

# CONSERVATION COMMISSION OF WESTERN AUSTRALIA - REPORT ON THE OLD GROWTH NOMINATION WITHIN ARCADIA FOREST BLOCK - COMPARTMENT 03/11 LOGGING COUPE

## ***Executive Summary***

In January 2011 the Conservation Commission received a public nomination for a review of old-growth forest status within Arcadia forest block compartment 03/11.

The Department of Environment and Conservation (DEC)'s dieback interpretation mapping designated the nomination area as predominantly 'dieback free' apart from three separate infestations of dieback totalling approximately 35 hectares.

An area of approximately 10 hectares has been identified by the Conservation Commission as meeting the criteria of old-growth forest. ***This area has been determined as unavailable for timber harvesting.***

## ***Background***

This report summarises the Conservation Commission's findings based on its consideration of available records and field sampling undertaken by the Conservation Commission audit staff. The following old-growth definition applies to the assessment area:

- Jarrah and jarrah/tingle forest: "uncut forest or forest subject to minimal disturbance which is not known to be affected by *Phytophthora cinnamomi*".

In accordance with the Conservation Commission's paper *Assessment criteria and process for the Conservation Commission review of old-growth amendments*, the effects of disturbance are considered more than minimal where changes to the structure of the overstorey caused by these disturbances are still evident or where changes to the overstorey or understorey are irreversible.

### Public nomination of old-growth

The *Forest Management Plan 2004-2013* (FMP) and the Conservation Commission's paper *Assessment criteria and process for the Conservation Commission review of old-growth amendments*, provide a process for people to request that the Conservation Commission assess whether areas on an indicative timber harvest plan should be classified as old-growth forest in the DEC's corporate database. In line with that process a request was received on the 10th February 2011 in relation to Arcadia forest block compartment 03/11.

### Nomination areas

The nominee provided a detailed description including maps, images and way points within the coupe. A boundary including a buffer was drawn around these way points to create three nomination areas totalling approximately 41 hectares. The location of these nomination areas can be seen on Map 1.

### Site Description

Arcadia forest block compartment 03/11 is located 35km south east of the City of Bunbury. The area within the coupe is gently sloping and varies between 195m and 265m above sea level. Annual rainfall is between 900 millimetres and 1100 millimetres per annum. Private land abuts the northern and eastern boundaries of the coupe.

### Forest types

The broad description of forest type for the coupe is jarrah forest. There are three vegetation complexes occurring within the coupe, these are Hester, Murray 1 and Yarragil 1 with some intermediate vegetation types occurring along these margins. Descriptions of relevant vegetation complexes for the areas assessed are provided in Appendix 1.

### **Sampling Process**

Sampling incorporated the process outlined in the document *Assessment criteria and process for the Conservation Commission review of old-growth amendments*. Due to some variable intensity of logging in the area, it was decided to undertake a full stump

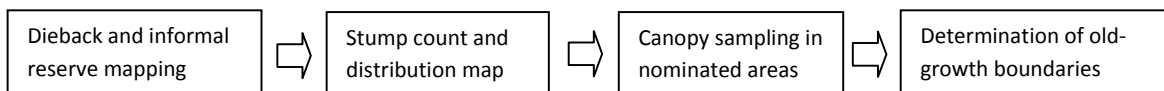
count in the areas nominated. The area chosen to undertake canopy sampling was selected using the stump distribution data.

### Remote Analysis

The nomination area was reviewed using the following background information:-

- Digitised aerial photos and data layers to confirm forest and non-forest structural boundaries and general observations in relation to forest structure;
- The latest available harvesting records, dieback sampling, forest types, vegetation complexes and informal reserves as provided by DEC.

### Stratification process



### **Field Checks**

An initial site visit revealed that logging had occurred over most of the coupe. There was evidence of past disturbances that included old forest tracks and high numbers of stumps. Some high cut stumps typical of pre 1960's harvesting were observed as well as pole cuts.

