AUDIT REPORT - TAMBAN STATE FOREST, COMPARTMENT(S) 55 & 56

Auditee:	FORESTRY CORPORATION OF NSW (FCNSW)
Audited State Forest & Cpts:	Tamban State Forest, compartment(s) 55 & 56 (see **Figure 1**, below). The field audit took 1 day to complete.
Region:	Lower North East
Date/Audit timing:	14th December 2015
Type of audit:	Compliance
Purpose of audit:	Report on the level of compliance with conditions and environmental performance in line with EPA compliance priorities.
Audit objectives:	1. Assess compliance against audit criteria that reflect EPA compliance priorities. 2. Assess and categorise risk of identified non-compliance or appropriate further observations. 3. Request action plans against key audit findings so that auditee can use risk categorisation to inform timeliness and level of risk reduction control 4. Promote continuous improvement of the environmental performance of forestry operations.
Audit scope:	• Hollow bearing & recruitment trees • Basal Area Retention • Streams – Mark-up & protection • Ridge & Headwater Habitat – Mark-up & protection **Physical scope**: This audit was limited to the physical boundaries of compartments 55 & 56 **Temporal scope**: The audit period for assessment of compliance with operational conditions is the day of the audit inspection – 14th December 2015 The audit period for assessment of reporting conditions is 12 months prior to the audit inspection
Audit criteria:	• Cond. 5.6(d)(e)(h) Hollow bearing and recruitment tree retention, selection and protection • Cond. 5.7 Riparian habitat protection • Cond. 5.1 (f) marking of EZ and buffer zones • Schedule 5 – Condition 33 • Section 120 POEO Act
Summary of Operations	From the harvesting plan: "This operation will be managed with the object of harvesting trees that have reached their maximum economic end use, and removing poorer quality and less vigorous trees to allow the remaining high-quality trees to grow on…Tree removal and ground disturbance must also maximise regeneration opportunities…STS must remove no more than 40% of the basal area across the net harvest area…BA removal may exceed 40% in some localized areas, but will be balanced by offset areas, non harvest areas and tree retention across the tract"

1. Audit Findings – Overview

A summary of EPAs findings are in the table below. Full details and evidence of audit findings can be found in the **Audit Findings Table** in **Attachment 1** including further observations made from the audit.

EPA Compliance Priority 15/16	Audit Scope	Compliant	Non-compliant	Not Determined	Not Applicable
Exclusion zones	**Riparian protection zone**	1			
	Riparian protection zone mark-up				1
	R & HW habitat		1	1	
Hollow bearing and recruitment trees	**H Retention**	1			
	H Selection	1	3		
	R Retention	4			
	R Selection	1	3		
	H&R Protection	8			
Forest Structure	**Basal Area Retention**			1	
	TOTAL	**16**	**7**	**2**	**1**

ATTACHMENT 1: AUDIT FINDINGS TABLE –TAMBAN STATE FOREST, COMPARTMENTS 65, 66

CONDITION RELATED TO HOLLOW-BEARING TREES – REGROWTH ZONE - RETENTION

Condition No. and detail	Compliant? Yes/No/ Not determined/Not Applicable	Number of non-compliances (sample size & unit)	Action required by licensee
5.6(d) Tree Retention – Regrowth Zone **Threatened Species Licence, Lower North East Region** 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.	**Yes**	0 / 1 (post harvest area in three separate areas totalling 2 ha)	

Comment and Evidence

The Environment Protection Authority (EPA) found that FCNSW complied with this condition in the area assessed, due to the lack of a pre-harvest assessment.

EPA Officers assessed three transects inside harvested areas. The total area assessed was 2 hectares. Each transect were comprised of a number of 0.2ha circular plots. Plot centres were randomly selected on GPS before approaching the location. EPA counts marked and unmarked live standing candidate H trees towards retention up to the regrowth H tree retention rate threshold.

All plots were in the net harvested areas and did not overlap each other or protected features. Across all three transects, EPA officers observed one marked H tree and three candidate, unmarked H trees totalling four H trees across 2ha. FCNSW achieved a retention rate of 2 H trees/ha.

Table 1: H & R tree transects within harvested area – H tree results

Location	Start EPA waypoint	End EPA waypoint	Assessment Method	Area assessed	H trees marked	Unmarked candidate H trees	Retention rate/ha
Transect One	69	71	Plot transects (3 plots per transect)	0.6 ha	1	0	1.67 H/ha includes marked and unmarked
Transect Two	87	92	Plot transects (4 plots per transect)	0.8 ha	0	1	1.25 H/ha includes marked and unmarked
Transect Three	94	96	Plot transects (3 plots per transect)	0.6ha	0	2	3.33 H/ha includes marked and unmarked
Total (comprises marked H and unmarked candidate H)				**2 ha**	**1**	**3**	**2 H/ha marked and unmarked**

NOTE: EPA officers considered trees retained to be candidate H trees only where they met the TSL criteria (despite not being marked)

WHY IS COMPLIANCE WITH THIS TSL CONDITION IMPORTANT?

Largest Size Cohort:

The presence, abundance and size of hollows are positively correlated with tree basal diameter, which is an index of age (Lindenmayer *et al.* 1991a, Bennett *et al.* 1994, Ross 1999, Soderquist 1999, Gibbons *et al.* 2000, Shelly 2005). Tree diameter at breast height (DBH) is, in turn, a strong predictor of occupancy by vertebrate fauna (Mackowski 1984, Saunders *et al.* 1982, Smith and Lindenmayer 1988, Gibbons *et al.* 2002, Kalcounis-Rüppell *et al.* 2006). The minimum size-class at which trees consistently (>50% of trees) contain hollows varies depending on the species and environmental conditions, yet is always skewed toward the larger, more mature trees. (Reference: *Loss of Hollow-bearing Trees – key threatening process determination - NSW Scientific Committee - final determination (2007))*

