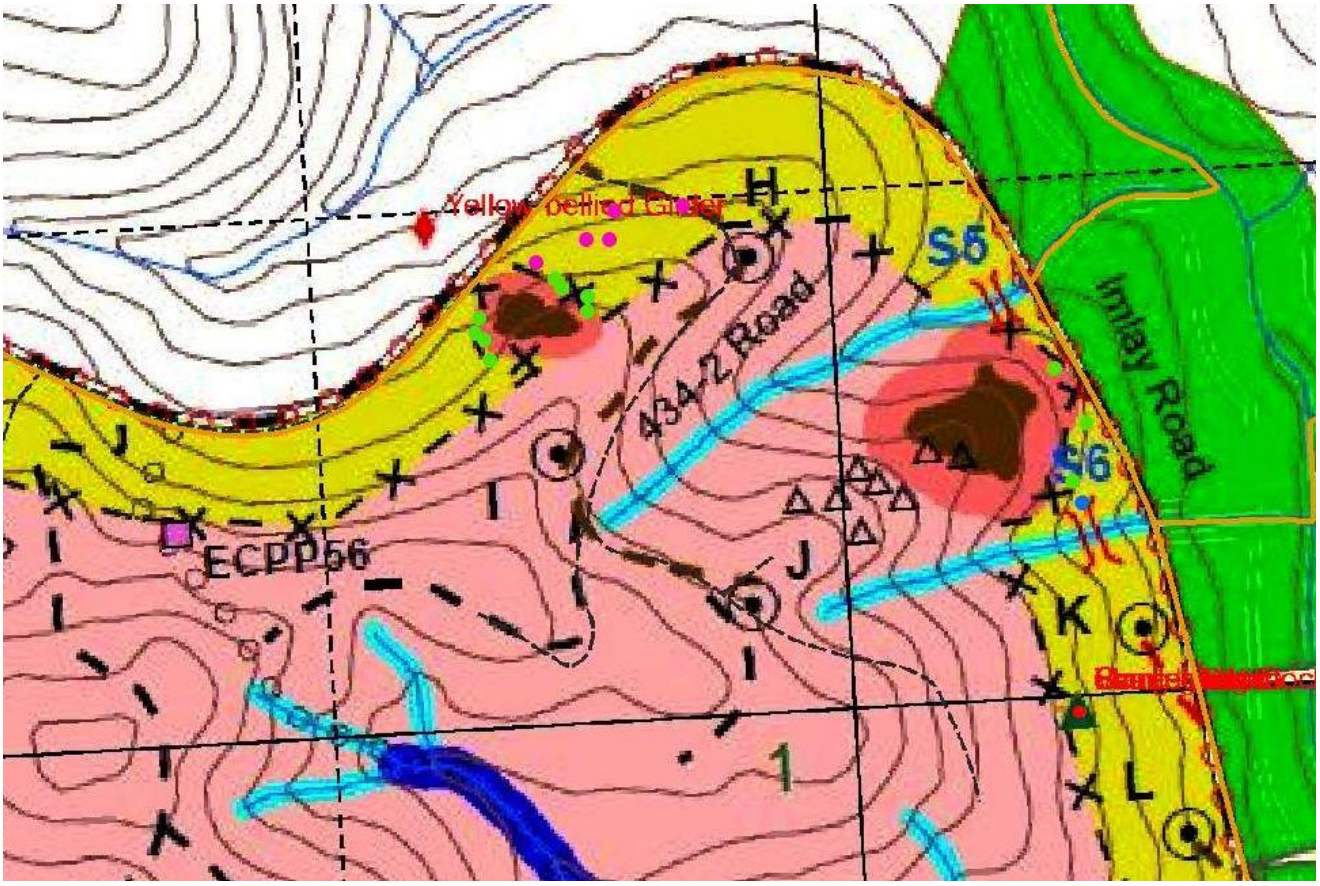
EPA AUDIT REPORT – CROWN FOREST
YAMBULLA STATE FOREST, COMPARTMENT 434

Auditee:	Forestry Corporation NSW
Audit scope:	Yambulla State Forest, compartment 434 (see **Map 1**, below). The field audit took 0.5 day to complete.
Region:	Eden Region
Date/Audit timing:	18 October 2016
Lead EPA auditor:	Peter Lezaich
Assisting EPA auditors:	Dinka Dekaris, John Forcier
Justification of audit:	Post-harvest audit focussing on EPA compliance priority areas
Audit objectives:	1. Determine compliance with Eden Region IFOA conditions
Audit criteria:	• Condition 5.6 TSL (H&R retention, selection and protection) • Condition 5.7 (Stream exclusion zones) • Condition 5.11 TSL (Rocky outcrops and cliffs)
Summary of Operations	From the harvesting plan: The stands to be harvested consist primarily of mature to over-mature Silvertop Ash (*E.* siberi), Brown Barrel (*E.* fastigata), Yellow Stringybark (*E. muelleriana)*, Messmate (*E.* obliqua) and Mountain Grey Gum (*E. cypellocarpa*) along the strip of unlogged stand within the area of FMZ 4 – general management and FMZ 3b-visual protection adjacent to Imlay Road within the Compartments 433, 434 and 435. Mixed-age stands described above will be harvested in a modified shelter-wood silvicultural system in accordance with the Eden IFOA. It is proposed that the mixed-aged stands will next be available for commercial thinning operations in approximately 15-20 years time.

AREAS ASSESSED: ROCKY OUTCROPS, H & R RETENTION AND PROTECTION



Map 1: Areas inspected during the EPA audit on 18 October 2016, compartment 434 Yambulla State Forest. The green circles show locations of waypoint for rocky outcrop assessment. The Pink circles show the waypoints used to assess H and R trees, the blue circle shows the waypoint for drainage feature assessment.

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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
5.6 TSL – H tree retention	0	1	0
5.6 TSL – R tree retention	0	1	0
5.6 TSL - H tree selection	0	5	0
5.6 TSL - R tree selection	0	4	0
5.6 TSL - H & R tree protection	1	9	0
5.2 TSL – Compartment markup	0	1	0
5.11 TSL – Rocky outcrops and cliffs	0	1	0
TOTALs	**1**	**22**	**0**

AUDIT RECOMMENDATIONS

Action Details	Non-compliance Code*	Target/Action Date
Nil		

AUDIT FINDINGS - FIELD COMPONENT

1. Tree Retention / Mark-up

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

- In low quality habitat a minimum of four hollow bearing trees must be retained in every two hectares of net logging area. Where this density is not available, the existing hollow bearing trees must be retained plus additional trees must be retained to meet the requirement of four in every two hectares. The additional trees retained must be those with the largest DBHOB. (Condition 5.6 (g) (iii) of the TSL);
