CONSERVATION COMMISSION OF WESTERN AUSTRALIA - REPORT ON THE OLD GROWTH NOMINATION WITHIN COONAN FOREST BLOCK - COMPARTMENT 05

Executive Summary

In August 2010 the Conservation Commission received a public nomination for a review of old-growth forest status within Coonan forest block compartment 05.

The Department of Environment and Conservation (DEC) dieback interpretation mapping designated the nomination area as predominantly 'dieback free' apart from 5 infestations of dieback totalling 17 hectares.

An area of approximately 132 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, inputs 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

As required in the *Forest Management Plan 2004-2013* (FMP) and further detailed in the Conservation Commission's paper *Assessment criteria and process for the Conservation*

Commission review of old-growth amendments, there is a process for persons to request the Conservation Commission to assess whether areas on an indicative timber harvest plan should be classified as old-growth forest in the DEC's corporate database. Such a request was received on 27th August 2010 in relation to Coonan forest block compartment 05.

Nomination areas

The nominee provided a detailed description including maps and images of 10 separate highlighted areas within the coupe. These areas totalled 78.6 hectares and ranged from 3.7 to 12.5 hectares in size and were mostly located in transitional zones on the boundaries of locally represented vegetation complexes. Together with these 10 areas, the nominee also identified a greater nomination area totalling 405 hectares that the nominee considered might contain old-growth forest.

Site Description

Coonan forest block compartment 05 is located 15km due east of the town of Manjimup. The area within the coupe is gently sloping and varies between 250m and 220m above sea level with some upland depressions. Annual rainfall is between 800 millimetres and 900 millimetres per annum. There is a range of soil types from shallow laterite capping to sandy loams. There is private land to the south and north of the coupe. The hydrology of the area appears to have been altered through drainage to the south. Most of the coupe has been heavily impacted by recent fire with a comparatively sparse understory.

Forest types

While the broad description of forest type for the coupe is jarrah forest, there are four vegetation complexes occurring within the coupe. These are Bevan 2, Corbalup 2, Yornup and Collis 2 with some intermediate vegetation types occurring along these margins. Descriptions of each vegetation complex are provided in Appendix 1. There are also areas of non-forest vegetation around upland depressions. These non-forest areas are normally identified by DEC as informal reserve type; diverse ecotype zones (DEZ). Both old-growth reserves and DEZ reserves are unavailable for harvesting.

Sampling Process

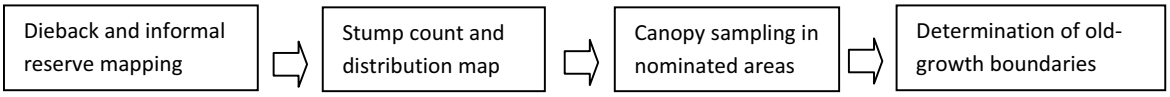
Sampling incorporated the process outlined in the document *Assessment criteria and process for the Conservation Commission review of old-growth amendments*. Due to some variable intensity of logging in the area, it was decided to undertake a full stump count. The areas selected for canopy sampling selected using the number of stumps per hectare present.

Remote Analysis

The nomination area was reviewed and sample areas were defined using the following background information:-

- Digitised aerial photos and data layers were used to confirm forest and non-forest structural boundaries and general observations in relation to forest structure;
- The latest available harvesting records, dieback sampling and forest types and vegetation complex and informal reserves as provided by the DEC; and
- Stump distribution data for the portion of the area surveyed by the DEC.

Stratification process



Field Checks

DEC harvesting records indicate the majority of Coonan 05 was harvested in the 1960's. The Stratification of field sampling was undertaken using the ten specifically nominated areas identified as likely old-growth forest from the public nomination. The majority of these areas were located on the margins of vegetation complexes between Bevan 2 and Corbalup 2 or Bevan 2 and Yornup. Canopy sampling was undertaken in areas most likely to contain old-growth from remote analysis, the stump distribution mapping and visual inspection. Conservation Commission audit staff initially verified a portion of stump survey work completed

by the DEC. A comprehensive stump survey was then undertaken throughout the greater nomination area (405 hectares) to determine old-growth forest boundaries.

Results and Findings

Dieback

The most recent DEC dieback samples taken within Coonan 05 indicate the area to be free of dieback apart from 5 infestations totalling 17 hectares. 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 shows a greater intensity of harvesting in the laterite uplands of the Bevan 2 vegetation complex. Visual inspection revealed most of this area to be jarrah dominant and have a high intensity of stumps per hectare. There was also evidence of numerous forest tracks and snig tracks. A gradual reduction in stump intensity was observed on the margins of vegetation complexes into Corbalup 2 and Yornup. These areas were characterised by a mixture of forest, woodland and shrub-land. The reduction or absence of stumps is most likely a reflection of the lower quantity and poorer quality of timber in these areas and hence the limited timber harvesting historically.

Stump analysis revealed a variable history of disturbance within the coupe. High cut stumps typical of pre 1960's harvesting were observed as well as pole cutting and firewood collection. Fire history records indicate the Coonan area was severely impacted by fire which has burnt out a number of stumps. The intensity of harvesting is therefore potentially higher than that indicated by the stump enumeration. As indicated however, canopy sampling in conjunction with stump analysis allows measurement of disturbance to the canopy where these harvesting disturbances may still be evident.

Canopy Sampling and boundary demarcation

Canopy sampling was undertaken in those areas most likely to contain old-growth forest from the stump distribution analysis. Sample points were spaced at 10 metre intervals to increase the sample size. Two-hectares represents the minimum size requirement for old-growth forest where the minimum width is 141 meters. A combination of 2 hectare and 0.5 hectare pixels was

used to determine this minimum requirement, and to assist in defining the boundaries of old-growth forest.

