



Metropolitan Coal Vegetation Monitoring

Longwalls 23-27 Spring 2019

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Contents

1	Introduction	1
2	Methods	3
2.1	Upland swamp monitoring	6
2.1.1	Visual inspections	6
2.1.2	Transect/quadrat monitoring.....	8
2.1.3	Indicator species	9
2.2	Riparian vegetation	10
2.2.1	Visual Inspections	10
2.2.2	Quadrat monitoring	12
2.2.3	Indicator species	12
2.3	Species identification and nomenclature	12
2.4	Survey timing	13
2.5	Weather conditions	14
2.6	Assessment against performance indicators	17
2.6.1	Upland swamp vegetation	17
2.6.2	Riparian vegetation	17
3	Results & discussion	19
3.1	Upland swamp vegetation monitoring	19
3.1.1	Visual inspections	19
3.1.2	Transect/quadrat monitoring.....	24
3.1.3	Indicator species monitoring	38
3.1.4	Assessment against performance indicator.....	46
3.2	Riparian vegetation monitoring	48
3.2.1	Visual inspections	48
3.2.2	Quadrat monitoring	60
3.2.3	Indicator Species	63
3.2.4	Assessment against performance indicators	70
3.3	Significant species	72
3.4	Introduced species.....	73
4	Conclusions	74
4.1	Upland swamp vegetation monitoring	74
4.2	Riparian vegetation monitoring	74
	References	75

List of figures

Figure 1: Metropolitan Coal regional location.....	2
Figure 2: Vegetation communities overlying Longwalls 23-27 and surrounds.....	4
Figure 3: Upland swamps overlying and adjacent to Longwalls 23-27.....	5
Figure 4: Control swamps in which vegetation monitoring is undertaken.....	7
Figure 5: Riparian monitoring locations.....	11
Figure 6: Monthly rainfall for the study area (January 2010 to December 2019).....	16
Figure 7: Native species richness within upland swamp sites supporting Restioid Heath (RH) and Banksia Thicket (BT), spring 2010 to spring 2019, BL = baseline.....	25
Figure 8: Native species richness within upland swamp sites supporting Tea Tree Thicket, spring 2010 to spring 2019, BL = baseline.....	25
Figure 9: Mean species richness in upland swamp sites supporting Restioid Heath and Banksia Thicket, spring 2010 to spring 2019.....	31
Figure 10: Mean species richness in upland swamp sites supporting Tea Tree Thicket, spring 2010 to spring 2019.....	32
Figure 11: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, <i>Epacris obtusifolia</i> (spring 2010 to spring 2019).....	40
Figure 12: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, <i>Pultenaea aristata</i> (spring 2010 to spring 2019).....	41
Figure 13: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, <i>Sprengelia incarnata</i> (spring 2010 to spring 2019) ⁷	41
Figure 14: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, <i>Banksia robur</i> (spring 2010 to spring 2019).....	42
Figure 15: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, <i>Callistemon citrinus</i> (spring 2010 to spring 2019).....	42
Figure 16: Proportion of tagged <i>Epacris obtusifolia</i> which have died at longwall and control Restioid Heath and Banksia Thicket swamps (spring 2010 to spring 2019). Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23-27.....	44
Figure 17: Proportion of tagged <i>Pultenaea aristata</i> which have died at longwall and control Restioid Heath and Banksia Thicket swamps (spring 2010 to spring 2019). Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23-27.....	45
Figure 18: Proportion of tagged <i>Sprengelia incarnata</i> which have died at longwall and control Restioid Heath and Banksia Thicket swamps (spring 2010 to spring 2019). Dashed line	

indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23-27.	45
Figure 19: Proportion of tagged <i>Banksia robur</i> which have died at longwall and control Restioid Heath and Banksia Thicket swamps (spring 2010 to spring 2019). Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23-27.	46
Figure 20: Native species richness within riparian monitoring sites across all seasons, spring 2010 to spring 2019, BL = baseline.	61
Figure 21: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, <i>Lomatia myricoides</i> (spring 2010 to spring 2019).	65
Figure 22: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, <i>Prostanthera linearis</i> (spring 2010 to spring 2019) ¹¹	66
Figure 23: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, <i>Schoenus melanostachys</i> (spring 2010 to spring 2019) ¹¹	66
Figure 24: Proportion of tagged <i>Prostanthera linearis</i> which have died at longwall and control riparian sites (spring 2010 to spring 2019). Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23- 27.	69
Figure 25: Proportion of tagged <i>Schoenus melanostachys</i> which have died at longwall and control riparian sites (spring 2010 to spring 2019) ⁶ . Dashed line indicates change from baseline monitoring seasons to mining undertaken during and post mining of Longwalls 23-27.	69

List of tables

Table 1: Survey timing spring 2019.....	13
Table 2: Summary of weather conditions throughout monitoring period (Spring 2010 – Spring 2019)	14
Table 3: Monthly rainfall for entire survey period (spring 2008 to spring 2019) taken from Metropolitan Colliery Meteorological Station Helensburgh 2.	15
Table 4: Number of native species recorded in upland swamps (spring 2010 to spring 2019).	26
Table 5: Species Richness for Swamp 28 (Transect 2) – Baseline Period (values are cover/abundance scores).....	29
Table 6: Species Richness for Swamp 28 (Transect 2) – Mining Period (values are cover/abundance scores).....	30
Table 7: Species with dieback (Condition score <5) in longwall and controls sites supporting Restioid Heath / Banksia Thicket.	33
Table 8: Analysis of Similarities (ANOSIM) for vegetation cover/abundance in upland swamps supporting Restioid Heath / Banksia Thicket.	35
Table 9: Number of species found to have an increase or decrease in the average cover/abundance score in spring 2019 compared to autumn 2019.....	36
Table 10: Analysis of Similarities (ANOSIM) for vegetation condition in upland swamps supporting Restioid Heath / Banksia Thicket.	37
Table 11: Number of species found to have an increase or decrease in the average condition score in spring 2019 compared to autumn 2019.	38
Table 12: Summary of Upland Swamp Vegetation Monitoring against Trigger Action Response Plan.	47
Table 13: Number of native species recorded in riparian sites across all seasons (spring 2010 to spring 2019).	62
Table 14: Vegetation condition and reproductive status of indicator species at control (compromised) sites MRIP07 and MRIP08 for spring 2016 to spring 2019.	67
Table 15: Summary of Riparian Vegetation Monitoring against Trigger Action Response Plan.....	71
Table 16: Species of conservation significance recorded across vegetation monitoring sites, spring 2019.	72

List of plates

Plate 1: Swamp 30, Photo Point 3, showing seepage along rock platform – Spring 2019.	22
Plate 2: Swamp 31, Photo Point 3, showing yellowing and senescing of <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> and <i>Petrophile pulchella</i> on the terminal step – Spring 2019.	22
Plate 3: Swamp 19, Photo Point 2, showing yellowing <i>Leptospermum arachnoides</i> and senescing <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> and <i>Baeckea imbricata</i> – Spring 2019.	23
Plate 4: Swamp 94, Photo Point 3, showing yellowing and senescing of <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> and <i>Leptospermum squarrosus</i> – Spring 2019.	23
Plate 5: Eastern Tributary, adjacent to MRIP05, with water in the pool – spring 2019.	52
Plate 6: Eastern Tributary, MRIP11, Photo Point 2, downstream view – spring 2019.	52
Plate 7: Eastern Tributary, MRIP07, Photo Point 2C, downstream view – spring 2019.	53
Plate 8: Eastern Tributary, MRIP08, Photo Point 4, upstream view – spring 2019.	53
Plate 9: Waratah Rivulet MRIP02 area of previous flood impacts – spring 2019.	54
Plate 10: Eastern bank of Waratah Rivulet MRIP02, Photo Point 1 view upstream – spring 2019.	54
Plate 11: Eastern bank of Waratah Rivulet MRIP02, Photo Point 1 view downstream – spring 2019.	55
Plate 12: Eastern bank of Waratah Rivulet MRIP02, Photo Point B view downstream – spring 2019.	55
Plate 13: Eastern Tributary MRIP05, Photo Point 4a west bank – spring 2019.	56
Plate 14: Eastern Tributary MRIP09, Photo Point 3 view upstream – spring 2019.	56
Plate 15: Eastern Tributary MRIP11, Photo Point 4a, patches of dead <i>Gleichenia microphylla</i> – spring 2019.	57
Plate 16: Eastern Tributary MRIP12, Photo Point 2, west bank, showing previous dieback of <i>Gleichenia microphylla</i> and <i>Schoenus melanostachys</i> – spring 2019.	57
Plate 17: Eastern Tributary cracking across rock bar between sites MRIP05 and MRIP06 – spring 2019.	58
Plate 18: Eastern Tributary, MRIP08, Photo Point 4, cracking – spring 2019.	59
Plate 19: Eastern Tributary, MRIP12, Photo Point 2, in-stream cracking – spring 2019.	59

1 Introduction

Metropolitan Coal is located near Helensburgh, approximately 30 km south of Sydney and 30 km north of Wollongong (**Figure 1**). Metropolitan Coal is a wholly owned subsidiary of Peabody Energy Australia Pty Ltd.

Metropolitan Coal was granted approval (08_0149) for the Metropolitan Coal Project (the Project) in accordance with section 75J of the *Environmental Planning and Assessment Act 1979* on 22 June 2009. In accordance with Project Approval Condition 6, Schedule 3, a Biodiversity Management Plan (BMP) was prepared as a component of the Metropolitan Coal Longwalls 23-27 Extraction Plan to manage the potential environmental consequences of the Extraction Plan on aquatic and terrestrial flora and fauna, with a specific focus on swamps (Metropolitan Coal 2015).

The Metropolitan Coal Longwalls 23-27 Biodiversity Management Plan has been superseded by the Metropolitan Coal Longwalls 301-303 Biodiversity Management Plan (Metropolitan Coal, 2018). In accordance with the Longwalls 301-303 Biodiversity Management Plan, the Longwalls 23-27 vegetation monitoring program continued to be implemented to monitor the potential impacts of Longwalls 23-27 on terrestrial flora, with a specific focus on upland swamp and riparian vegetation.

Mining of Longwalls 23-27 commenced in May 2014 and was completed in March 2017. This spring 2019 report presents the fifth dataset collected post the completion of Longwalls 23-27, with data also collected in spring 2017, autumn 2018, spring 2018 and autumn 2019 (Eco Logical Australia 2018b – 2020). Previous data collection and reporting has occurred during the mining of Longwalls 23-27 in autumn 2014, spring 2014, autumn 2015, spring 2015, autumn 2016, spring 2016 and autumn 2017 (Eco Logical Australia 2014a – 2018a). Prior to the commencement of mining, baseline data was collected during spring 2010, autumn 2011, spring 2011, autumn 2012, spring 2012, autumn 2013 and spring 2013 (Eco Logical Australia 2013).

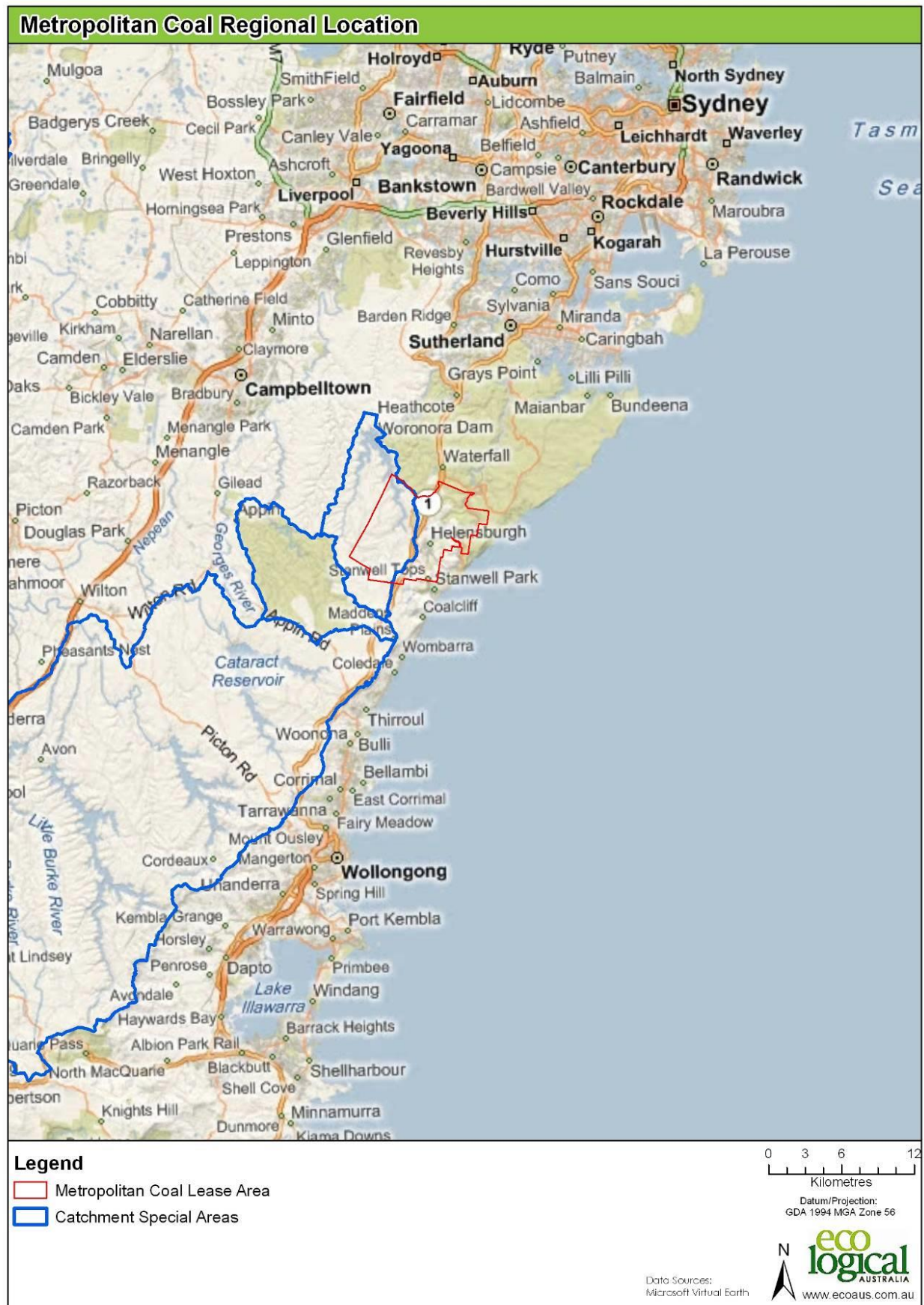


Figure 1: Metropolitan Coal regional location.

2 Methods

The vegetation monitoring program for Longwalls 23-27 comprises two main components:

- monitoring of upland swamp vegetation; and
- monitoring of riparian vegetation.

Bangalay Botanical Surveys (BBS 2008) mapped 17 upland swamps located above or immediately adjacent to Longwalls 23-27 consistent with vegetation mapping by the NSW National Parks and Wildlife Service (NPWS 2003), namely Swamps 19, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 93, 94, 95, 96, 97, 98 (**Figure 2** and **Figure 3**). The vegetation in these 17 swamps was classified as 'Banksia Heath' (Swamps 94 and 33) and 'Sedgeland-heath Complex' (Swamps 19, 27, 28, 29, 30, 31, 32, 34, 35, 36, 93, 95, 96, 97 and 98) consistent with vegetation mapping by NPWS (2003). Sedgeland-Heath Complex is a mapping unit that amalgamates the Sedgeland, Restioid Heath and Cyperoid Heath vegetation associations identified by Keith & Myerscough (1993), but condensed by NPWS (2003) on the basis that they could not be readily distinguished by air photo interpretation for community mapping.

Subsequent field inspections were undertaken by Eco Logical Australia to validate the vegetation classification of BBS (2008). The swamps over Longwalls 23-27 are relatively small and comprise either Banksia Thicket or Restioid Heath or a combination of the two with the following exceptions:

- Swamp 28, mapped as 'Sedgeland-heath Complex' (BBS 2008), contained elements of the vegetation communities 'Banksia Thicket' and 'Tea Tree Thicket' consistent with descriptions of this community by BBS (2008) and NPWS (2003);
- Swamp 29, mapped as 'Sedgeland-heath Complex' (BBS 2008), contained vegetation which was more characteristic of 'Sandstone-Heath Woodland' consistent with descriptions of this community by BBS (2008) and NPWS (2003);
- Swamp 32 and Swamp 34, mapped as 'Sedgeland-heath Complex' (BBS 2008) was considered to include elements of the 'Sandstone-Heath Woodland' consistent with descriptions of this community by BBS (2008) and NPWS (2003).

Riparian vegetation occurs along streams which flow to the Woronora Reservoir including the Waratah Rivulet and the Eastern Tributary and some of their tributaries. Vegetation mapped by BBS (2008) is shown on **Figure 2**. Riparian vegetation includes vegetation mapped as community 4a (Sandstone Riparian Scrub; (BBS 2008)).

Upland swamp and riparian vegetation surveys are conducted bi-annually in autumn and spring.

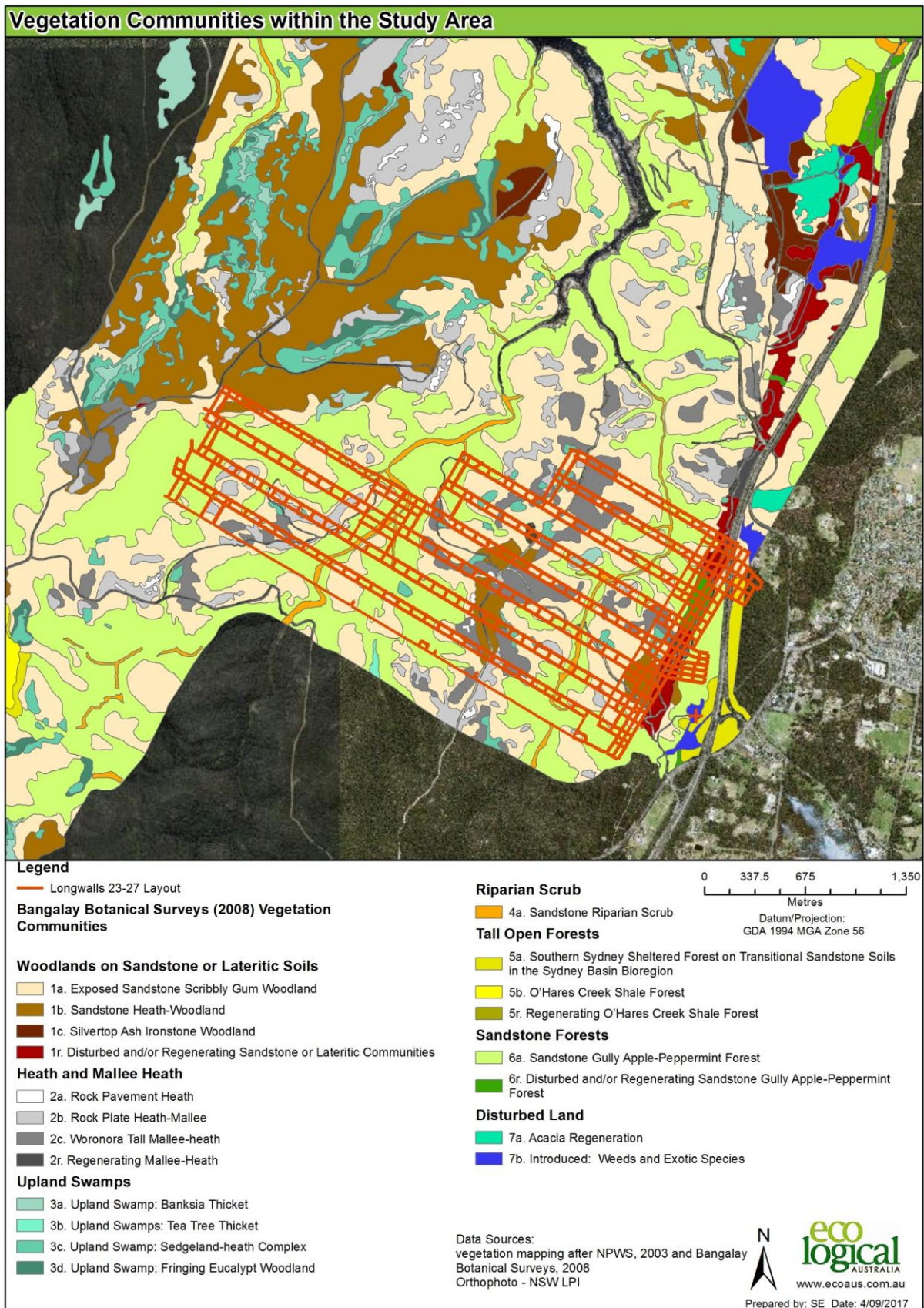


Figure 2: Vegetation communities overlying Longwalls 23-27 and surrounds.

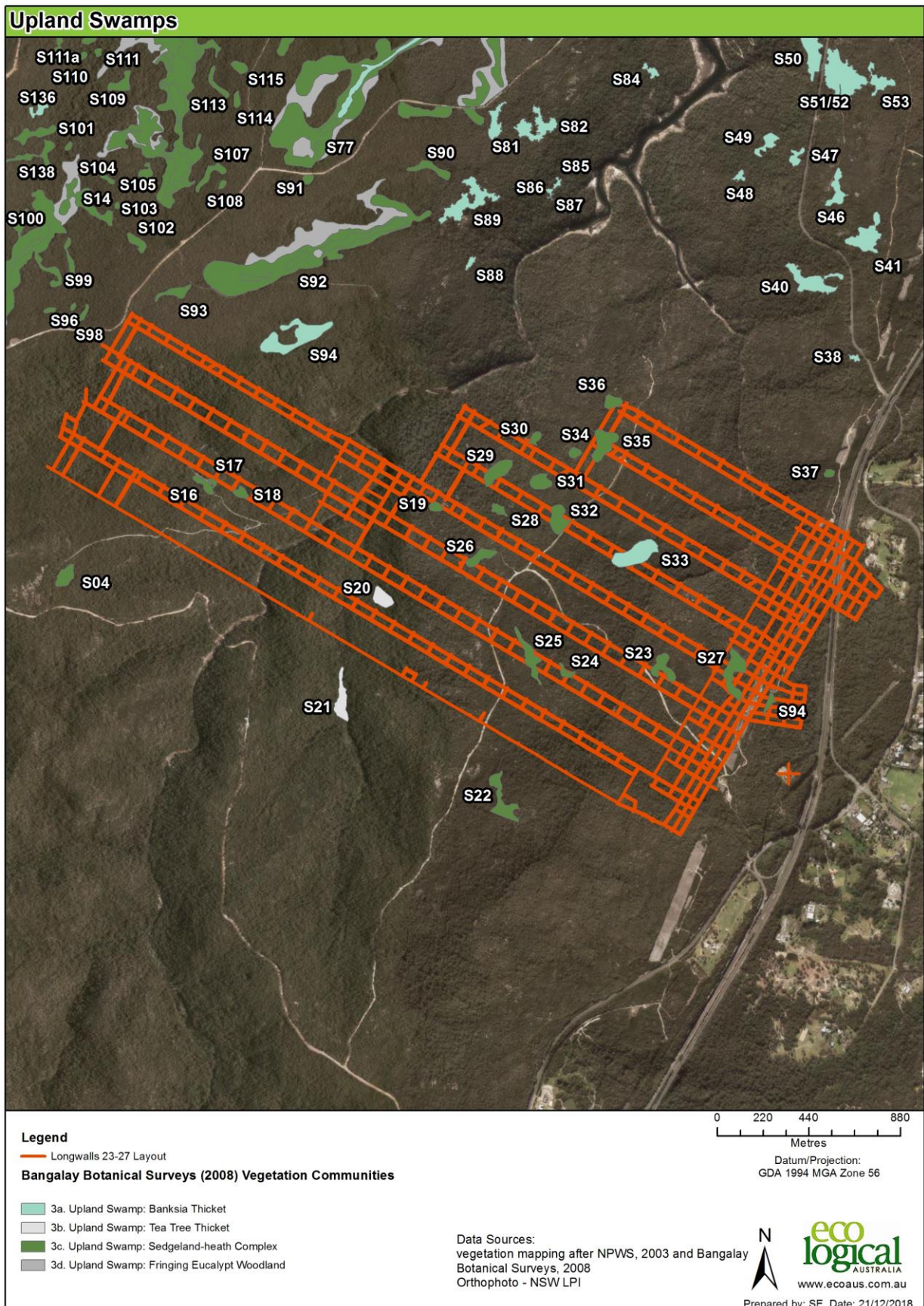


Figure 3: Upland swamps overlying and adjacent to Longwalls 23-27.

2.1 Upland swamp monitoring

2.1.1 Visual inspections

Visual inspections were conducted during spring 2019 in Swamps 19, 28, 30, 31, 32, 33, 34, 35, 36 and 94 overlying and/or immediately adjacent to Longwalls 23-27 (**Figure 3**) and in control Swamps 101, 111a, 125, 135, 136, 137a, 137b, 138, Bee Creek Swamp, Woronora River 1, Woronora River south arm, and Dahlia Swamp (**Figure 4**) to record evidence of potential subsidence impacts.

Traverses over the swamps were conducted in spring 2019 to record:

- cracking of exposed bedrock areas and/or swamp substrate;
- areas of increased erosion, particularly along any existing drainage line;
- any changes in water colour, particularly evidence of iron precipitation;
- changes in vegetation condition, including areas of stressed vegetation (i.e. plants that demonstrate symptoms of stress) and dead/dying plants that appear unusual; and
- whether the amount of seepage (at the terminal step/over exposed surfaces of the swamp) at the time of inspection appears unusual (relative to recent rainfall).

Photographs of cracking, erosion, water colour changes and stressed vegetation were taken, concurrently with a description of these observations, and appropriate global positioning system (GPS – GDA 94 datum) readings taken for established photo points and areas of interest. Seepage areas were documented by photographs of flow over exposed surfaces, e.g. terminal step and exposed sandstone areas.

Traverses aimed at covering the majority of the extent of each swamp were conducted.

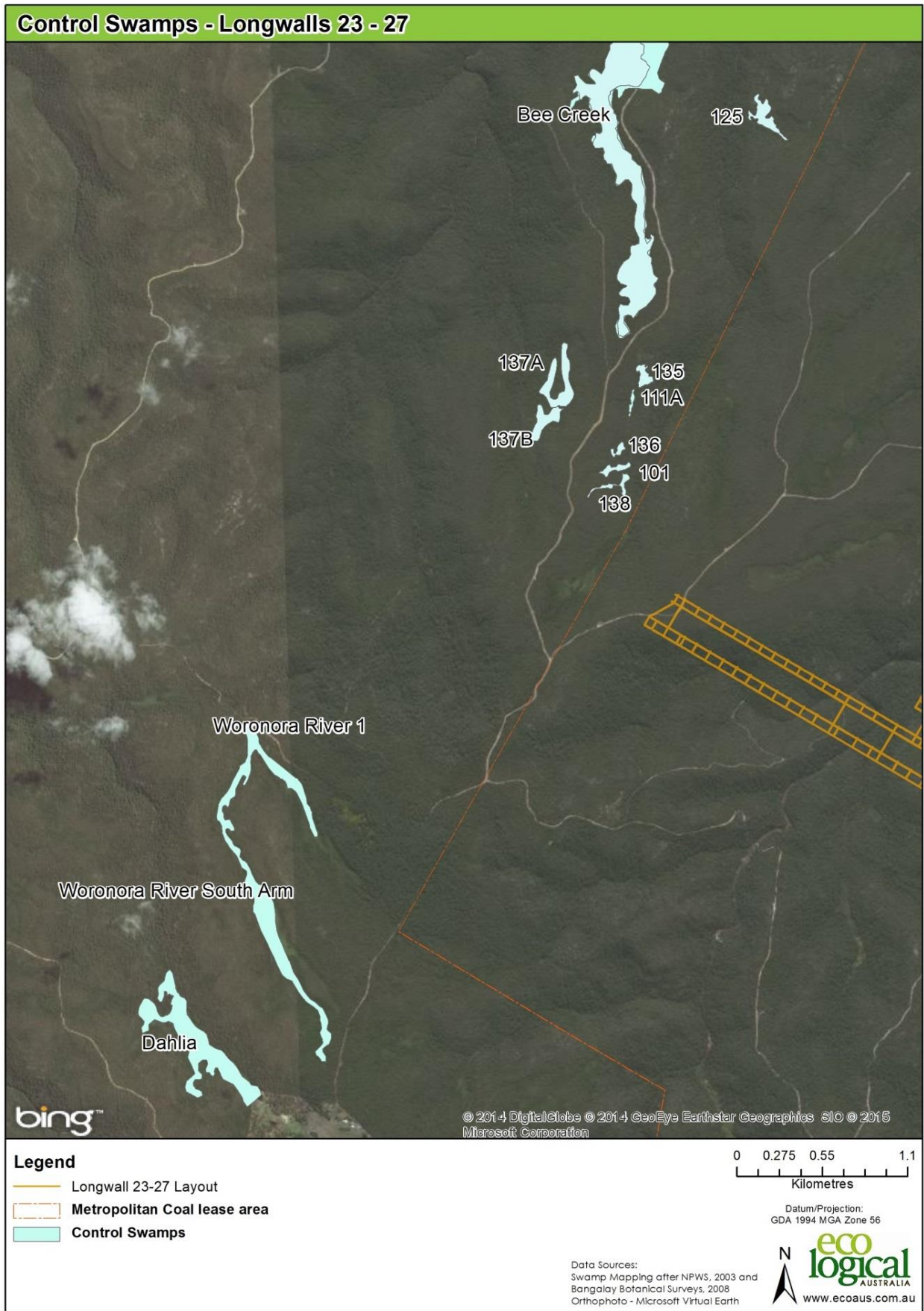


Figure 4: Control swamps in which vegetation monitoring is undertaken.

2.1.2 Transect/quadrat monitoring

Transect/quadrat monitoring was conducted during spring 2019 in Swamps 28, 30, 33, 35 and 94 overlying or immediately adjacent to Longwalls 23-27 and in control Swamps 101, 111a, 125, 135, 136, 137a, 137b, 138, Bee Creek Swamp, Woronora River 1, Woronora River south arm and Dahlia Swamp.

With the exception of Swamp 28, which supports Tea Tree Thicket in the lower portion of the swamp, all the swamps over Longwalls 23-27 comprise either Banksia Thicket or Restioid Heath, or a combination of the two.

Swamps considered suitable as controls for the Banksia Thicket / Restioid Heath vegetation were Swamps 135, 136, 137a, 137b, 138 and Bee Creek Swamp, as well as control swamps monitored as a component of the Longwalls 20-22 vegetation monitoring program, namely Swamps 101, 111a and 125. Swamps considered suitable as controls for the Tea Tree Thicket vegetation were swamps Woronora River 1, Woronora River south arm and Dahlia Swamp monitored as a component of the Longwalls 20- 22 vegetation monitoring program.

Swamps 30, 33, 35, 94 and control Swamps 135, 136, 137a, 137b and 138 are valley side swamps and tend to have their longest axis extending horizontally around the slope perpendicular to the gradient and are often rather narrow. Three transects have been established in each of these swamps extending downslope perpendicular to the horizontal long axis and approximately evenly distributed along the long axis.

Swamp 28 is also a valley side swamp which supports Banksia Thicket in the upper portion of the swamp and Tea Tree Thicket in the lower portion of the swamp. No similar swamps in terms of their geomorphic characteristics are known from elsewhere in the study area to provide a control for Swamp 28. Patches of Tea Tree Thicket in three much larger swamps (Woronora River 1, Woronora River south arm and Dahlia Swamp) have been selected as controls for the Tea Tree Thicket in Swamp 28 with the proviso that the condition and floristics of the vegetation in all swamps is similar. A single larger swamp, Bee Creek Swamp, has been selected as a control for the Banksia Thicket within Swamp 28.

Swamp 28 and the corresponding control swamps Bee Creek Swamp, Woronora River 1, Woronora River south arm and Dahlia Swamp have their long axis extending downslope. In these swamps transects have been established across the slope perpendicular to the long axis. Two approximately evenly spaced transects have been established in Swamp 28, one within Banksia Thicket and the other in Tea Tree Thicket vegetation. As the control swamps are much larger in area, only a single transect has been established in Woronora River 1, Woronora River south arm, and Dahlia Swamp, with three transects established in Bee Creek Swamp.

Transects have been marked with a star picket at each end and at regular intervals (20 m) to ensure that the same line is used each monitoring season. Vegetation has also been flagged along this line (every 5 m) to further aid re-locating the transect line and quadrat positions. For the valley side swamps, vegetation assessment is made on 1 m² quadrats centred on the transect line at 5 m intervals starting from 0 m. Exceptions to this include Swamps 30 and 137b where the vegetation is dense. In Swamps 30 and 137b, the placement of quadrats is as for Tea Tree Thicket swamps, with the quadrats placed upslope of the transect line with one quadrat edge located on the line. For Swamp 28 and the associated control swamps, vegetation assessment is made on 1 m² quadrats placed upslope of the transect line with one quadrat edge located on the line. Quadrats are placed upslope to avoid surveying trampled vegetation along the transect, with trampling more pronounced in these swamps due to the thick vegetation cover.

The transect length varies within each swamp and between swamps, however, the statistical analyses to be performed on the quadrat data do not require the transect lengths to be the same between swamps.

