



South East Queensland Horse Trail Network Interim Assessment: Springbrook & Nerang National Parks



**Queensland
Government**

Prepared by: Ecological Sciences, Queensland Herbarium and Biodiversity Science, Department of Environment and Science

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Introduction:

Springbrook National Park covers 6,558ha and is comprised of four main sections—Springbrook plateau, Mount Cougal to the southeast, and Natural Bridge and Numinbah to the west (QPWS 2013a). As early as 1879 the Numinbah area was proclaimed as timber reserve covering some 16,956ha extending to the Springbrook plateau. Most of this area was released for timber cutting, leaving only 2,258ha in the valley as state forest—gazetted in 1915. By the end of the 1920s large areas of Numinbah Valley had been cleared and dairy farms were expanding. Warrie National Park in the Canyon area was declared in 1937, followed by Purling Brook Falls in 1940. Other sections of the national park were progressively declared from 1941–1973. Springbrook Conservation Park was declared in 2008 (QPWS 2013a).

In 1994, Springbrook National Park was included in the World Heritage listed Gondwana Rainforests of Australia and World Heritage Area. The rainforests, eucalyptus forests and montane heath provide habitat to many threatened species. The landscape is of significant cultural value to Traditional Owners including the people of the Yugambah language region. The people of the Yugambah language region have been identified as the Wangerriburra, Birinburra, Gugingin, Migunberri, Mununjali, Bollongin, Minjungbal and Kombumerri (QPWS 2013a).

The topography of Nerang National Park is steep and rugged with deep gullies and narrow wetlands at lower elevations. Erosion of steep sections of the trail network necessitates regular maintenance. The Nerang district is undergoing rapid urban development. Increasing vandalism, arson and illegal dumping within the park is adversely impacting high quality visitor experiences, the control of weeds and other pests and the objectives of best practice fire management. Nerang is within the Yugembeh language region. (QPWS 2013b).

Horse riding has long been a part of the Queensland lifestyle, and many southeast Queensland forests are valued by horse riders as safe and scenic places to ride, although the number of riders is low (DERM 2011; Rossi *et al.* 2013). The south-east Queensland horse-riding trail network (HTN) includes more than 500km of trails within 29 reserves between Gympie and the State's southern border. The HTN trails link to a broader trail network that includes about 340km of trails in Queensland's forest plantations and at least 470km of trails on other tenures, including several other State Forests (DERM 2010).

Road and trail networks within native forest ecosystems are fundamental in providing access for the purposes of recreational use, extraction of forest products, fire control and routine resource management (Ngugi *et al.* 2014). However disturbance associated with road construction and maintenance, as well as use by vehicles, cyclists, motorbikes, walkers and horses, increase the risk of invasion by non-native (weed) plant species along roads (Potito and Beatty 2005; Ansong and Pickering 2013). Once established in disturbed road verges, some invasive species may colonise adjacent undisturbed native vegetation (Ngugi *et al.* 2014).

Non-native species that become established in natural ecosystems compete with native species for available resources and can replace native species to the detriment of organisms that depend

on these native species (Gower 2008). For example, non-native plant species have rapidly invaded and successfully displaced native species in many conservation areas in Australia (Ngugi and Neldner 2017) and buffel grass (*Cenchrus ciliaris*) forms monocultures in pasture lands of Queensland (Butler and Fairfax 2003).

Multiple vectors including vehicles, machinery, soil movement, animals, wind, water, and humans are involved in the spread of non-native species along forest trails (Ngugi *et al.* 2014). Horses have been implicated as significant vectors in the introduction of plant species observed adjacent to horse trails in nature reserves (Gower 2008). The risks associated with horse riding include seed movements through horse dung, hair, hoof debris, riders, and riding equipment. In a review of world-wide studies analysing the potential dispersal of weeds through horse dung, Ansong and Pickering (2013a) identified 156 naturalised plant species in Australia that germinate from horse dung. Other reported negative impacts from horse use include trampling of vegetation and soils, nutrient addition through urine and dung, introduction of pathogens, as well as enhanced erosion and sediment run-off. All these impacts may trigger changes in species composition of adjacent native ecosystems.

The objective of the Horse Trails Scientific Monitoring Program (DERM 2010) is to monitor horse riding on the Southeast Queensland Horse Riding Trail Network that traverses through Southeast Queensland protected areas, identify any impacts of such use, and recommend management actions to address such impacts. Studies relating to the social, erosional and water quality impacts of horses and horse riding are available on the DES website ([Monitoring and managing potential impacts | Parks and forests | Department of Environment and Science, Queensland \(des.qld.gov.au\)](http://des.qld.gov.au)).

This monitoring program was initiated in 2009 and established 52 paired long-term monitoring sites along designated horse trails located in conservation reserves in seven National Parks in southeast Queensland (Figure 1). These monitoring sites examine (1) the invasion and extent of non-native plant species along the management roads designated as horse trails; and (2) changes in BioCondition over time of vegetation adjacent the horse trails.

Methods:

Study location

Springbrook and Nerang National Parks were assessed at three sites containing a total of six transects in three Regional Ecosystems (REs) shown in Table 1. Springbrook North section covers 2281.5 hectares and Nerang National Park covers 1653.4 hectares. The monitoring sites for this extensive National Park were distributed across the landscape to sample different conditions. The three REs are 12.12.14, 12.11.24 and 12.11.25 and Technical Descriptions (TDs) for these REs are presented in Appendix 2. The TDs are detailed descriptions of the normal range in structure and floristic composition of remnant regional ecosystems and their component vegetation communities.

Table 1. Summary statistics for monitoring sites at Springbrook NP and Nerang NP arranged by regional ecosystem.

National Park	Regional Ecosystem	Surface area (ha)	Proportion of park/reserve (%)	No. of transects examined
Springbrook	12.12.14 Shrubby woodland usually of rocky near coastal areas on igneous rocks	59.8	2.6	2
Nerang	12:11.24 <i>Eucalyptus carnea</i> , <i>E. tindaliae</i> , <i>Corymbia intermedia</i> +/- <i>E. siderophloia</i> or <i>E. crebra</i> woodland on metamorphics +/- interbedded volcanics	975.2	58.9	2
Nerang	12.11.25 <i>Corymbia henryi</i> and/or <i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> +/- <i>E. crebra</i> , <i>E. carnea</i> , <i>E. tindaliae</i> woodland on metamorphics +/- interbedded volcanics	500.4	30.3	2

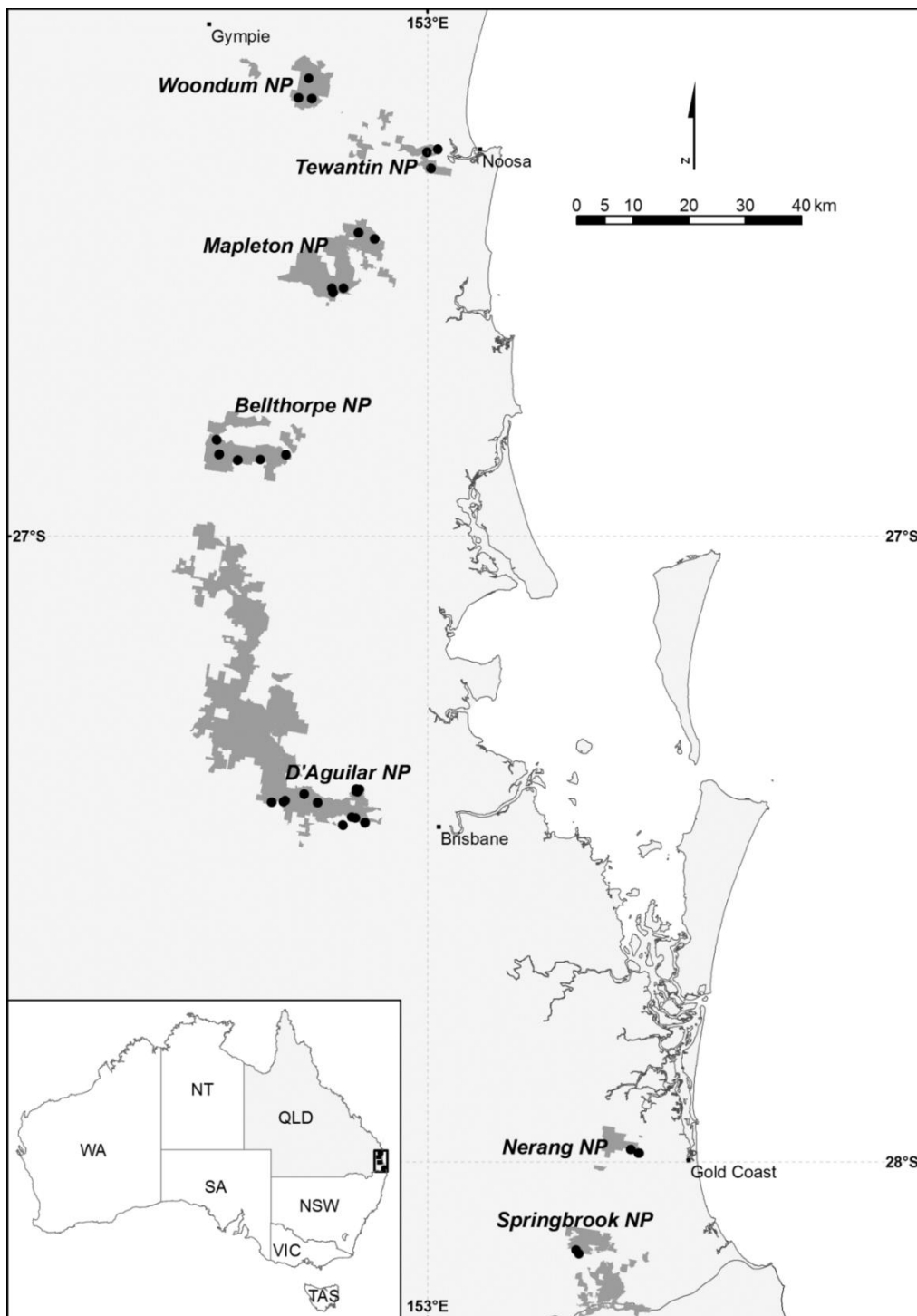


Figure 1. Map of Australia showing Queensland State, location of the seven National Parks (NP) in southeast Queensland that have designated horse trail network, and distribution and location of study sites (Ngugi *et al.* 2014).

Site selection and Sampling

Permanent sites for vegetation monitoring were established in 2012 along the horse trail network in Springbrook and Nerang National Parks and monitored in 2016 and 2019. Sites were overlaid where possible on existing ecological research plots used for vegetation mapping and classification purposes (Neldner *et al.* 2022), or native forest permanent plots used for long-term monitoring of forest growth (Ngugi *et al.* 2015), allowing surveys to add to existing valuable datasets. The data collection method is described in Ngugi *et al.* (2014).

1. Assessing impact of non-native species on the vegetation along management roads

Vegetation growing adjacent to the horse trail network was sampled using 20 m transects laid out perpendicular to the trail edge on both sides of the trail. The trail edge was defined as the shoulder edge of the trail surface where vegetation growth is evident, and from which point vegetation cover continues into the adjacent vegetation. Along each transect a total of eight quadrats were sampled. At the start of the transect five contiguous 1 x 1 m quadrats extending from the trail edge to 5 m into the forest were sampled to estimate spread of non-native species. Contiguous plots were used to accurately determine the distance of influence from the trail edge that was impacted by non-native species. In addition, 1x1 m plots were sampled at 10 m, 15 m, and 20 m along the transect line. In each 1x1 m plot, all plant species were recorded, and the projective foliage cover of each ground layer species (less than 1.5 m in height) was estimated. Cover was also assessed for leaf litter, bare-ground and coarse woody debris (> 10 cm diameter) as a percentage of the total area in each quadrat (1 m²) (Ngugi *et al.* 2014). This sampling design is very similar to that used by Potito and Beatty (Potito and Beatty 2005) and Gower (Gower 2008).

2. Assessing the condition of the forest regional ecosystems

To sample the species diversity and cover composition in the relatively less disturbed adjacent native forest at each location, a 50 x 10 m forest transect was established parallel to the horse trail and 25 m from the trail edge. All vascular plant species observed within the transect were recorded and the cover of ground stratum species was assessed in five 1x1 quadrats along the transect midline. Comprehensive sampling of the structure and floristics of the forests followed the standard Queensland Herbarium vegetation survey methodology (Neldner *et al.* 2022) used

for collecting data for the Queensland Biodiversity and Ecology Information System (QBEIS) and allowed each site to be assessed for their BioCondition (Eyre *et al.* 2015).

Plant species identification and categorisation

All herbaceous and woody vascular species observed within each plot were identified to species in the field where possible. Where necessary specimens were collected and brought to the Queensland Herbarium for identification. Where available material was insufficient to identify species, identity was recorded at genus level. Nomenclature, and native and non-native status follows the Census of Queensland Flora 2021 (Brown 2021). Characterisation of species as environmental weeds, weeds of national significance and/ or declared weeds under State legislation was done using the online facility maintained by the Queensland Department of Agriculture, Fisheries and Forestry (QPWS 2022).

Results:

Springbrook and Nerang National Parks were assessed at three sites containing a total of six transects across three Regional Ecosystems (RE's). Detailed results for the non-native species richness and vegetation cover, and BioCondition scores for the transects at each site are provided in the report cards in Appendix 1.

A summary of weed species richness and cover in the trail-edge transect is presented in Table 2. The highest observed mean cover of non-native species in the trail edge was 60.4% recorded at Nerang 2B and was dominated by *Melinus minutiflora*. The highest number of non-native species recorded at the trail-edge at both Parks was two. Within the QBEIS transect, the highest mean cover of non-native species was 0.3% (Table 2). The highest mean of non-native species richness in the QBEIS sites was four species with majority of QBEIS sites having less than four species (Table 2).

BioCondition score among all the sites ranged from 65 to 91% on a 0 to 100% scale (the higher the score the better the condition) and the lowest mean score was 65%, indicating that most sites were in reasonable condition (Table 3). The highest BioCondition scores were recorded in RE 12.11.25 in Nerang with the mean ranging from 73 to 80%.

Table 2. Mean and range of non-native cover*, and absolute numbers (richness) of non-native species identified per visit at each sampled regional ecosystem within Springbrook and Nerang National Parks. Values for both trail-edge and QBEIS transects are shown.

Regional Ecosystem	Sites	Site Visit	TRAIL-EDGE TRANSECTS				QBEIS TRANSECTS			
			Cover mean (%)	Cover range (%)	Species mean (count)	Species range (count)	Cover mean (%)	Cover range (%)	Species mean (count)	Species range (count)
12.11.24 <i>Eucalyptus carnea</i> or <i>E. tindaliae</i> , <i>Corymbia intermedia</i> +/- <i>E. siderophloia</i> or <i>E. crebra</i> woodland on metamorphics +/-interbedded volcanics	Nerang 2B	1	60.4	60.4	2	2	0.25	0.25	4	4
		2	7.3	7.3	2	2	0.3	0.3	2	2
		3	0	0	0	0	0	0	1	1
12.11.25 <i>Corymbia henryi</i> and/or <i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> +/- <i>E. crebra</i> , <i>E. carnea</i> , <i>E. tindaliae</i> woodland on metamorphics +/-interbedded volcanics	Nerang 1A, Nerang 1B, Nerang 2A	1	0	0	0	0	0.14	0 – 0.25	4	2 – 6
		2	0	0	0	0	0	0	2	1 – 3
		3	0.6	0 - 1.7	1	0 - 2	0	0	2	1 - 2
12.12.14 <i>Eucalyptus racemosa</i> subsp. <i>racemosa</i> +/- <i>Lophostemon confertus</i> , <i>Syncarpia glomulifera</i> , <i>Eucalyptus acmenoides</i> woodland to open forest usually on rocky near coastal areas on Mesozoic to Proterozoic igneous rocks	Springbrook 19830A, Springbrook 19830B	1	0.1	0 – 0.3	1	0 - 1	0	0	1	1
		2	0	0	0	0	0	0	1	1
		3	0	0	0	0	0	0	1	1

*non-native cover is the sum of weeds recorded in the ground and shrub layers (Eyre et al. 2015)

Table 3. Mean and range of BioCondition scores for the QBEIS (forest) sites summarised by regional ecosystem within Springbrook and Nerang National Parks.

Regional Ecosystem	Sites	Site Visit	BioCondition mean (%)	BioCondition range (%)
12.11.24 <i>Eucalyptus carnea</i> or <i>E. tindaliae</i> , <i>Corymbia intermedia</i> +/- <i>E. siderophloia</i> or <i>E. crebra</i> woodland on metamorphics +/- interbedded volcanics	Nerang 2B	1	84	84
		2	67	67
		3	65	65
12.11.25 <i>Corymbia henryi</i> and/or <i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> +/- <i>E. crebra</i> , <i>E. carnea</i> , <i>E. tindaliae</i> woodland on metamorphics +/- interbedded volcanics	Nerang 1A, Nerang 1B, Nerang 2A	1	87	83 – 89
		2	84	81 – 91
		3	87	86 – 89
12.12.14 <i>Eucalyptus racemosa</i> subsp. <i>racemosa</i> +/- <i>Lophostemon confertus</i> , <i>Syncarpia glomulifera</i> , <i>Eucalyptus acmenoides</i> woodland to open forest usually on rocky near coastal areas on Mesozoic to Proterozoic igneous rocks	Springbrook 19830A, Springbrook 19830B	1	74	67 – 81
		2	73	62 – 83
		3	80	73 – 87

Discussion and Conclusion

This study investigated the impacts of horse riding along horse trails and the risk of horses acting as vectors in the introduction of non-native plant species adjacent protected areas within Springbrook and Nerang National Parks in southeast Queensland.

Non-native species

The construction, maintenance and use of horse trail networks that traverse native vegetation may predispose these ecosystems to invasion by non-native plant species (Ngugi *et al.* 2014). However, following repeated and comprehensive sampling of one site (two transects) at Springbrook National park and two sites (four transects) at Nerang National Park, across three sampling time points (2012, 2016 and 2019) - both National Parks showed low levels of invasion by non-native species.

Most weeds found in Springbrook and Nerang National Parks were present sporadically across time with occurrences at specific time points before becoming absent at subsequent samplings. For example, *Melinis minutiflora* was dominating Narang 2B at the first site visit, but QPWS brought it under control and none of it was recorded in subsequent site visits. *Ochna serrulata* was the only non-native species to be consistently present at all sampling time points and was localised in the forest transect of site 2A in Nerang National Park. The only non-native species that was present at both Springbrook and Nerang National Parks was *Lantana camara*. All remaining non-native species were unique to each National Park and did not occur at both.

Springbrook National Park was found to have had minimal incursion of non-native species, with only two weed species occurring at site 19830A - *Solanum mauritianum* and *Gamochaeta coarctata*, with sparse cover were found only in 2012 without any recurrence in subsequent samplings. Site 19830B at Springbrook had *Lantana camara* present only in 2016 and *Cirsium vulgare* only in 2019.

Simiarly, Nerang National Park showed minimal incursion by non-native species, but had a more consistent presence of *Lantana camara* though at very low cover, which occurred at all examined sites. *Lantana camara* was found exclusively in the QBEIS (forest) sites within Nerang National Park with no representatives at the trail-edge transects, suggesting a preference for the deeper, less disturbed forest sites. The presence of non-native plants in the forest transects without representatives in the transects adjacent to the trail-edge suggests complex modes of seed dispersal that may not be exclusively dependent on horse trail networks (Ngugi *et al.* 2014). Other such vectors may include mammals and birds (Willson and Crome 1989) and athropogenic vectors such as clothing and vehicles (Ansong & Pickering., 2014). The

absence of non-native species may be the result of active weed management by National Park authorities that include chemical spraying and the use of fire (QPWS 2012; Ngugi *et al.* 2014).

