

Review of old-growth forest status

Forest Block/ Compartment	Barrabup 03
Region	South West
District	Blackwood
Date of request	06 June 2017
Origin of request	Public nomination
Location	The Barrabup 03 harvest coupe comprises an area of approximately 530 hectares which is bounded by Vasse Highway in the west and Cundinup South Road in the north. Old Cundinup Road runs north to south in the eastern portion of the coupe and adjoins Milward Road on the coupe's southern boundary (see Appendix 1 – Base map).
Old-growth forest definition/s applied to assessment area	Jarrah and jarrah/tingle forest – uncut (never harvested) forest or forest subject to minimal disturbance which is not affected by <i>Phytophthora cinnamomi</i>

Summary	<p>A review of the nominated area was conducted in accordance with the <i>Procedures for the assessment, identification and demarcation of old-growth forest</i> (FEM Procedure FEM075).</p> <p>The review confirmed that the forest within the coupe has been previously cutover, but a total of 43 hectares (comprised of 12 separate patches) of minimally-disturbed jarrah forest met the definition of old-growth jarrah forest. A further 16 hectares of previously unmapped diverse ecotype zone was also identified within the Barrabup 03 harvest coupe.</p>
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Report Reviewed	28 September 2017
Endorsed	M. Rayner
	Manager, Forest Management Branch

1. Collation of background data and refinement of the assessment area

1.1 Location and description of area under review

Barrabup forest block is located approximately 5 kilometres north of the Nannup townsite. The location and boundaries of the Barrabup 03 harvest coupe are depicted in Appendix 1. The entire coupe was nominated for a review of the old-growth forest status. However, a detailed ground survey was later focussed on areas that would be available for timber harvesting as the fauna habitat zone in the north of the coupe and informal reserves are excluded from harvest disturbance.

The coupe has an undulating topography, with slopes becoming steeper and more pronounced near streams. Laterite-derived soils dominate the coupe, and several gravel pits have been utilised over time. The distribution of very rocky terrain (particularly the south-east quadrant of the coupe) may have influenced the intensity and extent of previous harvest activities.

1.2 Forest type and structure

Aerial Photography Interpretation (API) conducted in 1955 indicated that the forest within the coupe was predominantly jarrah forest type, of varied canopy density and forest structure (Appendix 2).

At the time of photography much of the coupe was classified as 'massed' forest stands of between 40 and 70 per cent crown cover, with height classes ranging from 25-29 metres (A), 20-24 metres (B+) and 15-19 metres (B). Several areas in the centre and south-eastern section of the coupe were classified as jarrah/marri mixed pole stands, potentially arising from regeneration following harvesting decades earlier. Within these areas the upper strata was clearly separable from the pole understorey. Upper strata crown cover ranged from between 6-30 per cent with total crown cover varying from 50 to 70 per cent, and height class of mostly 20-24 metres. Light fire damage was recorded in two of the pole stands. The coupe also comprised of several mixed jarrah/marri saplings stands, consisting of 20 per cent mature trees occupying the upper strata and a sapling or scrub understorey. Total crown cover in these areas was between 30 and 50 per cent with a height class of 20-24 metres.

The 1955 photography also recorded several areas adjacent to streams that were either very open (V.O.), dense scrub (D, Sc) or flats (F) vegetation (Appendix 2). The non-forest areas and/or areas with less than 30 per cent crown cover were later incorporated into the informal reserve system as diverse ecotype zones (DEZ). Both DEZ and old-growth forest areas are excluded from harvest operations.

Analysis of recent high-resolution digital stereo imagery (acquired in 2014) was largely consistent with the original API interpretation and subsequent records of harvesting recorded in sections of the coupe during the 1960s, but additional (previously unclassified) DEZ areas were also identified and are depicted in Appendix 2.

1.3 Harvest history

Departmental records of previous timber harvesting indicate that most of the coupe had been cutover once either before 1920 or during the decade of 1920-1929. Remnant sleeper sections observed during the field survey are consistent with this era of cutting. A portion of the coupe was cutover a second time during the decade 1950-1959, and a third time during the decade 1960-1969 (Appendix 3). A small area on the western boundary of the coupe was also recorded as having a second harvest during the decade 1970-1979 (Appendix 3).

1.4 *Phytophthora dieback* status

Infestation by *Phytophthora dieback* is considered a significant unnatural disturbance, and excludes jarrah forest types from being classified as old-growth forest. Mapping of *Phytophthora cinnamomi* occurrence in the coupe was completed in April 2017 (Appendix 4). Approximately 571 hectares was interpreted, of which 288 hectares was classified as uninfested and 14 hectares as uninterpretable. Uninfested areas were dispersed across the coupe, with the largest concentration occurring in the western portion (see survey area 1). The remaining areas were classified as infested, with the infestation encompassing the coupe boundary and main access roads.

1.5 Fire history

Fire history records indicate the forest within the coupe has been burnt regularly since the 1940s, with prescribed burns documented in every decade between 1940-2010 (Appendix 5). The coupe has also been impacted by two significant bushfires: one in 1948 and another in 2000. The 1948 bushfire was the most widespread, burning the entire coupe west of Old Cundinup Road.

1.6 Other disturbances

Evidence of an old fence line running east-west in the southern portion of the coupe was detected during the field surveys (see Appendix 6). A search of records was unable to confirm if the area had been subject to a possible grazing lease.