Canopy sampling analysis

From visual inspection and stump intensity analysis nomination areas 9 and 10 were selected for canopy sampling. Both nomination areas were located on the boundary of the Bevan 2 and Corbalup 2 vegetation complexes.

Sampling within area 10 returned an average of 2.5 stumps per hectare and an estimated upper canopy proportion of mature or senescent trees of 49.1 percent. This figure falls within the benchmark figure of 50 percent used by the Commission as the minimum requirement for minimally disturbed old-growth forest. Sampling within area 9 returned an average of 9.4 stumps per hectare and an average estimated upper canopy proportion of mature or senescent trees of 40.3 percent which is below the minimum requirement. Therefore all the areas of 2.5 or fewer stumps per hectare were mapped as old-growth forest where they met the minimum size requirements. Areas with greater than 2.5 stumps per hectare were determined to be non old-growth forest.

Table 1 Sample Results.

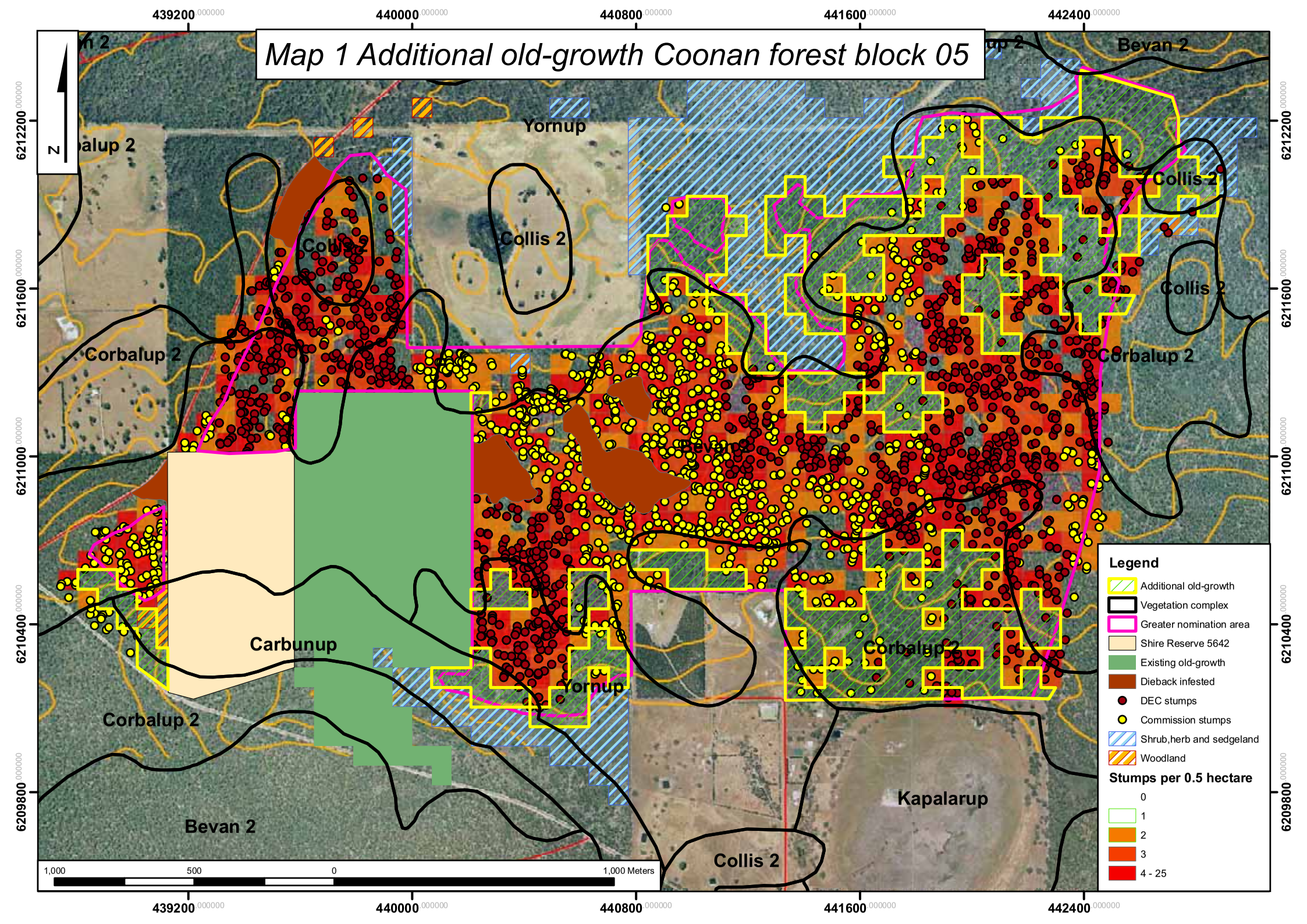
Sample areas	*Estimated number of stumps per hectare*	*Estimated total upper crown cover*	*Estimated upper crown proportion of mature or senescent trees*	*Estimated upper crown proportion of regrowth trees*	*Old Growth*
Area 10 Bevan 2/ Corbalup	**2.5**	**72.4%**	**49.1%**	**50.9%**	**Yes**
Area 9 Bevan 2/ Corbalup	**9.4**	**77.8%**	**40.3%**	**59.7%**	**No**