BioCondition scores within the forest transects

Both Springbrook and Nerang National Parks had relatively good BioCondition scores overall, however site 19830A in Springbrook showed a moderate score. This was primarily due to a lack of large trees and hence reduced ecologically dominant layer and subcanopy cover. Native perennial grass was low in 2016 but reached benchmark level by 2019. Site 2B in Nerang National Park had a declining BioCondition score due to a loss of large trees following the 2012 sampling. Perennial grass cover appeared to decline after the 2012 sampling which further reduced the overall score. All other examined sites showed consistently high BioCondition scores despite the occurrence of fires in 2014/2015 within Nerang National Park and 2018 in Springbrook National Park.

Conclusion

Threat of incursion by non-native species is present in both Springbrook and Nerang National Parks and both parks presently have low levels of incursion. This is likely due to continued and active usage of trails for recreation and mechanical maintenance of the trails. Since the start of the horse trail monitoring there has been a growing increase of mountain bike tracks and riders, resulting in considerable erosion along the bike tracks. QPWS&P management has kept up with non-native species eradication along trail edges, however there is a low level of infestation by non-native species that will require continued monitoring.

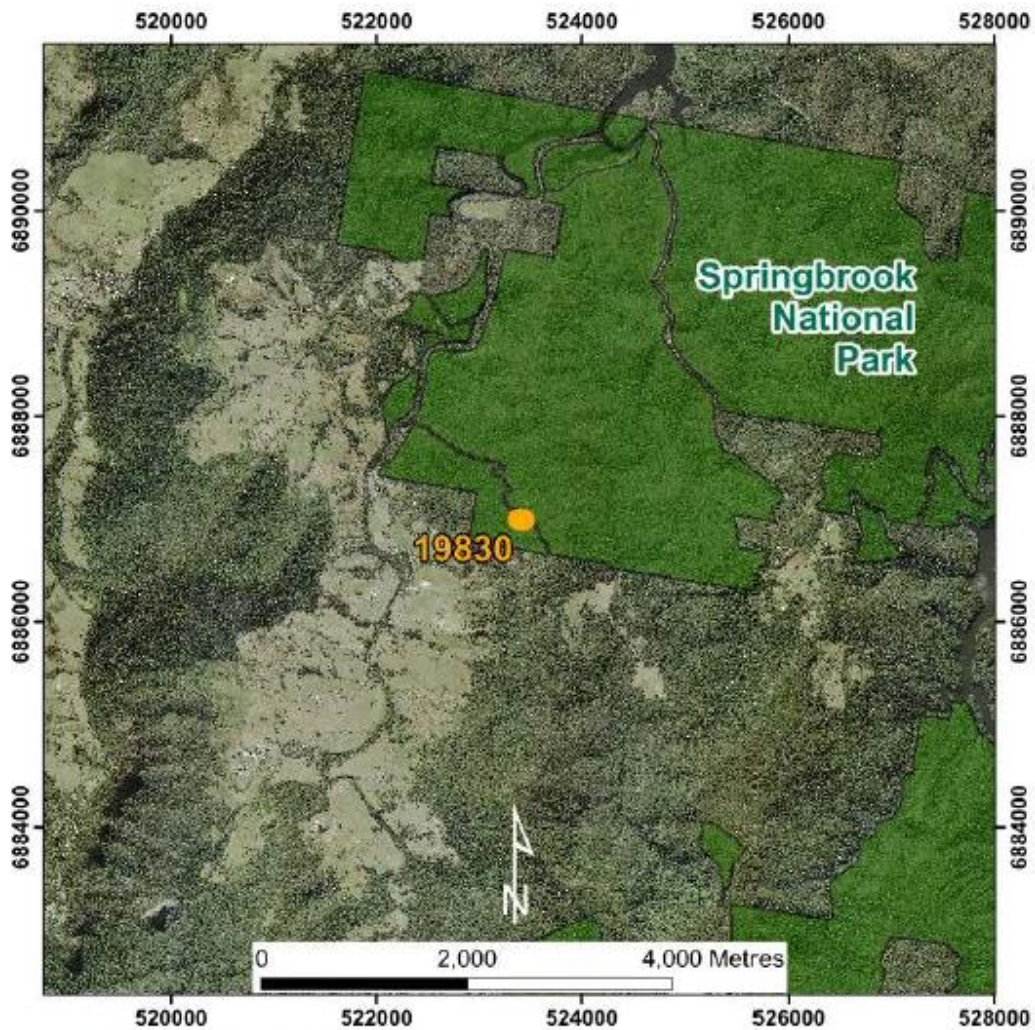
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Appendix I. Site report cards



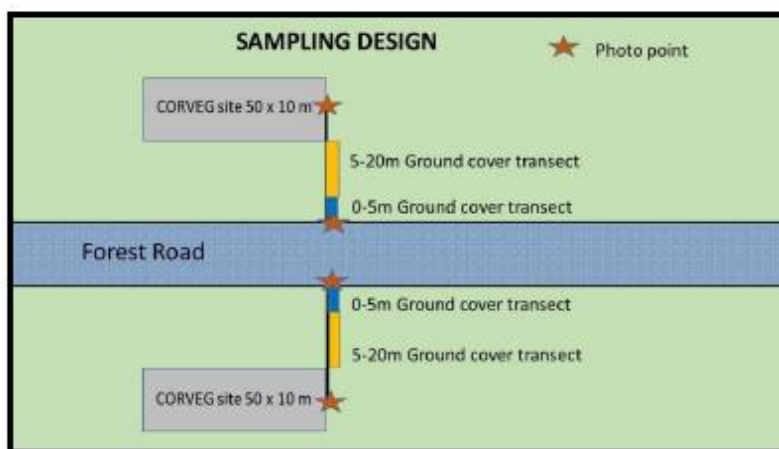
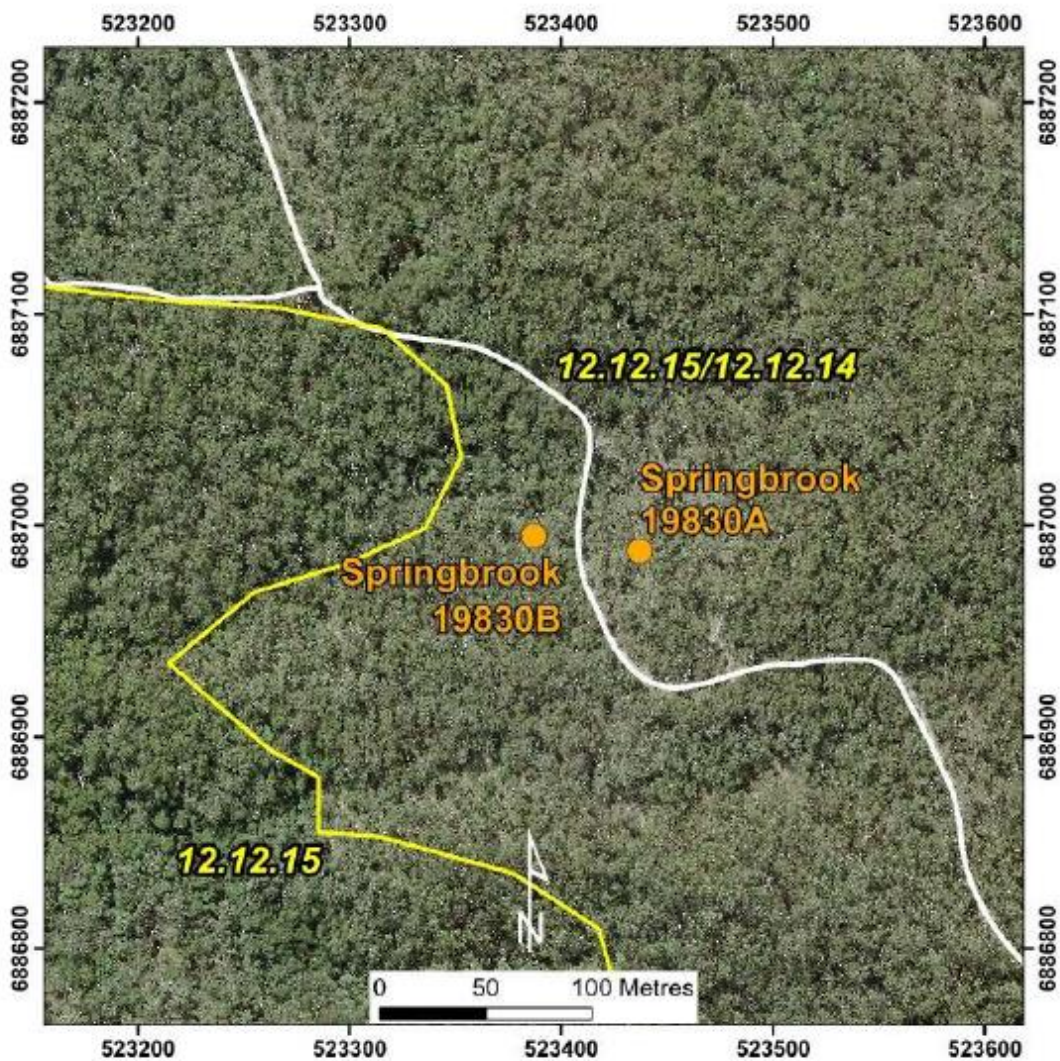
SEQ Monitoring Report Card

Springbrook 19830A

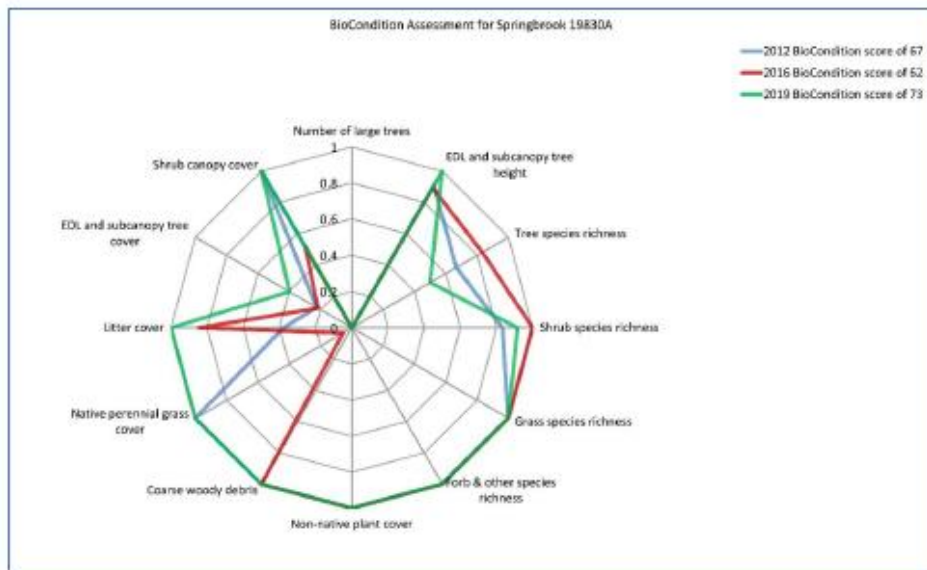
Regional Ecosystem 12.12.14

Corymbia gummifera, *Eucalyptus carnea*, *Eucalyptus fusiformis* open forest

Queensland Herbarium, October 2021



QBEIS Site BioCondition monitoring



Radar diagram of BioCondition Scores by attribute and year sampled
 BioCondition scores: 2012 – 67 2016 – 62 2019 – 73
 Fire History: Burnt September 1996



Forest monitoring transect March 2016

Forest monitoring transect August 2019

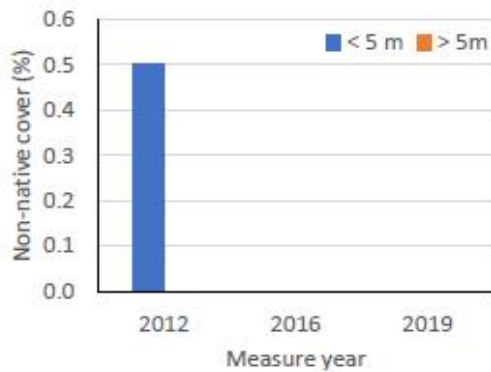
General Comments: This site consistently had a moderate BioCondition score. It consistently lacked large trees, and the EDL and subcanopy was always below the benchmark value. The native perennial grass cover was low in 2016 but had reached benchmark values in 2019.

Trail-edge ground cover transect at Springbrook 19830A

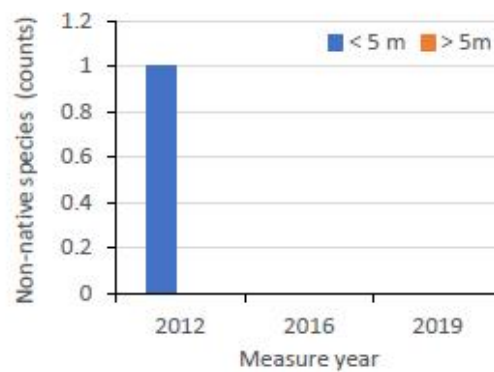


Trail-edge transect September 2012

Trail-edge transect August 2019

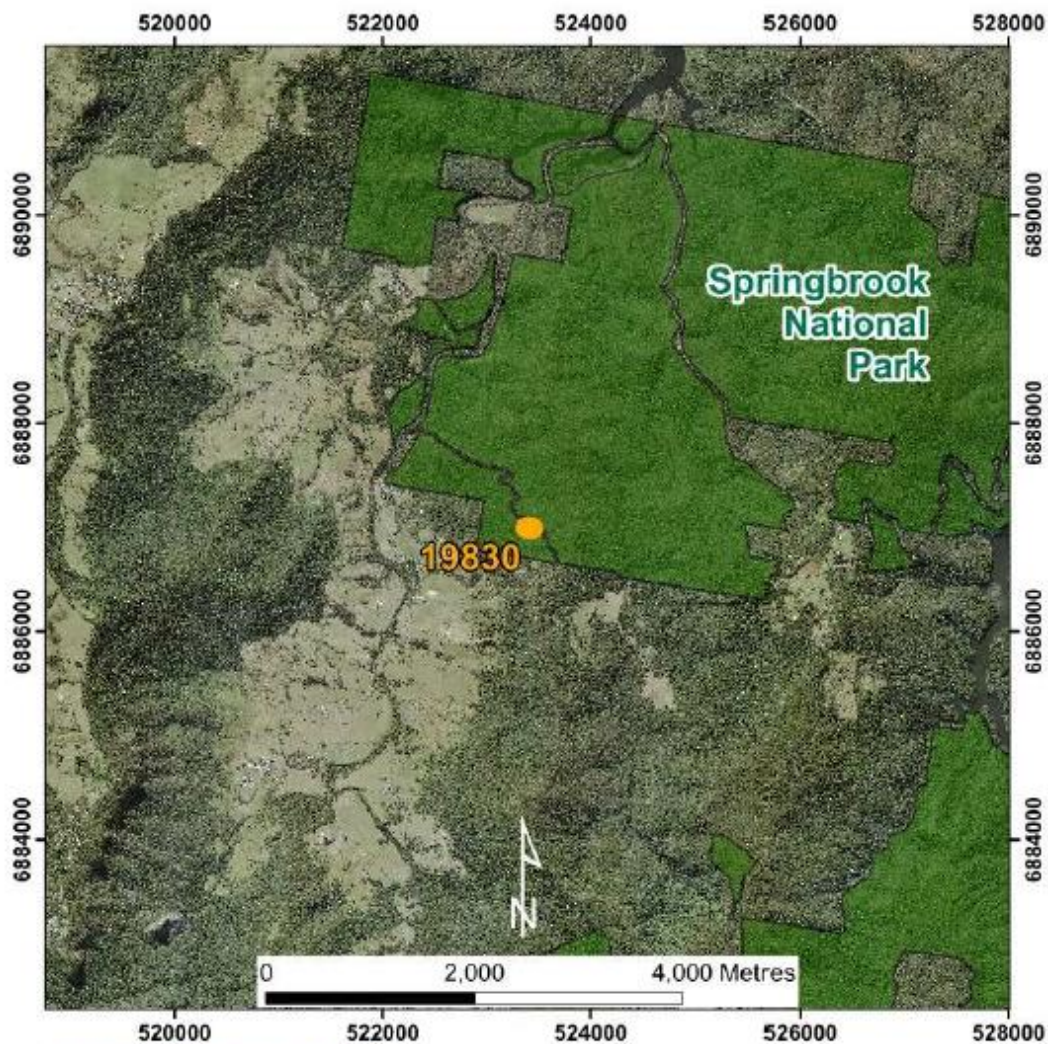


Non-native species cover



Number of non-native species

General comments: The only non-native species recorded in the trail-edge transect was sparse individuals of *Gamochaeta coarctata* which were only recorded in 2012. The only non-native species recorded in the QBEIS site was *Solanum mauritianum* in 2012.



SEQ Monitoring Report Card

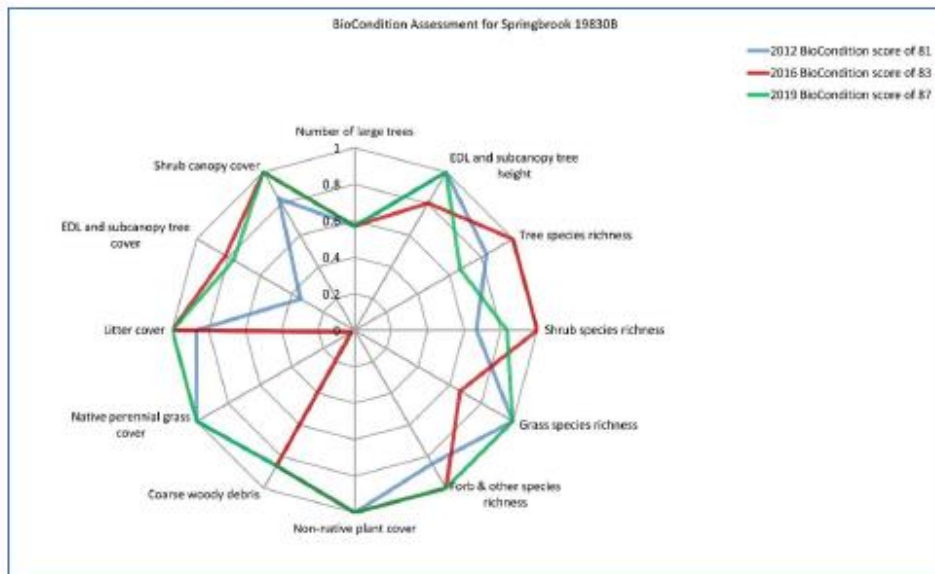
Springbrook 19830B

Regional Ecosystem 12.12.14

Eucalyptus carnea, *Syncarpia glomulifera* open forest

Queensland Herbarium, October 2021

QBEIS Site BioCondition monitoring



Radar diagram of BioCondition Scores by attribute and year sampled
 BioCondition scores: 2012 – 81 2016 – 83 2019 – 87
 Fire History: Burnt August 2018



Forest monitoring transect September 2012

Forest monitoring transect August 2019

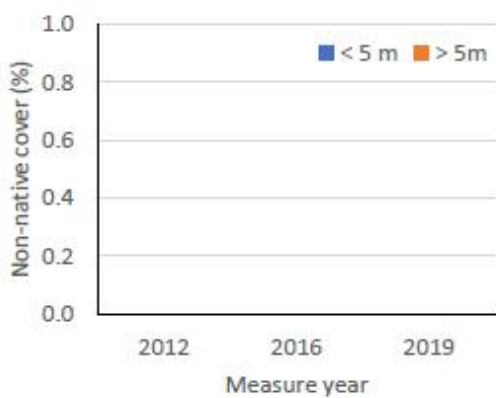
General Comments: This site consistently had a high BioCondition score. The largest variation in scores occurred in the perennial grass cover and grass species richness. The 2018 may have led to increased values of these attributes in 2019.

