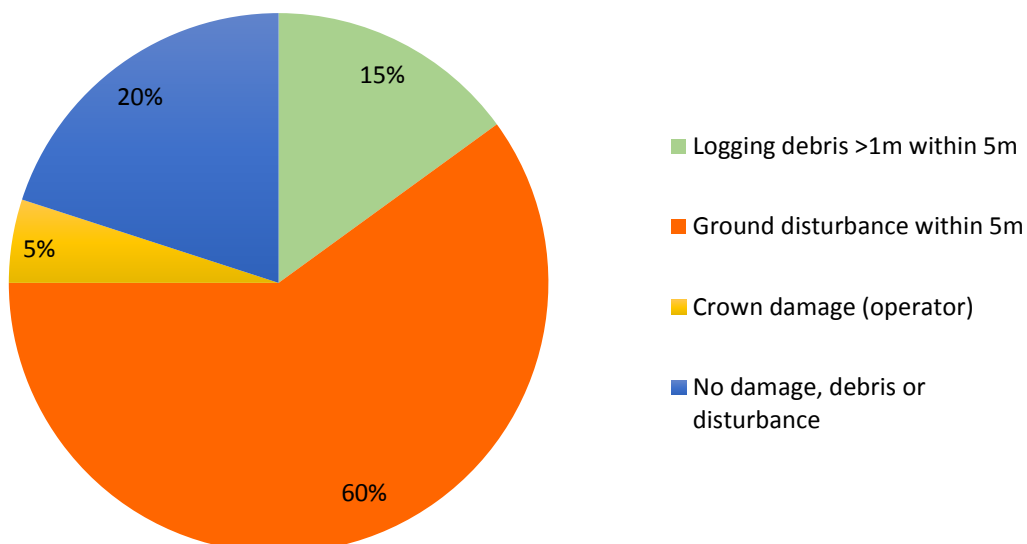
For more detailed observations, refer to Table 3 in the Appendix to this report.

Why is it important?

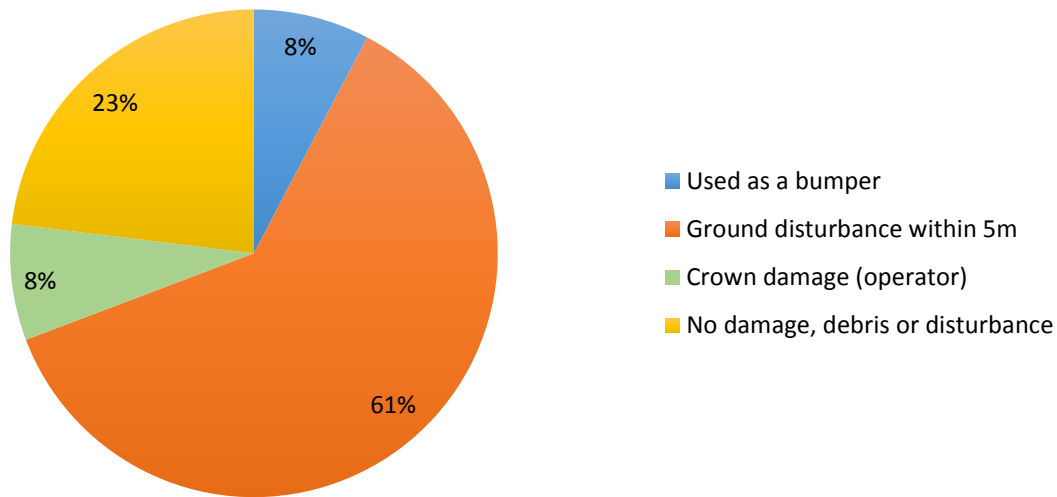
The EPA findings regarding protection of retained trees are represented in the two pie charts below. These show that FCNSW achieved full compliance (i.e. a 100% rate of protection) in 20% of Hollow-bearing trees, and 23% of Recruitment trees. It is the EPA's view that these are very low rates of compliance, given the importance of the TSL provisions relating to the protection of retained trees. The issue is exacerbated by the fact that it occurs repeatedly and is not a one-off event restricted to the current audit.