The data collected for each quadrat included:

- vegetation structure;
- dominant species;
- estimated cover and height for each stratum;
- full floristics;
- estimated cover/abundance for each species in the quadrat using the following seven-point Modified Braun-Blanquet scale:

Modified Braun-Blanquet Scale

1 = cover less than 5% of site and rare
 2 = cover less than 5% of site and uncommon
 3 = cover less than 5% of site and common
 4 = cover 5% – 20% of site
 5 = cover 21% – 50% of site
 6 = cover 51% – 75% of site
 7 = cover 76% – 100%

- condition/health rating for each species in the quadrat using the following scale:

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

Photographs of each quadrat and permanent photo points along each transect were taken.

2.1.3 Indicator species

Due to the minimal number of swamps and variation in floristics across the swamps, it has not been possible to select indicator species common to all swamps. Overall, five indicator species have been selected, three for the Sedgeland-Heath and Banksia Thicket swamps and two for the Tea Tree Thicket swamps across both longwall and control sites. Twenty tagged individuals of each species were established at each site in spring 2010 as follows:

- *Epacris obtusifolia* – monitored in Swamps 19, 30, 33, 35, 94, 101, 111a, 125, 135, 136, 137a, 137b and 138;
- *Pultenaea aristata* – monitored in Swamps 19, 30, 33, 35, 94, 101, 111a, 135, 136, 137a and 138;
- *Sprengelia incarnata* – monitored in Swamps 19, 33, 35, 94, 101, 125, 135, 136, 137a and 138;
- *Banksia robur* – monitored in Swamp 28, Woronora River 1, Woronora River south arm, and Dahlia Swamp and;
- *Callistemon citrinus* – monitored in Swamp 28, Woronora River 1, Woronora River south arm, and Dahlia Swamp.

Population monitoring data collected includes:

- condition/health rating for each plant, based on the following scale:

Condition Scale

- 1 = severe damage/dieback
- 2 = many dead stems
- 3 = some dead branches
- 4 = minor damage
- 5 = healthy

- reproductive rating for each plant, based on the following scale:

Reproductive Rating

- 1 = nil
- 2 = sparse (occasional flowers only)
- 3 = low (under 25% of potential flowering)
- 4 = moderate (25% to 75% of potential flowering)
- 5 = high (over 75% of potential flowering)

All locations of tagged individuals were recorded using a differential GPS providing sub-metre accuracy to enable accurate re-location during future surveys. Tagged individuals were also flagged in the upper branches providing a rapid visual reference point.

2.2 Riparian vegetation

Riparian vegetation is monitored along the Waratah Rivulet (longwall sites MRIP01 and MRIP02 and control sites MRIP03, MRIP04 and MRIP10) and the Eastern Tributary (longwall sites MRIP05, MRIP06, MRIP09, MRIP11 and MRIP12 and control (compromised) sites MRIP07 and MRIP08), **Figure 5**.

Riparian vegetation monitoring sites MRIP07 and MRIP08 were used as control sites for comparison against the longwall riparian monitoring sites prior to subsidence impacts occurring to pools on the Eastern Tributary at these sites post spring 2016 and before autumn 2017. Analyses from autumn 2017 onwards no longer considers these sites as control sites.

Quadrat/transect surveys for longwall sites MRIP01, MRIP02, MRIP05 and MRIP06, control sites MRIP03 and MRIP04, and control (compromised) sites MRIP07 and MRIP08 commenced in spring 2008 as part of the Longwalls 20-22 monitoring program. Visual inspections and indicator species monitoring were introduced at these sites and at longwall site MRIP09 and control site MRIP10 in spring 2009.

Quadrat/transect surveys, visual inspections and indicator species monitoring at sites over Longwalls 23- 27 (sites MRIP11 and MRIP12) commenced in spring 2010.

2.2.1 Visual Inspections

Visual inspections of riparian areas were undertaken in locations adjacent to the riparian vegetation monitoring sites (MRIP01, MRIP02, MRIP03, MRIP04, MRIP05, MRIP06, MRIP07, MRIP08, MRIP09, MRIP10, MRIP11 and MRIP12, **Figure 5**), together with areas traversed whilst accessing the monitoring sites to record evidence of subsidence impacts including:

- areas of new water ponding;
- any cracking or rock displacement; and
- changes in vegetation condition, including areas of stressed vegetation that appear unusual.

Photographs of any new water ponding, cracking/rock displacement and stressed vegetation were taken, concurrently with a description of the observations, and appropriate GPS readings.

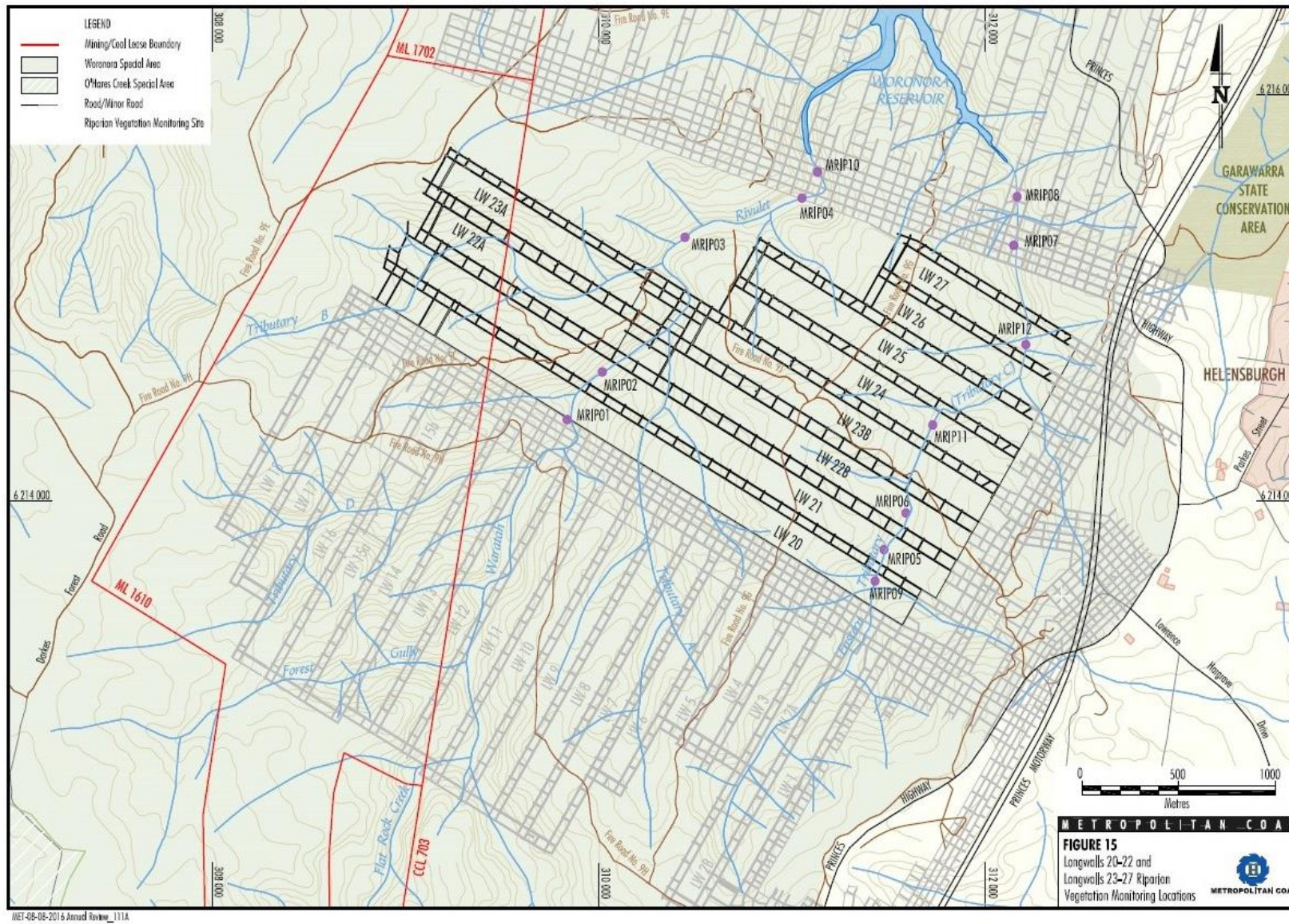


Figure 5: Riparian monitoring locations.

2.2.2 Quadrat monitoring

Permanent quadrats (20 m x 2 m) were established for monitoring riparian vegetation at the following sites:

- MRIP01, MRIP02, MRIP05 and MRIP06 overlying Longwalls 20-22;
- MRIP11 and MRIP12 overlying Longwalls 23-27; and
- MRIP03, MRIP04, MRIP07 and MRIP08, downstream of Longwalls 20-22 and Longwalls 23-27.

The data collected for each quadrat included:

- vegetation structure;
- dominant species;
- estimated cover and height for each stratum;
- full floristics;
- estimated cover/abundance for each species using seven-point Modified Braun-Blanquet scale (as per upland swamps, **Section 2.1.2**).
- condition/health rating for each species in the quadrat (as per upland swamps, **Section 2.1.2**).

Permanent photo points have been established for each quadrat.

2.2.3 Indicator species

Three species were selected for population monitoring along Waratah Rivulet and the Eastern Tributary, namely *Prostanthera linearis*, *Lomatia myricoides* and *Schoenus melanostachys*. Twenty tagged individuals of each species are monitored at each site, with the exception of MRIP08, where only 10 individuals of *Prostanthera linearis* were able to be found and tagged. Monitoring of indicator species commenced in spring 2009 for longwall sites MRIP01, MRIP02, MRIP05, MRIP06 and MRIP09 and control sites MRIP03, MRIP04, MRIP07, MRIP08 and MRIP10, as part of Longwall 20-22 vegetation monitoring, and in spring 2010 for longwall sites MRIP11 and MRIP12.

Population monitoring data collected includes:

- condition/health rating for each plant (as per upland swamps, **Section 2.1.2**); and
- reproductive rating (as per upland swamps, **Section 2.1.2**).

All locations of tagged individuals were recorded using a differential GPS providing sub-metre accuracy to enable accurate re-location during future surveys. Tagged individuals were also flagged in the upper branches providing a rapid visual reference point.

Copies of data sheets used for all the monitoring surveys are provided in **Appendix A**.

All swamp and riparian site details, including GPS waypoints, and transect details are provided in **Appendix B**.

2.3 Species identification and nomenclature

Field guides and standard texts used for the identification of plant species, included:

- Bishop (2000)
- Brooker & Kleinig (2006)
- Fairley & Moore (2010)

- Harden (1992-2002)
- Jacobs, Whalley, & Wheeler (2008)
- Jones (2006)
- Klaphake (2004)
- Pellow, Henwood, & Carolin (2009)
- Robinson (2003).

The naming of plant species recorded during the surveys follows the nomenclature presented in Harden (1992-2002), with subsequent taxonomic updates from NSW Flora Online on PlantNet (the NSW Plant Information Network System) (Royal Botanic Gardens and Domain Trust Sydney, 2019).

2.4 Survey timing

A summary of timing of vegetation monitoring conducted in spring 2019 is outlined in **Table 1**.

Table 1: Survey timing spring 2019.

Date	Upland Swamp Sites
03/09/2019	Swamp 138
04/09/2019	Swamp 111a, Swamp 135 (in part)
06/09/2019	Swamp 31, Swamp 32, Swamp 33
09/09/2019	Swamp 34, Swamp 35
10/09/2019	Swamp 94
30/09/2019	Swamp 136
01/10/2019	Swamp 101
02/10/2019	Swamp 135 (in part)
15/10/2019	Swamp 19, Swamp 28, Swamp 30
16/10/2019	Swamp 125
18/10/2019	Swamp 36
21/10/2019	Bee Creek Swamp, Swamp 137a (in part)
22/10/2019	Swamp 137a (in part), Swamp 137b
05/11/2019	Dahlia Swamp, Woronora River 1 (in part)
06/11/2019	Woronora River 1 (in part), Woronora River south arm
Date	Riparian Vegetation
23/10/2019	MRIP05, MRIP06, MRIP09
28/10/2019	MRIP01, MRIP02
29/10/2019	MRIP03, MRIP04, MRIP10
30/10/2019	MRIP07, MRIP08, MRIP12
18/11/2019	MRIP11

2.5 Weather conditions

The weather conditions during the spring 2019 survey period were generally similar to previous spring survey periods. Overall, the temperatures in spring 2019, as recorded at Bellambi Meteorological station, ranged from a minimum of 7.5°C to a maximum of 35.6°C, similar to previous spring seasons including spring 2008 (7.5°C – 36°C) and the previous spring 2018 (6.7°C – 36.3°C).

The monthly rainfall from January 2010 to December 2019, encompassing the entire study period (October 2010 to November 2019), taken from the Metropolitan Colliery Meteorological Station Helensburgh 2, is presented with the long term mean monthly rainfall in **Table 3** and **Figure 6**.

The current spring 2019 survey was undertaken following very dry conditions from July 2017 onwards. Rainfall increased slightly above average for October and November 2018 and again in March 2019, but remained well below average for the majority of months preceding and during the spring 2019 survey. During the spring 2019 survey, rainfall increased slightly above average for the month of September 2019, but remained well below average for the other survey months.

The rainfall preceding and during vegetation surveys has been discussed in the previous reports (Eco Logical Australia 2010a – 2020)¹, and is summarised in the table below (**Table 2**).

Table 2: Summary of weather conditions throughout monitoring period (Spring 2010 – Spring 2019)

Survey Season / Period	Conditions prior to survey/s	Rainfall during survey/s
Spring 2010 – Autumn 2012	Wet conditions (many months above average during this period)	Moderate to high rainfall
Spring 2012	Dry conditions (all winter months well below average rainfall)	Low rainfall
Autumn 2013	Wetter condition (many months above average rainfall immediately preceding)	Moderate to high rainfall
Spring 2013	Wetter conditions followed by dry winter	Moderate to high rainfall
Autumn 2014	Average conditions	Low rainfall
Spring 2014	Dry conditions	Low to moderate rainfall
Autumn 2015	Moderately wet conditions	High rainfall (exceptionally high rainfall in April 2015)
Spring 2015	Moderate to dry conditions (all winter months well below average rainfall)	Low to moderate rainfall
Autumn 2016	Wet conditions (above average rain in November 2015 and very heavy rain in January 2016)	Low rainfall (below average rainfall for all survey months)
Spring 2016	Wet conditions (heavy rain in June 2016)	Low rainfall (below average rainfall for all survey months)
Autumn 2017	Wet conditions (heavy rain in March 2017)	Low rainfall (below average rainfall for most of survey period)
Spring 2017 – Autumn 2018	Dry conditions (rainfall well below average from July 2017 onwards)	Low rainfall (below average rainfall for all survey months)
Spring 2018	Dry conditions (rainfall well below average from July 2017 onwards)	Moderate rainfall (above average rainfall for October and November 2018)
Autumn 2019	Dry conditions	Low to moderate rainfall (above average rainfall March 2019 only)

¹ Previous reporting has based mean rainfall data on Bureau of Meteorology Station No. 068228 (Bellambi). Reports since autumn 2017 have used Darkes Forest Station No. 068024 which has a longer rainfall record for comparison of long-term means.

Survey Season / Period	Conditions prior to survey/s	Rainfall during survey/s
	(rainfall well below average for all summer months)	
Spring 2019	Dry conditions (rainfall well below average for all late autumn and winter months)	Low to moderate rainfall (above average rainfall September 2019 only)

Table 3: Monthly rainfall for entire survey period (spring 2008 to spring 2019) taken from Metropolitan Colliery Meteorological Station Helensburgh 2.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	37.0	182.5	118.5	30.5	89.5	169.0	47.5	43.0	173.5	75.0	103.5	90.5
2011	42.0	4.0	164.5	59.5	51.0	167.0	169.5	91.0	75.0	80.0	162.5	76.0
2012	180.5	242.0	235.5	117.5	15.0	129.5	45.5	5.5	22.5	63.5	54.5	28.0
2013	171.0	220.5	67.0	104.5	106.5	283.5	7.0	11.0	80.5	12.0	217.5	54.5
2014	31.5	50.5	218.5	59.0	11.5	28.0	8.0	93.0	25.5	79.5	39.5	182.5
2015	113.5	96.0	32.5	445.0	101.5	62.5	53.0	81.5	38.5	30.5	119.0	60.5
2016	275.0	31.0	46.5	55.5	36.0	394.5	92.5	84.0	52.5	15.5	36.0	67.5
2017	63.0	172.0	404.5	70.0	13.5	174.5	12.5	18.5	0.5	37.0	39.0	52.5
2018	38.0	83.0	139.0	19.0	11.5	95.5	1.0	16.0	41.0	175.5	117.0	93.5
2019	58.0	44.0	180.5	24.0	6.5	88.5	36.5	48.0	130.0	29.5	40.0	2.5
Mean*	131.8	158.7	154.3	128.1	128.1	146.6	96.4	89.1	76.6	91.9	105.4	103.8

Survey periods highlighted.

* Mean data taken from Bureau of Meteorology Station No. 068024 (Darkes Forest), established in 1894 (Source: www.bom.gov.au, Jan 2020). Each monthly long-term mean is calculated using all data obtained since the commencement of monitoring at Station 068024.

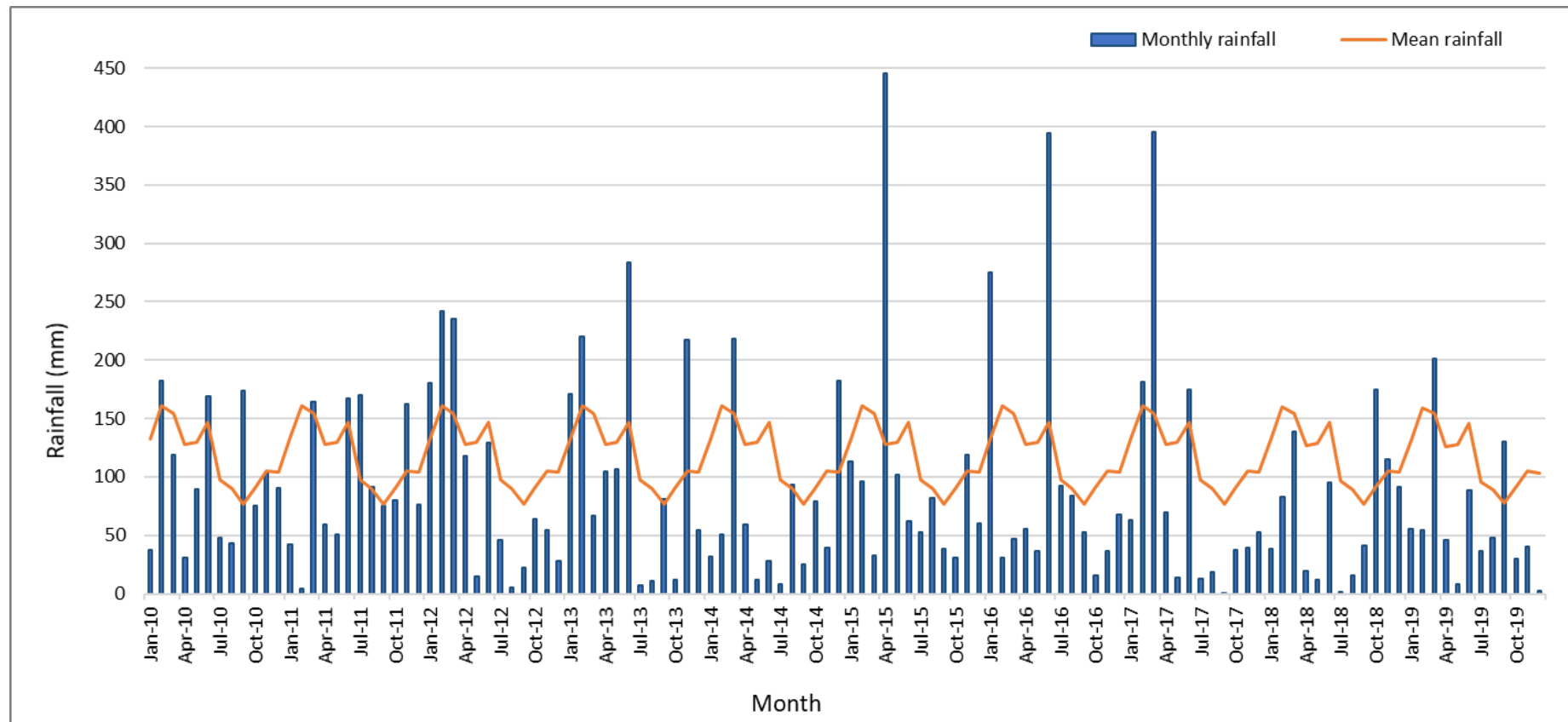


Figure 6: Monthly rainfall for the study area (January 2010 to December 2019).

Observational data from HELENSBURGH 2 Metropolitan Coal weather station (Source: Manly Hydraulics Laboratory www.mhl.nsw.gov.au, Jan 2020). Mean data taken from Bureau of Meteorology Station Number 068024 (Darkes Forest), established in 1894 (Source: www.bom.gov.au, Jan 2020).

2.6 Assessment against performance indicators

The monitoring results from the spring 2019 survey have been analysed and assessed against the performance indicators developed for upland swamp vegetation monitoring and riparian vegetation monitoring in accordance with the Longwalls 301-303 Biodiversity Management Plan (**Appendix C**).

2.6.1 Upland swamp vegetation

Visual observations

The information recorded during these inspections is used to make an assessment of changes in the condition of the swamps over time.

Transect/quadrat monitoring

The data collected from the transect/quadrat monitoring was analysed as follows:

- Analysis of the number of species (i.e. species richness) overtime and relative to control sites using analysis of variance (ANOVA). The purpose of ANOVA is to test for significant differences in floristic diversity over time. The analysis was conducted using the R statistical package v 3.6.2.
- Analysis of species lists using Cluster Analysis (ANOSIM). Cluster Analysis is a method used for combining similar objects into groups or clusters and is used to test for significant differences in species cover/abundance and condition scores overtime and relative to control sites. ANOSIM looks at groups of sites in multidimensional space and compares them with other groups to see if they are different. Data for the ANOSIM analysis were based on the average cover/abundance and average vegetation condition across all quadrats for each transect, whether a species was present or not: i.e. the transect is considered the unit of comparison. The analysis was conducted using the R statistical package v 3.6.2.

Indicator species monitoring

The data collected from indicator species monitoring is qualitatively analysed for the proportions of plants surviving, and differences in health and reproduction ratings over time and relative to control swamps.

Assessment against upland swamp vegetation performance indicator

The visual inspections, transect/quadrat data and population monitoring of indicator species is used to assess the upland swamp vegetation performance indicator:

The vegetation in upland swamps is not expected to experience changes significantly different to vegetation in control swamps.

2.6.2 Riparian vegetation

Visual inspections

The information recorded during these inspections will be used to make an assessment of changes in the condition of the riparian vegetation over time.

Quadrat monitoring

The vegetation structure data, including dominant species, height and estimated cover for each stratum, collected from the quadrat monitoring is qualitatively assessed. The full floristics and associated cover/abundance and condition data is analysed to provide an assessment of trends between monitoring sites and over time in overall species richness as well as the cover/abundance and condition of particular species.

Indicator species monitoring

The data collected from the indicator species monitoring is qualitatively analysed for the proportion of plants surviving overtime and relative to control sites, and differences in health and reproduction ratings over time and relative to control sites.

Assessment against riparian vegetation performance indicator

The vegetation monitoring conducted at locations adjacent to riparian vegetation monitoring sites and areas traversed whilst accessing the monitoring sites is used to assess the extent of riparian dieback against the riparian vegetation performance indicator:

Impacts to riparian vegetation are expected to be localised and limited in extent, similar to the impacts previously experienced at Metropolitan Coal.

The riparian vegetation performance indicator will be considered to be exceeded if vegetation monitoring:

- identifies an increase in the extent of vegetation dieback compared to that observed at site MRIP02 on the Waratah Rivulet and between sites MRIP05 and MRIP09 on the Eastern Tributary; or
- identifies vegetation dieback greater than 50 cm from the stream at sites MRIP01, MRIP03, MRIP04, MRIP06, MRIP07, MRIP08, MRIP10, MRIP11 or MRIP12, as a result of mine subsidence.

3 Results & discussion

A list of all flora species recorded during spring 2019 monitoring surveys is presented in **Appendix D**.

3.1 Upland swamp vegetation monitoring

3.1.1 Visual inspections

Visual inspections were conducted across all upland swamp sites during the spring 2019 survey. Traverses covering the majority of the extent of each swamp were conducted, and the following provides a summary of the visual observations:

- No new areas of cracking of exposed bedrock areas were observed in either longwall or control swamps, other than where minor cracks in exposed bedrock, considered to be a weathering artefact, occur (Swamp 34). No additional cracks were observed at this, or any other sites.
- No new areas of shrinkage of swamp surface sediments were observed in the current spring 2019 survey.
- Areas in which active erosion was observed were all minor and limited to sheet erosion (Swamps 30, 111a and 137a), in spring 2019. Swamps previously observed with active erosion but not recorded with any erosion impacts in spring 2019 include Swamp 19, 28, 31, 33, 34, 35, 36, 101, 125, 137b, Dahlia Swamp and Woronora River 1.
- The spring 2019 survey commenced following an extended dry period from July 2017 onwards. Throughout this period, monthly rainfall has remained below average apart from October and November 2018 and March 2019, which all had above average rainfall. During the spring 2019 survey, rainfall for the month of September was above average but remained well below average during October and November. The limited rainfall prior to and throughout the survey season is reflected in the occurrence of only minor seepage recorded at five valley side swamps (four longwall and one control) in spring 2019:
 - Swamp 19 (minor seepage between Photo Point 2 and Photo Point 3);
 - Swamp 30 (widespread shallow seepage across most of the rock platform) (**Plate 1**);
 - Swamp 33 (minor seepage along terminal step between Photo Point 4 and bottom of Transect 2, as well as to the south of the bottom of Transect 3); and
 - Swamp 36 (shallow seepage across rock bar north of Photo Point 2); and
 - Swamp 135 (minor seepage at end of Transect 3).
- For Tea Tree Thicket swamps, standing water and seepage were not recorded in any of the three larger headwater control swamps, although surface sediments were damp/moist to wet at all sites. Similarly, no standing water or seepage was observed in the Tea Tree Thicket vegetation component of longwall Swamp 28 and soil surface sediments were damp/moist. Swamp 28 has consistently been observed with drier swamp sediments and less standing water than the larger control swamps, including during the baseline monitoring period.
- Across all upland swamps, no changes in water colour or new areas of water ponding were observed in either longwall or control swamps in spring 2019. One stagnant pool was observed in the creek line adjacent to Transect 2, in control site Swamp 125.
- For the valley side swamps supporting Restioid Heath and Banksia Thicket, vegetation in spring 2019 at both longwall and control sites was found to be in a range of conditions, varying from healthy to stressed, with a number of shrubs and ground layer species recorded with leaf yellowing and dieback. Healthy individuals of all species noted with dieback were observed within

all swamps, with dieback most evident where soils are shallow, particularly over rocky areas. While the cause of stressed vegetation is unknown, its occurrence within longwall and control swamps, indicates that leaf yellowing and dieback is likely attributable to environmental conditions, including the stress associated with drying out of shallow soils during below-average rainfall prior to the spring 2019 survey period, and not related to mining of Longwalls 23-27. Visual observations noted the following details regarding vegetation stress of particular species, vegetation layers and swamps:

- Stressed individuals, or individuals with yellowing foliage, which were common in both longwall and control swamps including: *Banksia ericifolia* subsp. *ericifolia* (Swamps 19, 30, 31, 32, 33, 34, 35, 36, 94, 101, 125, 135, 136, 137a and 137b), *Hakea teretifolia* (Swamps 19, 33, 35, 36, 101, 111a, 135, 136, 137a, 137b and 138), *Leptospermum squarrosum* (Swamps 35, 94, 137a and 137b) and *Petrophile pulchella* (Swamps 31, 32, 33, 34, 101, 111a, 125 and 136).
- Within the shrub layer, scattered dead individuals or individuals with severe dieback included: *Banksia ericifolia* subsp. *ericifolia* (Swamps 31, 34, 94, 135 and 137a), *Hakea teretifolia* (Swamp 137a), *Leptospermum squarrosum* (Swamp 94) and *Petrophile pulchella* (Swamp 31) individuals.
- One shrub species, *Baeckea imbricata*, was observed with individuals with yellowing foliage or dieback in a number of longwall swamps only (Swamps 19, 30 and 35).
- Within the ground layer, sedge species observed with yellowing foliage and/or senescing culms were recorded in most longwall and control sites and included *Chordifex dimorphus*, *C. fastigiatus*, *Empodisma minus*, *Lepidosperma filiformis*, *L. neesii*, *L. limicola*, *Lepyrodia scariosa* and *Schoenus brevifolius* (Swamps 32, 33, 35, 36, 94, 111a, 125, 136, 137a and 138).
- In spring 2017, large areas of senescing vegetation were recorded in Swamp 30 (scattered throughout), Swamp 31 (at the north end of the swamp near the rocky step) and Swamp 33 (across the mid southern end of the swamp). In these swamps, along with Swamp 32, it was noted that individuals of the shrubs *Banksia ericifolia* subsp. *ericifolia* and *Hakea teretifolia*, were consistently observed scattered throughout the whole swamp to be yellowing or dead. Areas of senescing vegetation remained similar in the autumn 2018 survey, with the exception of Swamp 33 where few live *Hakea teretifolia* individuals were observed, especially in the vicinity of Transect 2 and Photo Point 3a. In the previous two surveys, spring 2018 and autumn 2019, vegetation continued to appear stressed in both the shrub and ground layers of these swamps, however large areas of senescing vegetation were only observed in Swamp 31 around the rock platform at Photo Point 3. Regrowth of *Banksia ericifolia* subsp. *ericifolia* and *Hakea teretifolia* was also observed in autumn 2019. In spring 2019, vegetation in these swamps remains in a similar condition to the previous season, however vegetation condition continues to decrease in Swamp 31, at Photo Point 3, where senescing *Banksia ericifolia* subsp. *ericifolia* and *Petrophile pulchella* were common (**Plate 2**).
- In autumn 2019, large patches of vegetation in Swamp 19 were recorded to be in a declined condition (Condition 3), particularly around the rock plates at Photo Points 1a and 2, with yellowing and senescing of *Banksia ericifolia* subsp. *ericifolia*, *Leptospermum squarrosum*, *Hakea teretifolia* and *Baeckea imbricata* individuals. In the current spring 2019 survey, vegetation remains in a stressed condition, similar to autumn 2019, with yellowing and senescing of *Banksia ericifolia* subsp. *ericifolia* and *Baeckea imbricata* individuals scattered throughout and *Leptospermum arachnoides* commonly observed with yellowing foliage and some dead branches (Condition 3) on and around the rock platforms (**Plate 3**).

- In spring 2019, individuals of *Banksia ericifolia* subsp. *ericifolia* which were senescing or had yellowing foliage were common throughout Swamp 94, particularly around the rock plates and steps at Photo Points 2, 3, and 6 (**Plate 4**). At Photo Point 3, yellowing foliage and dead individuals of *Leptospermum squarrosum* were also common.
- For the Tea Tree Thicket swamps, vegetation of both longwall (lower portion of Swamp 28) and control swamps was found to be generally in better condition than at the Banksia Thicket and Restioid Heath sites in spring 2019, with most vegetation found to be in good condition. Exceptions to the generally good condition of vegetation included the following:
 - Dieback of the understorey species *Empodisma minus* and *Gleichenia microphylla* was observed within the lower portion of longwall Swamp 28, similar to that observed in autumn 2019. Some minor regrowth of *Empodisma minus* was observed along Transect 2, however this was not captured by the floristics data. The dieback of these species within Swamp 28 has been previously observed including within baseline monitoring periods and is attributed to the dense mid-storey vegetation shading the understorey.
 - *Gleichenia microphylla* was observed with dieback within all Tea Tree Thicket Swamps (both longwall and control swamps), however it was noted that most patches were not recent dieback, being the same patches that have been noted in previous reports and are still standing due to the sheltered nature of these swamps.
 - Consistent with all prior surveys, no standing water or seepage was observed within Swamp 28, however soils were damp/moist at the site in spring 2019. Swamp 28 has been observed to be a much drier swamp, compared to the control swamps since monitoring began in spring 2010². This may also contribute to the increased dieback within Swamp 28 compared to the control sites, particularly for *Gleichenia microphylla* and *Empodisma minus*. In spring 2019, sediments in all control swamps were recorded as damp/moist to wet.
- No weed species were observed within any of the longwall or control swamps during the spring 2019 visual inspections.

² It is noted that while Dahlia Swamp and Woronora River 1 swamps are used as controls for the Tea Tree Thicket vegetation in Swamp 28, these large headwater swamps are not comparable from a hydrogeological perspective as Swamp 28 is located in a valley-side position. Being large head-water swamps, the control swamps remain moist most of the time. For groundwater monitoring, the valley-side Swamps 137a and 137b are used as control sites for Swamp 28.



Plate 1: Swamp 30, Photo Point 3, showing seepage along rock platform – Spring 2019.



Plate 2: Swamp 31, Photo Point 3, showing yellowing and senescing of *Banksia ericifolia* subsp. *ericifolia* and *Petrophile pulchella* on the terminal step – Spring 2019.



Plate 3: Swamp 19, Photo Point 2, showing yellowing *Leptospermum arachnoides* and senescing *Banksia ericifolia* subsp. *ericifolia* and *Baeckea imbricata* – Spring 2019.



Plate 4: Swamp 94, Photo Point 3, showing yellowing and senescing of *Banksia ericifolia* subsp. *ericifolia* and *Leptospermum squarrosum* – Spring 2019.