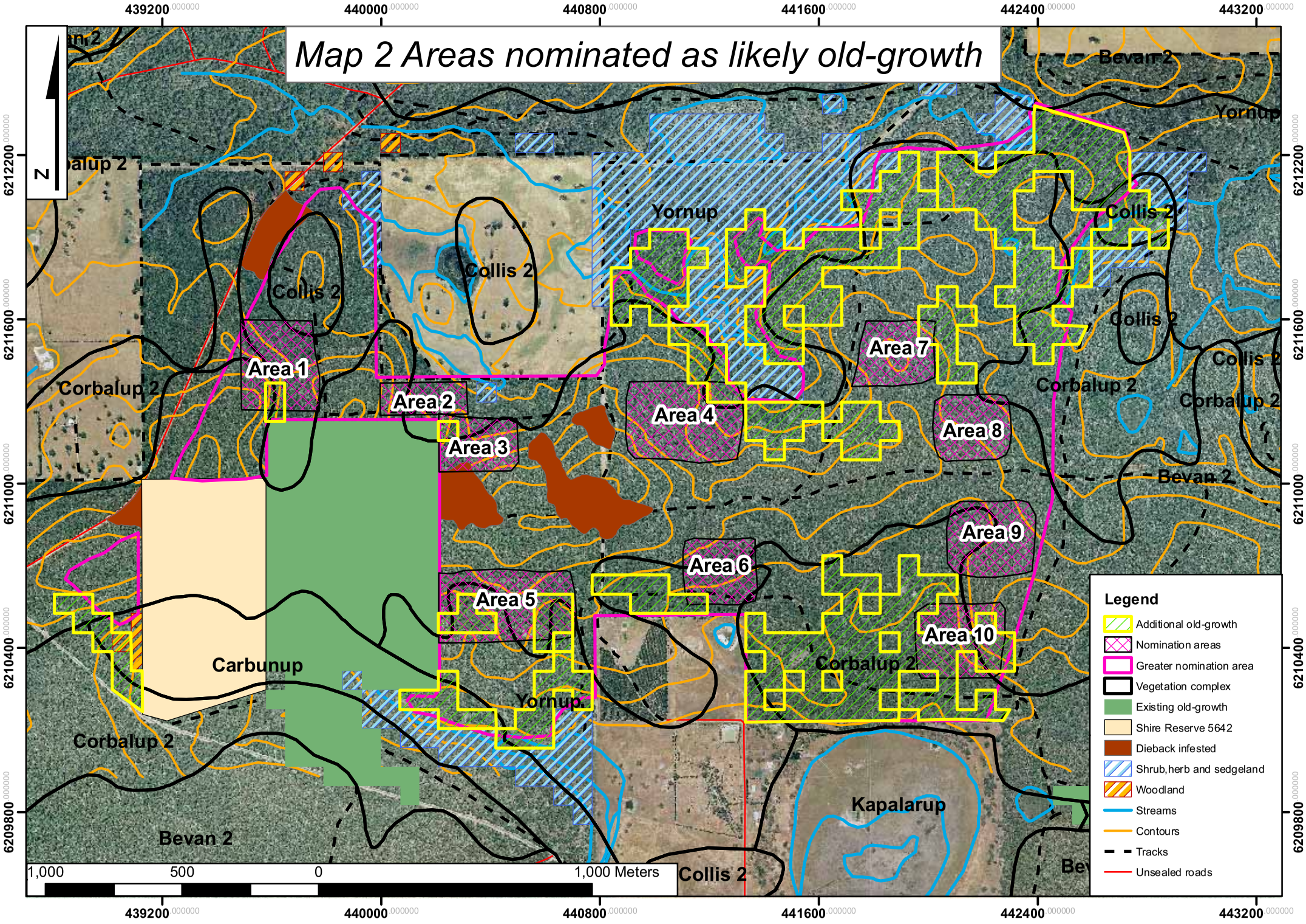
Summary

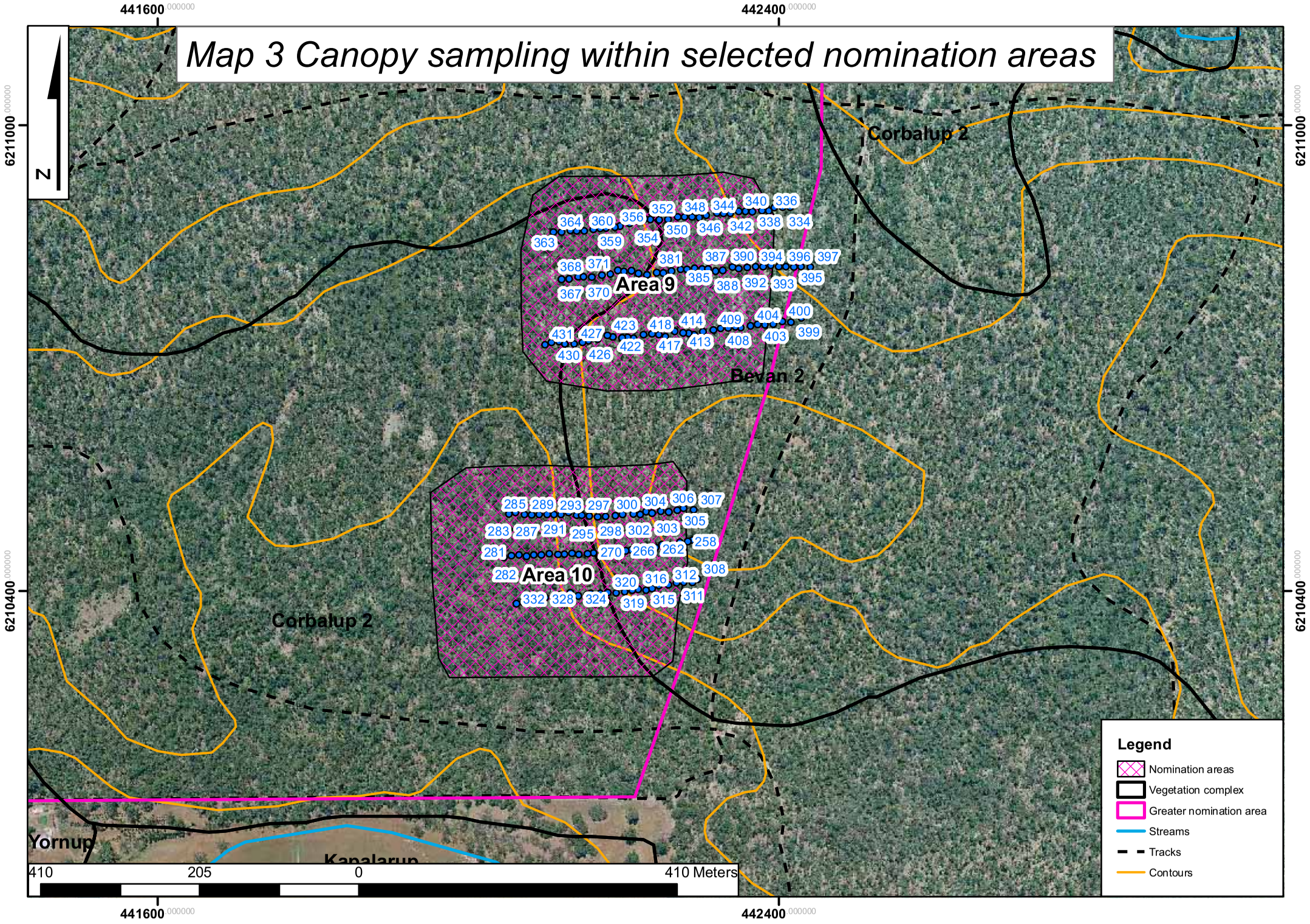
Therefore in summary:-

An area of approximately 132* hectares has been determined as old-growth forest and ***will be unavailable for timber harvesting.*** Those areas not determined to be old-growth forest ***will remain available for harvesting***.

*Although the DEC mapping of DEZ has been provided to the Commission, field assessment revealed that much of the 132 hectares of old-growth identified may contain areas of non-forest woodland and shrub land and may be further refined in the future. Any unidentified DEZ is normally mapped in the field and excluded from harvesting operations.


Map 1 Additional old-growth Coonan forest block 05
N
439200
440000
440800
441600
442400
6212200
6211600
6211000
6210400
6209800
Yornup
Collis 2
Corbalup 2
Carbunup
Bevan 2
Kapalarup
Legend
Additional old-growth
Vegetation complex
Greater nomination area
Shire Reserve 5642
Existing old-growth
Dieback infested
DEC stumps
Commission stumps
Shrub,herb and sedgeland
Woodland
Stumps per 0.5 hectare
0
1
2
3
4 - 25
1,000
500