### **Results and Findings**

#### Dieback

The most recent DEC dieback samples taken within Arcadia 03/11 logging coupe were independently verified by the Vegetation Health Service. They show the area to be predominantly free of dieback apart from 3 infestations totalling approximately 35 hectares (Map 1). These areas were not sampled as areas infested with dieback do not meet the criteria for old-growth forest.

### Stump data analysis

A broad evaluation of stump distribution within the coupe showed high numbers of stumps in nomination area 1 and nomination area 2 (Map 2). A visual inspection revealed most of this area to be jarrah dominant. Stump counts within nomination area 1 and nomination area 2 returned an average of greater than 20 stumps per hectare. Canopy sampling was not undertaken in these areas as the number of stumps far exceeds what has historically been found to be minimally disturbed old-growth forest.

In nomination area 3, an area greater than 2 hectares containing no stumps was observed. An area surrounding this with few stumps was also observed. The number of stumps declines moving downhill from heavily cut over forest. This lower lying area is not as dominant by jarrah as the forest up slope and contains an even mix of jarrah, marri and blackbutt. This area of forest is also of a smaller size class than other areas of the coupe. The reduction or absence of stumps is most likely a reflection of the lower proportion of jarrah at the time of logging and the poorer quality of timber in this vicinity.

### Canopy Sampling and boundary demarcation

From visual inspection and stump intensity analysis, nomination area 3 was selected for canopy sampling. Sampling within area 3 returned an average of 3.8 stumps per hectare and an estimated upper canopy proportion of mature or senescent trees of 55.4 percent (Table 1). This figure falls above the benchmark figure of 50 percent used by the Commission as the minimum requirement for minimally disturbed old-growth forest. A half hectare stump intensity map has been used to assist in defining an old-growth forest boundary. All half hectare pixels with 2 or fewer stumps were mapped as minimally disturbed old-growth forest (where adjacent to uncut forest - see Map 2). All other areas sampled in this assessment were determined to be non old-growth forest.