Trail-edge ground cover transect at Springbrook 19830B

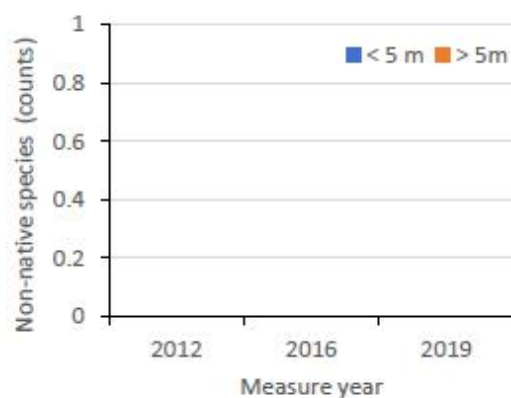


Trail-edge transect September 2012

Trail-edge transect August 2019



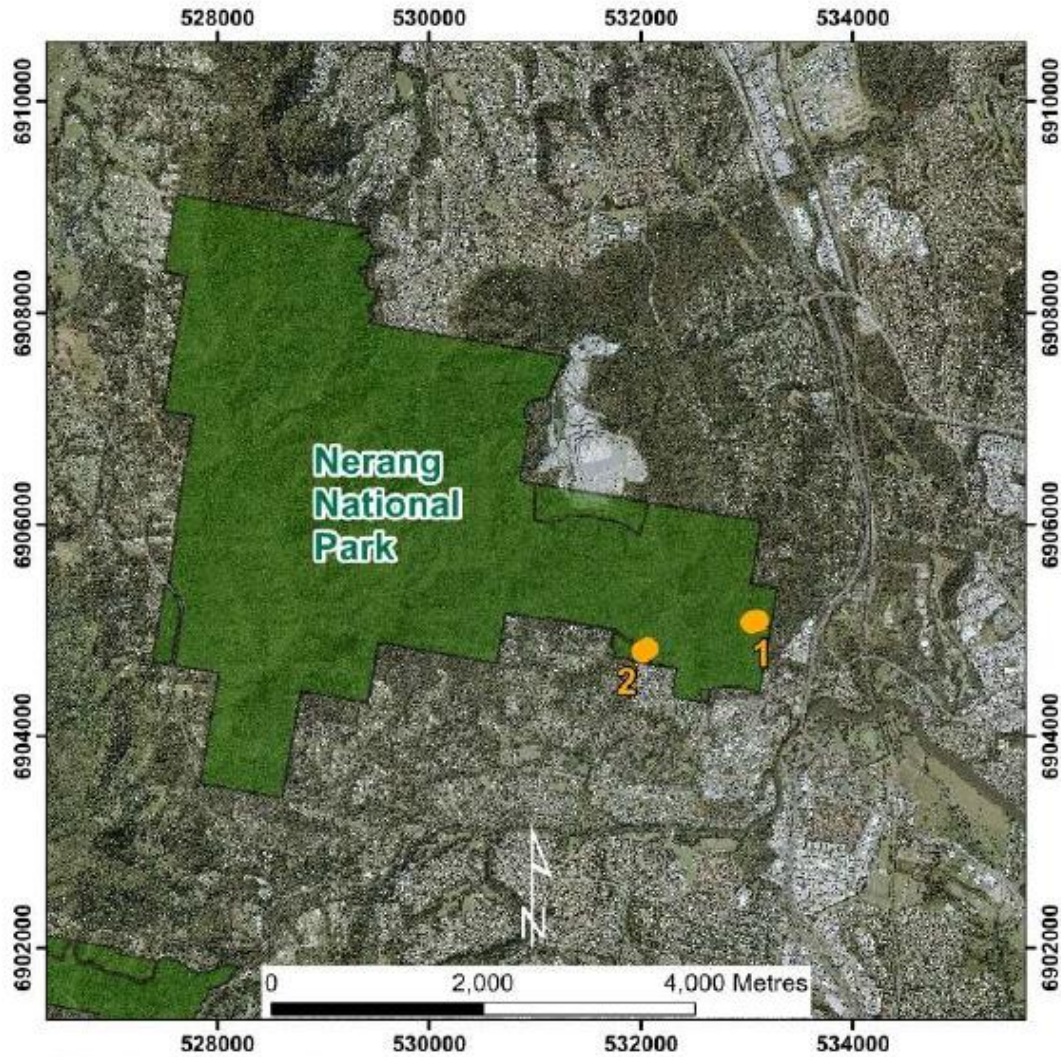
Non-native species cover



Number of non-native species

General comments: There were no non-native species recorded on the trail-edge transect. The most only non-native species were *Lantana camara* recorded only in 2016 and *Cirsium vulgare* only recorded in 2019.

Nerang National Park: Site 1



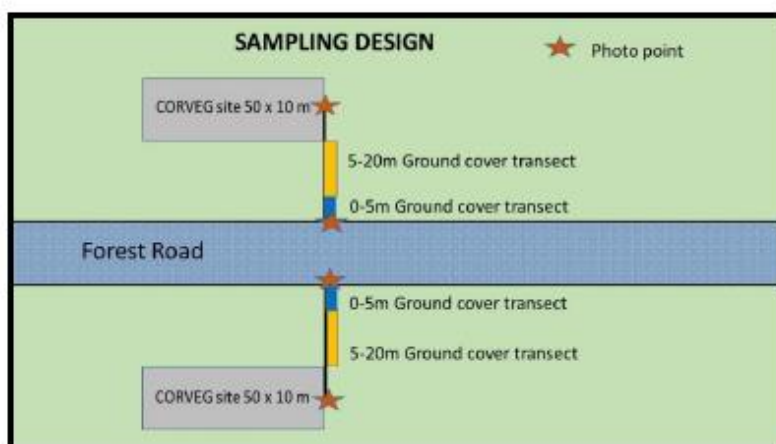
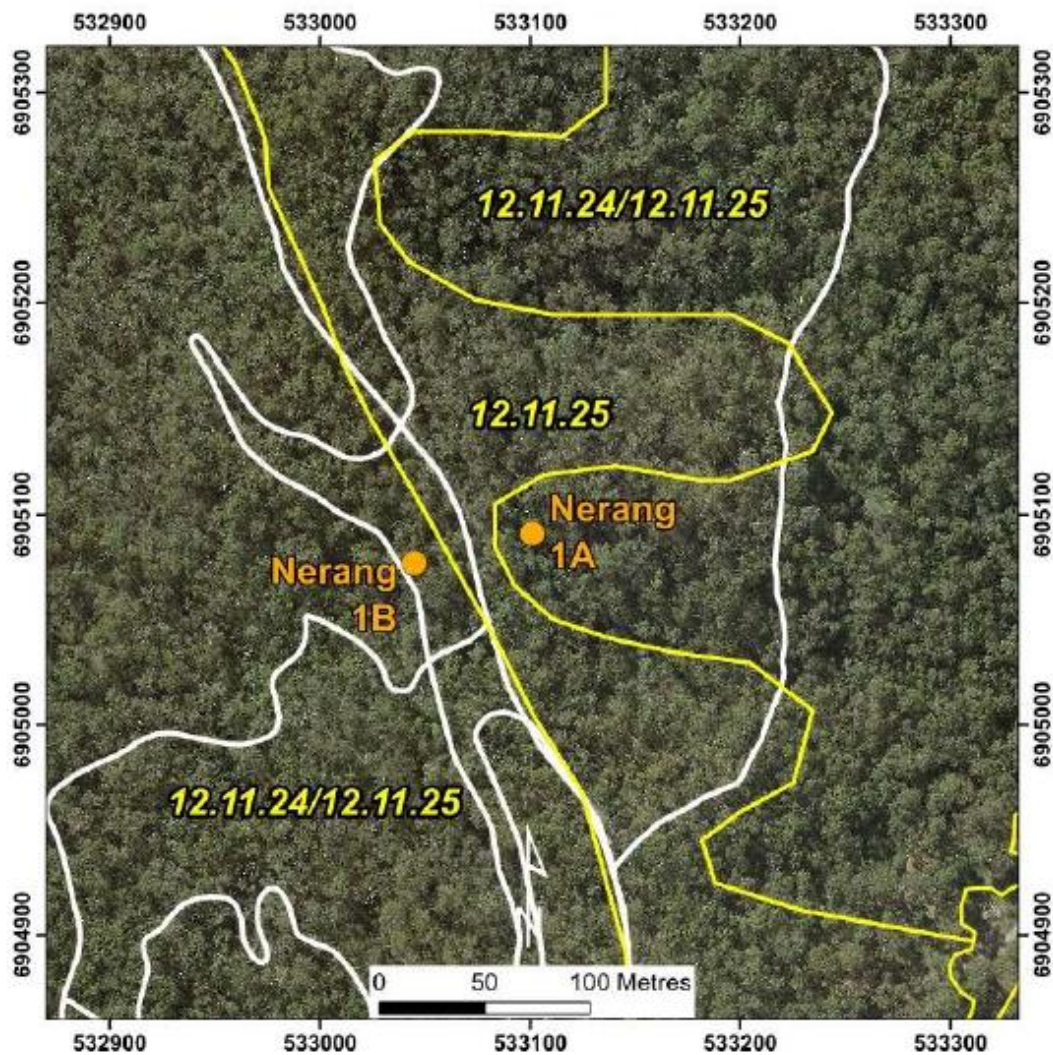
SEQ Monitoring Report Card

Nerang 1A

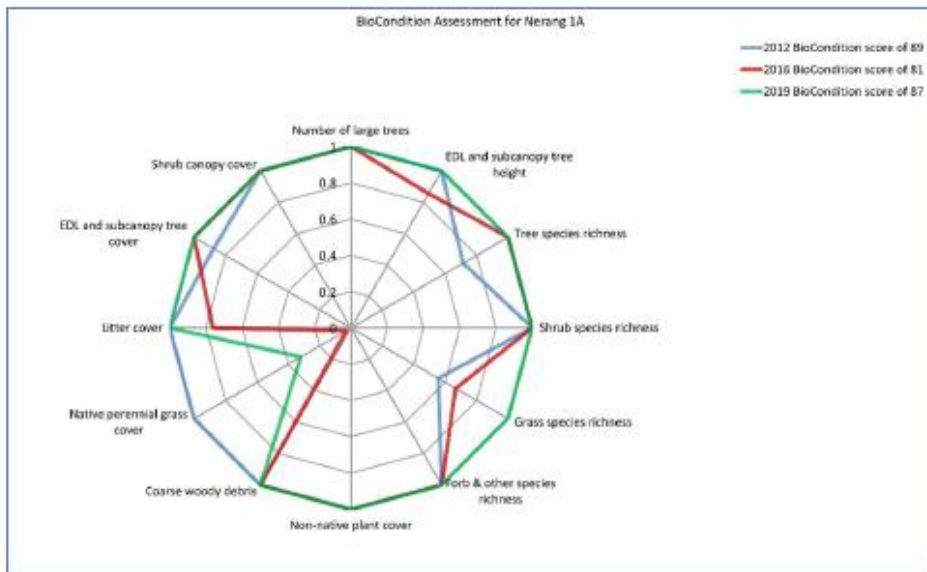
Regional Ecosystem 12.11.25

Corymbia henryi, *Eucalyptus crebra*,
Eucalyptus carnea woodland

Queensland Herbarium, October 2021



QBEIS Site BioCondition monitoring



Radar diagram of BioCondition Scores by attribute and year sampled
 BioCondition scores: 2012 – 89 2016 – 81 2019 – 87
 Fire History: Burnt August 2015



Forest monitoring transect September 2012 Forest monitoring transect August 2019

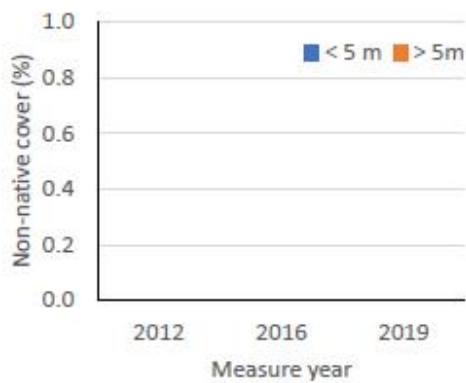
General Comments: This site consistently had a high BioCondition scores, which decreased slightly in 2016 after the August 2015 fire. The perennial grass cover and grass species richness values were frequently suboptimal.

Trail-edge ground cover transect at Nerang 1A

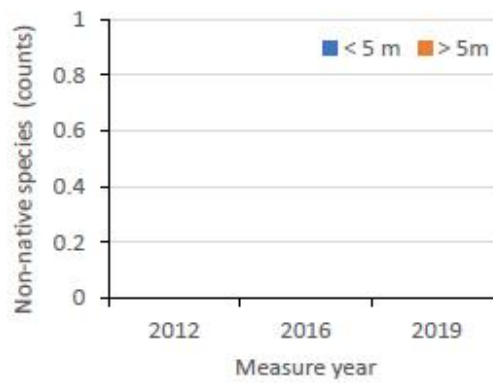


Trail-edge transect September 2012

Trail-edge transect August 2019

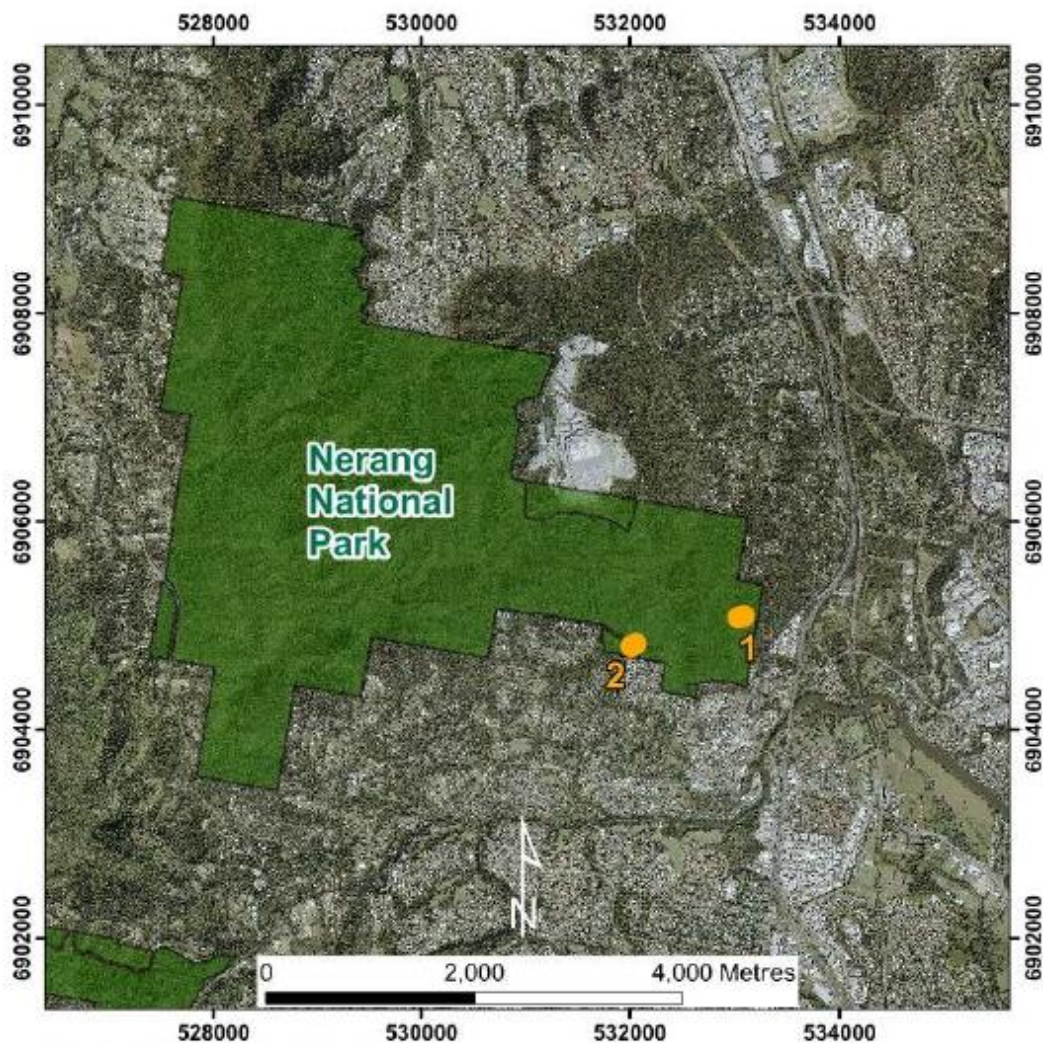


Non-native species cover



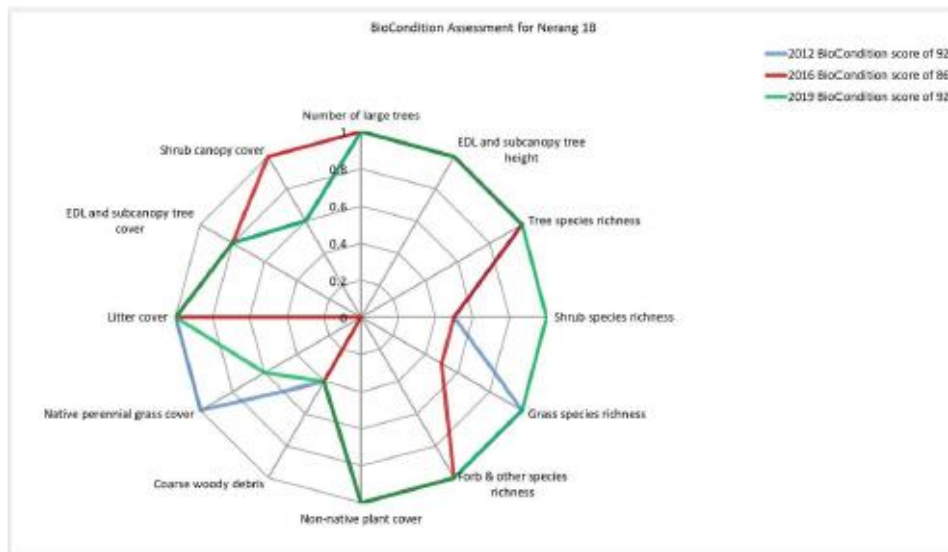
Number of non-native species

General comments: No non-native species were recorded in the trail-edge transect. Very sparse individuals of the herbs *Erigeron sumatrensis*, *Sonchus oleraceus* and *Melinis repens*, the shrubs *Lantana camara* and *Ochna serrulata* and climber *Passiflora suberosa* were recorded in the QBEIS site at various sampling times.



SEQ Monitoring Report Card
Nerang 1B
Regional Ecosystem 12.11.25
Corymbia henryi, *Eucalyptus propinqua*, *Eucalyptus tindaliae*, *Eucalyptus carnea* woodland
Queensland Herbarium, October 2021

QBEIS Site BioCondition monitoring



Radar diagram of BioCondition Scores by attribute and year sampled
 BioCondition scores: 2012 – 92 2016 – 86 2019 – 91
 Fire History: Burnt September 2015



Forest monitoring transect September 2012 Forest monitoring transect August 2019

General Comments: This site consistently had a high BioCondition score. The perennial grass cover had lower cover and lower grass species richness in 2016 because the site had recently been burnt. However these values had recovered to Benchmark values by the 2010 sampling.

