BOONANARRING

MINERAL SANDS PROJECT

AUTUMN 2023

GROUNDWATER DEPENDENT

VEGETATION MONITORING

Prepared for Image Resources NL

by

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August 2023

EXECUTIVE SUMMARY

Image Resources NL is mining mineral sands along the eastern side of the Swan Coastal Plain in the Boonanarring area, about 20 kilometres north of Gingin in Western Australia. Overburden removal commenced in May 2018, the processing plant was commissioned and in full production from the 1st December 2018 and a pump was installed to allow dewatering of Pit C from December 2018 to November 2019 and Pit B from March to July 2020. Top soil/subsoil clearing of Pit D (adjacent to Boonanarring Nature Reserve) commenced in September 2021, with overburden removal starting in December 2021. Active mining of 'heavy mineral concentrate' ore (HMC) ceased at the Boonanarring project in March 2023, with final ore reserves being removed from Pit D. Backfill continued with Bund J and K material being deposited into the Pit D mining void.

A Vegetation Monitoring Program for terrestrial and wetland (potential) groundwater dependent vegetation (GDV) in Bartlett's Well NR and Boonanarring NR and for Collard's Wetland, was required for approval of the mining project. An element of the Vegetation Monitoring Programs were pre-mining (baseline) surveys that were to include:

- One Spring monitoring of all monitoring variables;
- One Autumn monitoring of canopy condition.

Pre-mining tree crown assessment monitoring was conducted in Spring 2015 and Autumn 2016 (excepting for a burnt transect in Boonanarring NR). Other pre-mining monitoring surveys were subsequently conducted in some of the GDV areas in Spring 2017 and Spring 2018.

The Autumn 2023 survey is the ninth monitoring survey since commencement of mining and was undertaken between the 25th and 26th of April 2023. Active mining in Pit A (the northern most pit and adjacent to Bartlett's Well NR) ceased in July 2021 and following two additional rounds of monitoring after the cessation of mining, no further monitoring of the Bartlett's Well NR sites was required and they were not included in the Autumn 2023 survey.

Analysis showed that the mean Crown Assessment Index (CAI) of trees increased from Autumn 2022 to Autumn 2023 at the Boonanarring NR treatment and Control sites. No new *Banksia* tree deaths were recorded at the Boonanarring NR sites in the Autumn 2023 monitoring. Trees that had died previously (CAI=0) remain in the analysed data set and so the mean tree CAI recorded in Autumn 2023 significantly understates the

mean CAI of the remaining live trees. *Banksia attenuata* and *Banksia menziesii* trees at Boonanarring NR GDV sites, on average, remained moderately healthy.

At Collard's Wetland, mean CAI for 'all trees' increased between Autumn 2022 and Autumn 2023. However, mean CAI of 'all trees' has declined significantly since pre-mining monitoring in Autumn 2016. The trend differs between species, with mean CAI of *Melaleuca rhaphiophylla* and *Corymbia calophylla* (Marri) crowns not significantly different between pre-mining Autumn 2016 and Autumn 2023 surveys, but mean CAI of *Eucalyptus rudis* and *Melaleuca preissiana* trees declining significantly over that period. *Melaleuca rhaphiophylla* crowns at Collard's Wetland sites were 'very healthy' and their mean CAI had not changed significantly in Autumn 2023. Mean CAI of *Eucalyptus rudis* (Flooded Gum) and *Corymbia calophylla* (Marri) trees has increased between Autumn 2022 and Autumn 2023 and has been increasing since a significant decline was recorded in Spring 2019. Mean CAI of *Melaleuca preissiana* trees has slowly declined at Collard's sites since Autumn 2016, with overshadowing from the taller *Eucalyptus rudis* and *Corymbia calophylla* trees considered a significant factor.

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1.0 INTRODUCTION

1.1 Background

Image Resources NL is mining mineral sands along the eastern side of the Swan Coastal Plain in the Boonanarring area, about 20 kilometres north of Gingin, Western Australia. The first area mined was on farmland south of Wannamal Rd West and adjacent to the scarp to the east (Pit C). Preparation for mining began in May 2018 with the removal of overburden. The processing plant was constructed and commissioned during 2018. Commissioning was completed by the 1st of December 2018. A pump was installed in Pit C in December 2018 for tails return water and for dewatering. No dewatering took place prior to December 2018 (in the 'pre-mining' period). The next areas mined after the commencement of mining at Pit C, were north of Wannamal Rd West (Pit B (adjacent to Wannamal Rd West) and Pit A (northern most pit)) (Figure 1). Mining of Pit A (adjacent to Bartlett's Well NR) finished in July 2021 and the pit is now being back-filled and progressively rehabilitated with 'waste' soil and top soil/sub-soil. Top soil/subsoil clearing of Pit D (southern-most pit and nearest pit to Boonanarring NR) commenced in September 2021, with overburden removal starting in December 2021. Active mining of HMC continued in Pit D until March 2023, with the mining stage of the Boonanarring project now finished. Pit D is now being backfilled with waste material and progressively rehabilitated.

In February 2013, groundwater dependent vegetation (GDV) mapping was undertaken in Bartlett's Well Nature Reserve (here after Bartlett's Well NR) and in a small area of Boonanarring Nature Reserve (here after Boonanarring NR) (adjacent to and on the eastern side of the proposed mine envelope) as part of the proposed mine approvals process (360 Environmental, 2013). *Banksia attenuata-Banksia menziesii* low woodlands and low open woodlands were mapped as potential Terrestrial GDV in the surveyed areas. Extensive deaths of *Banksia attenuata* and *Banksia menziesii* trees were noted in parts of the *Banksia* woodlands in Bartlett's Well NR and in Boonanarring NR and were considered to be most likely due to drought (360 Environmental, 2013). Vegetation units associated with a *Melaleuca preissiana* low woodland seasonal dampland in Bartlett's Well NR were also mapped as potential Wetland GDV.

The report and recommendations of the Environmental Protection Authority for the Boonanarring Mineral Sands Mine (EPA, 2014) set out conditions for approval of the mining project in Ministerial Statement 981 (MS981) that included, as part of Condition 6-1, that "The proponent shall ensure that the groundwater dewatering and abstraction associated with the activities does not cause any loss or degradation of defined environmental values within Bartlett's Well and Boonanaring Nature Reserves ...". A 'Nature Reserve Vegetation and Groundwater Monitoring and Response Plan' (NRVGMRP) was prepared to address Condition 6

of the EPA document (COOE, 2015) and address requirements from the Department of Biodiversity, Conservation and Attractions (DBCA), as part of the site's Water Operating Strategy, approved by the Department of Water and Environmental Regulation (DWER). Included in the NRVGMRP was a Vegetation Monitoring Program for terrestrial and wetland (potential) GDV in Bartlett's Well NR and Boonanarring NR, that outlined monitoring methodology, frequency and timing and listed indicative monitoring site locations (Appendix B in COOE, 2015).

Ministerial Statement 981 also set out Condition 7-1 for approval of the mining project, that "The proponent shall ensure that the groundwater dewatering and abstraction associated with the activities does not cause any loss or degredation of defined environmental values with Collard wetland…". Collard's wetland (here after referred to as 'Collard's Wetland') lies some 3km to the west of Boonanarring NR and west of the proposed mining area (Figure 1). A 'Groundwater Monitoring Plan' (GMP) was prepared to address Condition 7 of the EPA document (Appendix A in COOE, 2015) and address requirements as part of the site's Water Operating Strategy, subject to approval by the DWER. Included in the GMP was a Vegetation Monitoring Program for Collard's Wetland that outlined monitoring methodology, frequency and timing. These used the same methodology as that proposed for the GDV monitoring in the Nature Reserves. Indicative monitoring site locations in Collard's Wetland were also listed in the document.

An element of the Vegetation Monitoring Programs for the Nature Reserves and for Collard's Wetland was pre-mining (baseline) surveys that were to include:

- One Spring monitoring of all monitoring variables;
- One Autumn monitoring of canopy condition.

Ministerial Statement 981 (MS981) conditions 6-4 and 7-4 required that "Prior to the commencement of groundwater dewatering and/or abstraction associated with the proposal, the proponent shall provide the baseline data results required by condition .... ['6-2(4) and 6-3' and '7-2(2) and 7-3' respectively]... to the CEO" (EPA, 2014). Pre-mining baseline surveys were conducted in Spring 2015 (all sites excluding sites along one transect burnt in Boonanarring NR), Autumn 2016 (all sites excluding the burnt transect in Boonanarring NR), Spring 2017 (excluding one burnt transect in Boonanarring NR and the wetland GDV sites in Bartlett's Well NR) and Spring 2018 (all Boonanarring NR sites only, including a first sample of the transect sites burnt in Spring 2015). All pre-mining baseline survey data has been reported (Morgan, 2019).

Monitoring after commencement of mining, began with the Autumn 2019 monitoring survey. The GDV monitoring requirements have since been amended as set out in the updated 'Nature

Reserve Vegetation and Ground Water Monitoring and Response Plan' (NRVGMRP) (Image Resources, 2021). The updated monitoring requirements removed the need for more detailed annual Spring monitoring elements that were in addition to a tree canopy condition assessment, bringing the Spring monitoring into alignment with the Autumn monitoring requirements. The monitoring schedule was also revised to require two rounds of monitoring after the cessation of mining/excavation and dewatering. As mining/excavation and dewatering from Pit A and Pit B, adjacent to Bartlett's Well NR, ceased in July 2021, the Autumn 2022 survey was the final survey for Bartlett's Well NR sites.

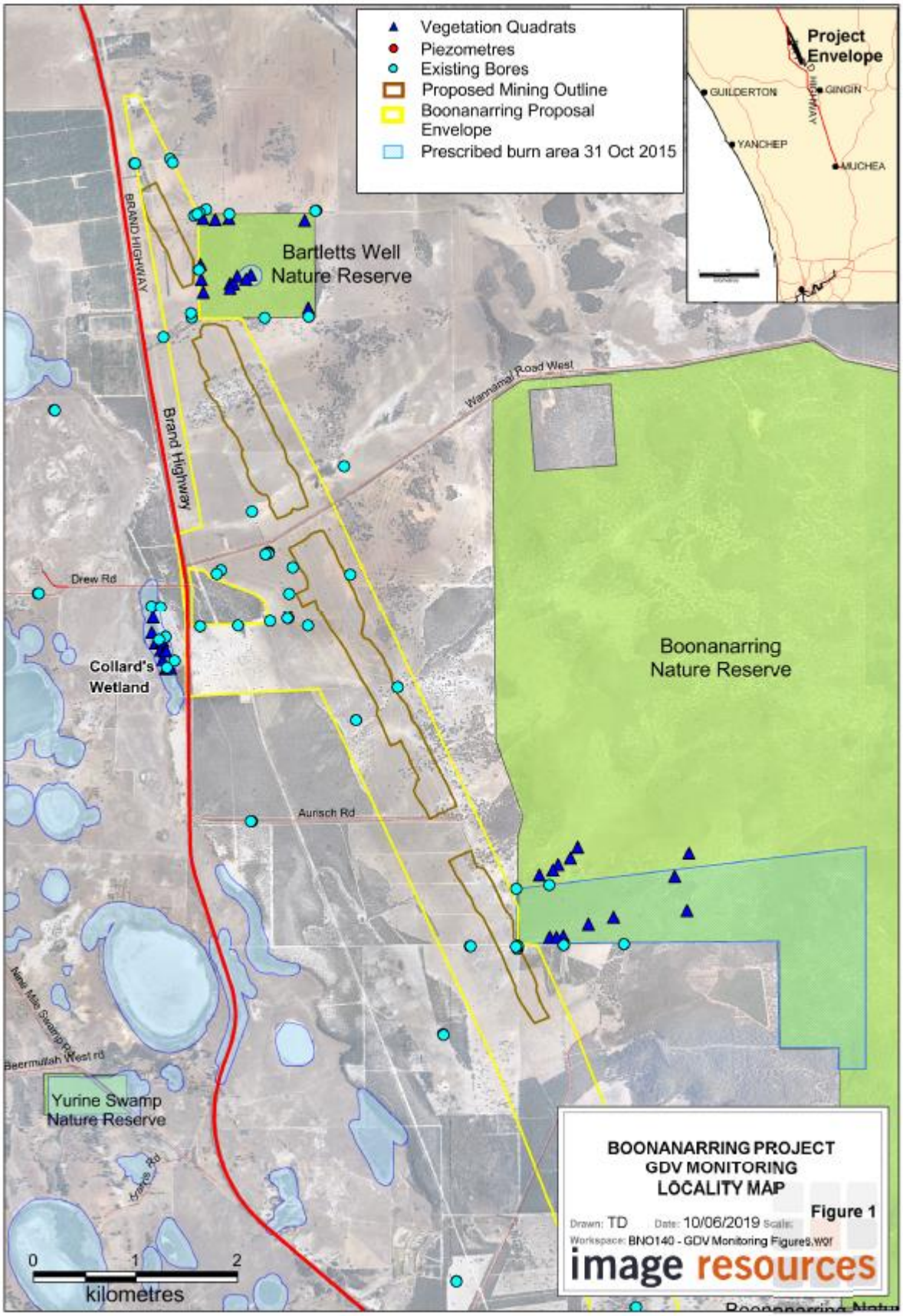
Another element of the 'Nature Reserve Vegetation and Ground Water Monitoring and Response Plan' (NRVGMRP) (Image Resources, 2021) and Groundwater Monitoring Plan (Image Resources, 2020) was the requirement for ground water monitoring. Numerous bores were installed at locations around Pit C, Collard's Wetland, Bartlett's Well NR and Boonanarring NR, for the purpose of monitoring depth to the Superficial and deeper aquifer groundwater. The bore locations are shown in Figures 1 to 4. Depth to ground water is recorded manually monthly or quarterly (where there is also an installed groundwater logger) at the bore locations.

1.2 Purpose of the Autumn 2023 GDVM survey

The Autumn 2023 survey was undertaken to satisfy the GDV monitoring requirements set out in the updated, current Water Operating Strategy (Image Resources, 2022) and EPA implementation conditions (condition 7-3, EPA, 2014) for annual Autumn and Spring GDV monitoring surveys during the period of mining. The Autumn 2023 survey was a canopy condition assessment and is the fifth autumn GDV monitoring event undertaken after commencement of mining and associated dewatering at the Boonanarring site.

1.3 The survey area

The location of GDV monitoring quadrats in Boonanarring NR and Collard's Wetland are shown Figure 1.


Vegetation Quadrats
Piezometres
Existing Bores
Proposed Mining Outline
Boonanarring Proposal Envelope
Prescribed burn area 31 Oct 2015
Project Envelope
GUILDERTON
GINGIN
YANCHEP
MUCHEA
Bartletts Well Nature Reserve
BRAND HIGHWAY
Brand Highway
Wannamal Road West
Drew Rd
Collard's Wetland
Boonanarring Nature Reserve
Aurisch Rd
Beermullah West rd
Yurine Swamp Nature Reserve
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1
2
kilometres
BOONANARRING PROJECT
GDV MONITORING
LOCALITY MAP
Figure 1
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image resources

2.0 BACKGROUND INFORMATION ON BOONANARRING GDV MONITORING

2.1 Location of GDV monitoring sites

A total of 14 terrestrial and 18 wetland GDV monitoring sites were established and sampled in Spring 2015 (see Table 1; Figures 2 and 3 below, and Figure 3 in Morgan (2019)). Seven other sites planned as part of a second monitoring transect in Boonanarring NR in 2015, but which were in an area subsequently burnt in October 2015, were finally established and recorded in Spring 2018 (pre-mining) (Figure 2).

'Treatment' sites were located in transects which, where possible, were orientated perpendicularly to the proposed mining envelope and to the shallowest ground water point near the mining envelop (that is, orientated upslope, from low elevation to high elevation to try and get a gradient of DTGW) and gradient of distance from drawdown area. 'Control' sites were located at points high in the landscape and far from the drawdown areas.

2.2 Pre-mining (baseline) monitoring

GDV monitoring surveys prior to December 2018 (when the processing plant was commissioned and pumps were installed for pit dewatering), are considered to be pre-mining monitoring. The following monitoring was conducted in the pre-mining period.

Spring 2015 GDV survey

Terrestrial GDV sites (excluding Boonanarring NR transect T2 sites, which had been burnt just prior to set-up):

- 20x20m quadrats – tree counts and tree canopy condition assessment;
- 10x10m quadrat (nested) – a complete list of species and canopy covers. Species lists updated with a second early spring visit to sites in Spring 2016.

Wetland GDV sites:

- 10x10m quadrats – tree counts, tree covers and tree canopy condition assessment;
- Two nested 5x5m quadrats – complete species list with species canopy cover. Species lists updated with a second early spring visit to sites in Spring 2016.

Autumn 2016 GDV survey

Terrestrial GDV sites (except Boonanarring NR T2 sites) and Wetland GDV sites:

- tree canopy condition assessment;

Spring 2017 GDV survey

Terrestrial GDV sites (except Boonanarring NR T2 sites):

- tree canopy condition assessment; tree counts

Wetland GDV sites (Collard's Wetland sites, but not the Bartlett's Well NR wetland sites):

- tree canopy condition assessment, tree counts.

Spring 2018 GDV survey

Terrestrial GDV sites (Boonanarring NR only)

- Transect T2: established 5 new quadrats (BNR07, BNR08, BNR09, BNR10, BNR11) and sampled along with 2 T2 sites already established (BNR12, BNR13):
    - 20x20 quadrat - tree counts and canopy condition assessment;
    - 10x10 quadrat (nested) - complete species list with species canopy cover.
- Transect T1 sites (established 2015: BNR01, BNR02, BNR03, BNR04, BNR05, BNR06):
    - tree canopy condition assessment;

2.3 GDV monitoring after commencement of mining/dewatering

The first GDV monitoring undertaken for the Boonanarring project after commencement of mining was the Autumn 2019 GDV survey. Since then there have been monitoring surveys in Spring 2019, Autumn 2020, Spring 2020, Autumn 2021, Spring 2021, Autumn 2022 and Spring 2022.

Autumn 2019 survey

Terrestrial GDV sites:

- tree canopy condition assessment;

Wetland GDV sites:

- tree canopy condition assessment.

Spring 2019 GDV survey (including detailed monitoring elements)

Terrestrial GDV sites:

- 20x20m quadrats – tree counts and tree canopy condition assessment;
- 10x10m quadrat (nested) – a list of perennial species list and their covers.

Wetland GDV sites:

- 10x10m quadrats – tree counts, tree covers and tree canopy condition assessment;
- Two nested 5x5m quadrats – complete list of all species, with covers.

Autumn 2020, Spring 2020, Autumn 2021, Spring 2021 GDV surveys

Terrestrial GDV sites:

- tree canopy condition assessment;

Wetland GDV sites:

- tree canopy condition assessment.

2.4 Cessation of monitoring in Bartlett's Well NR

As noted in section 1.1 above, following the completion of Pit A mining and dewatering in July 2021, the Spring 2021 and Autumn 2022 surveys were the final surveys for Bartlett's Well NR. Consequently, no monitoring was undertaken in Bartlett's Well NR for the Autumn 2023 survey.

2.5 Depth to groundwater monitoring

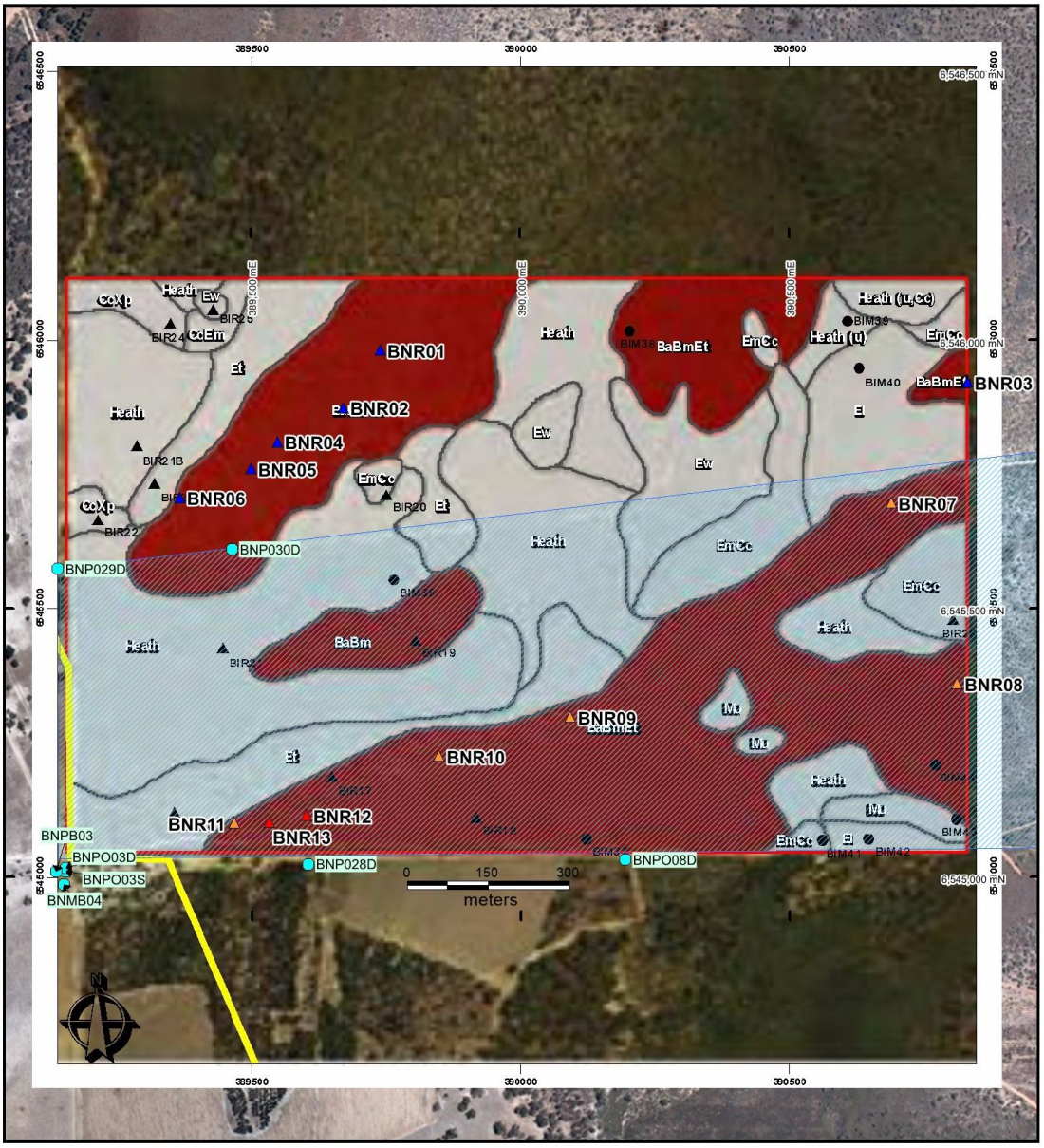
The most recent available historical depth to ground water (DTGW) data for bores at or adjacent to Boonanarring NR and Collard's Wetland are shown in Figures 4a, b.

Table 1. GDV monitoring sites (quadrats) in Boonanarring NR, Bartlett's Well NR and Collard's Wetland and site properties.

Site Nos	Location	GDV Type	Mapped Vegtn	Site Class[b]	Comments
BNR01	Boonanarring NR	Terrestrial	BaBmEt	T1	
BNR02	Boonanarring NR	Terrestrial	BaBmEt	T1	
BNR03	Boonanarring NR	Terrestrial	BaBmEt	C	
BNR04	Boonanarring NR	Terrestrial	BaBmEt	T1	
BNR05	Boonanarring NR	Terrestrial	BaBmEt	T1	
BNR06	Boonanarring NR	Terrestrial	BaBmEt	T1	
BNR07	Boonanarring NR	Terrestrial	BaBmEt	C	Established Nov 2018 (Area burnt Oct 2015)
BNR08	Boonanarring NR	Terrestrial	BaBmEt	C	Established Nov 2018 (Area burnt Oct 2015)
BNR09	Boonanarring NR	Terrestrial	BaBmEt	T2	Established Nov 2018 (Area burnt Oct 2015)
BNR10	Boonanarring NR	Terrestrial	BaBmEt	T2	Established Nov 2018 (Area burnt Oct 2015)
BNR11	Boonanarring NR	Terrestrial	BaBmEt	T2	Established Nov 2018 (Area burnt Oct 2015)
BNR12	Boonanarring NR	Terrestrial	BaBmEt	T2	Site burnt October 2015 (DBCA control burn).[a]
BNR13	Boonanarring NR	Terrestrial	BaBmEt	T2	Site burnt October 2015 (DBCA control burn). [a]
BWNR01	Bartlett's Well NR	Terrestrial	BaBmEt	T4	
BWNR02	Bartlett's Well NR	Terrestrial	BaBmEt	T4	
BWNR03	Bartlett's Well NR	Terrestrial	BaBmEt	T4	
BWNR04	Bartlett's Well NR	Terrestrial	BaBmEt	C1	
BWNR05	Bartlett's Well NR	Terrestrial	BaBmEt	T3	
BWNR06	Bartlett's Well NR	Terrestrial	BaBmEt	T3	
BWNR07	Bartlett's Well NR	Wetland	CcMpCa	bCcMp	
BWNR08	Bartlett's Well NR	Wetland	Mp	bMp	
BWNR09	Bartlett's Well NR	Wetland	Mp	bMp	
BWNR10	Bartlett's Well NR	Wetland	Mp	bMp	
BWNR11	Bartlett's Well NR	Wetland	MpMl	bMpMl	
BWNR12	Bartlett's Well NR	Wetland	Mp	bMp	
BWNR13	Bartlett's Well NR	Terrestrial	BaBmEt	T3	
BWNR14	Bartlett's Well NR	Terrestrial	BaBmEt	C1	
CW01	Collard's Wetland	Wetland	Mp	cMp	
CW02	Collard's Wetland	Wetland	ErMr	cMr	
CW03	Collard's Wetland	Wetland	ErMr	cMr	
CW04	Collard's Wetland	Wetland	ErMp	cErMp	
CW05	Collard's Wetland	Wetland	CcErLl	cCcEr	
CW06	Collard's Wetland	Wetland	Mr	cMr	
CW07	Collard's Wetland	Wetland	Mr	cMr	
CW08	Collard's Wetland	Wetland	ErMp	cErMp	
CW09	Collard's Wetland	Wetland	CcErLl	cCcEr	
CW10	Collard's Wetland	Wetland	ErMr	cMr	
CW11	Collard's Wetland	Wetland	ErMp	cErMp	
CW12	Collard's Wetland	Wetland	CcErLl	cCcEr	

[a] Sites pegged, but only scored for canopy condition

[b] T: transects; C: control sites; bxxx: Bartlett's Well wetland vegetation groupings; cxxx: Collard's Wetland vegetation groupings.



