Report on the old-growth nomination within Northcliffe forest block - compartment 03

July 2016

Government of **Western Australia**
Conservation and Parks Commission

Summary

In September 2011, a request for a review of old-growth status over Northcliffe forest block-compartment 03 (Northcliffe 03) was made by the Northcliffe Environment Centre. Northcliffe 03 contains predominantly karri forest with some mixed forest of marri and blackbutt.

Surveys were conducted by Conservation and Parks Commission staff from April through to July 2016. These surveys focused on canopy measurements and field checking previous harvest boundaries through stump enumeration to determine areas uncut and areas cut over. The assessment yielded the following results:

Single layer plot 1	55% mature/senescent, uncut	- **old-growth**
Two tiered Plot 2 & 3	78% mature/senescent, uncut	**- old-growth**

The areas identified in Map 3 of this report (approximately 36 hectares combined) meet the criteria of old-growth forest. These areas have therefore been determined as unavailable for timber harvesting. The remainder of the coupe (approximately 156 hectares) does not meet the requirements for old-growth forest and remains available for timber harvesting.

1.0 Background

As outlined in the *Forest management plan 2014–2023* (FMP), the Conservation and Parks Commission is responsible for carrying out specific actions that relate to the management of old-growth forests. These actions were included in the FMP to address a high level of public concern about the reliability of old-growth forest mapping data. Therefore, in 2005, the then Conservation Commission developed a process to provide transparency to old-growth forest assessments (see *Assessment criteria and process for the Conservation Commission review of old-growth amendments*). This process involves full public consultation and reporting. It enables members of the public to request the Conservation and Parks Commission to assess whether areas on the indicative timber harvesting plan should be classified as old-growth forest.

1.1 Definition of old-growth forest

The *National Forest Policy Statement* (Commonwealth of Australia 1992) defines 'old-growth forest' as forest that is ecologically mature and has been subjected to negligible unnatural

disturbance such as logging, roading and clearing. The definition focuses on forest in which the upper stratum or over-story is in a late mature or senescent growth stage. This definition implies that two conditions must be met for a stand to qualify as old-growth: (a) ecological maturity, and (b) minimal unnatural disturbance.

The Conservation and Parks Commission is guided by the definition of old-growth in the FMP, which is the same as that used in the *National Forest Policy Statement*. The FMP further details the criteria for inclusion of old-growth forest in the Department of Parks and Wildlife's (DPaW) corporate database:

> Areas greater than two hectares of ecologically mature forest, where the over-story is in a late mature to senescent growth stage, and where the effects of disturbance (e.g. dieback, timber production, grazing) are either absent or now negligible.

Under the *Western Australian Regional Forest Agreement* (RFA 1998), the working definition for old-growth karri forest is uncut forest which is in the late mature or senescent stage. By definition the analysis precludes a minimal disturbance component in the determination of old-growth forest. As defined above, karri stands must be uncut to qualify as old-growth. During the RFA, the oldest age class occupying at least 25% crown cover in karri forest was referred to as the dominant age class. Karri forest which was uncut with greater than 25% mature and senescent in the over-story was mapped as old-growth. For the purposes of the assessment of karri forest to determine old-growth areas, the Conservation and Parks Commission applies the same criteria for decision-making for areas equal to or greater than two hectares.

The Conservation and Parks Commission's assessment process for old-growth karri forest uses the FMP's definition of old-growth. To qualify as old-growth a stand must satisfy a disturbance threshold *and* an ecological maturity threshold.

In this report the descriptors of disturbance are generally the presence of stumps. For ecological maturity, stands must comprise a greater than 25% mature or senescent component in the canopy. Thresholds are described in this report as well as the assessment methodology and the data collected by the assessment team.

2.0 Assessment

This report summarises the Conservation and Parks Commission's findings based on its consideration of available records and inputs, as well as field sampling undertaken by the Conservation and Parks Commission audit staff.

2.1 Public nomination of old-growth

As required in the FMP and further detailed in the Conservation and Parks Commission's paper *Assessment criteria and process for the Conservation Commission review of old-growth amendments*, there is a process for members of the public to request that the Conservation and Parks Commission assess whether areas on an indicative timber harvest plan should be classified as old-growth forest in DEC's corporate database. Such a request was received on the 10th September 2011 in relation to Northcliffe 03.