The EPA considers it important that hollow-bearing and recruitment are adequately protected from both logging operations and post-logging risks, such as hazard reduction burns and wild fires. Excessive logging debris in the immediate proximity of hollow-bearing or recruitment trees increases the risk of damage to the retained trees – or tree death if the fire is very hot – in the occurrence of a fire. This has a flow on effect on the long-term availability of hollow-bearing and recruitment resources as key forestry structural values.

Protection of marked H trees: percentage of fully protected trees versus those with damage, debris or soil disturbance within 5m



Protection of marked R trees: percentage of fully protected trees versus those with damage, debris or soil disturbance within 5m



5. Marking-up of boundaries (compartment mark-up)

This part of the audit focuses on marking-up requirements relating to environmentally sensitive areas. Condition 5.1E of the Southern Region TSL defines sensitive areas as:

- High conservation value old growth forest (HCVOG);
- Rainforest / warm temperate rainforest / cool temperate rainforest;
- Rare non-commercial forest ecosystem;
- Ridge and Headwater Habitat
- Wetlands
- Heath and Scrub
- Rocky Outcrops and Cliffs
- Exclusion zones around a range of threatened fauna

The EPA surveyed areas of rainforest and FMZ 3A, shown on Map 4 at the beginning of this report.

Comment and Evidence

The EPA found that FCNSW was **compliant** with the above conditions in all areas assessed.

This finding is based on a survey of rainforest / FMZ 3A boundary, and a ridge and headwater boundary shown on Map 1 at the front of this report (the two boundaries overlap, with the rainforest boundary completely contained within the ridge and headwater exclusion). Un-mapped drainage lines were also observed to be marked in the field, in excess of the TSL requirements.

Number of compliances / non-compliances

The EPA records a single compliance or non-compliance finding in relation to compartment mark-up. Accordingly, the EPA recorded a single compliance finding in relation to compartment mark-up for the purposes of the audit.

6. Rainforest mapping and protection

This part of the audit focuses on the mapping and protection of rainforest areas, as per Condition 5.4 of the Southern Region TSL. The key requirements of the condition are:

- On-ground identification and location of Rainforest and exclusion zones around Warm Temperate and Cool Temperate Rainforest must be undertaken before logging;
- The location of Rainforest and exclusion zones must be shown on an operational map;
- A 20m exclusion zone must be implemented around all areas of Warm Temperate Rainforest and Cool Temperate Rainforest;
- Specified forestry activities are prohibited in Rainforest and Rainforest exclusion zones;
- Trees must not be felled into Rainforest or Rainforest exclusion zones, and harvesting machinery must not be used within Rainforest or Rainforest exclusion zone. The only exception is where a tree has been accidentally felled, as provided for in Condition 5.1A (f) of the TSL.

Comment and Evidence

The EPA found that FCNSW was **compliant** with the above conditions in all areas assessed.

This finding is based on an inspection of an area of rainforest shown on Map 1 at the start of this report. EPA officers walked 120m of the ridge and headwater boundary, within which the rainforest boundary is contained. No forestry activities were observed near the mapped boundary.

Number of compliances / non-compliances

The EPA records a single compliance / non-compliance finding for each length / location surveyed. Accordingly, the EPA recorded a single compliance finding for rainforest protection – and a separate compliance finding for rainforest mark-up, for the purposes of the audit.

7. Riparian Zone Protection

This part of the audit focuses on the protection of riparian zones. The Southern Region TSL does not require riparian protection zones to be marked in the field (see **Part 5 – Marking-up of boundaries**, above. Riparian protection zones are not defined as environmentally sensitive areas under the Southern Region TSL and hence do not need to be marked). However, the EPA notes that FCNSW continue to mark riparian zones to ensure compliance with the protection requirements of the licence.

Protection requirements for riparian zones are set out in Condition 5.7 of the TSL, which provides for two different protection zones alongside drainage lines and streams:

- a hard protection zone of 5m, to be measured from the top of the bank of the incised channel or, where there is no defined bank, from the edge of the channel;
- a soft protection zone along the entire length of each hard protection zone. The width of the soft protection zone varies according to stream order, as follows:
 - 5m for 1st order streams
 - 15m for 2nd order streams
 - 25m for 3rd order streams
 - 45m for 4th and higher order streams.