Boonanarring Proposal Envelope
Groundwater Dependent Vegetation Survey Area
Existng Bores
Prescribed burn area 31 Oct 2015

Flora Sampling Locations
Mapping Note
Releve

Potential Groundwater Sensitive Vegetation
Terrestrial
Wetland

Vegetation Quadrats
Established Oct 2015
Established Oct 2015, burnt Nov 2015
Established Oct 2018

BOONANARRING PROJECT
BOONANARRING NATURE RESERVE
GDV MONITORING QUADRAT LOCATIONS & VEGETATION UNITS
Figure 2

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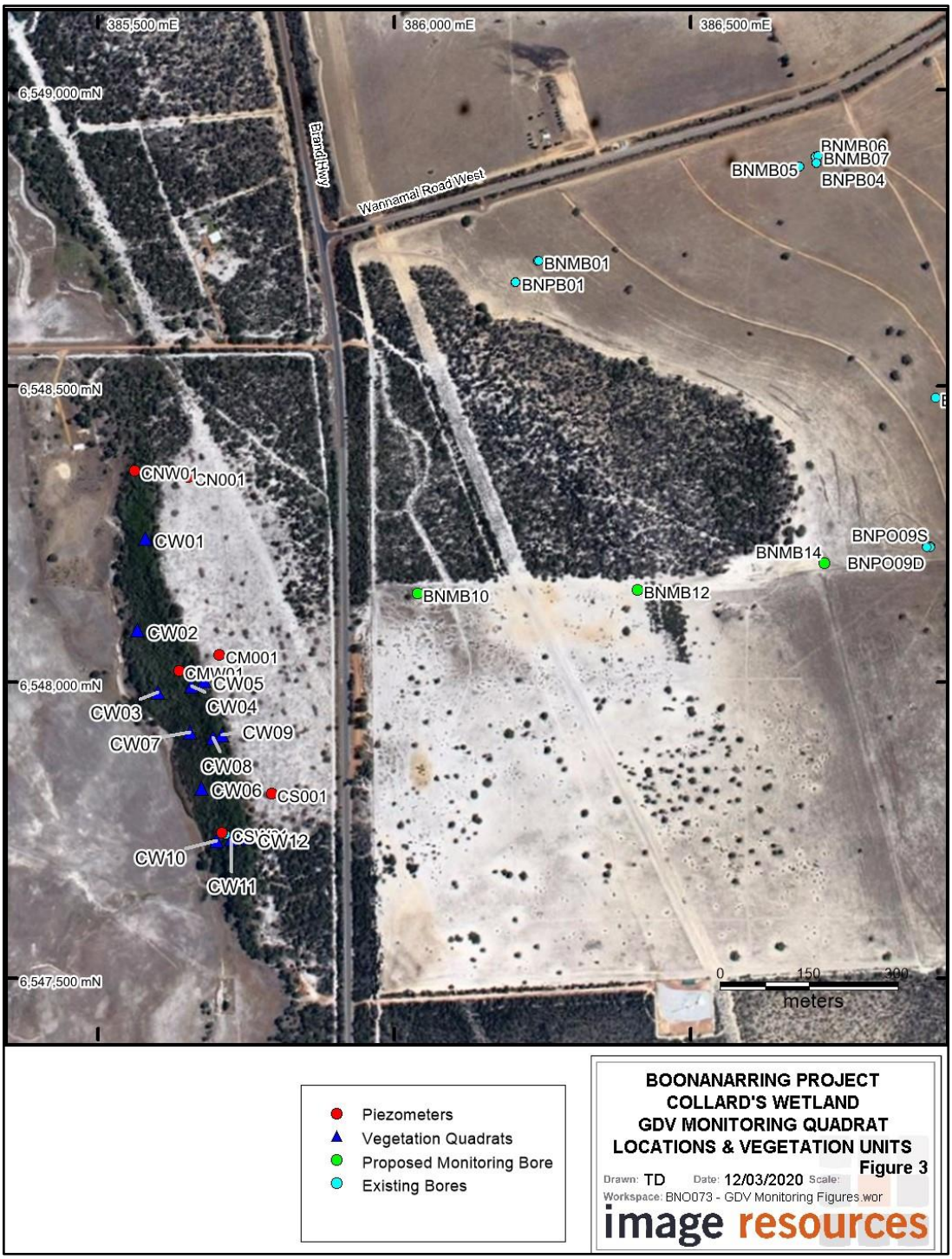
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BNMB06
BNMB07
BNMB05
BNPB04
BNMB01
BNPB01
CNW01
CN001
CW01
BNPO09S
BNMB14
BNPO09D
BNMB10
BNMB12
CW02
CM001
CMW01
CW05
CW03
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CW11
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meters
Piezometers
Vegetation Quadrats
Proposed Monitoring Bore
Existing Bores
BOONANARRING PROJECT
COLLARD'S WETLAND
GDV MONITORING QUADRAT
LOCATIONS & VEGETATION UNITS
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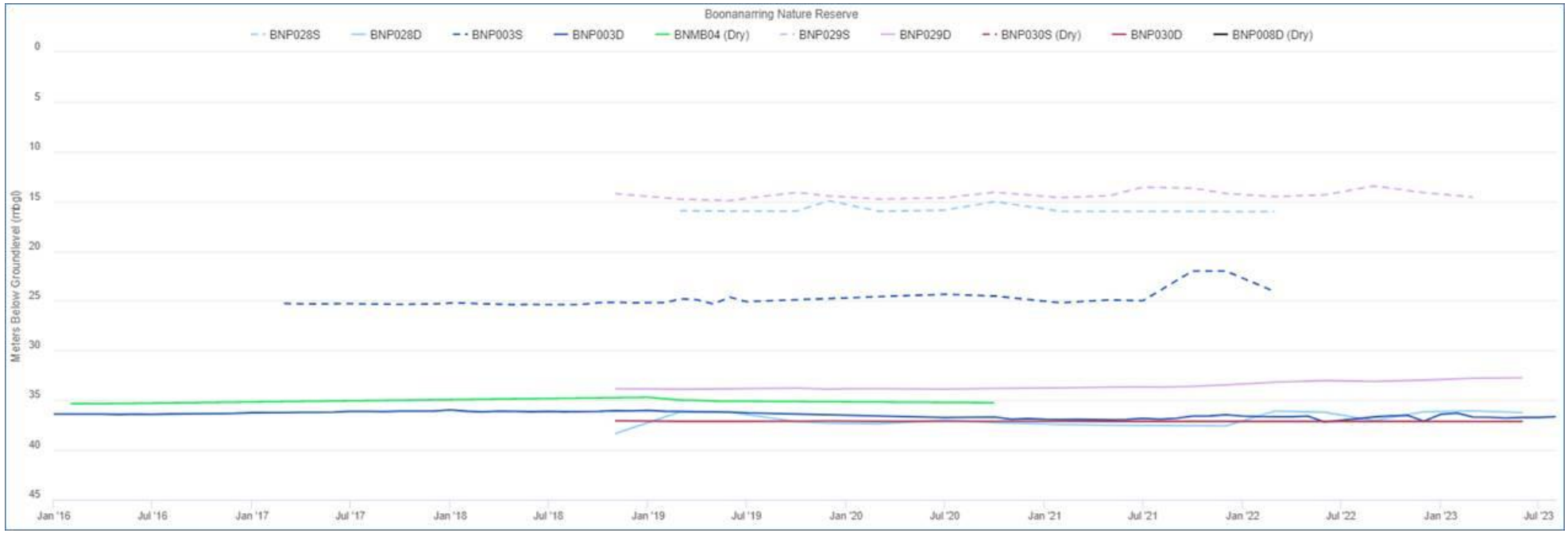

Figure 4a. Depth to Ground Water for bores at Boonanarring NR (see Fig 2 for bore locations).

Figure 4b. Depth to Ground Water for bores at Collard's Wetland (see Fig 3 for bore locations).

3.0 METHODS AND LIMITATIONS

3.1 Timing of the survey

The Autumn 2023 survey was undertaken between the 25th and 26th of April 2023.

3.2 Survey methods

3.2.1 Site records

When each quadrat (site) was visited, a photo was taken of the quadrat from the north or north-west corner, as per previous surveys. Some basic notes were made about the appearance of vegetation health in the quadrat. Sample trees were photographed (all trees at sites in Boonanarring NR, but not in Collard's Wetland due to the greater height and density of trees making tree crown photos less effective). Sample trees were then scored for crown assessment and foliage health. Where tree tags had become detached, they were refastened or replaced.

Where some sample trees had died and there was concern for future sample numbers at a site, new sample trees were selected, tagged and scored for potential inclusion in future monitoring analysis.

3.2.2 Canopy condition assessment

Canopy condition assessment was undertaken for the Autumn 2023 survey as described for previous surveys (Morgan, 2019). For each surveyed tree crown, 'crown density' (1 to 9), 'proportion of dead branches' (1 to 9) and 'degree of epicormic growth' (1 to 5) were scored using the 'Crown Assessment Procedure diagrams' supplied by DWER (Appendix 1). For each tree, the scores of these three elements of canopy condition were subsequently totaled to give a '3 point canopy assessment index', or 'crown assessment index' score for each tree (3 point scale; Ladd, 1996; cited by R. Loomes, *pers. comm.*). Because it is scored out of a smaller range of values, the addition of the three elements of canopy condition effectively gives less weight to 'degree of epicormic growth' than to the other two elements of canopy condition. The lesser weighting of 'degree of epicormic growth' in the index was made because it was argued that epicormic growth is not always an indicator of poor canopy condition or tree stress (R. Loomes (DWER), *pers. comm*.).

For the Boonanarring GDV monitoring surveys, 'Dead Branches' were scored for the outer part of the tree canopy, since branches in the inner part of the canopy had often died back due to factors such as competition for sunlight (shading) and nutrients, factors

unrelated to groundwater access and the general health of the tree. This was particularly noticeable for trees with dense canopies, such as *Melaleuca preissiana* and, more generally, for sites with high tree density and high overall canopy cover (a number of the Collard's Wetland sites). Another problem in canopy assessment arose when one or more of the main crown branches had died. In this case, 'dead branches' and 'crown density' assessment took into account the entire crown including the dead branches, but 'foliage health' (see below) focused on the remaining foliage on the live branches.

3.2.3 Foliage health assessment

Since the canopy condition 3 point assessment method did not include a direct assessment of foliage health, it was decided to include a simple assessment of crown foliage health for the sampled trees. A simple scale for foliage health was developed during the initial field survey and is shown in Table 2 below. It was designed to give an approximate and broad rating to tree foliage health. It should be noted that foliage health, like the three surveyed crown condition elements, could be affected by many factors other than detrimental changes in ground water access for GDV plant species, such as insect herbivory. The foliage health assessment focused on the foliage in the outer crown of trees to avoid foliage symptoms that occur in the inner canopy due to factors such as shading by the outer canopy.

Table 2. Foliage health Index (applied to the outer crown canopy of sampled trees).

Index	Foliage health description	Foliage health symptoms
5	Healthy	Leaves green and abundant; very little leaf yellowing (some yellowing, leaf drop or other deterioration restricted to older leaves/branches lower in canopy (inside the crown canopy)).
4	Signs of some stress	Some leaves yellowing, mostly healthy green.
3	Significant stress	Leaf yellowing widespread, some defoliation (leaf drop) and leaf necrosis.
2	Serious stress	Leaf yellowing widespread; leaf necrosis may be significant in parts of crown.
1	Seriously stressed/diseased tree; near death	Extensive leaf necrosis and defoliation in outer canopy

3.3 Limitations of the GDV monitoring survey

The subjective nature of canopy condition assessments was a limitation for the survey, although this was mitigated to some extent by regular reference to the crown assessment procedure diagrams. This limitation of the assessment applied both within any one season of sampling between sites and also in comparing data from different seasons. Photos of trees from previous surveys were used as a reference when making crown assessments.

Rules on the parts of canopies used to assess 'dead branches' and foliage health and on the assessment of major dead branches in ongoing surveys helped with consistency during the survey.

Another limitation of the monitoring survey was that the crown assessment index and foliage health index may not always reflect tree stress or tree health. Fire was disruptive to tree assessment along one transect of sites in Boonanarring NR (transect T2, Table 1; Figure 2), which were burnt in October 2015. Tree crowns at these sites were fire damaged to various extents, resulting in dead branches and scorched foliage and was responsible for subsequent epicormic growth. At other sites, overshadowing by neighboring trees also impacted crown assessment factors.

3.4 Data analysis

Descriptive statistics, means and standard deviations, were calculated for the Autumn 2023 tree Crown Assessment Index (CAI) and Foliage Health Index (FHI) data sets. The Excel spreadsheet 'Pivot Table' function was used to calculate the descriptive statistics.

The data sets used for the descriptive statistics in this report included trees that had died after the first pre-mining survey (Spring 2015) and excluded monitoring trees that were first recorded after the Spring 2015 survey. This was consistent with the previous Autumn GDV monitoring reports, but differed from the Spring GDV report treatment, which optimised Spring data comparisons (see Morgan, 2020). When monitoring trees died, they subsequently scored a 'zero' for the three elements of canopy condition assessment (and therefore zero for crown assessment index) and for the foliage health assessment. For some of this analysis, data was grouped into 'site classes'. In the Wetland GDV areas, sites were grouped by vegetation type 'site classes'. In the Terrestrial GDV areas, sites were grouped by 'treatment' class ('treatment' and 'control'), where the unquantified 'distance from mining envelope' was effectively the 'treatment'.

StatPlus Pro V7.6.5 computer package (AnalystSoft, 2021) was used to run a comparison of paired means sample t-test to compare, where possible, 'same season' Autumn 2016 (pre-mining) with Autumn 2023 (post commencement of mining/de-watering) crown assessment index scores and foliage health index scores to test for significant differences of the paired means. The comparison of means t-test was run separately for the Boonanarring NR and Collard's Wetland monitoring locations/GDV Types (Table 1). The null hypothesis was 'sample means are equal' and the null hypothesis was accepted if the 't' statistic value was less than the Critical Value (for a confidence limit of 5%; two-tailed hypothesis). The results of the StatPlus Pro V7.6.5 comparison of paired means t-test were stated for the 'alternative hypothesis'.

The data set for the comparison of means t-test was edited to specifically suit comparison of Autumn 2016 and Autumn 2023 datasets and varied from that for the calculation of the descriptive statistics. The following data criteria were used:

- excluded trees that were first recorded dead up to and including the Autumn 2016 survey (trees that died after the Autumn 2016 survey were included);
- excluded trees that were first sampled after the Autumn 2016 survey (included 3 trees first sampled in Autumn 2016 survey).

Because the area in which the Boonanarring NR transect T2 sites were located was burnt in October 2015, only transect T1 sites could be included in the comparison of means test described above. Since both T1 and T2 sites were sampled in the pre-mining Spring 2018 survey, an additional set of 't tests' were run for the Boonanarring NR sites which was a comparison of means between pre-mining Spring 2018 data and Autumn 2023 data. This analysis included trees that died after Spring 2018 and excluded trees first recorded after Spring 2018 (included trees added to the sampling between Spring 2015 and Spring 2018).

4.0 RESULTS OF THE AUTUMN 2023 GDV MONITORING

4.1 General observations on site vegetation

Photographs of vegetation at all of the monitoring sites were taken for the Autumn 2023 survey and are presented in this document, along with paired pre-mining site photographs from the following surveys (Plates 1 to 50):

- Spring 2017 (Collard's Wetland sites), and
- Spring 2018 (Boonanarring NR sites).

The general vegetation at the Boonanarring NR GDV sites (Plates 1-26) and Collard's Wetland sites (Plates 27-50) appeared healthy. *Banksia* trees at the Boonanarring NR sites generally appeared in healthy condition and understory vegetation was generally green and healthy. No new *Banksia* tree deaths were recorded during the Autumn 2023 monitoring survey (Table 3). The last significant number of *Banksia* tree deaths (11 deaths) were recorded at the Boonanarring NR sites during the Autumn 2021 monitoring survey.

The general vegetation at Collard's Wetland GDV sites also appeared healthy. As well as the central wetland sites being wet and boggy, a number of sites along the western margin of the wetland were also inundated at the time of the survey (sites CW03, CW07 and CW10). Several of the central Collard's Wetland sites continued to be very wet (inundated) and boggy, as they have been from the commencement of monitoring in 2015. **Isolepis prolifera* cover is also increasing at the wetter sites and is notably high at sites CW11 and CW04. While numerous *Eucalyptus rudis* and *Melaleuca preissiana* trees inside and around quadrats have been noted as fallen in past reports, there did not appear to be any newly fallen trees at the time of the August 2023 sampling.

4.2 Tree crown assessment and foliage health

4.2.1 General observations

While there was a total of 219 trees scored in the Autumn 2023 GDV survey (including trees added to the GDV monitoring since the Spring 2015 survey and trees that had died since monitoring started), a total of 198 trees were included in the calculation of the tree crown assessment descriptive statistics (after excluding redundant trees due to the timing tree deaths/inclusions relative to the sample dates).

- 103 trees in Boonanarring NR Terrestrial GDV sites;
- 95 trees in Collard's Wetland GDV sites.

Tree canopy condition assessment data and 'crown assessment index' scores for each tree for pre-mining and post-commencement of mining surveys, including Autumn 2023 data, are presented in Appendices 2 and 3. A crown assessment index score of about 14 or 15 could be considered to represent a moderately healthy crown (some small, dead branchlets (5), average crown foliage density (5) and none or an occasional epicormic branchlettes (4 to 5)). A foliar health index value of about '4' would also indicate a moderately healthy tree crown. A crown assessment index score of about 17 to 21 could be considered to represent a very healthy/vigorous crown (none or very sparse small dead branches (7 to 9), no epicormics growth (5) and a crown with average to dense foliage (5 to 7)). Finally, a crown assessment index score of about 9 or less would indicate a tree with signs of significant stress (large and/or small branches dead (3), epicormic branchlettes in moderate abundance over most of the crown (3) and a crown of sparse, poorly spread clumps of foliage (3)).

Mean Crown Assessment Index (CAI) and Foliage Health Index (FHI) values are shown by tree species, 'treatment' and GDV Type in Tables 4 and 5. The trends are summarized below.

Boonanarring NR (Terrestrial GDV)

The mean CAI of *Banksia attenuata* and *Banksia menziesii* trees in the two 'treatment' transects (T1 and T2) increased moderately from Autumn 2022 levels. Mean CAI of the trees have declined from pre-mining levels, with *B. attenuata* having a large fall in Autumn 2021 due to the death of a large number of trees between Spring 2020 and Autumn 2021 (Table 3, Table 4a, b). However, mean CAI has been increasing for both *Banksia spp*. since Autumn 2021 sampling and is at 'moderately' or near moderately healthy levels again for *Banksia* trees in the treatment sites. Mean CAI of *B. attenuata* and *B. menziesii* trees was lowest in the C1 'control' site (BNR03) (Table 5), mostly due to the death of 4 of the 8 trees used for calculating the descriptive statistics for that site (Table 3; Table 5). Most deaths (3) occurred between Spring 2015 and Autumn 2016 at that site. Mean CAI since Spring 2018 has been steady for C1 trees and has actually been increasing in the C2 trees as a result of canopy condition recovering after the 2015 fire in the transect T2 sites. Similar trends have been observed in the FHI levels.

Collard's Wetland

The mean CAI and FHI values for 'all trees' at Collard's Wetland remains in the moderately healthy range, after declining from 15.1 in Autumn 2016 to 13.8 in

Autumn 2022 (Table 4). The mean CAI for 'all trees' was steady between Autumn 2022 and Autumn 2023. However, the trends in mean CAI varied between tree species at Collard's Wetland. While *Melaleuca rhaphiophylla* crowns have remained 'very healthy'over that period (CAI of 17.5 and 17.9 respectively), there was a significant decline in mean CAI of *Corymbia calophylla* trees and *Eucalyptus rudis* trees during 2019 (Table 4). Mean CAI has been recovering in those tree species since and that trend continued in Autumn 2023. Mean CAI of *Melaleuca preissiana* trees has been slowly declining since the Spring 2019 survey, with overshadowing a significant factor from the trees of the other taller species (*Corymbia calophylla* and *Eucalyptus rudis*).

4.2.2 Results of the comparison of means paired t-test analysis

The detailed results of the comparison of means paired t-test analysis are shown in Appendix 4. The results were:

- Boonanarring NR terrestrial GDV trees : There was no significant difference in the mean CAI of transect T1 'treatment' sites between pre-mining Autumn 2016 and Autumn 2023. Nor was there any significant difference in mean CAI of all treatment sites (T1 and T2 sites) between pre-mining Spring 2018 and Autumn 2023. Nor was there a significant difference in mean CAI of Control sites for the same comparisons. However, the comparison of means 't' test did find a significant decline in mean FHI for all treatment trees between Spring 2018 and Autumn 2023.
- Collard's Wetland GDV trees: There was a significant decline in mean CAI scores for 'all trees' at Collard's Wetland between pre-mining Autumn 2016 and Autumn 2023. When tree were analysed by species, mean CAI of *Melaleuca preissiana* and *Eucalyptus rudis* trees declined between Autumn 2016 and Autumn 2023. However, there was no significant difference in mean CAI of *Melaleuca rhaphiophylla* and *Corymbia calophylla* trees between Autumn 2016 and the Autumn 2023. No significant differences were found in mean FHI for trees between Autumn 2016 and Autumn 2023.

4.3 Depth to groundwater and tree crown assessment

Of the most relevant bores at Boonanarring NR, they were either dry (BNP030S) or had a depth to groundwater (DTGW) greater than 10 metres (bores BNP029S, BNP003S and BNP028S) in the period up to April 2023 (Figure 4a). It is generally considered that *Banksia attenuata* and *Banksia menziesii* trees don't access groundwater at depths greater than 10 metres (Froend *et al*., 2004). DTGW has been

consistent in the four bores since monitoring began between 2017 and 2018 (Figure 4a).

Bores CMW01 (near monitoring site CW04) and CSW01 (near site CW11) were located in the wetter central part of Collard's Wetland and, until about November 2020, had DTGW levels that had tracked closely together and decreased some 11 cm from May 2016 to be at about saturated profile levels in November 2020 (Figure 4b). In December 2021 the DTGW was shallow at both those bores and was at about saturated profile levels. The water level at bore CNW01 in the central north area of Collard's Wetland was well north of the northern most monitoring point and the DTGW there was a little greater (25cm in May 2016) and fluctuated more than the DTGW at the other Collard's bores (Figure 4b). DTGW steadily decreased at CNW01 to be close to the surface in December 2021 making a wetter profile. The DTGW trends in the Collard's Wetland bores suggest that the wetland has become slightly wetter since May 2016. Figure 4b also shows that the DTGW was considerably greater at Bores CN001, CM001 and CS001, which are located in the dry and more elevated paddock adjacent to and just east of Collard's Wetland (Figure 4b).

Table 3. *Banksia* spp. deaths at Boonanarring NR and Bartlett's Well NR terrestrial GDV sites included in the Autumn 2022 data analysis (tree deaths after Spring 2015 survey).

Site	First monitoring survey in which *Banksia* spp. deaths occurred														Total
	AUT 2016	SPG 2017	SPG 2018	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	SPG 2021	AUT 2022	SPG 2022	AUT 2023			
Boonanarring NR sites:															
BNR01 (T1)								1							1
BNR02 (T1)								2							2
BNR03 (C)	3			1											4
BNR04 (T1)	1							1							1
BNR05 (T1)			1					1							2
BNR06 (T1)	1							1							3
BNR07 (C)								1							1
BNR010 (T2)							1								1
BNR011 (T2)								1							1
BNR013 (T2)								3							3
Total	**5**	**0**	**1**	**1**	**0**	**0**	**1**	**11**	**0**	**0**	**0**	**0**			**19**

Table 4a. Mean crown assessment index and foliar health index values by tree species by GDV type by location.

Pre-mining data. (From dataset that included trees that died after Spring 2015 survey and excluded trees that were introduced into monitoring after the Spring 2015 survey (see Appendices 2&3 for all data)). Some Spring indices vary from the data presented in the same table in the Spring GDVM reports (eg Table 5; Morgan, 2022) because that report used a data set with different dead tree/new tree inclusion/exclusion dates, appropriate to that report.)

Tree species[a] by 'site class'	Nos trees	Crown Assessment Index								Foliar Health Index							
		Spring 2015		Autumn 2016		Spring 2017		Spring 2018		Spring 2015		Autumn 2016		Spring 2017		Spring 2018	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Boonanarring NR	**103**																
Terrestrial GDV Sites[b]	103	15.6	2.6	13.9	5.8	13.8	5.8	13.5	5.1	4.5	0.6	3.9	1.5	3.8	1.4	4.3	1.2
Ba[b]	60	15.4	3.0	14.1	5.1	14.3	5.2	13.4	4.9	4.6	0.6	4.1	1.3	4.0	1.3	4.4	1.1
Bm[b]	43	15.9	1.8	13.4	6.9	13.0	6.8	13.6	5.4	4.4	0.6	3.4	1.8	3.3	1.7	4.3	1.3
Collard's Wetland	**95**																
Wetland GDV Sites	95	15.6	3.1	15.1	3.2	14.6	3.6			4.7	0.5	4.7	0.5	4.6	0.6		
Cc	8	12.8	2.7	12.1	2.7	12.1	3.4			4.4	0.5	4.5	0.5	4.3	0.5		
Er	26	14.1	2.7	14.0	2.6	13.3	3.3			4.7	0.5	4.6	0.5	4.4	0.7		
Mp	36	15.4	3.0	14.8	3.4	14.3	4.1			4.7	0.6	4.7	0.5	4.6	0.6		
Mr	25	18.1	1.4	17.5	1.8	17.0	1.4			5.0	0.0	5.0	0.2	5.0	0.2		

[a] Ba: *Banksia attenuata*; Bm: *Banksia menziesii*; Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

b Spring 2015, Autumn 2016 and Spring 2017 Boonanarring data only includes Conrol C1 and Transect T1 data; Spring 2018 onwards includes C1, C2, T1 and T2 data (see Table 5a).

Table 4b. Mean crown assessment index and foliar health index values by tree species by GDV type by location.

Post commencement of mining data. (From dataset that included trees that died after Spring 2015 survey and excluded trees that were introduced into monitoring after the Spring 2015 survey (see Appendices 2&3 for all data)). Some Spring indices vary from the data presented in the same table in the Spring 2021 GDVM report (Table 5; Morgan, 2022) because that report used a data set with different dead tree/new tree inclusion/exclusion dates, appropriate to that report.)

Tree species[a] by 'site class'	Nos trees	Crown Assessment Index										Foliar Health Index									
		Autumn 2019		Spring 2019		Autumn 2020		Spring 2020		Autumn 2021		Autumn 2019		Spring 2019		Autumn 2020		Spring 2020		Autumn 2021	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Boonanarring NR	**103**																				
Terrestrial GDV Sites[b]	103	13.4	5.2	13.6	5.0	14.0	5.0	14.0	5.4	12.3	6.7	4.2	1.2	4.1	1.2	4.2	1.3	4.1	1.3	3.6	1.8
Ba[b]	60	13.2	5.3	13.4	5.1	13.8	5.1	13.6	5.5	11.5	6.9	4.2	1.2	4.2	1.2	4.2	1.3	4.1	1.4	3.5	1.9
Bm[b]	43	13.6	5.1	13.8	5.0	14.4	4.9	14.6	5.1	13.5	6.3	4.2	1.3	4.1	1.2	4.2	1.3	4.2	1.3	3.7	1.6
Collard's Wetland	**95**																				
Wetland GDV Sites	95	13.8	4.0	13.3	4.3	13.5	4.6	13.5	4.4	13.7	4.5	4.6	0.7	4.5	0.7	4.8	0.7	4.6	0.7	4.6	0.8
Cc	8	11.3	3.8	10.3	3.5	10.5	3.7	10.6	3.5	10.4	4.0	4.4	0.5	4.4	0.5	4.6	0.5	4.3	0.5	4.3	0.5
Er	26	10.8	3.3	9.8	3.6	10.2	4.3	10.9	4.2	11.4	4.6	4.2	0.9	4.0	0.8	4.6	1.1	4.7	1.0	4.3	1.3
Mp	36	14.2	3.8	13.8	4.0	13.6	4.0	13.1	4.1	13.2	4.0	4.7	0.7	4.6	0.6	4.7	0.5	4.4	0.7	4.6	0.6
Mr	25	17.1	1.4	17.0	1.5	17.7	1.7	17.6	1.7	17.7	1.5	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0

[a] Ba: *Banksia attenuata*; Bm: *Banksia menziesii*; Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

b b Spring 2015, Autumn 2016 and Spring 2017 Boonanarring data only includes Conrol C1 and Transect T1 data; Spring 2018 onwards includes C1, C2, T1 and T2 data (see Table 5a).

Table 4b (cont). Mean crown assessment index and foliar health index values by tree species by GDV type by location.

Post commencement of mining data. (From dataset that included trees that died after Spring 2015 survey and excluded trees that were introduced into monitoring after the Spring 2015 survey (see Appendices 2&3 for all data)).

Tree species[a] by 'site class'	Nos trees	Crown Assessment Index										Foliar Health Index									
		Spring 2021		Autumn 2022		Spring 2022		Autumn 2023				Spring 2021		Autumn 2022		Spring 2022		Autumn 2023			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD			Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Boonanarring NR	**103**																				
Terrestrial GDV Sites[b]	103	12.4	6.6	12.5	6.7	13.1	6.9	13.3	7.1			3.9	1.9	4.0	1.9	4.0	1.9	4.0	1.9		
Ba[b]	60	11.6	6.9	11.8	6.9	12.4	7.2	12.5	7.4			3.9	2.1	3.8	2.0	3.9	2.1	3.9	2.1		
Bm[b]	43	13.5	6.2	13.5	6.3	14.2	6.4	14.5	6.6			4.1	1.8	4.2	1.7	4.2	1.7	4.2	1.7		
Collard's Wetland	**95**																				
Wetland GDV Sites	95	13.6	4.2	13.7	4.4	14.0	4.6	13.8	4.8			4.5	0.8	4.8	0.8	4.7	0.8	4.6	0.9		
Cc	8	10.9	3.8	11.4	4.0	11.8	4.8	11.9	5.4			4.5	0.5	4.5	0.5	4.4	0.5	4.4	0.5		
Er	26	11.3	4.1	11.8	4.7	12.1	4.9	12.0	5.1			4.2	1.3	4.3	1.3	4.3	1.4	4.3	1.3		
Mp	36	13.1	3.5	12.9	3.8	12.9	4.1	12.7	4.4			4.4	0.6	5.0	0.2	4.8	0.5	4.6	0.7		
Mr	25	17.4	2.1	17.6	1.8	18.1	1.7	17.9	1.9			4.8	0.4	5.0	0.0	5.0	0.0	5.0	0.0		

[a] Ba: *Banksia attenuata*; Bm: *Banksia menziesii*; Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

b b Spring 2015, Autumn 2016 and Spring 2017 Boonanarring data only includes Conrol C1 and Transect T1 data; Spring 2018 onwards includes C1, C2, T1 and T2 data (see Table 5a).

Table 5a. Mean crown assessment index and foliar health index values by tree species by 'Treatment' by 'site class'.

Pre-mining data. (From dataset that included trees that died after Spring 2015 survey and excluded trees that were introduced into monitoring after the Spring 2015 survey (see Appendices 2&3 for all data)). Some Spring indices vary from the data presented in the same table in the Spring 2021 GDVM report (Table 5; Morgan, 2022) because that report used a data set with different dead tree/new tree inclusion/exclusion dates, appropriate to that report.)