3.1.2 Transect/quadrat monitoring

Vegetation structure, dominant species, and estimated cover for each stratum

The vegetation structure, dominant species and estimated cover for each stratum at upland swamp monitoring sites is provided in **Appendices E, F and G**.

The vegetation structure, dominant species and estimated cover for each stratum has been variable across all seasons with variations recorded between sites, seasons and strata. This variability is considered to reflect both the natural variations in the height and cover of vegetation structural layers through time, as well as the subjective nature of the data collection. Within the variability of this dataset, a general trend towards increasing height and cover of the mid layer vegetation and reduction in cover of the ground layer has occurred from spring 2010 to spring 2019 across all longwall and control sites. The increase in height and foliage cover of the mid-storey and subsequent decrease in groundcover is a recognised pattern which typically occurs within upland swamps with increased time since fire (Keith & Bradstock 1994). With increased time since fire, upland swamps commonly form dense thickets dominated by obligate seeders such as *Banksia ericifolia* subsp. *ericifolia*, *Hakea teretifolia* and *Leptospermum squarrosum*, with smaller shrubs and sedges tending to become sparser and less diverse. The formation of these dense thickets is mediated by fires, which reduces the cover of these obligate seeders.

Species richness

A summary of species richness within swamp quadrats since spring 2010 is provided in **Table 4** and in **Figure 7** and **Figure 8**. The raw data for each swamp is presented in **Appendices E, F and G**.

As observed for the baseline monitoring period (spring 2010 to spring 2013), species richness in spring 2019 was generally higher in valley side swamps supporting Restioid Heath and Banksia Thicket than in swamps supporting Tea Tree Thicket (**Table 4, Figure 7** and **Figure 8**).

Species richness within individual Restioid Heath and Banksia Thicket sites in spring 2019 was within the range of previous seasons for most sites (**Figure 7**), with the exception of longwall Swamp 28 – Transect 1 and control Swamp 101, which decreased below the range previously recorded for these sites by one and two species, respectively. In spring 2019, one control site (Swamp 137b) recorded a small decrease in species richness compared to autumn 2019. All other longwall sites and control sites recorded a small to moderate increase in species richness, with the exception of control Swamp 125 which remained unchanged, since autumn 2019.

The changes in species richness recorded at Restioid Heath / Banksia Thicket swamps in spring 2019 are contrary to the pattern of overall decrease in species richness which has been recorded across most longwall and control sites since spring 2016, although increases in species richness in spring 2019 were relatively small at most sites (one to two species). While the cause of the overall decrease in species richness since spring 2016 is unknown, its occurrence within both longwall and control sites indicates that this decrease may be attributable to environmental conditions, including the stress associated with drying out of shallow soils during the extended period of below-average rainfall from July 2017 through to the spring 2019 survey period.

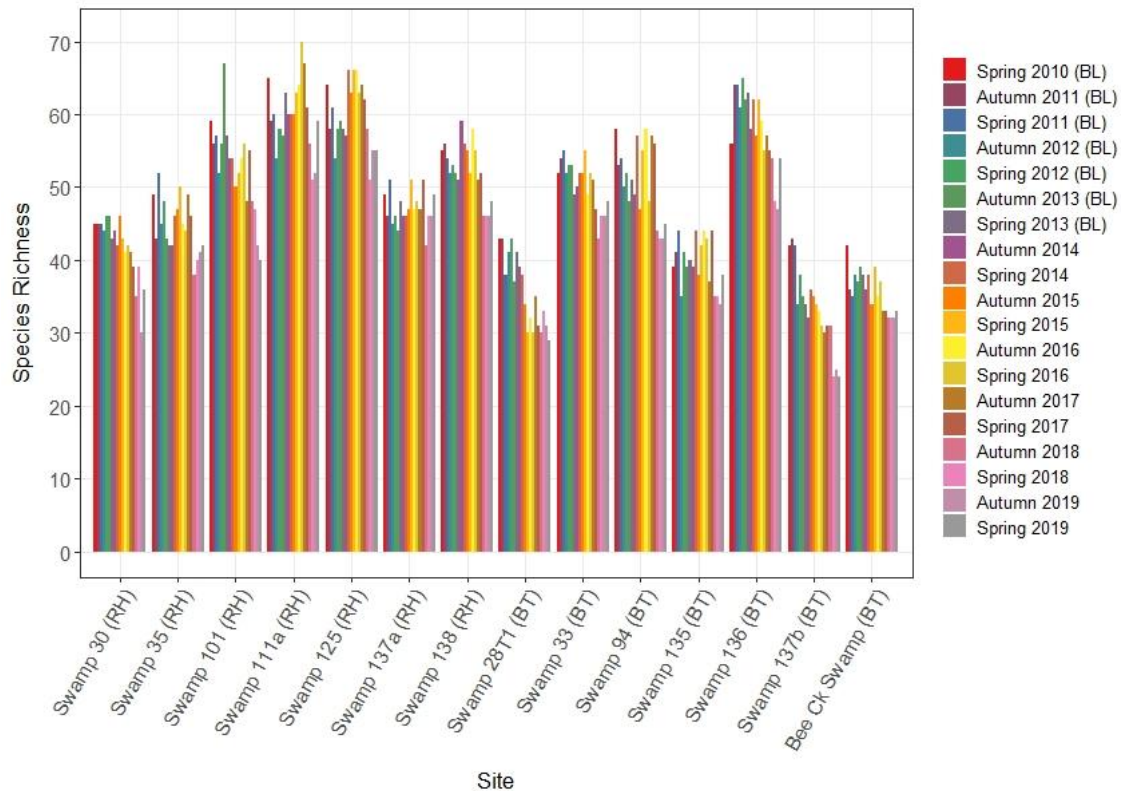


Figure 7: Native species richness within upland swamp sites supporting Restioid Heath (RH) and Banksia Thicket (BT), spring 2010 to spring 2019, BL = baseline.

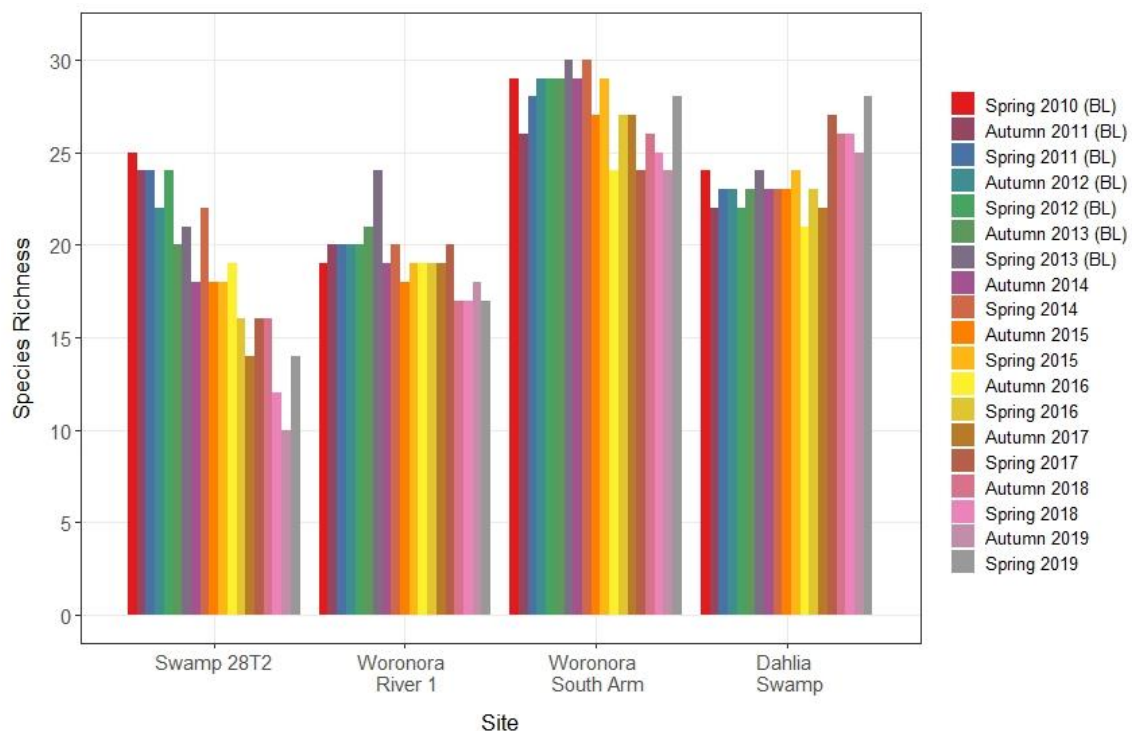


Figure 8: Native species richness within upland swamp sites supporting Tea Tree Thicket, spring 2010 to spring 2019, BL = baseline³.

³ Figures for Dahlia Swamp for autumn 2018 and spring 2018 differ slightly from previous reports due to error in exotic species definition.

Table 4: Number of native species recorded in upland swamps (spring 2010 to spring 2019).

Site	Spring 2010	Autumn 2011	Spring 2011	Autumn 2012	Spring 2012	Autumn 2013	Spring 2013	Autumn 2014	Spring 2014	Autumn 2015	Spring 2015	Autumn 2016	Spring 2016	Autumn 2017	Spring 2017	Autumn 2018	Spring 2018	Autumn 2019	Spring 2019
Swamp 30 (RH)	45	45	45	44	46	46	43	44	42	46	43	41	42	41	39	35	39	30	36
Swamp 35 (RH)	49	43	52	45	48	43	42	42	46	47	50	45	44	49	46	38	40	41	42
Swamp 101 (RH)	59	56	57	52	56	67	57	54	54	50	52	54	56	48	55	48	47	42	40
Swamp 111a (RH)	65	59	60	54	58	57	63	60	60	60	63	64	70	67	61	56	51	52	56
Swamp 125 (RH)	64	58	61	54	58	59	58	57	66	63	66	66	63	64	62	58	51	55	55
Swamp 137a (RH)	49	46	51	45	46	44	48	47	46	46	51	47	48	47	51	42	46	46	49
Swamp 138 (RH)	55	56	54	52	53	52	51	59	56	55	52	58	55	51	52	46	46	46	48
Swamp 28 – T1 (BT)	43	43	38	41	43	41	41	39	38	34	30	32	30	35	31	30	33	31	29
Swamp 33 (BT)	53	55	55	52	53	53	49	50	52	52	55	49	52	51	47	43	46	46	48
Swamp 94 (BT)	58	53	54	50	52	48	51	49	57	47	55	58	48	57	56	44	43	43	45
Swamp 135 (BT)	39	41	44	35	41	39	40	39	44	38	42	44	43	37	44	35	35	34	38
Swamp 136 (BT)	56	64	64	61	65	62	63	58	62	57	62	59	55	57	55	54	48	47	54
Swamp 137b (BT)	42	43	42	34	38	35	34	32	36	35	34	33	31	30	31	31	24	25	24
Bee Creek (BT)	42	36	35	38	37	39	38	36	38	34	39	35	37	33	33	32	32	32	33
Swamp 28 – T2 (TTT)	25	24	24	22	24	20	21	18	22	18	18	19	16	14	16	16	12	10	14
Woronora River 1 (TTT)	19	20	20	20	20	21	24	19	20	18	19	19	19	19	20	17	17	18	17
Woronora River south arm (TTT)	29	26	28	29	29	29	30	29	30	27	29	24	27	27	24	26	25	24	28
Dahlia Swamp (TTT) ⁴	24	22	23	23	22	23	24	23	23	23	24	21 (2)	23	22	27	26 (1)	26 (2)	25 (1)	28

Numbers in brackets indicate the number of exotic species recorded, additional to native species

RH = Restioid Heath; BT = Banksia Thicket; TTT = Tea Tree Thicket

⁴ Figures for Dahlia Swamp for autumn 2018 and spring 2018 differ slightly from previous reports due to error in exotic species definition.

Species richness within individual Tea Tree Thicket sites in spring 2019 was within the range of previous seasons at the single longwall (Swamp 28 – Transect 2) and two of the control sites (Woronora River 1 and Woronora River south arm), whilst the remaining control site (Dahlia Swamp) recorded the highest species richness observed at this site for the entire monitoring period (**Figure 8**). At the longwall site (Swamp 28 – Transect 2) a moderate increase in species richness since autumn 2019 was recorded (four species). A small decrease in species richness was recorded at one of the control sites (Woronora River 1), while a small to moderate increase in species richness since autumn 2019 was observed at the remaining two control sites (Dahlia Swamp and Woronora River south arm).

Species richness across Swamp 28 has reduced over time in both the Banksia Thicket and Tea Tree Thicket vegetation during both the baseline and mining period (**Table 4**), although small increases in the species richness of the Banksia Thicket component (Transect 1) were recorded in the autumn 2017 and spring 2018 surveys (**Figure 7**). Generally, the greatest decline in species number has been occurring in the Tea Tree Thicket component (Transect 2), located at the topographically lower section of the swamp. However, in the current spring 2019 survey, species richness within the Banksia Thicket component of Swamp 28 (Transect 1) declined below the previously recorded range for this site (by one species), whilst in the Tea Tree Thicket component (Transect 2) it increased by four species from the previous season (**Figure 8**). Declines in species richness in Swamp 28 may be related to the impacts to the groundwater system of Swamp 28 identified in 2016, based on the incomplete recovery of substrate water levels following rainfall events (Metropolitan Coal 2018).

Overall, a total of 41 species have been recorded within Swamp 28 (Transect 2) over the monitoring period:

- A total of eight species recorded during the baseline period were not recorded by the end of the baseline period (**Table 5**) or during the mining period (**Table 6**). Of the eight species not recorded by the end of the baseline period, two are considered to be wet heath or swamp species, namely: *Boronia parviflora* and *Selaginella uliginosum*, however these two species were recorded only once during the baseline period.
- An additional nineteen species were recorded within the mining period, but were not recorded by the spring 2019 survey. Of these species:
 - Five species (*Actinotus minor*, *Hakea dactyloides*, *H. salicifolia*⁵, *Leptospermum arachnoides* and *Ptilothrix deusta*) had been recorded in one or two surveys only during the mining period and were not recorded in the baseline period. All were recorded in only one quadrat with low estimated cover/abundance scores (1 or 2, i.e. cover less than 5 % of the quadrat).
 - Two species are considered to be wet heath or swamp species, namely: *Bauera microphylla* and *Monotaxis linifolia*. *Bauera microphylla* was recorded in all baseline surveys prior to, and including, spring 2012 and was then not recorded until autumn 2016. During the baseline period, *Monotaxis linifolia* was recorded in every survey and during the mining period was only recorded in the spring 2014, autumn 2015 and spring 2015 surveys.
- All species recorded in autumn 2019 were again recorded in spring 2019.
- Three species which had previously been recorded within the mining period but were not recorded by the previous autumn 2019 survey, were again recorded in spring 2019, namely *Leptocarpus tenax*, *Leptomeria acida* and *Schoenus brevifolius*.

⁵ It is suspected that the *H. dactyloides*, only recorded in the spring 2017 survey may be a misidentification of *H. salicifolia* given its absence from all other surveys, and the observation of this species for the first time in autumn 2018. Both were recorded with an estimated cover/abundance of 1 (cover less than 5 % of the site and rare) and noted to be overhanging the quadrat area.

- *Leptocarpus tenax* was recorded during all surveys across the baseline period but only sporadically across the mining period (autumn 2014, spring 2014, autumn 2018 and spring 2018).
- *Leptomeria acida* was recorded during most surveys across the baseline period (excluding spring 2011 and spring 2012) and most surveys during the mining period (excluding autumn 2014, autumn 2016, spring 2018 and autumn 2019).
- *Schoenus brevifolius* was recorded during all surveys across the baseline and monitoring period, prior to spring 2018.
- An additional species, *Cyathochaeta diandra* was recorded during the spring 2019 survey which has not previously been recorded within Swamp 28 – Transect 2. *Cyathochaeta diandra* was recorded in two quadrats with an estimated cover/abundance of 1 (cover less than 5 % of the site and rare) and was noted to be in Condition 5 (healthy condition).

In contrast, species richness in control sites (Woronora River 1, Woronora River south arm and Dahlia Swamp) has remained relatively stable throughout the monitoring period, however these large headwater swamps are not comparable from a hydrogeological perspective. Swamp 28 is very small, does not contain any internal drainage lines and free surface water has never been observed at this site since the inception of monitoring. Species richness in Transect 2 of Swamp 28 will continue to be closely monitored.

Table 5: Species Richness for Swamp28 (Transect 2) – Baseline Period (values are cover/abundance scores).

Family	Scientific Name	S28T2Q1S10	S28T2Q2S10	S28T2Q3S10	S28T2Q4S10	S28T2Q5S10	S28T2Q1A11	S28T2Q2A11	S28T2Q3A11	S28T2Q4A11	S28T2Q5A11	S28T2Q1S11	S28T2Q2S11	S28T2Q3S11	S28T2Q4S11	S28T2Q5S11	S28T2Q1A12	S28T2Q2A12	S28T2Q3A12	S28T2Q4A12	S28T2Q5A12	S28T2Q1S12	S28T2Q2S12	S28T2Q3S12	S28T2Q4S12	S28T2Q5S12	S28T2Q1A13	S28T2Q2A13	S28T2Q3A13	S28T2Q4A13	S28T2Q5A13	S28T2Q1S13	S28T2Q2S13	S28T2Q3S13	S28T2Q4S13	S28T2Q5S13	
Apiaceae	Actinotus minor																																				
Apiaceae	Xanthosia pilosa	1		1																																	
Cunoniaceae	Bauera microphylla			1					1					1					1				1	1													
Cunoniaceae	Bauera rubioides																																				
Cyperaceae	Cyathochaeta diandra																																				
Cyperaceae	Lepidosperma filiforme																								2	1											
Cyperaceae	Ptilothrix deusta																																				
Cyperaceae	Schoenus brevifolius		3	3	4	3		1	3	3	3		1	3	1	1		1	2	3	3		1	3	3	1			2	1	3	1		1	2	1	1
Droseraceae	Drosera binata	2			1							1										1			1	1						1			1		
Ericaceae	Epacris obtusifolia		2	2		3		2	1	1	3		2	3				1	3	1	1		3	3	1	1		3	1	2	1	1	4	2	1	1	
Euphorbiaceae	Monotaxis linifolia	2		1			1					1		1			1					2					2		4	1	2		1				
Fabaceae (Faboideae)	Dillwynia floribunda	1	3	1	3	3	1	3		3		1	2	1	1		1	2	1	1		1	3	2	2			4	1	2			4	1	1		
Fabaceae (Mimosoideae)	Acacia linifolia																										1										
Fabaceae (Mimosoideae)	Acacia terminalis	1						1						1								1										1					
Gleicheniaceae	Gleichenia microphylla	4	4	3	4	3	4	4	3	4	4	5	4	3	5	3	3	5	2	4	4	5	4	3	4	1	4	4	1	3	1	4	3	3	3	3	
Goodeniaceae	Dampiera stricta						1		1					1					1					1					1								
Lauraceae	Cassytha glabella	1			1	3	3	1			2	1				1						1		2	1				1			1				1	
Myrtaceae	Callistemon citrinus	4	1	5	3	1	1	1	4	3	1	4		5	2	1	4		4	5	1	1	1	4	3	2	1		4	5	1	1	1	4	4	2	
Myrtaceae	Leptospermum arachnoides																																				
Myrtaceae	Leptospermum grandifolium	1	3				1	4				2	1					1				1	3				1	3				1					
Myrtaceae	Leptospermum squarrosum					1			1									1															4				
Orchidaceae	Cryptostylis erecta																																				
Orchidaceae	Cryptostylis subulata						1					1																									
Poaceae	Entolasia stricta																								1												
Poaceae	Tetrarrhena turfosa	1			2		3		1	1		1					1	1				3					1	1			1	1	1			1	
Proteaceae	Banksia ericifolia subsp. ericifolia	5	3	5	5	5	4		4	4	4	4		5	5	5	5	4	5	5	5	5	1	4	5	5	5	5	4	5	4	4	5	1	5	5	4
Proteaceae	Banksia robur	5	5		1		1	5		1		4	4		1		4	4				4	4		2		4	4				4	5				
Proteaceae	Grevillea patulifolia																1																				
Proteaceae	Hakea dactyloides																																				
Proteaceae	Hakea salicifolia																																				
Proteaceae	Hakea teretifolia				1	5				4	4				1	4				1	4				2	5				4	5				4		
Proteaceae	Persoonia pinifolia		1			1		4			1		1			1		4					1		3				4		1		1		1	4	
Proteaceae	Petrophile pulchella																																				
Proteaceae	Symphionema paludosum	3			3	3	3			2	1	2			3		3	3		2		1			3	3		2			1		3			1	1
Restionaceae	Empodisma minus	5	4	4	4	4	5	4	4	4	4	4	4	1	3	3	3	3	4	3	3	4	3	3	3	3	4	4	3	3	1	3	3	4	2	3	
Restionaceae	Leptocarpus tenax		3			2	2				1					1	1					2	2				1	3					1				
Rutaceae	Boronia parviflora											1																									
Santalaceae	Leptomeria acida		1					1										1										1					1				
Selaginellaceae	Selaginella uliginosa					2																															
Thymelaeaceae	Pimelea linifolia subsp. linifolia	3		1			1			1		1		1			1					1			1	1				1	1			1	1		
Xanthorrhoeaceae	Xanthorrhoea resinosa			1					1	1				1					1					1	1					1	1						
Total species per survey, baseline period		25					24					24					22					24					20					21					
Total species recorded in baseline period		32																																			
	species no longer recorded baseline period																																				
	species no longer recorded mining period																																				
	additional species – mining period only																																				

30

Transect/quadrat monitoring analysis – Species richness

Upland swamp sites were split into two groups for analysis on the basis of their floristic differences: Restioid Heath / Banksia Thicket and Tea Tree Thicket swamps.

For the Restioid Heath / Banksia Thicket sites, species richness data were analysed for each season using analysis of variance (ANOVA). No significant differences were detected between longwall and control sites in any season including spring 2019 ($p = 0.457$; **Figure 9**).

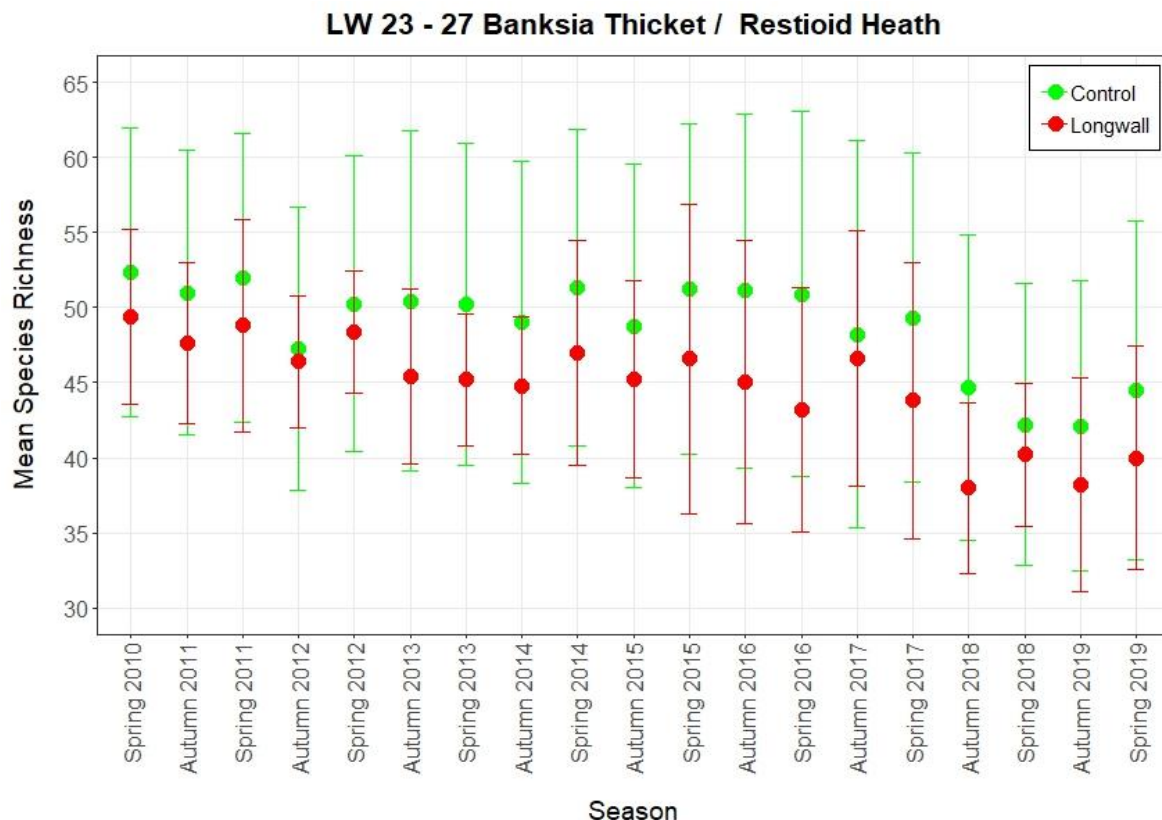


Figure 9: Mean species richness in upland swamp sites supporting Restioid Heath and Banksia Thicket, spring 2010 to spring 2019.

As there is only one Tea Tree Thicket longwall site, the species richness data was not analysed using ANOVA. Instead, a graphical representation of the data is presented in **Figure 10**. Mean species richness in control sites remains higher than the species richness recorded for the single longwall site (Swamp 28 – Transect 2), a trend that has been consistent since autumn 2013, during the baseline monitoring period. As discussed above, species richness within the single longwall swamp (Swamp 28 – Transect 2) has shown an overall decline, decreasing below the previously recorded range for this site in autumn 2019. In spring 2019 the species richness in the single longwall swamp (Swamp 28 – Transect 2) increased compared to the previous autumn 2019. Mean species richness in Tea Tree Thicket control sites increased slightly compared to autumn 2019, remaining within the range previously measured across all seasons (**Figure 10**).

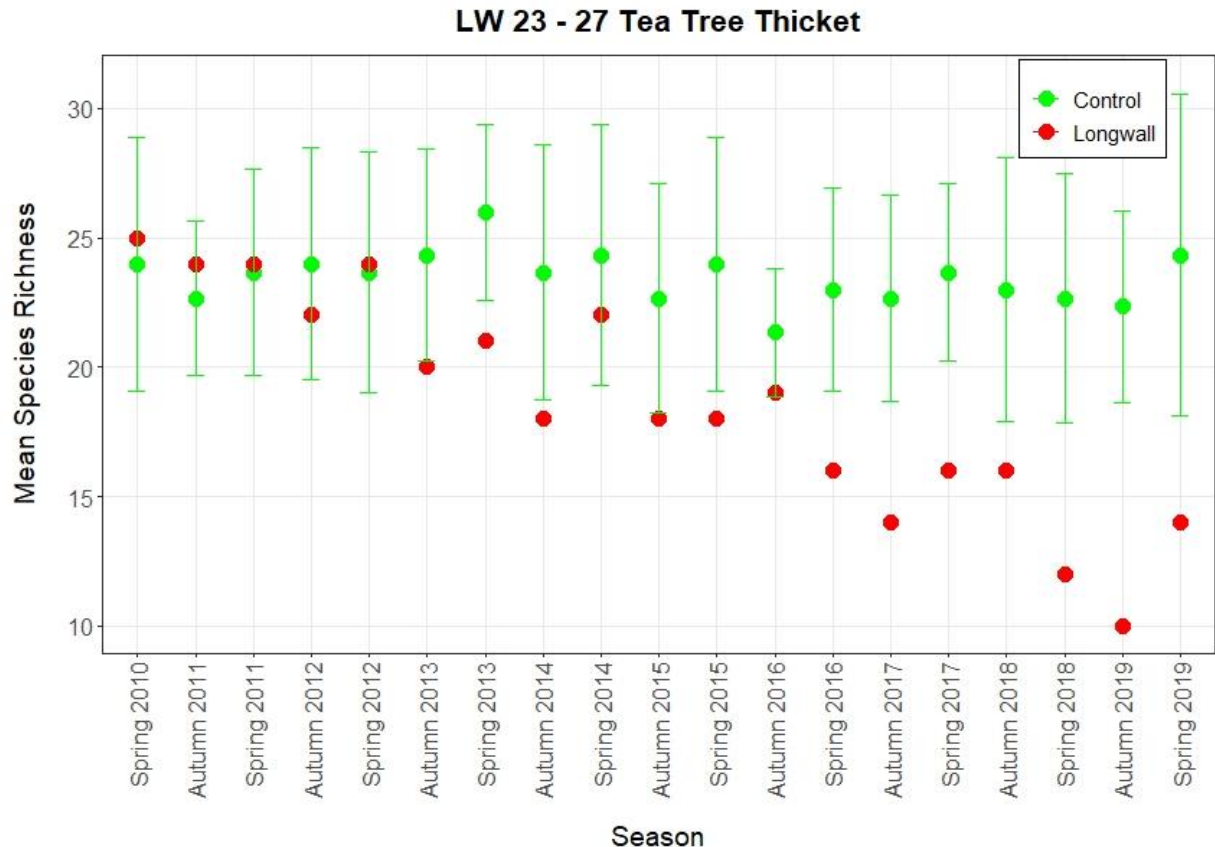


Figure 10: Mean species richness in upland swamp sites supporting Tea Tree Thicket, spring 2010 to spring 2019.

Cover/abundance and condition

The cover/abundance and condition ratings for each species are provided in **Appendices E, F and G**.

As for the baseline monitoring period, fluctuations in species cover/abundance were recorded across all sites in spring 2019. No patterns of increasing or decreasing cover/abundance were identified in relation to individual species across sites or groups of species (i.e. swamp indicator species, generalist species, shrubs, groundcovers) within sites.

Fluctuations in vegetation condition were also recorded across all sites. Generally, vegetation within both Restioid Heath / Banksia Thicket and Tea Tree Thicket swamps was in a healthy condition throughout the survey period and observations of dieback were limited to a small number of species and scattered individuals within swamps.

Within Restioid Heath / Banksia Thicket sites, a number of species were observed with dieback and leaf yellowing in both longwall and control sites, having condition ratings ranging from minor (Condition 4) to severe (Condition 1) damage/dieback. Species most commonly observed with some dieback in both longwall and control swamps were predominantly ground layer sedge species: *Chordifex fastigiatus*, *Chorizandra cymbaria*, *Empodisma minus* and *Schoenus brevifolius*.

The majority of species which were observed with dieback within longwall swamps in spring 2019 were also observed with dieback within control swamps (where the species occurred in both longwall and control swamps) (**Table 7**). Four species were observed with dieback in longwall swamps (i.e. Condition <5) and not observed with dieback within control swamps. Observations of dieback were limited to individual plants with minor dieback (Condition 4) or rarely some dead branches (Condition 3).

Ten species were observed with dieback within control swamps and were not observed with dieback within longwall swamps (**Table 7**). A full list of species and their condition scores, including those observed with dieback, within longwall and control swamps supporting Restioid Heath / Banksia Thicket in spring 2019 is provided in **Appendix E** and **F**.

Table 7: Species with dieback (Condition score <5) in longwall and controls sites supporting Restioid Heath / Banksia Thicket.

LONGWALL Sites only	CONTROL Sites only	LONGWALL & CONTROL Sites
<i>Allocasuarina distyla</i>	<i>Banksia oblongifolia</i>	<i>Baeckea imbricata</i>
<i>Bauera rubioides</i>	<i>Bauera microphylla</i>	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
<i>Gleichenia dicarpa</i> *	<i>Boronia parviflora</i>	<i>Cassytha glabella</i>
<i>Lepidosperma limicola</i>	<i>Chordifex dimorphus</i> **	<i>Chordifex fastigiatus</i>
<i>Sphaerolobium vimineum</i>	<i>Corymbia gummifera</i>	<i>Chorizandra cymbaria</i>
	<i>Cyathochaeta diandra</i>	<i>Empodisma minus</i>
	<i>Entolasia stricta</i>	<i>Epacris microphylla</i>
	<i>Gahnia sieberiana</i> **	<i>Epacris obtusifolia</i>
	<i>Gleichenia microphylla</i> **	<i>Hakea teretifolia</i>
	<i>Hakea gibbosa</i>	<i>Lepidosperma filiforme</i>
	<i>Isopogon anethifolius</i>	<i>Lepidosperma neesii</i>
	<i>Leucopogon esquamatus</i>	<i>Leptocarpus tenax</i>
	<i>Platysace linearifolia</i> **	<i>Leptospermum squarrosum</i>
	<i>Selaginella uliginosa</i>	<i>Lepyrodia scariosa</i>
		<i>Petrophile pulchella</i>
		<i>Ptilothrix deusta</i>
		<i>Pultenaea aristata</i>
		<i>Schoenus brevifolius</i>
		<i>Sprengelia incarnata</i>
		<i>Xanthorrhoea resinosa</i>

* species not found in control sites in spring 2019

** species not found in longwall sites in spring 2019

The average vegetation condition for each species, that is the mean of the vegetation condition scores recorded for each species across an individual swamp, was calculated from the spring 2019 data and compared to previous seasons. In spring 2019, the number of species that had an average vegetation condition less than 5 was within the range of previous seasons for all longwall sites, with two longwall sites (Swamps 30 and 35) increasing from autumn 2019 (by two species and one species, respectively). Similarly, two control swamps (Swamps 111a and 125) recorded an increase in the number of species with an average vegetation condition less than 5 (by three species and two species, respectively).