Condition 5.7.1 of the TSL sets out the provisions relating to hard protection zones. It provides that specified forestry



Photo 678: running stream north of Cpt 47/1 Road, a third order stream that was adequately protected with forestry operations occurring more than 30m from the stream.

activities are prohibited in a hard protection zone, no tree is to be felled into a protection zone (hard), and if a tree falls into a hard protection zone, then no part of the tree can be removed. Harvesting machinery is not to be used in a hard protection zone.

Condition 5.7.2 of the TSL sets out the provisions relating to soft protection zones. It provides that specified forestry activities and harvesting machinery are prohibited in a soft protection zones. Trees may be felled into and removed from a soft protection zone, but only in the course of a harvesting operation for the purpose of timber production (including a thinning operation that has timber production as one of its purposes) or in the course of road or snig track construction or reopening, snig track brushing-up or road maintenance.



Photo 683: tree with a 30m boundary marked on it, near a third order stream north of Cpt 47/1 Road.

Comment and Evidence

The EPA found that FCNSW was **compliant** with the above conditions in all areas assessed.

This finding is based on the assessment of a first order stream south of Cpt 46/2 Road, second order stream north of Cpt 46/3 Road and third order stream north of Cpt 47/1 Road – all streams were within the harvested areas. EPA officers surveyed 50m of second order riparian zone, and 80m of a third order riparian zone. As detailed in Table 1 in the Appendix to this report, EPA officers observed pink tape marking a riparian protection zone in all of the locations surveyed. The distances from the marked boundary to the stream were in excess of the required distances in each location (in the case of a third order stream, this equated to 35m and 39m from the water's edge, in the two locations inspected). No forestry activities were observed in either soft or hard protection zones.

Number of compliances / non-compliances

The EPA records a single finding of compliance / non-compliance for each length of riparian zone assessed. Accordingly, the EPA has recorded **three (3) compliances** in relation to riparian zone protection, for the purposes of the audit.

8. Basal Area Retention

This part of the audit focuses on the retention of basal area and general compliance with the silvicultural prescriptions for Single Tree Selection. The Southern Region IFOA defines Single Tree Selection (STS) in part 5(11) D. Under the IFOA, the silvicultural practice of STS contains the following elements:

- in the South Coast Sub-Region, trees are selected for logging or culling with the objective of ensuring that the sum of the basal areas of trees removed or destroyed comprises **no more than 45% of the sum of the basal areas** of all trees existing immediately prior to logging or culling within the net harvestable area of the tract, and
- the sum of the basal areas of trees remaining after logging or culling as a proportion of the net harvestable area of the tract existing immediately prior to logging or culling is **at least 10m² per hectare**.

The document "Implementation of IFOA Silviculture in the Southern Forest Agreement Region: Operational Guidelines for Harvesting" provides further guidance for forest workers in the correct implementation of STS.