2. Stratification of disturbance history using aerial photograph interpretation and other datasets

The high resolution, digital 3D stereo imagery acquired in 2014 was examined to detect evidence of previous harvest or other disturbances within the coupe. Gravel pits, internal tracks and some snig tracks were visible, but it was not possible to clearly differentiate the pattern and extent of relative disturbance classes in areas cutover many decades ago, and no other earlier aerial photography coverage was available prior to 1955 (and hence closer to the recorded decade of cutting). Consequently, field survey for the occurrence of stumps and other disturbance features was conducted across all areas that were available for harvest and which were uninfested with *Phytophthora dieback*.

3. Field survey of stump occurrence and other disturbance indicators

The survey area was defined using the boundaries of the harvest exclusion zones and *Phytophthora* dieback occurrence areas. Eight separate areas (covering approximately 275 hectares) were surveyed for stump occurrence and hence potential old-growth forest. A 0.5 hectare FMIS cell grid was used to provide a systematic basis for field sampling, with each 0.5 hectare grid square surveyed for the presence of stumps and other evidence of unnatural disturbance (snig tracks, landings and gravel pits), including those identified in the desktop image analysis.

The Forest Products Commission had commenced stump survey work in the northern portion of Survey Area 1, and their dataset was validated by sampling in the field to confirm it was fit-for-purpose to use in this assessment.

Large stumps of varying condition were typically encountered in areas cutover prior to the 1920s, often associated with a regeneration cohort in the vicinity (Figure 1).



Figure 1. Stump size, condition and distribution along a transect within an area cutover prior to the 1920s within the Barrabup 03 coupe.

Stumps associated with sleeper cutting were observed in survey area 1, with several stacks of decayed and fire-damaged sleepers encountered along transects (Figure 2).



Figure 2. Example of a jarrah sleeper stack identified in survey area one.

A significant number of stump hole cavities and burnt remnants of stumps were observed in most survey areas, suggesting that the time elapsed since the last harvest event (in some cases more than 80 years) and the frequency and intensity of past fires (bushfires and prescribed) may have reduced the stump frequency and hence evidence of previous harvesting. The recorded number and distribution of stumps is therefore highly likely to be an underestimate in these areas.

The location of each stump and other indicators of disturbance were recorded using a GPS for subsequent analysis in a GIS application. Appendix 6 depicts the results of the field survey summarised onto the 0.5 hectare FMIS grid cells. Each of the survey areas had significant stump numbers broadly distributed across the area, consistent with corporate records and indicating the previous harvest events had been extensive across the coupe.

4. Analysis of stump and other data to determine old-growth forest status

The minimum mappable area for old-growth forest is 2 hectares. A GIS tool was applied to objectively analyse the stump distribution and define patches where stump numbers and pattern indicated minimal disturbance, and hence potential old-growth forest status.

Several areas which recorded low stump counts (particularly in survey area 1) were associated with previously unclassified DEZ. These DEZ areas are separately recorded and are added to the informal reserve datasets.

In western jarrah forest, a threshold of six or less stumps per 2 hectares (four combined 0.5 hectare cells) generally indicates minimal disturbance from past harvesting and possible old-growth forest.

Stump counts in most of the cells surveyed exceeded this threshold, and were therefore categorised as more than minimally disturbed. The status of these areas therefore remains as non old-growth forest.

A strong correlation was evident between cells identified as being minimally disturbed and those areas where exposed, rocky outcrops were prominent. In these and several other dispersed patches within the coupe, the limited evidence of previous harvest disturbance qualifies these areas to be reclassified as jarrah old-growth forest.

The recommended boundaries for previously unmapped DEZ and old-growth forest are depicted in Appendix 7 and summarised in section 5 (below).

5. Recommendations

As depicted on the map in Appendix 7:

Recommendation	Area (ha)	Classification	Map colour
5.1	43	Reclassify to jarrah old-growth forest	Brown
5.2	16	Reclassify to DEZ	Light green

6. Proposed corporate data amendments

The following amendments to corporate datasets and plans are required:

Item	Description	Required?
6.1	Amendment of the corporate informal reserve dataset	Yes
6.2	Amendment of the corporate harvest history dataset	Yes
6.3	Amendment of the corporate old-growth forest dataset	Yes
6.4	A revised harvest coupe map depicting the additional informal reserves and reclassified old-growth forest	Yes

7. Appendices

- Appendix 1 Harvest coupe base map.
- Appendix 2 Section of original API map and/ or recent aerial interpretation.
- Appendix 3 Harvest history and harvest frequency from FMIS database.
- Appendix 4 Section of the *P.cinnamomi* protectable areas map.
- Appendix 5 Fire history from departmental records.
- Appendix 6 Disturbance locations map depicting areas surveyed and GPS location of stumps and other disturbance indicators.
- Appendix 7 Old-growth forest status map: depicting the area to be classified as old-growth forest and DEZ.