0
1,000 Meters


Map 2 Areas nominated as likely old-growth
N
439200
440000
440800
441600
442400
443200
6212200
6211600
6211000
6210400
6209800
Area 1
Area 2
Area 3
Area 4
Area 5
Area 6
Area 7
Area 8
Area 9
Area 10
Collis 2
Yornup
Corbalup 2
Bevan 2
Carbunup
Kapalarup
1,000
500
0
1,000 Meters
Legend
Additional old-growth
Nomination areas
Greater nomination area
Vegetation complex
Existing old-growth
Shire Reserve 5642
Dieback infested
Shrub,herb and sedgeland
Woodland
Streams
Contours
Tracks
Unsealed roads


Map 3 Canopy sampling within selected nomination areas
N
441600.000000
442400.000000
6211000.000000
6210400.000000
Area 9
Area 10
Corbalup 2
Bevan 2
Yornup
Kapalarup
352 348 344 340 336
364 360 356 350 346 342 338 334
363 359 354
381 387 390 394 396 397
368 371 385 388 392 393 395
367 370
423 418 414 409 404 400
431 427 422 417 413 408 403 399
430 426
285 289 293 297 300 304 306 307
283 287 291 295 298 302 303 305
281 270 266 262 258
282 320 316 312 308
332 328 324 319 315 311
410 205 0 410 Meters
Legend
Nomination areas
Vegetation complex
Greater nomination area
Streams
Tracks
Contours