CONDITION RELATED TO HOLLOW-BEARING TREES – REGROWTH ZONE – SELECTION

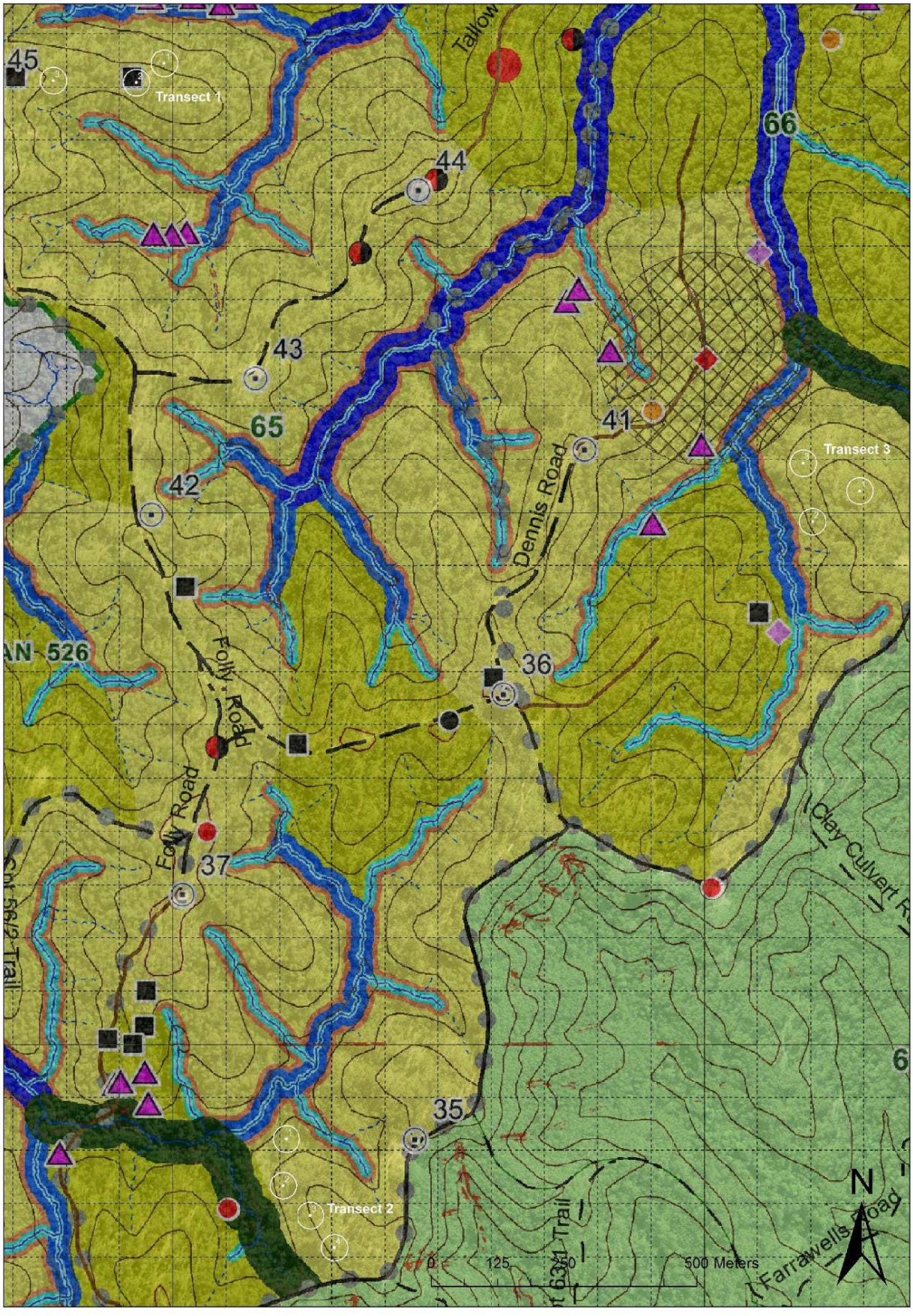
Condition No. and detail	Compliant? Yes/No/ Not determined/Not Applicable	Number of non-compliance (sample size & unit)	Action required by licensee
5.6(d) Tree Selection **Threatened Species Licence, Lower North East Region** Within the Regrowth Zone the following requirements for retention of Hollow-bearing trees apply: (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.	**No**	3 / 4 across 2ha of assessed post harvest area (note: one "H" tree was selected and marked in the area surveyed. Four (4) H trees were required by the TSL to be selected and marked)	An action plan must be developed and implemented to ensure that Hollow-bearing trees are retained across the compartment having as many of the characteristics listed in TSL condition 5.6d ii and iii, and consistent with the requirements of the H tree definition. *This non-compliance has an orange risk category. The likelihood of environment harm is likely. The scale of harm is moderate (considering rate of incidence and sensitivity of environment receptor).*

Comment and Evidence

The EPA found that FCNSW did not comply with the condition in the area assessed. EPA uses the presence or absence of marking (paint) on trees to indicate whether a tree has been selected or not. Assessments were done in post-harvesting areas only. (see Figure 1).

The results are shown in **Table 2**. There was one (1) marked H tree in Transect 1 (**Figure 4**), one (1) unmarked unselected candidate H tree in Transect 2, and two (2) unmarked unselected candidate H trees in Transect 3 (**Figure 3**). Three (3) unmarked unselected candidate H trees equates to three non compliances. These habitat resources were required to be selected prior to operation and marked in the field but weren't selected. Failure to select them are non compliances. It is very important that these H trees be selected and marked particularly in a regrowth zone where H tree resources are scarce and well below the TSL retention rate threshold of 10 H trees per 2ha. Selection and field marking is important as it informs harvest contractors to not harvest and protect them.

Figure 1: Tamban SF Audit 14 December 2015. Transect and plot locations for assessment of H & R trees, retained trees and cut stumps



Within the logged area, EPA officers conducted three transects comprising of either 3 or 4 circular plots each (see **map** on the next page). Within each plot, EPA officers measured the retained trees (both marked and unmarked) and the diameters of fresh stumps. **Tables 2 and 3** contain the detailed results of these transects. EPA officers recorded one (1) marked H tree, one (1) marked R tree and one (1) marked E tree in Transect 1; no marked trees in Transect 2; and one (1) marked R tree and one (1) marked E tree in Transect 3. The average dbhob of retained trees – including unmarked trees – was 54.8cm. The average dbhob of marked trees was 51.7cm. The average dbhob (with a conservative taper or -5cm applied to) of cut trees was 51.3cm.

Table 2: EPA Post-Harvest Assessments - Hollow bearing tree characteristics across assessed areas, retained trees.

Plot # / waypoint	Species	DBHOB (cm)	Marked H tree / E tree / candidate H tree/ unmarked tree	Crown Damage (Y / N)	Logging Debris within 5m (Y / N / height)	Tree used as Bumper	Ground Disturbance within 5m	Hollows, Burls and/or Protuberances	Crown Development	Tree Growth Stage
Transect 1										
Plot 1, wpt 69	Blackbutt	40	Unmarked	N	N	N	N	N	Co-dominant	Early mature
	Blackbutt	53.5	Unmarked	N	N	N	N	N	Dominant	Mature
Plot 2, wpt 70	White Mahogany	75.5	H tree	N	N	N	N	Hollows, protuberances, broken limbs	Dominant	Mature
	Bloodwood	42.5	E tree	N	N	N	N	N	Co-dominant	Mature
	Blackbutt	54.5	R tree	N	N	N	N	N	Dominant	Mature
	Bloodwood	40.5	Unmarked	N	N	N	N	Protuberances, broken limbs	Co-dominant	Mature
Transect 2										
Plot 1, wpt 87	White Mahogany	43	Unmarked	N	N	N	N	N	Co-Dominant	Mature
	Blackbutt	54	Unmarked	N	N	N	N	N	Dominant	Mature
	Blackbutt	54	Unmarked	N	Y/1.5m	N	Y	N	Dominant	Mature
	Blackbutt	46	Unmarked	N	N	N	N	N	Co-dominant	Mature
Plot 2, wpt 88	Bloodwood	42	Unmarked	N	N	N	N	N	Co-Dominant	Mature
	Blackbutt	69	Unmarked	N	N	N	Y	N	Dominant	Mature
Plot 3, wpt 91	Blackbutt	47	Unmarked	N	N	N	Y	N	Sub-Dominant	Mature
	Blackbutt	57.5	Unmarked	Y (crown missing)	N	N	N	Protuberances	Dominant	Mature
Plot 4, wpt 92	White Mahogany	60	Unmarked	N	N	N	N	Protuberances, broken limbs	Dominant	Mature
	Blackbutt	86	Candidate H	N	N	N	Y	Protuberances, broken limbs	Dominant	Mature
	Blackbutt	51	Unmarked	Y	N	N	N	N	Co-dominant	Senescent

Plot # / waypoint	Species	DBHOB (cm)	Marked H tree / E tree / candidate H tree/ unmarked tree	Crown Damage (Y / N)	Logging Debris within 5m (Y / N / height)	Tree used as Bumper	Ground Disturbance within 5m	Hollows, Burls and/or Protuberances	Crown Development	Tree Growth Stage
Transect 3										
Plot 1, wpt 94	Ironbark	41	Unmarked	N	N	N	N	N	Sub-dominant	Mature
	Ironbark	34	E tree	N	N	N	Y	N	Co-dominant	Mature
	Ironbark	41.5	Unmarked	Y	N	N	N	Protuberances, broken limbs	Dominant	Mature
	Blackbutt	71	Candidate H	N	N	N	N	Protuberances, l limbs	Dominant	Mature
Plot 2, wpt 95	Blackbutt	85	Candidate H	N	N	N	N	Burls, protuberances, broken limbs	Dominant	Mature
	White Mahogany	48	Unmarked	N	N	N	N	Protuberances, broken limbs	Dominant	Senescent
	Ironbark	52	R tree	N	N	N	N	Broken limbs	Dominant	Mature
Plot 3, wpt 96	Blackbutt	56	Unmarked	N	N	N	N	N	Dominant	Mature
	Blackbutt	59	Unmarked	Y	N	N	N	Broken limbs	Dominant	Mature

Table 3: Stump diameters recorded inside the H & R plots within the three transects.