2.2 Site description

Northcliffe forest block is situated approximately 6 kilometers south east of the town of Northcliffe. The block is largely surrounded by farm land with some neighboring plantation timber. The Munabiddi bike trail runs along parts of the southern boundary of the block including compartment 03. Some of the compartments have been historically clear felled and are now regenerating karri regrowth stands. The block was not burnt in the landscape scale bushfire that occurred during February 2015.

The coupe area is 188 hectares and ranges between 100 and 150 meters above sea level. The site is characterized by moderately sloping valleys feeding down to stream zones with loamy soils. It is long-unburnt as evidenced by the extremely dense understory experienced during the field assessment.

2.3 Forest types and structure

The broad description of forest type is karri forest - south. Karri is the most common species forming the structure of the over-story. There are some parts of the coupe where blackbutt dominates the over-story with the occasional karri and marri. A middle story was observed mainly in stream zones and this comprised of peppermints and casuarinas. The understory comprised predominantly of sword sedge and water bush. A broad description of karri forest - south vegetation complex is provided in Appendix 1.

3.0 Sampling process

3.1 Analysis

The sampling method is based on the process outlined in *Assessment criteria and process for the Conservation Commission review of old-growth amendments*. The nomination area was reviewed and sample areas were selected using the following background information:

- digitized aerial photographs and data layers—used to confirm forest and non-forest structural boundaries and make general observations in relation to forest structure (Map 1)
- the latest available records of harvesting, soil types and vegetation types—provided by the department
- historical aerial photo imagery and disturbance mapping—provided by the department (Map 2)
- stump location enumeration in low to moderate impact areas as identified by aerial interpretation—this was undertaken by the Conservation and Parks Commission assessment team
- canopy sampling in low to moderate impact areas as identified by aerial interpretation—also undertaken by the Conservation and Parks Commission assessment team

3.2 Stratification

Departmental harvest records indicated the coupe was mainly selectively cut in the 1950s with a small area in the north harvested in the 1960's. An area on the southern boundary was clear felled in the 1990's (clearly visible in the digitized aerial photography) and a strip selectively cut in the 1980's.

Field sampling focused on those areas harvested in the 1950's and the 1960's that were mapped as moderate or low impact (Map 2). This included both single layered mature forest and two tiered mature forest (Map 1). Canopy sampling was undertaken in areas with no stumps (Map 3). Stump enumeration was undertaken from stream zones working outwards to establish a boundary of the selective cut. Please note there is also an interactive web map available at the following link.

https://www.arcgis.com/home/webmap/viewer.html?webmap=cccc6a2b34e446dabb6e7f3b2f8e3c2f&extent=116.1564,-34.6693,116.2198,-34.6402

3.3 Field results

Ground evidence of disturbance (the presence of stumps) is clear in most of the coupe with a significant regrowth component to the forest structure. These areas were not sampled in the field and can be seen in Map 3. The number of stumps observed reduced as sampling neared stream zones. This is consistent with patterns of harvesting in previous assessments undertaken by the Conservation and Parks Commission. Forest within stream zones was mainly two tiered forest with peppermint and casuarina mid-story. Canopy sampling in areas where no stumps were observed yielded the following results:-

Table 1: Detailed results for single layer plot 1 sampling site

Estimated number of stumps per hectare	Total canopy cover	Estimated canopy cover of mature or senescent trees
0	**84%**	55%