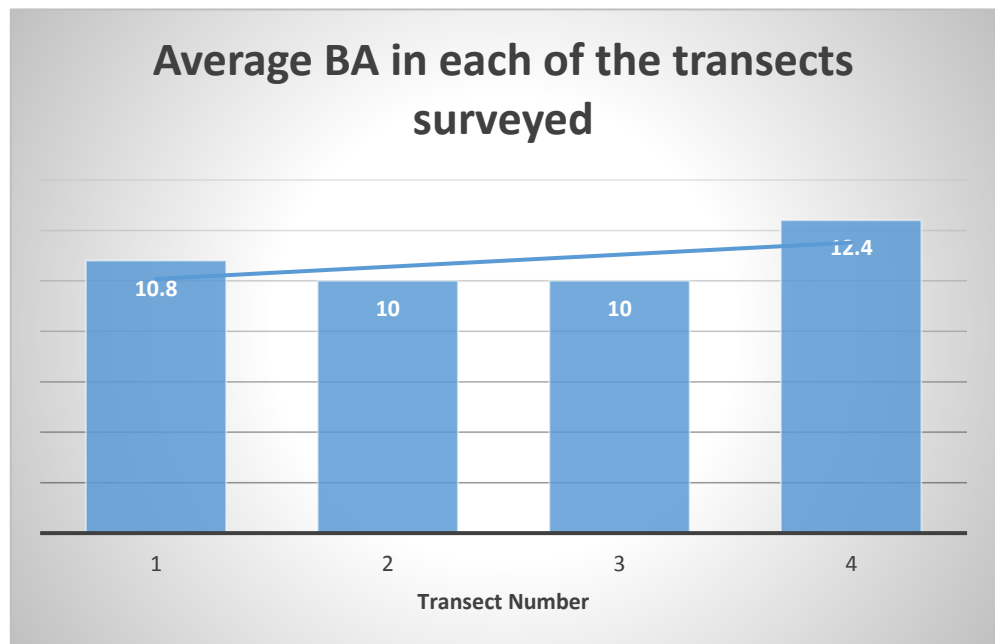
Comment and Evidence

The EPA cannot make a final determination on basal area retention without further input from FCNSW, for reasons outlined below.

Table 4 in the Appendix to this report shows the results of Basal Area sweeps that EPA undertook during the audit. As shown in the diagram below, none of the transects had average basal areas below 10m²/ha. The overall average (across all five transects) was 10.8m²/ha, thus satisfying the second part of the test cited above.

Number of compliances / non-compliances

The EPA make a single compliance / non-compliance finding in relation to Basal Area retention, as it relates to the entire logged area. For the purposes of the audit, the EPA are unable to make a final determination on the percentage of the sum of the basal area removed. More detailed data from FCNSW will be obtained at a later date, enabling the finding to be made.



RISK ASSESSMENT OF NON-COMPLIANCE

The significance of any non-compliances identified during the audit process are categorised. Following risk assessment of non-compliances, an escalating response relative to the seriousness of the non-compliance is determined to ensure the non-compliance is addressed by the enterprise.

The risk assessment of non-compliances involves assessment of the non-compliance against two criteria; the likelihood of environmental harm occurring and the level of environmental impact as a result of the non-compliance. After these assessments have been made, information is transferred into the risk analysis matrix below.

	Likelihood of Environmental Harm Occurring			
		Certain	Likely	Less Likely
Level of Environmental Impact	High	Code Red	Code Red	Code Orange
	Moderate	Code Red	Code Orange	Code Yellow
	Low	Code Orange	Code Yellow	Code Yellow

The assessment of the likelihood of environmental harm occurring and the level of environmental impact allows for the risk assessment of the non-compliance via a colour coding system. A red risk assessment for non-compliance denotes that the non-compliance is of considerable environmental significance and therefore must be dealt with as a matter of priority. An orange risk assessment for non-compliance is still a significant risk of harm to the environment however can be given a lower priority than a red risk assessment. A yellow risk assessment for non-compliance indicates that the non-compliance could receive a lower priority but must be addressed.

There are also a number of licence conditions that do not have a direct environmental significance, but are still important to the integrity of the regulatory system. These conditions relate to administrative, monitoring and reporting requirements. Non-compliance of these conditions is given a blue colour code.

The colour code is used as the basis for deciding on the priority of remedial action required by the licensee and the timeframe within which the non-compliance needs to be addressed. This information is presented in the action program alongside the target/action date for the noncompliance to be addressed.

While the risk assessment of non-compliances is used to prioritise actions to be taken, the EPA considers all non-compliances are important and licensees must ensure that all non-compliances are addressed as soon as possible.

APPENDIX: DATA TABLES AND FIGURES

Table 1: waypoints recorded in North Brooman State Forest, compartments 46 and 47, during an audit undertaken on 10 August 2016.