Within Tea Tree Thicket sites, the majority of species were recorded in a healthy condition in spring 2019. Those species which were recorded with dieback within the single longwall swamp, Swamp 28 (Transect 2), were also observed with dieback within control swamps, in particular:

- *Gleichenia microphylla* was recorded with severe dieback (Condition 1) in autumn 2018 across the whole of the Tea Tree Thicket portion of Swamp 28, a level of dieback which exceeded that which has previously been recorded, including during the baseline monitoring period. From spring 2018 to the current spring 2019 survey, no *Gleichenia microphylla* was recorded due to all individuals within survey plots being dead. Dieback was variable between control swamps, with most dieback recorded within the lower end of control swamp Woronora River 1 (adjacent to

Transect 1), as in previous seasons. However, it was noted that most patches were not recent dieback, being the same patches that have been noted in previous reports and are still standing due to the sheltered nature of these swamps. In addition, regrowth was frequently observed amongst this standing dead litter in spring 2019.

- Within Swamp 28 (Transect 2), *Empodisma minus* was observed in a healthy condition (Condition 5) or with minor dieback (Condition 4) or some dead culms (Condition 3). In control swamps this species remained in a healthy condition, with only isolated individuals recorded in the floristic survey with minor dieback (Condition 4) or some dead culms (Condition 3). As discussed in **Section 3.1.1**, dieback of *Empodisma minus* has occurred within Swamp 28 in previous seasons, however the condition of this species within both Swamp 28 and control sites has improved in spring 2019, compared to previous seasons. Observations of dieback of this species also occurred during the baseline monitoring period and is attributed to the tall dense mid-storey within this swamp shading the understorey, in which *Empodisma minus* is a dominant species.
- Within Swamp 28 (Transect 2), *Epacris obtusifolia* and *Leptocarpus tenax* were recorded with minor dieback (Condition 4) in one plot each, while all other records of these species, including those within control sites, were in a healthy condition.

Transect/quadrat monitoring analysis – vegetation cover/abundance

Upland swamp sites were split into two groups for analysis on the basis of their floristic differences: Restioid Heath / Banksia Thicket and Tea Tree Thicket swamps. Analysis of similarities (ANOSIM) was used to examine the differences in vegetation composition, as measured by species cover/abundance, of Restioid Heath / Banksia Thicket swamps between the longwall and control sites for each season, and the results are presented in **Table 8**. As there is only one Tea Tree Thicket longwall site, differences in vegetation cover/abundance was not analysed using ANOSIM.

Significant differences in vegetation composition between longwall and control sites, as recorded by species cover/abundance, were observed in all seasons from spring 2010 to autumn 2014 (except autumn 2012 where a marginal difference was detected), and again from autumn 2018 to the previous autumn 2019 survey. No significant difference was observed for the period between spring 2014 to spring 2017 survey. In the current spring 2019 survey, a significant difference between longwall and control sites was again recorded, however the low R statistic indicates that the treatment variable (control versus longwall) has a weak effect on this difference (**Table 8**). The R statistic in spring 2019 is very similar to that recorded since autumn 2018 and only marginally higher than that measured in spring 2011, during the baseline period. Therefore, the magnitude of the difference between longwall and control sites based on the vegetation composition has not varied greatly over time from the baseline period, and the measured differences are considered attributable to natural differences and seasonal variations in vegetation composition between individual swamps.

Table 8: Analysis of Similarities (ANOSIM) for vegetation cover/abundance in upland swamps supporting Restioid Heath / Banksia Thicket.

Season	R statistic	p-value
Spring 2010	0.173	0.039
Autumn 2011	0.167	0.038
Spring 2011	0.206	0.015
Autumn 2012	0.132	0.057
Spring 2012	0.142	0.04
Autumn 2013	0.154	0.044
Spring 2013	0.152	0.032
Autumn 2014	0.175	0.021
Spring 2014	0.099	0.109
Autumn 2015	0.125	0.068
Spring 2015	0.102	0.121
Autumn 2016	0.108	0.083
Spring 2016	0.0917	0.106
Autumn 2017	0.1156	0.063
Spring 2017	-0.104	0.599
Autumn 2018	0.277	0.005
Spring 2018	0.276	0.004
Autumn 2019	0.269	0.007
Spring 2019	0.258	0.009

Baseline period highlighted; seasons where significant differences were recorded (p-value <0.05) are bold.

A review of cover/abundance data change from the previous autumn 2019 survey to the current spring 2019 survey at individual sites shows similar numbers of species recording a decline in average vegetation cover/abundance in longwall and control sites (**Table 9**). One longwall site (Swamp 94) and two control sites (Swamps 136 and 137b) each had more species with a decrease in their average cover/abundance score from autumn 2019 than had increases (**Table 9**). Species showing a change in average cover/abundance in spring 2019 from autumn 2019 in longwall and control sites are listed in **Appendix E**.

Table 9: Number of species found to have an increase or decrease in the average cover/abundance score in spring 2019 compared to autumn 2019.

	Increased Cover/Abundance	Decreased Cover/Abundance
Longwall Sites		
Swamp 28 – Transect 1	12	6
Swamp 30	12	8
Swamp 33	17	10
Swamp 35	18	9
Swamp 94	9	18
Control Sites		
Swamp 101	18	13
Swamp 111a	26	9
Swamp 125	23	20
Swamp 135	17	15
Swamp 136	16	27
Swamp 137a	20	13
Swamp 137b	9	11
Swamp 138	16	16
Bee Creek Swamp	14	8

Transect/quadrat monitoring analysis – vegetation condition

Analysis of similarities (ANOSIM) was also used to examine differences in the vegetation condition of species of Restioid Heath / Banksia Thicket swamps between longwall and control sites for each season, and the results are presented in **Table 10**. As there is only one Tea Tree Thicket longwall site, differences in vegetation cover/abundance were not analysed using ANOSIM. Similar to results for vegetation cover/abundance, significant or marginal differences in vegetation condition between longwall and control sites have been observed in select seasons including the baseline period.

A significant difference in vegetation condition between longwall and control sites was observed for the current spring 2019 survey. As with the vegetation composition results, this indicates that the vegetation communities vary between control and longwall sites based on the vegetation condition of their species assemblages, however the low R statistic indicates that the treatment variable (control versus longwall) has a weak effect on this difference (**Table 10**). The low value of the R statistic indicates that the magnitude of the difference between longwall and control sites based on the vegetation condition remains low and has not varied greatly from the baseline period.

Table 10: Analysis of Similarities (ANOSIM) for vegetation condition in upland swamps supporting Restioid Heath / Banksia Thicket.

Season	R statistic	p-value
Spring 2010	0.173	0.021
Autumn 2011	0.177	0.022
Spring 2011	0.179	0.02
Autumn 2012	0.113	0.071
Spring 2012	0.150	0.042
Autumn 2013	0.134	0.053
Spring 2013	0.132	0.061
Autumn 2014	0.142	0.044
Spring 2014	0.103	0.092
Autumn 2015	0.116	0.083
Spring 2015	0.096	0.125
Autumn 2016	0.116	0.072
Spring 2016	0.0795	0.148
Autumn 2017	0.105	0.097
Spring 2017	-0.077	0.517
Autumn 2018	0.258	0.007
Spring 2018	0.264	0.006
Autumn 2019	0.279	0.004
Spring 2019	0.256	0.008

Baseline period highlighted; seasons where significant differences for were recorded (p-value <0.05) are bold.

A review of vegetation condition data change from the previous autumn 2019 survey to the current spring 2019 survey at individual sites shows similar numbers of species recording a decline in average vegetation condition in longwall and control sites (**Table 11**). In spring 2019, all longwall and control sites had a greater number of species with an increase in their average condition score from autumn 2019, than decreases (**Table 11**). Overall, five species declined in condition across longwall sites but did not decline at any control sites, where a change was recorded, between autumn 2019 and spring 2019, while sixteen species declined in condition in control sites but did not decline at any longwall sites, where a change was recorded, between autumn 2019 and spring 2019. Species showing change in condition in spring 2019 from autumn 2019 in longwall and control sites are listed in **Appendix E**.

Table 11: Number of species found to have an increase or decrease in the average condition score in spring 2019 compared to autumn 2019.

	Increased condition	Decreased condition
Longwall Sites		
Swamp 28 – Transect 1	3	3
Swamp 30	6	4
Swamp 33	10	4
Swamp 35	10	7
Swamp 94	16	3
Control Sites		
Swamp 101	16	2
Swamp 111a	9	9
Swamp 125	12	7
Swamp 135	7	4
Swamp 136	10	6
Swamp 137a	13	4
Swamp 137b	13	5
Swamp 138	12	4
Bee Creek Swamp	7	2

As significant differences between longwall and control sites, as measured by both vegetation composition and vegetation condition, were recorded across baseline monitoring seasons and survey seasons following the commencement of mining Longwalls 23-27, the observed differences are attributed to pre-existing differences and natural fluctuations in vegetation composition and condition between these swamps, driven by factors other than longwall mining.

3.1.3 Indicator species monitoring

Indicator species monitoring data, including a condition/health rating and reproductive rating for each plant, are provided in **Appendices E, F and G**.

Condition scale

Over the entire survey period, including the baseline monitoring period (i.e. all surveys up to and including spring 2013), and across all valley side swamps supporting Restioid Heath / Banksia Thicket, there has been a general decrease in the mean vegetation condition of the tagged indicator species, particularly from autumn 2017 to the current spring 2019 survey (**Figure 11**, **Figure 12** and **Figure 13**). This decrease has occurred at both longwall and control swamps and is considered to reflect the natural fluctuations in plant health associated with herbivory, resource competition, ageing plants and abiotic factors including aspect and shading from adjacent vegetation. As discussed in **Section 2.5**, the current spring 2019 survey was conducted following an extended dry period from July 2017 onward, with rainfall well below average for most months prior to and during the survey.

In spring 2019, mean vegetation condition for *Epacris obtusifolia* was greater at control sites than at longwall sites, as indicated by the non-overlapping error bars, although this difference was relatively small (less than one) (**Figure 11**). For *Pultenaea aristata* and *Sprengelia incarnata* mean vegetation condition

was the same between longwall and control sites (**Figure 12** and **Figure 13**). Mean vegetation condition decreased at both longwall and control sites for *Epacris obtusifolia* and *Pultenaea aristata*, compared to autumn 2019, although this decrease was minor. Mean vegetation condition of *Sprengelia incarnata* remained similar to autumn 2019. In spring 2019, the mean vegetation condition for tagged individuals of *Epacris obtusifolia*, *Pultenaea aristata* and *Sprengelia incarnata* at both longwall and control sites is the lowest recorded for these species across all seasons.

The mean vegetation condition of tagged indicator species in swamps supporting Tea Tree Thicket vegetation has varied between longwall and control sites for individual species (**Figure 14** and **Figure 15**). The mean vegetation condition for tagged *Callistemon citrinus* in longwall and control sites has remained relatively high and consistent across all seasons, with vegetation condition greater at longwall Swamp 28 up until autumn 2017, as indicated by non-overlapping error bars. In spring 2019, mean vegetation condition for *Callistemon citrinus* was greater at control sites than at Swamp 28, although the scale of this difference was small (less than 1) (**Figure 15**). The mean vegetation condition of *Callistemon citrinus* in spring 2019 was within the range recorded across the entire monitoring period for both longwall and control sites, following the increase in mean values from spring 2018.

In spring 2019 the mean vegetation condition of tagged *Banksia robur* individuals was greater in control sites than longwall sites, with the mean value in the longwall Swamp 28 remaining at the lowest recorded mean for this species across all seasons (**Figure 14**). The mean vegetation condition of *Banksia robur* at control sites in spring 2019 was within the range previously recorded following an increase from spring 2018 onwards. The mean vegetation condition for *Banksia robur* has generally been greater in control swamps, including during the baseline seasons. Vegetation condition in control swamps for this species has gradually declined since autumn 2011 (baseline) but remained relatively constant between spring 2014 and autumn 2018. The mean vegetation condition for *Banksia robur* in longwall Swamp 28 has been decreasing with noticeable declines from spring 2012 to spring 2013 (baseline), then from spring 2014 to the previous autumn 2019 survey. In spring 2019 all tagged *Banksia robur* individual in Swamp 28 were recorded as Condition 1.

Reproductive status

The mean reproductive status, as recorded by flowering status, of tagged indicator species, shows that flowering has generally been low to variable across all species within upland swamps and across all seasons including spring 2019 (**Figure 11** to **Figure 15**). The infrequent recording of flowering of indicator species across the entire survey period is thought to be related to the timing of surveys, which does not coincide with peak flowering periods.

Within valley side swamps supporting Restioid Heath / *Banksia* Thicket, the mean reproductive status of tagged indicator species has been variable between seasons and also between longwall and control swamps in individual seasons (**Figure 11**, **Figure 12** and **Figure 13**). No clear trends are apparent, apart from a tendency for reproductive status scores to be higher in spring monitoring seasons than autumn for *Epacris obtusifolia* and *Pultenaea aristata*. Where potential differences were observed, as indicated by non-overlapping error bars, the scale of these differences were small (less than 1) although larger differences were observed for individual species in particular seasons. In spring 2019, the mean reproductive status for *Epacris obtusifolia* and *Pultenaea aristata* was similar between longwall and control sites. The mean reproductive status of *Sprengelia incarnata* was greater at longwall sites than control sites, although the scale of this difference was small (less than 1).

Within Tea Tree Thicket swamps, mean reproductive status of both *Banksia robur* and *Callistemon citrinus* has been low across all seasons (**Figure 14** and **Figure 15**). Generally, mean reproductive status has been similar between longwall and control swamps, though potential differences, as indicated by non-overlapping error bars, have been observed in individual seasons. In spring 2019 the mean

reproductive status of tagged *Banksia robur* was similar between Swamp 28 and control sites, while mean reproductive status of *Callistemon citrinus* individuals was greater at control sites than at Swamp 28.

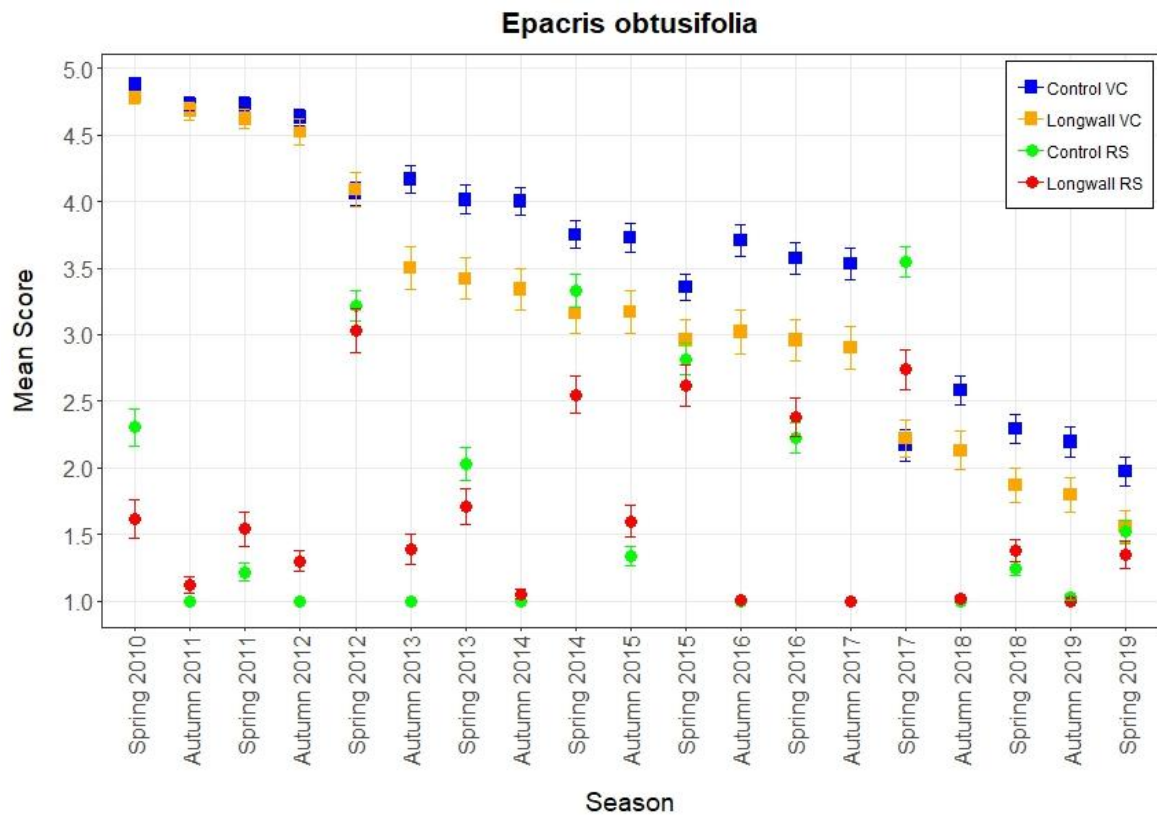


Figure 11: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, *Epacris obtusifolia* (spring 2010 to spring 2019)⁶.

⁶ Control RS point is often obscured by Longwall RS point where the value is the same, e.g. 1.0

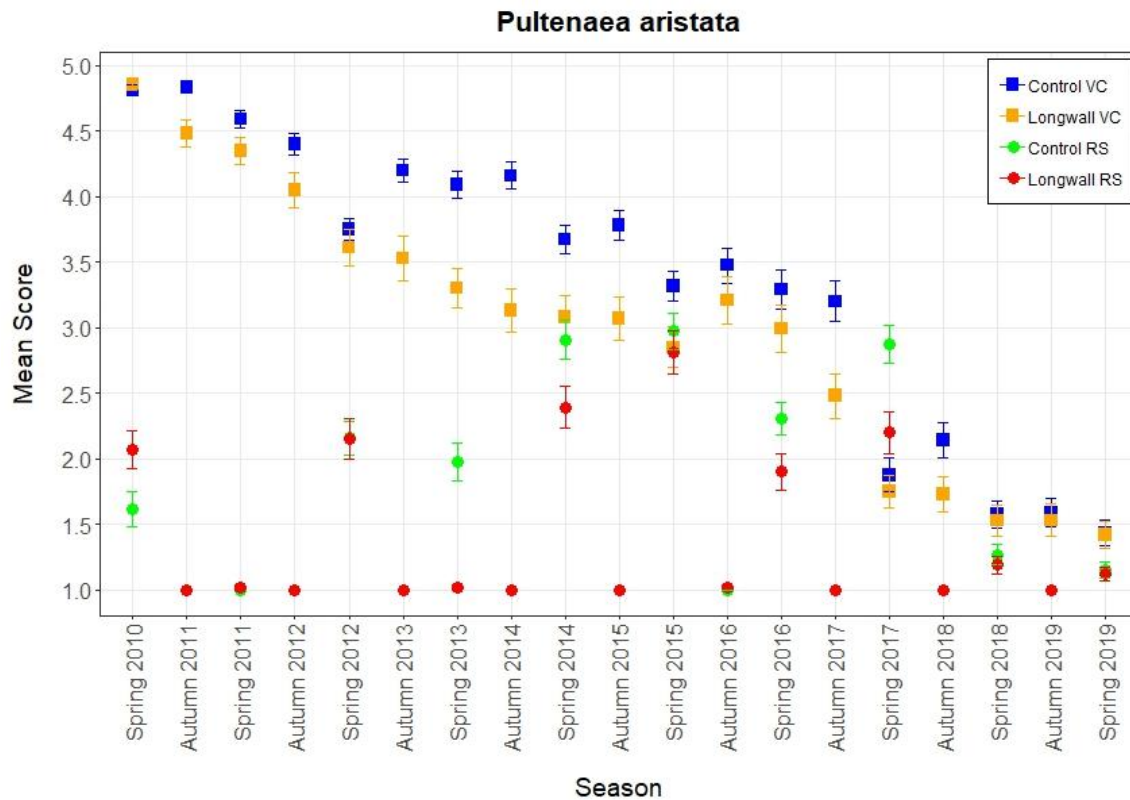


Figure 12: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, *Pultenaea aristata* (spring 2010 to spring 2019)⁷.

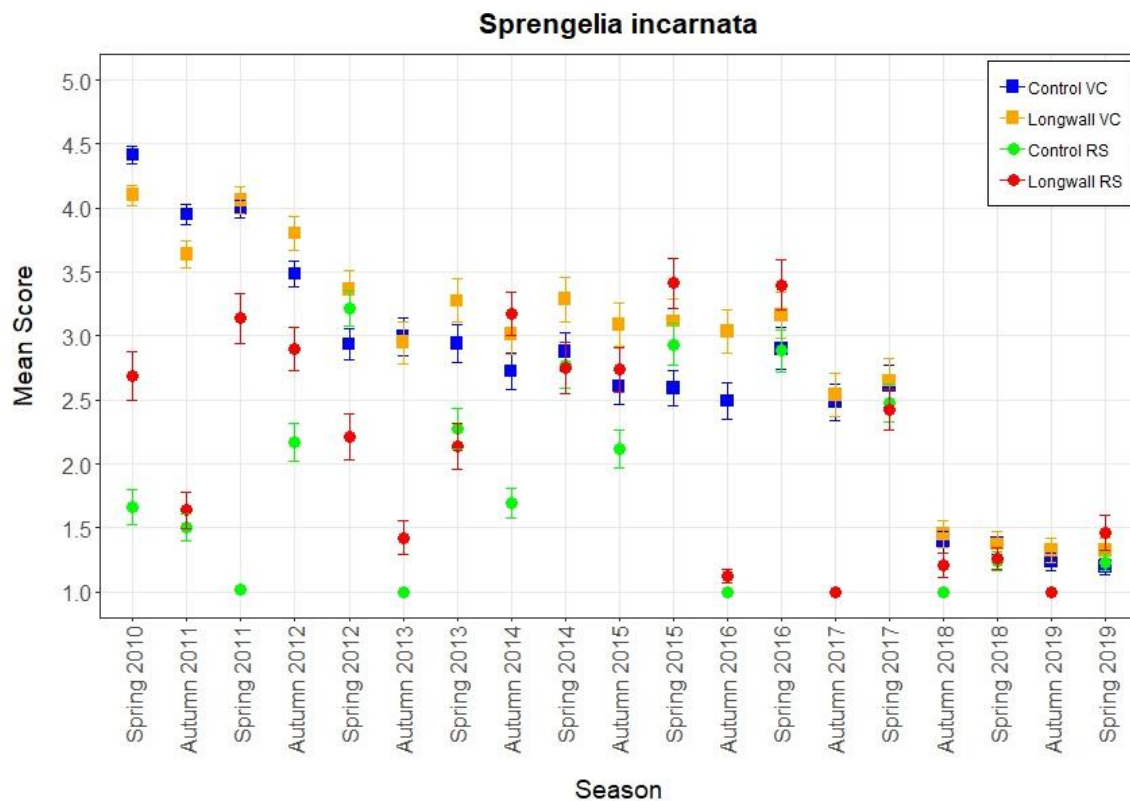


Figure 13: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, *Sprengelia incarnata* (spring 2010 to spring 2019)⁷.

⁷ Control RS point is often obscured by Longwall RS point where the value is the same, e.g. 1.0

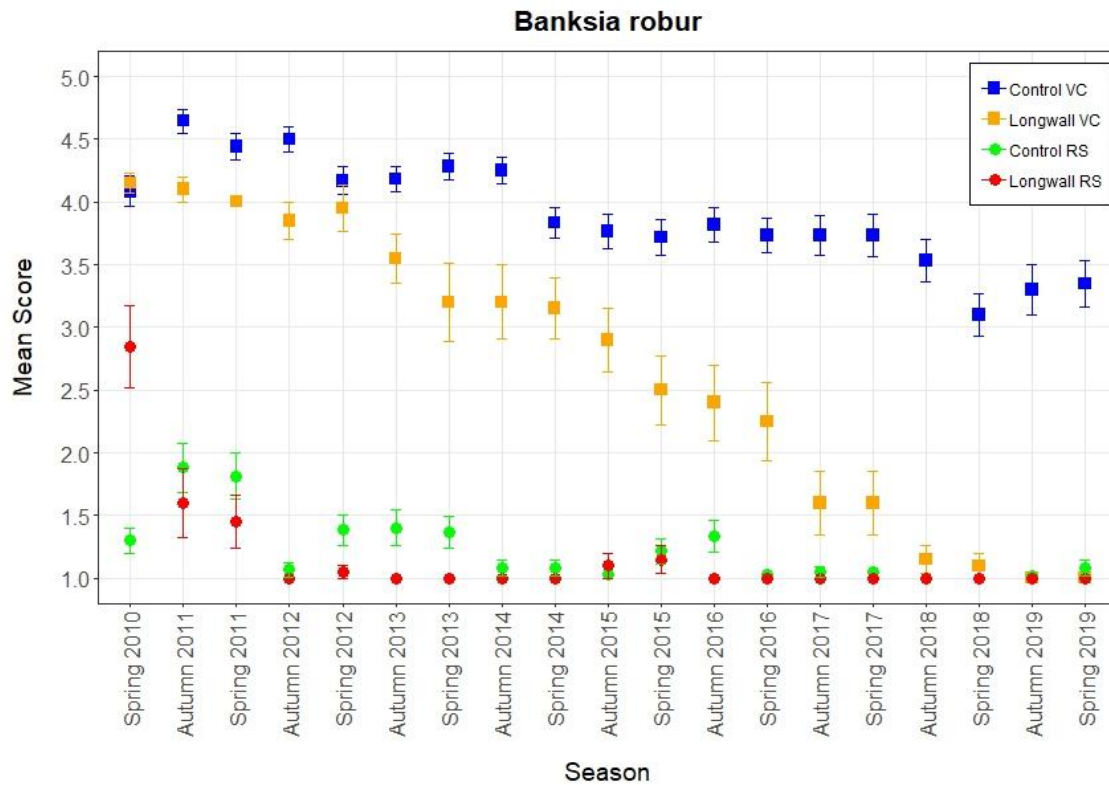


Figure 14: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, *Banksia robur* (spring 2010 to spring 2019)^{8,9}.

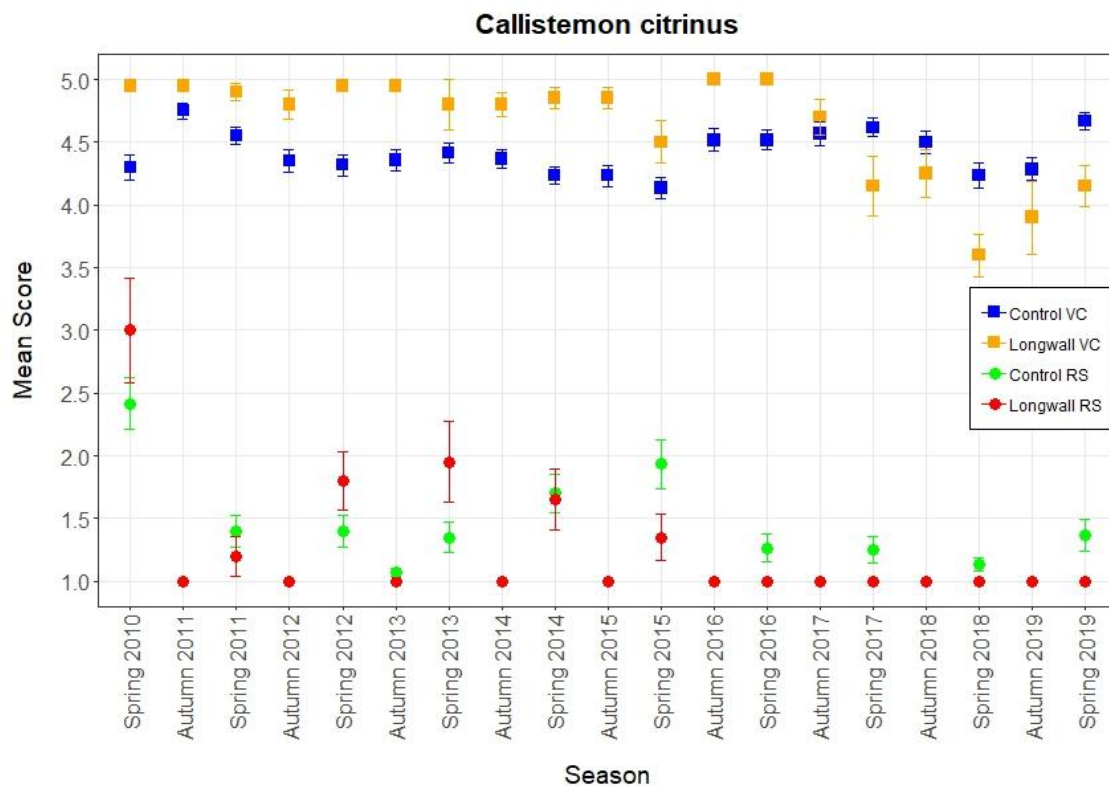


Figure 15: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, *Callistemon citrinus* (spring 2010 to spring 2019).

⁸ Control RS point is often obscured by Longwall RS point where the value is the same, e.g. 1.0

⁹ Longwall VC is obscured by Longwall RS for autumn 2019 and spring 2019

Proportion of plants surviving

In spring 2019, 539 of the tagged Restioid Heath / Banksia Thicket swamp indicator species were recorded in Condition 1 (dead or with severe dieback), increasing from 509 individuals recorded in autumn 2019. From autumn 2019 to spring 2019, 42 tagged indicator species individuals declined to Condition 1 after being in a healthier condition in autumn 2019. Twelve individuals recorded in Condition 1 in autumn 2019 were recorded in an improved condition in spring 2019.

The proportion of the total number of tagged individuals of each indicator species which have been recorded as dead (Condition 1) in each season is presented in **Figure 16**, **Figure 17** and **Figure 18**. Consistent with previous report findings, in spring 2019 the proportion of individuals which were recorded as dead for *Epacris obtusifolia* and *Pultenaea aristata* in longwall swamps was greater than that within control swamps. For *Sprengelia incarnata* a higher proportion of dead individuals continues to be recorded within control swamps, although the difference between control and longwall swamps remains small.

In spring 2019, there was a higher proportion of dead individuals of *Epacris obtusifolia* at longwall sites (0.8) compared to control sites (0.61), a pattern that has been recorded in all previous seasons since the baseline monitoring period (**Figure 16**). The increase in the proportion of dead individuals of *Epacris obtusifolia* from autumn 2019 to spring 2019 was greater at longwall sites (0.1) than that observed at control sites (0.06). That said, the difference in proportion dead between longwall and control sites in spring 2019 is broadly similar to the difference observed between longwall and control sites in each previous survey seasons since spring 2015, indicating that the observed mortality appears to be driven by natural factors, including extremely dry conditions, predation, competition with other vegetation and abiotic factors.

Similarly, the higher proportion of dead individuals of *Pultenaea aristata* at longwall sites (0.85) compared to control sites (0.82) in spring 2019 has been recorded in all previous seasons (**Figure 17**). The observed trends in mortality for *Pultenaea aristata* across all seasons generally show similar seasonal increases in the proportion dead at both longwall and control sites. Since autumn 2018 there has been an increasing trend in the proportion dead at control sites, which has narrowed of the gap between longwall and control sites. In the current spring 2019 survey, the proportional increase was small for both longwall and control sites, compared to previous recent seasons.

While the proportion of plants which have died across all sites continues to increase, and show differences between longwall and control swamps, these changes are consistent with what has been recorded during the baseline monitoring period, indicating that natural factors are contributing to the observed differences in mortality. As discussed in **Section 2.5**, the spring 2019 survey was conducted following an extended dry period from July 2017 onwards. This may account, at least in part, for the increase in the proportion of dead plants, observed in all indicator species at both longwall and control sites, particularly since autumn 2018.

In Tea Tree Thicket swamps, observations of dead tagged indicator species have generally been limited to *Banksia robur* individuals, and therefore analysis of the proportion of population monitoring individuals which have died is limited to this species. Whilst individuals of *Callistemon citrinus*, in both longwall Swamp 28 and control sites, have been recorded in Condition 1 in previous seasons, across the whole monitoring period the maximum recorded has been two individuals, and in subsequent seasons these individuals have been recorded in an improved condition.

In spring 2019, 34 of the tagged *Banksia robur* individuals were recorded as dead, decreasing from 37 recorded in autumn 2019. Of the 34 individuals recorded as dead in spring 2019, 20 individuals were located within the single longwall swamp (Swamp 28) and 14 individuals were located within control

swamps. As the total number of tagged *Banksia robur* within longwall swamps ($n = 20$) is much less than the total number tagged within control swamps ($n = 60$) the proportion of dead *Banksia robur* individuals in spring 2019 was more than four times greater within the longwall swamp (proportion dead = 1) compared to that within control swamps (proportion dead = 0.23) (**Figure 19**). In spring 2019, the proportion of dead *Banksia robur* individuals within Swamp 28 represents all tagged individuals of this species within longwall swamps, as first recorded in the previous autumn 2019 survey. A higher proportion of dead *Banksia robur* individuals at the single longwall site (Swamp 28), compared with control sites, has been observed since spring 2013 (prior to the commencement of mining Longwalls 23-27). The greater mortality of *Banksia robur* within the longwall swamp commenced during the baseline monitoring period, suggesting that it is attributable to natural factors including predation, competition with other vegetation, abiotic factors and/or the soil moisture status of Swamp 28 compared to the larger control swamps.