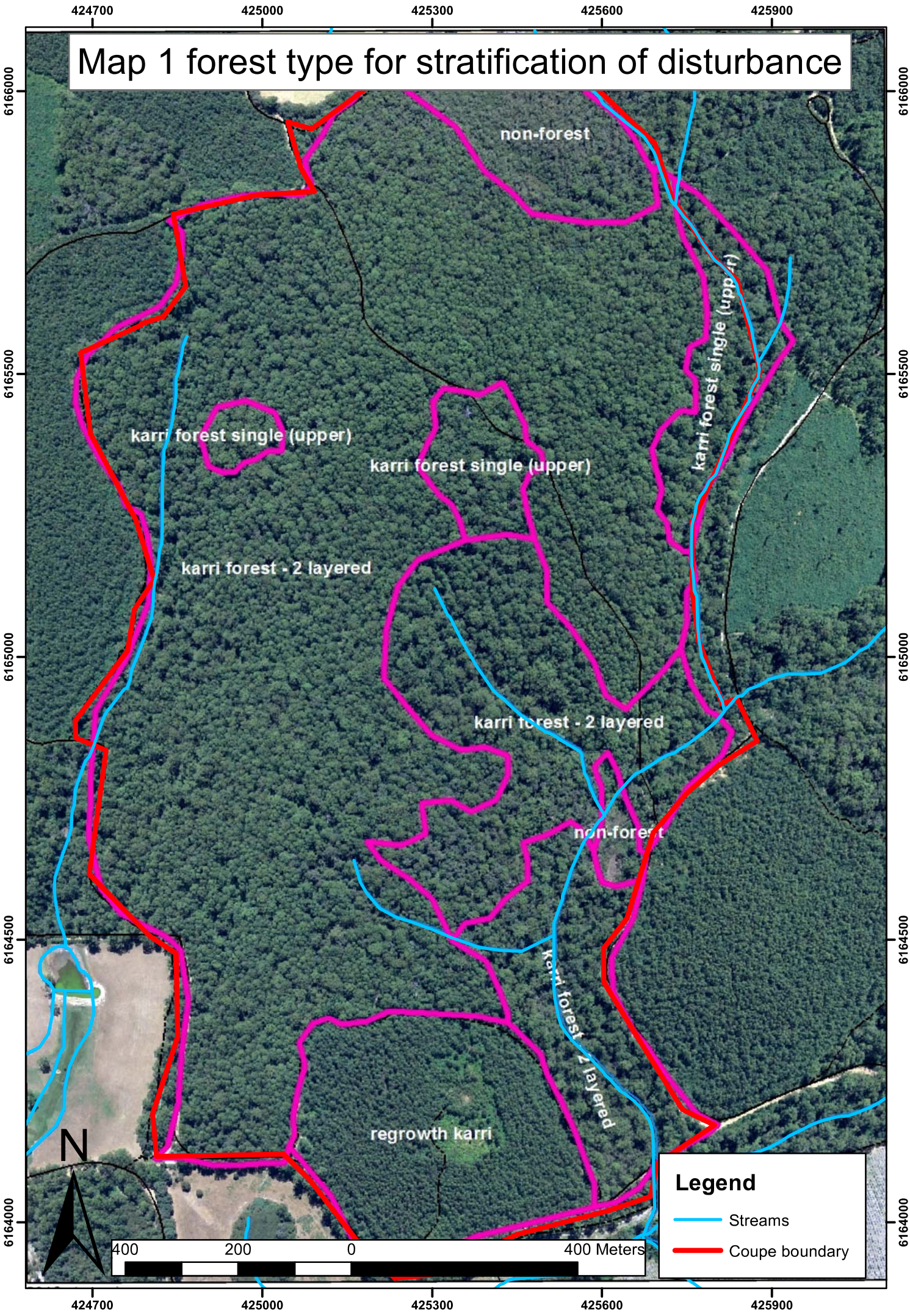
Table 2: Detailed results for two tiered layer plots 2 & 3 sampling sites