FID	Identification notes	Latitude	Longitude	Easting	Northing
0	H 10-08-2016 08:53:25	-35.47954	150.30276	255287	6070431
1	H 10-08-2016 08:55:25	-35.47945	150.30267	255279	6070441
2	R 10-08-2016 08:55:53	-35.4795	150.30263	255275	6070435
3	R 10-08-2016 08:57:40	-35.47994	150.30312	255321	6070388
4	H 10-08-2016 08:57:54	-35.47999	150.30315	255324	6070382
5	R 10-08-2016 08:58:10	-35.48	150.30307	255317	6070381
6	R should be H 10-08-201	-35.48005	150.3029	255301	6070375
7	plot 1 nb46 10-08-2016	-35.48002	150.30295	255306	6070378
8	plot 2 nb46 10-08-2016	-35.48051	150.30272	255287	6070323
9	R 10-08-2016 09:37:31	-35.48085	150.30296	255309	6070286
10	plot 3 nb46 10-08-2016	-35.48096	150.30255	255272	6070273
11	H 10-08-2016 09:39:35	-35.481	150.30251	255269	6070268
12	plot 4 nb46 10-08-2016	-35.4811	150.30186	255210	6070256
13	R 10-08-2016 09:49:11	-35.48112	150.30183	255208	6070253
14	plot 5 nb46 10-08-2016	-35.48041	150.30136	255163	6070331
15	H 10-08-2016 09:58:09	-35.4803	150.30138	255164	6070343
16	H should be R 10-08-201	-35.48064	150.30167	255192	6070306
17	stump in riparian zone	-35.48051	150.30182	255205	6070321
18	pink tape pushed over 1	-35.48051	150.30182	255205	6070321
19	pink tape pushed over 1	-35.4805	150.30177	255200	6070322
20	pink tape pushed over 1	-35.48048	150.30205	255226	6070325
21	plot 6 nb46 10-08-2016	-35.4748	150.29797	254838	6070945
22	H 10-08-2016 11:09:48	-35.4748	150.29793	254834	6070945
23	R 10-08-2016 11:13:17	-35.47484	150.29773	254816	6070940
24	missing R tree 10-08-20	-35.47535	150.2981	254852	6070884
25	plot 7 nb46 10-08-2016	-35.47535	150.2981	254852	6070884
26	pink tape 1 second orde	-35.47627	150.29745	254795	6070781
27	plot 8 nb46 10-08-2016	-35.47627	150.29774	254822	6070781
28	H 10-08-2016 11:50:51	-35.47609	150.29784	254830	6070802
29	pink tape 2 second orde	-35.47657	150.29785	254833	6070748
30	H 10-08-2016 12:06:16	-35.47609	150.2984	254881	6070803

FID	Identification notes	Latitude	Longitude	Easting	Northing
31	pink t? 10-08-2016 12:0	-35.4761	150.29852	254892	6070802
32	pink t? 10-08-2016 12:0	-35.47617	150.29855	254895	6070794
33	H 10-08-2016 12:10:26	-35.47629	150.2986	254900	6070781
34	plot 9 nb46 10-08-2016	-35.47629	150.29842	254883	6070781
35	pink t? 10-08-2016 12:1	-35.47587	150.29893	254928	6070829
36	plot 10 nb46 10-08-2016	-35.47575	150.29897	254932	6070842
37	tiny R 10-08-2016 12:20	-35.47575	150.29903	254937	6070842
38	tiny H 10-08-2016 12:25	-35.47572	150.29921	254953	6070846
39	missing H 10-08-2016 13	-35.4727	150.30333	255318	6071191
40	plot11 nb47 10-08-2016	-35.47246	150.30351	255334	6071218
41	pink tape third order 1	-35.47219	150.3033	255314	6071248
42	plot 2 nb47 10-08-2016	-35.47181	150.30331	255314	6071290
43	R 10-08-2016 13:22:27	-35.47181	150.30331	255314	6071290
44	H 10-08-2016 13:23:27	-35.47182	150.30342	255324	6071289
45	H 10-08-2016 13:32:09	-35.47176	150.30373	255352	6071297
46	water edge third order	-35.47133	150.30394	255369	6071345
47	pink t third order stre	-35.47162	150.30402	255378	6071313
48	stump in sez? 10-08-201	-35.47164	150.30412	255387	6071311
49	tree marked 30 10-08-20	-35.47161	150.3042	255394	6071314
50	H 10-08-2016 13:53:35	-35.47212	150.3046	255432	6071259
51	plot 13 nb47 10-08-2016	-35.47205	150.30469	255440	6071267
52	stump near missing R 10	-35.47184	150.30481	255450	6071290
53	pink t third order stre	-35.47183	150.30482	255451	6071292
54	water edge third order	-35.47145	150.30487	255454	6071334
55	plot 14 nb47 10-08-2016	-35.47291	150.30473	255446	6071171
56	plot 15 nb47 10-08-2016	-35.4735	150.30562	255528	6071108
57	R 10-08-2016 14:29:48	-35.47357	150.30582	255547	6071101
58	R 10-08-2016 14:33:07	-35.47362	150.30565	255532	6071095
59	H 10-08-2016 14:36:08	-35.47344	150.30571	255536	6071115
60	H 10-08-2016 14:57:47	-35.47511	150.30858	255802	6070937
61	plot 16 nb47 10-08-2016	-35.47473	150.30872	255813	6070979
62	R 10-08-2016 15:03:52	-35.47422	150.30872	255812	6071036
63	plot 17 nb47 10-08-2016	-35.47421	150.30865	255806	6071037
64	stump near missing R 10	-35.4738	150.3084	255782	6071082