Nomination area 9 canopy sampling data

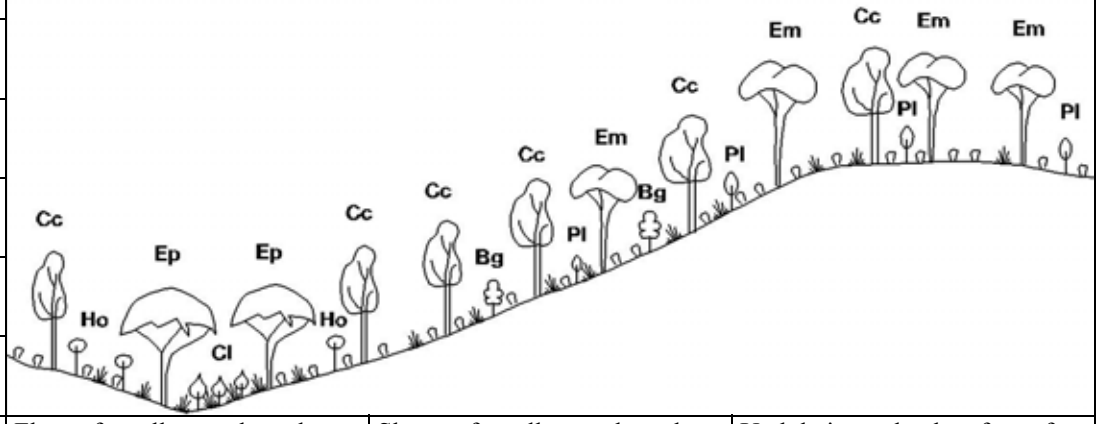
FID	CANOPY	SPECIES	DBH	DEVELOPMENT	QUALITATIVE
333	YES	JARRAH	80	MATURE/SEN	MOSTLY UPPER
334	YES	JARRAH	80	MATURE/SEN	MOSTLY UPPER
335	YES	JARRAH	40	REGROWTH	MOSTLY LOWER
336	YES	JARRAH	30	REGROWTH	MIXED
337	YES	JARRAH	40	REGROWTH	MIXED
338	NO	GAP	0	GAP	MOSTLY LOWER
339	YES	MARRI	50	REGROWTH	MIXED
340	YES	JARRAH	20	REGROWTH	MOSTLY LOWER
341	YES	JARRAH	20	REGROWTH	MOSTLY LOWER
342	NO	GAP	0	GAP	MOSTLY LOWER
343	YES	MARRI	100	MATURE/SEN	MOSTLY UPPER
344	NO	GAP	0	GAP	MIXED
345	NO	GAP	0	GAP	MOSTLY LOWER
346	YES	JARRAH	60	REGROWTH	MIXED
347	YES	JARRAH	20	REGROWTH	MOSTLY LOWER
348	NO	GAP	0	GAP	MOSTLY LOWER
349	YES	JARRAH	70	MATURE/SEN	MIXED
350	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
351	NO	GAP	0	GAP	MOSTLY LOWER
352	NO	GAP	0	GAP	MOSTLY LOWER
353	YES	MARRI	140	MATURE/SEN	MOSTLY UPPER
354	YES	MARRI	140	MATURE/SEN	MOSTLY UPPER
355	YES	JARRAH	30	REGROWTH	MOSTLY LOWER
356	YES	JARRAH	70	MATURE/SEN	MIXED
357	NO	GAP	0	GAP	GAP
358	YES	MARRI	130	MATURE/SEN	MOSTLY UPPER
359	YES	MARRI	130	MATURE/SEN	MIXED
360	NO	GAP	0	GAP	MOSTLY UPPER
361	YES	JARRAH	90	MATURE/SEN	MOSTLY UPPER
362	YES	JARRAH	110	MATURE/SEN	MOSTLY UPPER
363	YES	MARRI	80	MATURE/SEN	MOSTLY UPPER
364	NO	GAP	0	GAP	GAP
365	YES	MARRI	40	REGROWTH	MIXED
366	YES	MARRI	20	REGROWTH	MOSTLY LOWER
367	YES	JARRAH	120	MATURE/SEN	MOSTLY UPPER
368	YES	MARRI	50	REGROWTH	MOSTLY UPPER
369	YES	JARRAH	130	MATURE/SEN	MOSTLY UPPER
370	YES	MARRI	20	REGROWTH	MOSTLY LOWER
371	YES	MARRI	20	REGROWTH	MOSTLY LOWER
372	YES	JARRAH	20	REGROWTH	MIXED
373	YES	MARRI	30	REGROWTH	MIXED
374	YES	MARRI	120	MATURE/SEN	MOSTLY UPPER
375	YES	JARRAH	50	REGROWTH	MIXED
376	NO	GAP	0	GAP	MIXED
377	YES	JARRAH	60	REGROWTH	MOSTLY UPPER
378	YES	JARRAH	30	REGROWTH	MOSTLY UPPER
379	NO	GAP	0	GAP	MOSTLY LOWER
380	YES	JARRAH	50	REGROWTH	MOSTLY UPPER
381	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
382	NO	GAP	0	GAP	MOSTLY LOWER
383	YES	MARRI	20	REGROWTH	MOSTLY LOWER
384	YES	MARRI	60	REGROWTH	MIXED
385	YES	JARRAH	60	REGROWTH	MOSTLY UPPER
386	YES	JARRAH	90	MATURE/SEN	MOSTLY UPPER
387	YES	JARRAH	100	MATURE/SEN	MOSTLY UPPER
388	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
389	YES	JARRAH	40	MATURE/SEN	MIXED
390	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
391	NO	GAP	0	GAP	GAP
392	YES	MARRI	30	REGROWTH	MOSTLY LOWER
393	YES	JARRAH	60	REGROWTH	MIXED
394	YES	MARRI	120	MATURE/SEN	MOSTLY UPPER
395	YES	JARRAH	50	REGROWTH	MIXED
396	YES	JARRAH	30	REGROWTH	MOSTLY LOWER
397	NO	GAP	0	GAP	GAP
398	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
399	YES	JARRAH	50	REGROWTH	MIXED
400	YES	JARRAH	90	MATURE/SEN	MOSTLY UPPER
401	NO	GAP	0	GAP	MIXED
402	NO	GAP	0	GAP	MIXED
403	YES	MARRI	20	REGROWTH	MIXED
404	YES	MARRI	50	REGROWTH	MIXED
405	NO	GAP	0	GAP	MIXED
406	YES	JARRAH	0	REGROWTH	MIXED
407	NO	GAP	0	GAP	MOSTLY LOWER
408	YES	JARRAH	50	REGROWTH	MIXED
409	YES	JARRAH	50	REGROWTH	MIXED

FID	CANOPY	SPECIES	DBH	DEVELOPMENT	QUALITATIVE
410	YES	MARRI	30	REGROWTH	MOSTLY LOWER
411	YES	JARRAH	120	MATURE/SEN	MOSTLY UPPER
412	YES	JARRAH	120	MATURE/SEN	MOSTLY UPPER
413	YES	MARRI	20	REGROWTH	MOSTLY LOWER
414	YES	JARRAH	30	REGROWTH	MIXED
415	YES	MARRI	130	MATURE/SEN	MIXED
416	NO	GAP	0	GAP	GAP
417	NO	GAP	0	GAP	MOSTLY LOWER
418	YES	JARRAH	70	MATURE/SEN	MIXED
419	YES	JARRAH	50	REGROWTH	MIXED
420	YES	MARRI	40	REGROWTH	MOSTLY LOWER
421	YES	JARRAH	30	REGROWTH	MIXED
422	NO	GAP	0	GAP	MOSTLY LOWER
423	YES	JARRAH	50	REGROWTH	MIXED
424	YES	MARRI	70	MATURE/SEN	MIXED
425	YES	JARRAH	50	REGROWTH	MIXED
426	YES	JARRAH	30	REGROWTH	MOSTLY LOWER
427	YES	JARRAH	40	REGROWTH	MOSTLY UPPER
428	YES	JARRAH	90	MATURE/SEN	MOSTLY UPPER
429	YES	JARRAH	50	REGROWTH	MIXED
430	YES	JARRAH	60	REGROWTH	MIXED
431	YES	JARRAH	40	REGROWTH	MOSTLY LOWER

