ATTACHMENT J: FLORA SURVEY REPORT

- Astrebla Ecological Services



Flora Survey Report

Barnwell Road, Myola

Prepared by Astrebla Ecological Services November 2015

A flora survey report for clearing in an area mapped as a high risk area on a flora trigger map, as required under section 256 of the *Nature Conservation (Wildlife Management) Regulation 2006*. This report demonstrates that section 261ZA 1(a) of that regulation is met, and therefore clearing is authorised under the regulation.

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1 Introduction

1.1 Overview

Reever and Ocean Pty Ltd (the landowner) own a parcel of adjoining freehold lots in the Myola area, two kilometres west of Kuranda town centre. This land holding, at the southern of Barnwell Road terminus (street number 112), was previously a cattle farm. The majority of these lots are now vegetated by remnant vegetation that is predominately mapped as least concern regional ecosystems (see Appendix A).

However, a number of lots in the north of the project area are primarily mapped as non-remnant vegetation, and the landowners wish to clear some of this non-remnant vegetation so as to reinstate the property to its original condition as an operating farm.

The lots (referred to hereafter as 'the subject lots') which were surveyed for this Flora Report, all located in Mareeba Shire in a rural zone, are mapped in Figure 1 (the lots with white boundaries) and are:

- Lot 17 N157227
- Lot 18 N157227
- Lot 19 N157452

Most of the non-remnant vegetation in these lots is mapped as a high risk area on a flora trigger map. Therefore, under section 256 of the *Nature Conservation (Wildlife Management) Regulation 2006* (the NCWMR) a flora survey and flora survey report is required prior to clearing.

Note – parts of these lots have already been cleared in breach of s.256 and this breach has been self-reported to the Department of Environment and Heritage Protection (EHP) by the landowners (letter to Wildlife Officer Kerry Walsh dated 7 September 2015, see Appendix C).

This report is concerned only with areas not impacted under that previous clearing.

A flora survey undertaken in accordance with the requirements of the *Flora Survey Guidelines* – *Protected Plants* (as required under s.257 of the NCWMR) was undertaken in the areas of non-remnant vegetation proposed to be cleared. No protected plants were detected.

Therefore, this intended clearing will meet the activity exemption outlined in s.261ZA of the NCWMR, as no protected plant occurs in the clearing area or within 100 m.

1.2 Project location and description

The subject lots listed in Section 1.1 and mapped in Figure 1 are located at the southern end of Barnwell Road in Myola, within Mareeba Shire, in the rural zone. They form part of the old Barnwell family farm, which was formerly used for cattle grazing. The street address is 112 Barnwell Rd, Kuranda.

The entire northern third of the project area is located on gently undulating to undulating rises dissected by gullies. It had been cleared by the previous owners – historical aerial photo research indicates most of the northern third of the project area was already cleared in 1942, and had been kept in that state until the mid-1990s.

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These cleared areas were either open signal grass (*Urochloa mutica*) pasture, under lantana (*Lantana camara*) and raspberry (*Rubus alceifolius*), or wattle-dominated regrowth (dominated by a mixture of *Acacia celsa* and/or *A. cincinnata*).

The eastern sections of lots 17 and 18 are located in the Warril Creek catchment. The remainder of those lots, and lot 19, are located in the Haren Creek catchment (which forms part of Owen Creek catchment).

1.2.1 Geology

The entire project area is located on Barron River metamorphics (slate, phyllite, quartzite, chert, greywacke) (Bureau of Mineral Resources, Geology and Geophysics, 1962). Some local areas of sandstone have been noted.

1.3 Proposed land use and clearing area

The landowner proposes to restore this land, zoned rural, to its previous status as a farm, by clearing the non-remnant vegetation located outside of areas mapped as reef-regrowth watercourse vegetation (category R under the *Vegetation Management Act 1999*). In addition, a 60 m buffer from all creek lines (as detected on the ground, not as mapped in any publicly available mapping) has been imposed to protect habitat potentially utilised by the Kuranda treefrog (*Litoria myola*).

Therefore, only vegetation mapped as non-remnant will be directly impacted. The land proposed to be used for this purpose is mapped in Figure 1 and comprises all coloured areas – that is, areas mapped in Figure 1 as 'currently clear/open areas' and 'proposed new clearing areas'. Areas mapped in black are the areas proposed to be cleared which are the subject of this report (numbered one to five).

1.4 Survey methodology

This survey was conducted in two phases – an initial desktop survey was conducted to identify possible protected plants (listed by either the Commonwealth or Queensland governments) that are known or predicted to occur in the area within a ten kilometre radius, followed by random meander surveys on site in accordance with the *Flora Survey Guidelines – Protected Plants* (Department of Environment and Heritage Protection, 2014).

Surveys were conducted in two periods, between 29 August to 4 September 2015, and 9 November to 18 November 2015.