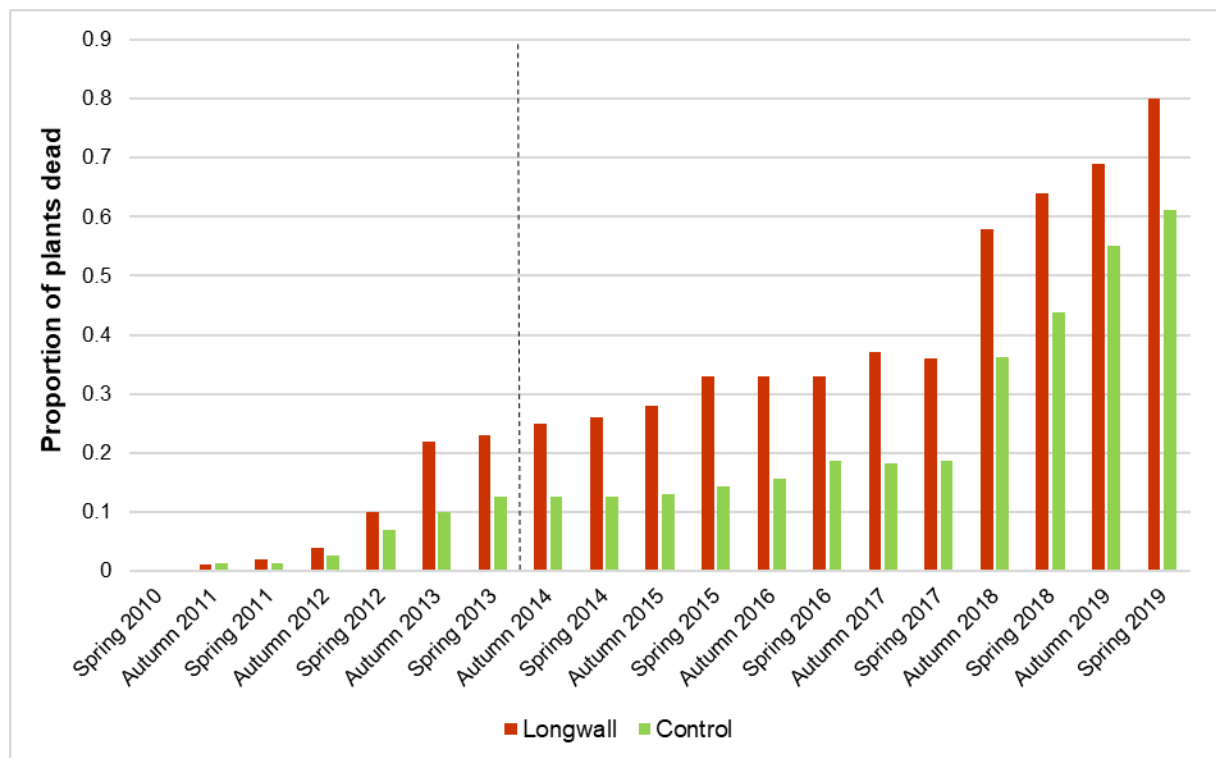


Figure 16: Proportion of tagged *Epacris obtusifolia* which have died at longwall and control Restioid Heath and Banksia Thicket swamps (spring 2010 to spring 2019). Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23-27.

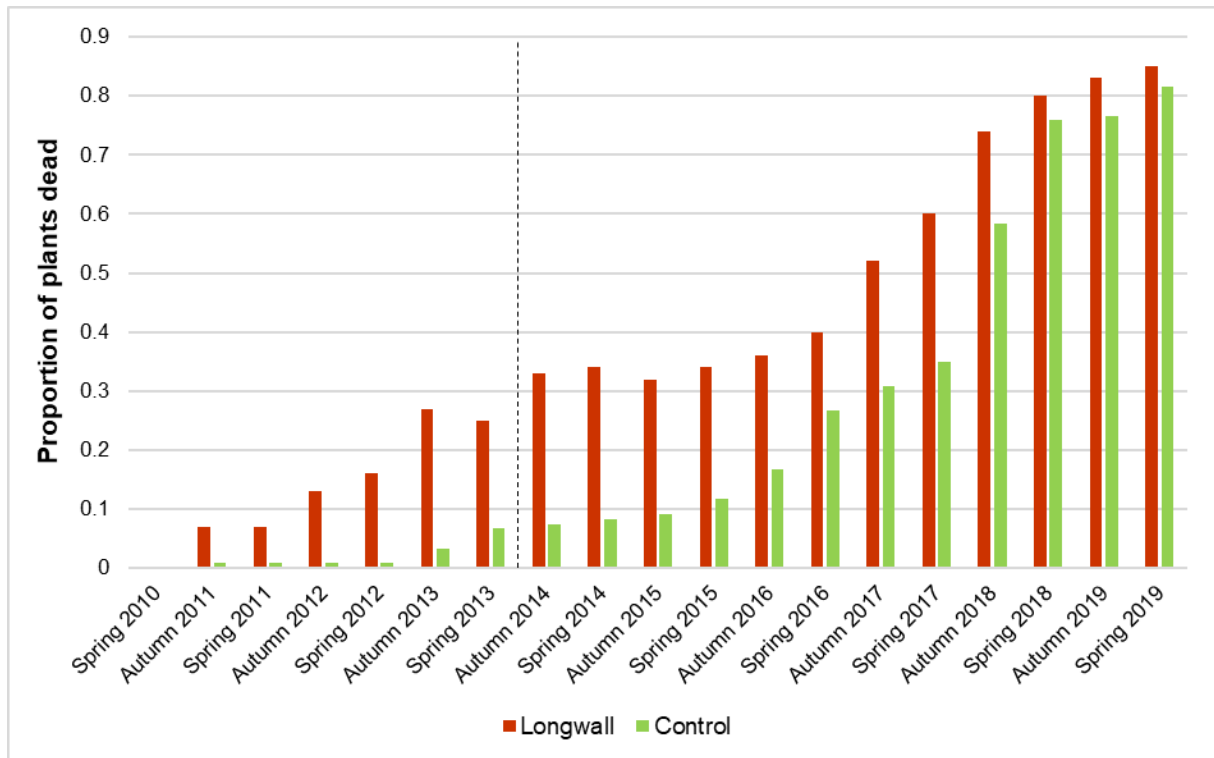


Figure 17: Proportion of tagged *Pultenaea aristata* which have died at longwall and control Restioid Heath and Banksia Thicket swamps (spring 2010 to spring 2019). Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23-27.

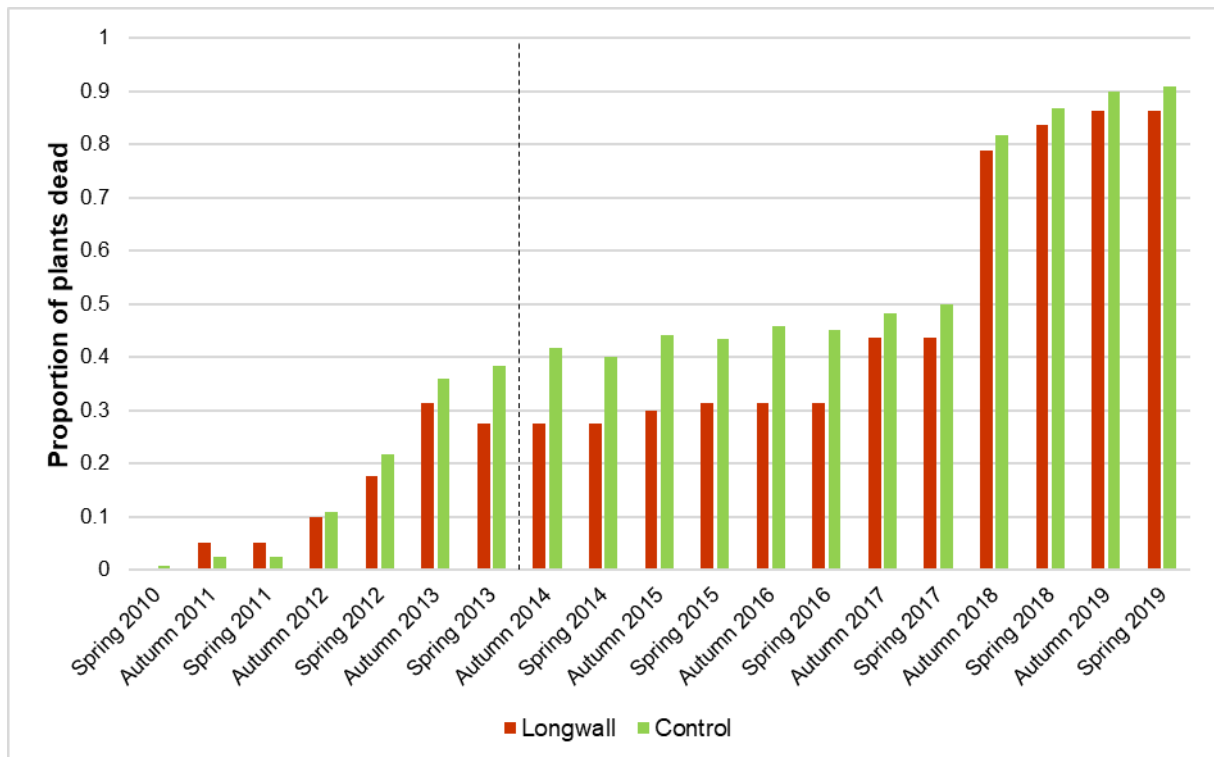


Figure 18: Proportion of tagged *Sprengelia incarnata* which have died at longwall and control Restioid Heath and Banksia Thicket swamps (spring 2010 to spring 2019). Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23-27.

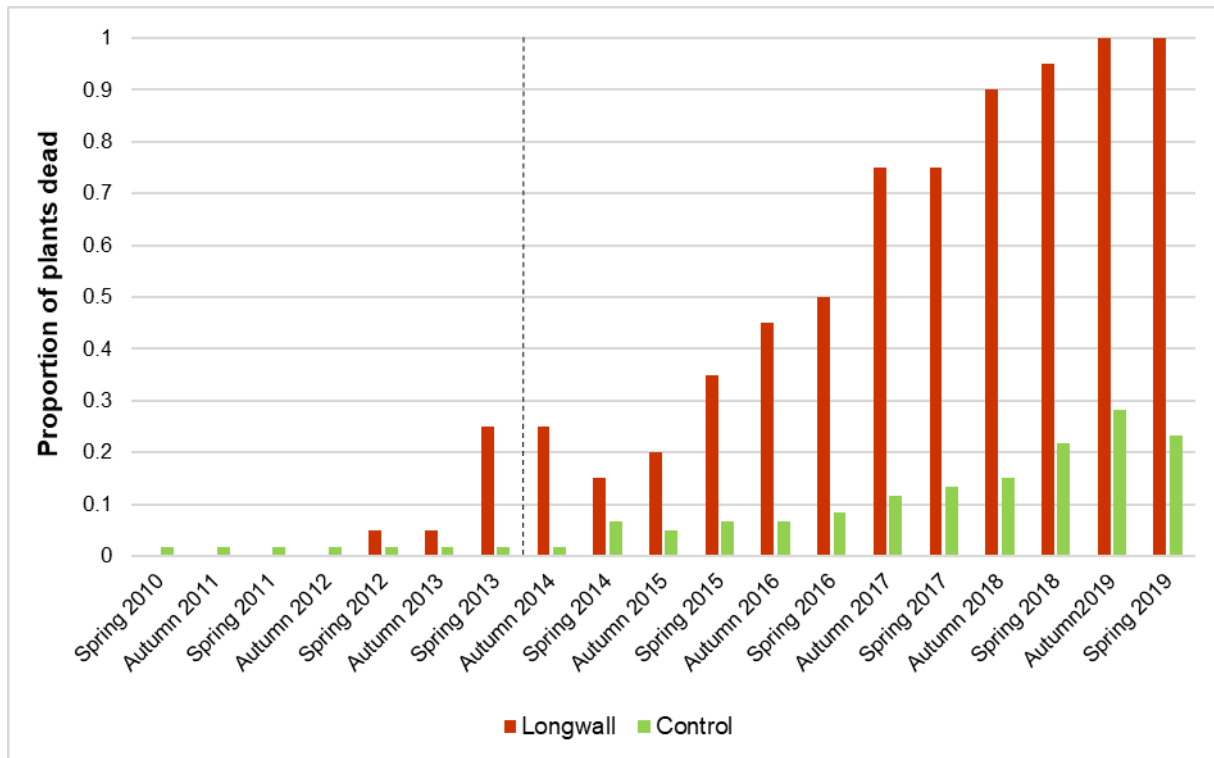


Figure 19: Proportion of tagged *Banksia robur* which have died at longwall and control Restioid Heath and Banksia Thicket swamps (spring 2010 to spring 2019). Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23-27.

3.1.4 Assessment against performance indicator

In accordance with the Longwalls 301-303 Biodiversity Management Plan, the visual observations, quadrat monitoring and indicator species monitoring results are used to assess the upland swamp vegetation performance indicator:

The vegetation in upland swamps is not expected to experience changes significantly different to changes in control swamps,

The visual observations, quadrat and indicator species monitoring results are described in **Sections 3.1.1** to **3.1.3**.

The Upland Swamp Vegetation Trigger Action Response Plan (TARP) from the Longwalls 301-303 Biodiversity Management Plan is provided in **Appendix C**. A summary of the results in relation to the upland swamp vegetation TARP is provided in **Table 12**.

In previous seasons, the performance indicator has been exceeded for Swamp 28, due to the continual decline in condition of the understorey species, the high mortality rate of *Banksia robur* individuals in comparison to all control sites and the overall declining trend in species richness in the Tea Tree Thicket component (around Transect 2) of this swamp (**Table 6**). In spring 2019, there has been a slight increase in species richness along Transect 2, the first reversal of the declining trend since spring 2017. In addition, some early signs of regrowth were observed in understorey species. However, in the Banksia Thicket component of this swamp (around Transect 1), species richness in spring 2019 was the lowest recorded during the monitoring period, continuing an overall declining trend. As a whole the results indicate that in spring 2019, the performance indicator has not been exceeded for this swamp.

Table 12: Summary of Upland Swamp Vegetation Monitoring against Trigger Action Response Plan.

Performance Indicator	Monitoring Sites	Baseline	Significance Levels/ Triggers		Spring 2019 Monitoring Results	Action/ Response	Comments
<i>The vegetation in upland swamps is not expected to experience changes significantly different to vegetation in control swamps</i>	- Swamps 19, 28, 30, 31, 32, 33, 34, 35, 36 and 94 overlying or adjacent to Longwalls 23-27. - Control Swamps 101, 111a, 125, 135, 136, 137a, 137b, 138, Bee Creek Swamp, Woronora River 1, Woronora River south arm and Dahlia Swamp.	Longwalls 23-27 swamps, as detailed in the LW23-27 vegetation monitoring report for the spring 2010 to spring 2013 surveys¹.	Level 1	Data analysis indicates: - there is not a declining trend in the condition of longwall swamp vegetation; and - there are no significant changes in vegetation between the mined and control swamps.	Swamps 30, 32, 33, 34, 35 and 36	Continue monitoring. Six monthly reporting.	The declining trend in the condition of longwall swamp vegetation previously recorded by vegetation monitoring from spring 2017 to spring 2018 for Swamps 30, 32, 33, 34, 35 and 36 has stabilised, with improvements in species richness and recovery in the form of new growth on many of the impacted species apparent in spring 2019.
			Level 2	Data analysis indicates: - there is a declining trend in the condition of longwall swamp vegetation over time, however a similar trend is occurring in control swamp vegetation; or - there are significant differences in vegetation between the mined and control swamps, however, the data indicates longwall swamp vegetation is consistent with the baseline monitoring results.	Swamps 19, 28, 31, and 94	Consider swamp groundwater monitoring data. Six monthly reporting.	In spring 2019, vegetation condition at longwall Swamps 19, 31 and 94 remained at the stressed level observed in autumn 2019, particularly with regards to senescing shrubs. However, this season to season stabilisation at these longwall sites follows a declining trend which commenced autumn 2015. The ongoing decline in the vegetation condition of the Tea Tree Thicket component of Swamp 28 with regards to condition of understorey species and loss of species richness appears to have stabilised in spring 2019, whilst the data indicates a possible declining trend in the Banksia thicket component of this swamp. Similar trends are apparent in the vegetation of some control sites. Continue close monitoring of trends in vegetation to assess the contribution of dry climatic condition versus mine subsidence impacts.
			Level 3	Data analysis indicates: - there is a declining trend in the condition of longwall swamp vegetation over time that is not occurring in control swamp vegetation; or - there are significant differences in vegetation between the mined and control swamps, and the data indicates longwall swamp vegetation is not consistent with the baseline monitoring results.	–	Consider swamp groundwater monitoring data. Initiate assessment against the performance measure². Consider the need for management measures, in accordance with Sections 8 and 9.	–

¹ Eco Logical Australia (2013) *Metropolitan Coal Vegetation Monitoring, Longwalls 23-27 – Baseline Data*. Report prepared for Metropolitan Coal.

² Threatened species, populations and ecological communities include those listed under the BC Act, EPBC Act or Fisheries Management Act at the time of Project Approval (i.e. the lists current as at 22 June 2009).

3.2 Riparian vegetation monitoring

3.2.1 Visual inspections

Visual inspections of riparian areas have been conducted in locations adjacent to riparian vegetation monitoring sites (i.e. sites MRIP01 to MRIP12) and areas traversed whilst accessing the monitoring sites.

The results of monitoring sites MRIP01, MRIP02, MRIP03, MRIP04, MRIP05, MRIP06, MRIP07, MRIP08, MRIP09 and MRIP10 are also presented in monitoring reports for Longwalls 20-22. The following sections present a summary of the results for all riparian monitoring sites in spring 2019.

Sites MRIP01, MRIP02, MRIP03, MRIP04 and MRIP10 on the Waratah Rivulet were surveyed in late October, following above average rainfall in September 2019. These surveys followed an extended dry period from July 2017 onwards, during which monthly rainfall was well below average, apart from October and November 2018 and March and September 2019, during which it rose slightly above average. Water levels at all Waratah Rivulet monitoring sites, both longwall (MRIP01 and MRIP02) and control (MRIP03, MRIP04 and MRIP10), were similar to the previous autumn 2019 surveys when water levels were slightly lower than the previous season. The water appeared cloudy with depth at long wall sites and at control site MRIP03, while it was clear at the other control sites. Despite low levels, the water was present and flowing at all Waratah Rivulet monitoring sites. Iron-stained floc was observed at both longwall sites, as well as on the rocks around the waterfall at control site MRIP04 (Photo Point 4a). Minor iron-stained seepage was recorded in sand adjacent to the waterfall (Photo Point 1a) at MRIP01 and along the rock bar below Pool N at MRIP02.

Sites MRIP05, MRIP06, MRIP07, MRIP08, MRIP09, MRIP11 and MRIP12 on the Eastern Tributary were surveyed in late October and mid-November, following the extended period of mostly below average monthly rainfall. Overall, water levels at all Eastern Tributary monitoring sites were higher than during the previous autumn 2019 survey period. In both the spring 2017 and autumn 2018 surveys, water levels were generally low across all Eastern Tributary sites, with no water observed at MRIP06, very low water levels at MRIP05 and only minor flow at MRIP09 in autumn 2018. In the spring 2018 survey, water flow was present and continuous. During the previous autumn 2019 survey, no water was observed in MRIP06, was limited to small rock pools at MRIP05, and occurred at very low levels in MRIP09, with no surface flow between these three sites. In the current spring 2019 survey, water was present and flowing slowly at all sites on the Eastern Tributary, although surface flow was not continuous between all sites. Water levels in spring 2019 were similar or slightly below those observed in spring 2018. The pool at MRIP05 (ETJ) had been dry in spring 2016, full in autumn 2017, low with no water flow downstream until spring 2018, however it was completely dry in the previous autumn 2019 survey. In the current spring 2019 survey, water was again observed at this pool (**Plate 5**). As in previous seasons, where water was present along Eastern Tributary (e.g. MRIP11 and MRIP12) it was orange-brown in colour, with iron-stained floc and stained vegetation commonly observed (**Plate 6** and **Plate 16**).

Prior to the autumn 2017 survey, mine subsidence impacts to pool drainage behaviour were recorded by Metropolitan Coal (Metropolitan Coal, 2017) at sites MRIP07 and MRIP08¹⁰. There was little water flow at site MRIP07 and downstream through site MRIP08 during the autumn 2017 and spring 2017 surveys, whilst water flow was present at low levels at both sites in autumn 2018. Water flow was again present in the spring 2018 survey, with water levels high following above average rainfall. During the previous autumn 2019 survey, there was no water present at MRIP07 and very low water levels at MRIP08,

¹⁰ Riparian vegetation monitoring sites MRIP07 and MRIP08 were used as control sites for comparison against the longwall riparian monitoring sites prior to subsidence impacts occurring to pools on the Eastern Tributary at these sites post spring 2016 and before autumn 2017. Analyses from autumn 2017 onwards no longer considers these sites as control sites.

resulting in minimal downstream water flow. In the current spring 2019 survey, low water levels were present at both MRIP07 and MRIP08 (**Plate 7** and **Plate 8**). Water at both sites appeared cloudy, yellow-brown in colour and contained floc.

All riparian sites were subject to high water flows in March 2017, resulting in impacts including flood-swept and prone vegetation, loss of individual plants, and burial of vegetation by adjacent vegetation, woody flood debris and sediment. The impacts were evident across all sites. The extent of bank scouring was often associated with sandy areas where vegetation was lost during high water flows (MRIP02, MRIP05, MRIP09, MRIP11 and MRIP12). Areas of sediment deposition were observed along both the Waratah Rivulet and the Eastern Tributary. The impacts of this event remain evident across all riparian monitoring sites in spring 2019, including scouring of stream banks and erosion of sediments. However, many previously impacted sites are showing significant recovery, including the development of a good covering of shrubs and sedges (**Plate 9**).

Vegetation was generally observed in good condition across and adjacent to the riparian monitoring sites. Exceptions to the generally good condition of riparian vegetation include the following:

- Plants recorded with dieback throughout all riparian sites tended to be isolated to a few individuals scattered throughout the sites and included the shrubs *Acacia longifolia* subsp. *longifolia*, *Allocasuarina littoralis*, *Banksia ericifolia* subsp. *ericifolia*, *Hakea dactyloides*, *H. salicifolia*, *H. teretifolia* and *Tristania neriifolia*.
- Vegetation along Waratah Rivulet at longwall site MRIP01 was generally found in good condition. Exceptions to this were the occasional occurrence of dieback in scattered individuals of the shrubs *Acacia longifolia* subsp. *longifolia* and *Banksia ericifolia* subsp. *ericifolia*.
- Within longwall site MRIP02, along Waratah Rivulet, riparian vegetation was in a similar condition in spring 2019 to that observed in autumn 2019, when vegetation was in an overall improved condition compared to previous seasons. Patches of dead *Pteridium esculentum* were still apparent, particularly from Photo Point 1 (**Plate 10** and **Plate 11**), however new growth was recorded amongst the dieback. At Photo Point B, a new area of *Pteridium esculentum* dieback was recorded on the eastern bank, while dead individuals of *Acacia longifolia* subsp. *longifolia*, *Allocasuarina littoralis* and *Dodonaea triquetra* were observed on the opposite bank, however dieback at this site did not exceed 50 cm from top of bank (**Plate 12**). Dieback was initially recorded at longwall site MRIP02 during spring 2012 and remained evident up to autumn 2017. In spring 2017, vegetation along both sides of the Waratah Rivulet was observed in an improved condition compared to previous surveys and regeneration was common. In autumn 2018, extensive areas of vegetation dieback were recorded on both sides of the Waratah Rivulet, with patches of dead *Gleichenia microphylla* and *Pteridium esculentum* occurring greater than 50 cm from the top of bank. Past observations of vegetation dieback and loss at this site were due to previous flood events and areas of prone vegetation are still evident.
- At longwall sites MRIP05 and MRIP06, along the Eastern Tributary, dieback of groundcover and shrub layer vegetation has been previously recorded along a discontinuous band, immediately adjacent to the water's edge (i.e. along the top of bank). As detailed in previous reports (Eco Logical 2019b), vegetation condition at MRIP05 and MRIP06 has fluctuated between dieback and recovery since spring 2013, affecting both ground layer and shrub species, in particular *Bauera rubioides*, *Gleichenia microphylla*, *Schoenus melanostachys* and *Sporadanthus gracilis*. In autumn 2018, dieback was greater than 50 cm from top of bank in some areas at both sites, whilst in spring 2018 it appeared improved, with regrowth occurring within these patches. In the current spring 2019 survey, minor regrowth of *Gleichenia microphylla* was observed at Photo Point 4a (**Plate 13**), where dieback greater than 50 cm from top of bank was observed in autumn 2019, above the pool ETJ (**Plate 5**).

- At longwall site MRIP09, along the Eastern Tributary, vegetation was observed to be in a good condition, similar to the previous autumn 2019 survey, with no dieback greater than 50 cm from top of bank recorded. New growth was observed at this site, particularly of *Gleichenia microphylla* (**Plate 14**). Dieback of shrubs and ground layer plants has been observed in this location since spring 2013, extending throughout 2014 and showing signs of improvement in the condition of groundcover species in autumn 2015 (Eco Logical 2018b). Further dieback of groundcover and shrub layer vegetation was observed in autumn 2018 along a discontinuous band immediately adjacent to the water's edge (i.e. the top of bank) at the lower end of MRIP09 (Photo Point 2) and extending discontinuously downstream to MRIP05. The extent of this dieback had not increased between autumn 2018 and spring 2019. Regeneration of shrub species within this area has been observed from 2016 to the current spring 2019 survey.
- At longwall site MRIP11, along the Eastern Tributary, vegetation along the edge of the creek was observed in a variable condition during both 2016 surveys, where dieback of groundcover species, including *Sporadanthus gracilis*, *Bauera rubioides* and *Gleichenia microphylla*, and some shrub species extended up from the water's edge, but no more than 50 cm from the top of bank, on both sides of the Eastern Tributary. In autumn 2017, areas of streamside vegetation were inundated, however the extent of dieback was confined primarily to understorey species with some shrubs prone over the creek, where inundated. In the autumn 2018 survey, flood impacts remained evident, however, there was no increase in the extent of dieback and recovery of some streamside vegetation had occurred. Recovery of streamside vegetation continued in spring 2018 up to the current spring 2019 survey, with the vegetation at the top of bank, and beyond, generally healthy. As in previous seasons, vegetation in the vertical zone from water level to top of bank was in a variable condition throughout the site, with some patches of *Gleichenia microphylla* dieback, and much of it covered in iron floc (**Plate 15**).
- At longwall site MRIP12, along the Eastern Tributary, vegetation along the edge of the creek has been observed in a variable condition since spring 2017. Dieback of ground layer species including *Bauera rubioides* and *Schoenus melanostachys*, and discolouration of shrub species including *Banksia ericifolia* subsp. *ericifolia*, *Allocasuarina distyla* and *Tristania neriifolia* was noted in spring 2017. In autumn 2018, dieback of *Banksia ericifolia* subsp. *ericifolia* continued, and ground layer species were observed in a declining condition including *Baumea juncea*, *Bauera rubioides* and *Sporadanthus gracilis*. Large areas of senescing *Gleichenia microphylla*, observed near the transect, were greater in extent than during the previous spring 2017 and autumn 2017 surveys, and at Photo Point 2, this dieback exceeded 50 cm from the top of bank. This was associated with the increased pooling of water, which was recorded upstream of Photo Point 1, as were senescing shrubs, such as *Allocasuarina distyla* and *Leptospermum morrisonii*, which were prone and falling into the stream. Dieback of *Gleichenia microphylla* has remained similar from autumn 2018 to the current spring 2019 survey, with no additional areas of dieback observed. This includes the areas of *Gleichenia microphylla* and *Schoenus melanostachys* dieback greater than 50 cm from top of bank at Photo Point 2 which had been recorded in previous seasons (**Plate 16**). Apart from this, no new or extended areas of vegetation dieback were recorded in spring 2019.

Observations of cracking or rock displacement at the riparian monitoring sites are summarised below:

- No new areas of bedrock cracking were observed within longwall sites MRIP01, MRIP02, MRIP05, MRIP06, MRIP09, MRIP11 and MRIP12 in spring 2019.
- Cracking of streamside rocky areas at the downstream end of MRIP01, and further downstream between MRIP01 and MRIP02, was first observed during surveys between autumn 2011 and 2012. Since this time, cracking has been observed to increase and pieces of cracked bedrock at

these sites have been transported downstream by higher water flows. Cracking and bedrock movement did not change between the spring 2017 and the current spring 2019 survey.

- Fine hairline cracking of bedrock was observed for the first time at MRIP04 in spring 2019, on the eastern bank below a small scarp (Photo Point 6).
- Cracking of bedrock was observed for the first time at MRIP05 in autumn 2016, at the pool below Photo Point 5 (between sites MRIP05 and MRIP06). In autumn 2017, further cracking was recorded across the rock bar just upstream of the pool, extending across the width of the rock bar, and a second crack was recorded approximately 1 m upstream. In subsequent surveys, including the current spring 2019 survey, previously recorded cracks at this site appeared unchanged (**Plate 17**).
- Cracking of a small exposed rocky outcrop at the start of MRIP06 was recorded for the first time in the autumn 2018 survey. In the current spring 2019 survey, cracking of a rock located along the track between Photo Point 6 and Photo Point 7 was observed for the first time at this site.
- Along the Eastern Tributary at site MRIP07 a new area of in-stream bedrock cracking was recorded for the first time in autumn 2017 at Photo Point 2c, resulting in little water flow at this site and downstream to MRIP08. At this time, cracking was also observed at Photo Point 4, just upstream of site MRIP08. In autumn 2018, an additional small crack was recorded within MRIP07 at Photo Point 1. In the previous autumn 2019 survey, additional hairline cracks were observed for the first time in MRIP08 at Photo Point 1 and Photo Point 4 (**Plate 18**). In the current spring 2019 survey, fragments of cracked rock at Photo Point 4 were missing, presumed to have been washed downstream. Bedrock displacement has not been observed at either MRIP07 or MRIP08.
- Cracking was first observed at longwall monitoring site MRIP12 during autumn 2018 survey at Photo Point 1 and Photo Point 2. No further cracking has been observed during the subsequent monitoring seasons, including the current spring 2019 survey (**Plate 19**).
- Across all observations, including sites MRIP07 and MRIP08, no impacts to adjacent vegetation were observed in association with any of the observed bedrock cracking.

Four introduced species were observed in riparian monitoring sites: *Andropogon virginicus* (Whiskey Grass) (MRIP02, MRIP03 and MRIP10), *Conyza* sp., (Fleabane) (MRIP01 and MRIP02), *Gamochaeta* sp. (Cudweed) (MRIP02 and MRIP04) and *Senecio madagascariensis* (Fireweed) (MRIP02). No introduced aquatic species have been recorded in streams adjacent to the riparian monitoring sites.



Plate 5: Eastern Tributary, adjacent to MRIP05, with water in the pool – spring 2019.



Plate 6: Eastern Tributary, MRIP11, Photo Point 2, downstream view – spring 2019.



Plate 7: Eastern Tributary, MRIP07, Photo Point 2C, downstream view – spring 2019.



Plate 8: Eastern Tributary, MRIP08, Photo Point 4, upstream view – spring 2019.



Plate 9: Waratah Rivulet MRIP02 area of previous flood impacts – spring 2019.



Plate 10: Eastern bank of Waratah Rivulet MRIP02, Photo Point 1 view upstream – spring 2019.



Plate 11: Eastern bank of Waratah Rivulet MRIP02, Photo Point 1 view downstream – spring 2019.



Plate 12: Eastern bank of Waratah Rivulet MRIP02, Photo Point B view downstream – spring 2019.



Plate 13: Eastern Tributary MRIP05, Photo Point 4a west bank – spring 2019.



Plate 14: Eastern Tributary MRIP09, Photo Point 3 view upstream – spring 2019.



Plate 15: Eastern Tributary MRIP11, Photo Point 4a, patches of dead *Gleichenia microphylla* – spring 2019.



Plate 16: Eastern Tributary MRIP12, Photo Point 2, west bank, showing previous dieback of *Gleichenia microphylla* and *Schoenus melanostachys* – spring 2019.



Plate 17: Eastern Tributary cracking across rock bar between sites MRIP05 and MRIP06 – spring 2019.



Plate 18: Eastern Tributary, MRIP08, Photo Point 4, cracking – spring 2019.



Plate 19: Eastern Tributary, MRIP12, Photo Point 2, in-stream cracking – spring 2019.

3.2.2 Quadrat monitoring

Prior to the autumn 2017 survey, mine subsidence impacts to pool drainage behaviour were recorded by Metropolitan Coal at sites MRIP07 and MRIP08, downstream of Longwall 27 (Metropolitan Coal, 2017). Prior to the impacts occurring, sites MRIP07 and MRIP08 were used as control sites for comparison against the longwall riparian monitoring sites. Analyses from autumn 2017 on will no longer consider these sites as control sites (consistent with the Longwalls 301-303 Biodiversity Management Plan).

Vegetation structure, dominant species and estimated cover for each stratum

The vegetation structure, dominant species and estimated cover for each stratum at riparian monitoring sites is provided in **Appendix H**.

In spring 2019, the percent cover and height of the structural layers was generally similar to that recorded for autumn 2019. Across all seasons (since the surveys commenced in spring 2010), the vegetation structure, dominant species and estimated cover for each stratum has varied between sites and between seasons within sites. Results have generally fluctuated with no clear trends in vegetation height or cover across sites. Following a decrease in the cover of mid-storey at a number of sites in autumn 2019, in the current spring 2019 survey an increase in mid-storey was observed at a number of sites, ranging from 10 – 20% (MRIP01, MRIP02 and MRIP08) to 30% (MRIP11) and 40% (MRIP05). At five sites, the cover of the lower storey decreased between 4% and 20% (MRIP02, MRIP04, MRIP05, MRIP06 and MRIP07). These trends, and the fluctuations observed in other sites, are considered to reflect both the natural variations in the height and cover of vegetation structural layers through time (including in response to flooding impacts), as well as the subjective nature of the data collection.