- In Low Quality Habitat a minimum of four recruitment trees must be retained in every two hectares of net logging area (Condition 5.6 (h) (iii) of the TSL).

Comment and Evidence

The EPA found that FCNSW was compliant with the above conditions in the area assessed. In particular, the EPA found there was an oversupply of both Hollow Bearing trees and Recruitment trees marked to satisfy Condition 5.6(e). This finding is based on a single 170 metre long transect that contained 5 assessment points (refer Table 1 in the Appendix to this report). The total area surveyed was 1.46 ha. Within this area, the EPA counted five (5) marked H trees and four (4) marked R trees. This equates to the following retention rates:

Retention rate (H trees)	6.8 trees/ha or 13.7 trees/2 ha
Retention rate (R trees)	5.5. trees/ha or 10.9 trees/2 ha

2. Hollow-bearing Trees: Selection

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

- Retained hollow-bearing trees must be selected from the trees with the largest dbhob within the two hectare area and must be live trees and should have good crown development and minimal butt damage.
- Retained hollow-bearing trees must represent the range of hollow-bearing species that occurs in the area. Preference should be given to selecting those species or trees which are most suitable for the threatened species known or likely to occur in the area.
- Hollow-bearing trees must be scattered throughout the net logging area, except where compliance with condition 5.6 f) iv. prevents such retention.

Comment and Evidence

The EPA found that FCNSW was **compliant** with the above conditions for all retained trees assessed. This finding is based on the assessment of five (5) 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 required by the TSL. The EPA noted that the trees were evenly scattered through the area surveyed and within the harvested area in general. The retained hollow-bearing trees also represented the range of species found in the area, with Silvertop Ash comprising the largest percentage as the dominant, hollow-forming species. The breakdown 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 5 compliances with regard to the selection of hollow-bearing trees.

Image 1: Photo 624: a marked hollow-bearing tree (waypoint 3, tree 2) belonging to the largest cohort, having hollows present, with good crown development given its age and growth stage. The tree exhibits nil butt damage or logging debris surrounding it.