Tree species[a] by 'Treatment' by 'site class'[b]	Nos of trees	Crown Assessment Index								Foliar Health Index							
		Spring 2015		Autumn 2016		Spring 2017		Spring 2018		Spring 2015		Autumn 2016		Spring 2017		Spring 2018	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Boonanarring NR	103																
Terrestrial GDV Sites	103	15.6	2.6	13.9	5.8	13.8	5.8	13.5	5.1	4.5	0.6	3.9	1.5	3.8	1.4	4.3	1.2
C1	8	13.8	2.1	8.4	7.4	8.6	7.6	7.6	6.9	4.0	0.8	2.5	2.1	2.5	2.1	2.3	1.9
Ba	5	13.2	1.9	10.0	6.2	10.4	6.5	8.8	5.6	4.0	0.7	3.2	1.8	3.2	1.8	2.8	1.6
Bm	3	14.7	2.5	5.7	9.8	5.7	9.8	5.7	9.8	4.0	1.0	1.3	2.3	1.3	2.3	1.3	2.3
C2	19							11.1	5.5							4.7	0.5
Ba	9							10.9	5.9							4.8	0.4
Bm	10							11.3	5.5							4.7	0.5
C ALL	27							10.1	6.1							4.0	1.6
T1	36	16.0	2.6	15.1	4.6	15.0	4.7	14.5	5.2	4.7	0.5	4.2	1.2	4.0	1.1	4.2	1.4
Ba	23	15.9	3.0	15.0	4.5	15.1	4.6	14.3	5.3	4.8	0.4	4.3	1.1	4.2	1.1	4.3	1.4
Bm	13	16.2	1.6	15.2	5.0	14.7	5.1	14.9	5.3	4.5	0.5	3.8	1.4	3.7	1.2	4.0	1.3
T2	40							14.9	2.7							4.7	0.5
Ba	23							14.4	2.9							4.7	0.5
Bm	17							15.4	2.3							4.8	0.4
T ALL	76							14.7	4.1							4.4	1.0

[a] Ba: *Banksia attenuata*; Bm: *Banksia menziesii*; Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

[b] 'Treatments'. T: transects; C: control sites; bxxx: Bartlett's Well wetland vegetation groupings; cxxx: Collard's Wetland vegetation groupings.

Table 5a (cont). Mean crown assessment index and foliar health index values by tree species by 'Treatment' by 'site class'.

Pre-mining data (From dataset that included trees that died after Spring 2015 survey and excluded trees that were introduced into monitoring after the Spring 2015 survey (see Appendices 2&3 for all data)). Some Spring indices vary from the data presented in the same table in the Spring 2021 GDVM report (Table 5; Morgan, 2022) because that report used a data set with different dead tree/new tree inclusion/exclusion dates, appropriate to that report.)

Tree species[a] by 'Treatment' by 'site class'[b]	Nos of trees	Crown Assessment Index								Foliar Health Index							
		Spring 2015		Autumn 2016		Spring 2017		Spring 2018		Spring 2015		Autumn 2016		Spring 2017		Spring 2018	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Collard's Wetland																	
Wetland GDV Sites	95	15.6	3.1	15.1	3.2	14.6	3.6			4.7	0.5	4.7	0.5	4.6	0.6		
cCcEr	22	13.4	2.5	12.7	2.7	12.0	3.5			4.5	0.6	4.5	0.5	4.3	0.6		
Cc	8	12.8	2.7	12.1	2.7	12.1	3.4			4.4	0.5	4.5	0.5	4.3	0.5		
Er	1	15.0	na	17.0	na	15.0	na			5.0	na	5.0	na	5.0	na		
Mp	13	13.6	2.4	12.7	2.6	11.6	3.7			4.5	0.7	4.4	0.5	4.3	0.6		
cErMp	31	15.0	2.1	14.4	2.3	14.0	2.5			4.6	0.6	4.6	0.5	4.6	0.6		
Er	15	14.8	2.1	14.3	2.3	14.0	2.6			4.5	0.5	4.5	0.5	4.6	0.5		
Mp	15	15.0	2.1	14.3	2.4	13.9	2.5			4.7	0.6	4.7	0.5	4.7	0.7		
Mr	1	17.0	na	16.0	na	14.0	na			5.0	na	5.0	na	5.0	na		
cMp	8	19.3	1.7	19.4	1.8	19.5	1.8			5.0	0.0	5.0	0.0	5.0	0.0		
Mp	8	19.3	1.7	19.4	1.8	19.5	1.8			5.0	0.0	5.0	0.0	5.0	0.0		
cMr	34	16.6	3.2	16.3	3.0	15.6	3.3			5.0	0.2	4.9	0.4	4.7	0.6		
Er	10	13.0	3.4	13.1	2.9	12.2	4.1			4.9	0.3	4.6	0.5	4.0	0.8		
Mr	24	18.2	1.4	17.6	1.8	17.1	1.2			5.0	0.0	5.0	0.2	5.0	0.2		

[a] Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

[b] 'Treatments'. T: transects; C: control sites; bxxx: Bartlett's Well wetland vegetation groupings; cxxx: Collard's Wetland vegetation groupings.

Table 5b. Mean crown assessment index and foliar health index values by tree species by 'Treatment' by 'site class'.

Post commencement of mining data. (From dataset that included trees that died after Spring 2015 survey and excluded trees where assessment commenced after the Spring 2015 survey (see Appendices 2&3 for all data)). Some Spring indices vary from the data presented in the same table in the Spring 2021 GDVM report (Table 5; Morgan, 2022) because that report used a data set with different dead tree/new tree inclusion/exclusion dates, appropriate to that report.)

Tree species[a] by 'Treatment' by 'site class'[b]	Nos of trees	Crown Assessment Index										Foliar Health Index									
		Autumn 2019		Spring 2019		Autumn 2020		Spring 2020		Autumn 2021		Autumn 2019		Spring 2019		Autumn 2020		Spring 2020		Autumn 2021	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Boonanarring NR	103																				
Terrestrial GDV Sites	103	13.4	5.2	13.6	5.0	14.0	5.0	14.0	5.4	12.3	6.7	4.2	1.2	4.1	1.2	4.2	1.3	4.1	1.3	3.6	1.8
C1	8	6.5	7.4	6.6	7.5	6.6	7.5	6.3	7.1	6.0	6.6	1.9	2.0	2.0	2.1	2.0	2.1	2.3	2.4	2.0	2.2
Ba	5	7.0	6.9	7.2	7.0	7.2	7.0	6.6	6.4	6.6	6.2	2.2	2.0	2.4	2.2	2.4	2.2	2.6	2.4	2.4	2.3
Bm	3	5.7	9.8	5.7	9.8	5.7	9.8	5.7	9.8	5.0	8.7	1.3	2.3	1.3	2.3	1.3	2.3	1.7	2.9	1.3	2.3
C2	19	11.2	5.2	11.7	4.2	12.6	3.4	12.2	3.7	11.8	4.3	4.7	0.5	4.6	0.6	4.6	0.5	4.8	0.4	4.2	1.2
Ba	9	10.9	5.9	11.7	4.7	12.6	3.7	12.3	4.6	12.6	4.2	4.7	0.5	4.8	0.4	4.7	0.5	4.9	0.3	4.7	0.5
Bm	10	11.5	4.7	11.8	4.0	12.6	3.2	12.1	2.9	11.2	4.6	4.8	0.4	4.4	0.7	4.6	0.5	4.8	0.4	3.8	1.5
C ALL	27	9.8	6.2	10.2	5.8	10.8	5.5	10.4	5.6	10.1	5.7	3.9	1.7	3.8	1.7	3.9	1.7	4.1	1.8	3.6	1.8
T1	36	14.6	5.2	14.8	5.1	15.0	5.3	15.1	5.4	12.4	7.7	4.0	1.3	4.1	1.3	4.2	1.4	4.2	1.4	3.4	2.0
Ba	23	14.3	5.3	14.4	5.2	14.8	5.4	14.7	5.3	10.7	8.2	4.0	1.3	4.1	1.4	4.3	1.4	4.3	1.5	3.0	2.3
Bm	13	15.2	5.1	15.4	5.2	15.5	5.3	15.6	5.6	15.5	5.6	3.9	1.3	4.0	1.3	4.2	1.3	4.0	1.4	4.0	1.3
T2	40	14.7	3.0	14.8	3.2	15.4	3.1	15.5	4.1	13.8	6.1	4.5	0.5	4.5	0.6	4.4	0.6	4.2	0.9	3.8	1.5
Ba	23	14.3	3.4	14.5	3.9	14.7	3.6	14.5	5.0	13.0	6.1	4.5	0.5	4.5	0.6	4.3	0.6	4.0	1.1	3.8	1.6
Bm	17	15.1	2.3	15.2	2.0	16.2	1.9	16.8	1.9	14.9	6.0	4.5	0.5	4.4	0.5	4.6	0.5	4.4	0.5	3.8	1.5
T ALL	76	14.6	4.2	14.8	4.2	15.2	4.2	15.3	4.7	13.1	6.9	4.3	1.0	4.3	1.0	4.3	1.0	4.2	1.2	3.6	1.8

[a] Ba: *Banksia attenuata*; Bm: *Banksia menziesii*; Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

[b] 'Treatments'. T: transects; C: control sites; bxxx: Bartlett's Well wetland vegetation groupings; cxxx: Collard's Wetland vegetation groupings.

Table 5b. Mean crown assessment index and foliar health index values by tree species by 'Treatment' by 'site class'.

Post commencement of mining data. (From dataset that included trees that died after Spring 2015 survey and excluded trees where assessment commenced after the Spring 2015 survey (see Appendices 2&3 for all data)). Some Spring indices vary from the data presented in the same table in the Spring 2021 GDVM report (Table 5; Morgan, 2022) because that report used a data set with different dead tree/new tree inclusion/exclusion dates, appropriate to that report.)

Tree species[a] by 'Treatment' by 'site class'[b]	Nos of trees	Crown Assessment Index								Foliar Health Index							
		Spring 2021		Autumn 2022		Spring 2022		Autumn 2023		Spring 2021		Autumn 2022		Spring 2022		Autumn 2023	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Boonanarring NR	103																
Terrestrial GDV Sites	103	12.4	6.6	12.5	6.7	13.1	6.9	13.3	7.1	3.9	1.9	4.0	1.9	4.0	1.9	4.0	1.9
C1	8	6.3	6.9	6.5	7.3	6.6	7.3	6.4	7.1	2.4	2.6	2.3	2.4	2.4	2.6	2.4	2.6
Ba	5	6.8	6.4	7.0	6.6	7.2	6.7	6.8	6.3	2.8	2.6	2.6	2.4	2.8	2.6	2.8	2.6
Bm	3	5.3	9.2	5.7	9.8	5.7	9.8	5.7	9.8	1.7	2.9	1.7	2.9	1.7	2.9	1.7	2.9
C2	19	12.4	4.4	12.5	4.3	13.6	4.4	13.4	4.8	4.7	1.2	4.6	1.2	4.7	1.2	4.6	1.2
Ba	9	12.9	3.9	13.7	3.7	14.6	3.5	14.6	4.3	5.0	0.0	4.9	0.3	5.0	0.0	4.9	0.3
Bm	10	11.9	5.0	11.5	4.8	12.7	5.1	12.4	5.1	4.4	1.6	4.3	1.6	4.4	1.6	4.3	1.6
C ALL	27	10.6	5.9	10.7	5.9	11.5	6.2	11.3	6.3	4.0	2.0	3.9	1.9	4.0	2.0	3.9	1.9
T1	36	12.3	7.6	12.4	7.7	13.0	8.0	13.0	8.0	3.6	2.1	3.7	2.2	3.8	2.2	3.7	2.2
Ba	23	10.7	8.3	10.6	8.2	11.1	8.6	11.0	8.5	3.3	2.4	3.3	2.4	3.3	2.4	3.2	2.4
Bm	13	15.2	5.4	15.8	5.6	16.2	5.8	16.5	5.7	4.2	1.3	4.5	1.4	4.6	1.4	4.6	1.4
T2	40	13.7	6.0	13.8	6.0	14.4	6.2	15.0	6.5	4.2	1.7	4.2	1.7	4.3	1.7	4.3	1.7
Ba	23	13.1	6.1	13.4	6.2	13.9	6.4	14.3	6.7	4.2	1.7	4.2	1.7	4.3	1.7	4.3	1.7
Bm	17	14.5	6.0	14.2	5.9	15.0	6.0	15.9	6.4	4.2	1.8	4.3	1.7	4.3	1.6	4.3	1.6
T ALL	76	13.0	6.8	13.1	6.8	13.7	7.1	14.0	7.3	3.9	1.9	4.0	1.9	4.1	1.9	4.0	1.9

[a] Ba: *Banksia attenuata*; Bm: *Banksia menziesii*; Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

[b] 'Treatments'. T: transects; C: control sites; bxxx: Bartlett's Well wetland vegetation groupings; cxxx: Collard's Wetland vegetation groupings.

Table 5b (cont). Mean crown assessment index and foliar health index values by tree species by 'Treatment' by 'site class'.

Post commencement of mining data. (From dataset that included trees that died after Spring 2015 survey and excluded trees where assessment commenced after the Spring 2015 survey (see Appendices 2&3 for all data)). Some Spring indices vary from the data presented in the same table in the Spring 2021 GDVM report (Table 5; Morgan, 2022) because that report used a data set with different dead tree/new tree inclusion/exclusion dates, appropriate to that report.)

Tree species[a] by 'Treatment' by 'site class'[b]	Nos of trees	Crown Assessment Index										Foliar Health Index									
		Autumn 2019		Spring 2019		Autumn 2020		Spring 2020		Autumn 2021		Autumn 2019		Spring 2019		Autumn 2020		Spring 2020		Autumn 2021	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Collard's Wetland																					
Wetland GDV Sites	95	13.8	4.0	13.3	4.3	13.5	4.6	13.5	4.4	13.7	4.5	4.6	0.7	4.5	0.7	4.8	0.7	4.6	0.7	4.6	0.8
cCcEr	22	11.7	3.8	11.1	3.7	11.2	3.6	11.2	3.7	11.0	3.6	4.3	0.8	4.3	0.7	4.5	0.6	4.2	0.7	4.4	0.6
Cc	8	11.3	3.8	10.3	3.5	10.5	3.7	10.6	3.5	10.4	4.0	4.4	0.5	4.4	0.5	4.6	0.5	4.3	0.5	4.3	0.5
Er	1	15.0	na	14.0	na	14.0	na	14.0	na	14.0	na	5.0	na	4.0	na	5.0	na	5.0	na	5.0	na
Mp	13	11.7	3.9	11.4	3.9	11.4	3.6	11.3	3.9	11.2	3.6	4.2	0.9	4.3	0.9	4.5	0.7	4.2	0.8	4.4	0.7
cErMp	31	12.5	2.8	11.6	3.4	11.5	3.8	11.3	3.5	11.8	3.4	4.6	0.7	4.4	0.7	4.7	0.9	4.5	1.0	4.4	1.0
Er	15	10.9	2.9	9.7	3.6	9.9	4.4	10.4	4.3	11.1	4.2	4.3	0.8	4.1	0.7	4.5	1.3	4.5	1.3	4.3	1.3
Mp	15	13.9	1.9	13.3	2.1	12.7	2.4	11.9	2.3	12.1	2.2	4.9	0.4	4.7	0.5	4.8	0.4	4.4	0.6	4.5	0.6
Mr	1	14.0	na	14.0	na	17.0	na	17.0	na	17.0	na	5.0	na	5.0	na	5.0	na	5.0	na	5.0	na
cMp	8	18.9	1.7	18.9	1.7	19.0	1.9	18.5	1.6	18.6	1.8	5.0	0.0	5.0	0.0	5.0	0.0	4.9	0.4	5.0	0.0
Mp	8	18.9	1.7	18.9	1.7	19.0	1.9	18.5	1.6	18.6	1.8	5.0	0.0	5.0	0.0	5.0	0.0	4.9	0.4	5.0	0.0
cMr	34	15.2	3.9	14.9	4.2	15.5	4.3	15.8	3.9	15.9	4.2	4.7	0.7	4.6	0.8	4.9	0.4	4.9	0.2	4.8	0.9
Er	10	10.3	3.8	9.6	3.8	10.3	4.3	11.4	4.2	11.6	5.5	3.9	1.0	3.7	0.9	4.7	0.7	4.8	0.4	4.3	1.6
Mr	24	17.3	1.2	17.1	1.4	17.7	1.7	17.6	1.7	17.8	1.5	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0

[a] Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

[b] 'Treatments'. T: transects; C: control sites; bxxx: Bartlett's Well wetland vegetation groupings; cxxx: Collard's Wetland vegetation groupings.

Table 5b (cont). Mean crown assessment index and foliar health index values by tree species by 'Treatment' by 'site class'.

Post commencement of mining data. (From dataset that included trees that died after Spring 2015 survey and excluded trees where assessment commenced after the Spring 2015 survey (see Appendices 2&3 for all data)). Some Spring indices vary from the data presented in the same table in the Spring 2021 GDVM report (Table 5; Morgan, 2022) because that report used a data set with different dead tree/new tree inclusion/exclusion dates, appropriate to that report.)

Tree species[a] by 'Treatment' by 'site class'[b]	Nos of trees	Crown Assessment Index								Foliar Health Index							
		Spring 2021		Autumn 2022		Spring 2022		Autumn 2023		Spring 2021		Autumn 2022		Spring 2022		Autumn 2023	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Collard's Wetland																	
Wetland GDV Sites	95	13.6	4.2	13.7	4.4	14.0	4.6	13.8	4.8	4.5	0.8	4.8	0.8	4.7	0.8	4.6	0.9
cCcEr	22	11.3	3.2	11.3	3.7	11.4	4.2	11.4	4.8	4.4	0.6	4.8	0.4	4.5	0.7	4.4	0.8
Cc	8	10.9	3.8	11.4	4.0	11.8	4.8	11.9	5.4	4.5	0.5	4.5	0.5	4.4	0.5	4.4	0.5
Er	1	15.0	na	15.0	na	17.0	na	17.0	na	5.0	na	5.0	na	5.0	na	5.0	na
Mp	13	11.3	3.0	11.0	3.7	10.7	3.8	10.7	4.5	4.2	0.6	4.9	0.3	4.6	0.8	4.3	0.9
cErMp	31	11.6	2.9	11.7	3.2	12.0	3.5	11.9	3.8	4.2	1.0	4.6	1.0	4.6	1.0	4.6	1.0
Er	15	10.9	3.5	11.1	4.0	11.6	4.3	11.7	4.5	4.1	1.2	4.3	1.3	4.4	1.3	4.5	1.3
Mp	15	11.9	1.7	11.9	2.2	12.0	2.4	11.7	2.9	4.3	0.6	5.0	0.0	4.9	0.4	4.7	0.5
Mr	1	17.0	na	16.0	na	17.0	na	17.0	na	5.0	na	5.0	na	5.0	na	5.0	na
cMp	8	18.1	1.8	17.9	1.6	18.4	1.4	17.9	2.1	4.8	0.5	5.0	0.0	4.9	0.4	5.0	0.0
Mp	8	18.1	1.8	17.9	1.6	18.4	1.4	17.9	2.1	4.8	0.5	5.0	0.0	4.9	0.4	5.0	0.0
cMr	34	15.7	4.2	16.1	4.1	16.4	4.3	16.2	4.5	4.6	0.9	4.8	0.9	4.8	0.9	4.7	0.9
Er	10	11.6	5.1	12.5	5.8	12.4	5.8	12.0	6.1	4.2	1.5	4.3	1.6	4.2	1.5	4.0	1.5
Mr	24	17.5	2.1	17.7	1.8	18.1	1.7	17.9	2.0	4.8	0.4	5.0	0.0	5.0	0.0	5.0	0.0

[a] Cc: *Corymbia calophylla*; Er: *Eucalyptus rudis* subsp. *rudis*; Et: *Eucalyptus todtiana*; Mp: *Melaleuca preissiana*; Mr: *Melaleuca rhaphiophylla*

[b] 'Treatments'. T: transects; C: control sites; bxxx: Bartlett's Well wetland vegetation groupings; cxxx: Collard's Wetland vegetation groupings.

5.0 SUMMARY AND DISCUSSION

Banksia attenuata and *Banksia menziesii* trees at Boonanarring NR GDV treatment sites (transects T1 and T2) were moderately healthy or near moderately healthy at Autumn 2023 with a mean CAI of 13.0 at T1 sites and 15.0 at T2 sites (even while including dead trees (CAI=0) in the statistics). Mean CAI increased moderately between Autumn 2022 and Autumn 2023 at Boonanarring NR treatment sites. However, the mean tree CAI and FHI at Boonanarring NR GDV sites has declined at T1 treatment sites since Spring 2018, mostly due to a large number of *Banksia* tree deaths between Spring 2020 and Autumn 2021 surveys. This has been partly offset by the improving tree crown health in transect T2 as those trees recover from fire damage in Spring 2015. No new *Banksia* tree deaths were recorded during the Autumn 2023 survey.

Many dead *Banksia* trees were observed in Boonanarring NR and Bartlett's Well NR prior to commencement of monitoring, with the deaths considered to be due to drought effects (360 Environmental, 2013). *Banksia* spp. deaths were also documented in the two reserves during the pre-mining monitoring period (Morgan, 2019). A survey for *Phytophthora cinnamomi* at and around the proposed monitoring sites in 2015 did not find evidence of the presence of that fungus.

At Collard's Wetland, the overall vegetation at all sites appeared healthy in Autumn 2023. Mean CAI of trees of three of the four tree species increased moderately between Autumn 2022 and Autumn 2023, with only *Melaleuca preissiana* mean CAI declining over that period (12.9 to 12.7). The mean CAI for all trees has declined significantly from pre-mining Autumn 2016 to Autumn 2023, with significant declines of mean CAI occurring in *Melaleuca preissiana* trees (14.8 to 12.7) and *Eucalyptus rudis* trees (14.0 and 12.0). However, mean CAI for *Corymbia calophylla* and *Eucalyptus rudis* trees has stabilized and moderately increased in recent years. The mean CAI of *Melaleuca preissiana* trees has fallen a little below 'moderately healthy' levels. Over-shadowing by taller *Corymbia calophylla* and *Eucalyptus rudis* trees is a significant contributing factor in crown decline in the *Melaleuca preissiana* trees.

Collard's Wetland sites in the wetter parts appear to be getting 'wetter'. Previously reported decline in the *Eucalyptus rudis* tree crowns at Collard's Wetland has been discussed in previous monitoring reports (Morgan, 2019) as being perhaps related to a wetter regime and perhaps increasing periods of inundation in parts of the wetland (making those sites more marginal for *Eucalyptus rudis* trees). Associated with the apparent increasing 'wettness' at Collard's has been the observed increase in cover of fern species and the weed **Isolepis prolifera*.

At the time of the Autumn 2023 survey, mining operations were resulting in a net addition of water to the water table in Pit B, north of Wannamal Rd West (about 3 kilometers east of Collard's Wetland). This was due to Pit B being used for deposition of codisposal (a slurry of sand and clay tailings) from processing operations south of Wannamal Rd (William de Koning, Environmental Advisor, Image

Resources; *pers. comm*.). Excess processing water from Pit B is recycled through to the plant and reused in the co-disposal process. The water table has risen at bore BNMB14, but further west and nearer to Collard's Wetland, at monitoring bores BNMB12 and BNMB10, DTGW has been fairly steady or has risen slightly (William de Koning, Environmental Advisor, Image Resources; *pers. comm*.; see bore locations in Figures 1, 2 and 3).

6.0 ACKNOWLEDGEMENTS

Mr William de Koning (Image Resources) coordinated land access with DBCA and surrounding land holders during the surveys and assisted with the survey.

Mr William de Koning (Image Resources) also supplied the depth to ground water data.

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PLATES

Order of quadrat photos (Plates 1 to 50): Boonanarring NR (quadrats BNR01-BNR13); Collard's Wetland (quadrats CW01-CW12).

Plate 1. Quadrat BNR01, Boonanarring NR (Spring 2015 GDVM).

Plate 2. Quadrat BNR01, Boonanarring NR (Autumn 2023 GDVM).

Plate 3. Quadrat BNR02, Boonanarring NR (Spring 2015 GDVM).

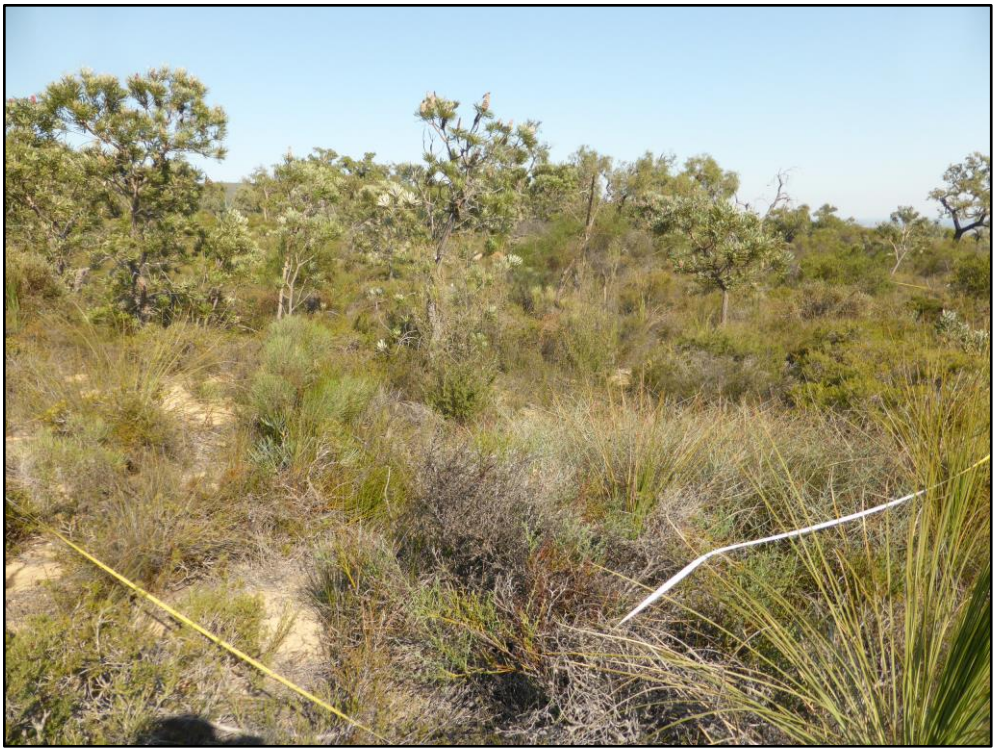


Plate 4. Quadrat BNR02, Boonanarring NR (Autumn 2023 GDVM).

Plate 5. Quadrat BNR03 (Terrestrial 'Control' site), Boonanarring NR (Spring 2015 GDVM).

Plate 6. Quadrat BNR03 (Terrestrial 'Control' site), Boonanarring NR (Autumn 2023 GDVM).

Plate 7. Quadrat BNR04, Boonanarring NR (Spring 2015 GDVM).

Plate 8. Quadrat BNR04, Boonanarring NR (Autumn 2023 GDVM).

Plate 9. Quadrat BNR05, Boonanarring NR (Spring 2018 GDVM, pre-mining).

Plate 10. Quadrat BNR05, Boonanarring NR (Autumn 2023 GDVM).

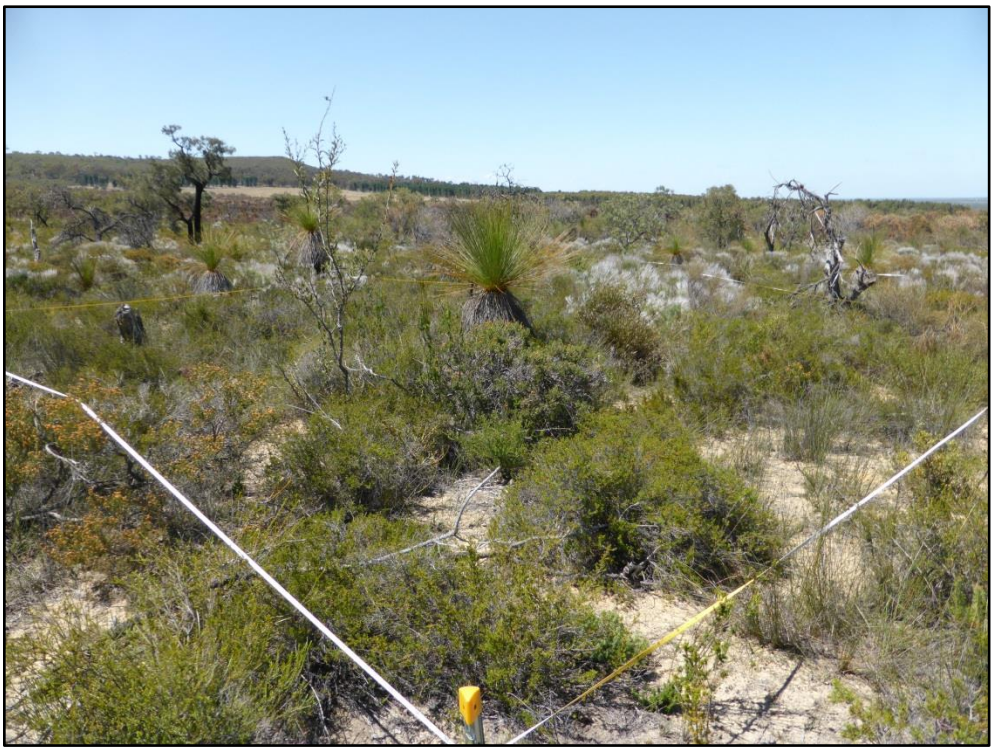


Plate 11. Quadrat BNR06, Boonanarring NR (Spring 2015 GDVM).