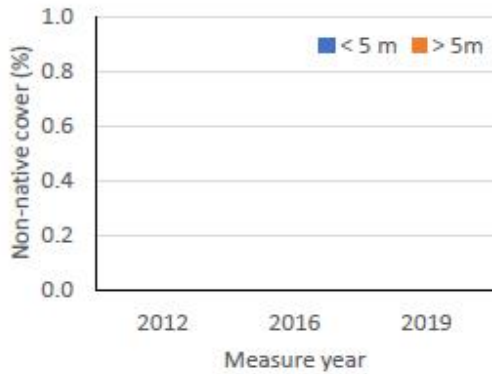
Trail-edge ground cover transect at Nerang 1B



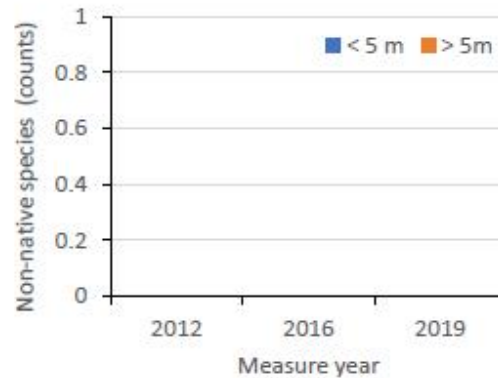
Trail-edge transect visit September 2012



Trail-edge transect March 2016



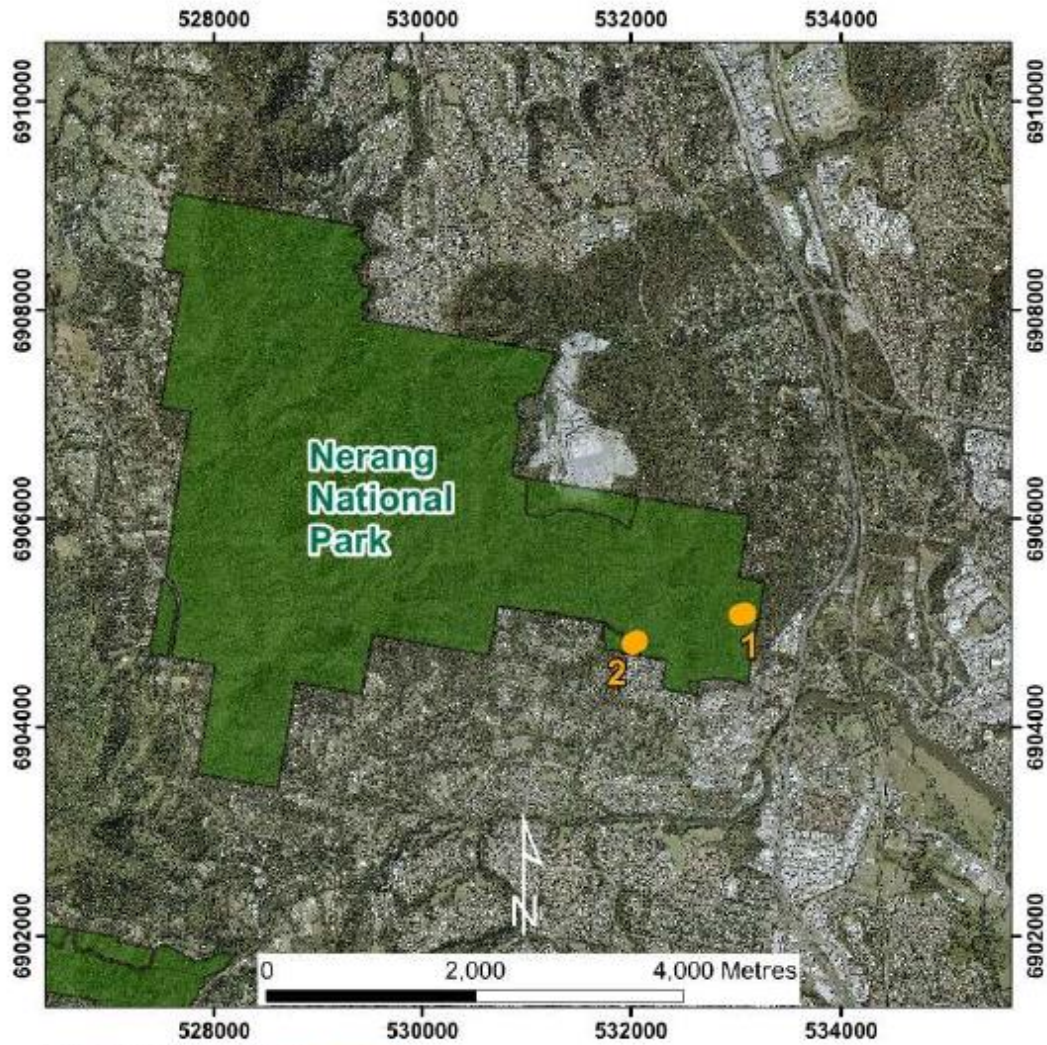
Non-native species cover



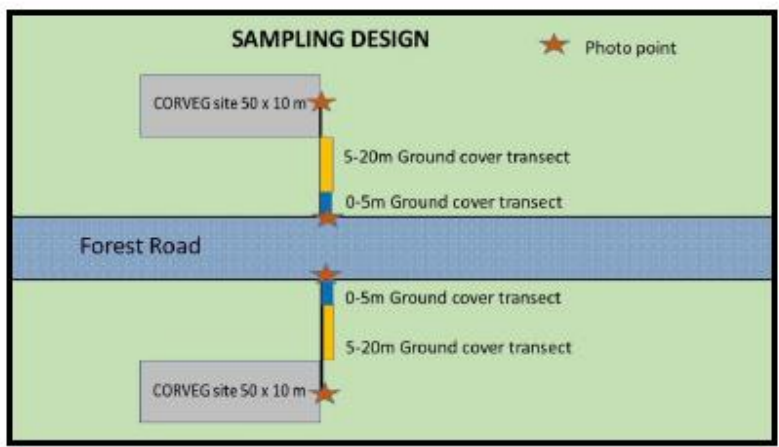
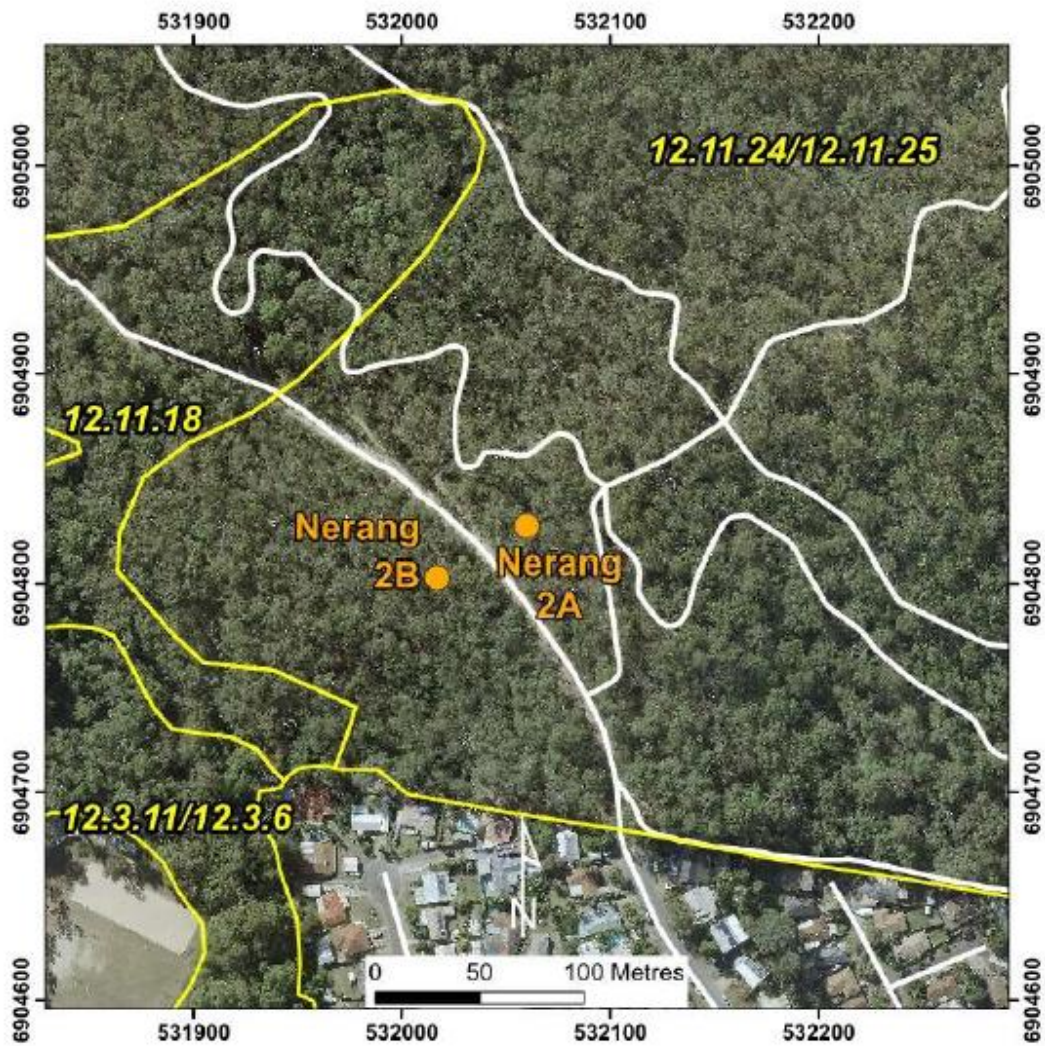
Number of non-native species

General comments: No non-native species were recorded in the trail-edge transect. Very sparse individuals of the herbs *Hypochaeris radicata*, the shrubs *Lantana camara*, *Senna pendula var. glabra* and *Ochna serrulata* and climber *Passiflora suberosa* were recorded in the QBEIS site at various sampling times.

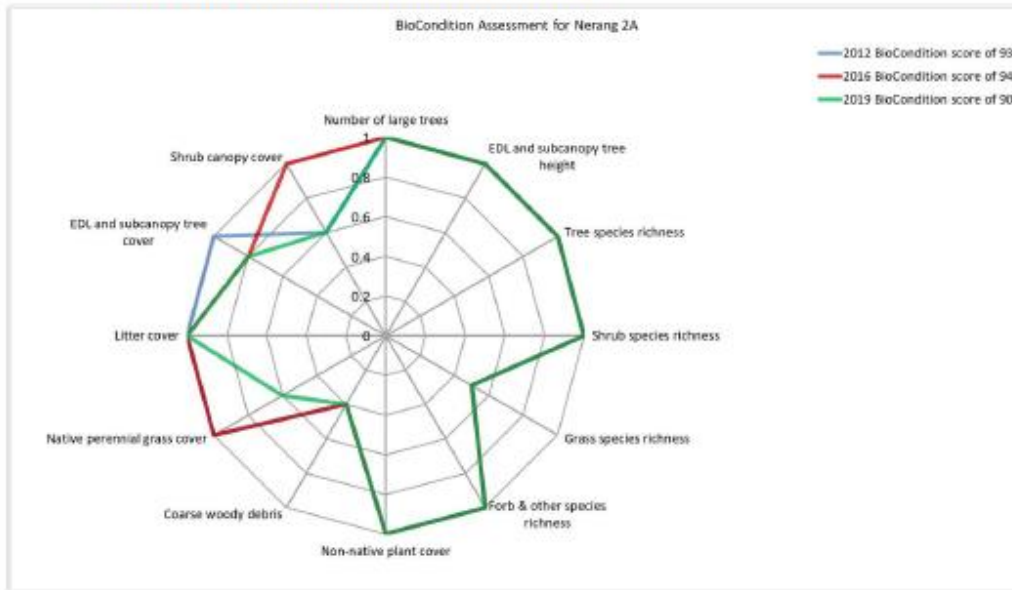
Nerang National Park: Site 2



SEQ Monitoring Report Card
Nerang 2A
Regional Ecosystem 12.11.24
Eucalyptus tindaliae, *Corymbia intermedia*, *Lophostemon confertus*
woodland
Queensland Herbarium, October 2021



QBEIS Site BioCondition monitoring



Radar diagram of BioCondition Scores by attribute and year sampled
 BioCondition scores: 2012 – 93 2016 – 94 2019 – 90
 Fire History: Burnt July 2014



Forest monitoring transect March 2016

Forest monitoring transect August 2019

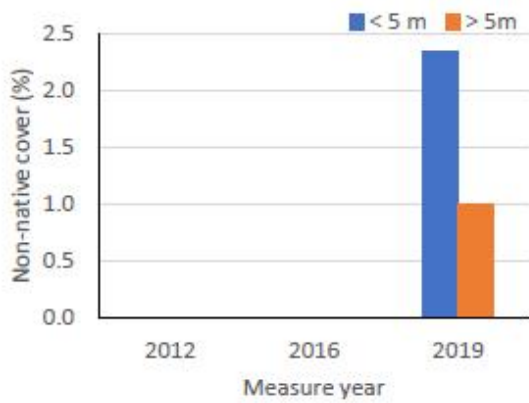
General Comments: This site consistently had a high BioCondition score. This site exhibits the thinning effect after hot fire. Mature and recruit *Allocasuarina littoralis* did not survive the 2014 fire. Dead trees can be seen standing in 2016 and have fallen by 2019.

Trail-edge ground cover transect at Nerang 2A

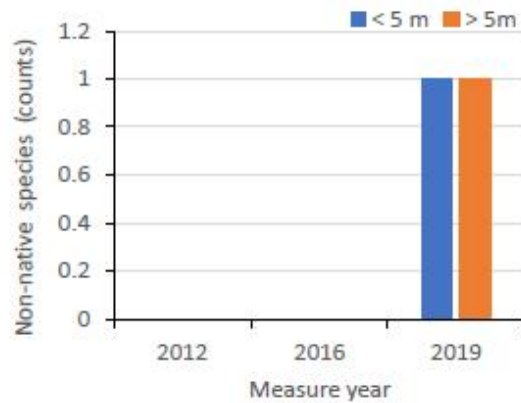


Trail-edge transect March 2016

Trail-edge transect August 2019

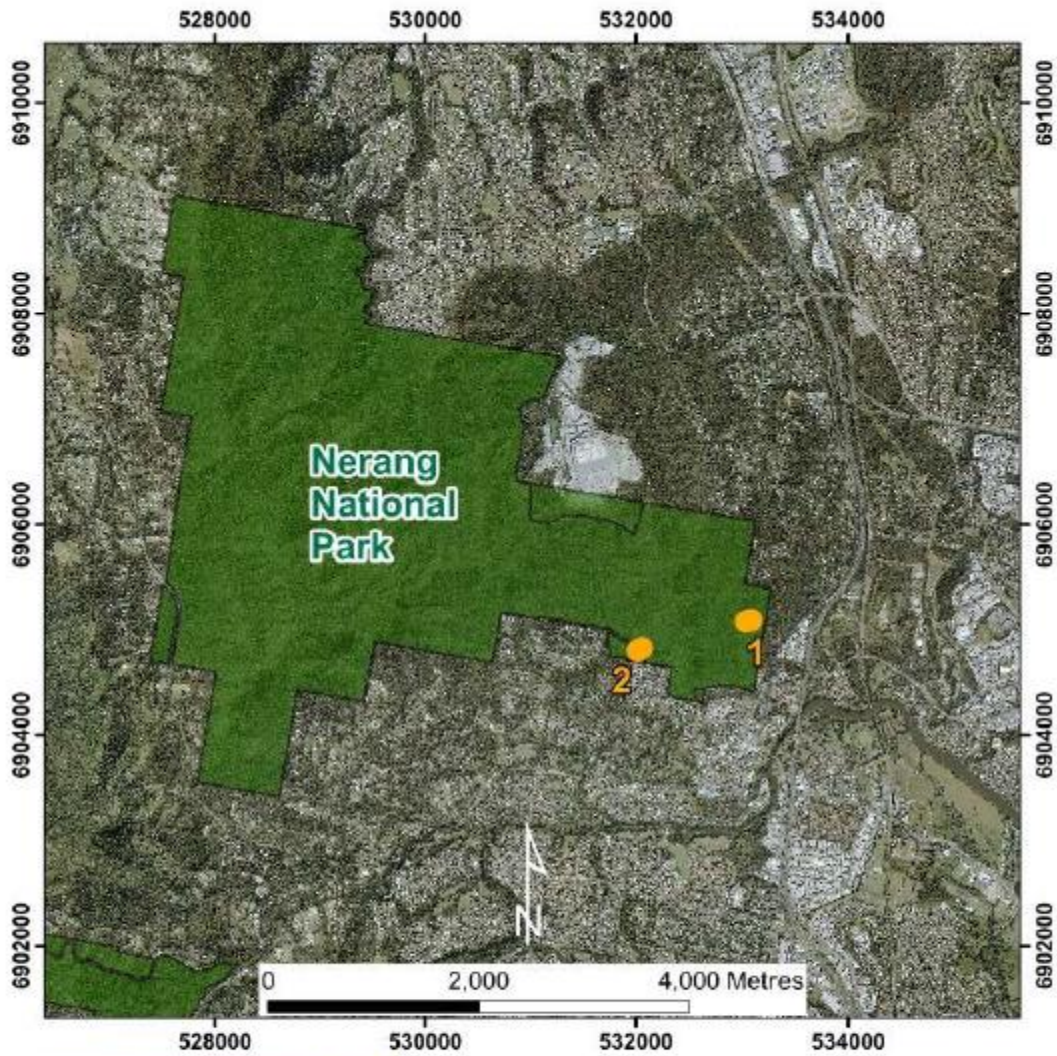


Non-native species cover



Number of non-native species

General comments: *Paspalum dilatatum* was the only non-native species were recorded in the trail-edge transect and only in 2019. Very sparse individuals of the *Lantana camara* were recorded in the QBEIS site in 2012, and *Ochna serrulata* was present at each sampling in the QBEIS site.