1.4.1 Desktop survey

The desktop survey involved two searches of the Wildlife Online database using differing radii, and a search of the Commonwealth government's online Protected Matters Search Tool (PMST). The results are provided in Appendix D. It should be noted that the PMST is predictive and as such a number of records nominated were discounted after further research into habitat requirements and records of known locations (and particularly the altitudes at which they occur). Protected species nominated in these searches that it was considered *may possibly be present* in the Myola area in mesophyll/notophyll vine forest, and that were targeted during the field survey, are:

- *Alpinia hylandii*: a petiolate ginger (Zingiberaceae) (Cooke, 1987) previously recorded at two locations within five kilometres of the Barnwell Rd site in mesophyll vine forest (Australia's Virtual Herbarium, 2015). This species was previously located by the author of this report on nearby land, lot 20 N157423 (in a patch of 0.7 ha at 55 350456 E 8139318 S).
- Archontophoenix myolensis (Myola palm): an Archontophoenix (Arecaceae) that is very similar to the common A. alexandrae the main morphological point of difference is in the mature fruit, with generally difficult to assess vegetative differences. It is restricted to riverine rainforest in the Warril Ck catchment, and adjacent riparian areas of the Barron River downstream of Warril Ck (Dowe and Hodel, 1994). The Barnwell Road property encompasses part of the Warril Ck catchment. Suspected Myola palms have been located adjacent to lot 17 by this report author, and one suspected individual has been recorded on lot 22. However, identification to species is very difficult with this species before reproductive age is reached (as was the case with all individuals found here).
- Canarium acutifolium var. acutifolium: a tree to 40 m tall in the Burseraceae, mainly distinguished from other Canarium spp. by the number of stamens. It has been collected from mesophyll vine forest beside watercourses at up to 200 m elevation (Threatened Species Scientific Committee, 2008ka). The record closest to Myola (and the only record in the Cairns/Kuranda area) came from a 1961 collection at Redlynch (Australia's Virtual Herbarium, 2015).
- *Polyphlebium (Crepidomanes) endlicherianum* (middle filmy ferm) and *P. majoriae*: these filmy ferns (Hymenophyllaceae) are restricted to damp locations, where they grow on rocks, logs or tree trunks (Bostock and Spokes, 1998; Department of the Environment, 2015). Both species have been infrequently collected in the Cairns/Kuranda area, with one record for each species between five and ten kilometres from Barnwell Rd (Australia's Virtual Herbarium, 2015).
- *Randia audasii*: an understorey tree (Rubiaceae) endemic to North Queensland growing in well-developed rainforest (Hyland *et al*, 2010). Four collections of this species have been made in the Kuranda and Speewah area within five kilometres of the Barnwell Road site (Australia's Virtual Herbarium, 2015).
- Senegalia albizioides (climbing wattle): a scrambling plant with bipinnate leaves endemic to North Queensland (Hyland *et al*, 2010), and previously recorded from Smithfield growing in disturbed notophyll vine forest and regrowth with lantana on metamorphic soils (Australia's Virtual Herbarium, 2015).

1.4.2 Site survey

As recommended in the *Flora Survey Guidelines – Protected Plants* (Department of Environment and Heritage Protection, 2014), a random meander method was used to search for protected plants on this site. The survey was conducted over two survey events between 29 August and 4 September, and 9 to 18 November, 2015. The surveys were conducted in areas that are proposed to be cleared that are 'in the wild', and the impact area (encompassing a 100 m buffer of 'in the wild' vegetation as defined in the guidelines). The objective of the surveys was to determine the presence of protected plants in the areas proposed to be cleared and in the impact areas.

The total area proposed to be cleared is 20.13 ha. According to the *Flora Survey Guidelines* – *Protected Plants* (Department of Environment and Heritage Protection, 2014), areas of less than 10 ha should be surveyed at a density of at least one transect. Those between 10 and 100 ha should be surveyed at a minimum density of two to five transects. All except one area proposed for clearing are less than 10 ha, and that area exceeds the 10 ha threshold by only 0.35 ha.

Therefore, a total of six transects were surveyed, as described below (and mapped in Figure 5). Each discrete area has at least one transect surveyed, and area 1, the largest, has two:

- Area 1 (10.35 ha):
 - Transect 1: 152 species recorded.
 - Transect 2: 102 species recorded.
- Area 2 (3.9 ha):
 - Transect 3: 126 species recorded.
- Area 3 (1.99 ha):
 - Transect 4: 135 species recorded.
- Area 4 (0.16 ha):
 - Transect 5: 99 species recorded.
- Area 5 (3.73 ha):
 - Transect 6: 154 species recorded.

Each transect was conducted recording plant species until no new plant species had been recorded for 30 minutes, or until all areas in the wattle-dominated regrowth and its 100 m buffer in that location had been searched.

Note – some transects are not continuous – due to the large areas and time involved in these surveys, it was sometimes necessary to interrupt the field survey, and the GPS tracks will reflect these interruptions.

The survey results for each transect are provided in Table 1. Transects are mapped in Figure 2, Figure 3 and Figure 4. All of the targeted threatened species listed in Section 1.4.1 above are apparent and identifiable at the time of year this survey was conducted (September and November). None were recorded as being present anywhere on the subject lots (lots 17 and 18 N157227 and lot 19 N157452).

1.5 Clearing dates

Clearing dates will be weather dependent and will be between 28 December 2015 and 28 December 2016. It is expected that clearing will occur sooner rather than later. However, in case of unforeseen delays, the dates on the application form have been entered as 28 December 2015 to 28 December, 2017.













DCDB_Myola area Transect 6 Currently clear/open areas

Proposed new clearing areas



Imagery:© Google. Taken 6/5/2015. This image reproduced at 1:1000 when printed at A4. Mareeba Shire DCDB © State of Queensland (Department of Natural Resources and Mines) [2015] GIS operator Simon Danielsen, Astrebla Ecological Services, 13/12/15.