Old-Growth Forest Status Review

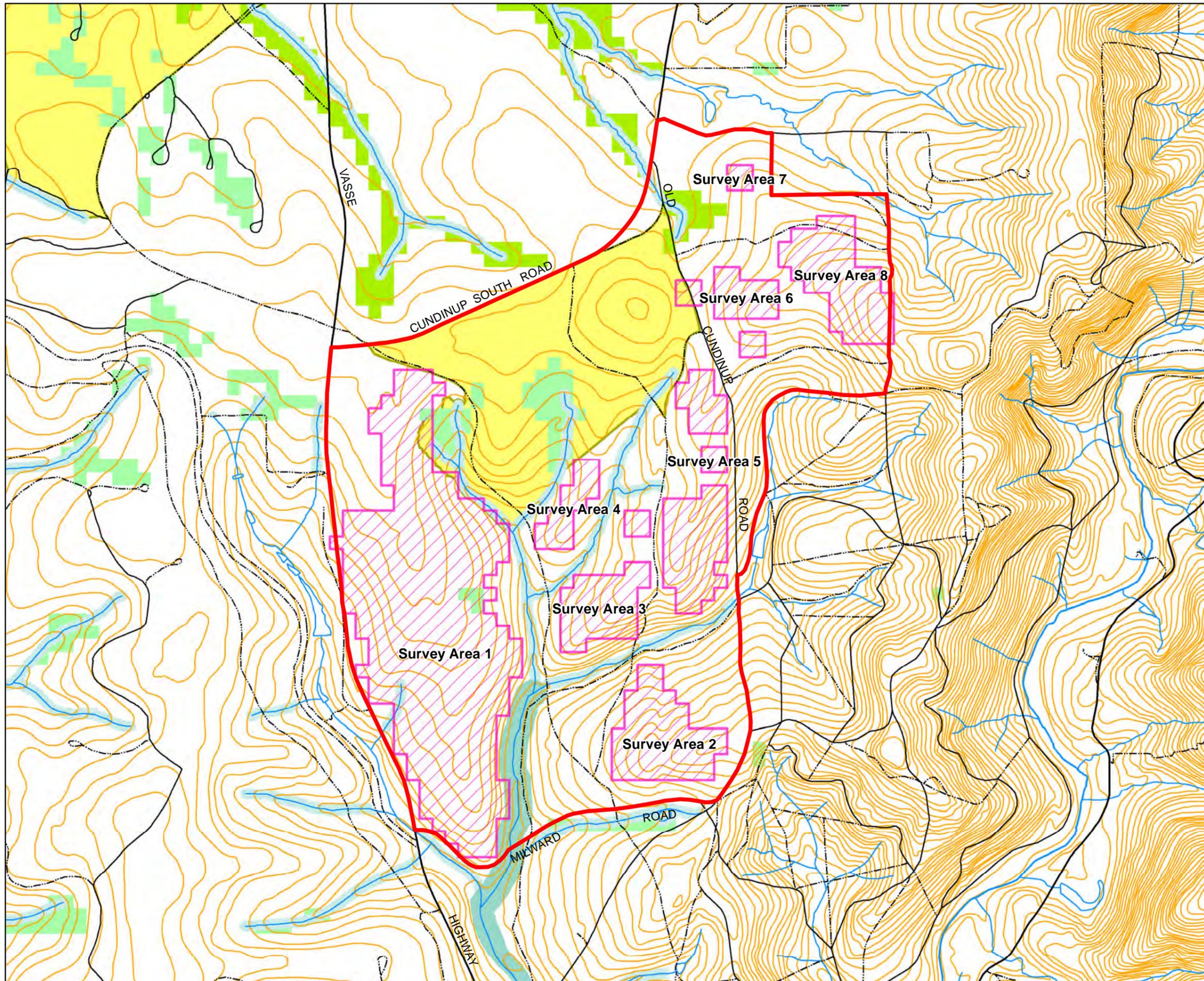
Barrabup 0317 Base Map

LEGEND

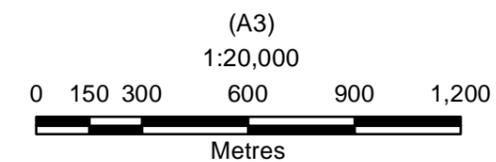
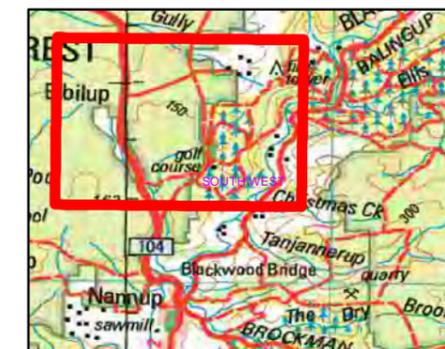
-  Proposed Harvest Coupe
-  Area for Detailed Assessment

EXCLUSION AREAS

-  Existing and Proposed Conservation Reserves
-  Other Informal Reserves
-  CAR Informal Reserves
-  Stream Reserves
-  River Reserves
-  Travel Routes
-  Fauna Habitat Zone



Map created on: 27/09/2017



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Old-Growth Forest Status Review