FID	Identification notes	Latitude	Longitude	Easting	Northing
65	plot18 nb47 10-08-2016	-35.47355	150.30829	255771	6071109
66	plot19 nb47 10-08-2016	-35.47298	150.30843	255782	6071173
67	H 10-08-2016 15:27:27	-35.47327	150.30894	255829	6071142
68	R with debris 10-08-201	-35.47316	150.30888	255823	6071154
69	plot20 nb47 10-08-2016	-35.47381	150.30875	255813	6071082
70	H 10-08-2016 15:49:42	-35.47491	150.30939	255875	6070961
71	R 10-08-2016 15:49:50	-35.4749	150.30939	255875	6070962
72	R 10-08-2016 15:51:38	-35.47411	150.3098	255910	6071051
73	H should be R. 10-08-20	-35.47373	150.30983	255911	6071093
74	H 10-08-2016 15:54:56	-35.47361	150.31015	255940	6071107
75	H crown damage	-35.47393	150.31024	255949	6071072
76	H 10-08-2016 15:58:50	-35.47384	150.31055	255977	6071083
77	pink t ridge and h boun	-35.47399	150.31071	255992	6071066

Table 2: Hollow-bearing (H) and Recruitment (R) trees recorded in compartments 46 and 47, North Brooman State Forest, during the audit undertaken on 10 August 2016. This table displays the data used to determine compliance with SELECTION requirements of the Southern Region Threatened Species licence. The highlighted rows show Recruitment trees that were found to have hollows and therefore should have been marked as Hollow-bearing trees.

Plot	Marked	Species	Cohort	Visible hollows?	Hollow location	Dominance class	Growth stage
1	R	Blackbutt	Largest	N		Dominant	Late mature
1	R	Spotted gum	Next largest	N		Co-dominant	
1	R	Spotted gum	Next largest	Y	Limbs	Co-dominant	Late mature
1	H	Spotted gum	Largest	N		Dominant	Late mature
2	H	Blackbutt	Largest	N		Dominant	Mature
2	R	Spotted gum	Largest	Y	Limbs	Co-dominant	Late mature
2	H	Blackbutt	Largest	N		Dominant	Late mature
3	H	Spotted gum	Largest	Y		Co-dominant	Late mature
4	R	Spotted gum	Next largest	N		Co-dominant	Mature
5	H	Blackbutt	Largest	N		Dominant	Mature
6	H	Spotted gum	Largest	Y		Dominant	Mature
6	R	Turpentine	Largest	N		Dominant	Mature
8	H	Spotted gum	Largest	Y	limbs, trunk	Dominant	Late mature
8	H	Spotted gum	Largest	Y	Limbs	Dominant	Late mature
9	H	Spotted gum	Next largest	Y	Limbs	Dominant	Late mature
9	H	Blackbutt	Largest	Y	limbs, trunk	Dominant	Late mature
9	H	Blackbutt	Largest	Y	limbs, trunk	Dominant	Late mature
10	R	Spotted gum	Next largest	N		Sub-dominant	Mature
10	H	Spotted gum	Next largest	N		Sub-dominant	Mature
12	H	Blackbutt	Largest	Y	limbs, trunk	Dominant	Late mature
12	R	Blackbutt	Largest	N		Dominant	Late mature
13	H	Blackbutt	Largest	Y	limbs, trunk	Dominant	Late mature
14	H	Blackbutt	Largest	Y	limbs, trunk	Dominant	Late mature
15	R	Blackbutt	Largest	Y	Limbs	Dominant	Late mature
15	R	Blackbutt	Largest	Y	limbs, trunk	Dominant	Late mature
17	R	Turpentine	Next largest	N		Co-dominant	Mature
18	H	Blackbutt	Largest	Y	Limbs	Dominant	Late mature
19	H	Blackbutt	Largest	Y	limbs, trunk	Dominant	Late mature