2 Survey results

2.1 Random meander results

The results of the six random meander surveys of the clearing impact areas are presented in Table 1. Random meanders are mapped in Figure 2. No species of conservation significance were detected in the clearing impact areas. A total of 232 species from 174 genera, in 83 families, were recorded. The most diverse families were:

- Elaeocarpaceae: 3 genera, 8 species
- Lauraceae: 6 genera, 14 species
- Myrtaceae: 10 genera, 15 species
- Rubiaceae: 8 genera, 8 species
- Rutaceae: 7 genera, 12 species
- Sapindaceae: 12 genera, 16 species.

The most diverse genera were:

- Elaeocarpus (Elaeocarpaceae): 5 species
- Cryptocarya (Lauraceae): 6 species
- Ficus (Moraceae): 5 species
- Syzygium (Myrtaceae): 5 species.

Table 1 Survey results

| Family | Species | 1 | 2 | 3 | 4 | 5 | 6 |
|---------------|--|---|---|---|---|---|---|
| Adiantaceae | Adiantum hispidulum Sw. | Υ | | Υ | Υ | Υ | Υ |
| | Taenitis pinnata (J.Sm.) Holttum | Υ | Υ | Υ | Υ | Υ | Y |
| Anacardiaceae | Blepharocarya involucrigera F.Muell. | Υ | | | | | Υ |
| Annonaceae | Melodorum uhrii F.Muell. | Υ | Υ | Υ | Υ | Υ | Υ |
| | Xylopia maccreae (F. Muell.) L.S.Sm. | Υ | | | | | Υ |
| Apiaceae | Mackinlaya macrosciadea (F.Muell.) F.Muell. | Υ | Y | Υ | Υ | | Υ |
| Apocynaceae | Alstonia muelleriana Domin | Υ | Υ | | Υ | Υ | Υ |
| | Alstonia scholaris (L.) R.Br. | | | | Υ | Υ | |
| | Alyxia ruscifolia R.Br. | Υ | | | | | Y |
| | Hoya macgillivrayi F.M.Bailey | Υ | | Υ | | | |
| | Melodinus acutiflorus F.Muell. | Υ | | Υ | | | Υ |
| | Melodinus australis (F.Muell.) Pierre | Υ | Υ | Υ | Υ | Υ | Υ |
| | Parsonsia latifolia (Benth.) S.T.Blake | | Υ | Υ | | | Υ |
| Araceae | Epipremnum pinnatum (L.) Engl. | Υ | | | Υ | | Υ |
| | Pothos longipes Schott | Υ | | | | | Υ |
| | Rhaphidophora australasica F.M. Bailey | Υ | | | | | Υ |
| Araliaceae | Delarbrea michieana (F. Muell.) F. Muell. | Υ | | | | | |
| | Polyscias australiana (F.Muell.) Philipson | Υ | Υ | Υ | Υ | Υ | Υ |
| | Polyscias elegans (C.Moore & F.Muell.) Harms | Υ | Υ | Υ | Υ | Υ | Υ |
| | Polyscias purpurea C.T.White | Υ | | | Υ | | |
| | Schefflera actinophylla (Endl.) Harms | Υ | | | Υ | Υ | |
| Araucariaceae | Agathis robusta (C.Moore ex F.Muell.) F.M.Bailey | | | Y | | | Y |