Barrabup 0317

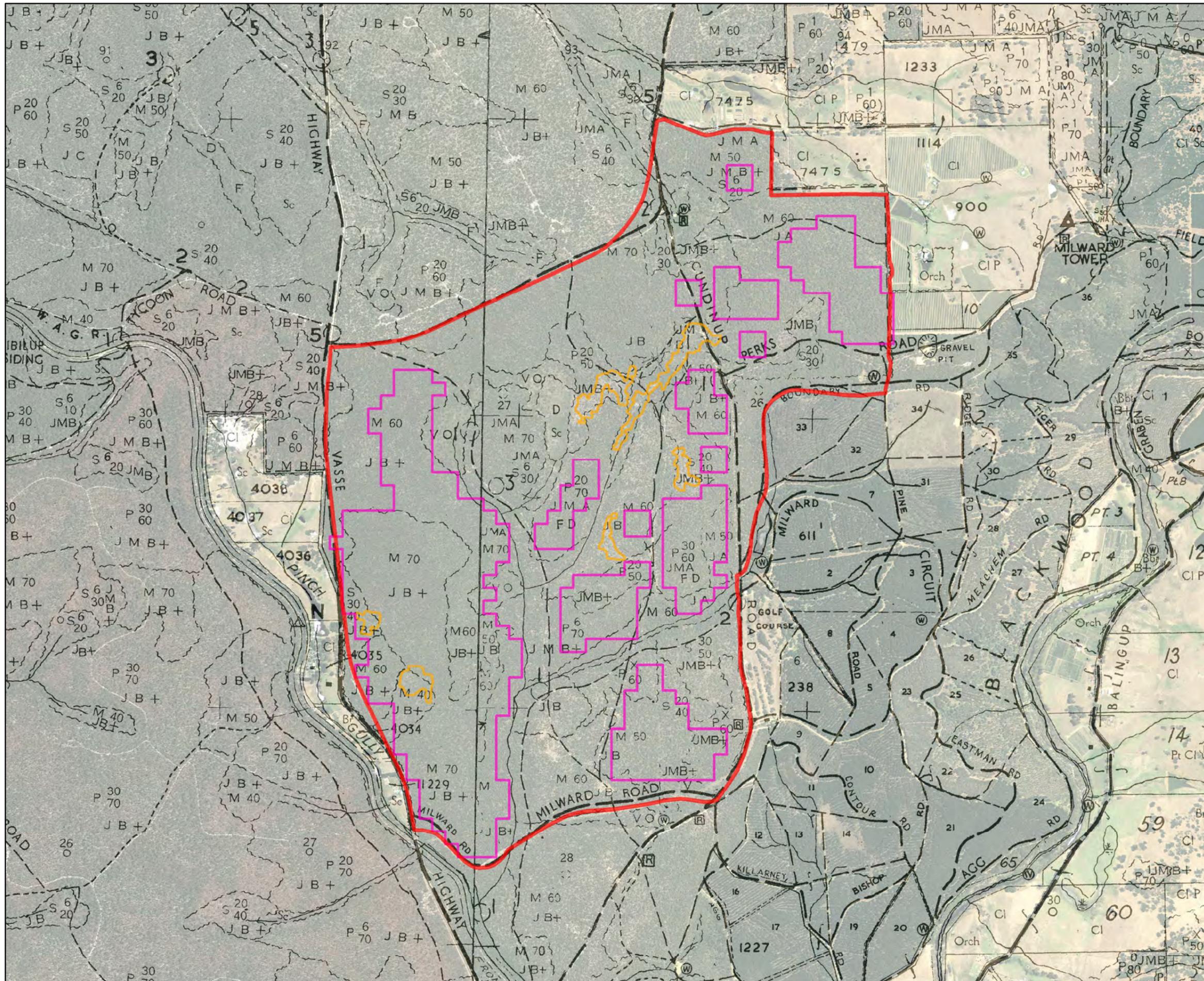
API Map

LEGEND

- Proposed Harvest Coupe
- Area for Detailed Assessment
- Re-classified Other Informal DEZ, J<30, NF (non forest)

Date of API Map Imagery : 1955

Date of Revised Imagery : 2013

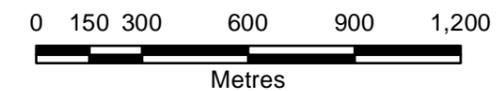


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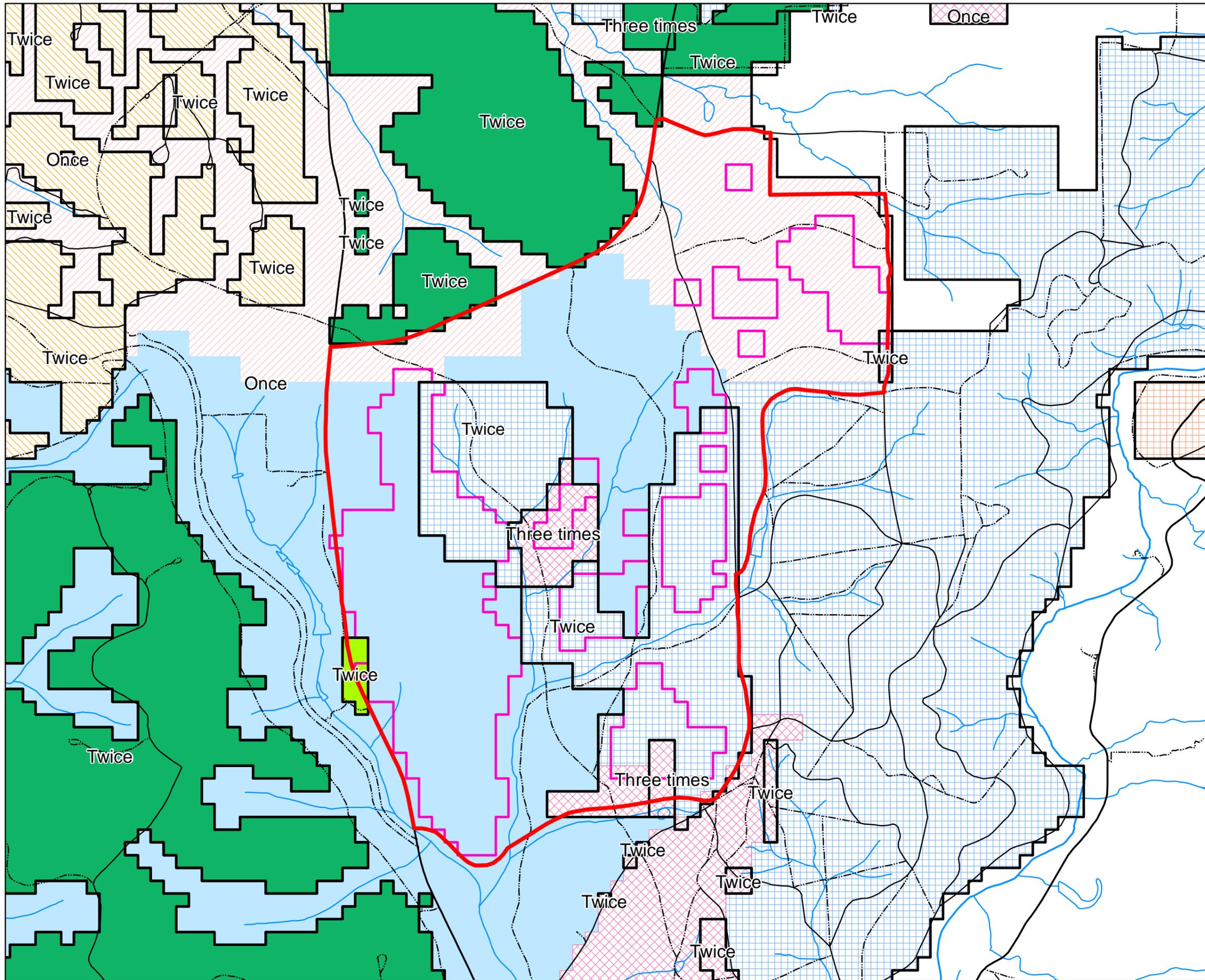