Location/waypoint	Tree/Stump no.	Basal Area (m2/ha)	Species	SDOB (cm)	Stump Height (cm)	DBHOB using taper
Transect 1						
Plot 1, wpt 69	S1	12	Blackbutt	54.5	30	49.5
	S2		Blackbutt	49.5	39	44.5
	S3		Blackbutt	50	31	45
	S4		Blackbutt	61.5	53	56.5
	S5		Blackbutt	48.5	20	43.5
	S6		Blackbutt	50	45	45
	S7		Blackbutt	52	25	47
	S8		Bloodwood	47.5	20	42.5
Plot 2, wpt 70	S1	14	Tallowood	50.5	29.5	45.5
	S2		White Mahogany	46.5	29	41.5
	S3		Blackbutt	63	44	58
	S4		Blackbutt	60	64	55
	S5		Blackbutt	48	48	43
Plot 3, wpt 71	S1	13	Blackbutt	50	43	55
	S2		Bloodwood	50.5	130	50.5
	S3		Grey Gum	55	41	50
	S4		White Mahogany	44	40	39
	S5		White Mahogany	50	57	45
	S6		Tallowood	55	34	50
Transect 2						
Plot 1, wpt 87	S1	22	Blackbutt	57.5	28	52.5
	S2		Blackbutt	59.5	19	54.5
	S3		Grey Gum	45	87	40
	S4		Grey Gum	52	51	47
	S5		Blackbutt	46	55	41
	S6		Grey Gum	40	57	35

Location/waypoint	Tree/Stump no.	Basal Area (m2/ha)	Species	SDOB (cm)	Stump Height (cm)	DBHOB using taper
	S7		Blackbutt	56	38	51
Plot 2, wpt 88	S1	6	Blackbutt	78	52	73
	S2		Blackbutt	43.5	47	38.5
	S3		Blackbutt	61	65	56
	S4		Blackbutt	48	34	43
	S5		Blackbutt	52.5	38	47.5
	S6		Blackbutt	55	68	50
	S7		Blackbutt	66.5	44	61.5
	S8		Blackbutt	70	30	65
	S9		Blackbutt	60	31	55
Plot 3, wpt 91	S1	14	Blackbutt	50	90	45
	S2		Blackbutt	46	44	41
	S3		Ironbark	56	130	56
	S4		Grey Gum	51.5	49	46.5
	S5		White Mahogany	52.5	130	52.5
	S6		Spotted Gum	62	130	62
	S7		Blackbutt	47	33	42
	S8		Blackbutt	43	45	38
	S9		Blackbutt	47.5	45	42.5
	S10		Blackbutt	50	50	45
Plot 4, wpt 92	S1	21	Blackbutt	45	40	40
	S2		Blackbutt	57.5	45	52.5
	S3		Blackbutt	46.5	42	41.5
	S4		Blackbutt	44	42	39
	S5		Blackbutt	52	40	47
	S6		Blackbutt	62	25	57
	S7		Blackbutt	66	57	61
	S8		Blackbutt	67.5	49	62.5
Transect 3						

Location/waypoint	Tree/Stump no.	Basal Area (m2/ha)	Species	SDOB (cm)	Stump Height (cm)	DBHOB using taper
Plot 1, wpt 94	S1	9	White Mahogany	47	19	42
	S2		Tallowood	49	130	49
	S3		Ironbark	47.5	39	42.5
	S4		Blackbutt	47.5	58	42.5
	S5		Ironbark	60	70	55
	S6		Ironbark	55.5	130	55.5
	S7		Ironbark	46.5	130	46.5
	S8		Ironbark	55	121	51
	S9		Ironbark	42.5	76	37.5
	S10		Ironbark	40	46	35
	S11		Ironbark	51	30	46
	S12		Blackbutt	41.5	41	36.5
	S13		Ironbark	45	70	40
Plot 2, wpt 95	S1	18	White Mahogany	55	42	50
	S2		Blackbutt	49	39	44
	S3		Blackbutt	50	30	45
	S4		Blackbutt	52.5	35	47.5
	S5		Blackbutt	38	39	33
	S6		Blackbutt	40	49	35
	S7		Blackbutt	55	25	50
	S8		Blackbutt	37	38	32
	S9		Blackbutt	58	38	53
	S10		Ironbark	47	18	42
	S11		Ironbark	40	35	35
	S12		Blackbutt	57.5	42	52.5
	S13		White Mahogany	47.5	50	42.5
Plot 3, wpt 96	S1	21	Blackbutt	64	34	59
	S2		Blackbutt	38	25	33
	S3		Blackbutt	43	60	38

Location/waypoint	Tree/Stump no.	Basal Area (m2/ha)	Species	SDOB (cm)	Stump Height (cm)	DBHOB using taper
	S4		Blackbutt	41	42	36
	S5		Blackbutt	51.1	130	51.1
	S6		Blackbutt	45	63	40
	S7		Blackbutt	65	44	60
	S8		Grey Gum	40	44	35
	S9		Blackbutt	49	34	44
	S10		Blackbutt	50	49	45

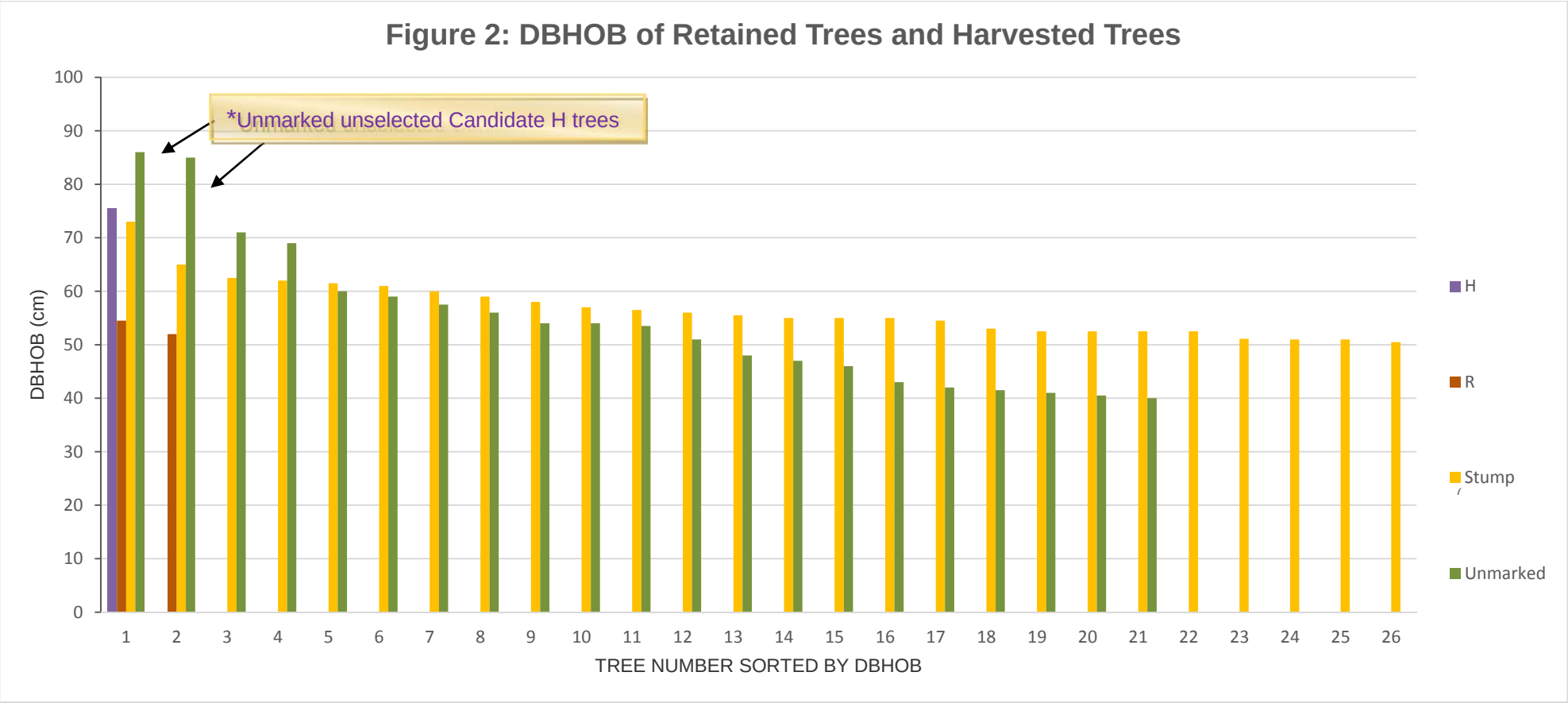


Figure 2 shows

- **26 stumps** in the 2ha assessment area were between **8cm and 22cm larger** in DBHOB (with conservative taper) than the two marked and retained R trees.
- **12 unmarked unselected retained trees** were between **9cm and 33cm larger** in DBHOB than the two marked and retained R trees.