SEQ Monitoring Report Card

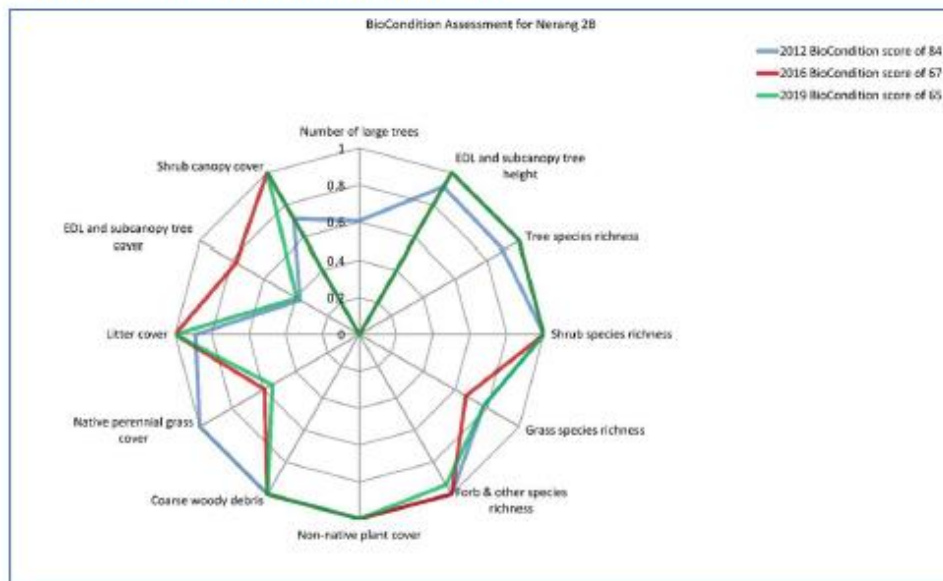
Nerang 2B

Regional Ecosystem 12.11.24

Eucalyptus tindaliae, *Eucalyptus resinifera*, *Eucalyptus microcorys*,
Corymbia intermedia woodland

Queensland Herbarium, October 2021

QBEIS Site BioCondition monitoring



Radar diagram of BioCondition Scores by attribute and year sampled
 BioCondition scores: 2012 – 84 2016 – 67 2019 – 65
 Fire History: Burnt August 2008



Forest monitoring transect March 2016

Forest monitoring transect August 2019

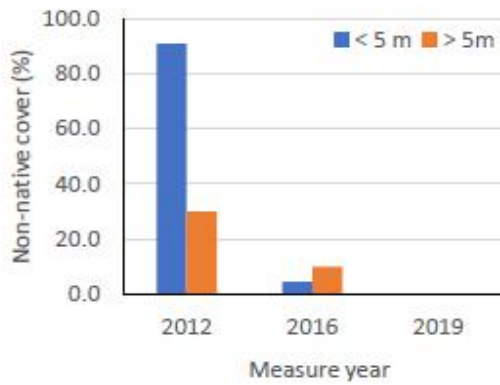
General Comments: This site declined in BioCondition score, mainly because of the loss of large trees after the 2012 sampling. The perennial grass cover also declined after the 2012 sampling.

Trail-edge ground cover transect at Nerang 2B

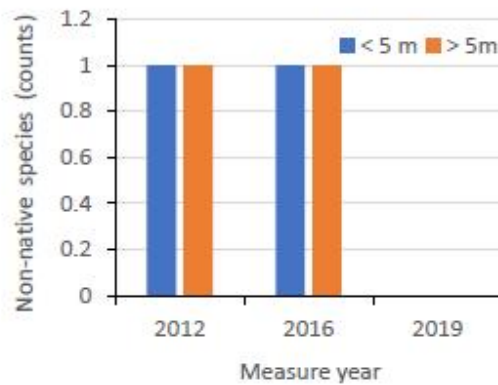


Trail-edge transect March 2016

Trail-edge transect August 2019



Non-native species cover



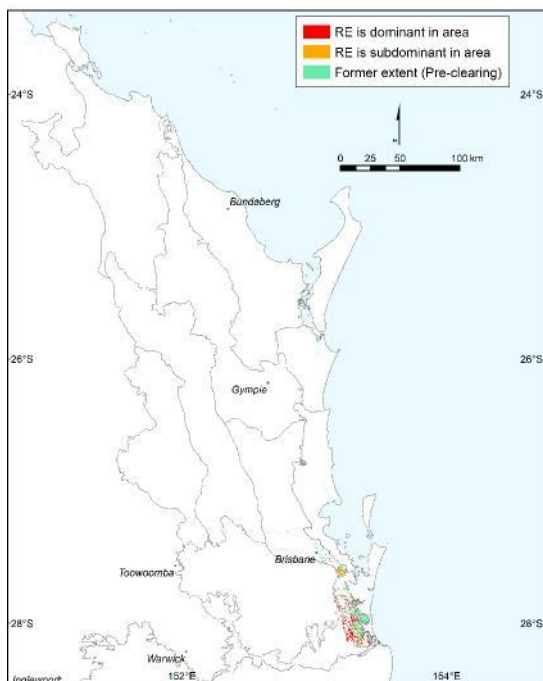
Number of non-native species

General comments: *Melinis minutiflora* was the only non-native species in the trail-edge transect and dominated in 2012, but was substantially reduced in cover in 2016 and not present in 2019.. Very sparse individuals of the *Lantana camara* were recorded in the QBEIS site at each sampling, while *Ochna serrulata* was present at the 2012 and 2016 sampling.

Appendix II. Technical Descriptions and Benchmarks

Please note that the [Technical Descriptions](#) and [Benchmarks](#) provided here are accurate at the time of publication of this report but may be subject to change over time as new data becomes available. Please refer to the relevant Departmental webpages to ensure you are accessing the most recent versions.

12.11.24: *Eucalyptus carnea* or *E. tindaliae*, *Corymbia intermedia* +/- *E. siderophloia* or *E. crebra* woodland on metamorphics +/-interbedded volcanics



Mapping data	Pre-clearing area = 28,127.6 ha; Remnant area 2019 = 13,950.8 ha; Remnant percent remaining in 2019 = 49.6 %
Species richness	total: 287 (28 sites); woody: 95 (28 sites); ground: 205 (27 sites); average spp./site: 48.3, standard deviation: 11.7 (27 sites)
Basal area	average/site: 20.9 m ² /ha; range: 9.0 - 39.0 m ² /ha; std. deviation: 7.2; (28 sites)
Ecological dominant layer (EDL) height	stratum: tree 1; average/site: 22.80m; range: 15.00 - 30.00m; (28 sites)
Ecological dominant layer (EDL) Crown Cover	stratum: tree 1; average: 45.8%; range: 25.0 - 80.0%; (28 sites)
Structural formation	Woodland: 60.7 %; Open Forest: 35.7 %; Tall Open Forest: 3.6 %; (28 sites)
Representative site(s)	4592, 5020, 5159, 5162, 6651, 6657, 6658, 6660, 6664, 6669, 6670, 6671, 6684, 6685, 8357, 8366, 12875, 13562, 13570, 13571, 13572, 13573, 13707, 13709, 13716, 16340, 17747, 17887

Stratum: Tree 1 (EDL)

Height: average: 22.80m; range: 15.00 - 30.00m; (28 sites)

Crown Cover: average: 45.8%; range: 25.0 - 80.0%; (28 sites)

Stem Count: average: 249 stems/ha; range: 80 - 800 stems/ha; std. deviation: 154.9 stems/ha; (23 sites)

Basal area: average: 15.3 m²/ha; range: 3.0 - 28.0 m²/ha; std. deviation: 5.8 m²/ha; (28 sites)

Species list (frequency %), average cover (%):

Most frequent species (up to 6):

Corymbia intermedia (78.6, 9.6), *Eucalyptus carnea* (67.9, 10.6), *Eucalyptus siderophloia* (64.3, 11.4), *Eucalyptus tindaliae* (42.9, 20.2), *Eucalyptus propinqua* (39.3, 6.1), *Eucalyptus microcorys* (32.1, 12.6)

Additional species:

Lophostemon confertus (25.0, 3.8), *Eucalyptus crebra* (21.4, 16.0), *Corymbia citriodora subsp. variegata* (21.4, 6.2), *Eucalyptus tereticornis* (17.9, 8.0), *Angophora leiocarpa* (17.9, 7.0), *Eucalyptus resinifera* (17.9, 6.7), *Corymbia henryi* (10.7, 2.6), *Eucalyptus seeana* (7.1, 3.5), *Angophora woodsiana* (7.1, 2.5), *Eucalyptus dura* (3.6, 16.3), *Eucalyptus helidonica* (3.6, 12.0), *Corymbia tessellaris* (3.6, 2.0), *Alphitonia excelsa* (3.6, 0.0), *Eucalyptus acmenoides* (3.6, 0.0)

Stratum: Tree 2

Height: average: 9.82m; range: 6.00 - 14.20m; (27 sites)

Crown Cover: average: 12.7%; range: 1.0 - 40.0%; (27 sites)

Stem Count: average: 582 stems/ha; range: 80 - 1,680 stems/ha; std. deviation: 448.4 stems/ha; (22 sites)

Basal area: average: 5.4 m²/ha; range: 1.0 - 16.0 m²/ha; std. deviation: 3.3 m²/ha; (25 sites)

Species list (frequency %), average cover (%):

Most frequent species (up to 6):

Lophostemon confertus (57.1, 5.0), *Allocasuarina torulosa* (46.4, 5.5), *Corymbia intermedia* (46.4, 2.3), *Acacia disparrima* subsp. *disparrima* (39.3, 4.5), *Eucalyptus carnea* (35.7, 3.2), *Eucalyptus propinqua* (21.4, 6.2)

Additional species:

Lophostemon suaveolens (21.4, 2.2), *Eucalyptus tindaliae* (21.4, 1.1), *Eucalyptus siderophloia* (21.4, 0.9), *Allocasuarina littoralis* (17.9, 8.3), *Eucalyptus crebra* (17.9, 0.9), *Eucalyptus tereticornis* (14.3, 1.0), *Eucalyptus microcorys* (10.7, 2.0), *Angophora leiocarpa* (10.7, 1.0), *Corymbia henryi* (10.7, 0.9), *Acacia concurrens* (7.1, 8.0), *Angophora woodsiana* (7.1, 2.3), *Corymbia citriodora* subsp. *variegata* (7.1, 1.0), *Eucalyptus seeana* (7.1, 1.0), *Eucalyptus resinifera* (7.1, 0.0), *Leptospermum polygalifolium* (3.6, 10.0), *Eucalyptus helidonica* (3.6, 4.0), *Corymbia tessellaris* (3.6, 3.0), *Acacia fimbriata* (3.6, 1.0), *Melaleuca salicina* (3.6, 1.0), *Alphitonia excelsa* (3.6, 0.0), *Angophora subvelutina* (3.6, 0.0), *Brachychiton populneus* subsp. *trilobus* (3.6, 0.0), *Eucalyptus dura* (3.6, 0.0), *Jagera pseudorhus* var. *pseudorhus* (3.6, 0.0)

Stratum: Tree 3

Height: average: 5.60m; range: 3.00 - 8.00m; (5 sites)

Crown Cover: average: 25.2%; range: 12.0 - 62.1%; (5 sites)

Stem Count: average: 800 stems/ha; range: 200 - 1,800 stems/ha; std. deviation: 699.7 stems/ha; (4 sites)

Basal area: average: 2.2 m²/ha; range: 1.0 - 4.0 m²/ha; std. deviation: 1.3 m²/ha; (4 sites)

Species list (frequency %), average cover (%):

Most frequent species (up to 6):

Alphitonia excelsa (14.3, 5.2), *Lophostemon confertus* (10.7, 12.1), *Allocasuarina littoralis* (10.7, 9.8), *Eucalyptus carnea* (7.1, 6.1), *Acacia disparrima* subsp. *disparrima* (7.1, 6.0), *Allocasuarina torulosa* (3.6, 15.7)

Additional species:

Lophostemon suaveolens (3.6, 9.0), *Melaleuca salicina* (3.6, 4.3), *Eucalyptus helidonica* (3.6, 3.0), *Corymbia henryi* (3.6, 2.6), *Persoonia stradbrokeensis* (3.6, 1.5), *Brachychiton populneus* subsp. *trilobus* (3.6, 1.3), *Eucalyptus propinqua* (3.6, 1.3), *Eucalyptus dura* (3.6, 0.9), *Eucalyptus seeana* (3.6, 0.3)

Stratum: Shrub 1

Height: average: 2.27m; range: 1.50 - 3.00m; (28 sites)

Crown Cover: average: 8.5%; range: 1.0 - 27.2%; (28 sites)

Stem Count: average: 1,640 stems/ha; range: 120 - 8,400 stems/ha; std. deviation: 1,686.2 stems/ha; (23 sites)

Basal area: average: 1.5 m²/ha; range: 1.0 - 3.0 m²/ha; std. deviation: 0.8 m²/ha; (8 sites)

Species list (frequency %), average cover (%):

Most frequent species (up to 6):

Acacia disparrima subsp. *disparrima* (96.4, 2.6), *Lophostemon confertus* (78.6, 2.5), *Alphitonia excelsa* (75.0, 1.4), *Lantana camara** (60.7, 3.3), *Acacia concurrens* (46.4, 4.1), *Acacia maidenii* (46.4, 1.5)

Additional species:

Corymbia intermedia (35.7, 0.7), *Jacksonia scoparia* (32.1, 1.9), *Eucalyptus carnea* (25.0, 1.2), *Eucalyptus siderophloia* (21.4, 1.0), *Styphelia sieberi* (21.4, 0.0), *Breynia oblongifolia* (17.9, 0.2), *Acacia falcata* (17.9, 0.0), *Pittosporum revolutum* (17.9, 0.0), *Wikstroemia*

indica (17.9, 0.0), *Acacia fimbriata* (14.3, 2.0), *Lophostemon suaveolens* (14.3, 1.1), *Allocasuarina torulosa* (14.3, 0.8), *Brachychiton populneus* subsp. *trilobus* (14.3, 0.2), *Glochidion ferdinandi* var. *ferdinandi* (14.3, 0.0), *Pultenaea retusa* (14.3, 0.0), *Allocasuarina littoralis* (10.7, 4.0), *Eucalyptus microcorys* (10.7, 2.0), *Acacia leiocalyx* subsp. *leiocalyx* (10.7, 1.5), *Eucalyptus crebra* (10.7, 1.0), *Melaleuca salicina* (10.7, 1.0), *Clerodendrum floribundum* (10.7, 0.0), *Eucalyptus tindaliae* (10.7, 0.0), *Jagera pseudorhus* var. *pseudorhus* (10.7, 0.0), *Leptospermum polygalifolium* (7.1, 1.5), *Corymbia citriodora* subsp. *variegata* (7.1, 0.5), *Acacia melanoxylon* (7.1, 0.0), *Angophora leiocarpa* (7.1, 0.0), *Corymbia torelliana* (7.1, 0.0), *Flindersia australis* (7.1, 0.0), *Glochidion sumatranum* (7.1, 0.0), *Heptapleurum actinophyllum* (7.1, 0.0), *Mallotus philippensis* (7.1, 0.0), *Persoonia media* (7.1, 0.0), *Persoonia sericea* (7.1, 0.0), *Persoonia stradbrokeensis* (7.1, 0.0), *Psychotria loniceroides* (7.1, 0.0), *Pultenaea villosa* (7.1, 0.0), *Swainsona galegifolia* (7.1, 0.0), *Trema tomentosa* var. *aspera* (7.1, 0.0), *Dodonaea triquetra* (3.6, 6.0), *Angophora woodsiana* (3.6, 2.0), *Eucalyptus helidonica* (3.6, 2.0), *Euroschinus falcatus* var. *angustifolius* (3.6, 1.0), *Melaleuca viminalis* (3.6, 1.0), *Notelaea ovata* (3.6, 1.0), *Ozothamnus diosmifolius* (3.6, 1.0), *Solanum stelligerum* (3.6, 1.0), *Triumfetta rhomboidea** (3.6, 1.0), *Polyscias elegans* (3.6, 0.2), *Trema tomentosa* var. *tomentosa* (3.6, 0.2), *Bursaria spinosa* subsp. *spinosa* (3.6, 0.0), *Cinnamomum camphora** (3.6, 0.0), *Commersonia bartramia* (3.6, 0.0), *Cordyline rubra* (3.6, 0.0), *Corymbia tessellaris* (3.6, 0.0), *Crotalaria lanceolata* subsp. *lanceolata** (3.6, 0.0), *Cupaniopsis anacardioides* (3.6, 0.0), *Daviesia ulicifolia* (3.6, 0.0), *Denhamia silvestris* (3.6, 0.0), *Eucalyptus propinqua* (3.6, 0.0), *Eucalyptus seeana* (3.6, 0.0), *Eucalyptus tereticornis* (3.6, 0.0), *Ficus coronata* (3.6, 0.0), *Guioa semiglaucula* (3.6, 0.0), *Hibbertia aspera* (3.6, 0.0), *Hibbertia stricta* (3.6, 0.0), *Hodgkinsonia ovatiflora* (3.6, 0.0), *Homalanthus populifolius* (3.6, 0.0), *Leptospermum* (3.6, 0.0), *Livistona australis* (3.6, 0.0), *Lomatia silaifolia* (3.6, 0.0), *Melaleuca linearis* var. *linearis* (3.6, 0.0), *Melaleuca nodosa* (3.6, 0.0), *Monotoca scoparia* (3.6, 0.0), *Myrsine angusta* (3.6, 0.0), *Myrsine variabilis* (3.6, 0.0), *Persoonia volcanica* (3.6, 0.0), *Polyscias sambucifolia* (3.6, 0.0), *Psychotria daphnoides* (3.6, 0.0), *Pultenaea spinosa* (3.6, 0.0), *Rhodamnia rubescens* (3.6, 0.0), *Rhodospaera rhodanthema* (3.6, 0.0), *Sannantha similis* (3.6, 0.0), *Trochocarpa laurina* (3.6, 0.0)

Stratum: Ground

Height: average: 0.57m; range: 0.30 - 0.75m; (27 sites)

Projective foliage cover (PFC): average: 45.0%; range: 4.0 - 75.0%; (27 sites)

Species list (frequency %), average cover (%):

Grass - perennial:

Most frequent species (up to 6):

Themeda triandra (88.9, 15.9), *Cymbopogon refractus* (81.5, 7.2), *Digitaria parviflora* (81.5, 3.8), *Imperata cylindrica* (81.5, 12.0), *Entolasia stricta* (77.8, 6.7), *Panicum effusum* (59.3, 3.0)

Additional species:

Capillipedium spicigerum (48.1, 3.5), *Eremochloa bimaculata* (44.4, 6.6), *Microlaena stipoides* (40.7, 6.3), *Oplismenus aemulus* (40.7, 0.8), *Aristida calycina* var. *calycina* (33.3, 2.0), *Ottochloa gracillima* (33.3, 11.7), *Chrysopogon sylvaticus* (25.9, 5.0), *Melinis minutiflora** (25.9, 10.2), *Oplismenus imbecillis* (25.9, 1.0), *Alloterpis semialata* (22.2, 2.0), *Eragrostis brownii* (18.5, 1.5), *Paspalidium gracile* (18.5, 4.3), *Paspalidium gausum* (14.8, 1.0), *Bothriochloa decipiens* (11.1, 0.0), *Dichelachne micrantha* (11.1, 5.0), *Eragrostis spartinooides* (11.1, 0.0), *Melinis repens** (11.1, 1.0), *Sporobolus creber* (11.1, 0.0), *Heteropogon contortus* (7.4, 0.0), *Megathyrus maximus** (7.4, 0.0), *Paspalum scrobiculatum* (7.4, 0.0), *Urochloa decumbens** (7.4, 0.0), *Andropogon virginicus** (3.7, 0.0), *Aristida queenslandica* (3.7, 0.0), *Aristida queenslandica* var. *dissimilis* (3.7, 1.0), *Aristida ramosa* (3.7, 0.0), *Aristida vagans* (3.7, 0.0), *Aristida warburgii* (3.7, 0.0), *Austrostipa* (3.7, 0.0), *Chloris* (3.7, 0.0), *Dichanthium sericeum* (3.7, 0.0), *Dichelachne** (3.7, 0.0), *Entolasia whiteana* (3.7, 0.2), *Eriachne pallescens* (3.7, 0.0), *Panicum simile* (3.7, 0.0)

Grass - annual/biennial:

Not present

Forbs & other:

Most frequent species (up to 6):

Desmodium rhytidophyllum (88.9, 4.7), *Cyanthillium cinereum* (85.2, 0.2), *Eustrephus latifolius* (74.1, 0.7), *Glycine clandestina* var. *clandestina* (74.1, 0.2), *Lobelia purpurascens* (74.1, 1.6), *Lomandra longifolia* (63.0, 3.4)