Old-Growth Forest Status Review

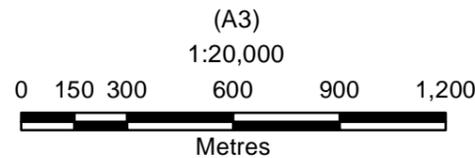
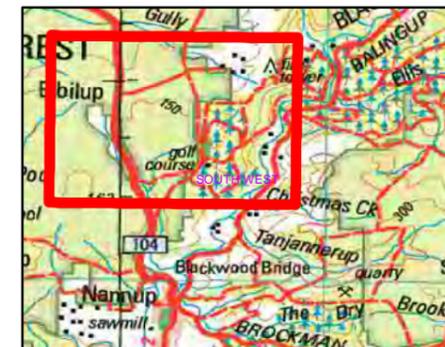
Barrabup 0317 Harvest History

LEGEND

-  Proposed Harvest Coupe
-  Area for Detailed Assessment
-  Harvest Frequency
-  No record of harvesting
-  Harvested before 1920
-  Harvested 1920-29
-  Harvested 1930-39
-  Harvested 1940-49
-  Harvested 1950-59
-  Harvested 1960-69
-  Harvested 1970-79
-  Harvested 1980-89
-  Harvested 1990-99
-  Harvested 2000-2009
-  Harvested 2010 and after



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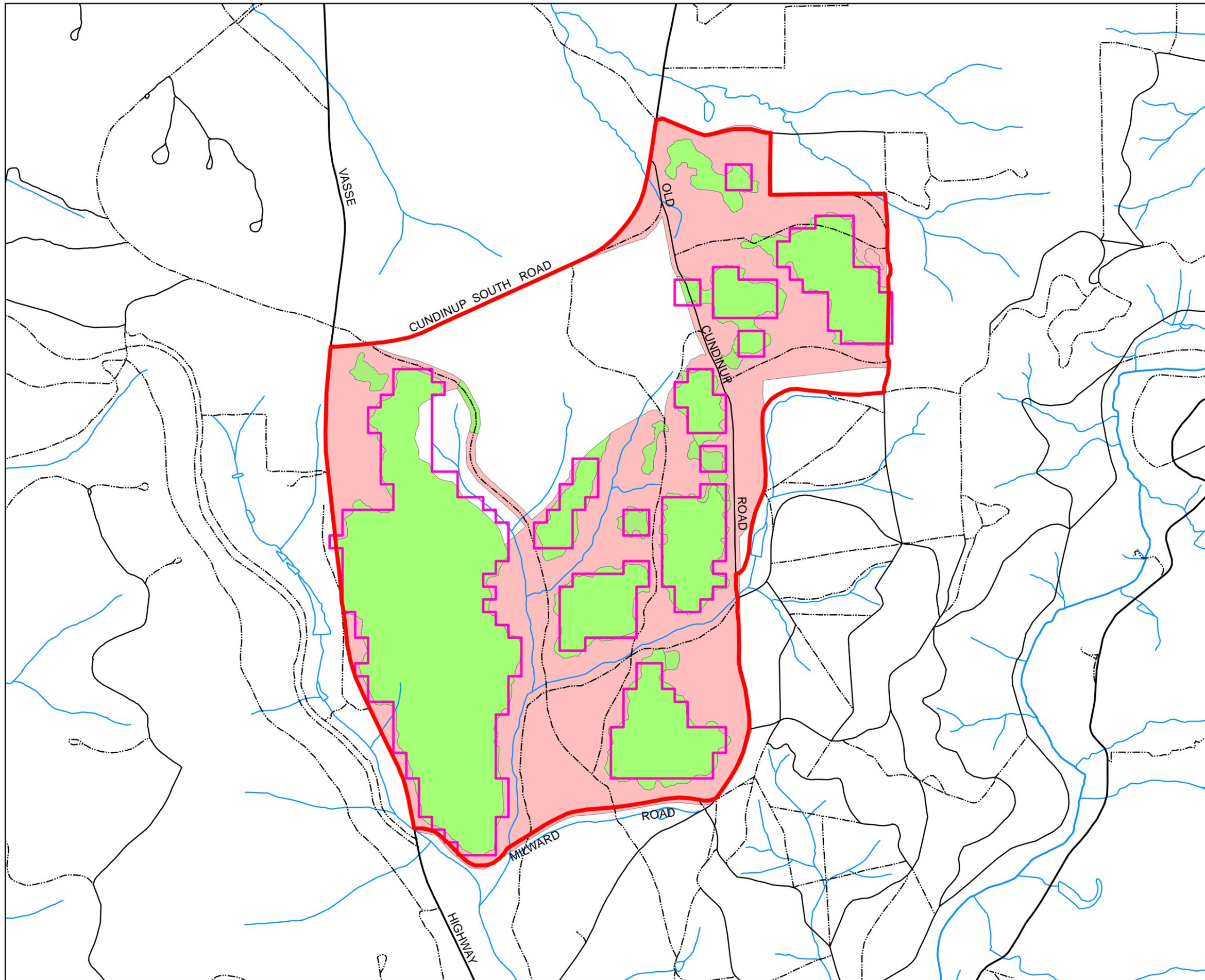
Old-Growth Forest Status Review