| Family | Species | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------------|--|--------|---|---|---|---|----------|
| Arecaceae | Archontophoenix alexandrae (F.Muell.) H.Wendl. & | Υ | | Y | | | Υ |
| | Drude | | | | | | |
| | Calamus australis Mart. | Υ | Υ | Υ | Υ | Υ | Υ |
| | Calamus caryotoides A.Cunn. ex Mart. | Y | | | | | Υ |
| | Calamus moti F.M.Bailey | Υ | Y | | Y | Υ | Υ |
| | Linospadix minor (W.Hill) F.Muell. | Υ | Y | | Υ | Υ | Υ |
| | Syagrus romanzoffiana (Cham.) Glassman* | | | Y | | | |
| Aristolochiaceae | Pararistolochia deltantha (F.Muell.) Michael J.Parsons | | | Y | Y | | |
| Aspleniaceae | Asplenium australasicum (J.Sm.) Hook. | Υ | Y | | Y | Y | Υ |
| Asteraceae | Ageratum houstonianum Mill.* | | | Y | | | |
| | Coronidium rupicola (DC.) Paul G.Wilson | | | Y | | | |
| Balanophoraceae | Balanophora fungosa J.R.Forst. & G.Forst. | Y | | | | | Y |
| Bignoniaceae | Deplanchea tetraphylla (R.Br.) F.Muell. | | | Y | | | Y |
| | Neosepicaea jucunda (F.Muell.) Steenis | Y | | | | | Y |
| | Pandorea pandorana (Andrews) Steenis | | | | | Y | |
| Blechnaceae | Blechnum cartilagineum Sw. | Y | | Y | Y | Y | Y |
| Carpodetaceae | Abrophyllum ornans (F.Muell.) Hook.f. ex Benth. | Y | | Y | Y | | Y |
| Clusiaceae | Calophyllum sil Lauterb. | Y | Y | Y | Y | Y | Y |
| | Garcinia warrenii F.Muell. | Y | Y | | | Y | Y |
| Connaraceae | Connarus conchocarpus F.Muell. subsp. conchocarpus | Y | Y | | | | Y |
| Cunoniaceae | Davidsonia pruriens F.Muell. | Y | Y | | Y | Y | Y |
| Cyatheaceae | Cyathea rebeccae (F.Muell.) Domin | Y | | Y | Y | Y | Y |
| | <i>Cyathea cooperi</i> (Hook. ex F.Muell.) Domin | Y | | Y | Y | | Y |
| Cyperaceae | Gahnia aspera (R.Br.) Spreng. | Y | Y | Y | Y | Y | ļ |
| | Scleria polycarpa Boeckeler | | | Y | | Y | |
| Dennstaedtiaceae | Pteridium esculentum (G.Forst.) Cockayne | | Y | Y | | Y | ļ |
| Dichapetalaceae | Dichapetalum papuanum (Becc.) Boerl. | Y | | | Y | | Y |
| Dilleniaceae | Dillenia alata (R.Br. ex DC.) Martelli | Y | | | | | |
| | Hibbertia scandens (Willd.) Gilg | Y | Y | Y | Y | Y | Y |
| | Tetracera daemeliana F.Muell. | Y | | Y | Y | Y | Y |
| | Tetracera nordtiana F.Muell. | Y | Y | Y | Y | Y | Y |
| Dioscoreaceae | Dioscorea transversa R. Br. | | | | | | Y |
| Ebenaceae | Diospyros cupulosa (F.Muell.) F.Muell. | Y | | | | | Y |
| | Diospyros hebecarpa A.Cunn. ex Benth. | | | | | | Y |
| Elaeocarpaceae | Aceratium megalospermum (F.Muell.) Balgooy | Y | | | | | Y |
| | Elaeocarpus bancroftii F.Muell. & F.M.Bailey | Y | Y | | Y | Y | |
| | Elaeocarpus eumunai F.M.Balley | V | | | Y | | <u> </u> |
| | Elaeocarpus foveolatus F.Muell. | Y | | Ŷ | Y | | v |
| | Elaeocarpus granamii F.Nuell | Y | v | v | v | v | Y |
| | Elaeocarpus granais F.Iviuell. | Ŷ | Y | Ŷ | Y | Y | Y |
| | Sloaned australis (Benth.) F.Muell. subsp. australis | V | v | v | Y | v | Y |
| Funda and in a second | Sloanea langii F.Muell. | Y | Y | Ŷ | Y | Y | Y |
| Euphorbiaceae | nomulantinus novoguineensis (warb.) K.Schum. | Y | v | v | v | v | Y |
| | M Dorny | Y | ľ | Y | Y | ľ | ř |
| | Livir city Macaranga subdentata Bonth | v | v | | | | v |
| | Mallotus polyadenos E Muell | v v | | | | | |
| | Omphalea queenslandige E M Pailoy | T V | | v | | | v |
| | Pockinghamia angustifolia (Ponth) Ainy Show | r v | | T | | | T V |
| | nockinghunnu ungustijunu (dentin.) Alfy Slidw | ľ | | | | | T |

| Family | Species | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------|---|---|---|---|---|---|---|
| Fabaceae | Austrosteenisia blackii (F.Muell.) R.Geesink var. blackii | Υ | | | Y | | Υ |
| | Austrosteenisia stipularis (C.T. White) Jessup | | Υ | | | | Υ |
| Flacourtiaceae | Scolopia braunii (Klotzsch) Sleumer | Υ | | Υ | Υ | | Y |
| Flagellariaceae | Flagellaria indica L. | Υ | Υ | Υ | Υ | | Y |
| Gleicheniaceae | Dicranopteris linearis (Burm.f.) Underw. | Υ | | Υ | Υ | | Υ |
| Hemerocallidaceae | Dianella caerulea Sims | Υ | Υ | Υ | Υ | Υ | Υ |
| Hypoxidaceae | <i>Molineria capitulata</i> (Lour.) Herb. | Υ | | Υ | | | |
| Icacinaceae | Apodytes brachystylis F.Muell. | | Υ | | | | Υ |
| Lamiaceae | Clerodendrum floribundum R.Br. | Υ | | | Υ | Υ | |
| Lauraceae | Beilschmiedia bancroftii (F.M.Bailey) C.T.White | Υ | Υ | Υ | Υ | | |
| | Cinnamomum laubatii F. Muell. | | Υ | Υ | Υ | Υ | Υ |
| | Cryptocarya clarksoniana B.Hyland | | | | | Υ | |
| | Cryptocarya grandis B.Hyland | | Υ | Υ | Υ | | |
| | Cryptocarya laevigata Blume | Υ | | | | | |
| | Cryptocarya mackinnoniana F.Muell. | Υ | Υ | Υ | Υ | Υ | Υ |
| | Cryptocarya murrayi F. Muell. | Υ | Υ | | | | |
| | Cryptocarya vulgaris B.Hyland | Υ | Υ | Υ | | | |
| | Endiandra acuminata C.T.White & W.D.Francis | Υ | Υ | Υ | | Υ | Υ |
| | Endiandra hypotephra F.Muell. | Υ | | | Υ | | Y |
| | Litsea bindoniana (F.Muell.) F.Muell. | Υ | Υ | Υ | Υ | Υ | |
| | Litsea leefeana (F.Muell.) Merr. | Υ | Υ | Υ | Υ | Υ | Υ |
| | Neolitsea brassii C.K.Allen | | Υ | | | | Υ |
| | Neolitsea dealbata (R.Br.) Merr. | Υ | Υ | Υ | Υ | Y | Υ |
| Laxmanniaceae | Cordyline cannifolia R.Br. | Υ | Υ | Υ | Υ | Υ | Υ |
| | Eustrephus latifolius R.Br. ex Ker Gawl. | | | Υ | Υ | | |
| | Lomandra longifolia Labill. | | Υ | | | | Y |
| Leptaulaceae | Citronella moorei (F.Muell. ex Benth.) R.A.Howard | Υ | | Υ | | | |
| Loranthaceae | Amyema queenslandica (Blakely) Danser | Υ | | Υ | Υ | | Υ |
| Lygodiaceae | Lygodium reticulatum Schkuhr | Υ | Υ | Υ | Υ | Υ | Υ |
| Maesaceae | Maesa dependens F.Muell. | Υ | Υ | Υ | | | |
| Melastomataceae | Melastoma cyanoides Sm. | | | | Υ | | |
| | Melastoma malabathricum L. subsp. malabathricum | Υ | | Υ | Υ | Υ | Υ |
| Meliaceae | Dysoxylum oppositifolium F.Muell. | | | | | | Υ |
| Menispermaceae | Hypserpa decumbens (Benth.) Diels | Υ | Υ | Υ | Υ | Υ | |
| | Hypserpa laurina (F.Muell.) Diels | Υ | Υ | Υ | Υ | Υ | Υ |
| | Stephania japonica (Thunb.) Miers | Y | | | | Υ | Y |
| | Tinospora smilacina Benth. | | | Υ | Υ | | |
| Mimosaceae | Acacia celsa Tindale | Y | Υ | Υ | Υ | Υ | Y |
| | Acacia cincinnata F.Muell. | Y | Υ | | Y | Υ | Y |
| | Acacia mangium Willd. | | | Υ | Υ | | Y |
| | Acacia melanoxylon R.Br. | Y | | | Υ | | |
| Monimiaceae | Austromatthaea elegans L.S. Sm. | Y | Υ | | | | |
| | Levieria acuminata (F.Muell.) Perkins | | | | Υ | | Y |
| | Palmeria scandens F.Muell. | Υ | Υ | Υ | Υ | Υ | |
| | Steganthera laxiflora (Benth.) Whiffin & Foreman | Y | Y | | Y | Y | Y |
| | subsp. laxiflora | | | | | | |
| | Tetrasynandra longipes Perkins | | | | | | Υ |
| Moraceae | Ficus congesta Roxb. var. congesta | | | Υ | Υ | Υ | |
| | Ficus destruens F. Muell. ex C.T. White | Υ | Υ | | Υ | | Υ |