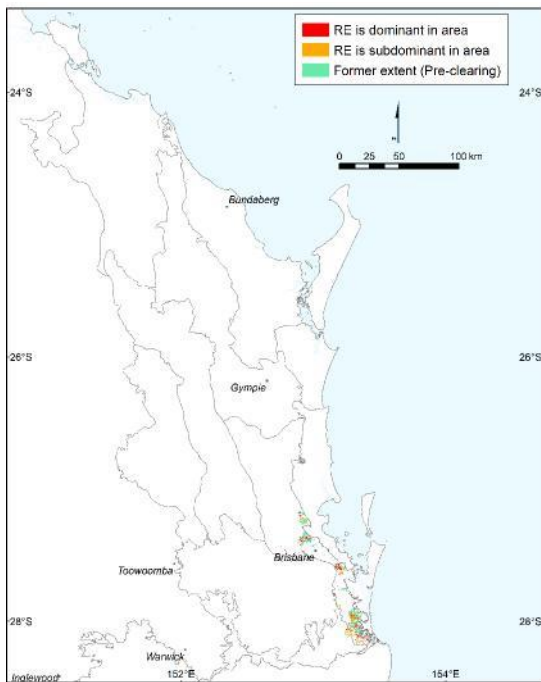
Additional species:

Goodenia rotundifolia (55.6, 0.8), *Lomandra laxa* (55.6, 4.0), *Lepidosperma laterale* var. *laterale** (51.9, 4.6), *Lomandra confertifolia* subsp. *pallida* (51.9, 1.8), *Cheilanthes sieberi* subsp. *sieberi* (44.4, 0.0), *Lomandra multiflora* subsp. *multiflora* (44.4, 1.0), *Brunoniella australis* (37.0, 0.0), *Cassipouba pubescens* (37.0, 0.0), *Clematicissus opaca* (37.0, 1.0), *Coleus australis* (37.0, 0.7), *Dianella caerulea* (37.0, 1.0), *Geitonoplesium cymosum* (37.0, 0.0), *Passiflora suberosa** (37.0, 2.0), *Phyllanthus virgatus* (37.0, 0.0), *Hardenbergia violacea* (33.3, 0.0), *Passiflora subpeltata** (33.3, 0.0), *Desmodium gunnii* (29.6, 0.2), *Bidens pilosa** (25.9, 0.0), *Chrysocephalum apiculatum* (25.9, 0.0), *Galactia tenuiflora* (25.9, 0.0), *Sigesbeckia orientalis* (25.9, 0.0), *Crotalaria montana* (22.2, 0.0), *Dianella longifolia* (22.2, 0.0), *Gomphocarpus physocarpus** (22.2, 0.0), *Lantana montevidensis** (22.2, 4.0), *Pigea stellarioides* (22.2, 0.0), *Smilax australis* (22.2, 0.0), *Centella asiatica* (18.5, 0.0), *Eremophila debilis* (18.5, 0.0), *Passiflora foetida** (18.5, 0.0), *Pseuderanthemum variable* (18.5, 0.4), *Scleria mackaviensis* (18.5, 0.0), *Stephania japonica* (18.5, 0.0), *Adiantum hispidulum* (14.8, 0.0), *Crassocephalum crepidioides** (14.8, 0.0), *Emilia sonchifolia** (14.8, 0.0), *Hibbertia vestita* (14.8, 0.0), *Hypericum gramineum* (14.8,

0.0), *Opercularia diphylla* (14.8, 0.0), *Pandorea pandorana* (14.8, 0.0), *Pimelea linifolia* subsp. *linifolia* (14.8, 0.0), *Pteridium esculentum* (14.8, 2.5), *Acrotriche aggregata* (11.1, 3.0), *Ageratum houstonianum** (11.1, 0.0), *Ajuga australis* (11.1, 1.0), *Blechnum medium* (11.1, 0.0), *Causonis clematidea* (11.1, 0.0), *Desmodium brachypodium* (11.1, 0.0), *Dioscorea transversa* (11.1, 0.0), *Erigeron canadensis** (11.1, 0.0), *Iphigenia indica* (11.1, 0.0), *Lagenophora stipitata* (11.1, 0.0), *Murdannia graminea* (11.1, 0.0), *Parsonia straminea* (11.1, 0.6), *Passiflora edulis** (11.1, 0.0), *Poranthera microphylla* (11.1, 0.0), *Acianthus fornicatus* (7.4, 0.6), *Ageratina riparia** (7.4, 1.0), *Baccharis halimifolia** (7.4, 0.0), *Blechnum neohollandicum* (7.4, 0.4), *Breynia oblongifolia* (7.4, 0.0), *Centratherum riparium* (7.4, 0.0), *Cirsium vulgare** (7.4, 0.0), *Cissus antarctica* (7.4, 0.0), *Curculigo ensifolia* var. *ensifolia* (7.4, 0.0), *Cyperus laevis* (7.4, 0.0), *Dianella revoluta* (7.4, 0.6), *Dichondra repens* (7.4, 0.2), *Drynaria rigidula* (7.4, 6.8), *Erigeron bonariensis** (7.4, 0.0), *Fimbristylis dichotoma* (7.4, 0.0), *Geodorum densiflorum* (7.4, 0.0), *Glossocardia bidens* (7.4, 0.0), *Glycine tabacina* (7.4, 0.0), *Grewia latifolia* (7.4, 0.0), *Hibbertia aspera* (7.4, 0.0), *Hypoxis pratensis* (7.4, 0.0), *Lilium formosanum** (7.4, 0.0), *Lomandra filiformis* subsp. *filiformis* (7.4, 1.2), *Macrotyloma axillare* var. *axillare** (7.4, 23.0), *Oxalis chnoodes* (7.4, 0.0), *Sida rhombifolia** (7.4, 0.0), *Solanum nigrum** (7.4, 0.0), *Sonchus oleraceus** (7.4, 0.0), *Thysanotus tuberosus* (7.4, 0.0), *Tripladenia cunninghamii* (7.4, 0.0), *Wahlenbergia capillaris* (7.4, 0.0), *Adiantum aethiopicum* (3.7, 0.0), *Ageratina adenophora** (3.7, 0.0), *Alphitonia excelsa* (3.7, 0.0), *Angophora subvelutina* (3.7, 0.0), *Bidens bipinnata** (3.7, 0.0), *Blechnum rupestre* (3.7, 0.0), *Brunonia australis* (3.7, 0.2), *Callicarpa pedunculata* (3.7, 0.0), *Carex breviculmis* (3.7, 0.0), *Cassytha filiformis* (3.7, 0.0), *Cassytha glabella* forma *glabella* (3.7, 0.0), *Celastrus subspicata* (3.7, 0.0), *Chamaecrista nomame* (3.7, 0.0), *Cissus* (3.7, 0.0), *Cissus hypoglauca* (3.7, 0.0), *Commelina lanceolata* (3.7, 0.0), *Corymbia citriodora* subsp. *variegata* (3.7, 0.0), *Corymbia intermedia* (3.7, 0.0), *Cyperus enervis* (3.7, 5.0), *Davallia pyxidata* (3.7, 0.0), *Desmodium heterocarpon* var. *heterocarpon* (3.7, 0.0), *Desmodium uncinatum** (3.7, 0.0), *Desmodium varians* (3.7, 0.0), *Dianella caerulea* var. *assera* (3.7, 0.0), *Dianella caerulea* var. *vannata* (3.7, 0.0), *Dipodium variegatum* (3.7, 0.0), *Eucalyptus carnea* (3.7, 0.0), *Gahnia aspera* (3.7, 0.0), *Glycine cyrtoloba* (3.7, 0.0), *Gompholobium pinnatum* (3.7, 0.0), *Goodenia mystrophylla* (3.7, 0.0), *Hibbertia stricta* (3.7, 4.0), *Hypochaeris radicata** (3.7, 0.0), *Kennedia rubicunda* (3.7, 0.0), *Lagenophora sublyrata* (3.7, 0.0), *Leptospermum polygalifolium* (3.7, 7.0), *Lobelia gibbosa* (3.7, 0.0), *Lophostemon suaveolens* (3.7, 0.0), *Maclura cochinchinensis* (3.7, 0.0), *Macroptilium atropurpureum** (3.7, 0.0), *Melichrus adpressus* (3.7, 0.0), *Myrsine variabilis* (3.7, 0.0), *Olea paniculata* (3.7, 0.0), *Oxalis* (3.7, 0.0), *Parsonia* (3.7, 0.0), *Persoonia media* (3.7, 0.0), *Physalis peruviana** (3.7, 0.0), *Phytolacca octandra** (3.7, 0.0), *Platynerium bifurcatum* (3.7, 0.0), *Polymeria calycina* (3.7, 0.0), *Psychotria loniceroides* (3.7, 0.0), *Pyrrosia rupestris* (3.7, 0.0), *Rubus moluccanus* var. *trilobus* (3.7, 0.0), *Rubus parvifolius* (3.7, 0.0), *Rubus x novus* (3.7, 0.0), *Scleria* (3.7, 0.0), *Scleria tricuspidata* (3.7, 1.0), *Sida cardiophylla* (3.7, 0.0), *Sida cordifolia** (3.7, 0.0), *Solanum mauritianum** (3.7, 0.0), *Strangea linearis* (3.7, 0.0), *Tetrastigma nitens* (3.7, 0.0), *Trachymene procumbens* (3.7, 0.0), *Triumfetta rhomboidea** (3.7, 3.0), *Veronica plebeia* (3.7, 0.0), *Viola betonicifolia* (3.7, 0.0), *Viola hederacea* (3.7, 0.0), *Wahlenbergia gracilis* (3.7, 0.0), *Xanthorrhoea latifolia* subsp. *latifolia* (3.7, 0.4), *Xanthorrhoea macronema* (3.7, 2.0), *Zornia dyctiocarpa* var. *filifolia* (3.7, 0.0)

Species list: Frequency (percent of total sites) and cover (average of species cover across sites where that species is present). Ordered by decreasing frequency. Naturalised species have an asterisk (*) after the name. indet. after listed name if indeterminate species or genus.

12.11.25: *Corymbia henryi* and/or *Eucalyptus fibrosa* subsp. *fibrosa* +/- *E. crebra*, *E. carnea*, *E. tindaliae* woodland on metamorphics +/- interbedded volcanics



Mapping data	Pre-clearing area = 17,496.4 ha; Remnant area 2019 = 7,809.7 ha; Remnant percent remaining in 2019 = 44.6 %
Species richness	total: 254 (25 sites); woody: 95 (25 sites); ground: 200 (25 sites); average spp./site: 42.6, standard deviation: 14.3 (25 sites)
Basal area	average/site: 22.4 m ² /ha; range: 12.0 - 34.0 m ² /ha; std. deviation: 6.2; (25 sites)
Ecological dominant layer (EDL) height	stratum: tree 1; average/site: 22.30m; range: 15.00 - 26.00m; (25 sites)
Ecological dominant layer (EDL) Crown Cover	stratum: tree 1; average: 45.8%; range: 13.5 - 80.8%; (25 sites)
Structural formation	Woodland: 56.0 %; Open Forest: 44.0 %; (25 sites)
Representative site(s)	2555, 5019, 5167, 6663, 6666, 6681, 6686, 7949, 8362, 8368, 8369, 8490, 8511, 8512, 8872, 13708, 14281, 15182, 15706, 16105, 16514, 17170, 17519, 17667, 17746

Stratum: Tree 1 (EDL)

Height: average: 22.30m; range: 15.00 - 26.00m; (25 sites)

Crown Cover: average: 45.8%; range: 13.5 - 80.8%; (25 sites)

Stem Count: average: 286 stems/ha; range: 80 - 520 stems/ha; std. deviation: 114.8 stems/ha; (23 sites)

Basal area: average: 18.4 m²/ha; range: 10.0 - 31.0 m²/ha; std. deviation: 5.7 m²/ha; (25 sites)

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Corymbia henryi (88.0, 13.6), *Eucalyptus carnea* (64.0, 7.5), *Corymbia intermedia* (48.0, 4.4), *Eucalyptus fibrosa* subsp. *fibrosa* (44.0, 22.8), *Eucalyptus tindaliae* (32.0, 8.0), *Eucalyptus siderophloia* (32.0, 6.0)

Additional species:

Corymbia citriodora subsp. *variegata* (28.0, 6.8), *Eucalyptus crebra* (24.0, 12.8), *Eucalyptus propinqua* (24.0, 10.8), *Lophostemon confertus* (24.0, 5.4), *Eucalyptus microcorys* (24.0, 4.9), *Eucalyptus major* (24.0, 3.8), *Eucalyptus seeana* (12.0, 11.6), *Eucalyptus acmenoides* (12.0, 7.3), *Eucalyptus helidonica* (8.0, 9.0), *Eucalyptus resinifera* (8.0, 5.0), *Angophora leiocarpa* (8.0, 2.0), *Eucalyptus*

tereticornis (8.0, 2.0), *Eucalyptus dura* (4.0, 36.0), *Angophora woodsiana* (4.0, 10.0), *Corymbia trachyphloia* (4.0, 6.2), *Melaleuca salicina* (4.0, 0.0)

Stratum: Tree 2

Height: average: 9.46m; range: 5.00 - 14.50m; (24 sites)

Crown Cover: average: 9.3%; range: 0.8 - 37.0%; (24 sites)

Stem Count: average: 379 stems/ha; range: 40 - 1,040 stems/ha; std. deviation: 302.8 stems/ha; (19 sites)

Basal area: average: 4.8 m²/ha; range: 2.0 - 9.0 m²/ha; std. deviation: 2.1 m²/ha; (20 sites)

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Corymbia henryi (60.0, 1.9), *Corymbia intermedia* (52.0, 2.7), *Lophostemon confertus* (44.0, 4.9), *Eucalyptus carnea* (40.0, 1.4),
Eucalyptus fibrosa subsp. fibrosa (28.0, 2.5), *Allocasuarina torulosa* (28.0, 2.2)

Additional species:

Eucalyptus tindaliae (20.0, 3.0), *Eucalyptus crebra* (20.0, 1.5), *Eucalyptus propinqua* (20.0, 1.3), *Allocasuarina littoralis* (16.0, 10.6),
Eucalyptus microcorys (16.0, 1.6), *Eucalyptus siderophloia* (16.0, 0.8), *Eucalyptus helidonica* (12.0, 3.1), *Corymbia citriodora subsp. variegata* (12.0, 2.6), *Acacia disparrima subsp. disparrima* (12.0, 0.6), *Angophora leiocarpa* (12.0, 0.6), *Lophostemon suaveolens* (8.0, 3.0), *Acacia concurrens* (8.0, 1.6), *Eucalyptus tereticornis* (8.0, 1.0), *Eucalyptus seeana* (8.0, 0.6), *Corymbia trachyphloia* (4.0, 7.1),
Melaleuca quinquenervia (4.0, 6.0), *Eucalyptus resinifera* (4.0, 3.0), *Angophora woodsiana* (4.0, 1.0), *Daviesia villifera* (4.0, 1.0),
Eucalyptus acmenoides (4.0, 0.5), *Flindersia australis* (4.0, 0.5), *Brachychiton populneus subsp. populneus* (4.0, 0.2), *Acronychia laevis* (4.0, 0.0), *Parsonsia straminea* (4.0, 0.0)

Stratum: Tree 3

Height: average: 6.50m; range: 4.00 - 8.00m; (3 sites)

Crown Cover: average: 9.9%; range: 6.5 - 13.8%; (3 sites)

Stem Count: average: 347 stems/ha; range: 200 - 480 stems/ha; std. deviation: 140.5 stems/ha; (3 sites)

Basal area: average: 1.5 m²/ha; range: 1.0 - 2.0 m²/ha; std. deviation: 0.7 m²/ha; (2 sites)

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Eucalyptus fibrosa subsp. fibrosa (8.0, 1.9), *Acacia disparrima subsp. disparrima* (8.0, 1.0), *Lophostemon confertus* (8.0, 0.2), *Allocasuarina littoralis* (4.0, 13.8), *Corymbia henryi* (4.0, 5.5), *Eucalyptus propinqua* (4.0, 2.0)

Additional species:

Eucalyptus helidonica (4.0, 1.9), *Eucalyptus carnea* (4.0, 1.0), *Acacia concurrens* (4.0, 0.3), *Corymbia trachyphloia* (4.0, 0.0)

Stratum: Shrub 1

Height: average: 2.11m; range: 1.20 - 3.50m; (25 sites)

Crown Cover: average: 6.6%; range: 0.0 - 24.7%; (25 sites)

Stem Count: average: 985 stems/ha; range: 40 - 2,560 stems/ha; std. deviation: 828.6 stems/ha; (18 sites)

Basal area: average: 1.0 m²/ha; range: 1.0 - 1.0 m²/ha; std. deviation: 0.0 m²/ha; (2 sites)

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Acacia disparrima subsp. disparrima (84.0, 3.1), *Lophostemon confertus* (60.0, 1.9), *Alphitonia excelsa* (44.0, 0.9), *Daviesia villifera* (32.0, 1.2), *Acacia leiocalyx subsp. leiocalyx* (28.0, 5.2), *Jacksonia scoparia* (28.0, 2.0)

Additional species:

Corymbia henryi (28.0, 1.2), *Acacia falcata* (24.0, 2.1), *Lantana camara** (24.0, 0.6), *Jagera pseudorhus var. pseudorhus* (24.0, 0.2),
Eucalyptus fibrosa subsp. fibrosa (20.0, 1.5), *Acacia concurrens* (20.0, 1.0), *Pultenaea spinosa* (16.0, 2.0), *Eucalyptus crebra* (16.0, 1.6),
Corymbia intermedia (16.0, 0.3), *Eucalyptus siderophloia* (16.0, 0.3), *Eucalyptus carnea* (16.0, 0.0), *Acrotriche aggregata* (12.0,

16.0), *Xanthorrhoea johnsonii* (12.0, 6.0), *Allocasuarina littoralis* (12.0, 2.0), *Acacia fimbriata* (12.0, 1.2), *Allocasuarina torulosa* (12.0, 1.0), *Eucalyptus tereticornis* (12.0, 1.0), *Styphelia sieberi* (12.0, 0.2), *Acacia maidenii* (12.0, 0.0), *Acacia penninervis* var. *longiracemosa* (12.0, 0.0), *Eucalyptus tindaliae* (12.0, 0.0), *Hovea acutifolia* (8.0, 2.0), *Eucalyptus propinqua* (8.0, 1.0), *Persoonia sericea* (8.0, 0.5), *Pultenaea villosa* (8.0, 0.4), *Notelaea longifolia* (8.0, 0.3), *Persoonia stradbrokeensis* (8.0, 0.3), *Billardiera scandens* (8.0, 0.2), *Eucalyptus microcorys* (8.0, 0.2), *Trochocarpa laurina* (8.0, 0.2), *Lophostemon suaveolens* (8.0, 0.0), *Senna pendula* var. *glabrata** (8.0, 0.0), *Wikstroemia indica* (8.0, 0.0), *Daviesia arborea* (4.0, 1.0), *Melaleuca salicina* (4.0, 0.6), *Alyxia ruscifolia* (4.0, 0.5), *Corymbia trachyphloia* (4.0, 0.5), *Daviesia ulicifolia* (4.0, 0.5), *Opuntia* (4.0, 0.5), *Pultenaea microphylla* (4.0, 0.5), *Schizomeria ovata* (4.0, 0.3), *Cyclophyllum coprosmoides* (4.0, 0.2), *Diospyros geminata* (4.0, 0.2), *Flindersia australis* (4.0, 0.2), *Guioa semiglaucula* (4.0, 0.2), *Melia azedarach* (4.0, 0.2), *Myrsine variabilis* (4.0, 0.2), *Psychotria loniceroides* (4.0, 0.2), *Pultenaea* (4.0, 0.2), *Acacia complanata* (4.0, 0.0), *Acacia melanoxylon* (4.0, 0.0), *Breynia oblongifolia* (4.0, 0.0), *Bursaria spinosa* subsp. *spinosa* (4.0, 0.0), *Cassinia laevis* subsp. *rosmarinifolia* (4.0, 0.0), *Cinnamomum camphora** (4.0, 0.0), *Eucalyptus seeana* (4.0, 0.0), *Glochidion ferdinandi* var. *ferdinandi* (4.0, 0.0), *Glycine clandestina* var. *clandestina* (4.0, 0.0), *Indigofera australis* (4.0, 0.0), *Monotoca scoparia* (4.0, 0.0), *Ochna serrulata** (4.0, 0.0), *Pandorea floribunda* (4.0, 0.0), *Pandorea pandorana* (4.0, 0.0), *Parsonia straminea* (4.0, 0.0), *Persoonia media* (4.0, 0.0), *Pittosporum* (4.0, 0.0), *Pittosporum revolutum* (4.0, 0.0), *Sannantha bidwillii* (4.0, 0.0), *Strangea linearis* (4.0, 0.0), *Swainsona galegifolia* (4.0, 0.0), *Xanthorrhoea fulva* (4.0, 0.0)

Stratum: Shrub 2

Height: average: 0.95m; range: 0.50 - 1.80m; (4 sites)

Crown Cover: average: 9.7%; range: 0.0 - 30.2%; (4 sites)

Stem Count: average: 1,453 stems/ha; range: 120 - 2,680 stems/ha; std. deviation: 1,283.3 stems/ha; (3 sites)

Basal area: No data available.