Figure 3: Unmarked candidate H trees in the harvest areas of compartments 65 & 66, Tamban State Forest

Unmarked candidate H tree, transect 2, base undamaged, minimal debris

Unmarked candidate H tree, transect 2. Visible protuberances and broken limbs

Figure 4: Marked H tree in the harvest area of compartment 65, Tamban State Forest

Marked H tree, transect 1. No butt damage, with minimal debris around the base.

Marked H tree, transect 1. Visible hollows, protuberances and broken limbs in the crown.

CONDITION RELATED TO RECRUITMENT TREES – REGROWTH ZONE - RETENTION

Condition No. and detail	Compliant? Yes/No/ Not determined/Not Applicable	Number of non-compliance (sample size & unit)	Action required by licensee
5.6(e) Tree Retention **Threatened Species Licence, Lower North East Region** The following condition must be applied within the regrowth zone: e) Within the Regrowth Zone, for each hollow-bearing tree retained in (d) above a recruitment tree must be retained.	**Yes**	**0/4**	

Comment and Evidence

EPA found that the area assessed was compliant with this condition. Four (4) H trees were retained thus four (4) R trees are required to be retained across 2ha in this regrowth zone. EPA counts and contributes marked and unmarked live standing candidate R trees for retention up to the TSL retention rate threshold.

Within the logged area, EPA officers undertook three transects comprising of either three or four circular plots each (see **Figure 1)**. Within each plot, EPA officers measured the retained trees (both marked and unmarked) and the diameters of fresh stumps. **Tables 2 and 3** above contain the detailed results of these transects. EPA officers recorded one (1) marked R tree in Transect 1 and one (1) marked R tree in Transect 3 (see **Table 4** below). No other R trees were found to be marked within the area surveyed. FCNSW achieved a marked retention rate of one (1) R tree per hectare.

As only one marked H tree was observed, the retention rate of marked R trees is sufficient. During the survey, EPA officers identified seven (7) candidate R trees, sufficient to match the number of H trees retained in the area assessed.

Table 4: H & R tree transects within harvest area - R tree results.

Location	Start EPA waypoint	End EPA waypoint	Assessment Method	Area assessed	R trees marked	Unmarked candidate R trees	Retention rate/ha

Transect One	69	71	Plot transects (3 plots per transect)	0.6 ha	1	1	3.33 R/ha includes marked and unmarked
Transect Two	87	92	Plot transects (4 plots per transect)	0.8 ha	0	4	5 R/ha includes marked and unmarked
Transect Three	94	96	Plot transects (3 plots per transect	0.6ha	1	2	5 R/ha includes marked and unmarked
Total (comprises marked R and unmarked candidate R)				**2 ha**	**2**	**7**	**4.5 R/ha marked and unmarked**

NOTE: EPA officers considered trees retained to be candidate R trees only where they met the TSL criteria (despite not being marked)

Table 5: EPA Unmarked Tree Assessments – Candidate R trees

GPS Waypoint	Easting	Northing	Photo reference	Species	DBHOB (cm)
69	485985	6583844	323, 324	Blackbutt	53.5
87	486214	6581823	363, 364	Blackbutt	54
87	486214	6581823	365	Blackbutt	54
91	486260	6581679	380, 379	Blackbutt	57.5
92	486306	6581618	385, 386	White Mahogany	60
96	487187	6583093	409, 410	Blackbutt	56
96	487187	6583093	411, 412	Blackbutt	59

CONDITION RELATED TO RECRUITMENT TREES – REGROWTH ZONE – SELECTION

Condition No. and detail	Compliant? Yes/No/ Not determined/Not Applicable	Number of non-compliances (sample size & unit)	Action required by licensee
5.6(e) Tree Selection **Threatened Species Licence, Lower North East Region** 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.	**No**	3/4 (4 R trees were required to be selected in the 2ha area assessed.	An action plan must be developed and implemented to ensure that recruitment trees are retained across the compartment having as many of the characteristics listed in TSL condition 5.6e i-v, and consistent with the requirements of the R tree definition. *This non-compliance has an orange risk category. The likelihood of environment harm is likely. The scale of harm is moderate (considering rate of incidence and sensitivity of environment receptor).*

Comment and Evidence

EPA found that FCNSW did not comply with this condition in the area assessed. EPA uses the presence or absence of marking (paint) on trees to indicate whether a tree has been selected or not. Assessments were done in post-harvesting areas only (see Figure 1).

Four (4) R trees were required to be selected. Two R trees were selected and of the two R trees selected, one (52cm DBHOB) was 21 cm smaller than a stump (73cm DBHOB after using a conservative taper). Accordingly, three (3) non compliances in total. This includes two (2) non compliances for the two candidate R trees not selected that were required to be selected and one (1) non compliance for selecting a tree that is outside the cohort of trees with the largest DBHOB (relative to the 73cm DBHOB stump).

Within the logged area, EPA officers undertook three transects comprising of either three or four circular plots each (see **Figure 1)**. EPA officers observed two (2) marked R trees and seven (7) unmarked candidate R trees.

Figure 5 plots tree diameters with stump diameters, sorted by size. Stump diameters were consistently larger than the marked and candidate R trees. The fifth largest candidate R tree, with a diameter of 54cm, is 19cm smaller than the largest cut tree and is below what EPA considers acceptable for cohort requirements. The audit findings suggest that the two largest cut trees should have been retained, as members of the largest size cohort.

WHY IS COMPLIANCE WITH THIS TSL CONDITION IMPORTANT?

Largest Size Cohort:

The presence, abundance and size of hollows are positively correlated with tree basal diameter, which is an index of age (Lindenmayer *et al.* 1991a, Bennett *et al.* 1994, Ross 1999, Soderquist 1999, Gibbons *et al.* 2000, Shelly 2005). Tree diameter at breast height (DBH) is, in turn, a strong predictor of occupancy by vertebrate fauna (Mackowski 1984, Saunders *et al.* 1982, Smith and Lindenmayer 1988, Gibbons *et al.* 2002, Kalcounis-Rüppell *et al.* 2006). The minimum size-class at which trees consistently (>50% of trees) contain hollows varies depending on the species and environmental conditions, yet is always skewed toward the larger, more mature trees. (Reference: *Loss of Hollow-bearing Trees – key threatening process determination - NSW Scientific Committee - final determination (2007))*