Barrabup 0317

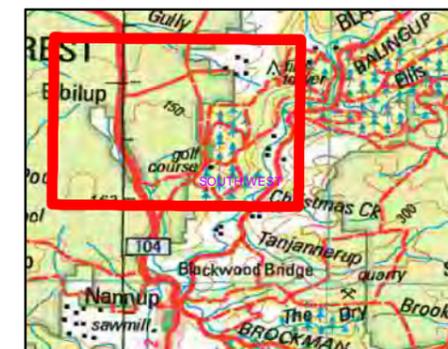
Phytophthora cinnamomi
Occurrence

LEGEND

- Proposed Harvest Coupe
- Area for Detailed Assessment
- Uninfested
- Uninterpretable
- Infested



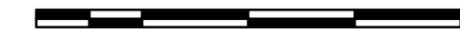
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0 150 300 600 900 1,200



Metres



Old-Growth Status Review

Barrabup 03

Fire History

LEGEND

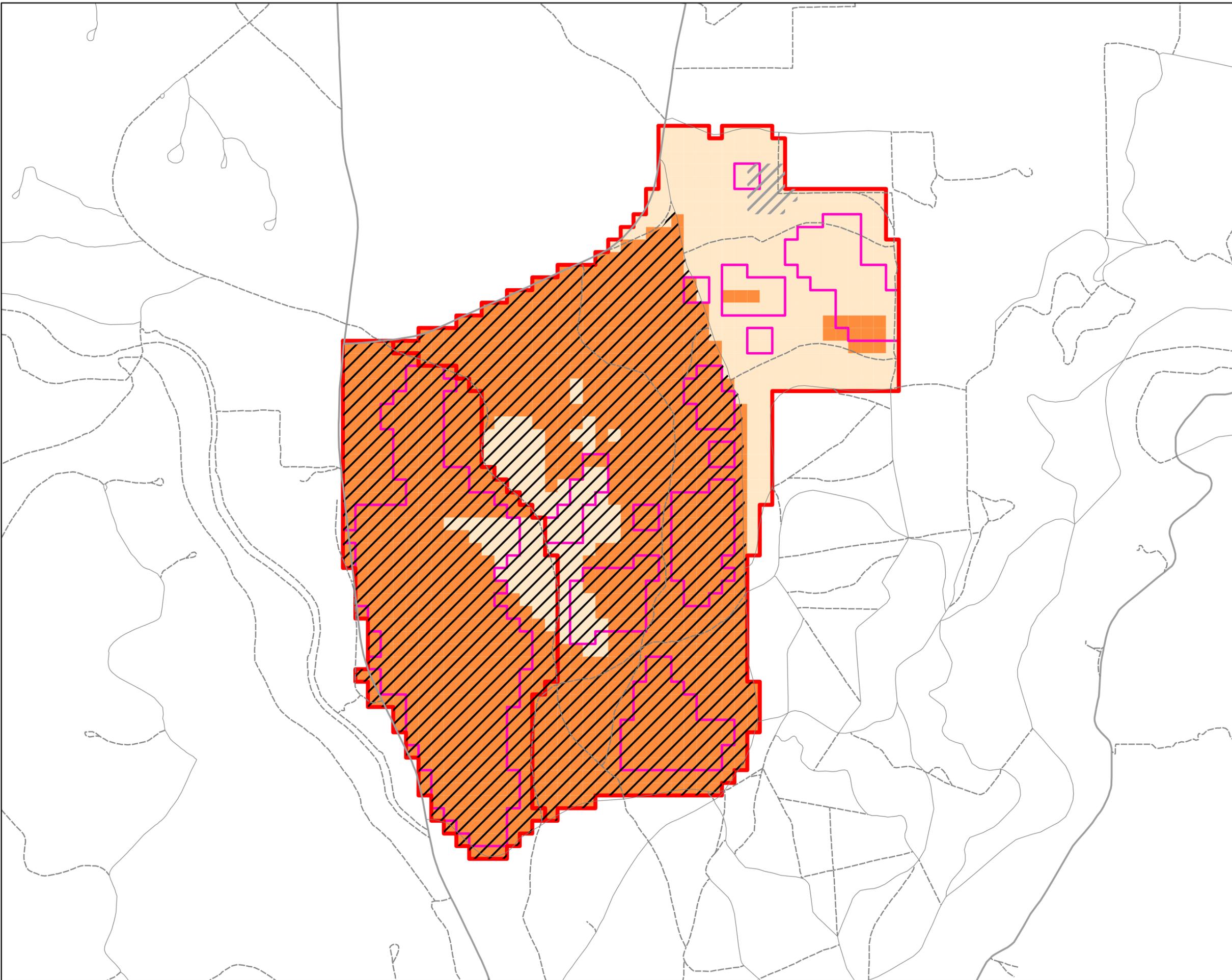
-  Proposed Harvest Coupe
-  Area for Detailed Assessment