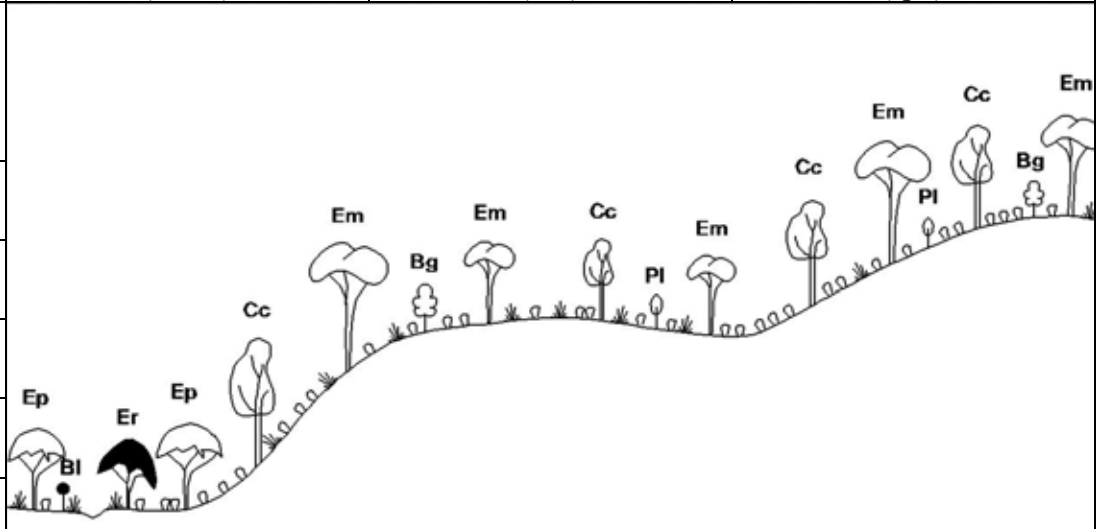
Nomination area 10 canopy sampling data

FID	CANOPY	SPECIES	DBH	DEVELOPMENT	QUALITATIVE
257	YES	MARRI	40	REGROWTH	MIXED
258	YES	MARRI	50	REGROWTH	MOSTLY UPPER
259	YES	MARRI	20	REGROWTH	MIXED
260	YES	JARRAH	40	REGROWTH	MIXED
261	YES	MARRI	30	REGROWTH	MOSTLY LOWER
262	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
263	NO		0	GAP	GAP
264	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
265	YES	MARRI	20	REGROWTH	MIXED
266	YES	JARRAH	80	MATURE/SEN	MOSTLY UPPER
267	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
268	NO	GAP	0	GAP	GAP
269	YES	MARRI	30	REGROWTH	MIXED
270	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
271	NO	GAP	0	GAP	GAP
272	NO	GAP	0	GAP	MOSTLY LOWER
273	YES	JARRAH	40	REGROWTH	MIXED
274	NO	GAP	0	GAP	GAP
275	NO	GAP	0	GAP	MIXED
276	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
277	NO	GAP	0	GAP	MOSTLY UPPER
278	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
279	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
280	NO	GAP	0	GAP	MIXED
281	NO	GAP	0	GAP	GAP
282	YES	JARRAH	100	MATURE/SEN	MOSTLY UPPER
283	YES	JARRAH	110	MATURE/SEN	MOSTLY UPPER
284	YES	JARRAH	120	MATURE/SEN	MOSTLY UPPER
285	NO	GAP	0	GAP	MIXED
286	YES	JARRAH	40	REGROWTH	MIXED
287	NO	GAP	0	GAP	MOSTLY LOWER
288	NO	GAP	0	GAP	GAP
289	NO	GAP	0	GAP	MOSTLY LOWER
290	YES	MARRI	20	REGROWTH	MOSTLY LOWER
291	YES	MARRI	90	MATURE/SEN	MIXED
292	YES	JARRAH	50	REGROWTH	MIXED
293	YES	JARRAH	90	MATURE/SEN	MOSTLY UPPER
294	NO	GAP	0	GAP	MIXED
295	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
296	YES	MARRI	50	REGROWTH	MIXED
297	YES	JARRAH	50	REGROWTH	MOSTLY UPPER
298	YES	JARRAH	40	REGROWTH	MIXED
299	NO	GAP	0	GAP	MIXED
300	YES	JARRAH	70	MATURE/SEN	MIXED
301	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
302	YES	JARRAH	30	REGROWTH	MOSTLY LOWER
303	YES	MARRI	30	REGROWTH	MIXED
304	YES	JARRAH	80	MATURE/SEN	MOSTLY UPPER
305	YES	JARRAH	50	REGROWTH	MIXED
306	YES	MARRI	20	REGROWTH	MOSTLY LOWER
307	YES	JARRAH	110	MATURE/SEN	MIXED
308	YES	MARRI	30	REGROWTH	MIXED
309	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
310	YES	JARRAH	70	MATURE/SEN	MIXED
311	YES	MARRI	100	MATURE/SEN	MOSTLY UPPER
312	YES	MARRI	100	MATURE/SEN	MOSTLY UPPER
313	YES	MARRI	20	REGROWTH	MIXED
314	YES	JARRAH	50	REGROWTH	MIXED
315	YES	JARRAH	40	REGROWTH	MIXED
316	YES	JARRAH	80	MATURE/SEN	MIXED
317	YES	MARRI	40	REGROWTH	MIXED
318	NO	GAP	0	GAP	MOSTLY LOWER
319	NO	GAP	0	GAP	MIXED
320	YES	JARRAH	70	MATURE/SEN	MOSTLY UPPER
321	YES	JARRAH	90	MATURE/SEN	MIXED
322	YES	JARRAH	30	REGROWTH	MIXED
323	YES	JARRAH	50	REGROWTH	MOSTLY LOWER
324	NO	GAP	0	GAP	GAP
325	YES	MARRI	40	REGROWTH	MIXED
326	YES	JARRAH	60	MATURE/SEN	MOSTLY UPPER
327	YES	MARRI	50	REGROWTH	MIXED
328	YES	JARRAH	40	REGROWTH	MIXED
329	YES	JARRAH	100	MATURE/SEN	MOSTLY UPPER
330	NO	GAP	0	GAP	GAP
331	NO	GAP	0	GAP	GAP
332	NO	GAP	0	GAP	GAP