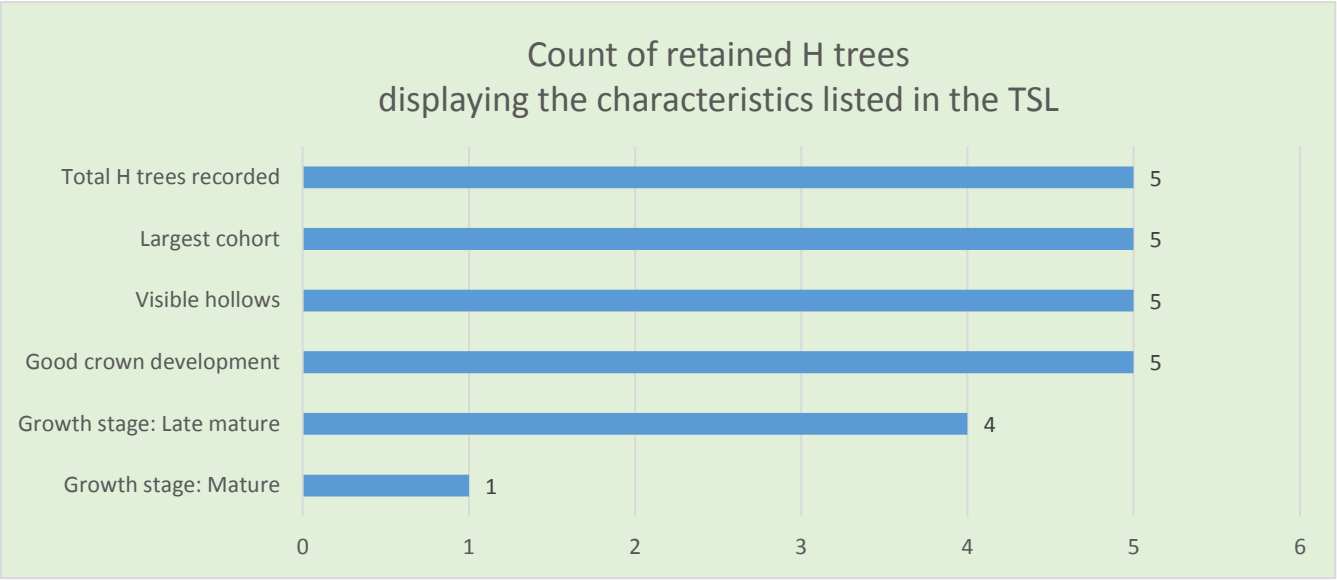

Chart 1: Count of retained hollow bearing trees and selection characteristics as per condition 5.6 of the threatened species licence