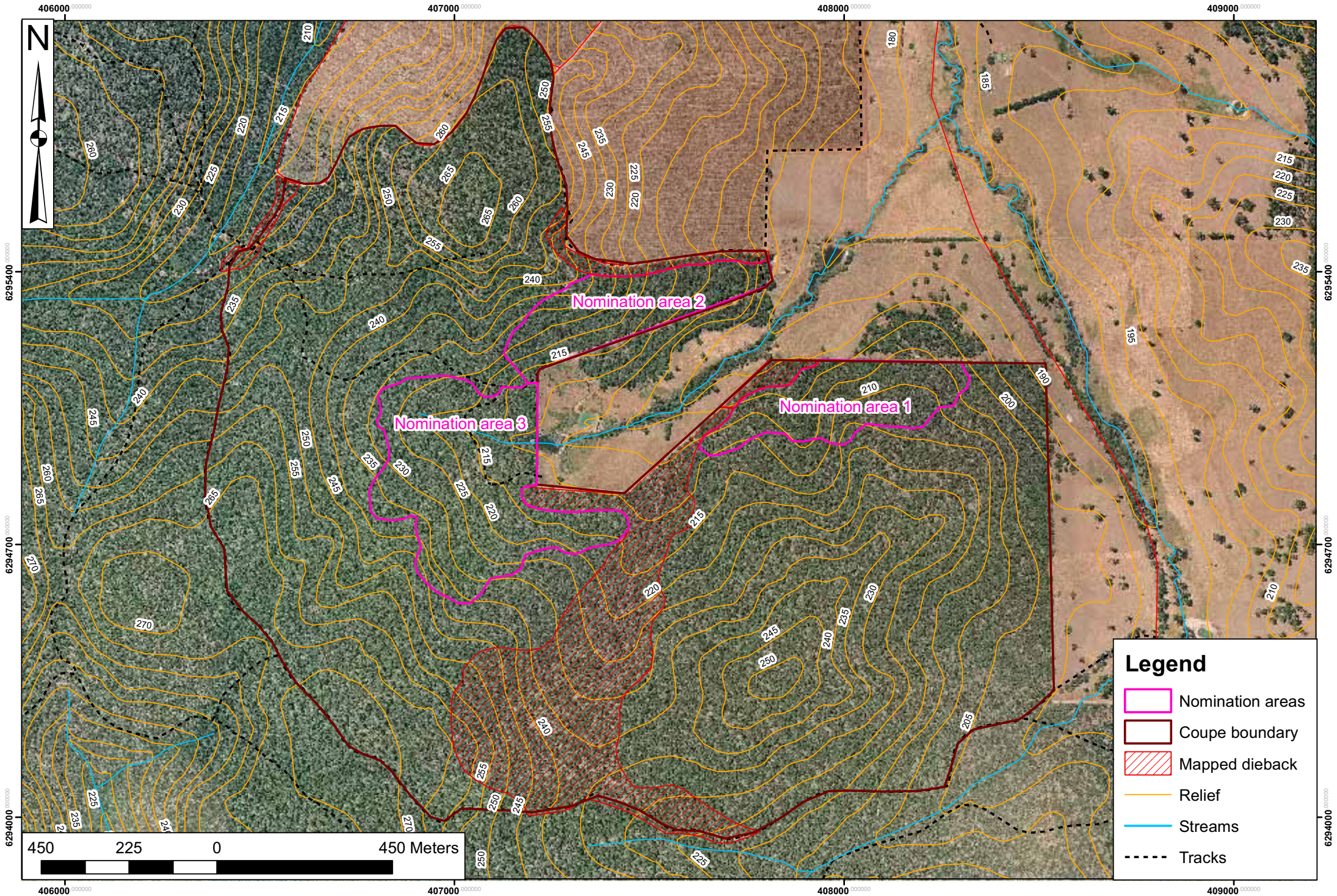
**Table 1 Sample Results.**

<b>Sample areas</b>	<b>Estimated number of stumps per hectare</b>	<b>Estimated total upper crown cover</b>	<b>Estimated upper crown proportion of mature or senescent trees</b>	<b>Estimated upper crown proportion of regrowth trees</b>	<b>Old Growth</b>
<b>Nomination Area 1</b>	<b>≥ 20</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>No</b>
<b>Nomination Area 2</b>	<b>≥ 20</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>No</b>
<b>Nomination Area 3</b>	<b>≤ 4.0</b>	<b>67.5%</b>	<b>55.4%</b>	<b>44.6%</b>	<b>Yes</b>

**Summary**

Approximately 10 hectares of previously unidentified old-growth forest has been located within the Arcadia 03/11 logging coupe. This area of old-growth forest identified in Map 2 will therefore ***be unavailable for timber harvesting.***