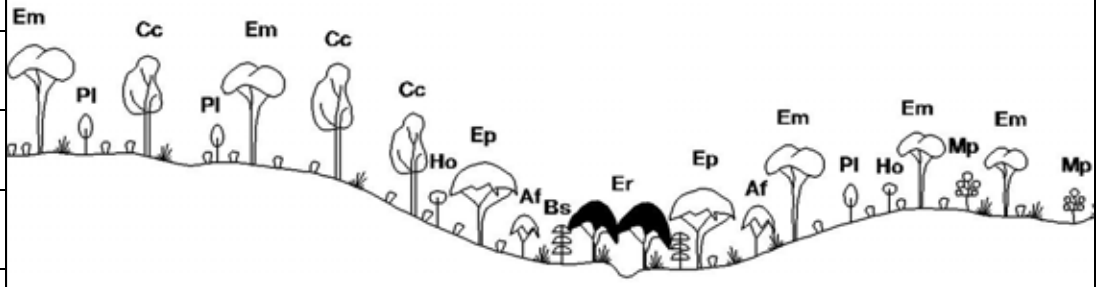
APPENDIX 1: Corbalup 2

Geographic Region	Humid south		E. of Manjimup
Geomorphologic Catena – VC (EVS)	PM2 – Pemberton (Nm5)	PM2 – Pemberton (Nm5)	CL2 – Corbalup (Jw5)
Landform and Vegetation Profile 100m 80m 60m 40m 20m			
Land form Description	Floor of a valley moderately incised into the Darling Plateau	Slopes of a valley moderately incised into the Darling Plateau	Undulating upland surface of the Darling Plateau
Soil structure, Texture and Fertility	Dark yellow brown silty sand, moderately fertile	Brown gravelly silty sand, moderately fertile	Yellow brown gravelly loamy sand, relatively infertile
Soil hydrology	Water gaining but not waterlogged due to good lateral drainage	Water shedding with good infiltration and storage capacity	Moderately water shedding via subsoil, good infiltration and storage capacity
Over storey (canopy or emergents)	Open Forest of *Eucalyptus patens* (Ep) and *Corymbia calophylla* (Cc)	Open Forest of *Corymbia calophylla* (Cc) and *Eucalyptus marginata* subsp. *marginata* (Em)	Open Forest of *Eucalyptus marginata* subsp. *marginata* (Em) and *Corymbia calophylla* (Cc)
Second storey	*Hakea oleifolia* (Ho) *Callistachys lanceolata* (Cl)	*Banksia grandis* (Bg) *Persoonia longifolia* (Pl)	*Persoonia longifolia* (Pl)
Shrub and herb storey	*Agonis linearifolia* *Xanthorrhoea preissii* *Tremandra diffusa* *Pteridium esculentum* *Opercularia hispidula* var. *pauciflora* *Phyllanthus calycinus* *Leucopogon verticillatus* *Baumea juncea*	*Macrozamia riedlei* *Leucopogon capitellatus* *Leucopogon propinquus* *Desmocladus fasciculatus* *Desmocladus flexuosus* *Bossiaea linophylla* *Hakea lissocarpha* *Hibbertia amplexicaulis* *Lomandra drummondii* *Lomandra sericea*	*Pteridium esculentum* *Leucopogon verticillatus* *Hovea elliptica* *Hibbertia amplexicaulis* *Lomandra drummondii* *Clematis pubescens* *Tremandra diffusa* *Leucopogon capitellatus*

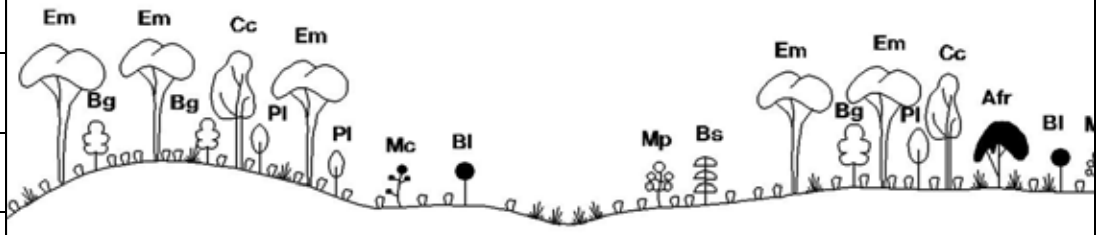
APPENDIX 2: Collis 02

Geographic Region	Humid south		E of Manjimup
Geomorphologic catena	YE – Yerraminnup (Wm4)	QP – Quininup (Jc6)	CO2 – Collis (Jp5)
Landform and Vegetation profile 100m 80m 60m 40m 20m			
Land form description	Floor and slopes of a valley moderately incised into the Darling Plateau, with steep slopes and broad floor	Complex of low smoothly convex hills and swales on ferrugineous sandstone	Low hills on the Darling Plateau, with smooth slopes and broadly convex crests
Soil structure, texture and fertility	Yellow duplex soils with sandy loam surface, moderately fertile	Pale brownish yellow sands underlain by ferrugineous sandstone or duricrust at shallow depth, infertile	Yellow duplex soils with sandy loam topsoil, over mottled structureless clay, relatively infertile
Soil hydrology	Slopes strongly water shedding but with good infiltration capacity; valley floors water gaining, seasonally waterlogged	Mildly water shedding via subsoil, good infiltration but mediocre storage capacity (very coarse)	Moderately water shedding with good infiltration and reasonable storage capacity
Continued Over Page			