Bush fire occurrence

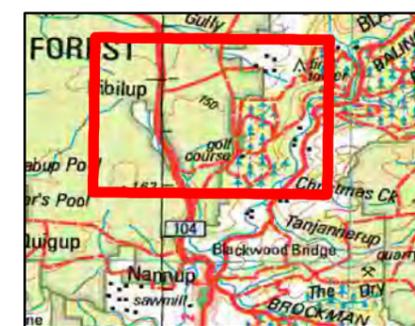
-  1948
-  2000

Estimated prescribed burn occurrence since the 1940s

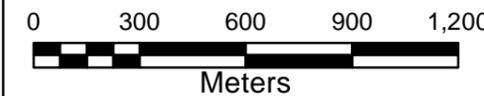
-  8 or less
-  > 8



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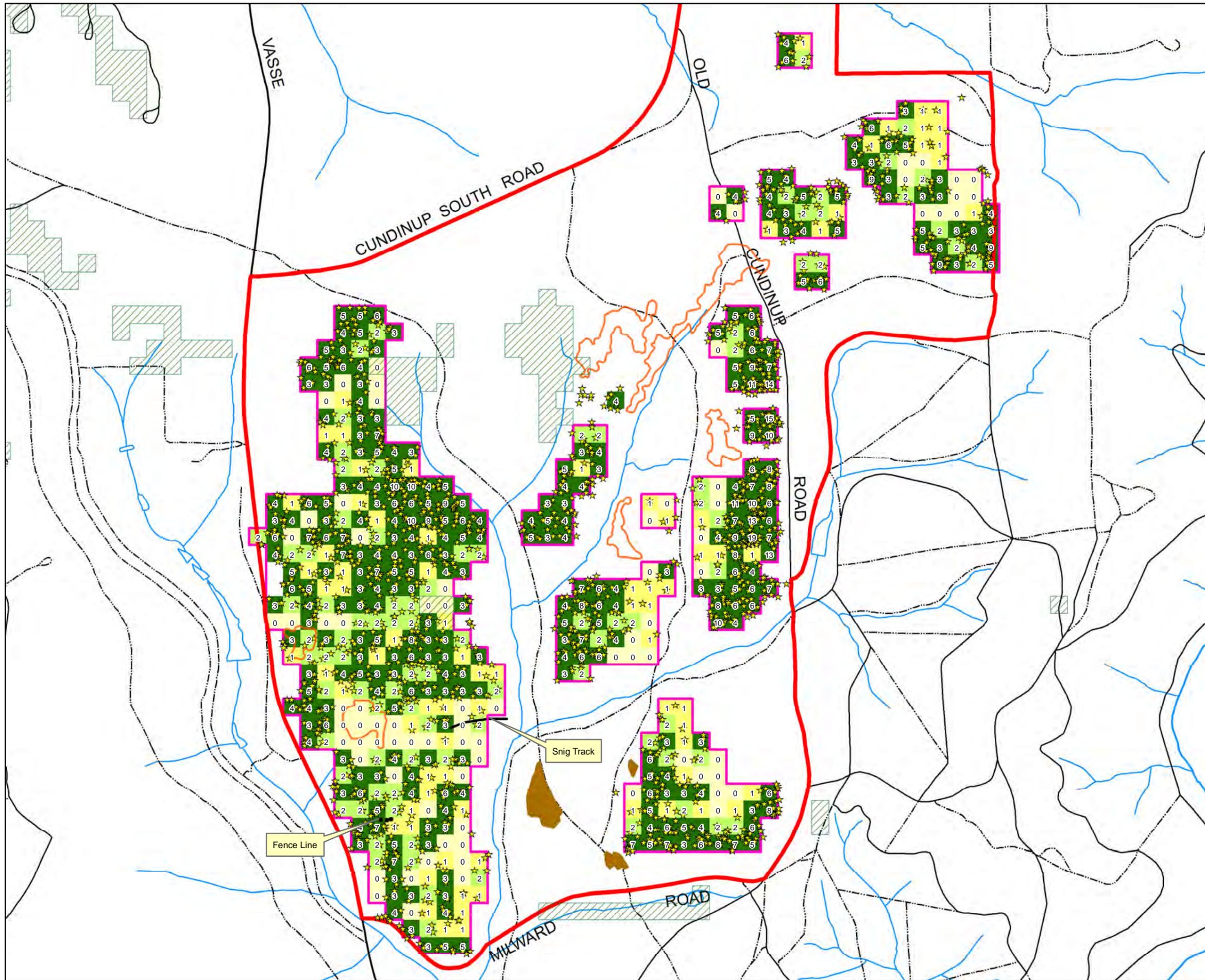
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Old-Growth Forest Status Review

Barrabup 0317

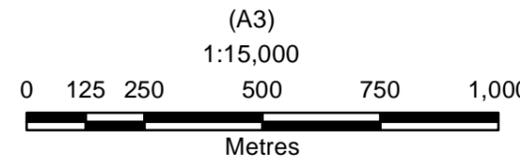
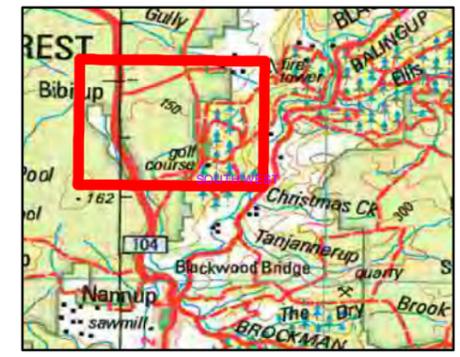
Disturbance Map