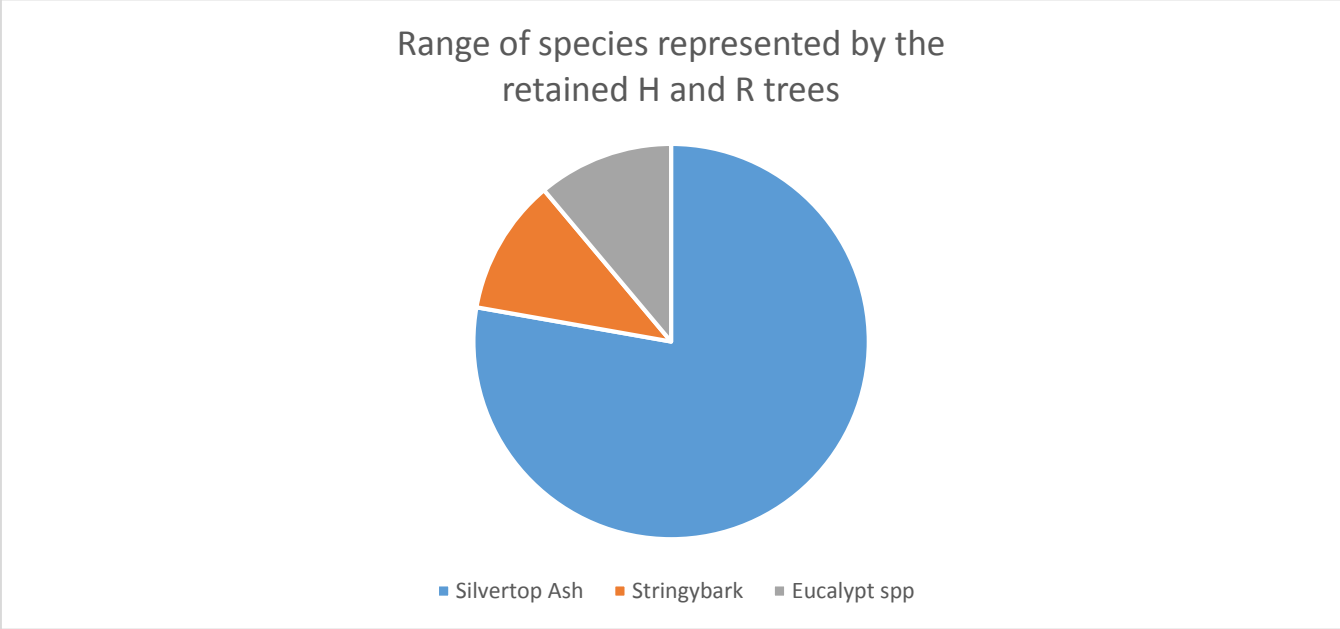

Chart 2: range of species represented by retained H & R trees within the area assessed.

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 Eden Region TSL. For the purposes of this audit, the following requirements apply:

- Recruitment trees must have the following characteristics:
    - Good crown development
    - Minimal butt damage
    - Represent the range of hollow-bearing species that occur in the area
    - Potential for developing into hollow-bearing trees
    - Located such that they result in retained trees being evenly scattered throughout the net logging area
    - Be in the late mature and mature growth stage where available;
- 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."

Image 2: Retained recruitment tree (waypoint 10, tree 1)

Comment and Evidence

The EPA found that FCNSW was **compliant** with the above conditions in the area assessed. The EPA recorded a total of four (4) compliances relating to the selection of Recruitment trees.

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, one (1) marked R tree was assessed as having a visible hollow, this is consistent with it being from the late mature growth stage.

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 four (4) **compliances**.

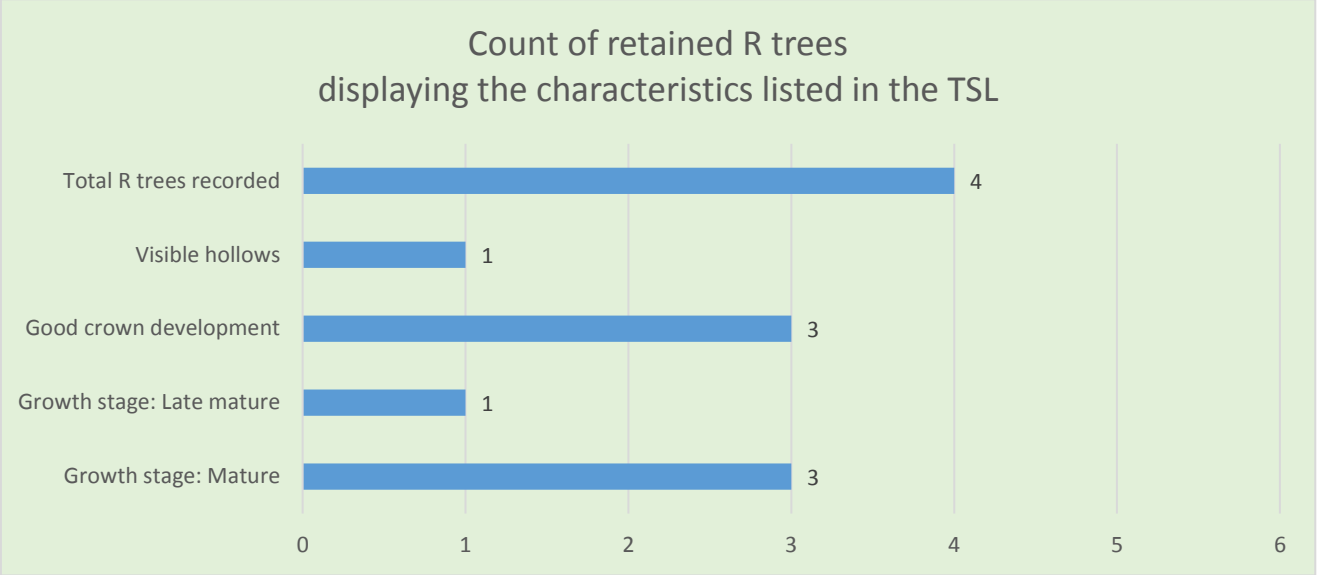

Chart 3: Count of retained recruitment trees and selection characteristics as per condition 5.6 of the threatened species licence

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). 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 component of the audit focused on the protection of hollow-bearing trees (H trees) and recruitment trees (R trees) that have been marked for retention. Condition 5.6(l) of the Eden Region Threatened Species Licence (TSL) requires damage to retained trees to be minimised. Further to this:

- Debris must not be accumulated higher than 1m within 5m radius of the retained trees,
- Retained trees must not be used as bumper trees during harvesting.
- Potential for damage to retained trees must be minimised by using directional felling techniques.