Figure 5: DBHOB of candidate R Trees and Harvested Trees

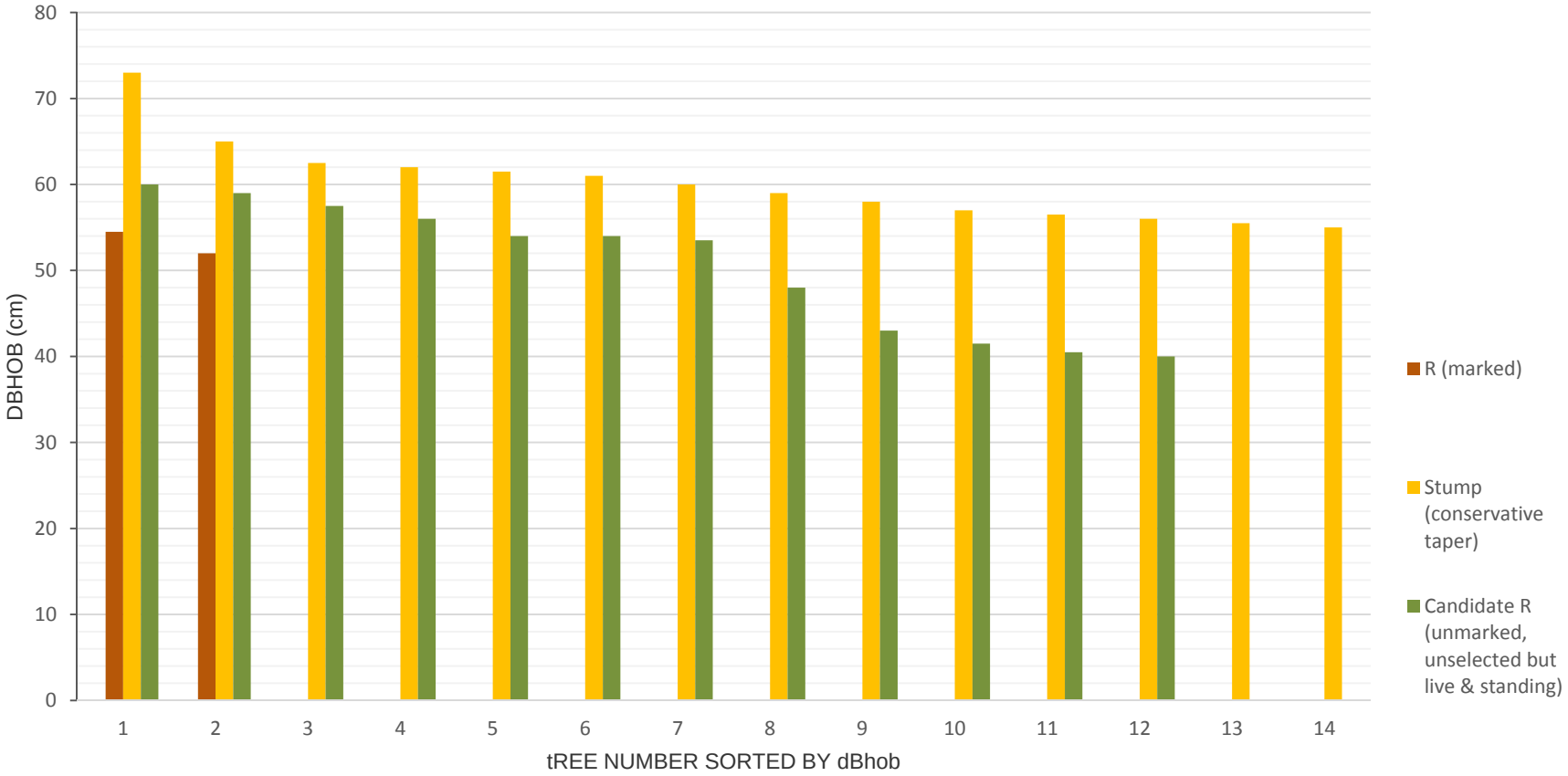
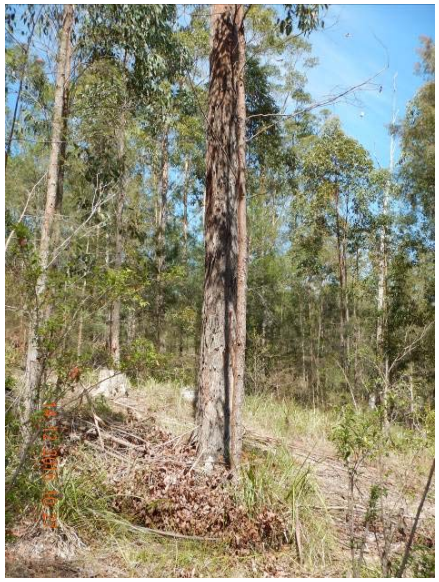


Figure 5 shows that **seven (7) cut stumps** in the 2 ha assessment area were **8 and 21cm larger in DBHOB** than the largest of the two (2) marked R trees in the area assessed.

Figure 6: Photos showing marked and unmarked candidate R trees in compartments 65 and 66, Tamban State Forest

Marked R tree, transect 3, ironbark, 52cm DBHOB, 21cm smaller than 73cm DBHOB stump therefore outside the size cohort of that harvested tree.



Unmarked candidate R tree, transect 1, blackbutt, 53.5cm DBHOB, base undamaged, minimal debris, healthy crown

Unmarked candidate R tree, transect 2, blackbutt, 54 cm DBHOB, with fire damage and butt damage

Unmarked candidate R tree, transect 3, blackbutt, 59cm DBHOB, protuberances and broken limbs visible

CONDITION RELATED TO HOLLOW-BEARING AND RECRUITMENT TREES – PROTECTION			
Condition No. and detail	**Compliant?** **Yes/No/ Not determined/Not Applicable**	**Number of non-compliance** **(sample size & unit)**	**Action required by licensee**
5.6(h) Protection of retained trees **Threatened Species Licence, Lower North East Region** i. When conducting specified forestry activities and post-logging burning, damage to trees retained under conditions 5.6 a), 5.6 b), 5.6 c), 5.6 d), 5.6 e) and 5.6 f) of this licence must be minimised to the greatest extent practicable. During harvesting operations, the potential for damage to these trees must be minimised by utilising techniques of directional felling. ii. In the course of conducting specified forestry activities, logging debris must not, to the greatest extent practicable, be allowed to accumulate within five metres of a retained hollow-bearing tree, recruitment tree, stag, *Allocasuarina* with more than 30 crushed cones beneath, eucalypt feed tree, or Yellow-bellied Glider or Squirrel Glider sap feed tree. Logging debris within a five metre radius of retained trees must be removed or flattened to a height of less than one metre. Mechanical disturbance to ground and understorey must be minimised to the greatest extent practicable within this five metre radius. Habitat and recruitment trees must not be used as bumper trees during harvesting operations.	**Yes**	0/8 (8 trees, including 1 marked H tree, 3 unmarked candidate H trees, 2 marked R trees, 2 unmarked candidate R trees)	
Comment and Evidence			
EPA officers determined that FCNSW complied with this condition in the assessed area. Out of the total of three marked H and R trees and five retained but unmarked candidate H & R trees within the surveyed areas, EPA officers recorded no damage to the marked trees or instances of excessive debris around the tree base. **Further Observations:** of the remaining 7 candidate R trees retained in the areas surveyed (none of which were marked as such), EPA officers recorded four instances of fire damage, two instances of mechanical damage, two instances of ground disturbance within 5 meters and one instance of debris accumulated within 5m of the base of the tree, ranging from 1.1m to 2.5m high.			

CONDITION RELATED TO FOREST STRUCTURE – BASAL AREA RETENTION

Condition No. and detail	Compliant? Yes/No/ Not determined/Not Applicable	Number of non-compliance (sample size & unit)	Action required by licensee
Lower North East IFOA Condition 5 – "Single Tree Selection" "Single Tree Selection" refers to a silvicultural practice, which in relation to a tract of forested land has the following elements: (a) trees selected for logging have trunks, that in cross-section, measured 1.3 metres above ground level, have a diameter (including bark) of 20cm or more (that is, a diameter at breast height over bark of 20 cm or more); and (b) trees are selected for logging with the objective of ensuring that the sum of the basal areas of trees removed comprises no more than 40% of the sum of the basal areas of all trees existing immediately prior to logging within the net harvestable area of the tract.	**Not determined**	N / A 10 BA sweeps at randomly selected plot centers. Range: $6m^2$/ha-$22m^2$/ha Average: $15m^2$/ha	

Comment and Evidence

Preliminary observations: The smallest diameter tree selected for logging in the assessment areas was recorded at 32cm (including taper), which complies with part (a) of this condition. The EPA could not determine compliance with part (b) of this condition, due to lack of pre-harvesting data. The EPA carried out 10 basal area sweeps within the harvested areas. The results are shown in Table 6. The lowest basal area recorded was 6 m^2/ha, with the highest at 22 m^2/ha. The average across all plots was 15 m^2/ha.

The harvest plan specifies basal area reduction to 50% of b.a. prior to operations, balanced by offset areas, non-harvest areas and tree retention across the tract. Future assessments of compliance with this condition need to incorporate evidence data from these balancing actions.