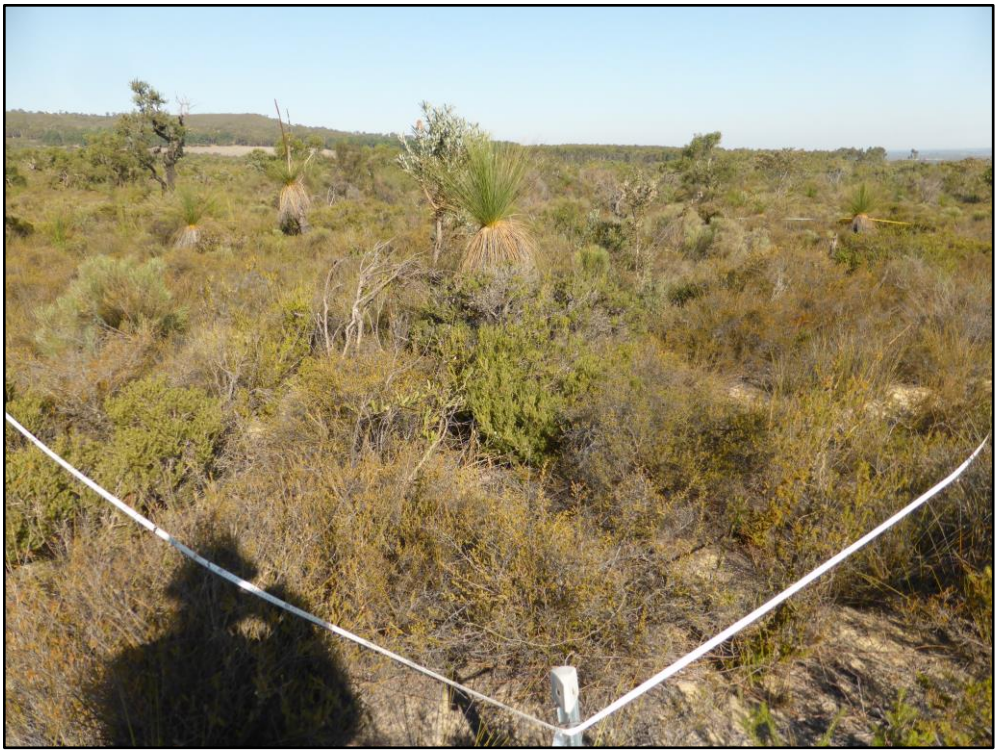


Plate 12. Quadrat BNR06, Boonanarring NR (Autumn 2023 GDVM).

Plate 13. Quadrat BNR07 (Terrestrial 'Control' site), Boonanarring NR (Spring 2018 GDVM).

Plate 14. Quadrat BNR07 (Terrestrial 'Control' site), Boonanarring NR (Autumn 2023 GDVM).

Plate 15. Quadrat BNR08 (Terrestrial 'Control' site), Boonanarring NR (Spring 2018 GDVM).

Plate 16. Quadrat BNR08 (Terrestrial 'Control' site), Boonanarring NR (Autumn 2023 GDVM).

Plate 17. Quadrat BNR09, Boonanarring NR (Spring 2018 GDVM).

Plate 18. Quadrat BNR09, Boonanarring NR (Autumn 2023 GDVM).

Plate 19. Quadrat BNR10, Boonanarring NR (Spring 2018 GDVM).

Plate 20. Quadrat BNR10, Boonanarring NR (Autumn 2023 GDVM).

Plate 21. Quadrat BNR11, Boonanarring NR (Spring 2018 GDVM).

Plate 22. Quadrat BNR11, Boonanarring NR (Autumn 2023 GDVM).

Plate 23. Quadrat BNR12, Boonanarring NR (Spring 2018 GDVM).

Plate 24. Quadrat BNR12, Boonanarring NR (Autumn 2023 GDVM).

Plate 25. Quadrat BNR13, Boonanarring NR (Spring 2018 GDVM).

Plate 26. Quadrat BNR13, Boonanarring NR (Autumn 2023 GDVM).

Plate 27. Quadrat CW01, Collard's Wetland (Spring 2015 GDVM).

Plate 28. Quadrat CW01, Collard's Wetland (Autumn 2023 GDVM).

Plate 29. Quadrat CW02, Collard's Wetland (Autumn 2016 GDVM).

Plate 30. Quadrat CW02, Collard's Wetland (Autumn 2023 GDVM).

Plate 31. Quadrat CW03, Collard's Wetland (Spring 2015 GDVM).

Plate 32. Quadrat CW03, Collard's Wetland (Autumn 2023 GDVM).

Plate 33. Quadrat CW04, Collard's Wetland (Autumn 2016 GDVM).

Plate 34. Quadrat CW04, Collard's Wetland (Autumn 2023 GDVM).

Plate 35. Quadrat CW05, Collard's Wetland (Autumn 2016 GDVM).

Plate 36. Quadrat CW05, Collard's Wetland (Autumn 2023 GDVM).

Plate 37. Quadrat CW06, Collard's Wetland (Autumn 2016 GDVM).

Plate 38. Quadrat CW06, Collard's Wetland (Autumn 2032 GDVM).

Plate 39. Quadrat CW07, Collard's Wetland (Autumn 2016 GDVM).

Plate 40. Quadrat CW07, Collard's Wetland (Autumn 2023 GDVM).

Plate 41. Quadrat CW08, Collard's Wetland (Spring 2015 GDVM).

Plate 42. Quadrat CW08, Collard's Wetland (from north-west corner) (Autumn 2023 GDVM).

Plate 43. Quadrat CW09, Collard's Wetland (Spring 2015 GDVM).

Plate 44. Quadrat CW09, Collard's Wetland (Autumn 2023 GDVM).

Plate 45. Quadrat CW10, Collard's Wetland (from north-west corner) (Spring 2015 GDVM).

Plate 46. Quadrat CW10, Collard's Wetland (from north-west corner) (Autumn 2023 GDVM).

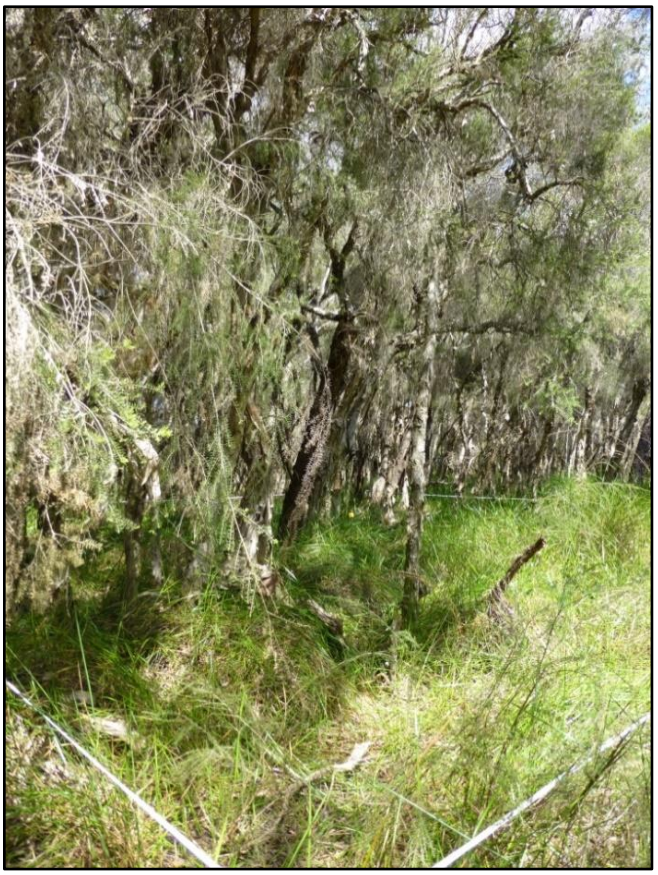


Plate 47. Quadrat CW11, Collard's Wetland (Spring 2015 GDVM).

Plate 48. Quadrat CW11, Collard's Wetland (Autumn 2023 GDVM).

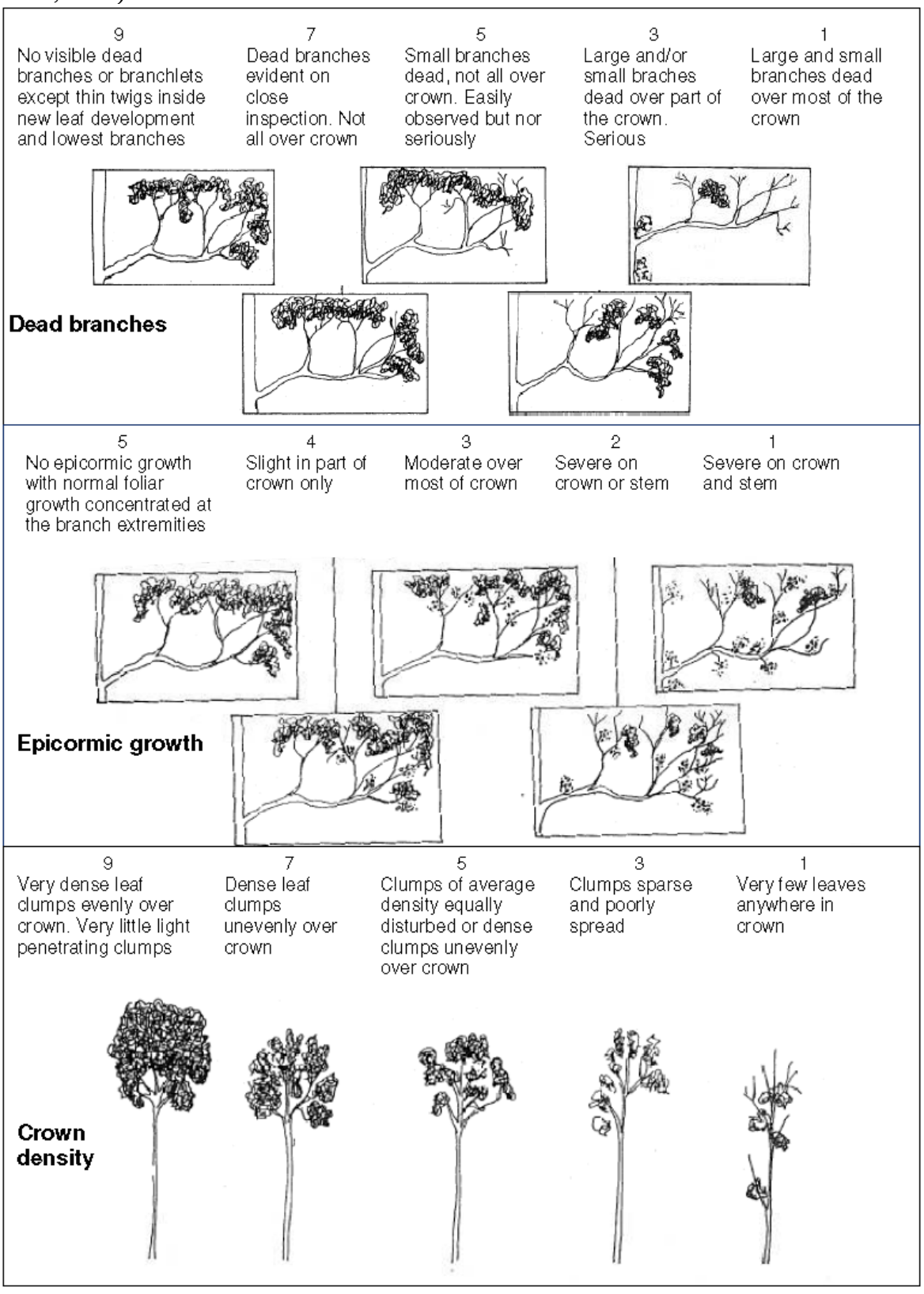
Plate 49. Quadrat CW12, Collard's Wetland (Spring 2015 GDVM).

Plate 50. Quadrat CW12, Collard's Wetland (Autumn 2023 GDVM).

APPENDICES

APPENDIX ONE. The Crown Assessment Procedure diagrams.

(Assessment classifications provided by R. Loomes, Department ofWater and referenced to Ladd, 1996).



APPENDIX TWO Pre-mining tree canopy condition assessment data.

I. Collard's Wetland sites.

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type[b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
CW01	Wet	cMp	Mp01	850	9	9	9		5	4	5		5	5	5		19	18	19		5	5	5	
CW01	Wet	cMp	Mp02	850	9	9	9		5	5	5		7	7	7		21	21	21		5	5	5	
CW01	Wet	cMp	Mp03		9	9	9		5	5	5		5	5	5		19	19	19		5	5	5	
CW01	Wet	cMp	Mp04	850	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW01	Wet	cMp	Mp05	850	9	9	9		5	5	5		7	7	7		21	21	21		5	5	5	
CW01	Wet	cMp	Mp06		9	9	9		5	5	5		7	7	7		21	21	21		5	5	5	
CW01	Wet	cMp	Mp07		9	9	9		5	5	5		5	7	7		19	21	21		5	5	5	
CW01	Wet	cMp	Mp08	850	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW02	Wet	cMr	Er01	900	7	7	7		4	4	5		5	5	5		16	16	17		5	5	4	
CW02	Wet	cMr	Er02	950	3	7	3		3	3	3		5	5	3		11	15	9		5	5	5	
CW02	Wet	cMr	Er03	860	3	3	5		4	4	4		3	5	5		10	12	14		5	5	4	
CW02	Wet	cMr	Mr01	600	9	7	7		5	4	5		5	5	5		19	16	17		5	5	5	
CW02	Wet	cMr	Mr02	600	9	9	7		5	5	5		5	5	5		19	19	17		5	5	5	
CW02	Wet	cMr	Mr03	650	9	9	7		5	5	5		5	5	5		19	19	17		5	5	5	
CW02	Wet	cMr	Mr04	600	9	9	9		5	5	5		5	5	5		19	19	19		5	5	5	
CW02	Wet	cMr	Mr05	490	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW03	Wet	cMr	Er01		3	3	3		3	3	3		3	3	3		9	9	9		5	5	5	
CW03	Wet	cMr	Er02	1000	3	3	3		2	2	2		3	3	3		8	8	8		5	5	4	
CW03	Wet	cMr	Er03X	330	5	5	3		2	2	1		5	5	1		12	12	5		5	4	2	
CW03	Wet	cMr	Mr01	750	7	7	7		5	5	5		7	7	7		19	19	19		5	5	5	
CW03	Wet	cMr	Mr02	960	9	9	7		5	5	5		5	5	5		19	19	17		5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

APPENDIX TWO Pre-mining tree canopy condition assessment data (cont).

I. Collard's Wetland sites (cont).

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type[b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
CW03	Wet	cMr	Mr03	1200	7	5	5		5	4	4		5	5	5		17	14	14		5	5	5	
CW03	Wet	cMr	Mr04	500	9	9	7		5	5	5		5	5	5		19	19	17		5	5	5	
CW03	Wet	cMr	Mr05	800	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW04	Wet	cErMp	Er01	900	7	5	5		4	4	4		5	5	5		16	14	14		5	4	4	
CW04	Wet	cErMp	Er02	600	5	5	5		4	3	3		3	3	3		12	11	11		4	4	4	
CW04	Wet	cErMp	Er03	1000	3	3	3		4	4	4		3	3	3		10	10	10		4	4	4	
CW04	Wet	cErMp	Er04	950	5	5	3		5	5	4		5	5	3		15	15	10		4	4	4	
CW04	Wet	cErMp	Er05	900	7	7	7		5	5	5		5	5	5		17	17	17		4	5	5	
CW04	Wet	cErMp	Mp01	700	3	3	3		4	4	4		3	3	3		10	10	10		5	5	5	
CW04	Wet	cErMp	Mp02	700	5	5	5		5	4	4		5	5	5		15	14	14		5	5	5	
CW04	Wet	cErMp	Mp03	850	7	3	3		5	5	5		5	5	5		17	13	13		4	4	5	
CW04	Wet	cErMp	Mp04	600	5	7	5		5	4	4		5	5	5		15	16	14		5	5	5	
CW04	Wet	cErMp	Mp05	750	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW04	Wet	cErMp	Mr01	600	7	7	5		5	4	4		5	5	5		17	16	14		5	5	5	
CW05	Wet	cCcEr	Cc01	1100	5	5	5		4	3	3		5	5	5		14	13	13		5	5	5	
CW05	Wet	cCcEr	Cc02	600	3	3	3		4	3	3		3	3	3		10	9	9		5	5	5	
CW05	Wet	cCcEr	Cc03X	800	3	3	1		4	4	4		1	1	1		8	8	6		4	4	4	
CW05	Wet	cCcEr	Cc04X	1600			5				4				5				14				5	
CW05	Wet	cCcEr	Mp01	1000	7	7	7		4	4	4		5	5	5		16	16	16		5	5	5	
CW05	Wet	cCcEr	Mp02	800	7	7	7		5	4	4		7	7	7		19	18	18		5	5	5	
CW05	Wet	cCcEr	Mp03X	600	5	3	3		4	4	4		3	3	3		12	10	10		5	5	5	
CW06	Wet	cMr	Mr01	550	9	7	7		5	5	5		5	5	5		19	17	17		5	4	4	
CW06	Wet	cMr	Mr08	670	9	9	7		5	5	5		5	5	5		19	19	17		5	5	5	
CW06	Wet	cMr	Mr12	500	9	9	9		5	5	5		5	5	5		19	19	19		5	5	5	
CW06	Wet	cMr	Mr16	530	9	7	7		5	5	5		5	5	5		19	17	17		5	5	5	
CW06	Wet	cMr	Mr28	600	9	9	9		5	5	5		5	5	5		19	19	19		5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

APPENDIX TWO Pre-mining tree canopy condition assessment data (cont).

I. Collard's Wetland sites (cont.).

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type[b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
CW07	Wet	cMr	Er01	450	5	5	5		5	4	4		5	5	5		15	14	14		5	4	4	
CW07	Wet	cMr	Mr19	700	3	3	5		5	5	5		5	5	5		13	13	15		5	5	5	
CW07	Wet	cMr	Mr21	500	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW07	Wet	cMr	Mr18	580	9	9	7		5	5	5		5	5	5		19	19	17		5	5	5	
CW07	Wet	cMr	Mr13	460	9	9	9		5	5	5		5	5	5		19	19	19		5	5	5	
CW07	Wet	cMr	Mr07	480	9	9	7		4	4	4		5	5	5		18	18	16		5	5	5	
CW07	Wet	cMr	Mr01	430	9	9	7		5	5	5		5	5	5		19	19	17		5	5	5	
CW08	Wet	cErMp	Er01	1000	7	7	7		4	4	5		5	5	5		16	16	17		5	5	5	
CW08	Wet	cErMp	Er02	1000	7	7	7		5	4	4		5	5	5		17	16	16		5	5	5	
CW08	Wet	cErMp	Er03	900	7	7	7		5	4	4		5	5	5		17	16	16		5	5	5	
CW08	Wet	cErMp	Er04	1000	7	7	7		5	4	4		3	5	5		15	16	16		5	5	5	
CW08	Wet	cErMp	Er05	1000	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW08	Wet	cErMp	Mp01	850	5	5	5		5	4	5		5	5	5		15	14	15		5	5	5	
CW08	Wet	cErMp	Mp09	600	5	5	3		5	5	5		3	5	3		13	15	11		5	5	5	
CW08	Wet	cErMp	Mp15	700	7	5	5		5	5	5		5	5	5		17	15	15		5	5	5	
CW08	Wet	cErMp	Mp19	800	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW08	Wet	cErMp	Mp26	800	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW09	Wet	cCcEr	Cc01	1000	5	5	5		5	4	4		5	5	5		15	14	14		4	5	4	
CW09	Wet	cCcEr	Cc02	800	3	3	3		5	4	4		3	3	3		11	10	10		5	4	4	
CW09	Wet	cCcEr	Cc03X	1000	5	5	5		5	4	5		5	5	5		15	14	15		4	4	4	
CW09	Wet	cCcEr	Er01	950	5	7	5		5	5	5		5	5	5		15	17	15		5	5	5	
CW09	Wet	cCcEr	Mp01	730	3	3	3		5	4	4		3	3	3		11	10	10		5	4	4	
CW09	Wet	cCcEr	Mp02	400	3	3	3		5	5	4		5	5	3		13	13	10		5	4	4	
CW09	Wet	cCcEr	Mp03	260	5	5	5		5	5	5		5	5	5		15	15	15		5	4	4	
CW09	Wet	cCcEr	Mp04	550	5	5	3		5	4	4		5	5	3		15	14	10		4	4	4	
CW10	Wet	cMr	Er01X	800	7	5	5		5	4	4		5	5	5		17	14	14		5	4	4	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

APPENDIX TWO Pre-mining tree canopy condition assessment data (cont).

I. Collard's Wetland sites (cont.).

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type[b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
CW10	Wet	cMr	Er02X	680	7	7	7		5	5	5		5	5	5		17	17	17		5	5	4	
CW10	Wet	cMr	Er03X	680	5	5	5		5	4	5		5	5	5		15	14	15		4	4	4	
CW10	Wet	cMr	Mr01	800	7	7	7		5	5	4		5	5	5		17	17	16		5	5	5	
CW10	Wet	cMr	Mr02	750	7	5	7		4	4	4		7	5	5		18	14	16		5	5	5	
CW10	Wet	cMr	Mr03X	800	7	7	7		5	5	5		5	5	5		17	17	17		5	5	5	
CW11	Wet	cErMp	Er01		5	5	5		4	4	5		5	5	3		14	14	13		4	4	4	
CW11	Wet	cErMp	Er02		5	5	5		5	5	5		5	5	5		15	15	15		5	5	5	
CW11	Wet	cErMp	Er03		5	5	5		5	4	4		5	5	5		15	14	14		5	5	5	
CW11	Wet	cErMp	Er04		5	5	5		4	4	4		5	5	5		14	14	14		4	4	5	
CW11	Wet	cErMp	Er05	550	5	3	3		4	4	4		3	3	3		12	10	10		4	4	4	
CW11	Wet	cErMp	Mp03		7	7	7		4	4	4		5	5	5		16	16	16		5	5	5	
CW11	Wet	cErMp	Mp05		5	3	3		5	5	5		5	3	3		15	11	11		3	4	3	
CW11	Wet	cErMp	Mp06		5	5	5		4	4	4		5	5	5		14	14	14		4	4	4	
CW11	Wet	cErMp	Mp07	600	5	3	3		4	4	4		3	3	3		12	10	10		5	4	3	
CW11	Wet	cErMp	Mp10	750	5	5	5		5	5	5		5	5	5		15	15	15		5	5	5	
CW12	Wet	cCcEr	Cc01		5	5	5		5	5	5		5	5	5		15	15	15		4	5	4	
CW12	Wet	cCcEr	Cc02		5	5	5		4	4	5		5	5	5		14	14	15		4	4	4	
CW12	Wet	cCcEr	Mp01		3	3	3		5	5	5		5	3	3		13	11	11		4	4	5	
CW12	Wet	cCcEr	Mp02		3	3	3		4	4	2		3	3	2		10	10	7		3	4	3	
CW12	Wet	cCcEr	Mp03	700	3	3	3		5	5	5		3	3	3		11	11	11		4	5	4	
CW12	Wet	cCcEr	Mp04	300-500	5	3	2		5	4	2		3	3	1		13	10	5		4	4	4	
CW12	Wet	cCcEr	Mp05		5	5	5		4	4	5		5	5	5		14	14	15		4	4	4	
CW12	Wet	cCcEr	Mp06	1100	5	3	3		5	5	5		5	5	5		15	13	13		5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

APPENDIX TWO Pre-mining tree canopy condition assessment data (cont).

II. Boonanarring NR.

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type [b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
BNR01	Ter	T1	Ba01	430	5	5	7	7	5	5	5	5	5	5	5	5	15	15	17	17	5	5	5	5
BNR01	Ter	T1	Ba02	205	7	7	7	7	5	5	5	5	5	5	5	5	17	17	17	17	5	4	4	4
BNR01	Ter	T1	Ba03	260	9	9	9	9	5	5	5	5	7	7	7	5	21	21	21	19	5	5	4	5
BNR01	Ter	T1	Ba04	330	7	7	7	7	5	5	5	3	5	5	5	5	17	17	17	15	5	5	5	5
BNR01	Ter	T1	Ba05	440	5	5	5	5	3	3	3	3	5	5	5	5	13	13	13	13	5	4	4	5
BNR01	Ter	T1	Bm01	330	5	3	3	3	5	4	3	3	5	5	3	3	15	12	9	9	4	2	3	4
BNR02	Ter	T1	Ba01	280	5	5	5	5	5	5	5	5	5	5	5	5	15	15	15	15	5	5	5	5
BNR02	Ter	T1	Ba02	320	7	9	9	9	5	5	5	5	5	5	5	5	17	19	19	19	5	5	5	5
BNR02	Ter	T1	Ba03	210	9	9	9	9	5	5	5	5	5	5	5	5	19	19	19	19	5	5	5	5
BNR02	Ter	T1	Ba04	350	7	7	7	7	5	5	5	5	5	5	5	5	17	17	17	17	5	4	4	5
BNR02	Ter	T1	Ba05	210	9	9	9	9	5	5	5	5	5	5	5	5	19	19	19	19	5	5	4	4
BNR02	Ter	T1	Ba06	440	5	5	5	5	5	5	4	4	5	5	5	5	15	15	14	14	5	5	5	5
BNR02	Ter	T1	Ba07	220	5	5	5	5	5	5	5	5	5	5	5	5	15	15	15	15	5	4	4	4
BNR02	Ter	T1	Bm01	260	7	7	7	9	4	4	4	4	5	5	5	5	16	16	16	18	5	4	4	4
BNR02	Ter	T1	Bm02	260	7	9	9	9	5	5	5	5	5	5	5	5	17	19	19	19	5	4	4	5
BNR02	Ter	T1	Bm03	720	5	5	5	5	4	4	5	5	5	5	5	5	14	14	15	15	5	5	4	5
BNR02	Ter	T1	Bm04	250	7	7	7	7	5	5	5	5	5	5	5	5	17	17	17	17	4	4	4	5
BNR03	Ter	C	Ba01	400	5	3	3	3	2	2	2	2	3	3	3	3	10	8	8	8	4	4	4	4
BNR03	Ter	C	Ba02	650	5	5	5	5	4	3	4	4	5	5	5	3	14	13	14	12	5	4	4	3
BNR03	Ter	C	Ba03	550	5	5	5	3	4	4	5	3	5	5	5	3	14	14	15	9	4	4	4	3
BNR03	Ter	C	Ba04	600	3	0	0	0	5	0	0	0	5	0	0	0	13	0	0	0	3	0	0	0
BNR03	Ter	C	Ba05	600	5	5	5	5	5	5	5	5	5	5	5	5	15	15	15	15	4	4	4	4
BNR03	Ter	C	Ba06	450		5	5	5		5	5	5		5	5	5		15	15	15		5	4	4
BNR03	Ter	C	Bm01	350	5	0	0	0	4	0	0	0	3	0	0	0	12	0	0	0	3	0	0	0
BNR03	Ter	C	Bm02	320	5	0	0	0	5	0	0	0	5	0	0	0	15	0	0	0	4	0	0	0

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX TWO Pre-mining tree canopy condition assessment data (cont).

II. Boonanarring NR (cont).

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type[b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
BNR03	Ter	C	Bm03X	300	7	7	7	7	5	5	5	5	5	5	5	5	17	17	17	17	5	4	4	4
BNR03	Ter	C	Bm04X	400		5	5	7		4	5	5		3	5	5		12	15	17		5	4	4
BNR03	Ter	C	Bm05X	450		5	5	5		5	5	5		5	5	5		15	15	15		4	4	4
BNR04	Ter	T1	Ba01	280	3	3	3	3	3	3	3	3	3	3	3	5	9	9	9	11	4	4	4	5
BNR04	Ter	T1	Ba02	530	5	5	7	5	5	5	5	5	5	5	5	5	15	15	17	15	4	4	4	4
BNR04	Ter	T1	Ba03X	280	7	7	7	7	5	5	5	5	5	5	5	5	17	17	17	17	5	5	5	5
BNR04	Ter	T1	Bm01	400	5	0	0	0	5	0	0	0	5	0	0	0	15	0	0	0	4	0	0	0
BNR04	Ter	T1	Bm02	280	7	7	7	7	5	5	5	4	7	7	5	5	19	19	17	16	5	5	4	5
BNR04	Ter	T1	Bm03X	400	5	5	5	3	5	5	5	5	5	5	5	5	15	15	15	13	4	4	4	4
BNR04	Ter	T1	Bm04X	260			9	9			5	5			5	5			19	19			4	4
BNR05	Ter	T1	Ba01	380	3	3	3	3	5	5	5	5	4	3	3	3	12	11	11	11	4	4	4	4
BNR05	Ter	T1	Ba02	250	9	7	7	7	5	5	5	5	5	5	5	5	19	17	17	17	5	5	5	5
BNR05	Ter	T1	Ba03	280	9	9	9	9	5	5	5	5	7	7	7	5	21	21	21	19	5	5	5	5
BNR05	Ter	T1	Ba04	460	3	3	3	0	5	5	5	0	4	3	3	0	12	11	11	0	4	3	3	0
BNR05	Ter	T1	Ba05	380	3	3	3	3	5	5	5	5	5	5	5	3	13	13	13	11	5	5	4	5
BNR05	Ter	T1	Ba06X	260				7				5				5				17				5
BNR05	Ter	T1	Bm01X	250	9	9	9	9	5	5	5	5	5	5	5	5	19	19	19	19	4	4	4	4
BNR05	Ter	T1	Bm02X	250	7	7	7	9	5	5	5	5	5	5	5	5	17	17	17	19	5	5	4	4
BNR06	Ter	T1	Ba01	180	7	0	0	0	5	0	0	0	5	0	0	0	17	0	0	0	5	0	0	0
BNR06	Ter	T1	Ba02	350	5	5	4	3	3	3	3	3	5	5	5	5	13	13	12	11	4	4	4	4
BNR06	Ter	T1	Ba03X	330	7	7	7	7	5	5	5	5	5	5	5	5	17	17	17	17	5	5	5	4
BNR06	Ter	T1	Ba04X				5	5			5	5			5	5			15	15			5	5
BNR06	Ter	T1	Ba05X				5	5			5	5			3	3			13	13			4	4
BNR06	Ter	T1	Bm01	400	5	7	5	7	5	5	5	5	5	4	5	5	15	16	15	17	4	4	4	4
BNR06	Ter	T1	Bm02X	330	5	7	5	5	5	5	5	5	5	5	5	5	15	17	15	15	4	4	4	4
BNR06	Ter	T1	Bm03X	380	7	7	7	7	5	5	5	5	5	5	5	5	17	17	17	17	5	5	5	4

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX TWO Pre-mining tree canopy condition assessment data (cont).