Comment and Evidence

The EPA assessed one instance of operational damage to a retained recruitment tree crown. The damage was minor and has been recorded as **one (1)** non-compliance with condition 5.6 (l) (i) of the TSL. The EPA observed zero instances of excess logging debris and/or butt damage to retained trees in keeping with condition 5.6 (l) (ii) of the TSL. **Nine (9)** compliances were therefore recorded against this condition.

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 EPA recorded one instance of operator crown damage to a recruitment tree. This non-compliance is of low environmental risk (yellow risk code) as the tree has retained a healthy compact crown and the broken branch may become the vector for hollow formation in the future.

Image 3: Retained recruitment tree with crown damage arising from the harvesting operation. Note the white scar on the tree bole midway within the crown.

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.

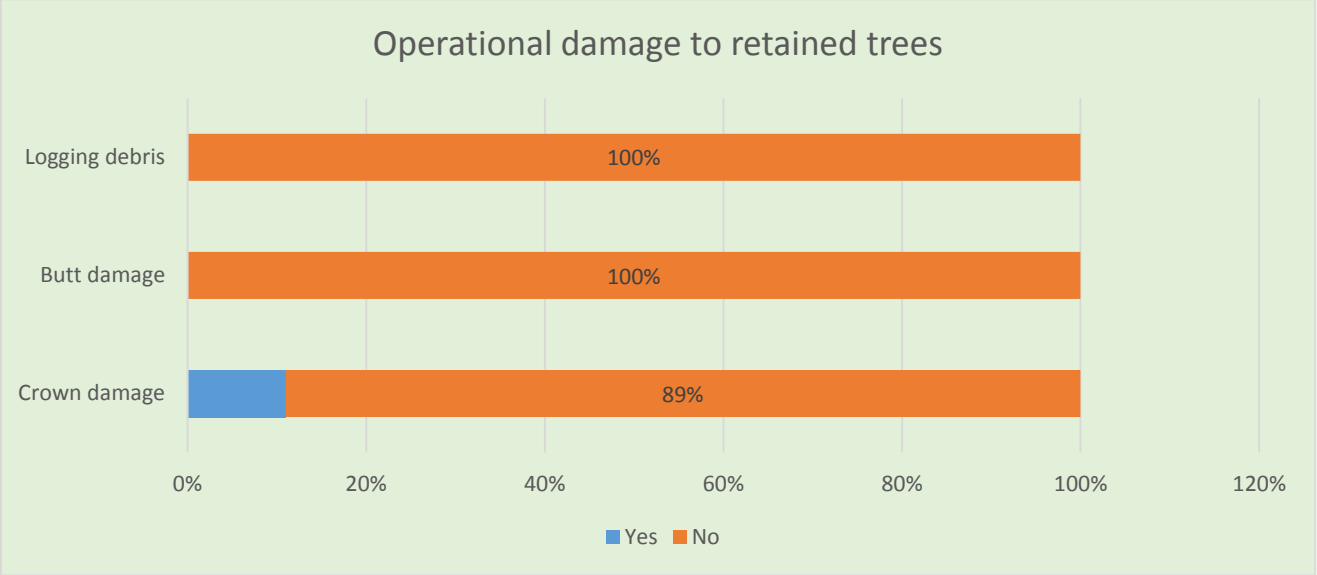

Chart 4: Damage to retained trees as asseed for cndition 5.6 (l) of the Eden Region threatened species license.

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

The Eden TSL requires that rocky outcrops and cliffs be marked up during compartment markup surveys. Condition 5.11 states that specified activities are prohibited from within areas of rocky outcrops or cliffs. Twenty metre (20m) exclusion zones are required for all rocky outcrops greater than 0.1 ha and forty metres (40m) where rocky outcrops are greater than 0.5 ha in area.

Two areas of rocky outcrop occurred within the harvested area of compartment 434, one area greater than 0.1 ha and the other greater than 0.5 ha.