# Map 1 Nomination areas - Arcadia Forest Block Compartment 03/11



# Map 2 Stump Distribution - Arcadia Forest Block Compartment 03/11

407000 000000

408000 000000



6295400 000000

6295400 000000

6294700 000000

6294700 000000

250 125 0 250 Meters

407000 000000

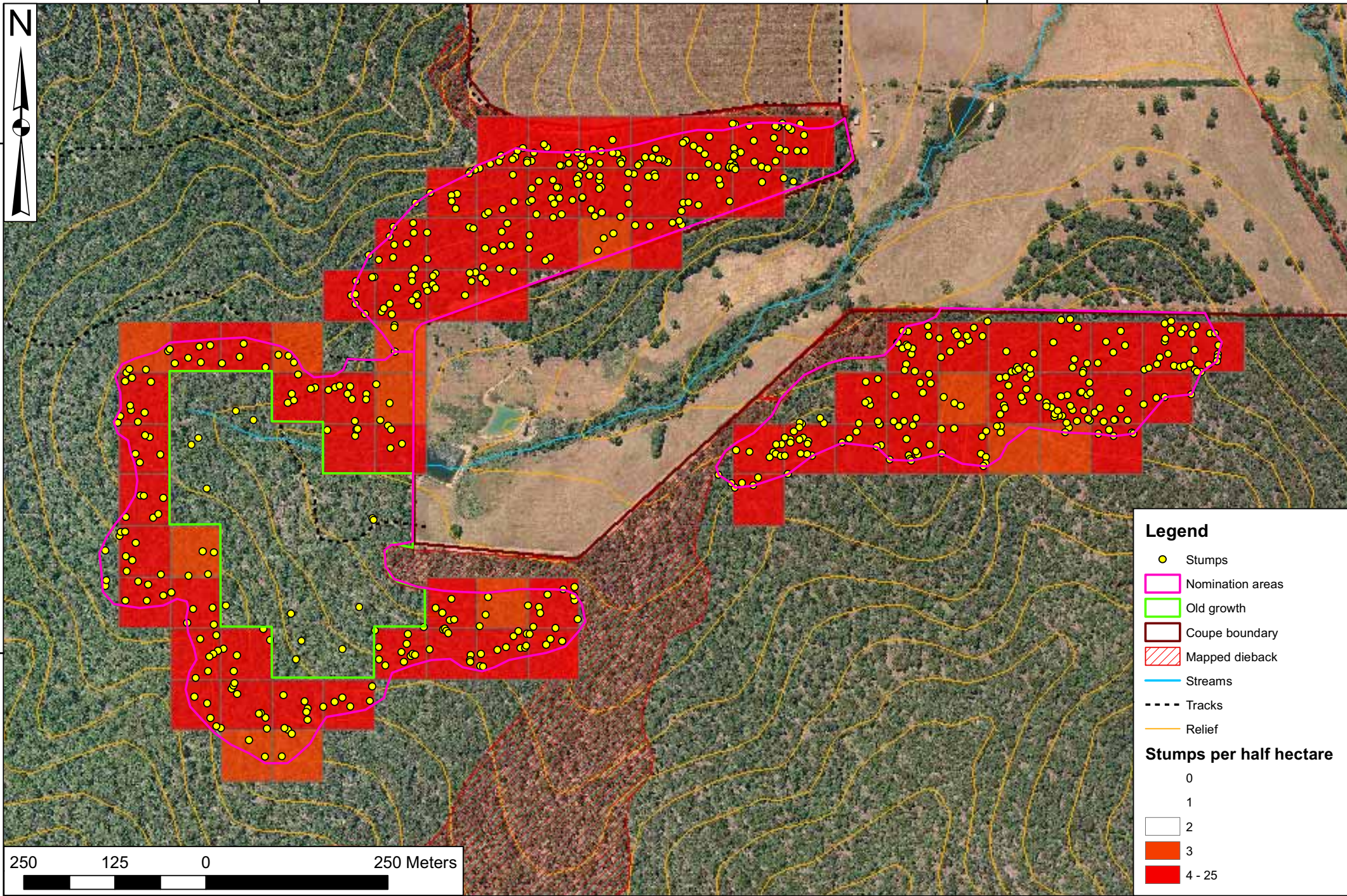
408000 000000

## Legend

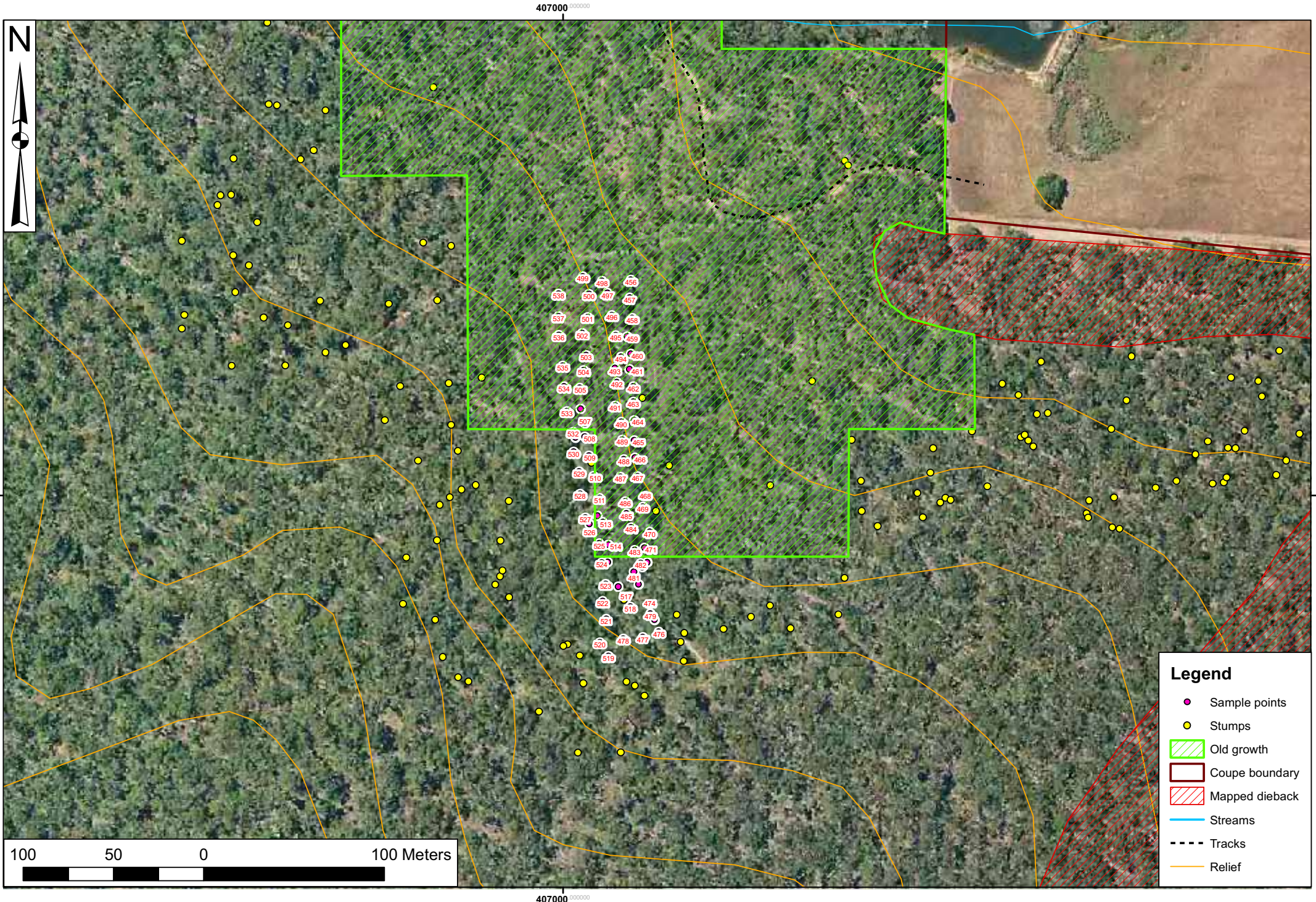
- Stumps
- ▭ Nomination areas
- ▭ Old growth
- ▭ Coupe boundary
- ▨ Mapped dieback
- Streams
- - - Tracks
- Relief

## Stumps per half hectare

- 0
- 1
- 2
- 3
- 4 - 25



# Map 3 Canopy Sampling - Arcadia Forest Block Compartment 03/11



- Legend**
- Sample points
  - Stumps
  - ▨ Old growth
  - ▭ Coupe boundary
  - ▨ Mapped dieback
  - Streams
  - - - Tracks
  - Relief