II. Boonanarring NR (cont).

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type[b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
BNR07	Ter	C	Ba01	210				9				5				5				19				5
BNR07	Ter	C	Ba02	280				5				4				5				14				4
BNR07	Ter	C	Ba03	300				6				5				5				16				5
BNR07	Ter	C	Ba04	500				5				2				5				12				5
BNR07	Ter	C	Ba05	210				7				5				5				17				4
BNR07	Ter	C	Bm01	700				4				5				5				14				4
BNR07	Ter	C	Bm02	400				7				5				5				17				5
BNR07	Ter	C	Bm03	550				5				5				5				15				4
BNR07	Ter	C	Bm04	330				5				5				5				15				5
BNR07	Ter	C	Bm05	520				5				5				5				15				5
BNR07	Ter	C	Bm06	400				7				5				5				17				4
BNR08	Ter	C	Ba01	380				1				1				3				5				5
BNR08	Ter	C	Ba02	500				1				1				3				5				5
BNR08	Ter	C	Ba03	430				1				1				3				5				5
BNR08	Ter	C	Ba04X	400				1				1				3				5				5
BNR08	Ter	C	Bm01	450				1				1				3				5				5
BNR08	Ter	C	Bm02	400				1				1				3				5				5
BNR08	Ter	C	Bm03	270				1				1				3				5				5
BNR08	Ter	C	Bm04X	250				1				1				3				5				5
BNR09	Ter	T2	Ba01	400				5				2				5				12				5
BNR09	Ter	T2	Ba02	450				5				2				5				12				5
BNR09	Ter	T2	Ba03	350				5				1				5				11				5
BNR09	Ter	T2	Ba04	530				3				2				5				10				5
BNR09	Ter	T2	Bm01	300				5				1				7				13				5
BNR09	Ter	T2	Bm02	290				5				2				7				14				5

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX TWO Pre-mining tree canopy condition assessment data (cont).

II. Boonanarring NR (cont).

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type[b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
BNR09	Ter	T2	Bm03X	550				5				3				3				11				5
BNR10	Ter	T2	Ba01	530				7				4				5				16				4
BNR10	Ter	T2	Ba02	350				5				2				5				12				4
BNR10	Ter	T2	Ba03	380				5				2				5				12				5
BNR10	Ter	T2	Ba04	530				5				5				5				15				4
BNR10	Ter	T2	Ba05	400				9				3				5				17				5
BNR10	Ter	T2	Ba06	500				5				2				5				12				5
BNR10	Ter	T2	Ba07	440				3				2				5				10				4
BNR10	Ter	T2	Ba08	400				5				2				5				12				5
BNR10	Ter	T2	Bm01	420				7				5				5				17				5
BNR10	Ter	T2	Bm02	250				9				2				5				16				5
BNR10	Ter	T2	Bm03X	?				7				3				5				15				5
BNR11	Ter	T2	Ba01	300				9				5				5				19				5
BNR11	Ter	T2	Ba02	330				9				5				5				19				4
BNR11	Ter	T2	Ba03	270				9				4				5				18				5
BNR11	Ter	T2	Bm01	210				9				5				5				19				5
BNR11	Ter	T2	Bm02	320				9				5				5				19				5
BNR11	Ter	T2	Bm03	300				7				4				5				16				4
BNR11	Ter	T2	Bm04	320				9				3				5				17				5
BNR11	Ter	T2	Bm05	350				7				3				5				15				5
BNR11	Ter	T2	Bm06	260				7				3				5				15				4
BNR12	Ter	T2	Ba01	250	7	7	7	7	5	5	5	5	5	5	5	5	17	17	17	17	4	4	4	5
BNR12	Ter	T2	Ba02	300	9	5	5	7	5	3	3	3	5	5	5	5	19	13	13	15	3	4	4	5
BNR12	Ter	T2	Ba03X	450	7	7	5	5	5	4	4	4	5	5	5	5	17	16	14	14	4	4	4	4

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX TWO Pre-mining tree canopy condition assessment data (cont).

II. Boonanarring NR (cont).

Orange shading: trees that have died since first sample; Green shading: new trees sampled since Spring 2015 survey

Site[a]	GDV Type[b]	Site Class	Tree Nos	Hgt	Proportion of Dead Branches Index (1 to 9)				Degree of Epicormic Growth Index (1 to 5)				Crown density (foliage density) Index (1 to 9)				Crown Assessment Index (3 to 23)				Foliage Health Index (5 to 1)			
					SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018	SPG 2015	AUT 2016	SPG 2017	SPG 2018
BNR12	Ter	T2	Ba04	205				9				4				5				18				5
BNR12	Ter	T2	Bm01	330	7	7	7	7	5	4	4	4	5	5	5	5	17	16	16	16	4	4	4	4
BNR13	Ter	T2	Ba01	430	7	5	5	5	4	4	4	4	5	5	5	5	16	14	14	14	3	4	4	5
BNR13	Ter	T2	Ba02	250	7	5	5	7	5	5	5	5	5	5	5	5	17	15	15	17	4	4	5	5
BNR13	Ter	T2	Ba03	290	7	7	7	7	5	4	5	5	5	5	5	5	17	16	17	17	4	4	4	4
BNR13	Ter	T2	Ba04	180	9	5	5	5	5	2	3	3	5	3	3	5	19	10	11	13	2	2	4	4
BNR13	Ter	T2	Bm01	440	7	5	5	3	5	4	4	3	5	3	5	5	17	12	14	11	2	3	4	4
BNR13	Ter	T2	Bm02	270	9	7	7	7	4	4	4	4	5	5	5	5	18	16	16	16	4	4	4	5
BNR13	Ter	T2	Bm03	480	7	5	5	5	5	5	5	5	5	5	5	4	17	15	15	14	4	4	4	5
BNR13	Ter	T2	Bm04	270	9	5	7	9	4	4	4	4	5	5	5	5	18	14	16	18	3	3	4	5

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE 'Post commencement of mining' tree canopy condition assessment data: AUT2019 to AUT2021.

I. Collard's Wetland sites (cont.). Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
CW01	Mp01	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	5	5
CW01	Mp02	9	9	9	9	9	5	5	5	5	5	7	7	7	7	7	21	21	21	21	21	5	5	5	5	5
CW01	Mp03	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	5	5
CW01	Mp04	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	5	5	5	5
CW01	Mp05	9	9	9	7	9	4	4	5	4	4	7	7	7	7	7	20	20	21	18	20	5	5	5	5	5
CW01	Mp06	9	9	9	9	9	5	5	5	4	4	7	7	7	7	7	21	21	21	20	20	5	5	5	5	5
CW01	Mp07	7	7	7	7	7	5	5	5	4	4	5	5	5	7	5	17	17	17	18	16	5	5	5	4	5
CW01	Mp08	7	7	7	7	7	5	5	5	4	5	5	5	5	5	5	17	17	17	16	17	5	5	5	5	5
CW02	Er01	5	5	7	7	7	3	3	4	4	5	4	4	5	5	5	12	12	16	16	17	4	4	5	5	5
CW02	Er02	3	3	4	4	5	3	3	3	3	4	3	3	5	5	5	9	9	12	12	14	5	5	5	5	5
CW02	Er03	5	5	5	7	7	4	4	4	4	5	5	5	5	5	5	14	14	14	16	17	4	4	5	5	5
CW02	Mr01	7	7	9	9	9	5	5	5	5	5	5	5	5	5	5	17	17	19	19	19	5	5	5	5	5
CW02	Mr02	7	7	7	7	9	5	5	5	5	5	5	5	5	5	5	17	17	17	17	19	5	5	5	5	5
CW02	Mr03	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	5	5	5	5
CW02	Mr04	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	5	5
CW02	Mr05	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	5	5	5	5
CW03	Er01	3	3	2	3	3	3	3	2	3	4	3	3	2	3	3	9	9	6	9	10	4	4	5	5	5
CW03	Er02	5	5	3	5	5	4	4	2	3	4	5		3	3	3	14	9	8	11	12	5	5	5	5	5
CW03	Er03X	1	1	1	1	0	1	1	1	2	0	1	1	1	1	0	3	3	3	4	0	2	2	3	4	0
CW03	Er04X			5	5	5			4	4	5			5	5	5			14	14	15			5	5	5
CW03	Er05X			3	3	3			2	3	3			2	2	4			7	8	10			4	4	5
CW03	Er06X			4	3	4			2	3	3			4	4	4			10	10	11			5	5	5
CW03	Mr01	7	7	9	9	9	5	5	5	5	5	7	7	7	7	7	19	19	21	21	21	5	5	5	5	5
CW03	Mr02	7	7	9	7	7	5	5	5	5	5	5	5	5	5	5	17	17	19	17	17	5	5	5	5	5
CW03	Mr03	5	5	5	5	7	4	4	4	4	5	5	5	5	5	5	14	14	14	14	17	5	5	5	5	5
CW03	Mr04	9	7	7	7	7	5	5	5	5	5	5	5	5	5	5	19	17	17	17	17	5	5	5	5	5

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : AUT2019 to AUT2021 (cont).

I. Collard's Wetland sites (cont.). Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
CW03	Mr05	7	7	9	9	9	4	4	4	5	5	5	5	5	5	5	16	16	18	19	19	5	5	5	5	5
CW04	Er01	4	4	5	5	3	3	3	3	3	3	4	4	4	4	3	11	11	12	12	9	5	5	5	5	4
CW04	Er02	3	3	3	3	4	1	1	1	1	2	3	1	1	1	3	7	5	5	5	9	4	4	5	5	5
CW04	Er03	3	3	3	4	4	3	2	3	3	2	3	3	3	3	5	9	8	9	10	11	4	4	5	5	5
CW04	Er04	3	3	3	4	4	3	2	2	3	2	3	2	2	2	3	9	7	7	9	9	4	4	4	5	4
CW04	Er05	3	4	5	5	7	3	3	3	3	3	3	2	3	3	5	9	9	11	11	15	4	4	5	5	5
CW04	Mp01	5	4	4	4	4	4	4	4	4	4	5	4	4	4	3	14	12	12	12	11	5	5	4	5	5
CW04	Mp02	5	4	4	4	4	4	4	4	3	3	5	4	3	3	3	14	12	11	10	10	5	5	5	4	5
CW04	Mp03	3	3	3	4	4	5	5	4	4	4	5	5	4	5	5	13	13	11	13	13	5	5	5	4	5
CW04	Mp04	5	5	5	5	5	4	4	4	4	4	5	5	5	4	4	14	14	14	13	13	5	4	5	4	5
CW04	Mp05	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	15	15	15	15	14	5	5	5	4	5
CW04	Mr01	5	5	7	7	7	4	4	5	5	5	5	5	5	5	5	14	14	17	17	17	5	5	5	5	5
CW05	Cc01	4	4	5	4	4	2	2	2	3	3	5	5	5	5	5	11	11	12	12	12	4	4	5	4	4
CW05	Cc02	3	2	2	2	1	2	2	2	2	1	3	3	3	3	1	8	7	7	7	3	4	4	5	4	4
CW05	Cc03X	1	1	1	1	1	2	3	1	2	2	1	1	1	1	2	4	5	3	4	5	4	4	4	4	4
CW05	Cc04X	4	7	7	4	5	3	4	4	4	4	5	5	5	5	5	12	16	16	13	14	5	5	5	5	5
CW05	Cc05X	5	7	5	5	5	4	4	3	3	3	5	5	5	5	5	14	16	13	13	13	4	5	5	5	5
CW05	Cc06X	7	7	6	6	6	4	4	4	4	4	5	5	5	5	5	16	16	15	15	15	4	5	5	5	5
CW05	Mp01	5	7	5	7	7	4	4	4	5	4	5	5	5	5	5	14	16	14	17	16	5	5	5	5	5
CW05	Mp02	7	7	7	7	7	4	4	4	4	4	7	7	7	7	5	18	18	18	18	16	5	5	5	5	5
CW05	Mp03X	3	3	3	3	3	4	4	4	4	5	3	3	3	3	3	10	10	10	10	11	5	5	5	5	5
CW06	Mr01	7	7	9	9	7	5	5	5	5	5	5	5	5	5	5	17	17	19	19	17	5	5	5	5	5
CW06	Mr08	7	9	9	9	9	5	5	5	5	5	5	5	5	5	5	17	19	19	19	19	5	5	5	5	5
CW06	Mr12	7	7	9	9	9	5	5	5	5	5	5	5	5	5	5	17	17	19	19	19	5	5	5	5	5
CW06	Mr16	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	5	5	5	5
CW06	Mr28	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	5	5
CW07	Er01	5	5	5	7	7	4	5	5	5	5	5	5	5	5	5	14	15	15	17	17	5	4	5	5	5

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : AUT2019 to AUT2021 (cont).

I. Collard's Wetland sites (cont.). Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
CW07	Er02		9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5
CW07	Er03X		7	7	7	7		5	5	5	5		5	5	5	5		17	17	17	17		5	4	4	4
CW07	Mr19	7	5	5	5	5	5	4	4	4	4	5	5	5	5	5	17	14	14	14	14	5	5	5	5	5
CW07	Mr21	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	5	5	5	5
CW07	Mr18	7	7	9	9	9	5	5	5	5	5	5	5	5	5	5	17	17	19	19	19	5	5	5	5	5
CW07	Mr13	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	5	5
CW07	Mr07	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	5	5	5	5
CW07	Mr01	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	5	5
CW08	Er01	5	4	4	5	4	3	3	3	3	3	5	4	4	5	5	13	11	11	13	12	5	4	5	5	5
CW08	Er02	5	5	5	5	5	4	4	4	4	4	5	5	5	5	5	14	14	14	14	14	5	4	5	5	5
CW08	Er03	5	5	5	7	7	3	3	4	4	4	5	5	5	5	5	13	13	14	16	16	5	5	5	5	5
CW08	Er04	7	7	7	5	5	4	4	4	4	4	5	5	5	5	5	16	16	16	14	14	5	5	5	5	4
CW08	Er05	7	7	7	7	8	4	3	4	4	4	5	4	5	5	6	16	14	16	16	18	5	5	5	5	5
CW08	Mp01	5	4	4	4	5	5	5	5	5	4	5	5	5	5	5	15	14	14	14	14	5	5	5	5	5
CW08	Mp09	3	3	3	3	3	4	3	3	3	3	3	4	2	2	2	10	10	8	8	8	5	5	5	5	4
CW08	Mp15	5	4	4	3	4	4	4	4	3	4	5	4	4	3	3	14	12	12	9	11	5	5	5	5	4
CW08	Mp19	7	7	5	3	5	5	5	5	3	4	5	5	5	3	5	17	17	15	9	14	5	5	5	5	5
CW08	Mp26	5	5	5	5	3	5	5	4	4	3	5	5	5	5	3	15	15	14	14	9	5	5	5	5	3
CW09	Cc01	5	6	5	5	5	4	4	3	3	3	5	5	5	5	5	14	15	13	13	13	5	5	5	5	4
CW09	Cc02	3	3	3	3	4	4	4	4	4	4	3	3	3	3	5	10	10	10	10	13	5	5	5	5	5
CW09	Cc03X	5	4	4	4	4	5	5	4	4	4	5	5	5	5	5	15	14	13	13	13	5	4	4	4	4
CW09	Er01	5	5	5	5	5	5	4	4	4	4	5	5	5	5	5	15	14	14	14	14	5	4	5	5	5
CW09	Mp01	3	3	3	3	3	4	4	4	4	4	3	4	4	4	4	10	11	11	11	11	5	5	5	4	4
CW09	Mp02	3	3	3	3	4	4	4	4	4	4	3	3	3	3	4	10	10	10	10	12	4	4	4	4	4
CW09	Mp03	3	3	3	3	3	4	4	4	4	4	5	4	3	3	2	12	11	10	10	9	3	4	4	4	4
CW09	Mp04	5	3	4	4	4	4	3	4	4	4	5	3	5	5	5	14	9	13	13	13	4	4	4	4	4
CW09	Mp05X			7	7	5			4	4	5			5	7	7			16	18	17			5	4	5

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : AUT2019 to AUT2021 (cont).

I. Collard's Wetland sites (cont.). Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
CW09	Mp06X			4	5	6			4	4	4			5	5	5			13	14	15			5	5	5
CW10	Er01X	1	1	2	2	2	2	2	2	2	3	3	2	3	3	2	6	5	7	7	7	4	3	4	4	4
CW10	Er02X	4	4	4	4	5	4	4	4	4	4	5	4	5	5	5	13	12	13	13	14	3	3	5	5	5
CW10	Er03X	4	3	3	3	3	2	2	3	3	3	3	3	3	3	2	9	8	9	9	8	3	3	5	5	4
CW10	Mr01	7	7	7	7	7	4	4	4	4	4	5	5	5	5	5	16	16	16	16	16	5	5	5	5	5
CW10	Mr02	7	7	7	7	7	4	4	4	4	4	5	5	5	5	5	16	16	16	16	16	5	5	5	5	5
CW10	Mr03X	7	7	7	7	7	5	5	5	4	4	5	5	5	5	5	17	17	17	16	16	5	5	5	5	5
CW11	Er01	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	10	10	10	10	10	4	4	5	5	4
CW11	Er02	3	3	3	3	3	2	2	2	2	3	5	2	3	3	4	10	7	8	8	10	4	4	4	4	4
CW11	Er03	2	2	2	2	3	2	2	2	2	3	3	3	1	3	3	7	7	5	7	9	4	4	5	4	4
CW11	Er04	4	4	4	4	4	2	2	2	2	2	5	5	5	5	5	11	11	11	11	11	4	4	5	5	5
CW11	Er05	3	1	0	0	0	3	1	0	0	0	3	1	0	0	0	9	3	0	0	0	2	2	0	0	0
CW11	Mp03	7	7	7	5	5	4	4	4	5	5	5	5	5	5	5	16	16	16	15	15	5	4	5	5	4
CW11	Mp05	3	3	3	3	3	5	5	5	5	5	3	3	3	3	3	11	11	11	11	11	4	4	4	4	4
CW11	Mp06	5	5	5	5	5	4	3	3	3	4	5	5	5	5	5	14	13	13	13	14	5	4	5	4	5
CW11	Mp07	4	4	4	4	4	4	3	2	3	3	3	3	3	3	3	11	10	9	10	10	4	4	5	4	4
CW11	Mp10	5	5	5	4	4	5	5	5	4	5	5	5	5	4	5	15	15	15	12	14	5	5	4	3	4
CW12	Cc01	4	3	4	4	4	5	2	5	5	4	5	3	3	3	3	14	8	12	12	11	4	5	4	4	5
CW12	Cc02	5	4	5	5	4	4	4	4	4	4	5	4	5	5	5	14	12	14	14	13	4	4	5	4	4
CW12	Cc03X	7	7	5	5	5	5	5	5	5	5	5	5	5	5	5	17	17	15	15	15	5	5	5	5	5
CW12	Mp01	3	3	3	3	3	5	4	5	4	5	3	3	3	3	3	11	10	11	10	11	5	4	5	5	5
CW12	Mp02	3	3	3	3	3	2	3	3	2	2	3	3	3	2	2	8	9	9	7	7	4	4	4	2	3
CW12	Mp03	3	3	3	3	3	5	5	5	3	4	3	3	3	3	4	11	11	11	9	11	4	5	5	4	5
CW12	Mp04	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	3	3	3	4	4	2	2	3	4	4
CW12	Mp05	5	5	5	5	5	5	5	4	4	4	7	7	7	7	7	17	17	16	16	16	4	4	5	4	5
CW12	Mp06	5	5	4	4	3	4	4	4	4	3	5	4	4	4	3	14	13	12	12	9	5	5	4	4	4

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : AUT2019 to AUT2021 (cont).

II. Boonanarring NR.

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
BNR01	Ba01	7	7	7	7	5	5	5	5	5	4	5	5	5	5	5	17	17	17	17	14	4	4	4	5	4
BNR01	Ba02	7	7	9	7	0	5	5	5	5	0	5	5	5	5	0	17	17	19	17	0	4	4	5	5	0
BNR01	Ba03	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	5	5
BNR01	Ba04	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	4	5	5	5	5
BNR01	Ba05	5	5	7	7	7	3	3	4	4	4	5	5	5	5	5	13	13	16	16	16	5	4	5	5	5
BNR01	Bm01	3	3	3	3	3	5	5	4	4	4	3	3	3	2	3	11	11	10	9	10	4	4	4	4	4
BNR02	Ba01	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	15	15	15	15	14	4	4	5	5	4
BNR02	Ba02	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	4	5	5	5	5
BNR02	Ba03	9	9	9	9	9	5	4	5	5	5	5	5	5	5	5	19	18	19	19	19	5	5	5	5	5
BNR02	Ba04	7	7	7	9	0	5	5	5	5	0	5	5	5	5	0	17	17	17	19	0	5	5	5	5	0
BNR02	Ba05	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	4	4	4	5	5
BNR02	Ba06	5	5	7	7	7	4	4	4	4	4	5	5	5	5	5	14	14	16	16	16	4	5	5	5	5
BNR02	Ba07	5	4	4	5	0	5	5	5	5	0	5	5	5	5	0	15	14	14	15	0	4	4	4	5	0
BNR02	Bm01	7	7	7	9	9	5	5	5	5	5	5	5	5	5	5	17	17	17	19	19	4	4	4	5	4
BNR02	Bm02	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	4	4	4	5	4
BNR02	Bm03	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	15	15	15	15	14	5	5	4	5	4
BNR02	Bm04	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	5	5	5	5
BNR03	Ba01	3	3	3	3	3	2	2	2	2	3	3	3	3	3	3	8	8	8	8	9	4	4	4	5	5
BNR03	Ba02	5	5	5	4	4	4	4	4	4	4	3	4	4	3	3	12	13	13	11	11	3	4	4	4	3
BNR03	Ba03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BNR03	Ba04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BNR03	Ba05	5	5	5	4	4	5	5	5	5	4	5	5	5	5	5	15	15	15	14	13	4	4	4	4	4
BNR03	Ba06	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	15	14	15	15	15	4	4	5	4	4
BNR03	Ba07	5	7	7	5	5	4	5	5	4	4	5	5	5	5	4	14	17	17	14	13	4	5	5	5	4
BNR03	Bm01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : AUT2019 to AUT2021 (cont).

II. Boonanarring NR (cont).

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
BNR03	Bm02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BNR03	Bm03X	7	7	7	7	5	5	5	5	5	5	5	5	5	5	5	17	17	17	17	15	4	4	4	5	4
BNR03	Bm04X	7	7	7	7	5	5	5	5	5	5	5	5	5	5	5	17	17	17	17	15	4	4	4	5	4
BNR03	Bm05X	5	7	7	5	0	5	5	5	5	0	5	5	5	5	0	15	17	17	15	0	4	4	4	4	0
BNR04	Ba01	3	3	3	3	3	3	5	4	5	5	3	3	3	3	3	9	11	10	11	11	4	4	4	4	4
BNR04	Ba02	5	5	7	5	7	5	4	5	5	5	5	5	5	5	5	15	14	17	15	17	4	4	4	4	4
BNR04	Ba03X	7	7	7	7	0	5	5	5	5	0	5	5	5	5	0	17	17	17	17	0	5	5	5	5	0
BNR04	Ba04X					7					5					5					17					5
BNR04	Bm01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BNR04	Bm02	7	7	7	9	9	4	5	5	5	5	4	7	7	7	7	16	19	19	21	21	4	4	5	4	5
BNR04	Bm03X	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5	14	14	14	14	15	4	4	4	3	4
BNR04	Bm04X	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	4	5	5	4	5
BNR04	Bm05X	9	9	9	9	9	5	5	5	5	5	5	7	5	5	5	19	21	19	19	19	5	5	5	5	5
BNR05	Ba01	3	3	3	3	0	5	5	5	4	0	5	3	3	3	0	11	11	11	10	0	4	4	4	3	0
BNR05	Ba02	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	5	5	5	5
BNR05	Ba03	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	5	5
BNR05	Ba04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BNR05	Ba05	3	4	3	3	3	5	5	5	5	5	5	4	3	3	3	11	13	11		11	5	5	5	4	5
BNR05	Ba06X	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	5	4	4	4	4
BNR05	Bm01X	9	9	9	7	9	5	5	5	5	5	5	5	5	5	5	19	19	19	17	19	4	4	5	4	5
BNR05	Bm02X	9	9	9	9	9	5	5	5	5	5	5	5	6	7	7	19	19	20	21	21	5	5	5	5	5
BNR06	Ba01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BNR06	Ba02	4	5	5	5	0	3	4	4	4	0	3	5	5	5	0	12	14	14	14	0	4	4	4	4	0
BNR06	Ba03X	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	4	4	5	4	4
BNR06	Ba04X	6	7	7	7	5	5	5	5	5	5	5	5	5	5	5	16	17	17	17	15	5	5	4	4	4

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : AUT2019 to AUT2021 (cont).

II. Boonanarring NR (cont).

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
BNR06	Ba05X	4	5	4	3	0	5	5	5	5	0	5	3	3	3	0	12	13	12	11	0	4	4	4	4	0
BNR06	Bm01	7	7	7	7	5	5	5	5	5	5	5	5	5	5	5	17	17	17	17	15	4	4	4	4	4
BNR06	Bm02X	6	6	7	7	5	5	5	5	5	5	5	5	5	5	5	16	16	17	17	15	4	4	5	4	4
BNR06	Bm03X	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	4	5	5	4	4
BNR07	Ba01	9	7	7	7	7	5	5	5	5	5	5	5	5	5	5	19	17	17	17	17	5	5	5	5	5
BNR07	Ba02	5	5	5	5	5	4	5	5	5	5	5	5	5	5	4	14	15	15	15	14	4	4	4	4	4
BNR07	Ba03	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	16	16	16	16	15	5	4	4	5	4
BNR07	Ba04	5	5	5	5	5	2	2	2	2	3	5	5	5	5	5	12	12	12	12	13	5	5	5	5	5
BNR07	Ba05	7	7	7	9	9	5	5	5	5	5	5	5	5	5	5	17	17	17	19	19	4	5	4	5	4
BNR07	Bm01	4	4	4	4	4	5	4	4	4	4	5	3	4	4	3	14	11	12	12	11	4	4	4	4	3
BNR07	Bm02	7	7	7	7	5	5	5	5	5	5	5	5	5	5	5	17	17	17	17	15	5	4	5	5	4
BNR07	Bm03	3	3	2	2	0	5	5	4	4	0	3	2	2	2	0	11	10	8	8	0	4	3	4	5	0
BNR07	Bm04	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	15	15	15	15	15	5	5	4	5	4
BNR07	Bm05	5	5	5	5	5	5	4	4	4	4	5	5	5	5	5	15	14	14	14	14	5	4	4	5	4
BNR07	Bm06	7	7	7	3	4	5	5	5	5	5	5	5	5	2	2	17	17	17	10	11	4	4	5	5	5
BNR08	Ba01	1	3	4	3	3	1	1	2	2	2	3	3	3	3	2	5	7	9	8	7	5	5	5	5	5
BNR08	Ba02	1	3	3	3	3	1	1	2	1	2	3	3	3	3	3	5	7	8	7	8	5	5	5	5	5
BNR08	Ba03	1	3	3	3	3	1	1	2	1	2	3	3	4	3	3	5	7	9	7	8	5	5	5	5	5
BNR08	Ba04X	1	3	4	4	4	1	1	2	2	3	3	3	4	4	5	5	7	10	10	12	5	5	5	5	5
BNR08	Bm01	1	1	3	3	3	1	1	2	2	2	3	3	3	3	2	5	5	8	8	7	5	5	5	4	4
BNR08	Bm02	3	5	5	5	5	1	1	2	3	3	5	5	5	5	5	9	11	12	13	13	5	5	5	5	4
BNR08	Bm03X	1	5	5	5	5	1	1	2	3	3	3	5	5	5	5	5	11	12	13	13	5	5	5	5	5
BNR08	Bm04X	3	3	4	4	5	1	1	2	2	3	3	3	5	5	5	7	7	11	11	13	5	5	5	5	5
BNR09	Ba01	5	5	5	7	7	2	2	3	4	4	5	5	5	5	5	12	12	13	16	16	5	5	5	5	5
BNR09	Ba02	3	3	4	4	5	2	2	2	3	3	3	4	4	4	5	8	9	10	11	13	5	5	4	5	5
											0															

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : AUT2019 to AUT2021 (cont).