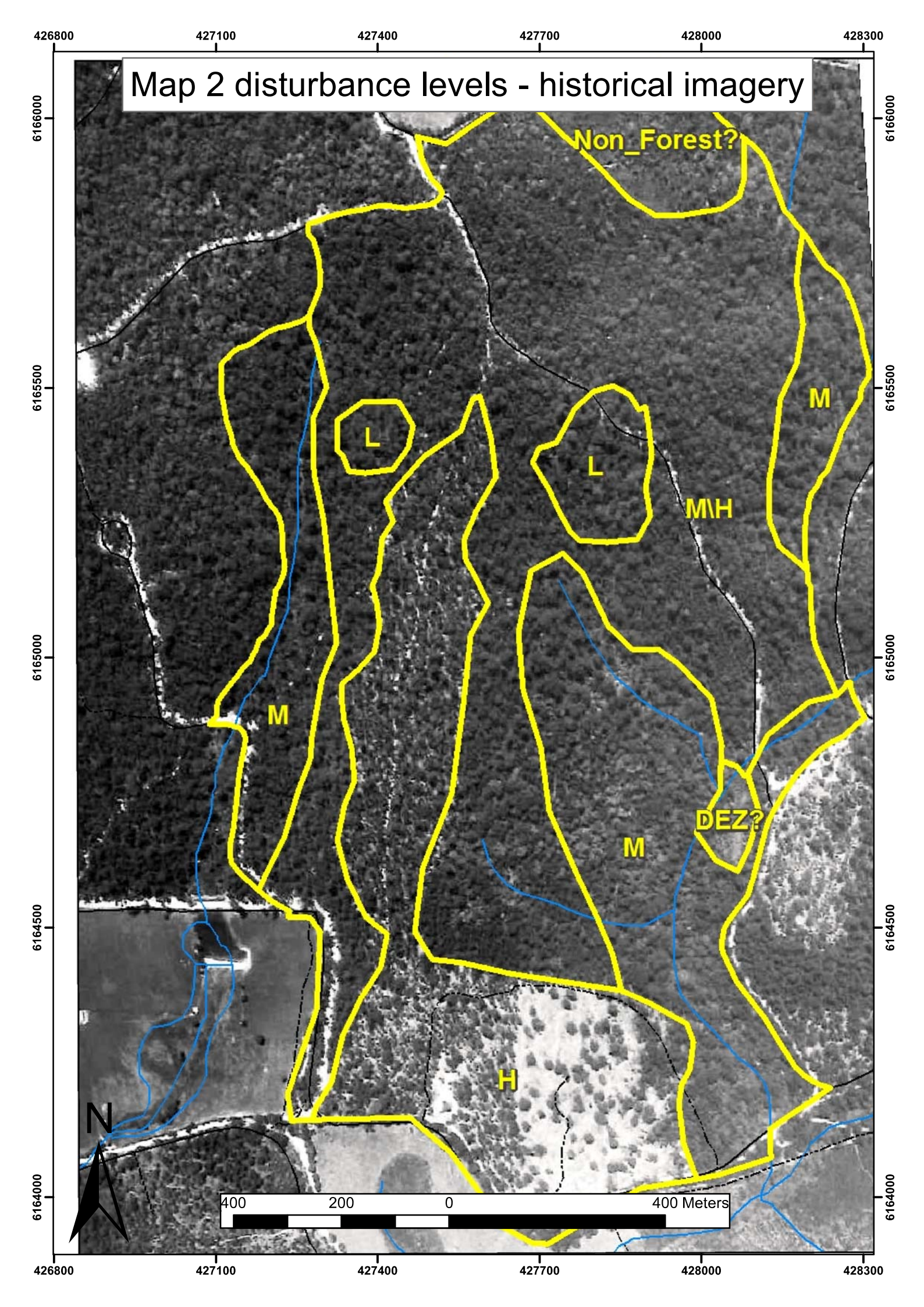
Estimated number of stumps per hectare	Total canopy cover	Estimated canopy cover of mature or senescent trees
0	**82%**	78%