| Family | Species | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------|---|---|---|---|---|---|---|
| | Ficus fraseri Miq. | | | | Y | Y | |
| | Ficus hispida L.f. var. hispida | | | Y | | | |
| | Ficus opposita Miq. | | | Y | | | |
| | Trophis scandens (Lour.) Hook. & Arn. subsp. scandens | | | | | Υ | Υ |
| Myristicaceae | Myristica insipida R.Br. | | Υ | | Υ | | Υ |
| Myrsinaceae | Ardisia brevipedata F.Muell. | Υ | Υ | Y | Υ | Υ | |
| | Ardisia crenata Sims | | Υ | Y | | | |
| | Embelia caulialata S.T.Reynolds | Υ | | Y | Υ | | |
| | Myrsine subsessilis F.Muell. | Υ | Υ | Y | | Υ | Υ |
| Myrtaceae | Archirhodomyrtus beckleri (F.Muell.) A.J.Scott | Υ | Υ | | Y | Y | Υ |
| | Corymbia torelliana (F.Muell.) K.D.Hill & L.A.S.Johnson | | | | Y | | Υ |
| | Decaspermum humile (G.Don) A.J.Scott | Υ | Υ | | Y | Y | |
| | Eucalyptus tereticornis Sm. | | | | | | Υ |
| | Melaleuca leucadendra (L.) L. | | | | | | Υ |
| | Psidium guajava L.* | | | Y | | | |
| | Rhodamnia sessiliflora Benth. | Υ | Υ | Y | Υ | Υ | Υ |
| | Rhodamnia spongiosa (F.M.Bailey) Domin | | | Y | | | |
| | Rhodomyrtus macrocarpa Benth. | Υ | | | Υ | | |
| | Syzygium fibrosum (F.M. Bailey) T.G. Hartley & L.M. | | | | Υ | | |
| | Perry | | | | | | |
| | Syzygium kuranda (F.M.Bailey) B.Hyland | Υ | Υ | Y | Y | Y | Υ |
| | Syzygium luehmannii (F.Muell.) L.A.S.Johnson | Υ | Y | | Y | Υ | Υ |
| | Syzygium suborbiculare (Benth.) T.G.Hartley & | | | | | | Υ |
| | L.M.Perry | | | | | | |
| | Syzygium wilsonii (F.Muell.) B. Hyland | Υ | | | | | Υ |
| | Tristania exiliflora F. Muell. | | | | | | Υ |
| Oleaceae | Jasminum didymum G.Forst. subsp. didymum | | | Υ | | | Υ |
| Orchidaceae | Cymbidium madidum Lindl. | Υ | Υ | Y | | Υ | Υ |
| Pandanaceae | Benstonea monticola (F.Muell.) Callm. & Buerki | Υ | Υ | Y | Υ | Υ | Υ |
| | Freycinetia excelsa F.Muell. | Υ | | | | | Υ |
| | Freycinetia scandens Gaudich. | Υ | | | | | Υ |
| Passifloraceae | Passiflora edulis Sims* | | | | Υ | | |
| | Passiflora kuranda Krosnick & A.J. Ford | Υ | Υ | | Υ | Υ | Υ |
| Phyllanthaceae | Breynia cernua (Poir.) Muell.Arg. | Υ | | Y | Υ | | |
| | Glochidion harveyanum Domin | | | Y | | | Υ |
| | Glochidion sumatranum Miq. | | | | Υ | | |
| Pinaceae | Pinus caribaea L. | | Υ | | | | |
| Piperaceae | Piper caninum Blume | Υ | Υ | Y | Υ | Υ | Υ |
| | Piper hederaceum (Miq.) A. Cunn. ex C.DC. | | Y | Y | | | Y |
| Pittosporaceae | Bursaria incana Lindl. | | | | | Y | |
| | Bursaria spinosa Cav. subsp. spinosa | | | | Υ | Y | Υ |
| | Pittosporum rubiginosum A. Cunn. | Y | | Y | Y | Y | |
| Poaceae | Imperata cylindrica (L.) Raeusch. | | Y | Y | Y | Υ | |
| | Megathyrsus maximus (Jacq.) B.K. Simon & | _ | | Y | Y | | Y |
| | S.W.L.Jacobs | | | | | | |
| | Melinis repens (Willd.) Zizka* | | | | Y | | |
| | Oplismenus undulatus (Ard.) Roem. & Schult. | Y | | | | | |
| | Urochloa decumbens (Stapf) R.D. Webster* | | | Y | Y | Y | |
| Podocarpaceae | Podocarpus grayae de Laub. | Y | Y | Y | Y | Y | Y |