II. Boonanarring NR (cont).

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
BNR09	Ba03	5	7	7	9	9	1	1	2	3	4	5	5	5	5	5	11	13	14	17	18	5	4	4	5	5
BNR09	Ba04	3	3	3	3	3	2	2	2	2	3	5	3	3	3	3	10	8	8	8	9	5	5	4	4	4
BNR09	Bm01	5	5	5	5	5	1	2	3	4	4	5	5	5	5	5	11	12	13	14	14	5	5	5	5	4
BNR09	Bm02	5	5	7	9	9	2	2	3	3	4	7	7	7	7	7	14	14	17	19	20	5	5	5	5	5
BNR09	Bm03X	5	5	5	5	5	3	3	3	4	4	3	4	4	5	5	11	12	12	14	14	4	4	5	4	4
BNR10	Ba01	7	7	7	7	7	5	4	5	5	4	5	5	5	5	5	17	16	17	17	16	4	4	4	4	4
BNR10	Ba02	5	5	2	2	2	2	2	3	1	2	5	5	3	1	1	12	12	8	4	5	4	4	3	2	5
BNR10	Ba03	5	4	5	4	4	2	2	2	2	3	5	3	4	5	5	12	9	11	11	12	5	4	4	5	4
BNR10	Ba04	5	5	7	5	5	5	5	5	5	5	5	5	5	5	4	15	15	17	15	14	4	4	4	4	4
BNR10	Ba05	7	7	7	7	7	3	3	4	4	4	5	6	5	5	5	15	16	16	16	16	5	5	4	5	5
BNR10	Ba06	5	5	7	7	7	2	2	3	4	4	5	5	5	5	5	12	12	15	16	16	5	5	4	4	4
BNR10	Ba07	3	3	3	0	0	2	2	3	0	0	5	3	3	0	0	10	8	9	0	0	4	3	3	0	0
BNR10	Ba08	5	5	5	5	5	2	2	2	3	4	5	5	5	5	5	12	12	12	13	14	5	5	5	4	5
BNR10	Bm01	7	7	7	7	9	5	5	5	5	5	5	5	5	5	5	17	17	17	17	19	5	5	5	4	5
BNR10	Bm02	7	7	7	7	7	4	4	4	4	4	5	5	5	5	5	16	16	16	16	16	4	4	4	4	4
BNR10	Bm03X	7	5	7	7	7	3	4	4	4	5	5	4	5	5	5	15	13	16	16	17	4	4	4	4	4
BNR11	Ba01	9	9	7	7	0	5	5	5	5	0	7	7	5	7	0	21	21	17	19	0	4	4	4	4	0
BNR11	Ba02	9	9	9	9	9	5	5	5	5	5	5	5	5	5	5	19	19	19	19	19	5	5	5	4	5
BNR11	Ba03	9	9	9	9	9	4	4	5	5	5	7	7	7	7	7	20	20	21	21	21	4	5	4	4	4
BNR11	Bm01	9	9	9	9	9	4	4	5	5	5	5	5	5	5	5	18	18	19	19	19	5	4	5	4	4
BNR11	Bm02	9	9	7	7	9	5	4	5	5	5	5	5	5	5	5	19	18	17	17	19	4	4	4	4	4
BNR11	Bm03	7	7	7	9	7	4	4	5	5	5	5	5	5	5	5	16	16	17	19	17	4	4	4	4	4

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : AUT2019 to AUT2021(cont).

II. Boonanarring NR (cont).

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021	AUT 2019	SPG 2019	AUT 2020	SPG 2020	AUT 2021
BNR11	Bm04	9	9	9	9	9	3	3	4	4	4	5	5	5	5	5	17	17	18	18	18	4	4	4	4	4
BNR11	Bm05	7	9	9	9	9	3	3	4	4	4	5	5	5	5	5	15	17	18	18	18	5	4	5	5	4
BNR11	Bm06	7	7	7	7	9	3	3	4	4	4	5	5	5	5	5	15	15	16	16	18	4	5	5	4	5
BNR12	Ba01	7	7	7	7	7	5	5	5	5	5	5	6	5	5	5	17	18	17	17	17	4	4	4	4	4
BNR12	Ba02	5	7	7	7	7	3	4	4	3	3	5	5	5	5	5	13	16	16	15	15	5	5	5	4	4
BNR12	Ba03X	5	5	5	5	5	4	4	4	4	4	5	5	5	5	5	14	14	14	14	14	5	5	4	4	4
BNR12	Ba04	9	9	9	9	7	4	5	4	4	5	5	6	5	5	5	18	20	18	18	17	4	4	4	4	4
BNR12	Bm01	7	7	7	7	7	4	4	4	4	4	5	5	5	5	5	16	16	16	16	16	4	4	4	4	4
BNR13	Ba01	5	5	7	7	7	4	4	5	4	4	5	6	5	5	5	14	15	17	16	16	5	5	5	5	5
BNR13	Ba02	7	7	9	9	0	5	5	5	5	0	5	5	5	5	0	17	17	19	19	0	4	5	5	4	0
BNR13	Ba03	7	7	7	7	7	5	5	5	5	5	5	5	5	5	5	17	17	17	17	17	4	4	5	5	4
BNR13	Ba04	5	5	5	5	5	3	4	4	4	4	5	5	5	5	5	13	14	14	14	14	4	4	5	4	4
BNR13	Bm01	3	5	5	5	4	3	3	4	4	4	5	4	4	4	3	11	12	13	13	11	4	4	4	4	4
BNR13	Bm02	7	7	7	9	0	4	4	5	5	0	5	5	5	5	0	16	16	17	19	0	5	5	5	5	0
BNR13	Bm03	5	5	7	7	0	5	5	5	5	0	4	4	4	5	0	14	14	16	17	0	5	5	5	5	0
BNR13	Bm04	7	7	7	7	7	4	4	5	5	5	5	5	5	5	5	16	16	17	17	17	5	5	5	5	5

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE (cont) 'Post commencement of mining' tree canopy condition assessment data: SPG2021 onwards.

I. Collard's Wetland sites. Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
CW01	Mp01	9	7	7	7		5	5	5	5		5	5	7	5		19	17	19	17		5	5	5	5	
CW01	Mp02	9	9	9	9		5	4	5	5		7	7	7	7		21	20	21	21		5	5	5	5	
CW01	Mp03	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
CW01	Mp04	5	7	7	7		5	5	5	5		5	5	5	5		15	17	17	17		5	5	5	5	
CW01	Mp05	9	9	9	9		4	5	5	4		6	6	5	6		19	20	19	19		5	5	4	5	
CW01	Mp06	9	9	9	9		4	4	4	5		5	5	5	5		18	18	18	19		5	5	5	5	
CW01	Mp07	7	7	7	5		4	4	4	4		6	5	6	5		17	16	17	14		4	5	5	5	
CW01	Mp08	7	7	7	7		5	4	5	5		5	5	5	5		17	16	17	17		4	5	5	5	
CW02	Er01	7	7	7	7		5	5	5	5		5	5	5	5		17	17	17	17		5	5	5	5	
CW02	Er02	5	7	7	7		4	4	4	4		5	5	5	5		14	16	16	16		5	5	5	5	
CW02	Er03	7	7	7	7		5	5	4	4		5	5	5	5		17	17	16	16		5	5	5	5	
CW02	Mr01	9	9	9	9		5	5	5	4		5	5	5	7		19	19	19	20		5	5	5	5	
CW02	Mr02	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
CW02	Mr03	9	9	9	9		4	4	4	5		5	5	5	5		18	18	18	19		5	5	5	5	
CW02	Mr04	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
CW02	Mr05	7	7	9	9		5	5	5	5		5	5	5	5		17	17	19	19		5	5	5	5	
CW03	Er01	3	4	4	5		4	4	4	4		3	3	4	4		10	11	12	13		5	5	5	5	
CW03	Er02	5	3	3	3		4	3	3	2		3	3	3	2		12	9	9	7		5	4	5	4	
CW03	Er03X	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
CW03	Er04X	5	5	5	4		5	4	4	4		5	4	3	3		15	13	12	11		5	5	5	5	
CW03	Er05X	3	3	4	5		4	4	3	4		2	2	4	4		9	9	11	13		5	5	5	5	
CW03	Er06X	5	4	5	5		4	4	4	4		5	4	5	5		14	12	14	14		5	5	5	5	
CW03	Mr01	9	9	9	9		5	5	5	5		8	7	7	7		22	21	21	21		5	5	5	5	
CW03	Mr02	7	7	9	9		5	5	5	5		6	6	6	5		18	18	20	19		5	5	5	5	
CW03	Mr03	5	5	5	7		4	4	4	4		5	5	5	5		14	14	14	16		5	5	5	5	
CW03	Mr04	7	9	7	9		4	4	5	4		5	5	5	5		16	18	17	18		5	5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : SPG2021 onwards (cont).

I. Collard's Wetland sites (cont.). Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
CW03	Mr05	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
CW04	Er01	3	3	3	3		4	3	3	3		3	3	3	3		10	9	9	9		4	4	5	5	
CW04	Er02	4	4	5	7		4	4	4	4		2	4	5	5		10	12	14	16		4	5	5	5	
CW04	Er03	3	4	5	5		4	3	4	4		3	3	4	4		10	10	13	13		5	5	5	5	
CW04	Er04	4	4	3	3		3	3	3	4		3	3	3	3		10	10	9	10		4	5	5	5	
CW04	Er05	5	5	5	6		4	4	4	4		5	5	5	5		14	14	14	15		4	4	5	5	
CW04	Mp01	4	4	4	5		4	4	4	4		4	4	4	4		12	12	12	13		5	5	4	4	
CW04	Mp02	5	5	5	5		3	4	4	4		3	4	5	5		11	13	14	14		4	5	5	5	
CW04	Mp03	5	5	4	5		4	4	4	4		5	5	5	5		14	14	13	14		5	5	5	5	
CW04	Mp04	5	5	5	5		4	4	4	4		4	4	4	5		13	13	13	14		5	5	5	5	
CW04	Mp05	5	5	5	5		4	4	4	4		4	4	4	4		13	13	13	13		5	5	4	5	
CW04	Mr01	7	7	7	7		5	4	5	5		5	5	5	5		17	16	17	17		5	5	5	5	
CW05	Cc01	4	5	5	6		3	3	3	3		4	5	5	5		11	13	13	14		5	5	5	5	
CW05	Cc02	1	1	1	1		1	1	1	1		1	1	1	1		3	3	3	3		4	4	4	4	
CW05	Cc03X	2	2	2	2		4	4	3	3		2	2	2	2		8	8	7	7		4	4	4	4	
CW05	Cc04X	4	4	5	5		3	4	4	4		5	5	5	6		12	13	14	15		4	4	4	5	
CW05	Cc05X	5	5	5	5		4	4	4	4		5	5	5	5		14	14	14	14		4	5	4	5	
CW05	Cc06X	5	5	7	7		4	4	5	5		5	6	6	6		14	15	18	18		5	5	5	5	
CW05	Mp01	5	7	7	7		4	4	4	4		5	5	5	5		14	16	16	16		5	5	5	5	
CW05	Mp02	5	7	7	7		4	4	4	5		5	5	5	6		14	16	16	18		5	5	4	5	
CW05	Mp03X	4	4	4	5		4	4	4	4		3	3	4	5		11	11	12	14		5	5	5	5	
CW06	Mr01	7	9	9	9		5	5	5	5		5	5	5	5		17	19	19	19		4	5	5	5	
CW06	Mr08	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
CW06	Mr12	9	7	9	9		5	5	5	5		5	5	5	5		19	17	19	19		4	5	5	5	
CW06	Mr16	9	7	9	9		5	4	5	5		5	4	5	5		19	15	19	19		5	5	5	5	
CW06	Mr28	9	9	9	9		5	5	4	5		4	5	5	5		18	19	18	19		5	5	5	5	
CW07	Er01	4	7	7	7		5	5	5	4		4	4	4	4		13	16	16	15		4	5	4	4	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : SPG2021 onwards (cont).

I. Collard's Wetland sites (cont.). Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland .

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
CW07	Er02	9	7	7	6		5	5	5	5		5	5	5	5		19	17	17	16		5	5	5	5	
CW07	Er03X	7	7	5	4		5	5	5	4		5	5	5	4		17	17	15	12		5	5	4	4	
CW07	Mr19	5	5	5	4		4	4	5	4		5	5	5	5		14	14	15	13		5	5	5	5	
CW07	Mr21	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
CW07	Mr18	7	9	9	7		5	5	5	5		5	5	5	5		17	19	19	17		5	5	5	5	
CW07	Mr13	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		4	5	5	5	
CW07	Mr07	7	7	7	5		4	4	5	5		5	5	5	5		16	16	17	15		4	5	5	5	
CW07	Mr01	9	9	9	7		4	4	5	5		5	5	5	5		18	18	19	17		5	5	5	5	
CW08	Er01	4	4	4	5		4	4	4	4		5	4	4	4		13	12	12	13		5	5	5	4	
CW08	Er02	4	5	5	5		4	4	4	4		4	4	4	4		12	13	13	13		5	5	5	4	
CW08	Er03	5	7	7	6		4	5	4	4		5	5	5	5		14	17	16	15		5	5	5	5	
CW08	Er04	5	5	5	5		4	4	5	5		5	5	6	6		14	14	16	16		5	5	5	5	
CW08	Er05	6	7	9	9		4	4	4	3		5	5	5	6		15	16	18	18		5	5	5	5	
CW08	Mp01	5	4	4	3		4	4	4	4		5	5	5	3		14	13	13	10		4	5	5	5	
CW08	Mp09	2	2	2	2		4	3	3	3		2	2	1	1		8	7	6	6		3	5	5	4	
CW08	Mp15	3	4	4	3		4	4	4	4		3	3	3	2		10	11	11	9		4	5	5	5	
CW08	Mp19	5	5	5	5		4	4	4	4		5	5	5	5		14	14	14	14		4	5	5	4	
CW08	Mp26	4	2	2	2		3	3	3	2		3	2	2	2		10	7	7	6		4	5	5	5	
CW09	Cc01	5	5	7	7		4	4	4	5		5	6	6	7		14	15	17	19		5	5	5	5	
CW09	Cc02	4	4	5	5		4	5	5	5		5	5	5	5		13	14	15	15		5	5	4	5	
CW09	Cc03X	5	5	5	6		4	4	4	4		5	5	7	7		14	14	16	17		5	5	5	4	
CW09	Er01	5	5	7	7		5	5	5	5		5	5	5	5		15	15	17	17		5	5	5	5	
CW09	Mp01	3	3	4	3		4	3	3	3		4	3	3	3		11	9	10	9		4	5	5	5	
CW09	Mp02	4	3	3	3		4	3	3	3		4	2	2	2		12	8	8	8		4	5	5	4	
CW09	Mp03	3	3	1	2		4	3	2	3		3	2	2	2		10	8	5	7		4	5	5	4	
CW09	Mp04	4	4	4	4		4	3	3	4		4	3	3	3		12	10	10	11		4	5	5	4	
CW09	Mp05X	5	7	7	7		4	4	4	4		7	7	7	7		16	18	18	18		4	5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : SPG2021 onwards (cont).

I. Collard's Wetland sites (cont.). Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
CW09	Mp06X	6	5	6	5		4	4	4	4		5	5	5	6		15	14	15	15		4	5	4	4	
CW10	Er01X	3	5	5	6		5	5	5	5		2	4	4	4		10	14	14	15		4	4	4	4	
CW10	Er02X	5	7	7	7		5	5	5	4		5	6	6	6		15	18	18	17		5	5	5	4	
CW10	Er03X	2	2	2	1		4	3	2	2		2	2	2	1		8	7	6	4		4	5	4	4	
CW10	Mr01	5	7	7	5		4	4	4	4		5	5	5	5		14	16	16	14		5	5	5	5	
CW10	Mr02	7	7	7	7		4	4	4	4		5	5	5	5		16	16	16	16		5	5	5	5	
CW10	Mr03X	5	7	7	7		3	4	4	4		5	5	5	5		13	16	16	16		5	5	5	5	
CW11	Er01	4	3	3	3		3	3	3	2		3	2	2	2		10	8	8	7		4	4	4	4	
CW11	Er02	3	3	4	3		4	4	4	4		4	4	4	4		11	11	12	11		4	4	4	5	
CW11	Er03	3	3	3	3		4	4	3	3		4	3	3	3		11	10	9	9		4	4	4	5	
CW11	Er04	4	4	4	4		3	3	3	3		3	4	4	4		10	11	11	11		4	4	4	5	
CW11	Er05	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
CW11	Mp03	3	4	5	5		4	4	4	5		5	4	5	5		12	12	14	15		4	5	5	5	
CW11	Mp05	3	4	4	4		5	5	5	4		4	4	3	3		12	13	12	11		4	5	5	5	
CW11	Mp06	5	4	5	5		3	3	3	3		4	4	4	5		12	11	12	13		5	5	5	5	
CW11	Mp07	4	4	4	4		3	4	4	3		4	4	4	3		11	12	12	10		4	5	5	4	
CW11	Mp10	4	5	5	5		4	4	4	4		4	5	5	5		12	14	14	14		4	5	5	5	
CW12	Cc01	4	4	4	4		4	4	3	4		3	3	3	3		11	11	10	11		4	4	4	4	
CW12	Cc02	4	4	4	3		4	4	4	3		5	5	5	3		13	13	13	9		4	4	4	4	
CW12	Cc03X	5	5	5	5		5	5	5	5		5	5	5	5		15	15	15	15		4	5	4	4	
CW12	Mp01	3	4	3	3		5	5	5	5		4	4	4	4		12	13	12	12		4	5	5	5	
CW12	Mp02	3	3	3	3		3	3	3	2		2	2	2	2		8	8	8	7		3	5	3	3	
CW12	Mp03	3	3	3	3		4	4	4	3		3	4	4	3		10	11	11	9		4	4	5	4	
CW12	Mp04	2	2	2	1		4	4	3	1		1	1	1	1		7	7	6	3		4	5	3	2	
CW12	Mp05	7	7	7	7		4	4	3	3		7	7	7	7		18	18	17	17		5	5	5	5	
CW12	Mp06	3	3	3	3		3	3	2	2		2	2	3	3		8	8	8	8		4	5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : SPG2021 onwards (cont).

II. Boonanarring NR.

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
BNR01	Ba01	5	5	7	5		5	5	5	5		5	5	5	5		15	15	17	15		5	5	5	5	
BNR01	Ba02	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR01	Ba03	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
BNR01	Ba04	7	7	9	9		5	4	5	5		5	5	5	5		17	16	19	19		5	5	5	5	
BNR01	Ba05	7	7	9	9		5	4	4	5		5	5	5	5		17	16	18	19		5	5	5	5	
BNR01	Bm01	3	3	3	4		4	4	4	4		3	3	3	4		10	10	10	12		4	4	5	5	
BNR02	Ba01	5	5	5	5		4	4	4	5		4	4	5	4		13	13	14	14		5	5	5	5	
BNR02	Ba02	9	7	9	9		5	5	5	5		5	5	5	5		19	17	19	19		5	5	5	5	
BNR02	Ba03	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
BNR02	Ba04	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR02	Ba05	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
BNR02	Ba06	5	7	7	7		5	5	5	5		5	5	5	5		15	17	17	17		5	5	5	5	
BNR02	Ba07	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR02	Bm01	7	9	9	9		5	5	5	5		5	5	5	5		17	19	19	19		4	5	5	5	
BNR02	Bm02	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		4	5	5	5	
BNR02	Bm03	4	5	5	5		5	4	5	5		5	5	5	5		14	14	15	15		4	5	5	5	
BNR02	Bm04	9	7	9	9		5	5	5	5		5	5	7	7		19	17	21	21		5	5	5	5	
BNR03	Ba01	3	3	3	3		3	4	4	4		3	3	3	3		9	10	10	10		5	5	5	5	
BNR03	Ba02	4	4	5	5		5	4	4	4		3	3	3	3		12	11	12	12		4	4	5	4	
BNR03	Ba03	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR03	Ba04	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR03	Ba05	4	5	5	4		5	5	5	4		4	4	4	4		13	14	14	12		5	4	4	5	
BNR03	Ba06	4	5	5	5		5	5	4	5		4	5	5	5		13	15	14	15		5	5	5	5	
BNR03	Ba07	5	5	5	5		5	5	5	4		4	5	5	5		14	15	15	14		5	5	5	5	
BNR03	Bm01	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : SPG2021 onwards (cont).

II. Boonanarring NR (cont).

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
BNR03	Bm02	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR03	Bm03X	7	7	7	7		4	5	5	5		5	5	5	5		16	17	17	17		5	5	5	5	
BNR03	Bm04X	5	7	7	7		5	5	5	5		5	5	5	5		15	17	17	17		5	5	5	5	
BNR03	Bm05X	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR04	Ba01	3	3	3	3		5	5	5	5		4	4	5	4		12	12	13	12		5	5	5	4	
BNR04	Ba02	5	5	7	5		5	5	5	5		5	5	5	5		15	15	17	15		5	5	5	5	
BNR04	Ba03X	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR04	Ba04X	7	7	9	9		5	5	5	5		5	5	5	5		17	17	19	19		5	5	5	5	
BNR04	Bm01	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR04	Bm02	7	9	9	9		5	5	5	5		7	7	7	7		19	21	21	21		5	5	5	5	
BNR04	Bm03X	4	4	5	5		5	5	5	5		5	5	5	5		14	14	15	15		4	4	5	5	
BNR04	Bm04X	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
BNR04	Bm05X	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
BNR05	Ba01	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR05	Ba02	7	7	7	7		5	5	5	5		5	5	5	5		17	17	17	17		5	5	5	5	
BNR05	Ba03	9	9	9	9		5	5	5	5		6	6	6	6		20	20	20	20		5	5	5	5	
BNR05	Ba04	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR05	Ba05	3	3	3	3		5	5	5	5		3	3	3	3		11	11	11	11		5	5	5	5	
BNR05	Ba06X	7	7	7	7		4	4	5	5		5	5	5	5		16	16	17	17		5	5	5	5	
BNR05	Bm01X	9	9	9	9		5	5	5	5		5	5	5	6		19	19	19	20		5	5	5	5	
BNR05	Bm02X	9	9	9	9		5	5	5	5		7	7	7	7		21	21	21	21		5	5	5	5	
BNR06	Ba01	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR06	Ba02	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR06	Ba03X	7	7	7	7		5	5	5	5		5	5	5	6		17	17	17	18		5	5	5	5	
BNR06	Ba04X	5	5	7	5		5	5	4	5		5	5	5	3		15	15	16	13		5	5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : SPG2021 onwards (cont).

II. Boonanarring NR (cont).

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
BNR06	Ba05X	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR06	Bm01	5	7	7	7		5	5	5	5		5	5	5	5		15	17	17	17		4	5	5	5	
BNR06	Bm02X	5	7	7	5		5	5	5	5		5	5	5	5		15	17	17	15		5	5	5	5	
BNR06	Bm03X	5	7	7	9		5	5	5	5		5	5	5	5		15	17	17	19		5	5	5	5	
BNR07	Ba01	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	4	
BNR07	Ba02	5	5	5	5		4	5	5	5		4	4	4	4		13	14	14	14		5	5	5	5	
BNR07	Ba03	7	7	7	7		4	5	5	5		5	5	5	6		16	17	17	18		5	4	5	5	
BNR07	Ba04	5	5	7	7		4	4	4	4		5	5	5	5		14	14	16	16		5	5	5	5	
BNR07	Ba05	7	7	9	9		4	5	5	5		5	5	5	7		16	17	19	21		5	5	5	5	
BNR07	Bm01	4	3	3	3		4	4	5	4		3	3	3	2		11	10	11	9		4	4	4	4	
BNR07	Bm02	7	5	7	7		5	5	5	5		5	5	5	5		17	15	17	17		5	5	5	5	
BNR07	Bm03	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR07	Bm04	5	5	5	5		5	5	5	5		5	5	5	5		15	15	15	15		5	5	5	5	
BNR07	Bm05	5	5	4	5		4	4	5	4		5	5	4	4		14	14	13	13		5	4	5	4	
BNR07	Bm06	4	4	7	5		5	4	5	3		4	4	4	5		13	12	16	13		5	5	5	5	
BNR08	Ba01	3	3	3	3		2	2	3	3		2	3	3	3		7	8	9	9		5	5	5	5	
BNR08	Ba02	3	3	4	3		3	3	4	3		3	3	3	3		9	9	11	9		5	5	5	5	
BNR08	Ba03	4	4	4	4		2	3	3	3		3	4	5	4		9	11	12	11		5	5	5	5	
BNR08	Ba04X	4	5	5	5		4	4	4	4		5	5	5	5		13	14	14	14		5	5	5	5	
BNR08	Bm01	3	3	3	4		2	2	3	3		2	2	3	3		7	7	9	10		5	5	5	5	
BNR08	Bm02	5	5	5	5		4	4	4	4		5	5	5	5		14	14	14	14		5	5	5	5	
BNR08	Bm03X	5	5	7	7		4	4	4	4		5	5	5	5		14	14	16	16		5	5	5	5	
BNR08	Bm04X	5	5	7	7		4	4	4	5		5	5	5	5		14	14	16	17		5	5	5	5	
BNR09	Ba01	7	7	9	9		4	4	4	5		5	5	5	5		16	16	18	19		5	5	5	5	
BNR09	Ba02	5	5	5	5		4	4	4	4		5	5	5	5		14	14	14	14		5	5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : SPG2021 onwards (cont).

II. Boonanarring NR (cont).

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
BNR09	Ba03	9	9	9	9		4	4	4	5		5	5	5	6		18	18	18	20		5	5	5	5	
BNR09	Ba04	3	4	4	4		3	3	3	3		4	4	3	4		10	11	10	11		5	5	5	4	
BNR09	Bm01	5	7	7	7		5	5	4	5		5	5	5	5		15	17	16	17		5	5	5	5	
BNR09	Bm02	7	7	9	9		4	4	4	5		7	5	5	6		18	16	18	20		5	5	5	5	
BNR09	Bm03X	5	5	5	7		4	5	4	5		5	5	5	5		14	15	14	17		5	5	5	5	
BNR10	Ba01	5	5	6	7		4	4	5	5		5	5	5	5		14	14	16	17		5	5	5	5	
BNR10	Ba02	2	2	2	2		2	2	3	2		1	1	1	1		5	5	6	5		3	3	5	5	
BNR10	Ba03	5	5	5	5		3	3	3	4		5	4	5	4		13	12	13	13		5	4	5	5	
BNR10	Ba04	5	5	5	5		5	5	5	5		5	4	4	4		15	14	14	14		4	5	5	5	
BNR10	Ba05	7	7	7	9		4	4	5	5		5	5	5	6		16	16	17	20		5	5	5	5	
BNR10	Ba06	7	7	7	7		4	4	4	5		5	5	5	6		16	16	16	18		5	5	5	5	
BNR10	Ba07	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR10	Ba08	5	5	5	5		4	4	4	4		5	5	5	5		14	14	14	14		5	5	5	5	
BNR10	Bm01	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
BNR10	Bm02	7	7	7	9		5	4	5	5		5	5	5	5		17	16	17	19		5	5	5	5	
BNR10	Bm03X	5	3	5	7		5	5	5	5		5	2	5	5		15	10	15	17		5	5	5	4	
BNR11	Ba01	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR11	Ba02	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	
BNR11	Ba03	9	9	9	9		5	5	5	5		7	7	7	7		21	21	21	21		5	5	5	5	
BNR11	Bm01	9	9	9	9		5	4	5	5		5	5	5	6		19	18	19	20		5	5	5	5	
BNR11	Bm02	7	7	9	9		5	5	5	5		5	5	5	4		17	17	19	18		5	5	5	5	
BNR11	Bm03	9	9	9	9		5	5	5	5		5	5	5	5		19	19	19	19		5	5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX THREE Post-commencement of mining tree canopy condition assessment data : SPG2021 onwards (cont).

II. Boonanarring NR (cont).

Orange shading: trees died since first sample; Green shading: new trees included in sampling after Spring 2015 survey.

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

Site[a]	Tree Nos	Proportion of Dead Branches Index (1 to 9)					Degree of Epicormic Growth Index (1 to 5)					Crown density (foliage density) Index (1 to 9)					Crown Assessment Index (3 to 23)					Foliage Health Index (5 to 1)				
		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023		SPG 2021	AUT 2022	SPG 2022	AUT 2023	
BNR11	Bm04	9	9	9	9		4	4	4	5		5	5	5	5		18	18	18	19		5	5	5	5	
BNR11	Bm05	9	9	9	9		4	4	4	5		5	5	5	6		18	18	18	20		5	5	5	5	
BNR11	Bm06	9	9	9	9		4	4	4	5		5	5	5	6		18	18	18	20		5	5	5	5	
BNR12	Ba01	7	7	9	9		5	5	5	5		5	5	5	5		17	17	19	19		5	5	5	5	
BNR12	Ba02	5	7	7	7		3	4	4	5		5	5	5	5		13	16	16	17		5	4	5	5	
BNR12	Ba03X	5	7	7	5		4	4	5	5		5	5	5	5		14	16	17	15		5	5	5	5	
BNR12	Ba04	7	9	9	9		5	5	5	5		5	5	5	5		17	19	19	19		5	5	5	5	
BNR12	Bm01	4	4	4	5		4	4	4	4		4	4	5	5		12	12	13	14		2	3	4	4	
BNR13	Ba01	7	7	7	7		5	5	5	5		5	5	5	6		17	17	17	18		5	5	5	5	
BNR13	Ba02	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR13	Ba03	7	7	9	7		5	5	5	5		5	5	5	5		17	17	19	17		5	5	5	5	
BNR13	Ba04	7	7	7	9		4	4	5	5		5	5	5	5		16	16	17	19		5	5	5	5	
BNR13	Bm01	4	5	5	4		3	3	4	4		4	4	4	4		11	12	13	12		5	5	4	5	
BNR13	Bm02	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR13	Bm03	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
BNR13	Bm04	7	7	9	9		5	5	5	5		5	5		5		17	17	19	19		5	5	5	5	

[a] BWNR: Bartlett's Well Nature Reserve; BNR: Boonanarring Nature Reserve; CW: Collard's Wetland. [b] Ter: Terrestrial; Wet: Wetland (see Table 1).