APPENDIX 3: Bevan 2

Geographic Region	Humid south		Quininup Rd
Geomorphologic Catena – VC (EVS)	BE2 – Bevan (Jp5)	ST – Strachan (*Stratton on map*) (NM5)	CL1 – Corbalup (Jw7)
Landform and Vegetation Profile 100m 80m 60m 40m 20m			
Land form description	Broadly convex crests and slopes in southern Darling Plateau	Medium sized valley with smooth gentle slopes and terraced floors, incised into the southern margin of Darling Plateau	Mildly undulating terrain of shallow depressions and low rises in the southern Darling Plateau
Soil structure, texture and fertility	Yellow duplex soils with gravelly loamy sand topsoil over poorly structured clay, with lateritic duricrust	Yellow duplex soils with gravelly loams sand topsoil over poorly structured clay, moderately fertile	Yellow duplex soils on rises, sands and podzols in depressions, variable fertility
Soil hydrology	Mildly water shedding with good infiltration and storage capacity	Slopes mildly water shedding with good infiltration and moderate storage capacity, floors seasonally flooded but not badly waterlogged	Ranging from mildly water shedding on rises to water gaining in depressions, good infiltration capacity poor lateral drainage
Over storey (canopy or emergents)	Open Forest of *Eucalyptus marginata* subsp. *marginata* (Em) and *Corymbia calophylla* (Cc)	Open Forest of *Eucalyptus rudis* (Er) and *Eucalyptus patens* (Ep) on the floor, *Corymbia calophylla* (Cc) on slopes	Open Forest to Woodland of *Eucalyptus marginata* subsp. *marginata* (Em)
Second storey	*Persoonia longifolia* (Pl)	*Hakea oleifolia* (Ho) *Banksia seminuda* (Bs)	*Melaleuca preissiana* (Mp) *Agonis flexuosa* (Af) *Persoonia longifolia* (Pl) *Hakea oleifolia* (Ho)
Shrub and herb storey	*Podocarpus drouynianus* *Leucopogon capitellatus* *Hovea elliptica* *Bossiaea linophylla* *Lindsaea linearis* *Acacia myrtifolia* some *Leucopogon verticillatus* *Pteridium esculentum*	*Melaleuca viminea, Melaleuca incana, Astartea fascicularis, Lepidosperma effusum, Hardenbergia comptoniana, Anigozanthos flavidus, Acacia saligna* *Pteridium esculentum* *Xanthorrhoea preissii*	*Xanthorrhoea preissii* *Leucopogon australis* subsp. *acutifolius, Hibbertia amplexicaulis, Lepidosperma tenue, Acacia extensa, Podocarpus drouynianus, Bossiaea linophylla* *Callistachys lanceolata*

APPENDIX 4: Yornup

Geographic Region	Perhumid south		N of Manjimup
Geomorphologic Catena – VC (EVS)	CO1 – Collis (Mp8)	YR – Yornup (Gw5)	CL1 – Corbalup (Jw7)
Landform and Vegetation Profile 100m 80m 60m 40m 20m			
Land form Description	Low hills with smooth slopes on the granitic plateau	Swampy plain with broad drainage floors on granitic plateau	Very low rises and shallow depressions
Soil structure, Texture and Fertility	Yellow duplex soils, with sandy loam surface over clay subsoil, moderately fertile	Humus podzols and yellow duplex soils, variable but mainly low fertility	Yellow duplex soils on rises, sands and podzols in depressions, variable fertility
Soil hydrology	Moderately water shedding good infiltration and storage capacity	Water gaining seasonally waterlogged with inadequate lateral drainage	Neutral or somewhat water gaining with inadequate lateral drainage in depressions
Over storey (canopy or emergents)	Open Forest of *Eucalyptus marginata* subsp. *marginata* (Em) with some *Corymbia calophylla* (Cc)	Mosaic of Open Woodlands of *Melaleuca cuticularis* (Mc) *M. preissiana* (Mp) *Banksia littoralis* (Bl) and *Banksia seminuda* (Bs) and Shrubland and Sedgeland	Open Forest of *Eucalyptus marginata* subsp. *marginata* (Em) with some *Corymbia calophylla* (Cc) on rises, Woodland of *Melaleuca preissiana* (Mp) and *Banksia littoralis* (Bl) in depressions
Second storey	*Banksia grandis* (Bg) *Persoonia longifolia* (Pl)		*Banksia grandis* (Bg) *Persoonia longifolia* (Pl) *Allocasuarina fraseriana* (Afr) on sandy flanks
Shrub and herb storey	*Leucopogon verticillatus* *Bossiaea ornata* *Bossiaea linophylla* *Hovea trisperma* *Hakea amplexicaulis* *Macrozamia riedlei* *Pteridium esculentum* *Leucopogon capitellatus*	*Kingia australis* *Meeboldina scariosa* *Mesomelaena tetragona* *Hakea varia* *Hakea ceratophylla* *Anarthria scabra* *Lepidosperma squamatum*	*Bossiaea linophylla* *Bossiaea ornata, Hovea trisperma* on rises, *Stirlingia latifolia* on sands, *Astartea fascicularis, Hakea varia, Hypocalymma angustifolium* in depressions