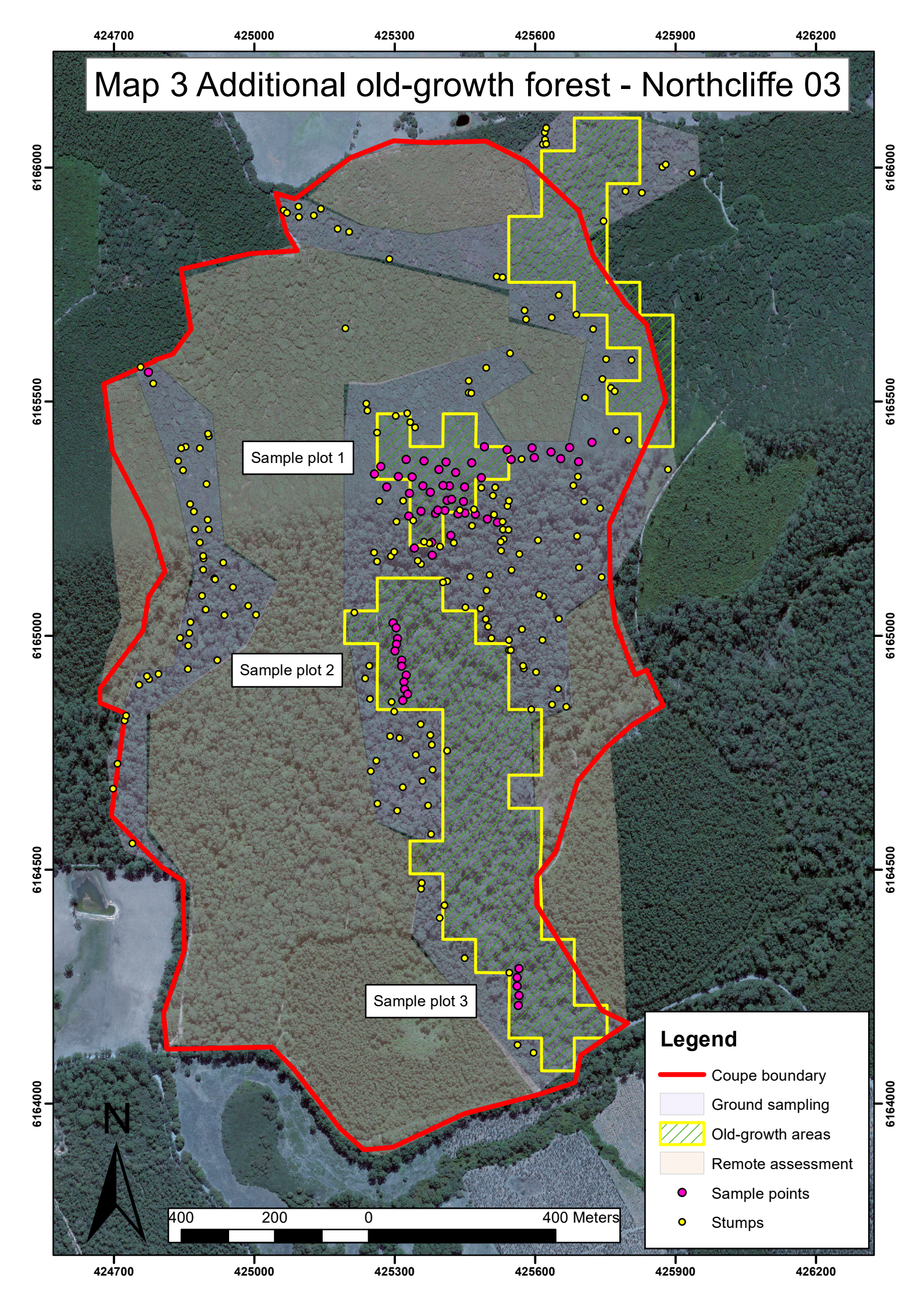
4.0 Finding

In summary, stratified canopy measurements have been used to estimate the total canopy cover and the proportion of mature or senescent trees in the over-story. Data from this assessment indicates the proportion of mature to regrowth in the areas sampled was in excess of the minimum requirement of 25%.

The 36 hectares identified as additional old-growth forest (Map 3) will be added to the old-growth forest layer and will not be available for timber harvesting. Approximately 4 hectares was located outside the coupe boundary. This leaves a remainder of approximately 156 hectares within the coupe that does not meet the criteria for old-growth forest or other informal reserve and remains available for timber harvesting. The area of old-growth has been mapped using a half-hectare grid however the actual old-growth boundary (on the ground) will need to be demarcated in the field prior to any disturbance operation.


Map 1 forest type for stratification of disturbance
424700
425000
425300
425600
425900
6166000
6165500
6165000
6164500
6164000
non-forest
karri forest single (upper)
karri forest single (upper)
karri forest single (upper)
karri forest - 2 layered
karri forest - 2 layered
non-forest
karri forest - 2 layered
regrowth karri
N
400
200
0
400 Meters
Legend
Streams
Coupe boundary


Map 2 disturbance levels - historical imagery
426800
427100
427400
427700
428000
428300
6166000
6165500
6165000
6164500
6164000
Non_Forest?
L
L
M
M\H
M
M
DEZ?
H
N
400
200
0
400 Meters


Map 3 Additional old-growth forest - Northcliffe 03
424700
425000
425300
425600
425900
426200
6166000
6165500
6165000
6164500
6164000
Sample plot 1
Sample plot 2
Sample plot 3
N
400
200
0
400 Meters
Legend
Coupe boundary
Ground sampling
Old-growth areas
Remote assessment
Sample points
Stumps