Table 6: Basal Area sweeps carried out by EPA officers in harvested areas

Plot Number	Basal Area (m^2/ha)	Waypoint	Easting	Northing
1	12	69	485985	6583844
2	14	70	485932	6583808
3	13	71	485776	6583811
4	22	87	486214	6581823
5	6	88	486208	6581735
6	14	91	486260	6581679
7	21	92	486306	6581618
8	9	94	487293	6583041
9	18	95	487205	6582983
10	21	96	487187	6583093
AVERAGE	**15**			

CONDITIONS RELATED TO STREAM EXCLUSION ZONES - PROTECTION			
Condition No. and detail	**Compliant? Yes/No/ Not determined/Not Applicable**	**Number of non-compliance (sample size & unit)**	**Action required by licensee**
5.7.1 Specified forestry activities restricted within protection zones (hard) a) The following rules apply to a protection zone (hard), except as varied by this condition (being condition 5.7.1), condition 5.7.3 and condition 5.20 (relating to beekeeping): i. specified forestry activities are prohibited in a protection zone (hard); ii. no tree is to be felled into a protection zone (hard). If a tree falls into a protection zone (hard), then no part of the tree can be removed; iii. harvesting machinery is not to be used in a protection zone (hard). **5.7.2 Restricted operations in protection zones (soft)** a) The following rules apply to a protection zone (soft), except as varied by this condition (being condition 5.7.2), condition 5.7.3 or condition 5.20 (relating to beekeeping): i. specified forestry activities are prohibited in a protection zone (soft); ii. harvesting machinery is not to be used in a protection zone (soft).	**Yes**	0/1	
Comment and evidence			
EPA officers inspected a second order stream, 175m north east of log dump 45 following harvest (See Table 7, Figure 7). The EPA found that FCNSW complied with conditions 5.7.1 and 5.7.2, as described in Table 7.			

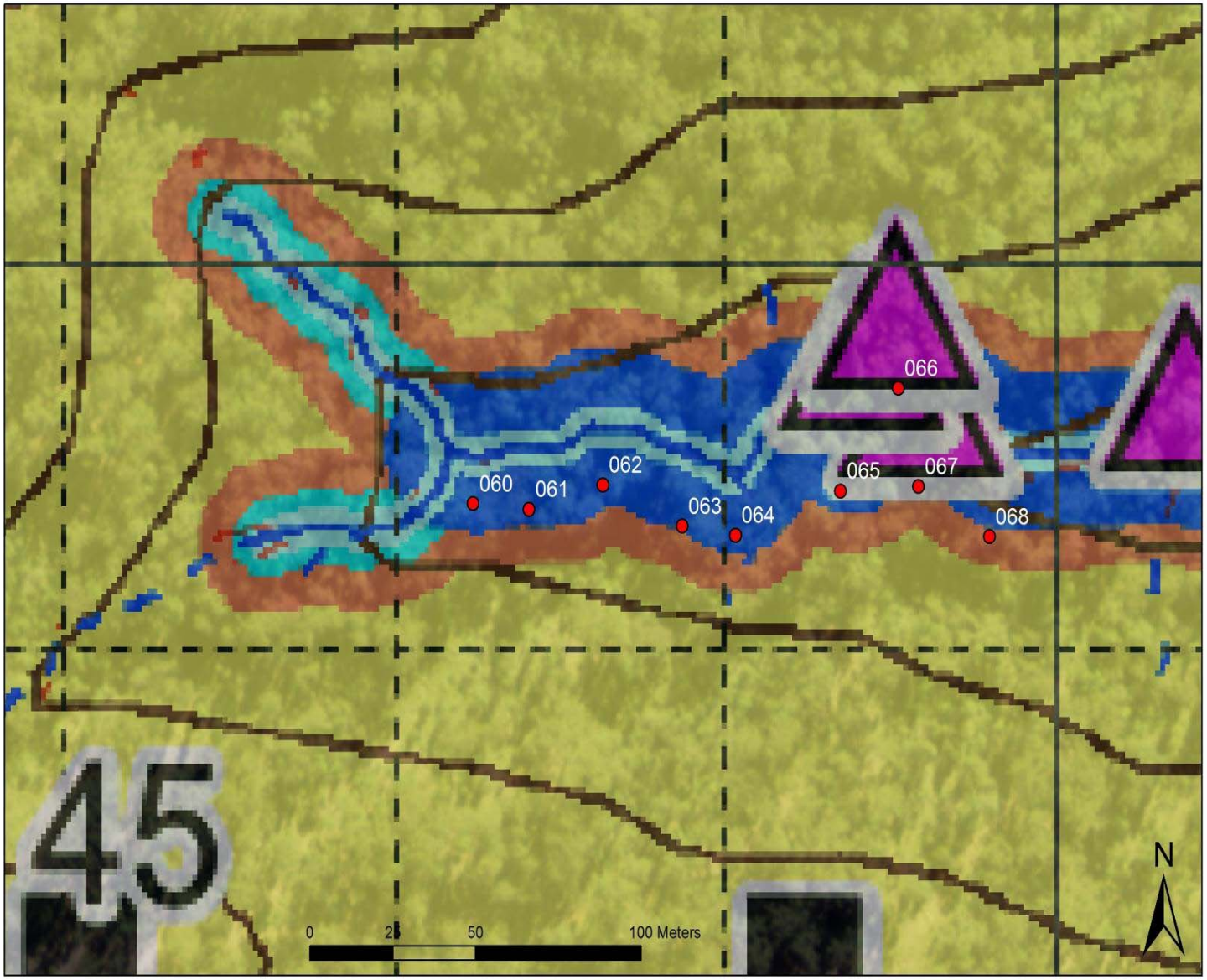


Figure 7: Map of riparian exclusion zone survey points

Table 7: Riparian exclusion zone survey results

Location	GPS waypoint	Easting	Northing	Photo reference	Details of field observations
225m NE of log dump 45	60	485824	6583938		Start assessment
	61	485841	6583936	306 - looking out	No markup visible. No recent logging activity. Some old debris from past operations
	62	485863	6583942	307 - looking from stream outwards	No markup visible. No recent logging activity. Some old debris from past operations
	63	485887	6583932	308 - looking out	No markup visible. No recent logging activity. Some old debris from past operations
	64	485903	6583929	309 - marked trees	Two bar markup for unmapped drainage line. Another tree marked ~~O~~ 1.5m away from it, suppressed Bloodwood (seed tree).
	65	485935	6583941	310 - looking out; 311 - looking in	Two trees felled 4m into Riparian Exclusion Zone. May have been felled directionally to avoid marked EZ for unmapped stream
	66	485952	6583968	312, 313 - Parsonsia dorrigoensis; 314 felled tree	*P. dorrigoensis* at mapped location. Mature tallowood felled into REZ and into *P. dorrigoensis*. Difficult to determine if this is part of the operation. Hand-cut, looks older than operational harvesting. Possible poaching
	67	485959	6583942		Unmapped drainage depression.
	68	485980	6583929		End assessment

Figure 8: Undisturbed riparian exclusion zone boundary (wpt 61)

FURTHER OBSERVATIONS RELATED TO STREAM EXCLUSION ZONES - FIELD MARK UP			
	Compliant?		**Action required by licensee**
In conducting the survey outlined in Table 7 and Figure 5, EPA officers found the 2º stream exclusion zone to be unmarked in the field. There was no evidence that the protection zones described in 5.7 (a) and (b) had been established by FCNSW. EPA officers inspected an un-mapped drainage (GPS waypoint 64) line from its confluence with the mapped stream and found it to be marked in the field with two bar markup. Further downstream, another unmapped drainage depression (GPS waypoint 67) was found to be unmarked.	**N/A**		An action plan must be developed and implemented to ensure that the riparian protection zones described in 5.7 (a) and (b) are marked in the field. *This non-compliance has a yellow risk category. The likelihood of environment harm is less likely. The scale of harm is moderate (considering rate of incidence and sensitivity of environment receptor).*

Figure 8: GPS point 64, observed two bar drainage line markup and seed tree markup.