APPENDIX FOUR. Comparison of means paired two-sample t-test of Autumn 2016 Pre-mining and Autumn 2023 tree canopy assessment scores

Basic data set (for comparison of Autumn2016 and Autumn 2023canopy assessments):

- Trees scored '0' when dead;
- Included trees that died after the Autumn 2016 survey (trees that died between Spring 2015 and were recorded 'dead' in Autumn 2016 were excluded);
- Excluded trees if sampling commenced after Autumn 2016 survey.

In the particular case of Boonanarring NR where not all sites were monitored in Autumn 2016, Autumn 2023 data was also compared to Spring 2018 site data. The data set:

- was revised to include trees dead after Spg18 (exclude trees dead at Spg18) and include new trees recorded before and at Spg18.

1 (i) Boonanarring NR: Terrestrial GDV Sites: crown assessment index (CAI)

A. Boonanarring NR 'T1' Treatment site transect and associated 'Control' site (only 'T1' sites - no 'T2' Autumn 2016 pre-mining data for comparison – sites burnt Spring 2015)

A (a). Boonanarring NR 'T1' Treatment site transect (T1 sites: BNR01, BNR02, BNR04, BNR05, BNR06)

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI AUT16 (1)	34	16.0000	2.8391	8.0606
CAI AUT23 (2)	34	13.7353	7.5451	56.9278

Means Report

VAR	Mean	95% LCL	95% UCL
CAI AUT16 (1)	16.0000	15.0094	16.9906
CAI AUT23 (2)	13.7353	11.1027	16.3679
Mean Difference (1-2)	2.2647	-0.0470	4.5765

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	2.2647
Variance	32.4942
Pearson R	0.4923
Test Statistic	1.9931
Degrees of Freedom	33

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%) 2.0345 p-value 0.0546 H1 (5%) Rejected

CONCLUSION: $|t|<2.0345(t_{0.05(2),\,33})$. Therefore, there was no significant difference in mean CAI of trees in treatment Transect T1 between Autumn 2016 and Autumn 2023.

A (b) Boonanarring NR 'T1' associated Control site (site BNR03)

Compare Means
Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI AUT16 (1)	8	13.6250	2.7223	7.4107
CAI AUT23 (2)	8	10.3750	6.8648	47.1250

Means Report

VAR	Mean	95% LCL	95% UCL
CAI AUT16 (1)	13.6250	11.3491	15.9009
CAI AUT23 (2)	10.3750	4.6359	16.1141
Mean Difference (1-2)	3.2500	-2.8731	9.3731

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	3.2500
Variance	27.2679
Pearson R	0.0239
Test Statistic	1.2551
Degrees of Freedom	7

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	2.3646	p-value	0.2497	H1 (5%)	Rejected

CONCLUSION: $|t|<2.3646(t_{0.05(2),7})$ Therefore no significant difference in CAI between Autumn 2016 and Autumn 2023 at Control site BNR03.

B. Boonanarring NR 'T1' and 'T2' Treatment transects and associated 'Control' sites (Spring 2018 pre-mining data used for comparison - no Autumn 2016 'T2' site pre-mining data available)
(Data set revised to include trees dead after Spring 2018 (exclude trees dead at Spring 2018) and include new trees recorded before and at Spring 2018)

B (a). Boonanarring NR 'T1' and 'T2' Treatment site transects (T1 and T2 sites: BNR01, BNR02, BNR04, BNR05, BNR06, BNR09, BNR10, BNR11, BNR12, BNR13)

Compare Means
Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI SPG18 (1)	78	15.3718	2.7826	7.7431
CAI AUT23 (2)	78	14.5385	6.8484	46.9011

Means Report

VAR	Mean	95% LCL	95% UCL
CAI SPG18 (1)	15.3718	14.7444	15.9992
CAI AUT23 (2)	14.5385	12.9944	16.0825
Mean Difference (1-2)	0.8333	-0.6361	2.3028

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.8333
Variance	27.3221
Pearson R	0.3192
Test Statistic	1.1292
Degrees of Freedom	77

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	1.9913	p-value	0.2623	H1 (5%)	Rejected

<u>CONCLUSION</u>: |t|<1.9913 ($t_{0.05(2),\,77}$) Therefore, there is <u>no significant difference</u> in mean CAI between Spring 2018 and Autumn 2023 at Boonanarring NR transect T1 and T2 treatment sites.

B (b) <u>Boonanarring NR 'T1' and 'T2' associated Control sites (BNR03, BNR07, BNR08)</u>

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI SPG18 (1)	27	11.8148	5.0690	25.6952
CAI AUT23 (2)	27	12.5185	5.5148	30.4131

Means Report

VAR	Mean	95% LCL	95% UCL
CAI SPG18 (1)	11.8148	9.8096	13.8201
CAI AUT23 (2)	12.5185	10.3369	14.7001
Mean Difference (1-2)	-0.7037	-1.9061	3.3135

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	-0.7037
Variance	28.0541
Pearson R	0.2251
Test Statistic	0.5543
Degrees of Freedom	26

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	2.0555	p-value	0.5841	H1 (5%)	Rejected

<u>CONCLUSION</u>: |t|<2.0555 **($t_{0.05(2),\,26}$). Therefore mean CAI actually increased at Boonanarring NR Control sites, although there was <u>no significant difference</u> in mean CAI between Spring 2018 and Autumn 2023.**

1 (ii) Boonanarring NR: Terrestrial GDV Sites: Foliage Health Index (FHI)

A. Boonanarring NR 'T1' Treatment site transect and associated 'Control' site

A (a). Boonanarring NR 'T1' Treatment site transect (T1 sites: BNR01, BNR02, BNR04, BNR05, BNR06)

Compare Means
Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
FH AUT16 (1)	34	4.4118	0.7014	0.4920
FH AUT23 (2)	34	3.9412	2.0441	4.1783

Means Report

VAR	Mean	95% LCL	95% UCL
FH AUT16 (1)	4.4118	4.1670	4.6565
FH AUT23 (2)	3.9412	3.2280	4.6544
Mean Difference (1-2)	0.4706	-0.2070	1.1482

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.4706
Variance	2.3351
Pearson R	0.3133
Test Statistic	1.4129
Degrees of Freedom	33

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	2.0345	p-value	0.1671	H1 (5%)	Rejected

CONCLUSION: $|t|<2.0345$ ($t_{0.05(2),\,33}$). Therefore, there was no significant difference in FHI between Autumn 2016 and Autumn 2023 for 'T1' Treatment transect sites.

A (b) Boonanarring NR 'T1' associated Control site (BNR03)

Compare Means
Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
FH AUT16 (1)	8	4.2500	0.4629	0.2143
FH AUT23 (2)	8	3.6250	2.2638	5.1250

Means Report

VAR	Mean	95% LCL	95% UCL
FH AUT16 (1)	4.2500	3.8630	4.6370
FH AUT23 (2)	3.6250	1.7324	5.5176
Mean Difference (1-2)	0.6250	-1.1590	2.4090

Paired two-sample t-test

Hypothesized Mean Difference	0.0000

Mean Difference	0.6250
Variance	2.6696
Pearson R	0.3749
Test Statistic	0.8284
Degrees of Freedom	7

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	2.3646	p-value	0.4348	H1 (5%)	Rejected

CONCLUSION: $|t|<2.3646(t_{0.05(2),7})$ Therefore, there was no significant difference in FHI between Autumn 2016 and Autumn 2023 for 'T1' Control site BNR03.

B. Boonanarring NR 'T1' and 'T2' Treatment transects and associated 'Control' sites (Spring 2018 pre-mining data used for comparison - no Autumn 2016 'T2' site pre-mining data available)
(Data set revised to include trees dead after Spg18 (exclude trees dead at Spg18) and include new trees recorded before and at Spg18)

B (a). Boonanarring NR 'T1' and 'T2' Treatment site transects (T1 and T2 sites: BNR01, BNR02, BNR04, BNR05, BNR06, BNR09, BNR10, BNR11, BNR12, BNR13)

Compare Means
Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
FH SPG18 (1)	78	4.6282	0.4864	0.2366
FH AUT23 (2)	78	4.1795	1.8072	3.2661

Means Report

VAR	Mean	95% LCL	95% UCL
FH SPG18 (1)	4.6282	4.5185	4.7379
FH AUT23 (2)	4.1795	3.7720	4.5870
Mean Difference (1-2)	0.4487	0.0382	0.8593

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.4487
Variance	1.7513
Pearson R	0.1064
Test Statistic	2.1764
Degrees of Freedom	77

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	1.9913	p-value	0.0326	H1 (5%)	Accepted

CONCLUSION: $|t|>1.9913$ $(t_{0.05(2),77})$. Therefore, there was a significant decrease in foliage health index of trees along treatment transects T1 and T2 between Spring 2018 and Autumn 2023.

B (b) Boonanarring NR 'T1' and 'T2' associated Control sites (BNR03, BNR07, BNR08)

Compare Means
Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
FH SPG18 (1)	27	4.4444	0.6405	0.4103
FH AUT23 (2)	27	4.2963	1.5888	2.5242

Means Report

VAR	Mean	95% LCL	95% UCL
FH SPG18 (1)	4.4444	4.1911	4.6978
FH AUT23 (2)	4.2963	3.6678	4.9248
Mean Difference (1-2)	0.1481	-0.4081	0.7044

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.1481
Variance	1.4672
Pearson R	0.4703
Test Statistic	0.5475
Degrees of Freedom	26

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)
t Critical Value (5%) 2.0555 p-value0.5887 H1 (5%) Rejected

CONCLUSION: |t|<2.0555 ($t_{0.05(2),\,26}$) Therefore there was no significant difference in foliage health index between Spring 2018 and Autumn 2023 at Boonanarring NR Control sites.

2 (i) Collard's Wetland Sites : crown assessment index

(a) Collard's Wetland sites: All tree species

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI AUT16 (1)	95	15.0737	3.2065	10.2817
CAI AUT23 (2)	95	13.8211	4.8113	23.1485

Means Report

VAR	Mean	95% LCL	95% UCL
CAI AUT16 (1)	15.0737	14.4205	15.7269
CAI AUT23 (2)	13.8211	12.8409	14.8012
Mean Difference (1-2)	1.2526	0.5188	1.9865

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	1.2526
Variance	16.7151
Pearson R	0.6628
Test Statistic	3.3891
Degrees of Freedom	94

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%) 1.9855 p-value 0.0010 H1 (5%) Accepted

CONCLUSION: $|t|>1.9855$ ($t_{0.05(2),\,94}$). Therefore there was a significant decrease in the mean CAI for all tree species at Collard's Wetland sites between Autumn 2016 and Autumn 2023.

(b) Collard's Wetland sites: *Melaleuca preissiana*

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI AUT16 (1)	36	14.8333	3.4434	11.8571
CAI AUT23 (2)	36	12.7222	4.3858	19.2349

Means Report

VAR	Mean	95% LCL	95% UCL
CAI AUT16 (1)	14.8333	13.6682	15.9984
CAI AUT23 (2)	12.7222	11.2383	14.2062
Mean Difference (1-2)	2.1111	0.9594	3.2629

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	2.1111
Variance	15.5460
Pearson R	0.6458
Test Statistic	3.7211
Degrees of Freedom	35

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)
t Critical Value (5%) 2.0301 p-value 0.0007 H1 (5%) Accepted

CONCLUSION: |t|>2.0301 ($t_{0.05(2),\ 35}$). Therefore there was a significant decrease in the mean CAI for all *Melaleuca preissiana* trees at Collard's Wetland sites between Autumn 2016 and Autumn 2023.

(c) Collard's Wetland sites: *Melaleuca rhaphiophylla*
Compare Means
Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI AUT16 (1)	25	17.5200	1.8055	3.2600
CAI AUT23 (2)	25	17.8800	1.9434	3.7767

Means Report

VAR	Mean	95% LCL	95% UCL
CAI AUT16 (1)	17.5200	16.7747	18.2653
CAI AUT23 (2)	17.8800	17.0778	18.6822
Mean Difference (1-2)	-0.3600	-0.3636	1.0836

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	-0.3600
Variance	3.5183
Pearson R	0.5648
Test Statistic	1.0268
Degrees of Freedom	24

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)
t Critical Value (5%) 2.0639 p-value0.3148 H1 (5%) Rejected

CONCLUSION: |t|<2.0639 ($t_{0.05(2),\ 24}$) Therefore, no significant difference in *Melaleuca rhaphiophylla* crown assessment index between Autumn 2016 and Autumn 2023.

(d) Collard's Wetland sites: *Corymbia calophylla*
Compare Means
Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI AUT16 (1)	8	12.1250	2.6959	7.2679
CAI AUT23 (2)	8	11.8750	5.3835	28.9821

Means Report

VAR	Mean	95% LCL	95% UCL
CAI AUT16 (1)	12.1250	9.8712	14.3788
CAI AUT23 (2)	11.8750	7.3743	16.3757
Mean Difference (1-2)	0.2500	-3.4553	3.9553

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.2500
Variance	18.1250
Pearson R	0.5721
Test Statistic	0.1595
Degrees of Freedom	7

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	2.3646	p-value	0.8777	H1 (5%)	Rejected

<u>CONCLUSION</u>: |t|<2.3646 ($t_{0.05(2),\,7}$) Therefore no significant difference in *Corymbia calophylla* crown assessment index between Autumn 2016 and Autumn 2023.

<u>(e) Collard's Wetland sites: *Eucalyptus rudis*</u>

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
CAI AUT16 (1)	26	13.9615	2.5997	6.7585
CAI AUT23 (2)	26	12.0385	5.0634	25.6385

Means Report

VAR	Mean	95% LCL	95% UCL
CAI AUT16 (1)	13.9615	12.9115	15.0116
CAI AUT23 (2)	12.0385	9.9933	14.0836
Mean Difference (1-2)	1.9231	0.1315	3.7146

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	1.9231
Variance	16.1985
Pearson R	0.4833
Test Statistic	2.2107
Degrees of Freedom	25

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	2.0595	p-value	0.0364	H1 (5%)	Accepted

<u>CONCLUSION</u>: |t|>2.0595 ($t_{0.05(2),\,25}$). Therefore there was a <u>significant decrease</u> in the mean CAI for all *Eucalyptus rudis* trees at Collard's Wetland sites between Autumn 2016 and Autumn 2023.

4 (ii) Collard's Wetland Sites : foliage health index (FHI)

(a) Collard's Wetland sites: All tree species

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
FH AUT16 (1)	95	4.7053	0.4583	0.2101
FH AUT23 (2)	95	4.6211	0.8652	0.7485

Means Report

VAR	Mean	95% LCL	95% UCL
FH AUT16 (1)	4.7053	4.6119	4.7986
FH AUT23 (2)	4.6211	4.4448	4.7973
Mean Difference (1-2)	0.0842	-0.0776	0.2460

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.0842
Variance	0.4793
Pearson R	0.4129
Test Statistic	1.0332
Degrees of Freedom	94

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%) 1.9855 p-value 0.3042 H1 (5%) Rejected

CONCLUSION: $|t|<1.9855$ ($t_{0.05(2),\,94}$) Therefore no significant difference in foliage health index between Autumn 2016 and Autumn 2023.

(b) Collard's Wetland sites: *Melaleuca preissiana*

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
FH AUT16 (1)	36	4.6667	0.4781	0.2286
FH AUT23 (2)	36	4.6389	0.6825	0.4659

Means Report

VAR	Mean	95% LCL	95% UCL
FH AUT16 (1)	4.6667	4.5049	4.8284
FH AUT23 (2)	4.6389	4.4079	4.8698
Mean Difference (1-2)	0.0278	-0.1935	0.2491

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.0278
Variance	0.3472
Pearson R	0.4086
Test Statistic	0.2548

Degrees of Freedom	35				

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	2.0301	p-value	0.8004	H1 (5%)	Rejected

CONCLUSION: |t|<2.0301 ($t_{0.05(2),35}$) Therefore no significant difference in foliage health index between Autumn 2016 and Autumn 2023.

(c) Collard's Wetland sites: *Melaleuca rhaphiophylla*

Very little difference in Autumn 2016 and Autumn 2023 foliage health index values, such that statistics package could not apply the comparison of means t-test to the *Melaleuca rhaphiophylla* FHI data (SD<=0).

CONCLUSION: No significant difference in *Melaleuca rhaphiophylla* foliage health index between Autumn 2016 and Autumn 2023.

(d) Collard's Wetland sites: *Corymbia calophylla*

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
FH AUT16 (1)	8	4.5000	0.5345	0.2857
FH AUT23 (2)	8	4.3750	0.5175	0.2679

Means Report

VAR	Mean	95% LCL	95% UCL
FH AUT16 (1)	4.5000	4.0531	4.9469
FH AUT23 (2)	4.3750	3.9423	4.8077
Mean Difference (1-2)	0.1250	-0.4108	0.6608

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.1250
Variance	0.2768
Pearson R	0.2582
Test Statistic	0.5517
Degrees of Freedom	7

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%)	2.3646	p-value	0.5983	H1 (5%)	Rejected

CONCLUSION: |t| <2.3646($t_{0.05(2),7}$). Therefore no significant difference in *Corymbia calophylla* foliage health index between Autumn 2016 and Autumn 2023.

(e) Collard's Wetland sites: *Eucalyptus rudis*

Compare Means

Descriptive Statistics

VAR	N	Mean	Std Dev	Variance
FH AUT16 (1)	26	4.5769	0.5038	0.2538
FH AUT23 (2)	26	4.3077	1.3496	1.8215

Means Report

VAR	Mean	95% LCL	95% UCL
FH AUT16 (1)	4.5769	4.3734	4.7804
FH AUT23 (2)	4.3077	3.7626	4.8528
Mean Difference (1-2)	0.2692	-0.2360	0.7745

Paired two-sample t-test

Hypothesized Mean Difference	0.0000
Mean Difference	0.2692
Variance	1.0377
Pearson R	0.3756
Test Statistic	1.0975
Degrees of Freedom	25

H1: Mu1 - Mu2 ≠ 0 / Not equal (two-tailed)

t Critical Value (5%) 2.0595 p-value 0.2829 H1 (5%) Rejected

<u>CONCLUSION</u>: |t| <2.0595($t_{0.05(2),\,25}$). Therefore there is <u>no significant difference</u> in *Eucalyptus rudis* foliage health index between Autumn 2016 and Autumn 2023.

APPENDIX FIVE. Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species. Pre-mining data (From dataset that included trees that died after commencement of monitoring in Spring 2015 (scored '0') and excluded monitoring trees introduced after Spring 2015).

Site[a] / Tree species[b]	Tree Nos	Crown Assessment Index								Foliage Health Index (FHI)							
		Spring 2015		Autmn 2016		Spring 2017		Spring 2018		Spring 2015		Autmn 2016		Spring 2017		Spring 2018	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BNR01	6	16.3	2.7	15.8	3.3	15.7	4.1	15.0	3.6	4.8	0.4	4.2	1.2	4.2	0.8	4.7	0.5
Ba	5	16.6	3.0	16.6	3.0	17.0	2.8	16.2	2.3	5.0	0.0	4.6	0.5	4.4	0.5	4.8	0.4
Bm	1	15.0	na	12.0	na	9.0	na	9.0	na	4.0	na	2.0	na	3.0	na	4.0	na
BNR02	11	16.5	1.6	16.8	1.9	16.8	1.9	17.0	1.9	4.9	0.3	4.5	0.5	4.4	0.5	4.7	0.5
Ba	7	16.7	1.8	17.0	2.0	16.9	2.2	16.9	2.2	5.0	0.0	4.7	0.5	4.6	0.5	4.7	0.5
Bm	4	16.0	1.4	16.5	2.1	16.8	1.7	17.3	1.7	4.8	0.5	4.3	0.5	4.0	0.0	4.8	0.5
BNR03	8	13.8	2.1	8.4	7.4	8.6	7.6	7.6	6.9	4.0	0.8	2.5	2.1	2.5	2.1	2.3	1.9
Ba	5	13.2	1.9	10.0	6.2	10.4	6.5	8.8	5.6	4.0	0.7	3.2	1.8	3.2	1.8	2.8	1.6
Bm	3	14.7	2.5	5.7	9.8	5.7	9.8	5.7	9.8	4.0	1.0	1.3	2.3	1.3	2.3	1.3	2.3
BNR04	6	15.0	3.3	12.5	7.0	12.5	6.9	12.0	6.3	4.3	0.5	3.7	1.9	3.5	1.8	3.8	1.9
Ba	3	13.7	4.2	13.7	4.2	14.3	4.6	14.3	3.1	4.3	0.6	4.3	0.6	4.3	0.6	4.7	0.6
Bm	3	16.3	2.3	11.3	10.0	10.7	9.3	9.7	8.5	4.3	0.6	3.0	2.6	2.7	2.3	3.0	2.6
BNR05	7	16.1	3.8	15.6	4.0	15.6	4.0	13.7	7.0	4.6	0.5	4.4	0.8	4.1	0.7	3.9	1.8
Ba	5	15.4	4.3	14.6	4.3	14.6	4.3	11.6	7.4	4.6	0.5	4.4	0.9	4.2	0.8	3.8	2.2
Bm	2	18.0	1.4	18.0	1.4	18.0	1.4	19.0	0.0	4.5	0.7	4.5	0.7	4.0	0.0	4.0	0.0
BNR06	6	15.7	1.6	13.3	6.7	12.7	6.5	12.8	6.7	4.5	0.5	3.7	1.9	3.7	1.9	3.3	1.6
Ba	3	15.7	2.3	10.0	8.9	9.7	8.7	9.3	8.6	4.7	0.6	3.0	2.6	3.0	2.6	2.7	2.3
Bm	3	15.7	1.2	16.7	0.6	15.7	1.2	16.3	1.2	4.3	0.6	4.3	0.6	4.3	0.6	4.0	0.0
BNR07	11							15.5	1.9							4.5	0.5
Ba	5							15.6	2.7							4.6	0.5
Bm	6							15.5	1.2							4.5	0.5
BNR08	8							5.0	0.0							5.0	0.0
Ba	4							5.0	0.0							5.0	0.0
Bm	4							5.0	0.0							5.0	0.0

APPENDIX FIVE (cont). Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species. Pre-mining data (From dataset that included trees that died after commencement of monitoring in Spring 2015 (scored '0') and excluded monitoring trees introduced after Spring 2015).

Site[a] / Tree species[b]	Tree Nos	Crown Assessment Index								Foliage Health Index (FHI)							
		Spring 2015		Autmn 2016		Spring 2017		Spring 2018		Spring 2015		Autmn 2016		Spring 2017		Spring 2018	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BNR09	7							11.9	1.3							5.0	0.0
Ba	4							11.3	1.0							5.0	0.0
Bm	3							12.7	1.5							5.0	0.0
BNR10	11							14.0	2.4							4.6	0.5
Ba	8							13.3	2.4							4.5	0.5
Bm	3							16.0	1.0							5.0	0.0
BNR11	9							17.4	1.7							4.7	0.5
Ba	3							18.7	0.6							4.7	0.6
Bm	6							16.8	1.8							4.7	0.5
BNR12	5							16.0	1.6							4.6	0.5
Ba	4							16.0	1.8							4.8	0.5
Bm	1							16.0	na							4.0	na
BNR13	8							15.0	2.4							4.6	0.5
Ba	4							15.3	2.1							4.5	0.6
Bm	4							14.8	3.0							4.8	0.5
CW01	8	19.3	1.7	19.4	1.8	19.5	1.8			5.0	0.0	5.0	0.0	5.0	0.0		
Mp	8	19.3	1.7	19.4	1.8	19.5	1.8			5.0	0.0	5.0	0.0	5.0	0.0		
CW02	8	16.3	3.7	16.6	2.4	15.9	3.1			5.0	0.0	5.0	0.0	4.8	0.5		
Er	3	12.3	3.2	14.3	2.1	13.3	4.0			5.0	0.0	5.0	0.0	4.3	0.6		
Mr	5	18.6	0.9	18.0	1.4	17.4	0.9			5.0	0.0	5.0	0.0	5.0	0.0		
CW03	8	15.0	4.6	14.6	4.6	13.3	5.2			5.0	0.0	4.9	0.4	4.5	1.1		
Er	3	9.7	2.1	9.7	2.1	7.3	2.1			5.0	0.0	4.7	0.6	3.7	1.5		
Mr	5	18.2	1.1	17.6	2.2	16.8	1.8			5.0	0.0	5.0	0.0	5.0	0.0		
CW04	11	14.6	2.7	13.9	2.6	13.1	2.6			4.5	0.5	4.5	0.5	4.6	0.5		
Er	5	14.0	2.9	13.4	2.9	12.4	3.0			4.2	0.4	4.2	0.4	4.2	0.4		
Mp	5	14.8	2.9	14.0	2.7	13.6	2.5			4.8	0.4	4.8	0.4	5.0	0.0		
Mr	1	17.0	na	16.0	na	14.0	na			5.0	na	5.0	na	5.0	na		

APPENDIX FIVE (cont). Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species.

Pre-mining data (From dataset that included trees that died after commencement of monitoring in Spring 2015 (scored '0') and excluded monitoring trees introduced after Spring 2015).

Site[a] / Tree species[b]	Tree Count	Crown Assessment Index								Foliage Health Index (FHI)							
		Spring 2015		Autmn2016		Spring 2017		Spring 2018		Spring 2015		Autmn 2016		Spring 2017		Spring 2018	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
CW05	6	13.2	4.0	12.3	4.0	12.0	4.5			4.8	0.4	4.8	0.4	4.8	0.4		
Cc	3	10.7	3.1	10.0	2.6	9.3	3.5			4.7	0.6	4.7	0.6	4.7	0.6		
Mp	3	15.7	3.5	14.7	4.2	14.7	4.2			5.0	0.0	5.0	0.0	5.0	0.0		
CW06	5	19.0	0.0	18.2	1.1	17.8	1.1			5.0	0.0	4.8	0.4	4.8	0.4		
Mr	5	19.0	0.0	18.2	1.1	17.8	1.1			5.0	0.0	4.8	0.4	4.8	0.4		
CW07	7	17.1	2.3	17.0	2.5	16.4	1.6			5.0	0.0	4.9	0.4	4.9	0.4		
Er	1	15.0	na	14.0	na	14.0	na			5.0	na	4.0	na	4.0	na		
Mr	6	17.5	2.3	17.5	2.3	16.8	1.3			5.0	0.0	5.0	0.0	5.0	0.0		
CW08	10	16.1	1.4	15.9	1.0	15.7	1.8			5.0	0.0	5.0	0.0	5.0	0.0		
Er	5	16.4	0.9	16.2	0.4	16.4	0.5			5.0	0.0	5.0	0.0	5.0	0.0		
Mp	5	15.8	1.8	15.6	1.3	15.0	2.4			5.0	0.0	5.0	0.0	5.0	0.0		
CW09	8	13.8	1.8	13.4	2.4	12.4	2.6			4.6	0.5	4.3	0.5	4.1	0.4		
Cc	3	13.7	2.3	12.7	2.3	13.0	2.6			4.3	0.6	4.3	0.6	4.0	0.0		
Er	1	15.0	na	17.0	na	15.0	na			5.0	na	5.0	na	5.0	na		
Mp	4	13.5	1.9	13.0	2.2	11.3	2.5			4.8	0.5	4.0	0.0	4.0	0.0		
CW10	6	16.8	1.0	15.5	1.6	15.8	1.2			4.8	0.4	4.7	0.5	4.5	0.5		
Er	3	16.3	1.2	15.0	1.7	15.3	1.5			4.7	0.6	4.3	0.6	4.0	0.0		
Mr	3	17.3	0.6	16.0	1.7	16.3	0.6			5.0	0.0	5.0	0.0	5.0	0.0		
CW11	10	14.2	1.3	13.3	2.2	13.2	2.1			4.4	0.7	4.4	0.5	4.3	0.8		
Er	5	14.0	1.2	13.4	1.9	13.2	1.9			4.4	0.5	4.4	0.5	4.6	0.5		
Mp	5	14.4	1.5	13.2	2.6	13.2	2.6			4.4	0.9	4.4	0.5	4.0	1.0		
CW12	8	13.1	1.8	12.3	2.0	11.5	3.8			4.0	0.5	4.4	0.5	4.1	0.6		
Cc	2	14.5	0.7	14.5	0.7	15.0	0.0			4.0	0.0	4.5	0.7	4.0	0.0		
Mp	6	12.7	1.9	11.5	1.6	10.3	3.7			4.0	0.6	4.3	0.5	4.2	0.8		
TOTAL trees	198																

APPENDIX FIVE (cont). Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species. Post commencement of mining data. (From dataset that included trees that died after commencement of monitoring in Spring 2015 (scored '0') and excluded monitoring trees introduced after Spring 2015).