Single layer plot 1

Sample number	Canopy	Species	Diameter	Development	Stumps	Disturbance	Qualtitative	Comment
0	YES	KARRI	125	MATURE/SENESCENT	0		MOSTLY UPPER	
1	YES	KARRI	80	REGROWTH	0		MOSTLY UPPER	og
2	YES	KARRI	120	MATURE/SENESCENT	0		MIXED	
3	YES	KARRI	135	MATURE/SENESCENT	0		MIXED	
4	YES	KARRI	30	REGROWTH	0		MOSTLY LOWER	
5	YES	KARRI	150	MATURE/SENESCENT	0		MOSTLY UPPER	og
6	NO	GAP	0	GAP	0		MIXED	
7	NO	GAP	0	GAP	0		MIXED	lge natural logs
8	NO	GAP	0	GAP	0		MIXED	og
9	YES	KARRI	40	REGROWTH	0		MIXED	
10	YES	KARRI	130	MATURE/SENESCENT	0		MOSTLY UPPER	og
11	YES	KARRI	130	MATURE/SENESCENT	0		MOSTLY UPPER	
12	YES	KARRI	50	REGROWTH	0		MIXED	possible stump
13	YES	KARRI	35	REGROWTH	0		MOSTLY LOWER	regrowth
14	NO	GAP	0	GAP	0		MIXED	
15	YES	KARRI	115	MATURE/SENESCENT	0		MOSTLY UPPER	
16	YES	KARRI	120	MATURE/SENESCENT	0		MOSTLY UPPER	og
17	YES	KARRI	60	REGROWTH	0		MIXED	
18	YES	KARRI	25	REGROWTH	0		MOSTLY LOWER	
19	YES	KARRI	115	MATURE/SENESCENT	0		MIXED	
20	YES	KARRI	40	REGROWTH	0		MIXED	
22	YES	KARRI	50	REGROWTH	0		MOSTLY UPPER	
23	YES	KARRI	120	MATURE/SENESCENT	0		MOSTLY UPPER	old growth
24	YES	KARRI	120	MATURE/SENESCENT	0		MOSTLY UPPER	same canopy prev pt
25	YES	KARRI	129	MATURE/SENESCENT	0	SNIGTRACK	MOSTLY UPPER	
26	YES	KARRI	140	MATURE/SENESCENT	0		MOSTLY UPPER	
27	YES	KARRI	55	REGROWTH	0		MIXED	
28	YES	KARRI	80	REGROWTH	1		MIXED	
29	YES	KARRI	133	MATURE/SENESCENT	0		MIXED	
30	NO	GAP	0	GAP	0		GAP	
31	YES	KARRI	30	REGROWTH	0		MIXED	
32	YES	KARRI	172	MATURE/SENESCENT	0	X-CUT LOG_	MIXED	photo point.Sen
33	YES	KARRI	75	REGROWTH	0		MIXED	
34	YES	KARRI	20	REGROWTH	0		MIXED	
35	YES	KARRI	60	MATURE/SENESCENT	0		MIXED	
36	NO	GAP	0	GAP	0	X-CUT LOG_	GAP	

37	YES	KARRI	138	MATURE/SENESCENT	0	MIXED
38	YES	KARRI	40	REGROWTH	0	MIXED
39	YES	KARRI	40	REGROWTH	0	MIXED
40	YES	KARRI	80	REGROWTH	0	MIXED
41	YES	KARRI	192	MATURE/SENESCENT	0	MOSTLY UPPER
42	YES	KARRI	135	MATURE/SENESCENT	0	MIXED
43	NO	GAP	0	GAP	0	MIXED
44	YES	KARRI	180	MATURE/SENESCENT	0	MOSTLY UPPER
45	YES	KARRI	135	MATURE/SENESCENT	0	MIXED