| Family | Species | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------|---|---|---|---|---|---|---|
| Polygalaceae | Xanthophyllum fragrans C.T. White | Υ | Υ | | Y | | |
| | Xanthophyllum octandrum (F.Muell.) Domin | Υ | | | Υ | Υ | |
| Polypodiaceae | Drynaria rigidula (Sw.) Bedd. | Υ | Υ | Υ | Υ | Υ | |
| | Platycerium bifurcatum (Cav.) C. Chr. | Υ | | Υ | Υ | Υ | Υ |
| Proteaceae | Cardwellia sublimis F. Muell. | Υ | Υ | Y | Υ | Υ | |
| | Carnarvonia araliifolia F.Muell. var. araliifolia | Υ | Υ | Υ | Υ | Υ | Y |
| | Darlingia darlingiana (F.Muell.) L.A.S. Johnson | Υ | Y | Υ | Υ | Υ | Υ |
| | Grevillea hilliana F. Muell. | | | | | | Υ |
| | Musgravea heterophylla L.S. Sm. | Υ | Υ | Υ | Υ | | Υ |
| | Opisthiolepis heterophylla L.S. Sm. | | Υ | Υ | | | |
| | Placospermum coriaceum C.T.White & W.D. Francis | Υ | Υ | Υ | Υ | Υ | Υ |
| Psilotaceae | Psilotum nudum (L.) P. Beauv. | Υ | Υ | Υ | | Υ | |
| Rhamnaceae | Alphitonia petriei Braid & C.T. White | Υ | Υ | Υ | Υ | Υ | Υ |
| | Alphitonia whitei Braid | Υ | Υ | Υ | Y | Υ | Υ |
| Rhizophoraceae | Carallia brachiata (Lour.) Merr. | Υ | | | | | Υ |
| Ripogonaceae | Ripogonum album R.Br. | Υ | Υ | Υ | Y | Y | Υ |
| Rosaceae | Rubus alceifolius Poir.* | Y | Y | Υ | Y | Υ | Υ |
| Rubiaceae | Aidia racemosa (Cav.) Tirveng. | | | | | Υ | Υ |
| | Atractocarpus fitzalanii (F.Muell.) Puttock | | | | Υ | | Υ |
| | Coelospermum paniculatum F.Muell. | | Υ | | | | Υ |
| | <i>Coffea liberica</i> W.Bull. ex Hiern* | | | Υ | Υ | | |
| | Cyclophyllum coprosmoides (F.Muell.) S.T.Reynolds & | Υ | | Υ | | | Υ |
| | R.J.F.Hend. | | | | | | |
| | Gardenia ovularis F.M.Bailey | Y | Y | Y | Y | Υ | Υ |
| | Psydrax attenuata (Benth.) S.T. Reynolds & R.J.F. | | | | Y | | Υ |
| | Hend. | | | | | | |
| | Spermacoce latifolia Aubl.* | | | Y | | | |
| Rutaceae | Acronychia acronychioides (F.Muell.) T.G.Hartley | Y | Y | | Υ | Υ | |
| | Acronychia laevis J.R.Forst. & G.Forst. | Y | | | | | Y |
| | Brombya platynema F.Muell. | Y | Y | | Y | | Y |
| | Flindersia bourjotiana F.Muell. | Y | Y | | | Y | |
| | Flindersia ifflaiana F.Muell. | Y | Y | | Y | Y | Y |
| | Flindersia pimenteliana F.Muell. | | Y | | Y | | |
| | Medicosma fareana (F.Muell.) T.G. Hartley | | Y | | | | Υ |
| | Melicope bonwickii (F. Muell.) T.G. Hartley | | Y | | Y | | Y |
| | Melicope elleryana (F.Muell.) T.G. Hartley | | Y | Y | Y | Y | Υ |
| | Melicope xanthoxyloides (F.Muell.) T.G. Hartley | Y | Y | Y | Y | Y | |
| | Pitaviaster haplophyllus (F.Muell.) T.G. Hartley | | | Y | | | |
| | Tarenna dallachiana (F. Muell. ex Benth.) S. Moore | Y | | Y | | | |
| Sapindaceae | Castanospora alphandii (F.Muell.) F.Muell. | | | Y | | | |
| | Elattostachys microcarpa S.T.Reynolds | Y | | | | | Y |
| | Ganophyllum falcatum Blume | | | Y | | | |
| | <i>Guioa acutifolia</i> Radlk. | Y | Y | Y | Y | Y | Y |
| | Guioa lasioneura Radlk. | | Y | | | | Y |
| | Harpullia rhyticarpa C.T.White & W.D.Francis | Y | | Y | | | Y |
| | Jagera pseudorhus (A.Rich.) Radlk. var. pseudorhus | L | | Y | | | |
| | Mischocarpus exangulatus (F. Muell.) Radlk. | Y | | Y | Y | | |
| | Mischocarpus grandissimus (F. Muell.) Radlk. | | Y | | | | Y |
| | Mischocarpus lachnocarpus (F.Muell.) Radlk. | Y | Y | Y | Y | Y | Y |