## Canopy sampling data Arcadia 03/11

FID	CANOPY	SPECIES	DBH	DEVELOPMENT	QUALITATIVE
456	YES	BBUTT	65	MATURE/SEN	MIXED
457	YES	MARRI	20	REGROWTH	MIXED
458	YES	GAP	0	GAP	MIXED
459	YES	JARRAH	50	MATURE/SEN	MOSTLY UPPER
460	NO	GAP	0	GAP	GAP
461	NO	GAP	0	GAP	MOSTLY LOWER
462	YES	MARRI	50	REGROWTH	MOSTLY UPPER
463	YES	MARRI	30	REGROWTH	MIXED
464	NO	GAP	0	GAP	MIXED
465	YES	BBUTT	75	MATURE/SEN	MIXED
466	YES	BBUTT	75	MATURE/SEN	MIXED
467	NO	GAP	0	GAP	MOSTLY LOWER
468	YES	JARRAH	50	REGROWTH	MIXED
469	YES	BBUTT	30	REGROWTH	MIXED
470	NO	GAP	0	GAP	MIXED
471	YES	BBUTT	60	MATURE/SEN	MOSTLY UPPER
472	YES	MARRI	30	REGROWTH	MIXED
473	YES	MARRI	30	REGROWTH	MIXED
474	YES	MARRI	25	REGROWTH	MIXED
475	YES	MARRI	70	MATURE/SEN	MOSTLY UPPER
476	YES	MARRI	60	MATURE/SEN	MIXED
477	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
478	YES	JARRAH	110	MATURE/SEN	MOSTLY UPPER
479	YES	MARRI	60	MATURE/SEN	MIXED
480	YES	GAP	0	GAP	MOSTLY LOWER
481	NO	GAP	0	GAP	GAP
482	YES	MARRI	40	REGROWTH	MIXED
483	YES	BBUTT	60	MATURE/SEN	MOSTLY UPPER
484	YES	JARRAH	70	MATURE/SEN	MIXED
485	YES	BBUTT	80	MATURE/SEN	MIXED
486	YES	BBUTT	80	MATURE/SEN	MIXED
487	YES	BBUTT	85	MATURE/SEN	MOSTLY UPPER
488	YES	BBUTT	110	MATURE/SEN	MOSTLY UPPER
489	YES	MARRI	30	REGROWTH	MIXED
490	NO	GAP	0	GAP	MOSTLY LOWER
491	YES	JARRAH	50	MATURE/SEN	MIXED
492	YES	BBUTT	70	MATURE/SEN	MOSTLY UPPER
493	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
494	NO	GAP	0	GAP	MOSTLY LOWER
495	NO	GAP	0	GAP	MOSTLY LOWER
496	NO	GAP	0	GAP	MOSTLY UPPER
497	YES	JARRAH	40	REGROWTH	MIXED
498	YES	MARRI	30	REGROWTH	MOSTLY UPPER
499	YES	MARRI	140	MATURE/SEN	MOSTLY UPPER
500	NO	GAP	0	GAP	GAP
501	NO	GAP	0	GAP	MIXED
502	NO	GAP	0	GAP	MOSTLY UPPER
503	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
504	YES	MARRI	65	MATURE/SEN	MOSTLY UPPER
505	YES	MARRI	60	MATURE/SEN	MIXED
506	NO	GAP	0	GAP	GAP
507	YES	MARRI	30	REGROWTH	MIXED
508	NO	GAP	0	GAP	GAP
509	YES	BBUTT	80	MATURE/SEN	MOSTLY UPPER
510	YES	BBUTT	80	MATURE/SEN	MIXED
511	NO	GAP	0	GAP	GAP
512	YES	MARRI	30	REGROWTH	MIXED
513	YES	MARRI	40	REGROWTH	MIXED
514	YES	BBUTT	140	MATURE/SEN	MIXED
515	YES	MARRI	50	REGROWTH	MIXED
516	YES	MARRI	50	REGROWTH	MIXED
517	YES	MARRI	30	REGROWTH	MIXED
518	NO	GAP	0	GAP	GAP
519	YES	MARRI	60	MATURE/SEN	MOSTLY UPPER
520	YES	MARRI	40	REGROWTH	MOSTLY LOWER
521	YES	JARRAH	50	REGROWTH	MIXED
522	NO	GAP	0	GAP	MOSTLY LOWER
523	NO	GAP	0	GAP	MOSTLY LOWER
524	YES	BBUTT	140	MATURE/SEN	MIXED
525	YES	BBUTT	140	MATURE/SEN	MOSTLY UPPER
526	YES	BBUTT	40	REGROWTH	MIXED
527	NO	GAP	0	GAP	MOSTLY LOWER
528	NO	GAP	0	GAP	MIXED
529	YES	MARRI	40	REGROWTH	MIXED
530	NO	GAP	0	GAP	GAP
531	YES	MARRI	30	REGROWTH	MIXED
532	YES	MARRI	30	REGROWTH	MIXED