Two tiered plots 2 & 3

Sample number	Canopy	Species	Diameter	Development	Stumps	Disturbance	Qualtitative	Comment
46	YES	KARRI	182	MATURE/SENESCENT	0		MIXED	senescent
47	YES	KARRI	50	REGROWTH	0		MOSTLY UPPER	
48	YES	KARRI	200	MATURE/SENESCENT	0		MOSTLY UPPER	senescent
49	YES	KARRI	200	MATURE/SENESCENT	0		MOSTLY UPPER	senescent
50	NO	GAP	0	GAP	0		MOSTLY UPPER	
51	YES	KARRI	115	MATURE/SENESCENT	0		MOSTLY UPPER	mature
52	NO	GAP	0	GAP	0		MIXED	
53	YES	KARRI	130	MATURE/SENESCENT	0		MOSTLY UPPER	
54	YES	KARRI	99	REGROWTH	0		MOSTLY UPPER	
55	YES	KARRI	250	MATURE/SENESCENT	0		MOSTLY UPPER	senescent
56	YES	KARRI	250	MATURE/SENESCENT	0		MOSTLY UPPER	senescent same prev
57	NO	GAP	0	GAP	0		MOSTLY UPPER	
60	YES	KARRI	125	MATURE/SENESCENT	0		MOSTLY UPPER	
61	YES	KARRI	180	MATURE/SENESCENT	0		MOSTLY UPPER	senescent
62	YES	KARRI	125	MATURE/SENESCENT	0		MOSTLY UPPER	
63	YES	KARRI	40	REGROWTH	0	X-CUT LOG_	MOSTLY UPPER	
64	YES	KARRI	120	MATURE/SENESCENT	0		MOSTLY UPPER	

Appendix 1

Descriptions of vegetation and soils for those landscape conservation units within the assessment area are described below. The specific vegetation complexes within the coupe are Bw8, Iw8 and Ta8.

APPENDIX C: SUMMARY OF LINKAGES BETWEEN LANDSCAPE CONSERVATION UNITS, ECOLOGICAL VEGETATION SYSTEMS AND VEGETATION COMPLEXES

19. S K – SOUTHERN KARRI

S K – A - Swampy Plains and Deposits, Lateritic Uplands, together with Minor Valleys and Non-lateritic Slopes and Ridges

Yv4 Component vegetation complex ***CM***.
Shallow depressions in south coast hinterland and southern margin of the Darling Plateau in humid zone. Soils range from unconsolidated clays and solonetz in depressions to sandy podzols on margins. Vegetation ranges from Open Woodland of *Melaleuca cuticularis* in depressions to Woodland of *Banksia attenuata - Allocasuarina fraseriana - Eucalyptus marginata* subsp. m*arginata* on margins. Shrub and herb vegetation ranges from *Juncus pallidus, *Juncus bufonius, Samolus junceus, Harperia lateriflora, Baeckea astarteoides* in depressions to *Pultenaea reticulata, Adenanthos obovatus, Dasypogon bromeliifolius* and *Melaleuca thymoides* on slopes.

Sv9 Component vegetation complex ***Pi***.
Swampy plains with granitic and lateritic rises in hyperhumid zone. Vegetation ranges from Sedgeland of *Anarthria prolifera, Hypolaena exsulca, Empodisma gracillimum, Lepidosperma leptostachyum, Xyris lanata* and *Evandra aristata* through Heath of *Pultenaea reticulata, Adenanthos obovatus, Taxandria linearifolia, Taxandria parviceps* and *Homalospermum firmum* to Woodland of *Eucalyptus patens - Eucalyptus megacarpa - Melaleuca preissiana* on flats and *Eucalyptus marginata* subsp. *marginata - Corymbia calophylla* on rises. Understorey on rises *Acacia pentadenia; Agonis theiformis, Podocarpus drouynianus* and *Bossiaea linophylla.*

Bw8 Component vegetation complexes ***A*** and ***Q***.
Subcoastal swamps and damplands in hyper and perhumid zones. Vegetation ranges from Sedgeland of *Evandra aristata, Anarthria scabra, Xyris lanata, Alexgeorgea ganopoda, Leptocarpus elegans* (ms) and *Anarthria prolifera* to Heath of *Pericalymma crassipes, Homalospermum firmum, Taxandria parviceps, Taxandria linearifolia, Banksia quercifolia* and *Kunzea sulphurea* to Woodland of *Melaleuca preissiana - Eucalyptus patens - Nuytsia floribunda - Banksia littoralis - Banksia ilicifolia.*