At MRIP02, cover of understorey was greater than 60% in all seasons up to and including spring 2012, with cover recorded at less than 50% in all seasons after spring 2012, including cover of 15% in spring 2016. This reduction in cover has occurred in conjunction with observations of dieback as discussed in **Section 3.2.1** and a shift in dominant species of the ground layer. This is considered to be attributable to the water loss experienced at this site in spring 2012 and altered water levels observed after this time, including periods where the vegetation at site MRIP02 has been submerged or inundated. In spring 2017, cover of the understorey increased to 50% from 45% in autumn 2017, with a shift in dominant ground cover species from largely *Sticherus flabellatus* var. *flabellatus*, *Gleichenia microphylla* and *Bauera rubioides* to *S. flabellatus* var. *flabellatus* and *Bauera rubioides*, which have been recorded as dominant in previous seasons. A decrease in cover was recorded in autumn 2018 to 20%, with extensive areas both sides of the creek observed with dead *Gleichenia microphylla* and *Pteridium esculentum* in the lower storey. Cover of the lower storey increased in the spring 2018 survey up to 40% with *Sticherus flabellatus* var. *flabellatus*, *Gleichenia microphylla* and *Bauera rubioides* again considered most dominant. Cover declined in the previous autumn 2019 survey to 30%, and again in the current spring 2019 survey to 25%, with *Sticherus flabellatus* var. *flabellatus*, *Gleichenia microphylla* and *Bauera rubioides* remaining as the dominant species.

Species richness

A summary of species richness within riparian monitoring sites since spring 2010 is provided in **Table 13** and **Figure 20**. The raw data for each riparian monitoring site is presented in **Appendix H**.

In spring 2019, species richness within riparian monitoring sites was generally similar to previous seasons, with most values falling within the range observed across previous seasons for individual sites. The exception to this is longwall site MRIP11, which increased in species richness above what has previously been recorded at this site (by three species). At longwall riparian monitoring sites, a moderate to large increase in species richness was observed in spring 2019, when compared to autumn 2019, at three sites (MRIP05, MRIP06 and MRIP11), a small increase in species richness occurred at one site

(MRIP12) whilst a small decline in species richness was recorded at two sites (MRIP01 and MRIP02). At control riparian monitoring sites, a small decrease in species richness was observed in spring 2019, when compared with autumn 2019, at one site (MRIP04), whilst no change occurred at the other site (MRIP03). A moderate increase occurred at both of the control (compromised) sites (MRIP07 and MRIP08) in spring 2019.

Across the entire monitoring period (spring 2010 – spring 2019), an overall decrease in species richness has been observed in both longwall and control monitoring sites. This trend however, appears to be reversing for a number of control and longwall sites, with increases in species richness observed since autumn 2017 (MRIP04, MRIP06, MRIP07), spring 2017 (MRIP02) and autumn 2018 (MRIP01, MRIP12). As these trends have been observed across control sites and longwall sites, these changes are considered to be in response to climate, population dynamics and natural disturbances including flood and drought.

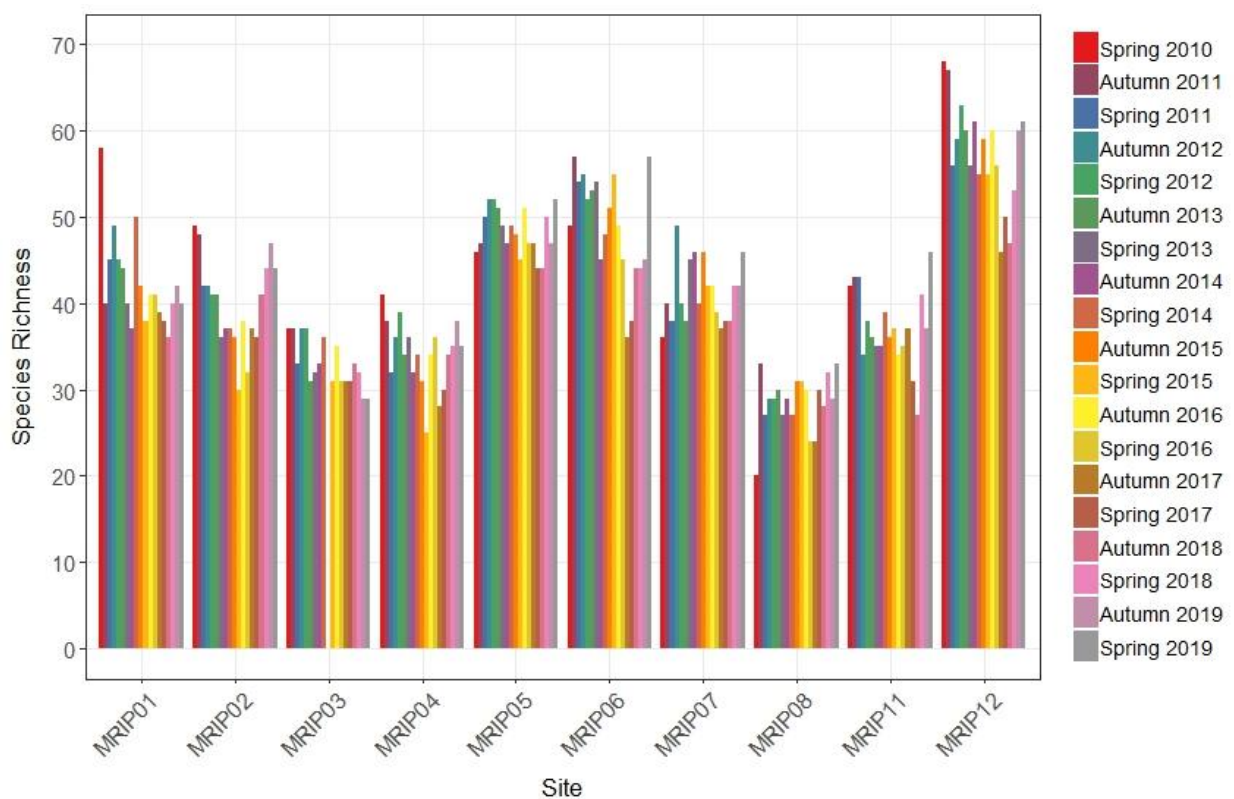


Figure 20: Native species richness within riparian monitoring sites across all seasons, spring 2010 to spring 2019, BL = baseline.

Table 13: Number of native species recorded in riparian sites across all seasons (spring 2010 to spring 2019).

Site	Spring 2010	Autumn 2011	Spring 2011	Autumn 2012	Spring 2012	Autumn 2013	Spring 2013	Autumn 2014	Spring 2014	Autumn 2015	Spring 2015	Autumn 2016	Spring 2016	Autumn 2017	Spring 2017	Autumn 2018	Spring 2018	Autumn 2019	Spring 2019
Longwall sites																			
MRIP01	58 (1)	40	45	49	45	44	40	37	50	42	38	41	41	39	38	36 (2)	40	42	40
MRIP02	49	48	42	42	41	41	36	37	37	36	30	38 (1)	32 (1)	37 (1)	36	41 (1)	44	47 (1)	45
MRIP05	46	47	50	52	52	51	49	47	49	48	45	51	47	47	44	44	50	47	52
MRIP06	49	57	54	55	52	53	54	45	48	51	55	49	45	36	38	44	44	45	57
MRIP07*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	37	38	38	42	42	46
MRIP08*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	30	28	32	29	33
MRIP11	42	43	43	34	38	36	35	35	39	36	37	34	35	37	31	27	41	37	46
MRIP12	68 (3)	67 (5)	56	59	63	60	56	61 (1)	55	59	55 (1)	60	56	46	50	47	53	60 (1)	61 (1)
Control sites*																			
MRIP03	37	37	33	37	37	31	32	33	36	-	31	35	31	31	31	33	32	29	29
MRIP04	41	38	32	36	39	34	36	32	34	31	25	34	36	28 (1)	30	34	35	38	35
MRIP07*	36	40	38	49	40	38	45	46	40	46	42	42	39	N/A	N/A	N/A	N/A	N/A	N/A
MRIP08*	20	33	27	29	29 (1)	30	27	29	27	31	31	30	24	N/A	N/A	N/A	N/A	N/A	N/A

NB: numbers in brackets indicate the number of exotic species recorded in addition to native species

* Riparian vegetation monitoring sites MRIP07 and MRIP08 were used as control sites for comparison against the longwall riparian monitoring sites prior to subsidence impacts occurring to pools on the Eastern Tributary at these sites post spring 2016 and before autumn 2017. Analyses from autumn 2017 onwards no longer considers these sites as control sites.

Cover/abundance and condition

The cover/abundance and condition ratings for each species are provided in **Appendix H**.

Cover/abundance

Fluctuations in species cover/abundance were recorded across all sites and all seasons. In spring 2019, no patterns of increasing or decreasing cover/abundance were identified in relation to individual species across sites or groups of species (i.e. riparian species, generalist species, shrubs, groundcovers) within sites, with the exception of sites MRIP02, MRIP05, MRIP06, MRIP09 and MRIP12 where dieback of streamside vegetation has been recorded along the edge of the stream to varying degrees. For most riparian sites, ground layer species are dominated by *Bauera rubioides*, *Gleichenia microphylla*, *Schoenus melanostachys* and *Sticherus flabellatus* var. *flabellatus*.

The foliage cover of *Gleichenia microphylla* at site MRIP02 has been recorded under 5% in all seasons since dieback was first recorded in spring 2012, reducing from 21-50% cover for the three seasons prior to dieback being observed (i.e. autumn 2011, spring 2011, autumn 2012). In spring 2017, the cover of *Gleichenia microphylla* at MRIP02 increased to 5-20%. In autumn 2018 and spring 2018, *Gleichenia microphylla* was recorded in a reduced condition with a cover/abundance of less than 5%, where it remained in autumn 2019. The cover/abundance of *Sticherus flabellatus* var. *flabellatus* at this site has increased since autumn 2018, from 5-20% to 21-50%. In the current spring 2019 survey, *Gleichenia microphylla* increased to 5-20% at this site, while *Sticherus flabellatus* var. *flabellatus* remained between 21-50%.

Condition

The majority of species within all riparian monitoring quadrats at both longwall and control sites were recorded in a healthy condition (Condition 5) in spring 2019, including species at control (compromised) sites MRIP07 and MRIP08.

Observations of vegetation with dieback included occasional observations of plants with minor dieback (Condition 4) to infrequent observations of some dead branches (Condition 3). Species for which dieback was observed at multiple sites included *Banksia ericifolia* subsp. *ericifolia* and *Gleichenia microphylla*. While some species were recorded with dieback in longwall sites and in a healthy condition in control sites (*Cassytha glabella*, *Hakea salicifolia*, *Leptocarpus tenax*, *Leptospermum morrisonii*, *Lomandra fluvialis*, *Sporadanthus gracilis* and *Tristania neriifolia*), the majority of dieback observed for these species was only minor dieback (Condition 4), or occasionally some dead branches (Condition 3). Two species were recorded with dieback in control sites and in a healthy condition in longwall sites (*Bauera rubioides* and *Prostanthera linearis*).

3.2.3 Indicator Species

Indicator species monitoring data, including a condition/health rating and reproductive rating for each plant, are provided in **Appendix H**.

As noted in **Sections 3.2.1** and **Section 3.2.2**, riparian control sites MRIP07 and MRIP08, located along the Eastern Tributary, were impacted by mine subsidence between spring 2016 and autumn 2017 and can no longer be used as control sites. However, indicator species monitoring at MRIP07 and MRIP08 will continue.

Indicator species monitoring results at longwall sites MRIP01, MRIP02, MRIP05, MRIP06, MRIP09, MRIP11 and MRIP12 have been analysed and assessed against control sites MRIP03, MRIP04 and MRIP10. The results for sites MRIP07 and MRIP08 are discussed separately.

Condition scale

Overall, mean vegetation condition has decreased over the entire survey period for the three riparian indicator species, *Lomatia myricoides*, *Prostanthera linearis* and *Schoenus melanostachys*, within both longwall and control sites, with the level of decline greatest for *Prostanthera linearis* and only a minor decline observed for *Lomatia myricoides* (**Figure 21**, **Figure 22** and **Figure 23**). The mean vegetation condition for tagged riparian indicator species *Lomatia myricoides* was similar between longwall and control sites throughout the baseline period and all seasons until spring 2012, after which the mean vegetation condition at control sites remained relatively high and consistent between seasons, whilst it was more variable for longwall sites but generally lower than control sites (**Figure 21**). Up to and including spring 2019, the mean vegetation condition for tagged riparian indicator species *Prostanthera linearis* has generally been higher at longwall than control sites (**Figure 22**) whilst it has been more variable for *Schoenus melanostachys* over this period (**Figure 23**).

In spring 2019, the mean vegetation condition of *Lomatia myricoides* was higher at control sites compared to longwall sites (**Figure 21**). At longwall sites, mean vegetation condition remained similar to the previous three seasons, when mean vegetation condition decreased below the previously recorded range. In spring 2019, mean vegetation condition of *Lomatia myricoides* at control sites increased compared to autumn 2019, where mean vegetation condition had decreased below the previously recorded range for this species.

In spring 2019, the mean vegetation condition of *Prostanthera linearis* was higher at longwall sites compared to control sites (**Figure 22**). At longwall sites, mean vegetation condition decreased slightly compared to autumn 2019, while mean vegetation condition at control sites increased to a level similar to that observed in spring 2018.

In spring 2019, the mean vegetation condition of *Schoenus melanostachys* was higher at control sites compared to longwall sites (**Figure 23**). At both longwall and control sites the mean vegetation condition increased compared to autumn 2019.

At control (compromised) site MRIP07, the vegetation condition for *Prostanthera linearis* and *Schoenus melanostachys* decreased slightly, whilst *Lomatia myricoides* remained unchanged, compared to autumn 2019. At control (compromised) site MRIP08, *Lomatia myricoides* and *Schoenus melanostachys* decreased slightly in condition, whilst *Prostanthera linearis* remained unchanged, compared to autumn 2019 (**Table 14**).

Reproductive status

In spring 2019, the mean reproductive status for tagged riparian indicator species was similar, and minimal, at longwall and control sites for *Lomatia myricoides*, as indicated by overlapping error bars (**Figure 21**). For *Prostanthera linearis* mean reproductive status was, likewise, minimal but slightly higher at longwall sites than at control sites (**Figure 22**), whilst mean reproductive status for *Schoenus melanostachys* was higher at control sites than at longwall sites (**Figure 23**). The mean reproductive status for these two species has been considerably more variable between seasons than for *Lomatia myricoides*, and between longwall and control sites within seasons, preventing any discernible trend from being detected.

At control (compromised) sites, MRIP07 and MRIP08, the reproductive status recorded in spring 2019 for *Lomatia myricoides*, *Prostanthera linearis* and *Schoenus melanostachys* was slightly lower than results recorded in autumn 2019, although this difference was minor (less than 1) (**Table 14**).

The limited flowering recorded for each of the tagged riparian indicator species continues to be comparable to results in previous seasons including the baseline monitoring period. The infrequent

recording of flowering plants of indicator species across the entire survey period is thought to be related to the timing of surveys which do not coincide with peak flowering periods.

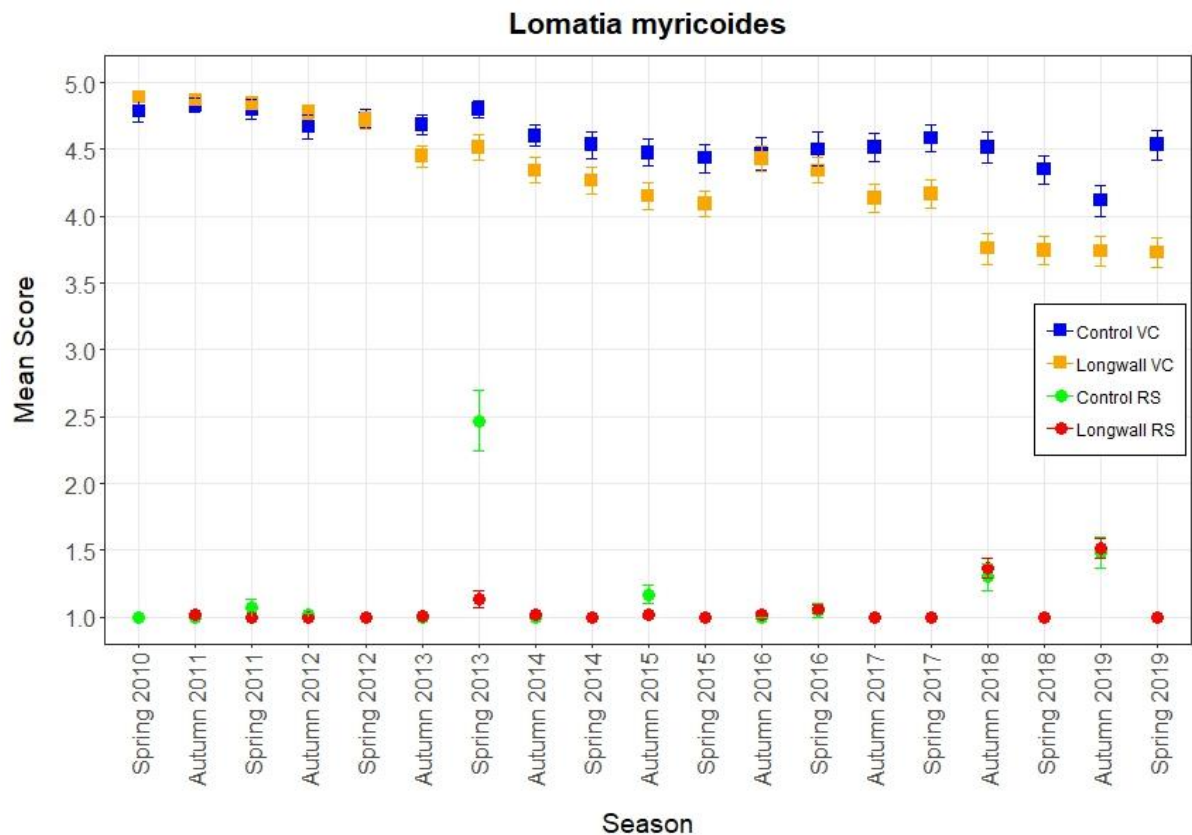


Figure 21: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, *Lomatia myricoides* (spring 2010 to spring 2019)¹¹.

¹¹ Riparian vegetation monitoring sites MRIP07 and MRIP08 were used as control sites for comparison against the longwall riparian monitoring sites prior to subsidence impacts occurring to pools on the Eastern Tributary at these sites post spring 2016 and before autumn 2017. These sites have been removed from all seasons data analyses

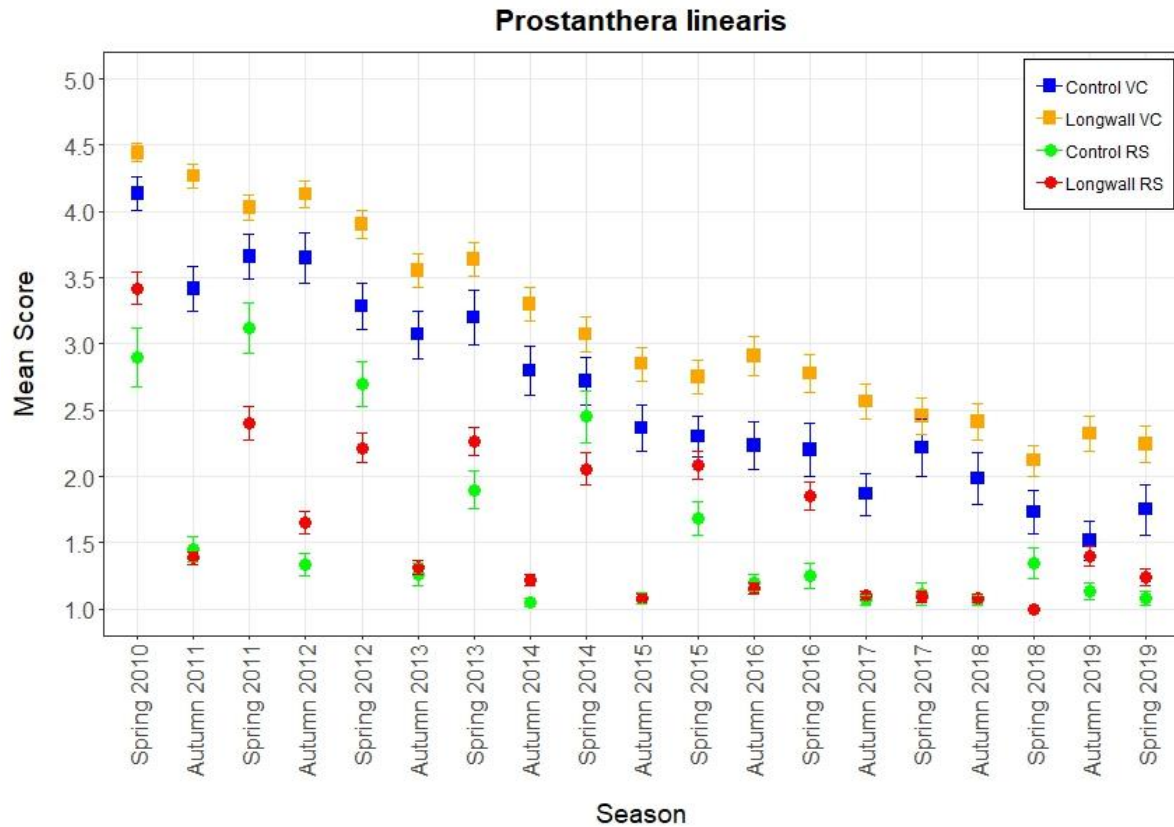


Figure 22: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, *Prostanthera linearis* (spring 2010 to spring 2019)¹¹.

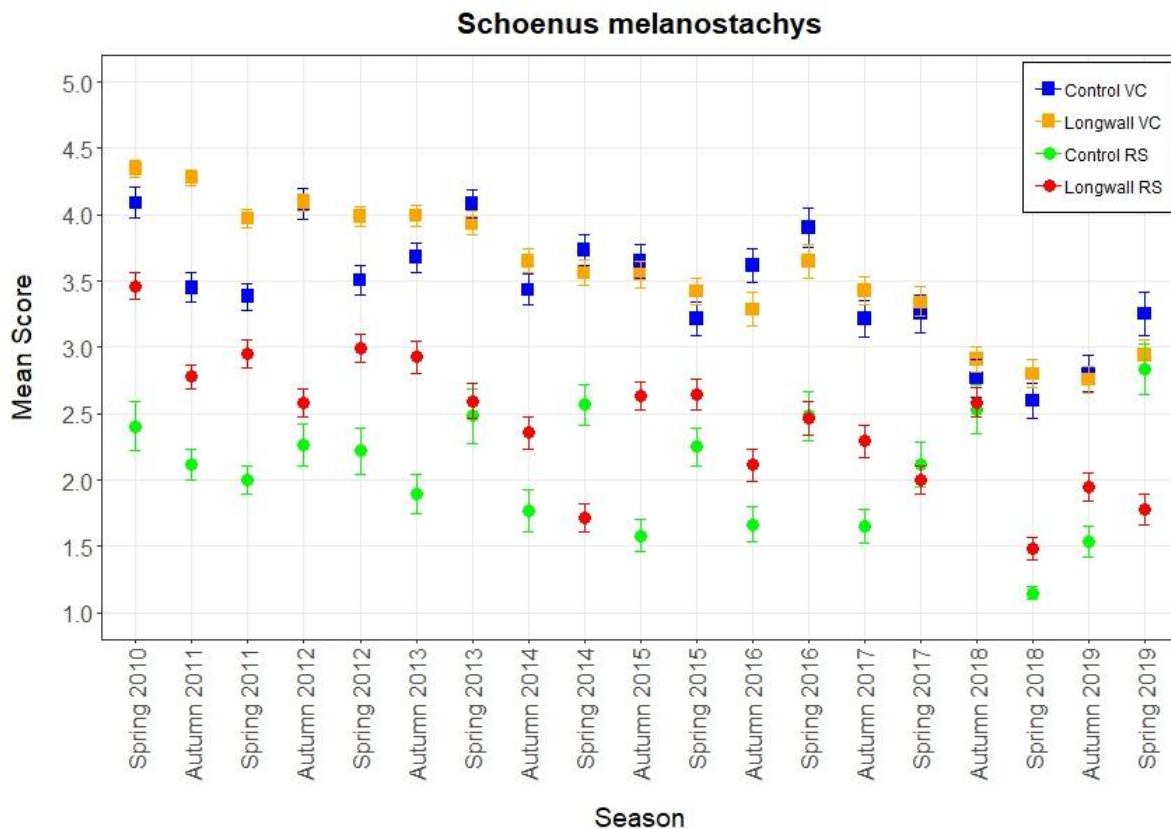


Figure 23: Mean Scores for Vegetation Condition (VC) and Mean Reproductive Status (RS) for the Indicator Species, *Schoenus melanostachys* (spring 2010 to spring 2019)¹¹.

Table 14: Vegetation condition and reproductive status of indicator species at control (compromised) sites MRIP07 and MRIP08 for spring 2016 to spring 2019.

Vegetation Condition															Reproductive status														
Condition Score	MRIP07							MRIP08							Reproductive Rating	MRIP07							MRIP08						
	Spr 2016	Aut 2017	Spr 2017	Aut 2018	Spr 2018	Aut 2019	Spr 2019	Spr 2016	Aut 2017	Spr 2017	Aut 2018	Spr 2018	Aut 2019	Spr 2019		Spr 2016	Aut 2017	Spr 2017	Aut 2018	Spr 2018	Aut 2019	Spr 2019	Spr 2016	Aut 2017	Spr 2017	Aut 2018	Spr 2018	Aut 2019	Spr 2019
Lomatia myricoides															Lomatia myricoides														
C5	13	10	14	8	6	8	6	5	6	7	5	4	5	2	RS5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C4	3	3	5	2	6	3	6	8	7	10	7	11	11	11	RS4	-	-	-	-	-	-	-	-	-	1	-	-	-	
C3	4	7	1	6	4	5	5	5	5	1	6	3	3	5	RS3	-	-	-	-	-	1	-	-	-	-	-	1	-	
C2	-	-	-	2	1	2	1	1	1	1	1	1	-	1	RS2	1	-	-	2	-	5	-	-	-	-	1	-	-	-
C1	-	-	-	2	3	2	2	1	1	1	1	1	1	1	RS1	19	20	20	18	17 (3)	12 (2)	18 (2)	19 (1)	19 (1)	19 (1)	17 (1)	19 (1)	18 (1)	19 (1)
Prostanthera linearis															Prostanthera linearis														
C5	10	5	7	10	-	7	6	3	1	5	5	3	2	1	RS5	2	-	-	-	-	-	-	3	-	-	-	-	-	-
C4	3	9	6	1	9	6	5	1	3	-	2	1	2	4	RS4	9	-	1	-	-	-	-	1	-	-	-	-	-	-
C3	4	2	3	4	6	1	3	2	3	2	-	1	1	-	RS3	1	-	-	-	-	7	1	1	-	-	-	1	2	
C2	-	1	-	1	-	2	-	-	-	-	1	-	-	-	RS2	4	3	-	-	-	4	1	-	-	-	1	-	3	-
C1	3	3	4	4	5	4	6	4	3	3	2	4	5	5	RS1	1 (3)	14 (3)	15 (4)	16 (4)	15 (5)	5 (4)	12 (6)	1 (4)	7 (3)	7 (3)	7 (2)	5 (4)*	1 (5)	3 (5)
Schoenus melanostachys															Schoenus melanostachys														
C5	6	6	1	1	-	1	2	5	2	3	2	2	1	2	RS5	4	-	1	-	-	-	-	-	1	1	-	-	-	-
C4	3	6	10	5	1	6	3	5	4	5	4	5	4	4	RS4	-	10	4	3	1	3	2	4	9	2	8	2	1	1
C3	7	6	6	10	12	8	8	5	10	5	8	8	8	6	RS3	1	1	4	6	1	2	2	1	5	3	1	4	1	1
C2	2	-	1	2	5	3	4	2	3	3	6	5	6	4	RS2	1	3	4	5	1	5	-	3	3	5	3	4	6	2
C1	2	2	2	2	2	2	3	3	1	3	-	-	1	4	RS1	12 (2)	4 (2)	5 (2)	4 (2)	15 (2)	8 (2)	13 (3)	9 (3)	1 (1)	7 (2)	8	10	11 (1)	12 (4)

Numbers in brackets indicate plants which are dead and therefore have a default Reproductive Status of 1

* data for one tagged individual not recorded during survey

Proportion of plants surviving

The assessment of the proportion of plants surviving is limited to riparian sites overlying Longwalls 23-27 (MRIP11 and MRIP12) and control sites downstream (MRIP03, MRIP04 and MRIP10). Sites overlying Longwalls 20-22 (MRIP01, MRIP02, MRIP05, MRIP06 and MRIP09) are not included within this assessment due to the different baseline monitoring periods for these sites (spring 2009 and autumn 2010) compared to sites overlying Longwalls 23-27 (spring 2010 to spring 2013). Up to spring 2016, sites MRIP07 and MRIP08 are included in the control sites data. As a result of subsidence impacts prior to autumn 2017, these sites have been treated separately from the other control sites.

In spring 2019, 74 of the tagged riparian indicator species were recorded as dead or with severe dieback (Condition 1), decreasing from 79 individuals in autumn 2019. From autumn 2019 to spring 2019, four tagged indicator species individuals declined to Condition 1 after being in a healthier condition in autumn 2019, while nine individuals recorded in Condition 1 in autumn 2019 were recorded in an improved condition in spring 2019. In spring 2019, only three tagged *Lomatia myricoides* individuals have been recorded as dead, or Condition 1, within longwall and control sites, which is a decrease from four individuals in autumn 2019. Due to the low occurrence of Condition 1 *Lomatia myricoides* individuals within longwall and control sites, no further analysis is attempted.

Since the commencement of mining Longwalls 23-27, the proportion of tagged riparian indicator species that were recorded as dead has been higher within control sites than within longwall sites for both *Prostanthera linearis* and *Schoenus melanostachys* (apart from spring 2013 and autumn 2016 for *Schoenus melanostachys*) (**Figure 24** and **Figure 25**). The proportion of tagged *Prostanthera linearis* individuals recorded as dead has generally increased over the entire monitoring period, for both longwall and control monitoring sites, though the proportion dead at control sites has been higher than at longwall sites in each season (**Figure 24**). This trend has continued in the current spring 2019 survey for both longwall and control sites. Very few tagged individuals of *Schoenus melanostachys* have been recorded as dead, or Condition 1, across all sites and seasons, with the proportion of dead individuals generally higher within control sites than longwall sites (**Figure 25**). In the current spring 2019 survey, the proportion of dead *Schoenus melanostachys* was again higher within control sites than longwall sites, though the margin of this difference was considered to be relatively small.

As the proportion of tagged riparian indicator species that were recorded as dead has generally been greater at control sites than at longwall sites, following the commencement of mining Longwalls 23-27, the observed mortality is attributed to natural factors including the variable impacts of flooding, predation, competition with other vegetation and abiotic factors. The riparian vegetation performance indicator has not been exceeded in regard to this analysis.

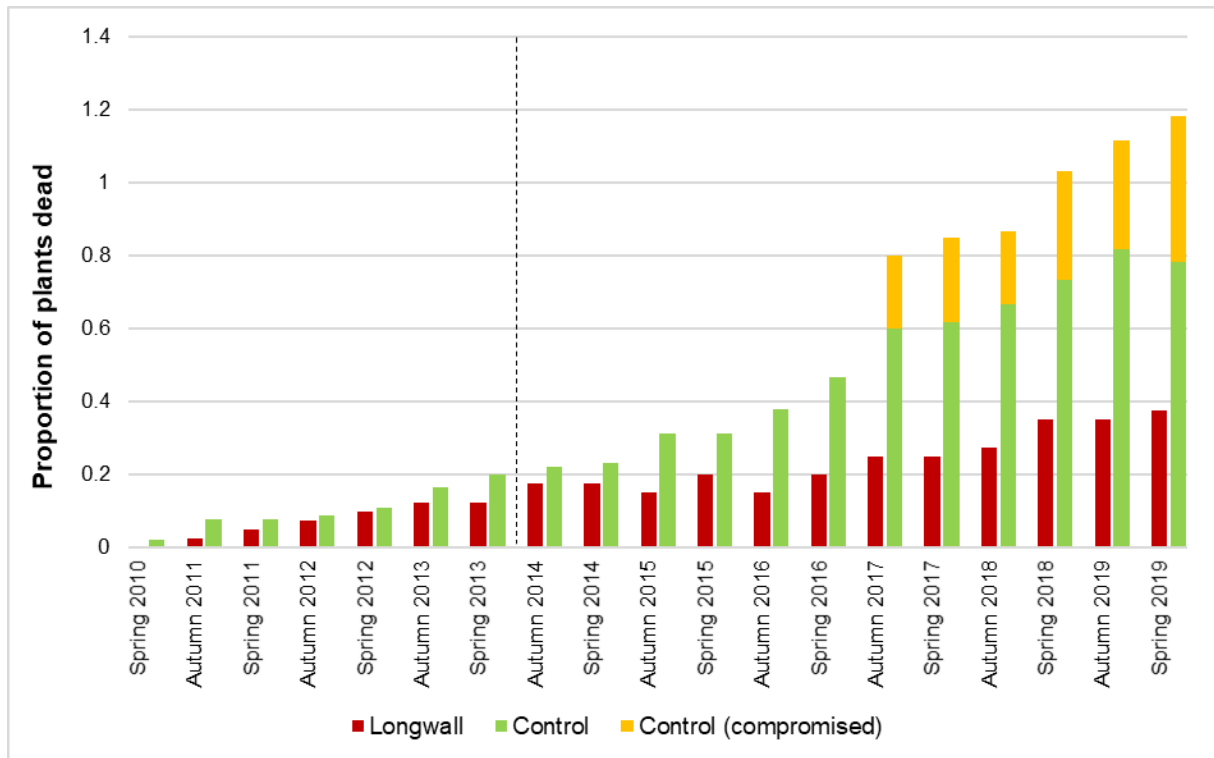


Figure 24: Proportion of tagged *Prostanthera linearis* which have died at longwall and control riparian sites (spring 2010 to spring 2019)¹². Dashed line indicates change from baseline monitoring seasons to monitoring undertaken during and post mining of Longwalls 23- 27.