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Alphitonia excelsa (16.0, 1.0), *Persoonia sericea* (12.0, 0.5), *Daviesia villifera* (8.0, 18.0), *Acrotriche aggregata* (8.0, 2.5), *Acacia disparrima* subsp. *disparrima* (8.0, 1.5), *Eucalyptus fibrosa* subsp. *fibrosa* (8.0, 1.2)

Additional species:

Styphelia sieberi (8.0, 1.0), *Corymbia henryi* (8.0, 0.8), *Acacia fimbriata* (8.0, 0.3), *Denhamia silvestris* (8.0, 0.2), *Hovea acutifolia* (8.0, 0.2), *Xanthorrhoea latifolia* subsp. *latifolia* (4.0, 1.0), *Eucalyptus propinqua* (4.0, 0.5), *Jacksonia scoparia* (4.0, 0.5), *Lophostemon confertus* (4.0, 0.5), *Dodonaea triquetra* (4.0, 0.2), *Hibbertia linearis* var. *obtusifolia* (4.0, 0.2), *Monotoca scoparia* (4.0, 0.2), *Acacia concurrens* (4.0, 0.0), *Acacia falcata* (4.0, 0.0), *Acacia melanoxylon* (4.0, 0.0), *Acacia penninervis* var. *longiracemosa* (4.0, 0.0), *Daviesia** (4.0, 0.0), *Eucalyptus crebra* (4.0, 0.0), *Lantana camara** (4.0, 0.0), *Pittosporum revolutum* (4.0, 0.0), *Pultenaea microphylla* (4.0, 0.0), *Pultenaea villosa* (4.0, 0.0), *Smilax australis* (4.0, 0.0)

Stratum: Ground

Height: average: 0.53m; range: 0.10 - 0.90m; (25 sites)

Projective foliage cover (PFC): average: 28.9%; range: 1.0 - 80.0%; (25 sites)

Species list (frequency (%), average cover (%)):

Grass - perennial:

Most frequent species (up to 6):

Entolasia stricta (92.0, 5.1), *Themeda triandra* (80.0, 12.0), *Cymbopogon refractus* (72.0, 3.8), *Eremochloa bimaculata* (60.0, 6.4), *Imperata cylindrica* (56.0, 3.4), *Digitaria parviflora* (52.0, 1.9)

Additional species:

Panicum effusum (44.0, 1.3), *Capillipedium spicigerum* (32.0, 6.0), *Aristida calycina* var. *calycina* (28.0, 6.0), *Arundinella nepalensis* (28.0, 5.8), *Eragrostis brownii* (28.0, 0.0), *Microlaena stipoides* (28.0, 0.0), *Aristida vagans* (24.0, 2.4), *Paspalidium gausum* (24.0, 0.0), *Alloteropsis semialata* (20.0, 2.5), *Aristida benthamii* var. *benthamii* (20.0, 2.7), *Oplismenus aemulus* (20.0, 2.5), *Paspalidium distans* (16.0, 1.0), *Aristida queenslandica* var. *queenslandica* (12.0, 1.0), *Dichelachne micrantha* (12.0, 5.0), *Digitaria* (12.0, 0.0), *Eragrostis spartinooides* (12.0, 1.0), *Melinis repens** (12.0, 1.0), *Ottochloa gracillima* (12.0, 0.0), *Chrysopogon sylvaticus* (8.0, 1.2), *Digitaria minima* (8.0, 0.2), *Melinis minutiflora** (8.0, 1.5), *Aristida warburgii* (4.0, 0.0), *Entolasia whiteana* (4.0, 2.0), *Megathyrus maximus** (4.0, 1.0), *Paspalidium gracile* (4.0, 0.0), *Paspalum scrobiculatum* (4.0, 0.0), *Poa sieberiana* (4.0, 5.0), *Sporobolus australasicus* (4.0, 0.0), *Sporobolus creber* (4.0, 0.0), *Urochloa decumbens** (4.0, 0.0)

Grass - annual/biennial:

Not present

Forbs & other:

Most frequent species (up to 6):

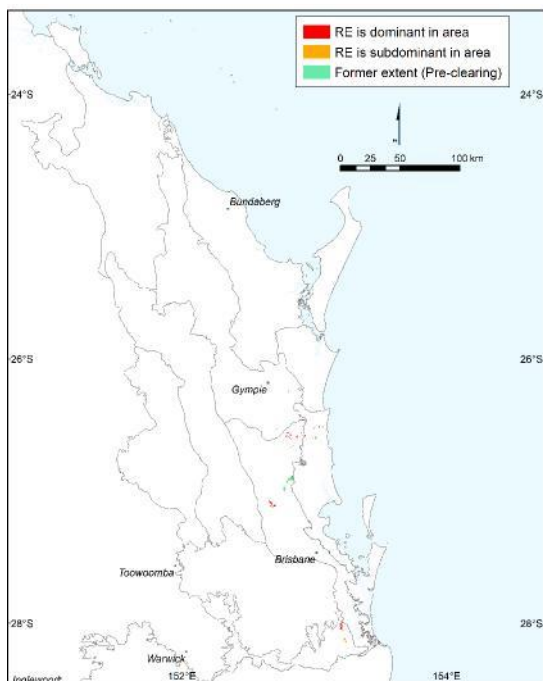
Cyanthillium cinereum (76.0, 0.4), *Desmodium rhytidophyllum* (76.0, 0.7), *Lepidosperma laterale* var. *laterale** (72.0, 5.1), *Lobelia purpurascens* (72.0, 0.7), *Lomandra multiflora* subsp. *multiflora* (64.0, 3.1), *Cheilanthes sieberi* subsp. *sieberi* (60.0, 1.0)

Additional species:

Goodenia rotundifolia (52.0, 0.3), *Eustrephus latifolius* (48.0, 0.3), *Glycine clandestina* var. *clandestina* (48.0, 0.4), *Lomandra confertifolia* subsp. *pallida* (44.0, 4.4), *Clematicissus opaca* (40.0, 0.2), *Dianella caerulea* (40.0, 0.5), *Passiflora suberosa** (40.0, 0.2), *Brunoniella australis* (32.0, 0.3), *Hardenbergia violacea* (32.0, 1.0), *Pigea stellarioides* (32.0, 0.0), *Lomandra laxa* (28.0, 2.0), *Phyllanthus virgatus* (28.0, 0.2), *Pseuderanthemum variabile* (28.0, 0.0), *Dianella caerulea* var. *vannata* (24.0, 0.2), *Dianella longifolia* (24.0, 0.0), *Lomandra longifolia* (24.0, 1.0), *Murdannia graminea* (24.0, 0.0), *Bidens pilosa** (20.0, 0.0), *Acacia disparrima* subsp. *disparrima* (16.0, 1.4), *Acacia falcata* (16.0, 0.0), *Alphitonia excelsa* (16.0, 0.0), *Asparagus aethiopicus** (16.0, 0.2), *Cassytha pubescens* (16.0, 0.0), *Corymbia intermedia* (16.0, 1.0), *Galactia tenuiflora* (16.0, 0.0), *Hibbertia stricta* (16.0, 1.8), *Oxalis corniculata** (16.0, 0.0), *Pomax umbellata* (16.0, 1.0), *Smilax australis* (16.0, 0.0), *Acacia leiocalyx* subsp. *leiocalyx* (12.0, 1.1), *Coleus australis* (12.0, 0.2), *Commelina diffusa* (12.0, 0.4), *Corymbia citriodora* subsp. *variegata* (12.0, 0.0), *Dianella revoluta* (12.0, 1.1), *Lantana camara** (12.0, 0.0), *Lomandra filiformis* subsp. *filiformis* (12.0, 0.7), *Lophostemon confertus* (12.0, 2.0), *Persoonia sericea* (12.0, 0.0), *Pittosporum revolutum* (12.0, 0.0), *Sigesbeckia orientalis* (12.0, 0.0), *Acrotriche aggregata* (8.0, 1.0), *Allocasuarina littoralis* (8.0, 0.0), *Blechnum medium* (8.0, 0.0), *Breynia oblongifolia* (8.0, 0.0), *Cassytha filiformis* (8.0, 1.0), *Causonis clematidea* (8.0, 0.0), *Cheilanthes tenuifolia* (8.0, 0.0), *Chorizema parviflorum* (8.0, 0.0), *Chrysocephalum apiculatum* (8.0, 0.0), *Cirsium vulgare** (8.0, 0.0), *Crassocephalum crepidioides** (8.0, 0.0), *Crotalaria montana* (8.0, 0.0), *Curculigo ensifolia* var. *ensifolia* (8.0, 0.0), *Cyperus enervis* (8.0, 0.0), *Daviesia ulicifolia* (8.0, 0.0), *Desmodium gunnii* (8.0, 0.0), *Dioscorea transversa* (8.0, 0.0), *Drynaria rigidula* (8.0, 0.0), *Eucalyptus carnea* (8.0, 0.0), *Eucalyptus tindaliae* (8.0, 4.0), *Fimbristylis dichotoma* (8.0, 0.0), *Geitonoplesium cymosum* (8.0, 0.0), *Glochidion ferdinandi* var. *ferdinandi* (8.0, 0.0), *Glossocardia bidens* (8.0, 0.0), *Glycine cyrtoloba* (8.0, 1.0), *Hibbertia linearis* var. *obtusifolia* (8.0, 0.0), *Jagera pseudorhus* var. *pseudorhus* (8.0, 0.0), *Kennedia rubicunda* (8.0, 0.0), *Lomandra* (8.0, 0.0), *Monotoca scoparia* (8.0, 1.0), *Ochna serrulata** (8.0, 0.2), *Pandorea pandorana* (8.0, 0.0), *Persoonia stradbrokeensis* (8.0, 0.4), *Pimelea linifolia* subsp. *linifolia* (8.0, 0.0), *Podolobium scandens* (8.0, 2.0), *Poranthera microphylla* (8.0, 0.0), *Pteridium esculentum* (8.0, 0.0), *Pultenaea villosa* (8.0, 0.4), *Scleria mackaviensis* (8.0, 0.2), *Scleria tricuspidata* (8.0, 0.0), *Sida rhombifolia** (8.0, 0.0), *Spermacoce brachystema* (8.0, 0.0), *Tripladenia cunninghamii* (8.0, 0.0), *Veronica plebeia* (8.0, 0.0), *Xanthorrhoea johnsonii* (8.0, 0.0), *Xanthorrhoea macronema* (8.0, 4.5), *Zieria smithii* (8.0, 0.0), *Zornia dyctiocarpa* var. *filifolia* (8.0, 0.0), *Acacia burrowii* (4.0, 0.0), *Acacia maidenii* (4.0, 0.0), *Acianthus fomicatus* (4.0, 0.0), *Adiantum hispidulum* (4.0, 0.0), *Ageratina adenophora** (4.0, 0.0), *Ageratina riparia** (4.0, 0.0), *Asparagus africanus** (4.0, 0.0), *Billardiera scandens* (4.0, 0.0), *Blechnum cartilagineum* (4.0, 2.0), *Blechnum doodianum* (4.0, 0.0), *Brunfelsia australis** (4.0, 0.0), *Calochlaena dubia* (4.0, 8.0), *Calotis dentex* (4.0, 0.0), *Centella asiatica* (4.0, 0.0), *Centratherum punctatum** (4.0, 0.0), *Centratherum riparium* (4.0, 0.2), *Cinnamomum camphora** (4.0, 0.0), *Cissus antarctica* (4.0, 0.0), *Cordyline congesta* (4.0, 0.0), *Corymbia henryi* (4.0, 0.0), *Crotalaria lanceolata* subsp. *lanceolata** (4.0, 0.0), *Cyclophyllum coprosmoides* (4.0, 0.0), *Cyperus gracilis* (4.0, 2.0), *Cyperus leiocaulon* (4.0, 0.0), *Denhamia celastroides* (4.0, 0.0), *Desmodium brachypodium* (4.0, 0.0), *Dipodium variegatum* (4.0, 0.0), *Elaeocarpus reticulatus* (4.0, 0.0), *Emilia sonchifolia** (4.0, 0.0), *Eremophila debilis* (4.0, 0.0), *Eucalyptus crebra* (4.0, 0.0), *Eucalyptus microcorys* (4.0, 0.0), *Eucalyptus propinqua* (4.0, 0.0), *Eucalyptus resinifera* (4.0, 0.0), *Fimbristylis vaginata* (4.0, 0.0), *Gahnia aspera* (4.0, 0.0), *Geodorum densiflorum* (4.0, 0.0), *Glycine tabacina* (4.0, 0.0), *Gomphocarpus physocarpus** (4.0, 0.0), *Goodenia mystrophylla* (4.0, 0.0), *Hibbertia aspera* (4.0, 0.0), *Hibbertia vestita* (4.0, 0.0), *Hypochoeris radicata** (4.0, 0.0), *Iphigenia indica* (4.0, 0.0), *Lagenophora stipitata* (4.0, 0.0), *Lantana montevidensis** (4.0, 0.0), *Laxmannia gracilis* (4.0, 0.0), *Lomandra filiformis* subsp. *coriacea* (4.0, 3.0), *Macroptilium atropurpureum** (4.0, 0.0), *Malvaceae* (4.0, 0.0), *Myrsine angusta* (4.0, 0.0), *Nephrolepis cordifolia* (4.0, 0.0), *Notelaea longifolia* (4.0, 0.0), *Opercularia diphylla* (4.0, 0.0), *Oxalis chnoodes* (4.0, 0.0), *Parsonia straminea* (4.0, 0.0), *Pittosporum* (4.0, 0.0), *Pittosporum spinescens* (4.0, 0.0), *Polygala japonica* (4.0, 0.0), *Psychotria loniceroides* (4.0, 0.0), *Pterostylis nutans* (4.0, 0.0), *Sannantha similis* (4.0, 0.0), *Scleria* (4.0, 0.0), *Sida cordifolia** (4.0, 0.0), *Sonchus oleraceus** (4.0, 0.0), *Strangea linearis* (4.0, 0.0), *Stylidium graminifolium* (4.0, 0.0), *Syncarpia glomulifera* subsp. *glomulifera* (4.0, 0.0), *Viola hederacea* (4.0, 0.0), *Wahlenbergia gracilis* (4.0, 0.0)

Species list: Frequency (percent of total sites) and cover (average of species cover across sites where that species is present). Ordered by decreasing frequency. Naturalised species have an asterisk (*) after the name. indet. after listed name if indeterminate species or genus.

12.12.14: *Eucalyptus racemosa* subsp. *racemosa* +/- *Lophostemon confertus*, *Syncarpia glomulifera*, *Eucalyptus acmenoides* woodland to open forest usually on rocky near coastal areas on Mesozoic to Proterozoic igneous rocks



Mapping data	Pre-clearing area = 4,927.5 ha; Remnant area 2019 = 2,935.0 ha; Remnant percent remaining in 2019 = 59.6 %
Species richness	total: 248 (23 sites); woody: 113 (23 sites); ground: 169 (23 sites); average spp./site: 35.8, standard deviation: 11.0 (23 sites)
Basal area	average/site: 23.1 m ² /ha; range: 10.0 - 48.0 m ² /ha; std. deviation: 8.3; (23 sites)
Ecological dominant layer (EDL) height	stratum: tree 1; average/site: 19.17m; range: 12.00 - 27.00m; (23 sites)
Ecological dominant layer (EDL) Crown Cover	stratum: tree 1; average: 45.7%; range: 12.0 - 87.0%; (23 sites)
Structural formation	Open Forest: 52.2 %; Woodland: 47.8 %; (23 sites)
Representative site(s)	3088, 3748, 3767, 4115, 4117, 5104, 5105, 5463, 5464, 5467, 6176, 6177, 6180, 6182, 6184, 8358, 11746, 13712, 13860, 14256, 15863, 17745, 17748

Stratum: Tree 1 (EDL)

Height: average: 19.17m; range: 12.00 - 27.00m; (23 sites)

Crown Cover: average: 45.7%; range: 12.0 - 87.0%; (23 sites)

Stem Count: average: 423 stems/ha; range: 120 - 1,280 stems/ha; std. deviation: 361.1 stems/ha; (9 sites)

Basal area: average: 21.3 m²/ha; range: 5.0 - 35.0 m²/ha; std. deviation: 7.1 m²/ha; (23 sites)

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Eucalyptus racemosa subsp. *racemosa* (60.9, 22.6), *Eucalyptus tindaliae* (52.2, 10.0), *Angophora woodsiana* (43.5, 6.9), *Eucalyptus microcorys* (43.5, 6.6), *Corymbia trachyphloia* subsp. *trachyphloia* (43.5, 4.5), *Eucalyptus pilularis* (43.5, 4.4)

Additional species:

Corymbia gummifera (39.1, 13.5), *Eucalyptus carnea* (30.4, 9.7), *Eucalyptus helidonica* (17.4, 13.8), *Lophostemon confertus* (17.4, 11.0), *Corymbia intermedia* (17.4, 10.0), *Eucalyptus fusiformis* (13.0, 7.0), *Syncarpia glomulifera* subsp. *glomulifera* (13.0, 6.0), *Eucalyptus acmenoides* (8.7, 11.5), *Eucalyptus dura* (8.7, 5.5), *Eucalyptus major* (8.7, 3.5), *Allocasuarina torulosa* (8.7, 2.0), *Syncarpia verecunda* (8.7, 1.5), *Eucalyptus resinifera* (4.3, 15.0), *Eucalyptus siderophloia* (4.3, 9.0), *Eucalyptus tereticornis* (4.3, 4.0), *Eucalyptus*

propinqua (4.3, 1.0), *Acacia melanoxylon* (4.3, 0.0)

Stratum: Tree 2

Height: average: 8.79m; range: 3.00 - 15.50m; (12 sites)

Crown Cover: average: 15.4%; range: 0.0 - 56.5%; (12 sites)

Stem Count: average: 562 stems/ha; range: 40 - 1,300 stems/ha; std. deviation: 464.9 stems/ha; (8 sites)

Basal area: average: 5.0 m²/ha; range: 1.0 - 21.0 m²/ha; std. deviation: 6.6 m²/ha; (8 sites)