CONDITION RELATED TO RIDGE AND HEADWATER HABITAT - PROTECTION			
Condition No. and detail	**Compliant? Yes/No/ Not determined/Not Applicable**	**Number of non-compliance (sample size & unit)**	**Action required by licensee**
5.8 Ridge and Headwater Habitat – protection zones (Threatened Species Licence, Lower North East Region) h) The felling of trees across the boundary of a Ridge and Headwater Habitat exclusion zone is prohibited except where no more than six (6) trees containing timber logs are felled across the boundary in any 200 metre length of the boundary of the Ridge and Headwater Habitat exclusion zone, whatever 200 metre length of boundary is considered.	**Not determined**		
I) Except as provided by conditions 5.1 and 5.8 (h)-(k), specified forestry activities other than road construction and road re-opening where there is no other practical means of access, are prohibited in these exclusion zones.	**No**	1/1 (300m R&HH exclusion zone)	An action plan must be developed and implemented to ensure that the R&HH protection zones described in TSL Condition 5.8 are marked in the field to prevent the incursion of prohibited forestry activities. *This non-compliance has an orange risk category. The likelihood of environment harm is likely. The scale of harm is moderate (considering rate of incidence and sensitivity of environment receptor).*
Comment and Evidence			
EPA officers inspected a mapped Ridge and Headwater Habitat zone, 300m south west of log dump 35 following harvest (See Figure 9, Table 8). No markup was observed. Multiple tree heads and large amounts of consolidated debris were observed within the exclusion zone (Figure 10). The magnitude of debris obscuring cut stumps, and lack of differentiation between individual tree heads prevented EPA officers from quantifying the number of incursions within the surveyed area. It is, however, considered highly likely that FCNSW have not complied with TSL Condition 5.8 (h) in this case. EPA officers also observed heavy logging debris in the exclusion zone (GPS waypoints 83, 84, see images Figure 10) that had been consolidated and pushed to these locations using machinery. This is a forestry activity prohibited under TSL Condition 5.8 (l). Trees accidentally or intentionally felled into the protection zone must be left in situ following log extraction, or removed entirely. Therefore, the EPA found that FCNSW did not comply with this condition in the area assessed.			

Figure 9: Map of Ridge & Headwater Habitat survey points

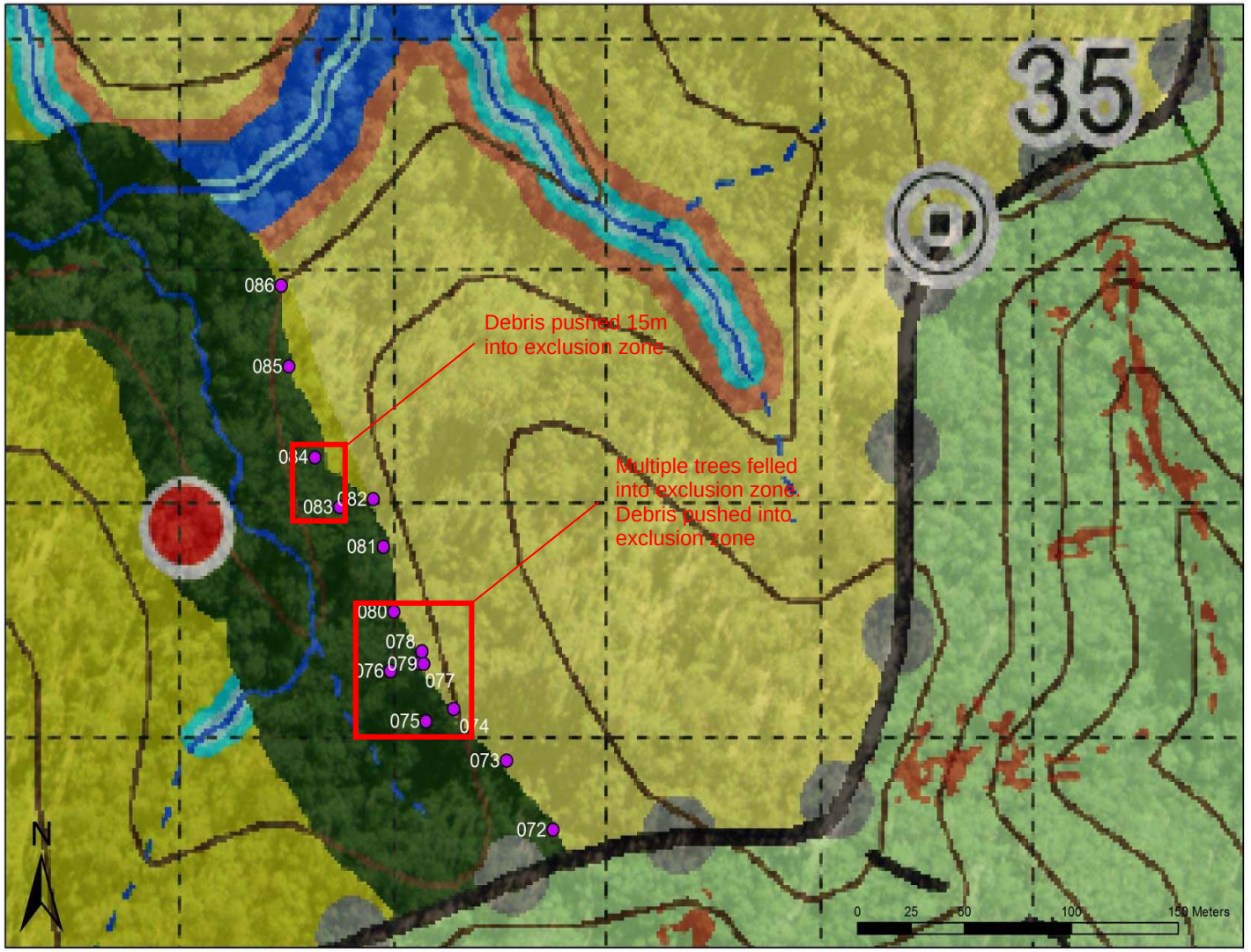


Table 8: Ridge and Headwater Habitat exclusion zone survey results

Location	GPS Waypoint	Easting	Northing	Photo reference	Details of field observations
R&HH Zone, 300m SW of log dump 35	72	486276	6581561	340 - looking out; 339 - looking in	Zone recovering from fire. No markup. No incursion.
	73	486254	6581590	341 - looking out; 342 - looking in	5m to closest logging activity. No incursions. Some old logging debris present in EZ.
	74	486229	6581613	343 - GPS acc = 3m; 344 - looking out; 345 - looking in	Incursion. Multiple trees felled into Exclusion Zone
	75	486216	6581607		Furthest incursion extent
	76	486200	6581629		Furthest incursion extent
	77	486213	6581632	346 - looking in; 347 - GPS acc = 3m; 348, 349 - looking out, 350 - looking in from GPS77	
	78	486214	6581637	351	Stump near boundary - BB, 60cm diameter @ 67cm cut height
	79	486215	6581632	352	Stump near boundary - BB, 58cm diameter @ 48cm cut height
	80	486201	6581654	353	Single head incursion 12m into EZ
	81	486196	6581682		No markup. No incursion.
	82	486192	6581703		
	83	486176	6581699	354	Heavy logging debris extending 15m into EZ
	84	486164	6581721	355	Debris pushed downslope to EZ boundary
	85	486152	6581760	356 - looking in; 357 looking out	
	86	486148	6581795	358 - looking towards tributary	End. No markup. No incursions. No logging operations.

Figure 10: Images from R&HH protection zone survey

Looking into R&HH protection zone from GPS waypoint 74. Multiple trees felled into protection zone

Looking into R&HH protection zone. EPA officer is standing on zone boundary at GPS waypoint 77. Multiple trees felled into protection zone, tree heads not left in situ.