Site[a] / Tree species[b]	Tree Nos	Crown Assessment Index										Foliage Health Index (FHI)									
		Autumn 2019		Spring 2019		Autumn 2020		Spring 2020		Autumn 2021		Autumn 2019		Spring 2019		Autumn 2020		Spring 2020		Autumn 2021	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BNR01	6	15.7	3.0	15.7	3.0	16.3	3.3	15.8	3.5	12.7	6.9	4.3	0.5	4.3	0.5	4.7	0.5	4.8	0.4	3.8	1.9
Ba	5	16.6	2.2	16.6	2.2	17.6	1.3	17.2	1.1	13.2	7.6	4.4	0.5	4.4	0.5	4.8	0.4	5.0	0.0	3.8	2.2
Bm	1	11.0	na	11.0	na	10.0	na	9.0	na	10.0	na	4.0	na	4.0	na	4.0	na	4.0	na	4.0	na
BNR02	11	16.9	1.9	16.7	2.0	17.0	1.8	17.5	1.9	14.2	7.3	4.4	0.5	4.5	0.5	4.5	0.5	5.0	0.0	3.7	1.9
Ba	7	16.9	2.2	16.6	2.2	17.0	2.1	17.4	2.0	12.4	8.7	4.3	0.5	4.6	0.5	4.7	0.5	5.0	0.0	3.4	2.4
Bm	4	17.0	1.6	17.0	1.6	17.0	1.6	17.5	1.9	17.3	2.4	4.5	0.6	4.5	0.6	4.3	0.5	5.0	0.0	4.3	0.5
BNR03	8	6.5	7.4	6.6	7.5	6.6	7.5	6.3	7.1	6.0	6.6	1.9	2.0	2.0	2.1	2.0	2.1	2.3	2.4	2.0	2.2
Ba	5	7.0	6.9	7.2	7.0	7.2	7.0	6.6	6.4	6.6	6.2	2.2	2.0	2.4	2.2	2.4	2.2	2.6	2.4	2.4	2.3
Bm	3	5.7	9.8	5.7	9.8	5.7	9.8	5.7	9.8	5.0	8.7	1.3	2.3	1.3	2.3	1.3	2.3	1.7	2.9	1.3	2.3
BNR04	6	11.8	6.4	12.5	6.7	12.8	7.0	13.0	7.2	10.7	8.9	3.5	1.8	3.5	1.8	3.7	1.9	3.3	1.8	2.8	2.2
Ba	3	13.7	4.2	14.0	3.0	14.7	4.0	14.3	3.1	9.3	8.6	4.3	0.6	4.3	0.6	4.3	0.6	4.3	0.6	2.7	2.3
Bm	3	10.0	8.7	11.0	9.8	11.0	9.8	11.7	10.7	12.0	10.8	2.7	2.3	2.7	2.3	3.0	2.6	2.3	2.1	3.0	2.6
BNR05	7	13.7	7.0	14.0	7.0	13.9	7.2	13.6	7.2	12.4	9.1	4.0	1.8	4.0	1.8	4.1	1.9	3.7	1.8	3.6	2.4
Ba	5	11.6	7.4	12.0	7.4	11.6	7.4	11.4	7.4	9.4	9.1	3.8	2.2	3.8	2.2	3.8	2.2	3.4	2.1	3.0	2.7
Bm	2	19.0	0.0	19.0	0.0	19.5	0.7	19.0	2.8	20.0	1.4	4.5	0.7	4.5	0.7	5.0	0.0	4.5	0.7	5.0	0.0
BNR06	6	13.2	6.7	13.5	6.7	13.7	6.8	13.7	6.8	10.7	8.3	3.3	1.6	3.5	1.8	3.8	1.9	3.3	1.6	2.7	2.1
Ba	3	9.7	8.7	10.3	9.1	10.3	9.1	10.3	9.1	5.7	9.8	2.7	2.3	2.7	2.3	3.0	2.6	2.7	2.3	1.3	2.3
Bm	3	16.7	0.6	16.7	0.6	17.0	0.0	17.0	0.0	15.7	1.2	4.0	0.0	4.3	0.6	4.7	0.6	4.0	0.0	4.0	0.0
BNR07	11	15.2	2.4	14.6	2.6	14.5	2.9	14.1	3.3	13.1	4.9	4.5	0.5	4.3	0.6	4.4	0.5	4.8	0.4	3.8	1.4
Ba	5	15.6	2.7	15.4	2.1	15.4	2.1	15.8	2.6	15.6	2.4	4.4	0.5	4.6	0.5	4.4	0.5	4.8	0.4	4.4	0.5
Bm	6	14.8	2.2	14.0	3.0	13.8	3.4	12.7	3.3	11.0	5.7	4.7	0.5	4.0	0.6	4.3	0.5	4.8	0.4	3.3	1.8
BNR08	8	5.8	1.5	7.8	2.1	9.9	1.6	9.6	2.5	10.1	2.9	5.0	0.0	5.0	0.0	5.0	0.0	4.9	0.4	4.8	0.5
Ba	4	5.0	0.0	7.0	0.0	9.0	0.8	8.0	1.4	8.8	2.2	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0
Bm	4	6.5	1.9	8.5	3.0	10.8	1.9	11.3	2.4	11.5	3.0	5.0	0.0	5.0	0.0	5.0	0.0	4.8	0.5	4.5	0.6

APPENDIX FIVE (cont). Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species. Post commencement of mining data. (From dataset that included trees that died after commencement of monitoring in Spring 2015 (scored '0') and excluded monitoring trees introduced after Spring 2015).

Site[a] / Tree species[b]	Tree Nos	Crown Assessment Index										Foliage Health Index (FHI)									
		Autmn 2019		Spring 2019		Autmn 2020		Spring 2020		Autmn 2021		Autmn 2019		Spring 2019		Autmn 2020		Spring 2020		Autmn 2021	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BNR09	7	11.0	1.8	11.4	2.1	12.4	2.9	14.1	3.7	14.9	3.6	4.9	0.4	4.7	0.5	4.6	0.5	4.7	0.5	4.6	0.5
Ba	4	10.3	1.7	10.5	2.4	11.3	2.8	13.0	4.2	14.0	3.9	5.0	0.0	4.8	0.5	4.3	0.5	4.8	0.5	4.8	0.5
Bm	3	12.0	1.7	12.7	1.2	14.0	2.6	15.7	2.9	16.0	3.5	4.7	0.6	4.7	0.6	5.0	0.0	4.7	0.6	4.3	0.6
BNR10	11	13.9	2.4	13.3	3.0	14.0	3.4	12.8	5.7	13.2	5.7	4.5	0.5	4.3	0.6	4.0	0.6	3.6	1.4	4.0	1.4
Ba	8	13.1	2.3	12.5	3.0	13.1	3.6	11.5	6.3	11.6	6.0	4.5	0.5	4.3	0.7	3.9	0.6	3.5	1.7	3.9	1.6
Bm	3	16.0	1.0	15.3	2.1	16.3	0.6	16.3	0.6	17.3	1.5	4.3	0.6	4.3	0.6	4.3	0.6	4.0	0.0	4.3	0.6
BNR11	9	17.8	2.2	17.9	1.9	18.0	1.5	18.4	1.4	16.6	6.3	4.3	0.5	4.3	0.5	4.4	0.5	4.1	0.3	3.8	1.5
Ba	3	20.0	1.0	20.0	1.0	19.0	2.0	19.7	1.2	13.3	11.6	4.3	0.6	4.7	0.6	4.3	0.6	4.0	0.0	3.0	2.6
Bm	6	16.7	1.6	16.8	1.2	17.5	1.0	17.8	1.2	18.2	0.8	4.3	0.5	4.2	0.4	4.5	0.5	4.2	0.4	4.2	0.4
BNR12	5	15.6	2.1	16.8	2.3	16.2	1.5	16.0	1.6	15.8	1.3	4.4	0.5	4.4	0.5	4.2	0.4	4.0	0.0	4.0	0.0
Ba	4	15.5	2.4	17.0	2.6	16.3	1.7	16.0	1.8	15.8	1.5	4.5	0.6	4.5	0.6	4.3	0.5	4.0	0.0	4.0	0.0
Bm	1	16.0	na	16.0	na	16.0	na	16.0	na	16.0	na	4.0	na	4.0	na	4.0	na	4.0	na	4.0	na
BNR13	8	14.8	2.1	15.1	1.7	16.3	1.9	16.5	2.1	9.4	8.0	4.5	0.5	4.6	0.5	4.9	0.4	4.6	0.5	2.8	2.3
Ba	4	15.3	2.1	15.8	1.5	16.8	2.1	16.5	2.1	11.8	7.9	4.3	0.5	4.5	0.6	5.0	0.0	4.5	0.6	3.3	2.2
Bm	4	14.3	2.4	14.5	1.9	15.8	1.9	16.5	2.5	7.0	8.4	4.8	0.5	4.8	0.5	4.8	0.5	4.8	0.5	2.3	2.6
CW01	8	18.9	1.7	18.9	1.7	19.0	1.9	18.5	1.6	18.6	1.8	5.0	0.0	5.0	0.0	5.0	0.0	4.9	0.4	5.0	0.0
Mp	8	18.9	1.7	18.9	1.7	19.0	1.9	18.5	1.6	18.6	1.8	5.0	0.0	5.0	0.0	5.0	0.0	4.9	0.4	5.0	0.0
CW02	8	15.3	3.3	15.3	3.3	16.4	2.4	16.6	2.2	17.4	1.7	4.8	0.5	4.8	0.5	5.0	0.0	5.0	0.0	5.0	0.0
Er	3	11.7	2.5	11.7	2.5	14.0	2.0	14.7	2.3	16.0	1.7	4.3	0.6	4.3	0.6	5.0	0.0	5.0	0.0	5.0	0.0
Mr	5	17.4	0.9	17.4	0.9	17.8	1.1	17.8	1.1	18.2	1.1	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0
CW03	8	13.9	5.5	13.0	5.5	13.3	6.7	14.0	5.7	14.1	6.7	4.5	1.1	4.5	1.1	4.8	0.7	4.9	0.4	4.4	1.8
Er	3	8.7	5.5	7.0	3.5	5.7	2.5	8.0	3.6	7.3	6.4	3.7	1.5	3.7	1.5	4.3	1.2	4.7	0.6	3.3	2.9
Mr	5	17.0	2.1	16.6	1.8	17.8	2.6	17.6	2.6	18.2	1.8	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0
CW04	11	11.7	2.8	10.9	3.2	11.3	3.4	11.5	3.2	11.9	2.7	4.6	0.5	4.5	0.5	4.8	0.4	4.6	0.5	4.8	0.4
Er	5	9.0	1.4	8.0	2.2	8.8	2.9	9.4	2.7	10.6	2.6	4.2	0.4	4.2	0.4	4.8	0.4	5.0	0.0	4.6	0.5
Mp	5	14.0	0.7	13.2	1.3	12.6	1.8	12.6	1.8	12.2	1.6	5.0	0.0	4.8	0.4	4.8	0.4	4.2	0.4	5.0	0.0
Mr	1	14.0	na	14.0	na	17.0	na	17.0	na	17.0	na	5.0	na	5.0	na	5.0	na	5.0	na	5.0	na

APPENDIX FIVE (cont). Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species. Post commencement of mining data. (From dataset that included trees that died after commencement of monitoring in Spring 2015 (scored '0') and excluded monitoring trees introduced after Spring 2015).

Site[a] / Tree species[b]	Tree Nos	Crown Assessment Index										Foliage Health Index (FHI)									
		Autmn 2019		Spring 2019		Autmn 2020		Spring 2020		Autmn 2021		Autmn 2019		Spring 2019		Autmn 2020		Spring 2020		Autmn 2021	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
CW05	6	10.8	4.8	11.2	5.0	10.7	5.3	11.3	5.5	10.5	5.5	4.5	0.5	4.5	0.5	4.8	0.4	4.5	0.5	4.5	0.5
Cc	3	7.7	3.5	7.7	3.1	7.3	4.5	7.7	4.0	6.7	4.7	4.0	0.0	4.0	0.0	4.7	0.6	4.0	0.0	4.0	0.0
Mp	3	14.0	4.0	14.7	4.2	14.0	4.0	15.0	4.4	14.3	2.9	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0
CW06	5	17.4	0.9	17.8	1.1	18.6	0.9	18.6	0.9	18.2	1.1	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0
Mr	5	17.4	0.9	17.8	1.1	18.6	0.9	18.6	0.9	18.2	1.1	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0
CW07	7	17.1	1.7	16.9	1.9	17.1	2.0	17.4	1.8	17.4	1.8	5.0	0.0	4.9	0.4	5.0	0.0	5.0	0.0	5.0	0.0
Er	1	14.0	na	15.0	na	15.0	na	17.0	na	17.0	na	5.0	na	4.0	na	5.0	na	5.0	na	5.0	na
Mr	6	17.7	1.0	17.2	1.8	17.5	2.0	17.5	2.0	17.5	2.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0
CW08	10	14.3	2.0	13.6	2.2	13.4	2.5	12.7	2.9	13.0	3.1	5.0	0.0	4.8	0.4	5.0	0.0	5.0	0.0	4.5	0.7
Er	5	14.4	1.5	13.6	1.8	14.2	2.0	14.6	1.3	14.8	2.3	5.0	0.0	4.6	0.5	5.0	0.0	5.0	0.0	4.8	0.4
Mp	5	14.2	2.6	13.6	2.7	12.6	2.8	10.8	2.9	11.2	2.8	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	4.2	0.8
CW09	8	12.5	2.3	11.8	2.3	11.8	1.7	11.8	1.7	12.3	1.6	4.5	0.8	4.4	0.5	4.5	0.5	4.4	0.5	4.3	0.5
Cc	3	13.0	2.6	13.0	2.6	12.0	1.7	12.0	1.7	13.0	0.0	5.0	0.0	4.7	0.6	4.7	0.6	4.7	0.6	4.3	0.6
Er	1	15.0	na	14.0	na	14.0	na	14.0	na	14.0	na	5.0	na	4.0	na	5.0	na	5.0	na	5.0	na
Mp	4	11.5	1.9	10.3	1.0	11.0	1.4	11.0	1.4	11.3	1.7	4.0	0.8	4.3	0.5	4.3	0.5	4.0	0.0	4.0	0.0
CW10	6	12.8	4.4	12.3	4.9	13.0	4.1	12.8	4.0	12.8	4.2	4.2	1.0	4.0	1.1	4.8	0.4	4.8	0.4	4.7	0.5
Er	3	9.3	3.5	8.3	3.5	9.7	3.1	9.7	3.1	9.7	3.8	3.3	0.6	3.0	0.0	4.7	0.6	4.7	0.6	4.3	0.6
Mr	3	16.3	0.6	16.3	0.6	16.3	0.6	16.0	0.0	16.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0
CW11	10	11.4	2.8	10.3	3.9	9.8	4.7	9.7	4.1	10.4	4.2	4.1	0.9	3.9	0.7	4.2	1.5	3.8	1.5	3.8	1.4
Er	5	9.4	1.5	7.6	3.1	6.8	4.4	7.2	4.3	8.0	4.5	3.6	0.9	3.6	0.9	3.8	2.2	3.6	2.1	3.4	1.9
Mp	5	13.4	2.3	13.0	2.5	12.8	2.9	12.2	1.9	12.8	2.2	4.6	0.5	4.2	0.4	4.6	0.5	4.0	0.7	4.2	0.4
CW12	8	11.5	4.4	10.4	4.1	11.0	3.9	10.5	3.9	10.3	3.7	4.0	0.9	4.1	1.0	4.4	0.7	3.9	0.8	4.4	0.7
Cc	2	14.0	0.0	10.0	2.8	13.0	1.4	13.0	1.4	12.0	1.4	4.0	0.0	4.5	0.7	4.5	0.7	4.0	0.0	4.5	0.7
Mp	6	10.7	4.8	10.5	4.6	10.3	4.3	9.7	4.1	9.7	4.1	4.0	1.1	4.0	1.1	4.3	0.8	3.8	1.0	4.3	0.8
TOTAL trees	198																				

APPENDIX FIVE (cont). Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species

Site[a] / Tree species[b]	Tree Count	Crown Assessment Index										Foliage Health Index (FHI)									
		Spring 2021		Autmn 2022		Spring 2022		Autmn 2023				Spring 2021		Autmn 2022		Spring 2022		Autmn 2023			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD			Mean	SD	Mean	SD	Mean	SD	Mean	SD		
BNR01	6	13.0	7.1	12.7	6.9	13.8	7.6	14.0	7.4			4.0	2.0	4.0	2.0	4.2	2.0	4.2	2.0		
Ba	5	13.6	7.7	13.2	7.5	14.6	8.2	14.4	8.2			4.0	2.2	4.0	2.2	4.0	2.2	4.0	2.2		
Bm	1	10.0	na	10.0	na	10.0	na	12.0	na			4.0	na	4.0	na	5.0	na	5.0	na		
BNR02	11	14.0	7.3	14.0	7.2	14.7	7.6	14.7	7.6			3.8	1.9	4.1	2.0	4.1	2.0	4.1	2.0		
Ba	7	12.1	8.6	12.1	8.5	12.6	8.8	12.6	8.8			3.6	2.4	3.6	2.4	3.6	2.4	3.6	2.4		
Bm	4	17.3	2.4	17.3	2.4	18.5	2.5	18.5	2.5			4.3	0.5	5.0	0.0	5.0	0.0	5.0	0.0		
BNR03	8	6.3	6.9	6.5	7.3	6.6	7.3	6.4	7.1			2.4	2.6	2.3	2.4	2.4	2.6	2.4	2.6		
Ba	5	6.8	6.4	7.0	6.6	7.2	6.7	6.8	6.3			2.8	2.6	2.6	2.4	2.8	2.6	2.8	2.6		
Bm	3	5.3	9.2	5.7	9.8	5.7	9.8	5.7	9.8			1.7	2.9	1.7	2.9	1.7	2.9	1.7	2.9		
BNR04	6	10.0	8.1	10.3	8.5	11.0	8.9	10.5	8.6			3.2	2.5	3.2	2.5	3.3	2.6	3.2	2.5		
Ba	3	9.0	7.9	9.0	7.9	10.0	8.9	9.0	7.9			3.3	2.9	3.3	2.9	3.3	2.9	3.0	2.6		
Bm	3	11.0	9.8	11.7	10.7	12.0	10.8	12.0	10.8			3.0	2.6	3.0	2.6	3.3	2.9	3.3	2.9		
BNR05	7	12.6	9.2	12.6	9.2	12.6	9.2	12.7	9.3			3.6	2.4	3.6	2.4	3.6	2.4	3.6	2.4		
Ba	5	9.6	9.3	9.6	9.3	9.6	9.3	9.6	9.3			3.0	2.7	3.0	2.7	3.0	2.7	3.0	2.7		
Bm	2	20.0	1.4	20.0	1.4	20.0	1.4	20.5	0.7			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
BNR06	6	10.3	8.0	11.3	8.8	11.3	8.8	11.5	9.0			3.2	2.5	3.3	2.6	3.3	2.6	3.3	2.6		
Ba	3	5.7	9.8	5.7	9.8	5.7	9.8	6.0	10.4			1.7	2.9	1.7	2.9	1.7	2.9	1.7	2.9		
Bm	3	15.0	0.0	17.0	0.0	17.0	0.0	17.0	2.0			4.7	0.6	5.0	0.0	5.0	0.0	5.0	0.0		
BNR07	11	13.5	5.0	13.4	5.1	14.3	5.3	14.1	5.7			4.5	1.5	4.3	1.5	4.5	1.5	4.3	1.5		
Ba	5	15.6	2.3	16.2	2.2	17.0	2.1	17.6	2.7			5.0	0.0	4.8	0.4	5.0	0.0	4.8	0.4		
Bm	6	11.7	6.1	11.0	5.7	12.0	6.3	11.2	6.1			4.0	2.0	3.8	1.9	4.0	2.0	3.8	1.9		
BNR08	8	10.9	3.2	11.4	3.0	12.6	2.8	12.5	3.2			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
Ba	4	9.5	2.5	10.5	2.6	11.5	2.1	10.8	2.4			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
Bm	4	12.3	3.5	12.3	3.5	13.8	3.3	14.3	3.1			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		

APPENDIX FIVE (cont). Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species

Site[a] / Tree species[b]	Tree Count	Crown Assessment Index										Foliage Health Index (FHI)									
		Spring 2021		Autmn 2022		Spring 2022		Autmn 2023				Spring 2021		Autmn 2022		Spring 2022		Autmn 2023			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD			Mean	SD	Mean	SD	Mean	SD	Mean	SD		
BNR09	7	15.0	2.8	15.3	2.3	15.4	3.0	16.9	3.3			5.0	0.0	5.0	0.0	5.0	0.0	4.9	0.4		
Ba	4	14.5	3.4	14.8	3.0	15.0	3.8	16.0	4.2			5.0	0.0	5.0	0.0	5.0	0.0	4.8	0.5		
Bm	3	15.7	2.1	16.0	1.0	16.0	2.0	18.0	1.7			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
BNR10	11	13.1	5.6	12.4	5.5	13.4	5.6	14.2	6.3			4.3	1.6	4.3	1.6	4.5	1.5	4.5	1.5		
Ba	8	11.6	5.9	11.4	5.8	12.0	5.9	12.6	6.8			4.0	1.8	4.0	1.8	4.4	1.8	4.4	1.8		
Bm	3	17.0	2.0	15.0	4.6	17.0	2.0	18.3	1.2			5.0	0.0	5.0	0.0	5.0	0.0	4.7	0.6		
BNR11	9	16.6	6.3	16.4	6.3	16.8	6.4	17.3	6.6			4.4	1.7	4.4	1.7	4.4	1.7	4.4	1.7		
Ba	3	13.3	11.6	13.3	11.6	13.3	11.6	13.3	11.6			3.3	2.9	3.3	2.9	3.3	2.9	3.3	2.9		
Bm	6	18.2	0.8	18.0	0.6	18.5	0.5	19.3	0.8			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
BNR12	5	14.6	2.3	16.0	2.5	16.8	2.5	16.8	2.3			4.4	1.3	4.4	0.9	4.8	0.4	4.8	0.4		
Ba	4	15.3	2.1	17.0	1.4	17.8	1.5	17.5	1.9			5.0	0.0	4.8	0.5	5.0	0.0	5.0	0.0		
Bm	1	12.0	na	12.0	na	13.0	na	14.0	na			2.0	na	3.0	na	4.0	na	4.0	na		
BNR13	8	9.8	8.3	9.9	8.3	10.6	9.0	10.6	9.1			3.1	2.6	3.1	2.6	3.0	2.5	3.1	2.6		
Ba	4	12.5	8.3	12.5	8.3	13.3	8.9	13.5	9.0			3.8	2.5	3.8	2.5	3.8	2.5	3.8	2.5		
Bm	4	7.0	8.4	7.3	8.6	8.0	9.6	7.8	9.4			2.5	2.9	2.5	2.9	2.3	2.6	2.5	2.9		
CW01	8	18.1	1.8	17.9	1.6	18.4	1.4	17.9	2.1			4.8	0.5	5.0	0.0	4.9	0.4	5.0	0.0		
Mp	8	18.1	1.8	17.9	1.6	18.4	1.4	17.9	2.1			4.8	0.5	5.0	0.0	4.9	0.4	5.0	0.0		
CW02	8	17.5	1.7	17.8	1.2	17.9	1.4	18.1	1.6			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
Er	3	16.0	1.7	16.7	0.6	16.3	0.6	16.3	0.6			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
Mr	5	18.4	0.9	18.4	0.9	18.8	0.4	19.2	0.4			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
CW03	8	13.9	6.8	13.8	6.9	14.0	7.0	14.1	7.2			4.4	1.8	4.3	1.8	4.4	1.8	4.3	1.8		
Er	3	7.3	6.4	6.7	5.9	7.0	6.2	6.7	6.5			3.3	2.9	3.0	2.6	3.3	2.9	3.0	2.6		
Mr	5	17.8	3.0	18.0	2.5	18.2	2.8	18.6	1.8			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
CW04	11	12.2	2.3	12.4	2.1	12.8	2.3	13.5	2.3			4.5	0.5	4.8	0.4	4.8	0.4	4.9	0.3		
Er	5	10.8	1.8	11.0	2.0	11.8	2.6	12.6	3.0			4.2	0.4	4.6	0.5	5.0	0.0	5.0	0.0		
Mp	5	12.6	1.1	13.0	0.7	13.0	0.7	13.6	0.5			4.8	0.4	5.0	0.0	4.6	0.5	4.8	0.4		
Mr	1	17.0	na	16.0	na	17.0	na	17.0	na							5.0	na	5.0	na		

APPENDIX FIVE (cont). Tree crown assessment index and foliar health index values (mean and standard deviation), by site by tree species

Site[a] / Tree species[b]	Tree Count	Crown Assessment Index										Foliage Health Index (FHI)									
		Spring 2021		Autmn 2022		Spring 2022		Autmn 2023				Spring 2021		Autmn 2022		Spring 2022		Autmn 2023			
		Mean	SD	Mean	SD	Mean	SD	Mean	SD			Mean	SD	Mean	SD	Mean	SD	Mean	SD		
CW05	6	10.2	4.2	11.2	5.0	11.2	5.2	12.0	5.8			4.7	0.5	4.7	0.5	4.5	0.5	4.7	0.5		
Cc	3	7.3	4.0	8.0	5.0	7.7	5.0	8.0	5.6			4.3	0.6	4.3	0.6	4.3	0.6	4.3	0.6		
Mp	3	13.0	1.7	14.3	2.9	14.7	2.3	16.0	2.0			5.0	0.0	5.0	0.0	4.7	0.6	5.0	0.0		
CW06	5	18.4	0.9	17.8	1.8	18.8	0.4	19.0	0.0			4.6	0.5	5.0	0.0	5.0	0.0	5.0	0.0		
Mr	5	18.4	0.9	17.8	1.8	18.8	0.4	19.0	0.0			4.6	0.5	5.0	0.0	5.0	0.0	5.0	0.0		
CW07	7	16.6	2.4	17.3	2.0	17.7	1.7	16.4	2.2			4.6	0.5	5.0	0.0	4.9	0.4	4.9	0.4		
Er	1	13.0	na	16.0	na	16.0	na	15.0	na			4.0	na	5.0	na	4.0	na	4.0	na		
Mr	6	17.2	1.9	17.5	2.1	18.0	1.7	16.7	2.3			4.7	0.5	5.0	0.0	5.0	0.0	5.0	0.0		
CW08	10	12.4	2.3	12.4	3.3	12.6	3.8	12.0	4.1			4.4	0.7	5.0	0.0	5.0	0.0	4.6	0.5		
Er	5	13.6	1.1	14.4	2.1	15.0	2.4	15.0	2.1			5.0	0.0	5.0	0.0	5.0	0.0	4.6	0.5		
Mp	5	11.2	2.7	10.4	3.3	10.2	3.6	9.0	3.3			3.8	0.4	5.0	0.0	5.0	0.0	4.6	0.5		
CW09	8	12.6	1.7	11.6	3.2	12.3	4.6	12.9	4.7			4.5	0.5	5.0	0.0	4.9	0.4	4.5	0.5		
Cc	3	13.7	0.6	14.3	0.6	16.0	1.0	17.0	2.0			5.0	0.0	5.0	0.0	4.7	0.6	4.7	0.6		
Er	1	15.0	na	15.0	na	17.0	na	17.0	na			5.0	na	5.0	na	5.0	na	5.0	na		
Mp	4	11.3	1.0	8.8	1.0	8.3	2.4	8.8	1.7			4.0	0.0	5.0	0.0	5.0	0.0	4.3	0.5		
CW10	6	12.7	3.1	14.5	3.9	14.3	4.3	13.7	4.8			4.7	0.5	4.8	0.4	4.7	0.5	4.5	0.5		
Er	3	11.0	3.6	13.0	5.6	12.7	6.1	12.0	7.0			4.3	0.6	4.7	0.6	4.3	0.6	4.0	0.0		
Mr	3	14.3	1.5	16.0	0.0	16.0	0.0	15.3	1.2			5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0		
CW11	10	10.1	3.6	10.2	3.9	10.4	4.1	10.1	4.3			3.7	1.3	4.1	1.5	4.1	1.5	4.3	1.6		
Er	5	8.4	4.7	8.0	4.6	8.0	4.7	7.6	4.6			3.2	1.8	3.2	1.8	3.2	1.8	3.8	2.2		
Mp	5	11.8	0.4	12.4	1.1	12.8	1.1	12.6	2.1			4.2	0.4	5.0	0.0	5.0	0.0	4.8	0.4		
CW12	8	10.9	3.6	11.1	3.6	10.6	3.5	9.5	4.1			4.0	0.5	4.6	0.5	4.3	0.9	4.0	1.1		
Cc	2	12.0	1.4	12.0	1.4	11.5	2.1	10.0	1.4			4.0	0.0	4.0	0.0	4.0	0.0	4.0	0.0		
Mp	6	10.5	4.1	10.8	4.2	10.3	3.9	9.3	4.8			4.0	0.6	4.8	0.4	4.3	1.0	4.0	1.3		
TOTAL trees	198																				