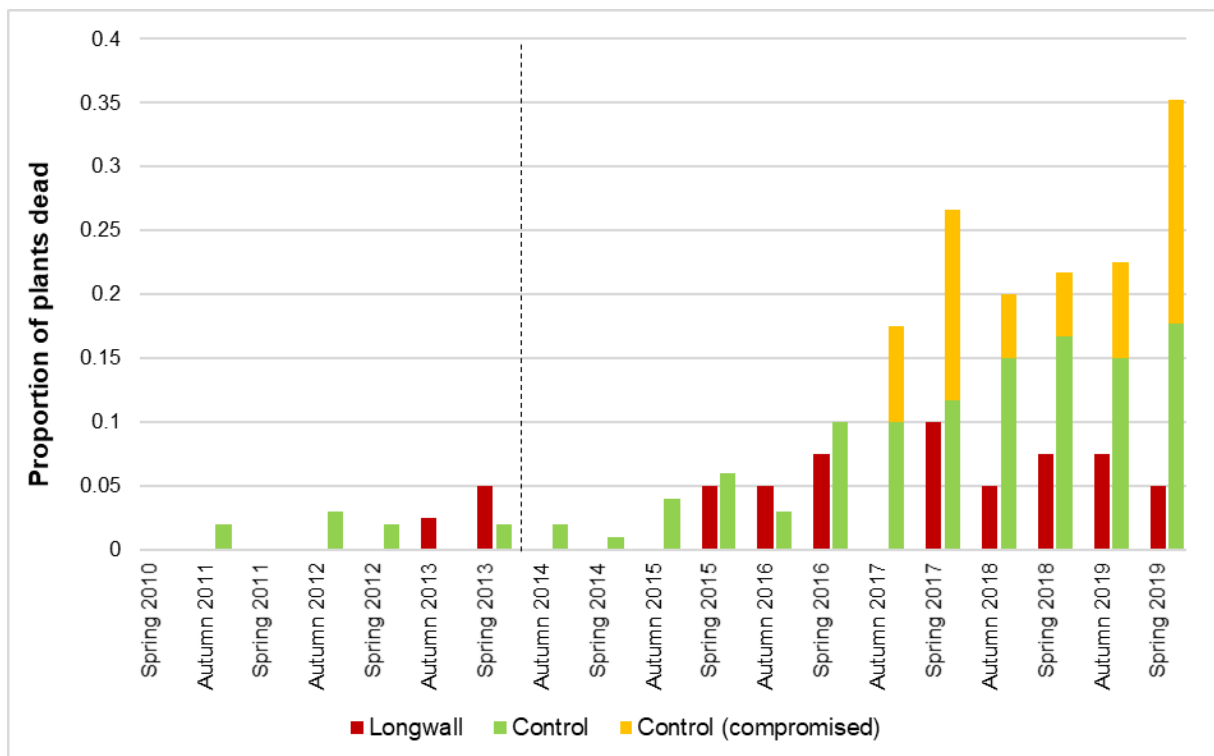


Figure 25: Proportion of tagged *Schoenus melanostachys* which have died at longwall and control riparian sites (spring 2010 to spring 2019)⁶. Dashed line indicates change from baseline monitoring seasons to mining undertaken during and post mining of Longwalls 23-27.

¹² Data point for Autumn 2018 differs to that reported in Autumn 2018 report due to calculation error

3.2.4 Assessment against performance indicators

In accordance with the Longwalls 301-303 Biodiversity Management Plan, the visual observations are used to assess the riparian vegetation performance indicator:

Impacts to riparian vegetation are expected to be localised and limited in extent, similar to the impacts previously experienced at Metropolitan Coal

The Riparian Vegetation Trigger Action Response Plan (TARP) from the Longwalls 301-303 Biodiversity Management Plan is provided in **Appendix C**.

Results of the visual observations are described in **Section 3.2.1** above. A summary of the results in relation to the riparian vegetation TARP is provided in **Table 15**.

Within longwall site MRIP05 the vegetation dieback that has been observed since autumn 2018 had not extended in spring 2019. No new areas of dieback were observed in spring 2019 and regrowth was observed in the lower storey species.

Within longwall site MRIP12, areas of vegetation dieback greater than 50 cm from the Waratah Rivulet remain similar to dieback observed in the previous three seasons. Observations of vegetation dieback and loss at this site are associated with areas of bank inundation as a result of previous flood events. No new areas of dieback were observed in spring 2019.

The performance indicator *'Impacts to riparian vegetation are expected to be localised and limited in extent, similar to the impacts previously experienced at Metropolitan Coal'* has not been exceeded in spring 2019.

Table 15: Summary of Riparian Vegetation Monitoring against Trigger Action Response Plan.

Performance Indicator	Baseline	Significance Levels/ Triggers ²		Autumn 2019 Monitoring Results	Action/Response	Comments
<i>Impacts to riparian vegetation are expected to be localised and limited in extent, similar to the impacts previously experienced at Metropolitan Coal</i>	No dieback of riparian vegetation prior to the commencement of Longwall 20 as a result of mining. Dieback of riparian vegetation greater than 50 cm from the stream identified at site MRIP02 on the Waratah Rivulet and between sites MRIP05 and MRIP09 on the Eastern Tributary during the mining of Longwalls 20-27.	Level 1	No dieback of riparian vegetation greater than 50 cm from the stream as a result of mine subsidence.	Sites MRIP01, MRIP03, MRIP04, MRIP06, MRIP07, MRIP08, MRIP10 and MRIP11	Continue monitoring. Six monthly reporting. For sites that were previously observed with riparian vegetation dieback greater than 50 cm record the reasons for the reduction in dieback (e.g. vegetation recovery, new stream bank resulting from erosion, other).	None of the sites have previously been observed with riparian vegetation dieback greater than 50 cm from the stream.
		Level 2	Vegetation monitoring: - does not identify an increase in the extent of vegetation dieback compared to that observed at site MRIP02 on the Waratah Rivulet and between sites MRIP05 and MRIP09 on the Eastern Tributary; and - does not identify vegetation dieback greater than 50 cm from the stream at sites MRIP01, MRIP03, MRIP04, MRIP06, MRIP07, MRIP08, MRIP10, MRIP11 or MRIP12, as a result of mine subsidence.	Sites MRIP02, MRIP05, MRIP09 and MRIP12	Consider recent stream features mapping results and pool water level monitoring data. Consider extent of erosion associated with areas of vegetation dieback and whether management measures are required. Six monthly reporting.	Stream conditions at sites MRIP02, MRIP05, MRIP09 and MRIP12 are described in Section 3.2.1 (along with previous observations at these sites). Scouring of the stream bank and erosion resulting from high water flows following heavy rain events described in Section 3.2.1 . The extent of dieback at sites previously observed with riparian vegetation dieback (MRIP02, MRIP05, MRIP09 and MRIP12) had not increased in the current survey and vegetation recovery was apparent.
		Level 3	Vegetation monitoring: - identifies an increase in the extent of vegetation dieback compared to that observed at site MRIP02 on the Waratah Rivulet and between sites MRIP05 and MRIP09 on the Eastern Tributary; and - identifies vegetation dieback greater than 50 cm from the stream at sites MRIP01, MRIP03, MRIP04, MRIP06, MRIP07, MRIP08, MRIP10, MRIP11 or MRIP12, as a result of mine subsidence.	No sites.	Consider recent stream features mapping results and pool water level monitoring data. Initiate assessment against the performance measure ¹ . Consider the need for management measures, in accordance with Sections 8 and 9.	-

¹ Threatened species, populations and ecological communities include those listed under the BC Act, EPBC Act or Fisheries Management Act at the time of Project Approval (i.e. the lists current as at 22 June 2009).

² Note: some sites listed are applicable to, and assessed in, the Longwalls 20-22 Spring 2019 Vegetation Monitoring Report.

3.3 Significant species

Five species of conservation significance were recorded during spring 2019 (**Appendix D**), all of which have been recorded previously (**Table 16**). Generally, the significant species observed during the transect/quadrat monitoring and visual inspections in spring 2019 were in healthy condition (Condition 5) at both longwall and control sites. Occasional individuals of *Lomandra fluviatilis* were recorded with minor dieback (Condition 4). Isolated individuals of *Pultenaea aristata* were recorded with minor dieback (Condition 4) across both longwall and control sites (**Table 16**). However, this represents an overall improvement in condition for this species compared to previous seasons. The individuals of *Eucalyptus luehmanniana* recorded along the transects in Swamp 33 were all in a healthy condition, however during the visual observations, this species was noted with minor dieback (Condition 4) across the extent of the swamp.

Table 16: Species of conservation significance recorded across vegetation monitoring sites, spring 2019.

Species	Conservation significance			Location and condition
	EPBC Act	BC Act	RoTAP Code	
<i>Darwinia diminuta</i>	–	–	2RCi	Swamps 35, 94, 101, 111a, 125, 136, 137a and 138 – Observed in healthy condition (Condition 5) in all swamps in spring 2019.
<i>Eucalyptus luehmanniana</i>	–	–	2RCa	Swamp 33 – Observed in a healthy to condition with some minor dieback (Condition 4) in spring 2019.
<i>Hibbertia nitida</i>	–	–	2RC-	MRIP01, MRIP02, MRIP03, MRIP05, MRIP06, MRIP07, MRIP08, MRIP11 and MRIP12 – Recorded in good condition (Condition 5) within all riparian quadrats in spring 2019.
<i>Lomandra fluviatilis</i>	–	-	3RCa	MRIP01, MRIP04, MRIP07, MRIP08, MRIP11 and MRIP12 – Recorded in good condition (Condition 5) within all sites, except MRIP01 and MRIP12 where it was observed with minor dieback (Condition 4), in spring 2019.
<i>Pultenaea aristata</i>	V	V	2V	Swamps 30, 35, 94, 101, 111a, 135, 136 and 138 – Recorded in good condition (Condition 5) within all swamps, with isolated individuals observed with minor dieback (Condition 4 – Swamps 35 and 138), in spring 2019. See Section 3.1.3 for details regarding condition of monitored populations of this species.

Legend

- BC Act (NSW Biodiversity Conservation Act 2016): V = Vulnerable
- EPBC Act (Commonwealth Environment Protection & Biodiversity Conservation Act 1999): V = Vulnerable
- RoTAP (Rare or Threatened Australian Plants) Code:
 - 3 = Geographic range in Australia more than 100 km
 - 2 = Geographic range in Australia less than 100 km
 - R = Rare in Australia but does not have an identifiable threat
 - C = Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 - V = Vulnerable
 - a = 1000 plants or more are known to occur within a conservation reserve(s)
 - i = less than 1000 plants are known to occur within a conservation reserve(s)
 - = reserved population size is not accurately known

Details regarding the condition of monitored populations of *Pultenaea aristata* are provided in **Section 3.1.3**.

Two species of conservation significance which have previously been recorded were not recorded in the current spring 2019 survey. *Tetradlea neglecta*, which has been recorded in all seasons prior to spring 2016, within one longwall swamp (Swamp 94), has not been recorded since the autumn 2018 survey. Additionally, *Acacia baubera* subsp. *aspera* was not recorded in the current spring 2019 survey. This species is known from one individual within the control site Swamp 111a. In the autumn 2018 survey, this individual was recorded with some dead branches (Condition 3) and has not been recorded since spring 2018.

Hibbertia nitida and *Lomandra fluviatilis* were generally recorded in good condition (Condition 5) in spring 2019, which represents an improvement in the overall condition of these species relative to previous seasons. *Hibbertia nitida* occurs more frequently within longwall riparian sites and is usually found away from the direct top of bank zone. As such, the dieback recorded in previous seasons is not considered to be related to the mining of Longwalls 23-27 and is more likely a result of the impacts of flooding which produce high velocity water flows carrying woody debris.

3.4 Introduced species

No weed species were observed within any of the longwall or control upland swamps in the current spring 2019 survey.

Five introduced species were observed in, and around, longwall and control riparian sites during spring 2019, namely: *Andropogon virginicus* (Whiskey Grass) (MRIP02, MRIP03 and MRIP10), *Conyza* sp. (Fleabane) (MRIP01 and MRIP02), *Gamochaeta* sp. (Cudweed) (MRIP02 and MRIP04), *Hypochaeris radicata* (Catsear) (MRIP12) and *Senecio madagascariensis* (Fireweed) (MRIP02). No introduced aquatic species have been recorded in streams adjacent to the riparian monitoring sites.

Including the observations in spring 2019, introduced species have been recorded in very low abundance in individual seasons, at all riparian monitoring sites except MRIP07. In addition to those mentioned above, weed species recorded include: *Ageratina adenophora* (Crofton Weed), *Cirsium vulgare* (Spear Thistle), *Cyperus brevifolius* (Mullumbimby Couch), *Cyperus eragrostis* (Umbrella Sedge), *Cyperus* sp., *Digitaria* sp., *Facelis retusa* (Annual Trampweed), *Gamochaeta coarctata*, *Gamochaeta spicata*, *Sonchus oleraceus* (Sowthistle) and *Taraxacum officinale* (Dandelion). The low occurrence of introduced species within the riparian monitoring sites is attributed to downstream dispersal from weed sources located in the upper catchment at Darkes Forest, along the Princes Highway and from Flat Rock Crossing where vehicle access may also promote weed spread.

Beyond the monitoring sites, weeds have previously been observed in low densities at Flat Rock Crossing, the area between MRIP03 and MRIP04, as well as scattered occurrences along verges of the main access roads (e.g. Fire trail 9H, Fire trail 9, Fire trail 9J). These include *Ageratina adenophora*, *Andropogon virginicus*, *Conyza* sp., *Gamochaeta* sp. and *Senecio madagascariensis*. Weed control works have been conducted along portions of Fire Trails 9H and 9J targeting *Ageratina adenophora* and *Andropogon virginicus*. Control of these species within areas upslope of riparian vegetation is likely to reduce the occurrences of these species within the riparian zone.

4 Conclusions

4.1 Upland swamp vegetation monitoring

The key findings of the Longwalls 23-27 spring 2019 upland swamp vegetation survey (since the previous autumn 2019 survey) can be summarised as follows:

- The declining trend in the condition of longwall swamp vegetation previously recorded by vegetation monitoring from spring 2017 to spring 2018 for Swamps 30, 32, 33, 34, 35 and 36 has stabilised for the second survey season, and minor recovery in the form of new growth on many of the impacted species was apparent in spring 2019. Swamp 30 has therefore returned to 'significance Level 1', whilst Swamps 32, 33, 34, 35 and 36 remain at 'significance Level 1', in accordance with the upland swamp vegetation monitoring TARP.
- Vegetation monitoring indicates a declining trend in the condition of longwall Swamps 19, 31 and 94 in spring 2019, particularly with regards to senescing shrubs (Swamps 19, 31 and 94), declining species richness and condition ratings (Swamps 30 and 94 only). A similar trend, however, is occurring in control swamp vegetation. Swamp 31 has been raised to 'significance Level 2', whilst Swamps 19, 31 and 94 remain at 'significance Level 2', in accordance with the upland swamp vegetation monitoring TARP.

Given the above, the upland swamp vegetation performance indicator, *the vegetation in upland swamps is not expected to experience changes significantly different to changes in control swamps*, has not been exceeded in spring 2019.

4.2 Riparian vegetation monitoring

The key findings of the Longwalls 23-27 spring 2019 riparian vegetation survey (since the previous autumn 2019 survey) can be summarised as follows:

- Dieback of riparian vegetation greater than 50 cm from the stream as a result of mine subsidence. has not been observed at sites MRIP01, MRIP03, MRIP04, MRIP06, MRIP07, MRIP08, MRIP10 and MRIP11 has not been observed to date. These sites remain at 'significance Level 1' in accordance with the riparian vegetation monitoring TARP.
- Areas previously observed with riparian vegetation dieback at sites MRIP02, MRIP05, MRIP09 and MRIP12 were not observed with the same extent of dieback in the current survey and vegetation recovery was apparent. These sites remain at 'significance Level 2' in accordance with the riparian vegetation monitoring TARP.

Given the above, the riparian vegetation performance indicator, *impacts to riparian vegetation are expected to be localised and limited in extent, similar to the impacts previously experienced at Metropolitan Coal*, has not been exceeded in spring 2019.

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Metropolitan Coal Vegetation Monitoring

Longwalls 23-27 Spring 2019 Appendices

Prepared for
Metropolitan Coal

12 October 2020



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Template 29/9/2015

Contents

Appendix A: Datasheets	1
Appendix B: Site details	8
Appendix C: Upland swamp and riparian vegetation performance indicators – Tables 12 and 14 of the Longwall 304 Biodiversity Management Plan	12
Appendix D: Species lists – Upland swamp monitoring sites and riparian monitoring sites	15
Appendix E: Upland swamps vegetation monitoring raw data – Restioid heath	24
<i>Vegetation structure, dominant species and estimated cover for each stratum – Restioid Heath</i>	<i>25</i>
<i>Estimated cover/abundance data – Restioid Heath</i>	<i>41</i>
<i>Vegetation condition – Restioid Heath</i>	<i>62</i>
<i>Indicator species – Restioid Heath</i>	<i>83</i>
Appendix F: Upland swamps vegetation monitoring data – Banksia thicket	94
<i>Vegetation structure, dominant species and estimated cover for each stratum – Banksia thicket</i>	<i>95</i>
<i>Estimated cover/abundance data – Banksia Thicket</i>	<i>109</i>
<i>Vegetation condition – Banksia Thicket</i>	<i>124</i>
<i>Indicator species data – Banksia Thicket</i>	<i>139</i>
Appendix G: Upland swamp vegetation monitoring data – Tea tree thicket swamps	147
<i>Vegetation structure, dominant species and estimated cover for each stratum – Tea tree thicket swamps</i>	<i>148</i>
<i>Estimated cover/abundance data – Tea tree thicket swamps</i>	<i>153</i>
<i>Vegetation condition – Tea tree thicket swamps</i>	<i>158</i>
<i>Indicator species data – Tea tree thicket swamps</i>	<i>163</i>
Appendix H: Riparian vegetation monitoring raw data	168
<i>Vegetation structure, dominant species and estimated cover for each stratum – Riparian sites</i>	<i>169</i>
<i>Estimated cover/abundance data – Riparian sites</i>	<i>172</i>
<i>Vegetation condition – Riparian sites</i>	<i>177</i>
<i>Indicator species data – Riparian sites</i>	<i>182</i>

Appendix A: Datasheets

Floristic Vegetation Survey



Date: _____ Recorder: _____ Site No: _____
 Camera No: _____ Photo No: _____

Location: _____

Quadrat Size (if not 20 x 20 m): _____

Map Name: _____ Scale: _____
 Grid Ref: E _____ N _____ Datum _____ Accuracy _____
 Lat: _____ S Long: _____ E

Landform Pattern: _____
 Morphology _____ Element _____
 Altitude: _____ metres
 Slope: _____ degrees
 Aspect: _____ degrees (magnetic)
 Horizontal Elevation: N _____ NE _____ E _____ SE _____ S _____ SW _____ W _____ NW _____

Map Geology: _____ Lithology: _____

Soil:

Compaction _____

Texture: _____

Colour: _____

Depth: _____ Deep (>1m) _____ Shallow (0.3-1m) _____ Skeletal (<0.3m) _____

Fire History _____ How determined _____

Disturbance: (circle)

erosion _____ logging _____ litter _____ weeds _____ feral animals _____

Comments: _____

Vegetation Structure: (Walker & Hopkins, 1983)

Stratum	Height (m)	% Cover	Dominant Species

Structural Formation Class: _____

Comments: _____

Floristic Composition

Date:

Site No:

No.	Species	C/A	Cond*	Notes	No.	Species	C/A	Cond*	Notes
1					31				
2					32				
3					33				
4					34				
5					35				
6					36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Condition

- 1 severe damage/dieback
- 2 many dead stems
- 3 some dead branches
- 4 minor damage
- 5 healthy

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = < 5% of site and rare (< 3 individuals)
- 2 = < 5% of site and uncommon (> 3 sparsely scattered)
- 3 = < 5% of site and common – consistent throughout plot
- 4 = cover of 5%-20%
- 5 = cover of 20% - 50% of site
- 6 = cover of 50% - 75% of site
- 7 = cover of 75% - 100% of site

o-h – overhanging; B – Buds; FL – Flowers; FR – Fruit

Floristic Vegetation Survey



Date: _____ Recorder: _____ Site No: _____
 Camera No: _____ Photo No: _____

Location: _____

Quadrat Size (if not 20 x 20 m): _____

Map Name: _____ Scale: _____
 Grid Ref: E _____ N _____ Datum _____ Accuracy _____
 Lat: _____ S _____ Long: _____ E _____

Landform Pattern: _____

Morphology _____ Element _____

Altitude: _____ metres

Slope: _____ degrees

Aspect: _____ degrees (magnetic)

Horizontal Elevation: N _____ NE _____ E _____ SE _____ S _____ SW _____ W _____ NW _____

Map Geology: _____ Lithology: _____

Soil: _____

Compaction: _____

Texture: _____

Colour: _____

Depth: _____ Deep (>1m) _____ Shallow (0.3-1m) _____ Skeletal (<0.3m) _____

Fire History _____ How determined _____

Disturbance: (circle)
 erosion _____ logging _____ litter _____ weeds _____ feral animals _____

Comments: _____

Vegetation Structure: (Walker & Hopkins, 1983)

Stratum	Height (m)	% Cover	Dominant Species

Structural Formation Class: _____

Comments: _____

Floristic Composition

* All Condition 5 unless otherwise indicated

No.	Species	C/A	Cond*	Notes
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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20				
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23				
24				
25				
26				
27				
28				
29				
30				

Condition

- 1 severe damage/dieback
- 2 many dead stems
- 3 some dead branches
- 4 minor damage
- 5 healthy

o-h - overhanging; B - Buds; FL - Flowers; FR - Fruit

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = < 5% of site and rare (< 3 individuals)
- 2 = < 5% of site and uncommon (> 3 sparsely scattered)
- 3 = < 5% of site and common - consistent throughout plot
- 4 = cover of 5%-20%
- 5 = cover of 20% - 50% of site
- 6 = cover of 50% - 75% of site
- 7 = cover of 75% - 100% of site

Population Monitoring

Autumn 2019

Lomatia myricoidesSite No: **MRIP01**Date: _____ Recorder: _____ Tag Colour: **Orange**

Tag Number	Easting	Northing	Condition	Height	Rating – Flowers	Rating – Fruit/Seeds	Notes
G1							
G2							
G3							
G4							
G5							
G6							
G7							
G8/G201							
G9							
G10							
G11							
G12							
G13							
G14							
G15							
G16							
G17							
G18							
G19							
G20							

Reproductive Ratings

1 – Nil
 2 – Sparse
 3 – Low
 4 – Moderate
 5 – High

occasional flowers only
 under 25% of potential
 25% – 75% of potential
 75% – 100 % of potential

Condition

1 severe damage/dieback
 2 many dead stems
 3 some dead branches
 4 minor damage
 5 healthy

Eco Logical Australia 2010

Visual Inspections for subsidence impacts – Swamps – Autumn 2020



Site No: Swamp 101

Date: _____

Recorder: _____

Potential Subsidence Impacts	Comments			
Cracking of exposed bedrock or sediments	No	Yes – extent and location:		
Any weeds	No	Yes – species and number:		
Large areas of unusual senescing vegetation	No	Yes – extent and location:		
Any species with dieback observed incl. number individuals impacted: (<i>F</i> -few, <i>O</i> - occasional, <i>C</i> -common), and distribution: (<i>I</i> - isolated, <i>S</i> - scattered, <i>W</i> - widespread).				
Amount of seepage – incl. location				
Swamp surface sediments	Dry	Damp/moist	Wet	Saturated - standing water
Changes in water colour or location etc.				
Areas of increased erosion – incl. severity, type & location (i.e. minor gully erosion in table drain)				
Other comments (Recent rainfall events, anthropogenic impacts, any other comments/observations)				

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Site no: Swamp 101

Camera: _____

Photo Points	Photo No(s).	Waypoints	Comments
PP1 Top end by track junction	50° 85°	Correct on GPS	
PP2 E. haemastoma near top	20° 60° 75°	Correct on GPS	
PP3 Along track at end of T1 (near) (mapping and GPS a bit off)	40° 280° 345°	308707 6216567	
PP4 Pinch point, E haemastoma	35° 80° 90°	308761 6216607	
PP5 Lower swamp, north side, middle Rock step next to track	130° 250° 195°	308808 6216628	
PP6 End of T3	170° 235° 260° 200° 80°	308735 6216621	
PP7 Lower swamp, E. haemastoma below PP5	115° 150° 230° 210°	308818 6216628	

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Appendix B: Site details

Longwalls 23-27 – Vegetation Monitoring Sites

Site	Monitoring techniques	Control / LW	Location	Easting, Northing	Vegetation	Site marker	Transect orientation
SWAMPS – RESTIOID HEATH							
S19	Visual observations; Population monitoring of indicator species	LW23	Adjacent to walking track – ex Fire Road 9J	310690 6214811	Restioid heath	At start	N/A
S27	Visual observations only	LW23/24	West of transmission line easement off Fire Road 9J, east of Eastern Tributary	312137 6213917	Restioid heath	At start	N/A
S30	Visual observations; Transects/quadrats; Population monitoring of indicator species	LW26	West of Fire Road 9G and north of Fire Road 9J	311141 6215104	Restioid Heath	At start	T1 – 270° T2 – 300° T3 – 300°
S31	Visual observations only	LW25	West of Fire Road 9G and north of Fire Road 9J	311187 6214929	Restioid Heath	At start	N/A
S32	Visual observations only	LW25	West of Fire Road 9G and north of Fire Road 9J	311301 6214718	Restioid Heath	At start	N/A
S34	Visual observations only	LW26	West of Fire Road 9G and north of Fire Road 9J	311361 6215067	Restioid Heath	At start	N/A
S35	Visual observations; Transects/quadrat; Population monitoring of indicator species	LW26/27	West of Fire Road 9G and north of Fire Road 9J	311496 6215097	Restioid Heath	At start	T1 – 340° T2 – 340° T3 – Due north
S36	Visual observations only	LW27	West of Fire Road 9G and north of Fire Road 9J	311564 6215319	Restioid Heath	At start	N/A
S101	Visual observations; Transects/quadrats; Population monitoring of indicator species	Control	East of Fire Road 9	308652 6216578	Restioid Heath	At start	T1 – Due east T2 – 60° T3 – 50°
S111a	Visual observations; Transects/quadrats; Population monitoring of indicator species	Control	East of Fire Road 9	308887 6217040	Restioid Heath	At start	T1 – 60° T2 – 90° T3 – 90°
S125	Visual observations; Transects/quadrats; Population monitoring of indicator species	Control	North-west of Fire Road 9D	309717 6218864	Restioid Heath	At start	T1 – Due west T2 – 280° T3 – 300°
S137a	Visual observations; Transects/quadrats; Population monitoring of indicator species	Control	West of Fire Road 9	308395 6216988	Restioid Heath	At start	T1 – 275° T2 – 250° T3 – 210 °
S138	Visual observations; Transects/quadrats; Population monitoring of indicator species	Control	East of Fire Road 9	308678 6216492	Restioid Heath	At start	T1 – 70° T2 – 70° T3 – 70
SWAMPS – BANKSIA THICKET							
S28	Visual observations; Transect/Quadrats	LW24	West of Fire Road 9G and north of Fire Road 9J	310991 6214799	Banksia Thicket	At start	T1 – 180°

Longwalls 23-27 – Vegetation Monitoring Sites

Site	Monitoring techniques	Control / LW	Location	Easting, Northing	Vegetation	Site marker	Transect orientation
S33	Visual observations; Transects/quadrat; Population monitoring of indicator species	LW25	East of Fire Road 9G and west of Eastern Tributary	311601 6214575	Banksia Thicket	At start	T1 – 140° T2 – 140° T3 – 140°
S94	Visual observations; Transects/quadrat; Population monitoring of indicator species	Adj. LW23	East of Fire Road 9E and south of track to Swamp 92	310076 6215680	Banksia Thicket	At start	T1 – 120° T2 – 120° T3 – 120°
S135	Visual observations; Transects/quadrat; Population monitoring of indicator species	Control	East of Fire Road 9	308945 6217252	Banksia Thicket	At start	T1 – 130° T2 – 130° T3 – 140°
S136	Visual observations; Transects/quadrat; Population monitoring of indicator species	Control	East of Fire Road 9	308350 6212700	Banksia Thicket	At start	T1 – 110° T2 – 85° T3 – 85°
S137b	Visual observations; Transects/quadrat; Population monitoring of indicator species	Control	West of Fire Road 9	308409 6216982	Banksia Thicket	At start	T1 – 280° T2 – Due west T3 – 290°
Bee Creek	Visual observations; Transect/Quadrats	Control	West of Fire Road 9 and North of junction with Fire Road 9F	308737 6218930	Banksia Thicket	At start	T1 – 260° T2 – 280° T3 – 270°
SWAMPS – TEA TREE THICKETS							
S28	Visual observations; Transects/quadrat; Population monitoring of indicator species	LW24	West of Fire Road 9G and north of Fire Road 9J	310991 6214799	Tea Tree Thicket	At start	T2 – 180°
Woronora 1	Visual observations; Transects/quadrat; Population monitoring of indicator species	Control	Darkes Forest Road, upstream from Woronora River Crossing	306406 6214962	Tea Tree Thicket	At start	T1 – 90°
Woronora River south arm	Visual observations; Transects/quadrat; Population monitoring of indicator species	Control	North of walking track off Darkes Forest Road, north of Fire Road 10H	306414 6213953	Tea Tree Thicket	At start	T1 – 60°
Dahlia swamp	Visual observations; Transects/quadrat; Population monitoring of indicator species	Control	North of Fire Road 10H, off Darkes Forest Road	306149 6212874	Tea Tree Thicket	At start	T1 – 60°
RIPARIAN SITES							
MRIP01	Visual observations; Quadrat data; and Population monitoring of indicator species	LW20	Waratah Rivulet, west bank, adj. to monitoring box	309835 6214400	Sandstone Riparian Scrub	At start	Downstream from peg
MRIP02	Visual observations; Quadrat data; and Population monitoring of indicator species	LW21	Waratah Rivulet, west bank	301017 6214635	Sandstone Riparian Scrub	At start	Downstream from peg

Longwalls 23-27 – Vegetation Monitoring Sites

Site	Monitoring techniques	Control / LW	Location	Easting, Northing	Vegetation	Site marker	Transect orientation
MRIP03	Visual observations; Quadrat data; and Population monitoring of indicator species	Control	Waratah Rivulet, east bank	310428 6215311	Sandstone Riparian Scrub	At start	Downstream from peg
MRIP04	Visual observations; Quadrat data; and Population monitoring of indicator species	Control	Waratah Rivulet, east bank	311049 6215492	Sandstone Riparian Scrub	At start	Downstream from peg
MRIP05	Visual observations; Quadrat data; and Population monitoring of indicator species	LW21	Creek east of Fire Road 9G, access via ford on Fire Road 9J, east bank	311473 6213759	Sandstone Riparian Scrub	At start	Downstream from peg
MRIP06	Visual observations; Quadrat data; and Population monitoring of indicator species	LW22	Creek east of Fire Road 9G, access via ford on Fire Road 9J, east bank	311587 6213939	Sandstone Riparian Scrub	At start	Downstream from peg
MRIP07	Visual observations; Quadrat data; and Population monitoring of indicator species	Former Control	Creek east of Fire Road 9G, access via end of Fire Trail 9G, west bank	312144 6215259	Sandstone Riparian Scrub	At start	Downstream from peg
MRIP08	Visual observations; Quadrat data; and Population monitoring of indicator species	Former Control	Creek east of Fire Road 9G, access via end of Fire Road 9G, west bank	312161 6215499	Sandstone Riparian Scrub	At start	Downstream from peg
MRIP09	Visual observations; and Population monitoring of indicator species	LW20	Eastern Tributary, upstream of site MRIP05	311424 6213600	Sandstone Riparian Scrub	–	–
MRIP10	Visual observations; and Population monitoring of indicator species	Control	Waratah Rivulet, downstream from site MRIP04	311150 6215600	Sandstone Riparian Scrub	–	–
MRIP11	Visual observations; Quadrat data; and Population monitoring of indicator species	LW24	Eastern Tributary, downstream of Fire Trail 9J ford	311729 6214368	Sandstone Riparian Scrub	At start	Downstream from peg
MRIP12	Visual observations; Quadrat data; and Population monitoring of indicator species	LW27	Eastern Tributary, downstream of Fire Trail 9J ford	312211 6214768	Sandstone Riparian Scrub	At start	Downstream from peg

Appendix C: Upland swamp and riparian vegetation performance indicators – Tables 12 and 14 of the Longwall 304 Biodiversity Management Plan

Table 12
Trigger Action Response Plan – Upland Swamp Vegetation Monitoring

Performance Measure	Performance Indicator	Monitoring Sites	Parameters	Frequency/ Sample Size	Analysis Methodology	Error Types	Baseline	Significance Levels/ Triggers		Action/Response
Negligible impact on Threatened Species, Populations, or Ecological Communities	The vegetation in upland swamps is not expected to experience changes significantly different to vegetation in control swamps	- Swamps 16, 17, 18, 20, 24 and 25 overlying or adjacent to Longwalls (LW) 20-22. - Swamps 19, 28, 30, 31, 32, 33, 34, 35, 36 and 94 overlying or adjacent to LW23-27. - Swamps 40, 41, 47, 48, 49, 50, 53 and 58 overlying or adjacent to LW301-303. - Swamps within the 35° angle of draw and/or predicted 20 mm subsidence contour of LW304 (i.e. those listed for LW301-303 above). - Control Swamps 101, 111a, 125, 135, 136, 137a, 137b, 138, Bee Creek Swamp, Woronora River 1, Woronora River south arm and Dahlia Swamp.	- Visual inspections¹. - Transect/ quadrat data². - Population monitoring of indicator species³.	Biannually, in autumn and spring.	- Visual assessment of changes in the condition of the swamps over time. - Qualitative analysis of collected vegetation data. - Statistical analysis of species diversity (e.g. ANOVA⁴ or cluster analysis⁵). - Qualitative analysis of proportions of plants surviving, and differences in health and reproduction ratings over time and relative to control swamps.	- Subjective nature of visual observations and qualitative analysis. - Statistical significance levels. Significant = $P < 0.05$	- LW20-22 swamps, as detailed in the LW20-22 vegetation monitoring report for the spring 2008 to autumn 2010 surveys⁶. - LW23-27 swamps, as detailed in the LW23-27 vegetation monitoring report for the spring 2010 to spring 2013 surveys⁷. - LW301-303 swamps, as detailed in the LW301-303 vegetation monitoring report for the spring 2015 to autumn 2017 surveys⁸. - LW304 swamps since spring 2015. Additional baseline data will be collected prior to LW304 commencement.	Level 1	Data analysis indicates: - there is not a declining trend in the condition of longwall swamp vegetation; and - there are no significant changes in vegetation between the mined and control swamps.	Continue monitoring. Six monthly reporting.
								Level 2	Data analysis indicates: - there is a declining trend in the condition of longwall swamp vegetation over time, however a similar trend is occurring in control swamp vegetation; or - there are significant differences in vegetation between the mined and control swamps, however, the data indicates longwall swamp vegetation is consistent with the baseline monitoring results.	Consider swamp groundwater monitoring data. Six monthly reporting.
								Level 3	Data analysis indicates: - there is a declining trend in the condition of longwall swamp vegetation over time that is not occurring in control swamp vegetation; or - there are significant differences in vegetation between the mined and control swamps, and the data indicates longwall swamp vegetation is not consistent with the baseline monitoring results.	Consider swamp groundwater monitoring data. Initiate assessment against the performance measure ⁹ . Consider the need for management measures, in accordance with Sections 8 and 9.