<b>FID</b>	<b>CANOPY</b>	<b>SPECIES</b>	<b>DBH</b>	<b>DEVELOPMENT</b>	<b>QUALITATIVE</b>
533	NO	GAP	0	GAP	MIXED
534	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
535	YES	MARRI	50	REGROWTH	MOSTLY UPPER
536	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
537	NO	GAP	0	GAP	GAP
538	NO	GAP	0	GAP	MOSTLY LOWER

## APPENDIX 1: VEGETATION COMPLEXES OF THE SOUTH WEST FOREST REGION

Geographic Region	Perhumid north		S of Harvey
Geomorphologic catena – VC (EVS)	Lo – Lowdon (Ms5)	D1 – Dwellingup (JP6)	Yg1 – Yarragil (H16)
Landform and Vegetation profile			
100m			
80m			
60m			
40m			
20m			
Land form description	Dissected slopes of the Darling Plateau close to the Darling Scarp, often on metamorphic rocks	Residual uplands of the Darling Plateau, in the form of divides and spurs	Minor valleys incised into the Darling Plateau
Soil structure, texture and fertility	Deep gravelly duplex soils on upper slopes, red and yellow duplex soils on lower slopes	Yellowish brown sandy gravels, underlain by kaolinitic clays at depth, with outcrops of lateritic duricrust	Deep sandy gravels on slopes, orange earths over iron hardpan, or humus podzols on valley floors
Soil hydrology	Moderately to strongly water shedding, with good infiltration and moderate storage capacity	Mildly water shedding with good infiltration and storage capacity	Slopes mildly water shedding, good infiltration and storage capacity; floor water gaining, seasonally water-logged
Over storey (canopy or emergents)	Open Forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Em) and <i>Corymbia calophylla</i> (Cc) on deeper soils; <i>Agonis flexuosa</i> (Af) as low open forest on shallower soils	Open Forest to Tall Open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Em) and <i>Corymbia calophylla</i> (Cc)	Open Forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Em) and <i>Corymbia calophylla</i> (Cc) on slopes; open forest to woodland of <i>Eucalyptus patens</i> (Ep) and <i>Eucalyptus megacarpa</i> (Emg) on floors
Second storey	<i>Banksia grandis</i> (Bg) and <i>Persoonia longifolia</i> (Pl)	<i>Allocasuarina fraseriana</i> (Afr), <i>Banksia grandis</i> (Bg) <i>Persoonia longifolia</i> (Pl)	<i>Banksia grandis</i> (Bg) and <i>Persoonia longifolia</i> (Pl) on slopes, <i>Banksia littoralis</i> (Bl) and <i>Banksia seminuda</i> (Bs) on valley floor
Shrub and herb storey	<i>Leucopogon verticillatus</i> <i>Leucopogon capitellatus</i> <i>Acacia urophylla</i> <i>Bossiaea aquifolium</i> subsp. <i>aquifolium</i> , <i>Hibbertia hypericoides</i> , <i>Macrozamia riedlei</i> , <i>Phyllanthus calycinus</i> <i>Pteridium esculentum</i>	<i>Leucopogon verticillatus</i> <i>L. capitellatus</i> , <i>L. propinquus</i> <i>Pteridium esculentum</i> , <i>Acacia urophylla</i> , <i>Bossiaea aquifolium</i> subsp. <i>quifolium</i> , <i>Bossiaea ornata</i> , <i>Hakea lissocarpha</i> , <i>Hovea chorizemifolia</i> <i>Macrozamia riedlei</i>	<i>Acacia alata</i> <i>Agonis linearifolia</i> <i>Astartea fascicularis</i> <i>Grevillea diversifolia</i> <i>Gahnia decomposita</i> <i>Lepidosperma tetraquetrum</i> <i>Mesomelaena tetragona</i> on valley floor