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Corymbia gummifera (26.1, 3.9), *Allocasuarina littoralis* (17.4, 17.0), *Eucalyptus carnea* (13.0, 11.6), *Eucalyptus racemosa* subsp. *racemosa* (13.0, 1.0), *Eucalyptus fusiformis* (13.0, 0.0), *Syncarpia glomulifera* subsp. *glomulifera* (8.7, 11.0)

Additional species:

Leptospermum trinervium (8.7, 6.0), *Corymbia trachyphloia* subsp. *trachyphloia* (8.7, 3.5), *Eucalyptus microcorys* (8.7, 2.5), *Lophostemon confertus* (8.7, 2.5), *Eucalyptus resinifera* (8.7, 0.0), *Allocasuarina torulosa* (4.3, 2.0), *Banksia integrifolia* subsp. *compar* (4.3, 2.0), *Eucalyptus acmenoides* (4.3, 2.0), *Lophostemon suaveolens* (4.3, 2.0), *Angophora woodsiana* (4.3, 1.5), *Syncarpia verecunda* (4.3, 1.0), *Acacia disparrima* subsp. *disparrima* (4.3, 0.0), *Corymbia intermedia* (4.3, 0.0), *Eucalyptus pilularis* (4.3, 0.0)

Stratum: Shrub 1

Height: average: 1.83m; range: 1.20 - 3.50m; (23 sites)

Crown Cover: average: 28.6%; range: 3.0 - 88.0%; (23 sites)

Stem Count: average: 2,940 stems/ha; range: 60 - 8,680 stems/ha; std. deviation: 2,950.0 stems/ha; (8 sites)

Basal area: average: 1.0 m²/ha; range: 1.0 - 1.0 m²/ha; std. deviation: 0.0 m²/ha; (1 site)

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Xanthorrhoea latifolia subsp. *latifolia* (56.5, 6.6), *Pultenaea villosa* (43.5, 9.8), *Lophostemon confertus* (39.1, 7.4), *Acrotriche aggregata* (39.1, 2.4), *Hakea florulenta* (39.1, 2.1), *Acacia myrtifolia* (34.8, 4.8)

Additional species:

Monotoca scoparia (34.8, 2.5), *Lomatia silaifolia* (30.4, 2.8), *Podolobium ilicifolium* (30.4, 2.0), *Leptospermum trinervium* (26.1, 2.0), *Banksia spinulosa* var. *collina* (21.7, 4.2), *Acacia hispidula* (21.7, 1.3), *Pultenaea retusa* (21.7, 1.3), *Acacia suaveolens* (21.7, 1.0), *Persoonia sericea* (21.7, 1.0), *Acacia viscidula* (17.4, 13.7), *Daviesia villifera* (17.4, 8.0), *Notelaea ovata* (17.4, 4.2), *Syncarpia glomulifera* subsp. *glomulifera* (17.4, 3.5), *Daviesia wyattiana* (17.4, 3.0), *Hakea sericea* (17.4, 2.5), *Corymbia gummifera* (17.4, 2.2), *Macrozamia lucida* (17.4, 1.8), *Allocasuarina torulosa* (17.4, 1.5), *Persoonia iogyne* (17.4, 1.0), *Acacia penninervis* var. *penninervis* (17.4, 0.8), *Alphitonia excelsa* (17.4, 0.8), *Styphelia sieberi* (13.0, 7.0), *Acacia falcata* (13.0, 6.7), *Banksia oblongifolia* (13.0, 4.5), *Petrophile canescens* (13.0, 2.0), *Jacksonia scoparia* (13.0, 1.5), *Leptospermum polygalifolium* (13.0, 1.3), *Banksia integrifolia* subsp. *compar* (13.0, 1.2), *Acacia leiocalyx* subsp. *leiocalyx* (13.0, 1.0), *Hakea eriantha* (13.0, 1.0), *Acacia disparrima* subsp. *disparrima* (8.7, 7.0), *Hovea acutifolia* (8.7, 5.5), *Syncarpia verecunda* (8.7, 3.5), *Eucalyptus carnea* (8.7, 3.2), *Allocasuarina littoralis* (8.7, 2.0), *Acacia ulicifolia* (8.7, 1.0), *Leptomeria acida* (8.7, 1.0), *Phyllota phyllicoides* (8.7, 1.0), *Breynia oblongifolia* (8.7, 0.5), *Hibiscus divaricatus* (8.7, 0.5), *Acacia stricta* (8.7, 0.0), *Gahnia sieberiana* (8.7, 0.0), *Acacia fimbriata* (4.3, 20.0), *Lantana camara** (4.3, 14.0), *Platylobium formosum* (4.3, 3.0), *Denhamia silvestris* (4.3, 2.0), *Angophora woodsiana* (4.3, 1.0), *Banksia spinulosa* var. *spinulosa* (4.3, 1.0), *Bursaria spinosa* subsp. *spinosa* (4.3, 1.0), *Clematicissus opaca* (4.3, 1.0), *Parsonia straminea* (4.3, 1.0), *Westringia eremicola* (4.3, 1.0), *Acacia melanoxylon* (4.3, 0.5), *Glochidion ferdinandi* var. *ferdinandi* (4.3, 0.5), *Heptapleurum actinophyllum* (4.3, 0.5), *Acacia baeuerlenii* (4.3, 0.0), *Angophora leiocarpa* (4.3, 0.0), *Baccharis halimifolia** (4.3, 0.0), *Cissus hypoglauca* (4.3, 0.0), *Comesperma hispidulum* (4.3, 0.0), *Corymbia trachyphloia* subsp. *trachyphloia* (4.3, 0.0), *Cupaniopsis parvifolia* (4.3, 0.0), *Dodonaea triquetra* (4.3, 0.0), *Elaeocarpus obovatus* (4.3, 0.0), *Eucalyptus resinifera* (4.3, 0.0), *Gompholobium latifolium* (4.3, 0.0), *Guioa semiglaucula* (4.3, 0.0), *Hibbertia linearis* var. *obtusifolia* (4.3, 0.0), *Hovea lanceolata* (4.3, 0.0), *Jagera pseudorhus* var. *pseudorhus* (4.3, 0.0), *Leptospermum microcarpum* (4.3, 0.0), *Mirbelia speciosa* subsp. *ringrosei* (4.3, 0.0), *Notelaea* sp. (Barakula A.R.Bean 7553) (4.3, 0.0), *Persoonia media* (4.3, 0.0), *Pomaderris argyrophylla* (4.3, 0.0), *Pomaderris ferruginea* (4.3, 0.0), *Psychotria loniceroides* (4.3, 0.0), *Pultenaea spinosa* (4.3, 0.0), *Schizomeria ovata* (4.3, 0.0), *Sphaeropteris cooperi* (4.3, 0.0), *Trema tomentosa* var. *aspera* (4.3, 0.0), *Zieria smithii* (4.3, 0.0)

Stratum: Shrub 2

Height: average: 1.27m; range: 0.70 - 2.00m; (4 sites)

Crown Cover: average: 34.3%; range: 5.0 - 47.0%; (4 sites)

Stem Count: average: 16,100 stems/ha; range: 16,100 - 16,100 stems/ha; std. deviation: 0.0 stems/ha; (1 site)

Basal area: No data available.

Species list (frequency (%), average cover (%)):

Most frequent species (up to 6):

Monotoca scoparia (17.4, 1.5), *Xanthorrhoea latifolia* subsp. *latifolia* (13.0, 3.7), *Lomatia silaifolia* (13.0, 2.0), *Acrotriche aggregata* (13.0, 1.5), *Hakea sericea* (8.7, 9.0), *Daviesia villifera* (8.7, 7.0)

Additional species:

Leptospermum polygalifolium (8.7, 4.5), *Banksia oblongifolia* (8.7, 2.5), *Leptomeria acida* (8.7, 2.5), *Banksia spinulosa* var. *collina* (8.7, 1.5), *Acacia hispidula* (8.7, 1.0), *Petrophile canescens* (8.7, 1.0), *Dodonaea triquetra* (8.7, 0.8), *Phyllota phyllicoides* (4.3, 15.0), *Pultenaea flexilis* (4.3, 14.0), *Pultenaea villosa* (4.3, 7.0), *Leptospermum trinervium* (4.3, 4.0), *Lophostemon confertus* (4.3, 4.0), *Acacia myrtifolia* (4.3, 2.0), *Caustis flexuosa* (4.3, 2.0), *Hovea acutifolia* (4.3, 2.0), *Acacia suaveolens* (4.3, 1.0), *Austrostipa pubescens* (4.3, 1.0), *Elaeocarpus reticulatus* (4.3, 1.0), *Gahnia melanocarpa* (4.3, 1.0), *Gompholobium latifolium* (4.3, 1.0), *Jacksonia scoparia* (4.3, 1.0), *Pimelea linifolia* subsp. *linifolia* (4.3, 0.2), *Sannantha collina* (4.3, 0.2), *Woolfsia pungens* (4.3, 0.2), *Acacia baeuerlenii* (4.3, 0.0), *Acacia juncifolia* (4.3, 0.0), *Acacia maidenii* (4.3, 0.0), *Acacia penninervis* var. *penninervis* (4.3, 0.0), *Acacia viscidula* (4.3, 0.0), *Bossiaea heterophylla* (4.3, 0.0), *Bursaria spinosa* subsp. *spinosa* (4.3, 0.0), *Comesperma hispidulum* (4.3, 0.0), *Notelaea ovata* (4.3, 0.0), *Notelaea* sp. (*Barakula* A.R.Bean 7553) (4.3, 0.0), *Persoonia iogyne* (4.3, 0.0), *Persoonia sericea* (4.3, 0.0), *Podolobium ilicifolium* (4.3, 0.0), *Pultenaea retusa* (4.3, 0.0)

Stratum: Ground

Height: average: 0.42m; range: 0.20 - 0.60m; (23 sites)

Projective foliage cover (PFC): average: 25.2%; range: 3.0 - 70.0%; (23 sites)

Species list (frequency (%), average cover (%)):

Grass - perennial:

Most frequent species (up to 6):

Themeda triandra (78.3, 11.3), *Imperata cylindrica* (65.2, 1.9), *Entolasia stricta* (52.2, 1.8), *Cymbopogon refractus* (30.4, 1.7), *Panicum effusum* (17.4, 2.0), *Austrostipa pubescens* (13.0, 0.7)

Additional species:

Digitaria parviflora (13.0, 0.0), *Eremochloa bimaclata* (13.0, 3.0), *Ottochloa nodosa* (13.0, 0.0), *Oplismenus aemulus* (8.7, 2.4), *Alloterospis semialata* (4.3, 0.0), *Aristida calycina* (4.3, 0.0), *Aristida queenslandica* var. *queenslandica* (4.3, 0.2), *Aristida vagans* (4.3, 0.0), *Arundinella nepalensis* (4.3, 2.0), *Capillipedium spicigerum* (4.3, 3.0), *Digitaria* (4.3, 3.0), *Digitaria breviglumis* (4.3, 0.0), *Eragrostis* (4.3, 1.0), *Eragrostis brownii* (4.3, 0.0), *Panicum simile* (4.3, 0.0), *Paspalidium distans* (4.3, 0.0)

Grass - annual/biennial:

Not present

Forbs & other:

Most frequent species (up to 6):

Lepidosperma laterale var. *laterale** (60.9, 0.9), *Hardenbergia violacea* (56.5, 1.5), *Pteridium esculentum* (52.2, 6.8), *Desmodium rhytidophyllum* (47.8, 1.0), *Hibbertia aspera* (43.5, 2.7), *Pimelea linifolia* subsp. *linifolia* (43.5, 1.9)

Additional species:

Billardiera scandens (39.1, 0.0), *Smilax glycyphylla* (39.1, 1.0), *Acrotriche aggregata* (30.4, 0.8), *Lomandra longifolia* (30.4, 0.6), *Xanthorrhoea latifolia* subsp. *latifolia* (30.4, 7.3), *Dianella caerulea* (26.1, 0.7), *Glycine clandestina* var. *clandestina* (26.1, 0.7), *Goodenia rotundifolia* (26.1, 4.5), *Patersonia glabrata* (26.1, 0.0), *Pomax umbellata* (26.1, 0.0), *Gompholobium pinnatum* (21.7, 1.0), *Hibbertia diffusa* (21.7, 1.0), *Lomandra multiflora* subsp. *multiflora* (21.7, 1.0),

Monotoca scoparia (21.7, 9.0), *Persoonia sericea* (21.7, 1.0), *Xanthosia pilosa* (21.7, 1.0), *Bossiaea heterophylla* (17.4, 0.0), *Caustis flexuosa* (17.4, 6.8), *Eustrephus latifolius* (17.4, 0.0), *Hibbertia sericea* (17.4, 1.0), *Lindsaea microphylla* (17.4, 0.0), *Lomandra confertifolia* subsp. *pallida* (17.4, 1.9), *Notelaea ovata* (17.4, 1.6), *Pultenaea petiolaris* (17.4, 0.0), *Tetradlea thymifolia* (17.4, 1.0), *Comesperma hispidulum* (13.0, 1.0), *Cyanthillium cinereum* (13.0, 1.9), *Desmodium gunnii* (13.0, 0.0), *Glycine tabacina* (13.0, 0.0), *Hibbertia dentata* (13.0, 0.0), *Hibbertia linearis* var. *obtusifolia* (13.0, 0.6), *Hibbertia stricta* (13.0, 0.0), *Lomandra filiformis* subsp. *filiformis* (13.0, 1.1), *Pandorea pandorana* (13.0, 0.0), *Pigea stellarioides* (13.0, 0.0), *Platylobium formosum* (13.0, 1.7), *Pultenaea villosa* (13.0, 7.0), *Woollsia pungens* (13.0, 0.6), *Blechnum cartilagineum* (8.7, 2.0), *Brunoniella australis* (8.7, 0.0), *Cassytha glabella* forma *glabella* (8.7, 1.8), *Cheilanthes sieberi* subsp. *sieberi* (8.7, 1.0), *Dampiera sylvestris* (8.7, 1.0), *Gonocarpus teucroides* (8.7, 0.0), *Hibbertia vestita* (8.7, 0.0), *Leptospermum polygalifolium* (8.7, 0.0), *Lobelia purpurascens* (8.7, 0.6), *Parsonsia straminea* (8.7, 0.0), *Pseuderanthemum variabile* (8.7, 0.2), *Schizaea bifida* (8.7, 0.0), *Stephania japonica* var. *discolor* (8.7, 0.0), *Sticherus flabellatus* var. *flabellatus* (8.7, 12.0), *Syncarpia glomulifera* subsp. *glomulifera* (8.7, 8.0), *Acacia disparrima* subsp. *disparrima* (4.3, 1.0), *Acacia maidenii* (4.3, 0.0), *Acacia melanoxylon* (4.3, 1.0), *Acmena smithii* (4.3, 0.0), *Adiantum hispidulum* var. *hispidulum* (4.3, 0.0), *Allocasuarina torulosa* (4.3, 0.0), *Amperea xiphoclada* var. *xiphoclada* (4.3, 0.0), *Blechnum doodianum* (4.3, 1.0), *Bossiaea prostrata* (4.3, 0.0), *Calochlaena dubia* (4.3, 5.0), *Cassytha filiformis* (4.3, 0.2), *Cassytha pubescens* (4.3, 1.0), *Caustis blakei* subsp. *blakei* (4.3, 1.0), *Centella asiatica* (4.3, 1.0), *Chrysocephalum apiculatum* (4.3, 0.0), *Cirsium vulgare** (4.3, 0.0), *Clematicissus opaca* (4.3, 0.0), *Coleus australis* (4.3, 0.0), *Commersonia dasyphylla* (4.3, 0.0), *Crowea exalata* subsp. *magnifolia* (4.3, 0.0), *Curculigo ensifolia* var. *ensifolia* (4.3, 0.0), *Cyanothamnus polygalifolius* (4.3, 0.0), *Daviesia ulicifolia* (4.3, 0.0), *Dendrophthoe glabrescens* (4.3, 0.0), *Denhamia celastroides* (4.3, 0.0), *Dianella* (4.3, 0.0), *Dianella caerulea* var. *vannata* (4.3, 0.0), *Dianella revoluta* (4.3, 0.0), *Dipodium variegatum* (4.3, 0.0), *Dodonaea triquetra* (4.3, 0.0), *Eremophila debilis* (4.3, 0.0), *Eucalyptus carnea* (4.3, 2.0), *Eucalyptus dura* (4.3, 0.0), *Fimbristylis dichotoma* (4.3, 0.0), *Flemingia parviflora* (4.3, 0.0), *Gahnia aspera* (4.3, 4.0), *Gahnia sieberiana* (4.3, 1.0), *Geitonoplesium cymosum* (4.3, 0.0), *Geodorum densiflorum* (4.3, 0.0), *Gleichenia dicarpa* (4.3, 0.0), *Glochidion ferdinandi* var. *ferdinandi* (4.3, 0.0), *Glycine tomentella* (4.3, 0.0), *Gonocarpus* (4.3, 0.0), *Goodenia ovata* (4.3, 0.0), *Goodenia* sp. (Mt Castletower M.D.Crisp 2753) (4.3, 0.0), *Hakea florulenta* (4.3, 0.0), *Hibbertia scandens* (4.3, 0.0), *Hovea acutifolia* (4.3, 0.0), *Hovea linearis* (4.3, 0.2), *Kennedia rubicunda* (4.3, 1.0), *Lasiopetalum* (4.3, 0.0), *Leichhardtia fraseri* (4.3, 0.0), *Lepidosperma laterale* (4.3, 0.5), *Leptospermum petersonii* (4.3, 0.0), *Lomandra confertifolia* subsp. *confertifolia* (4.3, 0.0), *Lomandra laxa* (4.3, 3.0), *Lomatia silaifolia* (4.3, 0.0), *Machaerina juncea* (4.3, 0.0), *Melaleuca salicina* (4.3, 0.0), *Melichrus adpressus* (4.3, 0.2), *Mentha satuireioides* (4.3, 6.0), *Micranthemum ericoides* (4.3, 0.0), *Myrsine howittiana* (4.3, 0.0), *Myrsine variabilis* (4.3, 0.0), *Ochna serrulata** (4.3, 0.0), *Opercularia diphylla* (4.3, 0.0), *Ozothamnus diosmifolius* (4.3, 0.0), *Passiflora suberosa** (4.3, 1.0), *Persoonia stradbrokeensis* (4.3, 0.0), *Pittosporum revolutum* (4.3, 0.0), *Pomaderris canescens* (4.3, 0.0), *Pomaderris ferruginea* (4.3, 0.0), *Pultenaea flexilis* (4.3, 0.0), *Pultenaea retusa* (4.3, 0.0), *Pultenaea spinosa* (4.3, 0.0), *Schoenus brevifolius* (4.3, 0.0), *Scleria sphacelata* (4.3, 0.2), *Sigesbeckia orientalis* (4.3, 0.0), *Smilax australis* (4.3, 0.0), *Solanum densevestitum* (4.3, 2.0), *Stylidium graminifolium* (4.3, 0.0), *Thysanotus tuberosus* (4.3, 0.0), *Trachymene procumbens* (4.3, 0.0), *Tristaniopsis laurina* (4.3, 0.0), *Viola hederacea* (4.3, 0.0), *Xanthorrhoea johnsonii* (4.3, 0.0), *Xanthorrhoea macronema* (4.3, 0.0), *Zieria minutiflora* subsp. *minutiflora* (4.3, 0.0)

Species list: Frequency (percent of total sites) and cover (average of species cover across sites where that species is present). Ordered by decreasing frequency. Naturalised species have an asterisk (*) after the name. indet. after listed name if indeterminate species or genus.