Looking into R&HH protection zone from GPS waypoint 83. Heavy logging debris extending 15m into protection zone

Looking into R&HH protection zone from GPS waypoint 84. Debris pushed downslope past protection zone boundary

These are matters that were recorded during the field investigation but relate to conditions outside the audit scope

Relevant Condition	Details of matter	Recommendation
6.27 Threatened Flora: Monitoring program	During the riparian protection zone survey, EPA officers observed a large tallowwood felled into a mapped stand of *Parsonsia dorrigoensis*, creating significant disturbance to the stand (Table 7, GPS waypoint 66). The tree appeared to be hand cut and felled from outside the mapped harvest area, possibly as part of a poaching operation. See Figure 11 below.	FCNSW to consider any effects to its monitoring program or protection condition for *P. dorrigoensis*

Figure 11: Large tallowwood felled into riparian Hard EZ, and into mapped *P. dorrigoensis* stand. Likely poaching activity

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Condition No.	Number of non-compliances	Action Details	Non-compliance Code*	Target/Action Date
5.6(d) (ii), (iii)	3	**Hollow Bearing Tree Selection** An action plan must be developed and implemented to ensure that Hollow-bearing trees are retained across the compartment having as many of the characteristics listed in TSL condition 5.6d (ii) and (iii), and consistent with the requirements of the Hollow-bearing tree definition.		Immediately
5.6(e) (i) – (v)	3	**Recruitment Tree Selection** An action plan must be developed and implemented to ensure that recruitment trees are retained across the compartment having as many of the characteristics listed in TSL condition 5.6e and consistent with the requirements of the Recruitment tree definition.		Immediately
5.7 (a), (b) (i) – (iii)	N/A	**Riparian Protection Zone Mark up** An action plan must be developed and implemented to ensure that the riparian protection zones described in 5.7 (a) and (b) are marked in the field.		End of July 2016
5.8 (l)	1	**Ridge & Headwater Protection** An action plan must be developed and implemented to ensure that the R&HH protection zones described in TSL Condition 5.8 are marked in the field to prevent the incursion of prohibited forestry activities.		Immediately
Total	**7**			

ATTACHMENT 2: RISK ASSESSMENT OF NON-COMPLIANCE

The significance of any non-compliances identified during the audit process are categorised according to the Risk Matrix below. The risk assessment for any non-compliance involves assessment against two criteria: the likelihood of environmental harm occurring and the level of environmental impact.

	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**

Risk matrix for determining the risk assessment code.

- a code red risk assessment denotes that the non-compliance is of considerable environmental significance and therefore must be dealt with as a matter of priority.
- a code orange risk assessment denotes a significant risk of harm to the environment however can be given a lower priority than a red risk assessment.
- a code yellow risk assessment 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.

ATTACHMENT 3: AUDITEE SUBMISSIONS & EPA RESPONSE TABLE

Condition / Audit finding reference / page No.	EPA draft finding / risk categorisation	Location – description, GPS	FCNSW evidence submission	EPA final finding / risk categorisation	EPA response to FCNSW submission
5.6 d) (i,ii,iii) (TSL)	Not Compliant / Code Orange	Various	Based on the information supplied by EPA, FCNSW do not agree with EPA's assessment that additional habitat trees were present to those marked by FCNSW. Table 2 indicates that candidate trees were generally mature, which did not contain hollows. In FCNSW view, the presence of burls, protuberances, or broken limbs do not in isolation indicate the presence of hollows, and must be assessed in context. In FCNSW's view, the photos on page 12 and 13 of EPA's report do not meet the definition of habitat trees. FCNSW request that these three alleged non-compliances be withdrawn.	The tree photographed on page 13 is marked as a habitat tree by FCNSW. The context for assessment in environmental audits is the balance of probabilities. If candidate H trees in Table 2 are recorded as not having hollows, it is because EPA officers have considered all other relevant observed features and characteristics of the tree and reached the conclusion that on the balance of probabilities the tree was likely to have hollows that are not observable from the ground. EPA retained its draft audit finding.	Not Compliant / Code Orange

5.6 e) (TSL)	Not Compliant / Code Orange	Various	As FCNSW do not agree with EPA's allegation regarding the selection of Habitats trees, FCNSW do not agree that 4 recruitment trees need to be selected. **FCNSW request that these two alleged non-compliances be withdrawn.** With regard to the alleged non-compliance with condition 5.6 c, it is noted that EPA found compliance with the selection of recruitment trees in all attributes, with the exclusion of the trees belonging to a cohort of trees with the largest DBHOB. When marking trees for recruitment tree retention, FCNSW must consider retaining trees with as many of the characteristics as possible. Selecting trees from a cohort with the largest DBHOB is only one of these characteristics, and cannot be treated in isolation to other characteristics. The data collected by EPA is a relatively small sample size, does not adequately consider the special arrangement of tree selection, and is	The TSL condition refers to a number of elements that a tree must have to be considered a recruitment Tree. The EPA considers that the **key and dominant element is size**, i.e. "belonging to the cohort of trees with the largest DBHOB". If a tree is not a tree that belongs to the cohort trees with the largest DBHOB then it doesn't comply with the selection criteria. This element is important. We consider it as a key element as retaining trees belonging to the cohort of trees with the largest DBHOB represents the best chance of getting habitat continuity over space and time once existing hollow bearing tree resources cease. Size is easily measured and assessed. EPA uses it as a first screen to determine whether selection criteria is compliant or not. If a tree is selected and belongs to the cohort of trees with the largest DBHOB, then other elements of	Not Compliant / Code Orange

			limited by assessing stumps rather than standing trees. FCNSW's view is that assessing the adequacy of stumps as potential recruitment trees, cannot take into account the range of selection characteristics. As such the comparison of stump diameter to retained tree diameter in isolation is not an accurate measure of compliance with the condition. The data presented in Figure 5 suggests that the trees marked and retained as recruitment trees are large mature codominant trees that fulfil the characteristics of the intention of condition 5.6. In FCNSW view, the marked retained trees meet the requirement of recruitment trees. FCNSW request that this alleged non-compliances be withdrawn. Like EPA, FCNSW consider the selection and retention of retained trees as a very important component of maintaining essential habitat within the net harvest area. As such, a training package is being prepared to be delivered to all the Harvesting Coordinators and Forest Technicians across the north Coast. The aim of this training is to ensure that FCNSW has a	the condition are assessed in conjunction with size. EPA will continue to use size as a key element and not complying with the size element of the condition will represent a non compliance with the TSL condition. EPA retained its draft audit finding.	

			consistent approach to the selection of retained trees to ensure compliance with the TSL. The training will focus on appropriate habitat and recruitments tree selection, and undertaking pre harvest mark. The training will be conducted over a two week period in late April and early May.		
5.1 f (referred incorrectly in EPA Action Plan summary under 5.7)	Not Compliant / Code Yellow		FCNSW have conducted a root-cause analysis on boundary management and identified that boundary identification in the field using GPS is an accurate approach to delivering compliance. FCNSW is happy to formally discuss the results of the root cause analysis and procedure development regarding boundary identification with the EPA to avoid administrative non-compliance findings in future audits. **FCNSW has assessed this alleged non-conformance as having no risk and requests this is reflected in the EPA's final audit report.** FCNSW acknowledges the boundary was not marked in the field with paint, however, the boundary was clearly visible to the harvesting machine operator in the field on an Apple iPad	This non compliance is not administrative and really should not be taken as administrative. This TSL condition is designed to operate alongside other TSL conditions to minimise the risk of logging in protected areas. Not complying with it increases the risk, so it a risk reduction condition, not administrative. The TSL clearly requires exclusion zone boundaries to be marked in the field. This is marking the boundary in the field. There are a number of exclusion zone boundaries that are marked in the field (paint on trees) and a number of exclusion zone boundaries that are frequently not marked in the field (no paint on trees). All exclusion zone	Not Compliant / Code Yellow

			screen running FCNSW's 'FC Map App' software.	boundaries should be treated as equally important to protect. Field marking and record keeping are needed for the benefit of harvest contractors so they know their boundaries and what to protected. Having a visual on the ground (in the field) combined with proper record keeping is legally required by the TSL. In these instances, EPA auditors found no field marking on boundaries and incursions into ridge & headwater exclusion zones.	
5.8 (TSL)	Not Compliant / Code Orange		FCNSW have conducted routine audits during the course of this operation. Over 1km of exclusion boundary as been audited per quarter during this operation. A check of these QAA audits have found that the location of the Ridge and Headwater incursion specified in the EPA report was not found during FCNSW audit. The contractor for this operation has been counselled on this issue and advised on methods to better manage debris management and tree falling in	EPA retained its draft audit finding	Not Compliant / Code Orange

			the vicinity of Ridge and Headwater exclusion boundary.		