## APPENDIX 1: VEGETATION COMPLEXES OF THE SOUTH WEST FOREST REGION

Geographic Region	Humid central Between Kirup and Cundinup		
Geomorphologic catena – VC (EVS)	BL – Balingup (Ms5)	BL – Balingup (Ms5)	HR – Hester (JP6)
Landform and Vegetation profile			
100m			
80m			
60m			
40m			
20m			
Land form description	Deeply incised valley of a minor tributary of the Blackwood River	Shallowly incised head waters of a minor tributary of the Blackwood River	Residual lateritic uplands on the margin of the Blackwood dissection
Soil structure, texture and fertility	Red brown sandy loam to loam over saprolite, fertile	Gravelly red sandy loam, some lateritic floaters and outcrops, moderately fertile	Yellow brown gravelly loamy sand with numerous lateritic outcrops, infertile
Soil hydrology	Moderately water shedding except on streamline, moderate infiltration and storage capacity	Mildly water shedding except for valley floor, good infiltration and moderate storage capacity	Mildly water shedding via subsoil, very good infiltration and storage capacity due to depth of solum
Over storey (canopy or emergents)	Tall Open Forest of <i>Corymbia calophylla</i> (Cc) and <i>Eucalyptus patens</i> (Ep)	Open to Tall Open Forest of <i>Corymbia calophylla</i> (Cc) and <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Em)	Tall Open Forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> (Em) and <i>Corymbia calophylla</i> (Cc)
Second storey	No second storey of trees but tall shrub stratum of <i>Trymalium floribundum</i> (Tf) approaching size of small tree	<i>Banksia grandis</i> (Bg), <i>Persoonia longifolia</i> (Pl) on slopes, <i>Mirbelia dilatata</i> (Md) & <i>Trymalium floribundum</i> (Tf) on floor	<i>Banksia grandis</i> (Bg) <i>Persoonia longifolia</i> (Pl)
Shrub and herb storey	<i>Hibbertia amplexicaulis</i> <i>Tremandra diffusa</i> <i>Chorizema ilicifolium</i> <i>Clematis pubescens</i> <i>Hardenbergia comptoniana</i> <i>Pteridium esculentum</i> <i>Leucopogon verticillatus</i> <i>Lepidosperma tetraquetrum</i> on streamline	<i>Xanthorrhoea preissii</i> , <i>Patersonia rudis</i> subsp. <i>rudis</i> <i>Leucopogon verticillatus</i> <i>Leucopogon propinquus</i> <i>Leucopogon capitellatus</i> <i>Hakea amplexicaulis</i> <i>Macrozamia riedlei</i>	<i>Bossiaea aquifolium</i> subsp. <i>aquifolium</i> , <i>Xanthorrhoea preissii</i> , <i>X. gracilis</i> , <i>Hibbertia hypericoides</i> , <i>H. commutata</i> , <i>H. amplexicaulis</i> , <i>Leucopogon verticillatus</i> , <i>L. capitellatus</i> , <i>L. propinquus</i> , <i>Macrozamia riedlei</i> , <i>Pteridium esculentum</i> <i>Hakea lissocarpha</i> , <i>Dryandra lindleyana</i>