LEGEND

- Proposed Harvest Coupe
- Area for Detailed Assessment
- 0 stumps per half hectare
- 1 Stump per half hectare
- 2 stumps per half hectare
- 3 or more stumps per half hectare
- Other Informal, DEZ
- Re-classified Other Informal DEZ, J<30, NF (non forest)
- ★ Stumps
- Gravel Pit/Landing
- Fence Line
- Snig Track

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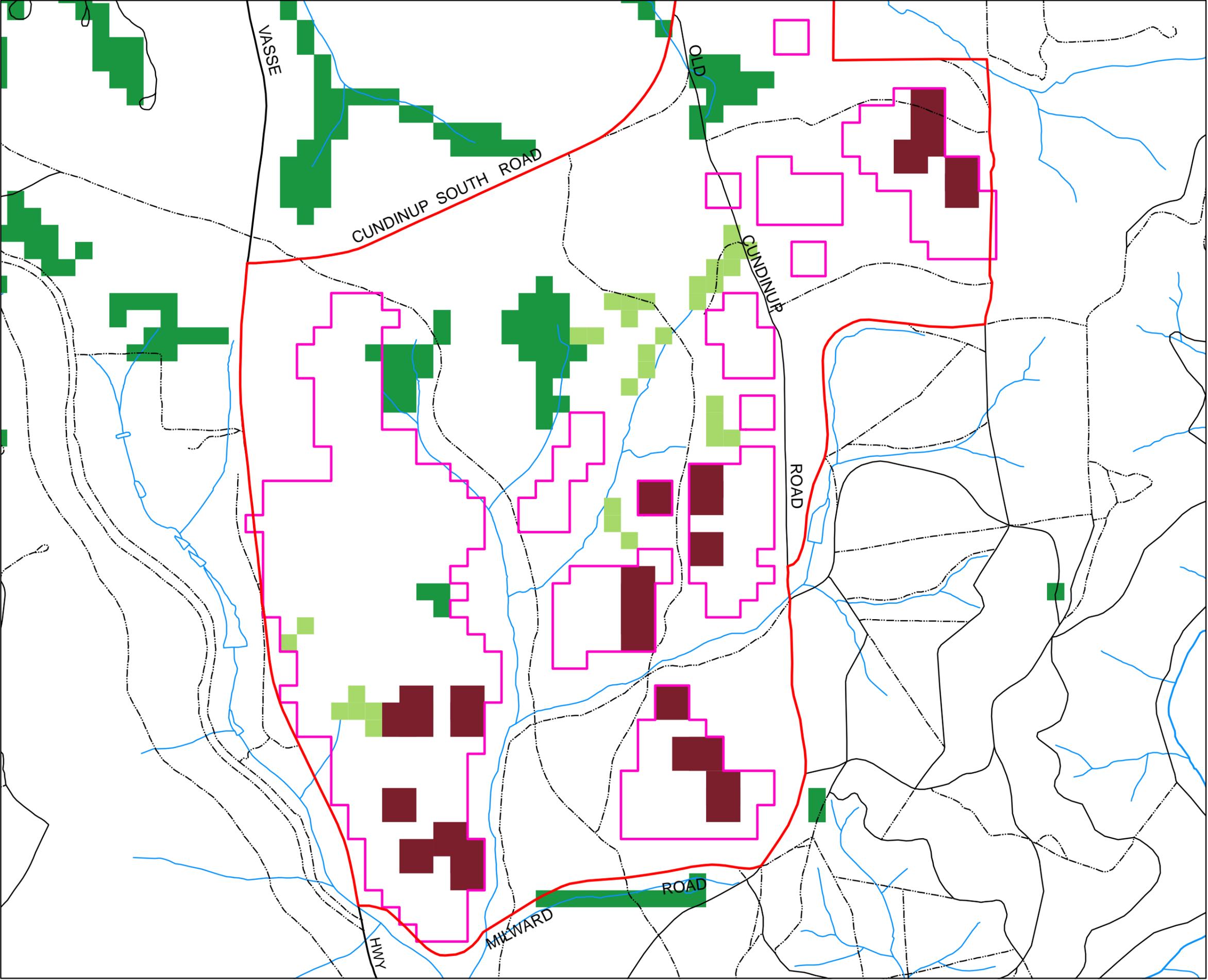
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Old-Growth Forest Status Review

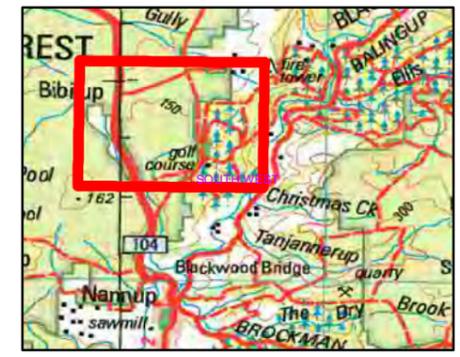
Barrabup 0317 Old Growth Status

LEGEND

- Proposed Harvest Coupe
- Area for Detailed Assessment
- Reclassify to old-growth forest
- Reclassify to Other Informal, DEZ
- Retain as Other Informal, DEZ



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Metres

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