Iw8 Component vegetation complexes ***S3.***
Shallow valleys in swampy terrain at the interface between the southern coastal plain and the hilly hinterland in the hyperhumid zone. Soils range from humus podzols in depressions to yellow duplex soils on slopes. Vegetation ranges from Open Woodland of *Melaleuca preissiana - Banksia littoralis - Nuytsia floribunda* in depressions to Woodland of *Eucalyptus marginata* subsp. *marginata* on the slopes. Shrub and sedge storey consists of *Astartea fascicularis, Taxandria parviceps, Hakea varia, Beaufortia sparsa, Homalospermum firmum, Adenanthos obovatus, Anarthria scabra, Anarthria prolifera, Evandra aristata, Sphenotoma gracile* and *Mesomelaena tetragona.*

APPENDIX C: SUMMARY OF LINKAGES BETWEEN LANDSCAPE CONSERVATION UNITS, ECOLOGICAL VEGETATION SYSTEMS AND VEGETATION COMPLEXES

19. S K – SOUTHERN KARRI

S K – A - Swampy Plains and Deposits, Lateritic Uplands, together with Minor Valleys and Non-lateritic Slopes and Ridges

Kp8 Component vegetation complexes ***BEb*** and ***CRb***.
Ridges and upper slopes with red brown earths and duplexes, at the southern margin of Darling Plateau, in perhumid zone. Dominant vegetation Tall Open Forest of *Eucalyptus diversicolor - Corymbia calophylla - Eucalyptus marginata* subsp. *marginata*. Second storey of *Banksia grandis, Persoonia longifolia* and *Allocasuarina decussata*. Tall shrub storey of *Bossiaea aquifolium* subsp. *laidlawiana, Chorilaena quercifolia, Tremandra stelligera, Acacia urophylla, Bossiaea linophylla, Leucopogon verticillatus, Hovea elliptica, Hardenbergia comptoniana* and *Pteridium esculentum*.

Ta8 Component vegetation complexes ***COb, Kb*** and ***MTb.***
Mild to moderately sloping uplands with red brown loamy soils, rising above the plateau and coastal plain in hyper and perhumid zones. Dominant vegetation, Tall Open Forest of *Eucalyptus jacksonii - Eucalyptus guilfoylei - Eucalyptus brevistylis - Corymbia calophylla - Eucalyptus marginata* subsp. *marginata.* Second storey of *Agonis flexuosa, Allocasuarina decussata* and *Banksia grandis*. Tall shrub understorey of *Chorilaena quercifolia, Acacia pentadenia, Trymalium floribundum, Pteridium esculentum, Hovea elliptica, Clematis pubescens* and *Billardiera floribunda*.

Sv6 Component vegetation complex ***CA***.
Extensive flat floored swampy plains with solonetzic and humus podzol soils among the hilly south coast hinterland in the humid perhumid zones. Dominant vegetation types are Sedgeland and Shrubland with some emergent *Melaleuca cuticularis - Nuytsia floribunda - Melaleuca preissiana,* with Woodland of *Banksia quercifolia - Banksia ilicifolia - Banksia attenuata - Corymbia ficifolia* (near Walpole only) on transition to uplands. Shrub and herb storey of *Taxandria parviceps, Dampiera linearis, Leucopogon australis, Astartea fascicularis, Melaleuca densa, Chaetanthus aristatus, Hibbertia stellaris, Anarthria laevis, Evandra aristata, Homalospermum firmum, Callistemon glaucus, Meeboldina scariosa, Beaufortia sparsa, Adenanthos obovatus* and *Lepidosperma squamatum.*

Gw6 Component vegetation complex ***QN***.
Swampy gullies and depressions with humus podzol and sandy yellow duplex soils near the southern margin of the Darling Plateau in the humid subhumid zones. Dominant vegetation is Woodland of *Eucalyptus marginata* subsp. *marginata - Melaleuca preissiana - Banksia littoralis - Corymbia calophylla*. Shrub and herb storey consists of *Taxandria parviceps, Hakea varia, Astartea fascicularis, Synaphea reticulata, Beaufortia sparsa, Hibbertia amplexicaulis, Meeboldina scariosa, Lepidosperma squamatum, Hakea prostrata* and *Hypocalymma angustifolium*.