| Family | Species | 1 | 2 | 3 | 4 | 5 | 6 |
|-----------------|--|---|---|---|---|---|---|
| | Rhysotoechia robertsonii (F. Muell.) Radlk. | Υ | Υ | Y | Y | Y | |
| | Sarcopteryx reticulata S.T.Reynolds | Υ | Υ | Y | Y | Υ | Υ |
| | Sarcotoechia serrata S.T.Reynolds | Υ | Υ | Y | Υ | Υ | Υ |
| | Synima cordierorum (F.Muell.) Radlk. | Υ | Υ | | Y | Υ | Υ |
| | Toechima daemelianum (F.Muell.) Radlk. | Υ | | | | | Υ |
| | Toechima erythrocarpum (F.Muell.) Radlk. | Υ | Υ | Y | Y | | Υ |
| Sapotaceae | Planchonella chartacea (F.Muell. ex Benth.) H.J.Lam | Υ | Υ | Y | Y | Υ | Υ |
| | Planchonella pohlmaniana (F.Muell.) Pierre ex Dubard | | Υ | | Y | | Υ |
| Schizaeaceae | Lygodium reticulatum Schkuhr | | | Y | Y | Υ | |
| Smilaceae | Smilax australis R.Br. | | | Y | | Υ | |
| Sparrmanniaceae | Trichospermum pleiostigma (F.Muell.) Kosterm. | | Υ | | Υ | | |
| Sterculiaceae | Brachychiton acerifolius Macarthur | Υ | Υ | | | | Υ |
| | Franciscodendron laurifolium (F.Muell.) B.Hyland & | Υ | Υ | | | | Υ |
| | Steenis | | | | | | |
| Symplocaceae | Symplocos puberula Jessup | Υ | Υ | Y | Υ | | Υ |
| Thymelaeaceae | Lethedon setosa (C.T.White) Kosterm. | Υ | Υ | Y | | Υ | Υ |
| Urticaceae | Dendrocnide moroides (Wedd.) Chew. | | | | | | Υ |
| Verbenaceae | Stachytarpheta jamaicensis (L.) Vahl* | | | Y | Υ | | Υ |
| | Duranta erecta L.* | Υ | Υ | Y | Υ | Υ | Υ |
| | Lantana camara L.* | Υ | Υ | Y | Υ | Υ | Υ |
| Vitaceae | Cissus hypoglauca A.Gray | Υ | | Y | Υ | | Υ |
| | Cissus penninervis (F.Muell.) Planch. | Υ | Υ | Y | Υ | Υ | Υ |
| Vittariaceae | Vittaria elongata Sw. | | | | Υ | | Υ |
| Winteraceae | Bubbia semecarpoides (F. Muell.) B.L. Burtt. | Y | | | | | Y |
| Zingiberaceae | Alpinia caerulea (R.Br.) Benth. | Υ | | | | | Y |

2.2 Habitats

Three general habitat types were noted in the clearing impact areas. These have been mapped in Figure 5.

2.2.1 Cleared areas

These areas are not 'in the wild' and were not surveyed. They include areas that have been clear for many years, and are largely dominated by lantana or signal grass, and areas that have recently been cleared by the proponent.

2.2.2 Wattle-dominated non-remnant regrowth

These are the areas proposed to be cleared by the proponent – **all areas proposed to be cleared are located in this habitat type**. They are generally characterised by advanced regrowth approximately 20 years old – from historical aerial photography these areas appear to have commenced reestablishing in the mid-1990s. They are dominated by *Acacia celsa* and *A. cincinnata,* with the following species also well-represented in all areas of this habitat type:

- Polyscias australiana (Araliaceae)
- Sloanea langii (Elaeocarpaceae)
- Macaranga involucrata var. mallotoides (Euphorbiaceae)
- Cryptocarya mackinnoniana and Litsea leefeana (Lauraceae)
- Hypserpa laurina (Menispermiaceae)

- Rhodamnia sessiliflora and Syzygium kuranda (Myrtaceae)
- Benstonea monticola (formerly Pandanus monticola) (Pandanaceae)
- *Carnarvonia araliifolia* var. *araliifolia, Darlingia darlingiana* and *Placospermum coriaceum* (Proteaceae)
- Alphitonia petriei and whitei (Rhamnaceae)
- Gardenia ovularis (Rubiaceae)
- *Guioa acutifolia, Mischocarpus lachnocarpus, Sarcopteryx reticulata* and *Sarcotoechia serrata* (Sapindaceae)
- Planchonella chartacea (Sapotaceae).