Comment and Evidence

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

This finding is based on an assessment of the buffer distance surrounding the two rocky outcrops within compartment 434. Greater than 50% of the rocky outcrop boundary (Waypoints 1-9) was outside of the harvest area. EPA officers assessed the implemented buffer distance as greater than the required 20 metres at all waypoints.

The larger rocky outcrop (waypoints 15-17) also had a buffer in excess of the required 40 metres. This was due to the location of the rocky outcrop and its proximity to a formed track, drainage feature protection and non-harvest areas.

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.

Image 4: Rocky outcrop with marked up buffer. EPA officer is at edge of rocky outcrop, buffer distance of 20m.

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			
Level of Environmental Impact		**Certain**	**Likely**	**Less Likely**
	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 Yambula State Forest, compartment 434, during an audit undertaken on 18 October 2016.

Name	BeginTime	Type	Longitude	Latitude
Waypoint 1	2016-10-18 02:14:41	Rocky outcrop	149.55301527900	-37.14998908800
Waypoint 2	2016-10-18 02:18:07	Rocky outcrop	149.55309823400	-37.15007781100
Waypoint 3	2016-10-18 02:23:35	Rocky outcrop	149.55337638200	37.15015828700
Waypoint 4	2016-10-18 02:26:19	Rocky outcrop	149.55336736700	37.15028053000
Waypoint 5	2016-10-18 02:36:28	Rocky outcrop	149.55228122300	37.15068049600
Waypoint 6	2016-10-18 02:36:33	Rocky outcrop	duplicate	duplicate
Waypoint 7	2016-10-18 02:39:39	Rocky outcrop	149.55221619700	37.15050320000
Waypoint 8	2016-10-18 02:41:40	Rocky outcrop	149.55212168600	37.15043919800
Waypoint 9	2016-10-18 02:43:23	Rocky outcrop	149.55216594900	37.15030684400
Waypoint 10	2016-10-18 02:51:51	H & R	149.55282366500	37.14984152200
Waypoint 11	2016-10-18 02:53:27	H & R	149.55338167300	37.14965728500
Waypoint 12	2016-10-18 02:59:37	H & R	149.55362500000	37.14966157600
Waypoint 13	2016-10-18 03:03:01	H & R	149.55369886800	37.14941314500
Waypoint 14	2016-10-18 03:08:25	H & R	149.55444798400	37.14938759000
Waypoint 15	2016-10-18 03:36:58	Rocky outcrop	149.55845655300	37.15093247600
Waypoint 16	2016-10-18 03:39:28	Rocky outcrop	149.55877400100	37.15142091800
Waypoint 17	2016-10-18 03:45:09	Rocky outcrop	149.55860922300	37.15192500300
Waypoint 18	2016-10-18 03:47:32	Drainage feature	149.55869894400	37.15212522700

Table 2: Hollow-bearing (H) and Recruitment (R) trees recorded in compartment 434, Yambula State Forest, during the audit undertaken on 18 October 2016. This table displays the data used to determine compliance with SELECTION requirements of the Eden Region Threatened Species licence.

Way point	Marked	Species	Cohort	Visible hollows?	Crown development	Growth stage
10	R	Silvertop Ash	Largest	N	Good	Mature
11	H	Stringybark	Largest	Y	Good	Mature
12	R	Silvertop Ash	Next largest	N	Average	Mature
12	H	Silvertop Ash	Largest	Y	Good	Late mature
13	H	Eucalypt spp	Largest	Y	Good	Late mature
13	H	Silvertop Ash	Largest	Y	Good	Late mature
14	R	Silvertop Ash	Next largest	Y	Good	Late mature
14	R	Silvertop Ash	Next largest	N	Good	Mature
14	H	Silvertop Ash	Largest	Y	Good	Late mature

Table 3: Hollow-bearing (H) and Recruitment (R) trees recorded in compartment 434, Yambula State Forest, during the audit on 18 October 2016. This table displays the data used to determine compliance with PROTECTION of retained trees requirements of the Eden Region Threatened Species licence.

Way point	Marked	Crown damage	Debris >1m within 5m	Used as bumper	Comments
10	R	Nil	no	no	
11	H	Natural	no	no	
12	R	Operational	no	no	Minor operational damage
12	H	Natural	no	no	
13	H	Natural	no	no	
13	H	Natural	no	no	
14	R	Natural	no	no	
14	R	Natural	no	no	
14	H	Natural	no	no	