Table 3: Hollow-bearing (H) and Recruitment (R) trees recorded in compartments 46 and 47, North Brooman State Forest, during the audit on 10 August 2016. This table displays the data used to determine compliance with PROTECTION of retained trees requirements of the Southern Region Threatened Species licence. Note: “natural-operator” damage denotes mostly natural crown damage, with some (minor) operator damage.

Plot	Marked	Crown damage	Debris >1m within 5m	Used as a bumper	Disturbance within 5m?	Comments
1	R	natural	no	no	no	borderline r tree could be h
1	R	natural	no	no	no	
1	R	natural	no	no	yes	Hollow evidence, should be h tree
1	H	natural	no	no	yes	hollows not visible, but good h tree
2	H	natural	no	no	no	marked h should be r tree, no hollows visible
2	R	natural	no	no	no	marked as r, should be h
2	H	natural	no	no	no	
3	H	operator	no	no	yes	heavy operational crown damage
4	R	natural	no	no	yes	poor quality r,
5	H	natural	no	no	yes	Next to snig track
6	H	natural	no	no	yes	near snig track
6	R	operator	no	no	yes	Next to snig track
7						No h or r trees in plot
8	H	natural	yes	no	no	logging debris within 5 m, greater than 1 Metre high
8	H	natural	no	no	yes	Next to snig track
9	H	natural	yes	no	yes	snig track
9	H	natural	no	no	yes	snig track
9	H	natural	no	no	no	
10	R	natural	no	yes	yes	sub dom tree, used as bumper
10	H	natural	yes	no	yes	sub dom tree, very poor quality, suppressed in the past
11						No marked trees in plot
12	H	natural	no	no	yes	Butt damage photo 676
12	R	natural	no	no	yes	snig track
13	H	natural	no	no	no	No h or r trees in plot or near by
14	H	natural	no	no	yes	snig track
15	R	natural	no	no	yes	Should be h
15	R	natural	no	no	yes	marked as h and r, should be h
16						No marked trees in plot
17	R	operator / natural	no	no	yes	butt damage to tree
18	H	natural	no	no	yes	snig track
19	H	natural	no	no	yes	snig track
20						No marked trees in plot

Table 4: Basal area sweeps recorded at each of the plots used during H & R surveys in North Brooman State Forest, compartments 46 and 47, 10 August 2016.

Plot	BA
1	20
2	18
3	4
4	8
5	4
6	16
7	8
8	14
9	10
10	2
11	14
12	12
13	6
14	4
15	14
16	22
17	8
18	12
19	4
20	16