Vines commonly encountered were:

- Calamus australis (Arecaceae)
- Tetracera nordtiana (Dilleniaceae)
- Piper caninum (Piperaceae)
- Cissus penninervis (Vitaceae).

In general, these areas were characterised by a lower species diversity and tree density – they are relatively easily traversed and species abundance is lower than in remnant mesophyll/notophyll vine forest (which is the 'climax' representation toward which this habitat type is heading).

In places along creeks, primarily beside transects two and five (but also present beside all other transects), dense 'thickets' of lantana and raspberry have taken over, to the exclusion of most other species. These thickets were generally present on alluvial flats and in the creek beds of those creeks that may have more ephemeral flows. In places the lantana and raspberry was three metres high. This vegetation can be difficult to map out and is incorporated into the areas mapped as wattle regrowth or (in some cases) as remnant mesophyll-notophyll vine forest.

2.2.3 Remnant mesophyll/notophyll vine forest

These areas are mapped as remnant on regional ecosystem mapping, and *generally* have not been cleared (at least, no clearing is evident in aerial photos going back to 1942).

They include the following regional ecosystems:

- 7.11.1a: Mesophyll vine forest. Lowlands and foothills on metamorphics. Very wet and wet rainfall zones. This community is located adjacent to area 1.
- 7.11.7a: Complex notophyll vine forest (with emergent *Agathis robusta*). Foothills and uplands. Moist rainfall zone. This community is located adjacent to area 5.

3 Qualifications of survey team

The survey was led by Simon Danielsen (CV is included as Appendix E). Simon is considered to be a 'suitably qualified person' for this survey because:

- He has a Bachelor of Science (Australian Environment Studies) (awarded 2000).
- He has five years experience working in Wet Tropics rainforests, including three years as a ranger with Skyrail in Barron Gorge National Park, and two years leading regular walking trips in Wooroonooran National Park.
- He has ten years experience in conducting flora surveys in Queensland, including in the Wet Tropics, Cape York Peninsula, Brigalow Belt, Central Queensland, Einasleigh Uplands and South East Queensland bioregions (for details see Appendix E).
- He has recently logged over 300 botanical determinations as a volunteer botanist at the Bangkok Forestry Herbarium in Thailand, including many of the families present at this survey site.

Simon was assisted by Mr Tore Linde, a Skyrail Ranger with 18 years experience in the identification of rainforest species in the Kuranda area. Mr Linde has conducted weekly phenology surveys from the Skyrail cableway and worked in the rainforest on a daily basis for most of his 18 year tenure at Skyrail. He has extensive knowledge of the rainforest species in Barron Gorge National Park, and the Kuranda/Smithfield area in general. Tore's CV is also included in Appendix E.

4 Potential impacts and mitigative measures

4.1 Potential impacts and mitigation measures

The potential impacts expected from this clearing are outlined below.

4.1.1 Impacts to threatened species

No threatened flora species were detected in the clearing impact areas (that is, within the clearing areas or a 100 m buffer). Fauna species that may utilise these areas include the Kuranda tree frog and the Australian lacelid (*Litoria dayi*) (Hoskin, 2007). Vegetation buffers of 60 m from all creeks on the property have been adopted to ensure habitat for both species is retained. This will also assist to protect water quality in these creeks, which are ephemeral and have either no or very low flow in most dry seasons.

4.1.2 Impacts from soil erosion and sedimentation

Exposure of soil in this area can result in soil erosion and associated sedimentation of waterways. This is particularly an issue on slopes and where sub-surface sections of the soil profile are exposed, especially during the wet season.

As outlined above, native vegetation buffers of 60 m will be retained adjacent to all waterways. This will assist to filter any overland flows from clearing areas. In addition, a sediment and erosion management plan prepared by a suitably qualified engineer will be implemented immediately after areas are cleared, to ensure that best practice sediment and erosion management standards are adopted.

4.1.3 Impacts to remnant vegetation and buffer areas

If clearing areas are not well-defined, clearing of regrowth may impact on adjacent areas of remnant vegetation and waterway corridors. The outer edge of all remnant vegetation areas have been identified on the ground using a mapping program on a GPS equipped 'tablet'. The boundary between areas proposed for clearing and those to be retained will be clearly marked with flagging tape and the bulldozer driver will be walked over the boundary so he will be familiar with it.

4.2 Summary

In summary, mitigation measures adopted for this clearing will be:

- Impacts to threatened species:
 - \circ $\;$ No threatened flora species are located within the clearing impact areas.
 - Vegetation buffers of 60 m will be retained adjacent to all waterways, meaning all waterways will have 120 m corridors after clearing is finished.
- Impacts from soil erosion and sedimentation:
 - All waterways will be buffered by a 120 m corridor of retained vegetation (60 m each side of the waterway).
 - A sediment and erosion management plan to be prepared by a suitably qualified engineer will be prepared and will be implemented as soon as possible on the completion of clearing in an area.
- Impacts to remnant vegetation and buffer areas:

- The outer edge of remnant vegetation areas adjacent to the proposed clearing areas have been identified using a GPS-equipped mapping program, and no clearing will occur in remnant areas.
- The boundary between areas to be cleared and those to be retained will be clearly marked with flagging tape, and the bulldozer driver will be walked over the boundary to ensure he is familiar with it.

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