AUDITEE SUBMISSIONS – NORTH BROOMAN STATE FOREST, COMPARTMENTS 46 AND 47

Condition / Audit finding reference / page No.	EPA draft finding / risk category	Location – description GPS	FCNSW evidence submission	EPA final finding / risk category	EPA response to FCNSW submission
TSL 5.6(d)	R tree retention / Red	Transects shown on Map at the front of the audit report / p.6 of the report	<p>The EPA notes in the Audit recommendation that EPA has made repeated requests for action on this matter, no action plan has been developed. Similar FCNSW has made numerous submission (sic) in response to EPA audit findings on this matter, specifically on the suitability of EPA's audit methodology. FCNSW has also made submissions that retention of retained trees must be assessed at the compartment level, not plot level.</p> <p>FCNSW tree retention information for North Brooman 46 & 47 shows the ratio of retained H&R trees is 1H:0.93R, which is considerably different to EPA findings. Furthermore, as part of FCNSW compliance monitoring for compartments 46 & 47, 8 retained tree transects have been done showing a retained tree ratio of 1H:0.94R, which is consistent with compartment mark-up data.</p> <p>FCNSW would also like to note that mark-up in this compartment is not yet completed. Adequate retention of recruitment trees in the non-regrowth zone is a compliance focus for FCNSW and will continue to be.</p> <p>Considering mark-up is ongoing FCNSW would like the EPA to re-assess the risk rating and change the compliance finding to not determined.</p>	Non-compliant / Red	<p>The EPA considered FCNSW submissions and field evidence gathered.</p> <p>In response to FCNSW submissions in relation to audit methodology, the EPA increased the minimum size of the sample, from 1ha to a minimum of 4ha. In addition, during the audit of North Brooman State Forest the EPA relied on the map of marked H and R trees provided by FCNSW. During the field inspection, however, the EPA were unable to locate some of the marked R trees shown on the FCNSW map. The EPA sought an explanation from FCNSW as to why this was, but none was provided.</p> <p>The EPA finding regarding uneven numbers of H and R trees stands. This is independent of sample size, since TSL condition 5.6(e)(ii) provides that recruitment trees should be "located such that they result in retained trees being evenly scattered throughout the net logging area."</p> <p>The EPA upholds its draft audit finding and requirement for action plan.</p>
TSL 5.6(e)	R tree selection / Red	Transects shown on Maps at the front of the audit report /	<p>"FCNSW continue to mark small and immature trees as recruitment trees, contrary to the requirements of the TSL."</p> <p>FCNSW does not understand this audit finding based on evidence provided in Table 2, page 21. This shows that</p>	Non-compliant / Red	<p>The EPA considered FCNSW submissions and field evidence gathered.</p> <p>The first finding relating to R tree selection is that of hollow-bearing trees being marked as R trees. For the reasons specified in the report, this is not compliant with</p>

		p.9 of the report	<p>all R trees were assessed as ‘mature’ or ‘late mature’. EPA’s results in Table 2 also show that for both the ‘mature’ and ‘late mature’ growth stages there is a mixture of cohorts being ‘largest’ and ‘next largest’, these results appear contradictory.</p> <p>FCNSW would like the EPA to redraft this finding to be consistent with audit evidence. It appears from the audit evidence presented that FCNSW is compliant with this condition.</p>		<p>the requirements of the TSL. Regarding small and immature trees, Table 1 of the report (rows 37 and 38) refer to “tiny R” and “tiny H”. These trees were outside the EPA survey plots, but were recorded for the purposes of the audit. The EPA also notes that only 6 out of 11 marked R trees belonged to the largest cohort. This was despite the fact that sufficient numbers of largest cohort trees were available for selection. Finally, the comment “FCNSW continue to mark small and immature trees as recruitment trees” refers to past instances / audits, as well as the current one.</p> <p>The EPA upholds its draft audit finding and requirement for action plan.</p>
TSL 5.6(h)	Protection of retained trees / Orange	Transects shown on Maps at the front of the audit report / p.11 of the report	<p>Protection of retained trees has been a continued compliance focus for FCNSW and since our joint audit in May 2016 we have increased our level of retained tree auditing.</p> <p>In compartment 46/47 FCNSW has carried out 8 retained tree transects, which include assessment of compliance with TSL condition 5.6(h). FCNSW has found a compliance rate of 97%. One H tree was identified with debris within 5m and the contractor was tasked to remove the debris.</p> <p>FCNSW has no comment on the EPA’s findings, except that the audit finding does not meet FCNSW standards for protection of retained trees and is being investigated. An onsite inspection has been scheduled for 12/10/16 to assess the EPA plots and conduct further retained tree transects. FCNSW will report to the EPA our findings.</p>	Non-compliant / orange	<p>The EPA considered FCNSW submissions and field evidence gathered.</p> <p>The EPA has taken into consideration FCNSW comment regarding additional effort being directed toward protection of retained trees. The EPA’s audit findings are based on the terms of the TSL. The EPA will continue to work with FCNSW to try and address this issue in the future.</p> <p>The EPA upholds its draft audit finding and requirement for action plan.</p>