¹ Visual inspections will be conducted in all swamps listed under 'Monitoring Sites' in this table, as well as Swamp 46 and Swamp 51/52.

² Transect/quadrat monitoring will continue to be conducted in Swamps 16, 17, 18, 20, 24 and 25 overlying Longwalls 20-22, Swamps 28, 30, 33, 35 and 94 overlying or adjacent to Longwalls 23-27, Swamps 40, 41, 46, 51/52 and 53 over Longwalls 301-303, and in control swamps. Transect/quadrat monitoring will be conducted in Swamp 48 and Swamp 50 over or adjacent to Longwall 304.

³ Indicator species monitoring will continue to be conducted in Swamps 18, 20, 24 and 25 overlying Longwalls 20-22, Swamps 19, 28, 30, 33, 35 and 94 overlying or adjacent to Longwalls 23-27, Swamps 40 and 53 over Longwalls 301-303, and in control swamps.

⁴ In general, the purpose of ANOVA is to test for significant differences between means.

⁵ The term cluster analysis encompasses a number of different algorithms and methods for grouping objects of similar kind into respective categories.

⁶ Eco Logical Australia (2010) *Metropolitan Coal Vegetation Monitoring Longwalls 20-22 - Baseline Data*. Report prepared for Metropolitan Coal.

⁷ Eco Logical Australia (2013) *Metropolitan Coal Vegetation Monitoring Longwalls 23-27 - Baseline data*. Report prepared for Metropolitan Coal.

⁸ Eco Logical Australia (2018) *Metropolitan Coal Vegetation Monitoring Longwalls 301-303 - Baseline data*. Report prepared for Metropolitan Coal.

⁹ Threatened species, populations and ecological communities include those listed under the BC Act, EPBC Act or Fisheries Management Act at the time of Project Approval (i.e. the lists current as at 22 June 2009).

Table 14
Trigger Action Response Plan – Riparian Vegetation Monitoring

Performance Measure	Performance Indicator	Monitoring Sites	Parameters	Frequency/ Sample Size	Analysis Methodology	Error Types	Baseline	Significance Levels/ Triggers	Action/Response
Negligible impact on Threatened Species, Populations, or Ecological Communities	<i>Impacts to riparian vegetation are expected to be localised and limited in extent, similar to the impacts previously experienced at Metropolitan Coal</i>	Locations adjacent to riparian vegetation monitoring sites (MRIP01 to MRIP12) and areas traversed whilst accessing the monitoring sites: - sites MRIP01, MRIP02, MRIP05, MRIP08 and MRIP09 overlying Longwalls (LW) 20-22; - sites MRIP11 and MRIP12 overlying LW23-27; - sites MRIP03, MRIP04 and MRIP10 downstream of LW23A; and - sites MRIP07 and MRIP08 downstream of LW23-27.	The extent of vegetation subject to vegetation dieback.	Biannually, in autumn and spring.	Assessment of the extent of riparian vegetation dieback.	Subjective nature of visual observations.	No dieback of riparian vegetation prior to the commencement of LW20 as a result of mining. Dieback of riparian vegetation greater than 50 cm from the stream identified at site MRIP02 on the Waratah Rivulet and between sites MRIP05 and MRIP09 on the Eastern Tributary as a result of mine subsidence during the mining of LW20-27.	Level 1 No dieback of riparian vegetation greater than 50 cm from the stream as a result of mine subsidence.	Continue monitoring. Six monthly reporting.
								Level 2 Vegetation monitoring: - does not identify an increase in the extent of vegetation dieback at site MRIP02 on the Waratah Rivulet and between sites MRIP05 and MRIP09 on the Eastern Tributary compared to that observed up to and including the spring 2017 vegetation survey; and - does not identify vegetation dieback greater than 50 cm from the stream at sites MRIP01, MRIP03, MRIP04, MRIP06, MRIP07, MRIP08, MRIP10, MRIP11 or MRIP12, as a result of mine subsidence.	Consider recent stream features mapping results and pool water level monitoring data. Consider extent of erosion associated with areas of vegetation dieback and whether management measures are required. Six monthly reporting.
								Level 3 Vegetation monitoring: - identifies an increase in the extent of vegetation dieback at site MRIP02 on the Waratah Rivulet and between sites MRIP05 and MRIP09 on the Eastern Tributary compared to that observed up to and including the spring 2017 vegetation survey; and - identifies vegetation dieback greater than 50 cm from the stream at sites MRIP01, MRIP03, MRIP04, MRIP06, MRIP07, MRIP08, MRIP10, MRIP11 or MRIP12, as a result of mine subsidence.	Consider recent stream features mapping results and pool water level monitoring data. Initiate assessment against the performance measure ¹ . Consider the need for management measures, in accordance with Sections 8 and 9.

¹ Threatened species, populations and ecological communities include those listed under the BC Act, EPBC Act or Fisheries Management Act at the time of Project Approval (i.e. the lists current as at 22 June 2009).

Appendix D: Species lists – Upland swamp monitoring sites and riparian monitoring sites

Longwalls 23-27 – Spring 2019

Species list – Upland Swamps monitoring sites

Family	Species	Common Name
Anthericaceae	<i>Thysanotus juncifolius</i>	
Apiaceae	<i>Actinotus minor</i>	Lesser Flannel Flower
	<i>Hydrocotyle laxiflora</i>	Stinking Pennywort
	<i>Platysace linearifolia</i>	
	<i>Xanthosia pilosa</i>	Woolly Xanthosia
	<i>Xanthosia</i> spp.	
	<i>Xanthosia tridentata</i>	Rock Xanthosia
Aspleniaceae	<i>Asplenium flabellifolium</i>	Necklace Fern
Casuarinaceae	<i>Allocasuarina distyla</i>	
	<i>Allocasuarina littoralis</i>	Black She-Oak
Colchicaceae	<i>Burchardia umbellata</i>	Milkmaids
Cunoniaceae	<i>Bauera microphylla</i>	
	<i>Bauera rubioides</i>	River Rose
Cyperaceae	<i>Baumea rubiginosa</i>	
	<i>Baumea</i> spp.	
	<i>Chorizandra cymbaria</i>	
	<i>Cyathochaeta diandra</i>	
	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge
	<i>Lepidosperma filiforme</i>	
	<i>Lepidosperma limicola</i>	
	<i>Lepidosperma neesii</i>	
	<i>Lepidosperma quadrangulatum</i>	
	<i>Ptilothrix deusta</i>	
	<i>Schoenus brevifolius</i>	
	<i>Schoenus lepidosperma</i>	
	<i>Schoenus lepidosperma</i> subsp. <i>pachylepis</i>	
Dicksoniaceae	<i>Calochlaena dubia</i>	Rainbow Fern
Dilleniaceae	<i>Hibbertia riparia</i>	
	<i>Hibbertia serpyllifolia</i>	Hairy Guinea Flower
Droseraceae	<i>Drosera peltata</i>	A Sundew
	<i>Drosera spatulata</i>	
Ericaceae	<i>Epacris microphylla</i>	Coral Heath
	<i>Epacris obtusifolia</i>	Blunt-leaf Heath
	<i>Epacris paludosa</i>	Swamp Heath
	<i>Leucopogon esquamatus</i>	
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	
	<i>Sprengelia incarnata</i>	Pink Swamp Heath
	<i>Styphelia tubiflora</i>	Red Five-Corner
Euphorbiaceae	<i>Micrantheum ericoides</i>	
	<i>Monotaxis linifolia</i>	
Fabaceae (Faboideae)	<i>Bossiaea ensata</i>	Sword Bossiaea
	<i>Dillwynia floribunda</i>	

Longwalls 23-27 – Spring 2019

Species list – Upland Swamps monitoring sites

Family	Species	Common Name
	<i>Gompholobium glabratum</i>	Dainty Wedge Pea
	<i>Mirbelia rubiifolia</i>	Heathy Mirbelia
	++ <i>Pultenaea aristata</i> ▲ 2V	Prickly Bush-pea
	<i>Pultenaea tuberculata</i>	
	<i>Sphaerolobium vimineum</i>	
Fabaceae (Mimosoideae)	<i>Acacia rubida</i>	Red-stemmed Wattle
	<i>Acacia</i> spp.	Wattle
Gleicheniaceae	<i>Gleichenia dicarpa</i>	Pouched Coral Fern
	<i>Gleichenia microphylla</i>	Scrambling Coral Fern
Goodeniaceae	<i>Dampiera stricta</i>	
Haloragaceae	<i>Gonocarpus micranthus</i>	
	<i>Gonocarpus tetragynus</i>	Poverty Raspwort
Iridaceae	<i>Patersonia glabrata</i>	Leafy Purple-flag
	<i>Patersonia sericea</i>	Silky Purple-Flag
Lauraceae	<i>Cassytha glabella</i>	
Lindsaeaceae	<i>Lindsaea linearis</i>	Screw Fern
Lobeliaceae	<i>Lobelia anceps</i>	
Lomandraceae	<i>Lomandra obliqua</i>	
Myrtaceae	<i>Angophora hispida</i>	Dwarf Apple
	<i>Baeckea imbricata</i>	
	<i>Baeckea linifolia</i>	Weeping Baeckea
	<i>Callistemon citrinus</i>	Crimson Bottlebrush
	<i>Callistemon linearis</i>	Narrow-leaved Bottlebrush
	<i>Corymbia gummifera</i>	Red Bloodwood
	<i>Darwinia diminuta</i> ▲ 2RCi	
	<i>Darwinia fascicularis</i>	
	<i>Eucalyptus haemastoma</i>	Broad-leaved Scribbly Gum
	<i>Eucalyptus luehmanniana</i> ▲ 2RCa	Yellow Top Mallee Ash
	<i>Eucalyptus oblonga</i>	Stringybark
	<i>Eucalyptus racemosa</i>	Narrow-leaved Scribbly Gum
	<i>Eucalyptus sieberi</i>	Silvertop Ash
	<i>Kunzea capitata</i>	
	<i>Leptospermum arachnoides</i>	
	<i>Leptospermum grandifolium</i>	Woolly Teatree
	<i>Leptospermum juniperinum</i>	Prickly Tea-tree
	<i>Leptospermum squarrosus</i>	
	<i>Leptospermum trinervium</i>	Slender Tea-tree
	<i>Melaleuca squarrosa</i>	Scented Paperbark
	<i>Micromyrtus ciliata</i>	Fringed Heath-myrtle
Orchidaceae	<i>Cryptostylis erecta</i>	Tartan Tongue Orchid
	<i>Cryptostylis subulata</i>	Large Tongue Orchid
Pittosporaceae	<i>Billardiera scandens</i>	Hairy Apple Berry

Longwalls 23-27 – Spring 2019

Species list – Upland Swamps monitoring sites

Family	Species	Common Name
Plantaginaceae	<i>Veronica plebeia</i>	Trailing Speedwell
Poaceae	<i>Anisopogon avenaceus</i>	Oat Speargrass
	<i>Entolasia stricta</i>	Wiry Panic
	<i>Entolasia stricta</i>	Wiry Panic
	<i>Hemarthria uncinata</i>	Matgrass
	<i>Tetrarrhena turfosa</i>	
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	
	<i>Banksia marginata</i>	Silver Banksia
	<i>Banksia oblongifolia</i>	Fern-leaved Banksia
	<i>Banksia robur</i>	Swamp Banksia
	<i>Banksia serrata</i>	Old-man Banksia
	<i>Conospermum ellipticum</i>	
	<i>Grevillea oleoides</i>	Red Spider Flower
	<i>Grevillea patulifolia</i>	
	<i>Hakea dactyloides</i>	Finger Hakea
	<i>Hakea gibbosa</i>	
	<i>Hakea teretifolia</i>	Needlebush
	<i>Isopogon anethifolius</i>	Narrow-leaf Drumsticks
	<i>Lambertia formosa</i>	Mountain Devil
	<i>Lomatia silaifolia</i>	Crinkle Bush
	<i>Persoonia levis</i>	Broad-leaved Geebung
	<i>Persoonia pinifolia</i>	Pine-leaved Geebung
	<i>Petrophile pulchella</i>	Conesticks
	<i>Petrophile sessilis</i>	
	<i>Symphionema paludosum</i>	
Restionaceae	<i>Baloskion gracile</i>	
	<i>Chordifex dimorphus</i>	
	<i>Chordifex fastigiatus</i>	
	<i>Empodisma minus</i>	
	<i>Leptocarpus tenax</i>	
	<i>Lepyrodia scariosa</i>	
	<i>Sporadanthus gracilis</i>	
Rhamnaceae	<i>Cryptandra ericoides</i>	Heathy Cryptandra
Rutaceae	<i>Boronia parviflora</i>	Swamp Boronia
Santalaceae	<i>Leptomeria acida</i>	Sour Currant Bush
Schizaeaceae	<i>Schizaea bifida</i>	Forked Comb Fern
Selaginellaceae	<i>Selaginella uliginosa</i>	Swamp Selaginella
Stylidiaceae	<i>Stylidium lineare</i>	Narrow-leaved Triggerplant
Thymelaeaceae	<i>Pimelea linifolia</i> subsp. <i>linifolia</i>	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	
Xyridaceae	<i>Xyris gracilis</i>	

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

▲ RoTAP species

2: Geographic range in Australia less than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

V: Taxon not presently Endangered, but at risk over a longer period

a: 1000 plants or more are known to occur within a conservation reserve(s)

i: less than 1000 plants are known to occur within a conservation reserve(s)

Longwalls 23-27 – Spring 2019

Species list – Riparian monitoring sites

Family	Species	Common Name
Apiaceae	<i>Actinotus minor</i>	Lesser Flannel Flower
	<i>Xanthosia pilosa</i>	Woolly Xanthosia
	<i>Xanthosia tridentata</i>	Rock Xanthosia
Asteraceae	<i>Gamochaeta</i> spp.*	
	<i>Hypochaeris radicata</i> *	Catsear
Blandfordiaceae	<i>Blandfordia nobilis</i>	Christmas Bells
Casuarinaceae	<i>Allocasuarina distyla</i>	
	<i>Allocasuarina littoralis</i>	Black She-Oak
Centrolepidaceae	<i>Centrolepis strigosa</i> subsp. <i>strigosa</i>	
Cunoniaceae	<i>Bauera rubioides</i>	River Rose
	<i>Callicoma serratifolia</i>	Black Wattle
	<i>Ceratopetalum apetalum</i>	Coachwood
	<i>Ceratopetalum gummiferum</i>	Christmas Bush
Cupressaceae	<i>Callitris rhomboidea</i>	Port Jackson Pine
Cyperaceae	<i>Baumea juncea</i>	
	<i>Baumea rubiginosa</i>	
	<i>Baumea</i> spp.	
	<i>Caustis flexuosa</i>	Curly Wig
	<i>Caustis pentandra</i>	Thick Twist Rush
	<i>Chorizandra cymbaria</i>	
	<i>Cyathochaeta diandra</i>	
	<i>Cyperus gracilis</i>	Slender Flat-sedge
	<i>Eleocharis gracilis</i>	
	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge
	<i>Gymnoschoenus sphaerocephalus</i>	Button Grass
	<i>Isolepis cernua</i>	Nodding Club-rush
	<i>Isolepis</i> spp.	Club-rush
	<i>Lepidosperma laterale</i>	Variable Sword-sedge
Dennstaedtiaceae	<i>Schoenus melanostachys</i>	
	<i>Pteridium esculentum</i>	Bracken
Dilleniaceae	<i>Hibbertia aspera</i>	Rough Guinea Flower
	<i>Hibbertia nitida</i> ▲ 2RC-	
Doryanthaceae	<i>Doryanthes excelsa</i>	Gymea Lily
Droseraceae	<i>Drosera binata</i>	Forked Sundew
	<i>Drosera peltata</i>	A Sundew
	<i>Drosera spatulata</i>	
Ericaceae	<i>Epacris longiflora</i>	Fuchsia Heath
	<i>Epacris microphylla</i>	Coral Heath
	<i>Epacris obtusifolia</i>	Blunt-leaf Heath
	<i>Epacris pulchella</i>	Wallum Heath
	<i>Leucopogon amplexicaulis</i>	Beard-heath
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	
	<i>Monotoca scoparia</i>	
	<i>Woollsia pungens</i>	
Euphorbiaceae	<i>Micrantheum ericoides</i>	

Longwalls 23-27 – Spring 2019

Species list – Riparian monitoring sites

Family	Species	Common Name
	<i>Pseudanthus pimeleoides</i>	
Fabaceae (Faboideae)	<i>Aotus ericoides</i>	
	<i>Dillwynia floribunda</i>	
	<i>Dillwynia retorta</i>	
	<i>Gompholobium glabratum</i>	Dainty Wedge Pea
	<i>Pultenaea blakelyi</i>	
	<i>Pultenaea daphnoides</i>	Large-leaf Bush-pea
	<i>Pultenaea stipularis</i>	
Fabaceae (Mimosoideae)	<i>Acacia linifolia</i>	White Wattle
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sydney Golden Wattle
	<i>Acacia obtusifolia</i>	
	<i>Acacia</i> spp.	Wattle
	<i>Acacia terminalis</i>	Sunshine Wattle
	<i>Acacia ulicifolia</i>	Prickly Moses
Gleicheniaceae	<i>Gleichenia microphylla</i>	Scrambling Coral Fern
	<i>Sticherus flabellatus</i> var. <i>flabellatus</i>	Umbrella Fern
Goodeniaceae	<i>Dampiera stricta</i>	
Haloragaceae	<i>Gonocarpus micranthus</i>	
	<i>Gonocarpus teucrioides</i>	Germander Raspwort
Juncaceae	<i>Juncus planifolius</i>	
	<i>Juncus prismatocarpus</i>	
Juncaginaceae	<i>Triglochin procera</i>	Water Ribbons
Lamiaceae	<i>Prostanthera linearis</i>	Narrow-leaved Mint-bush
Lauraceae	<i>Cassytha glabella</i>	
Loganiaceae	<i>Logania albiflora</i>	
	<i>Mitrasacme polymorpha</i>	
Lomandraceae	<i>Lomandra cylindrica</i>	
	<i>Lomandra fluviatilis</i> ▲ 3RCa	
	<i>Lomandra glauca</i>	Pale Mat-rush
	<i>Lomandra gracilis</i>	
	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
	<i>Lomandra obliqua</i>	
Myrtaceae	<i>Angophora costata</i>	Sydney Red Gum
	<i>Baeckea linifolia</i>	Weeping Baeckea
	<i>Callistemon citrinus</i>	Crimson Bottlebrush
	<i>Corymbia gummifera</i>	Red Bloodwood
	<i>Darwinia fascicularis</i>	
	<i>Eucalyptus agglomerata</i>	Blue-leaved Stringybark
	<i>Eucalyptus piperita</i>	Sydney Peppermint
	<i>Eucalyptus sieberi</i>	Silvertop Ash
	<i>Kunzea ambigua</i>	Tick Bush
	<i>Kunzea ericoides</i>	Burgan
	<i>Leptospermum grandifolium</i>	Woolly Teatree
	<i>Leptospermum morrisonii</i>	
	<i>Leptospermum polygalifolium</i>	Tantoon

Longwalls 23-27 – Spring 2019

Species list – Riparian monitoring sites

Family	Species	Common Name
	<i>Leptospermum squarrosum</i>	
	<i>Leptospermum trinervium</i>	Slender Tea-tree
	<i>Melaleuca squarrosa</i>	Scented Paperbark
	<i>Tristania neriifolia</i>	Water Gum
	<i>Tristaniopsis collina</i>	Mountain Water Gum
	<i>Tristaniopsis laurina</i>	Kanooka
Orchidaceae	<i>Cryptostylis erecta</i>	Tartan Tongue Orchid
Phormiaceae	<i>Dianella caerulea</i>	Blue Flax-lily
Phyllanthaceae	<i>Phyllanthus hirtellus</i>	Thyme Spurge
Pittosporaceae	<i>Billardiera scandens</i>	Hairy Apple Berry
Poaceae	<i>Anisopogon avenaceus</i>	Oat Speargrass
	<i>Austrostipa pubescens</i>	
	<i>Austrostipa</i> spp.	A Speargrass
	<i>Entolasia stricta</i>	Wiry Panic
	<i>Microlaena stipoides</i>	Weeping Grass
	<i>Tetrarrhena juncea</i>	Wiry Ricegrass
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	
	<i>Banksia marginata</i>	Silver Banksia
	<i>Banksia oblongifolia</i>	Fern-leaved Banksia
	<i>Banksia serrata</i>	Old-man Banksia
	<i>Grevillea diffusa</i> subsp. <i>diffusa</i>	
	<i>Hakea dactyloides</i>	Finger Hakea
	<i>Hakea gibbosa</i>	
	<i>Hakea salicifolia</i>	Willow-leaved Hakea
	<i>Hakea teretifolia</i>	Needlebush
	<i>Lambertia formosa</i>	Mountain Devil
	<i>Lomatia myricoides</i>	River Lomatia
	<i>Lomatia silaifolia</i>	Crinkle Bush
	<i>Persoonia pinifolia</i>	Pine-leaved Geebung
	<i>Petrophile pulchella</i>	Conesticks
	<i>Stenocarpus salignus</i>	Scrub Beefwood
Restionaceae	<i>Baloskion gracile</i>	
	<i>Chordifex dimorphus</i>	
	<i>Chordifex fastigiatus</i>	
	<i>Empodisma minus</i>	
	<i>Eurychorda complanata</i>	
	<i>Leptocarpus tenax</i>	
	<i>Lepyrodia scariosa</i>	
	<i>Sporadanthus gracilis</i>	
Rhamnaceae	<i>Cryptandra ericoides</i>	Heathy Cryptandra
	<i>Pomaderris elliptica</i> subsp. <i>elliptica</i>	
Rubiaceae	<i>Opercularia aspera</i>	Coarse Stinkweed
Rutaceae	<i>Leionema dentatum</i>	Toothed Phebalium
	<i>Leionema diosmeum</i>	
	<i>Nematolepis squamea</i> subsp. <i>squamea</i>	Satinwood

Longwalls 23-27 – Spring 2019

Species list – Riparian monitoring sites

Family	Species	Common Name
Santalaceae	<i>Leptomeria acida</i>	Sour Currant Bush
Sapindaceae	<i>Dodonaea triquetra</i>	Large-leaf Hop-bush
Scrophulariaceae	<i>Gratiola peruviana</i>	Australian Brooklime
Selaginellaceae	<i>Selaginella uliginosa</i>	Swamp Selaginella
Smilacaceae	<i>Smilax glycyphylla</i>	Sweet Sarsparilla
Sterculiaceae	<i>Lasiopetalum ferrugineum</i>	
Stylidiaceae	<i>Stylidium graminifolium</i>	Grass Triggerplant
Thymelaeaceae	<i>Pimelea linifolia</i> subsp. <i>linifolia</i>	
Xanthorrhoeaceae	<i>Xanthorrhoea media</i>	
Xyridaceae	<i>Xyris gracilis</i>	
	<i>Xyris operculata</i>	
	<i>Xyris</i> spp.	

* Non-native species

▲ RoTAP species

2: Geographic range in Australia less than 100 km

3: Geographic range in Australia more than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

a: 1000 plants or more are known to occur within a conservation reserve(s)

:- reserved population size is not accurately known

Appendix E: Upland swamps vegetation monitoring raw data – Restioid heath

*Vegetation structure, dominant species and
estimated cover for each stratum – Restioid Heath*

Restioid Heath monitoring sites – Spring 2019

Swamp 30 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S30T1Q1S19	T	8	8	5	<i>Eucalyptus racemosa</i>
	M1	9	4	10	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Allocasuarina littoralis</i>
	L1	0	1.3	25	<i>Empodisma minus</i> , <i>Leptocarpus tenax</i> , <i>Entolasia stricta</i>
S30T1Q2S19	M1	1	3.7	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Epacris obtusifolia</i>
	L1	0	1.3	1	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
S30T1Q3S19	M1	0.7	4	70	<i>Leptospermum squarrosum</i> , <i>Epacris obtusifolia</i>
	L1	0	0.7	1	<i>Schoenus brevifolius</i>
S30T1Q4S19	M1	1.5	3.2	25	<i>Leptospermum squarrosum</i>
	L1	0	1	5	<i>Schoenus brevifolius</i>
Transect 2					
S30T2Q1S19	M1	1.5	3.5	40	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Allocasuarina littoralis</i>
	L1	0	1.3	10	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i> , <i>Chordifex fastigiatus</i>
S30T2Q2S19	M1	1	3.5	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.1	5	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S30T2Q3S19	M1	1	3.2		<i>Leptospermum squarrosum</i> , <i>Baeckea imbricata</i>
	L1	0	0.4	5	<i>Lepyrodia scariosa</i>
S30T2Q4S19	M1	1.6	3.2	25	<i>Leptospermum squarrosum</i>
	L1	0	1	35	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S30T2Q5S19	M1	0.5	2.4	50	<i>Leptospermum squarrosum</i> , <i>Baeckea imbricata</i>
	L1	0	0.7	10	<i>Lepyrodia scariosa</i> , <i>Schoenus brevifolius</i>
Transect 3					
S30T3Q1S19	M1	1.5	4	80	<i>Callistemon citrinus</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	10	<i>Schoenus brevifolius</i> , <i>Ptilothrix deusta</i>
S30T3Q2S19	M1	2	3.8	20	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.7	15	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
S30T3Q3S19	M1	3	6	75	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	20	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
S30T3Q4S19	M1	0.7	3.5	20	<i>Leptospermum squarrosum</i>
	L1	0	0.9	25	<i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>

Restioid Heath monitoring sites – Spring 2019

Swamp 30 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
S30T3Q5S19	M1	1.2	3	65	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.7	5	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Schoenus brevifolius</i>
S30T3Q6S19	M1	0.4	2.3	25	<i>Baeckea imbricata</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.5	10	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>

Legend

T: Upper storey

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Restioid Heath monitoring sites – Spring 2019

Swamp 35 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S35T1Q1S19	M1	1.3	2.5	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.6	25	<i>Xanthorrhoea resinosa</i> , <i>Schoenus brevifolius</i> , <i>Empodisma minus</i> , <i>Bauera microphylla</i>
S35T1Q2S19	M1	1	2	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.2	40	<i>Schoenus brevifolius</i> , <i>Bauera microphylla</i> , <i>Empodisma minus</i>
S35T1Q3S19	M1	0.8	1.8	30	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.4	50	<i>Xanthorrhoea resinosa</i> , <i>Empodisma minus</i> , <i>Schoenus brevifolius</i>
S35T1Q4S19	M1	0.5	2.5	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i> , <i>Allocasuarina distyla</i>
	L1	0	1.5	5	<i>Chordifex fastigiatus</i> , <i>Empodisma minus</i>
S35T1Q5S19	M1	0.7	2.9	35	<i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	20	<i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i> , <i>Leptocarpus tenax</i>
S35T1Q6S19	M1	0.8	2.5	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	30	<i>Xanthorrhoea resinosa</i> , <i>Cyathochaeta diandra</i> , <i>Leptocarpus tenax</i>
S35T1Q7S19	M1	0.7	2.2	25	<i>Leptospermum squarrosum</i> , <i>Allocasuarina distyla</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	20	<i>Chordifex fastigiatus</i> , <i>Ptilothrix deusta</i> , <i>Leptocarpus tenax</i>
S35T1Q8S19	M1	0.5	1.8	30	<i>Leptocarpus tenax</i> , <i>Petrophile pulchella</i> , <i>Baeckea imbricata</i>
	L1	0	1.2	40	<i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i> , <i>Empodisma minus</i>
Transect 2					
S35T2Q1S19	M1	0.5	3	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
S35T2Q2S19	M1	0.6	3	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1.4	10	<i>Chordifex fastigiatus</i> , <i>Lepidosperma neesii</i>
S35T2Q3S19	M1	1.4	3	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.5	20	<i>Bauera rubioides</i> , <i>Chordifex fastigiatus</i> , <i>Lepidosperma neesii</i>
S35T2Q4S19	M1	0.7	2.5	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Bauera rubioides</i>
	L1	0	1.5	20	<i>Bauera microphylla</i> , <i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S35T2Q5S19	M1	0.5	1.9	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Epacris obtusifolia</i>
	L1	0	1.1	20	<i>Lepidosperma filiforme</i> , <i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
Transect 3					
S35T3Q1S19	M1	1	2.1	20	<i>Baeckea imbricata</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.3	25	<i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i> , <i>Xanthorrhoea resinosa</i>

Restioid Heath monitoring sites – Spring 2019

Swamp 35 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
S35T3Q2S19	M1	0.4	1.8	10	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Baekkea imbricata</i> , <i>Epacris obtusifolia</i>
	L1	0	1.2	60	<i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i> , <i>Ptilothrix deusta</i>
S35T3Q3S19	M1	1	2	30	<i>Leptospermum squarrosum</i> , <i>Epacris obtusifolia</i>
	L1	0	0.8	40	<i>Chordifex fastigiatus</i> , <i>Lepyrodia scariosa</i> , <i>Lepidosperma neesii</i>
S35T3Q4S19	M1	0.9	3	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.4	10	<i>Schoenus brevifolius</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
S35T3Q5S19	M1	1	3	55	<i>Leptospermum squarrosum</i> , <i>Baekkea imbricata</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.5	20	<i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i>
S35T3Q6S19	M1	0.5	2.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Baekkea imbricata</i>
	L1	0	1.4	30	<i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S35T3Q7S19	M1	1.1	2.5	35	<i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	20	<i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Restioid Heath monitoring sites – Spring 2019

Swamp 101 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S101T1Q1S19	M1	0.3	4	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.5	10	<i>Empodisma minus</i> , <i>Ptilothrix deusta</i>
S101T1Q2S19	M1	0.7	3.8	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.5	15	<i>Lepidosperma neesii</i>
S101T1Q3S19	M1	1.5	3	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	10	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S101T1Q4S19	M1	0.6	2.3	75	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.4	5	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S101T1Q5S19	M1	0.5	2.3	70	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.5	30	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Lepyrodia scariosa</i>
S101T1Q6S19	M1	1	2.5	75	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
S101T1Q7S19	M1	1	2.5	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.4	25	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Schoenus brevifolius</i>
S101T1Q8S19	M1	0.6	3	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.3	10	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
S101T1Q9S19	M1	0.4	1.7	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.4	40	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S101T1Q10S19	M1	0.2	2.5	40	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.3	20	<i>Lepidosperma filiforme</i> , <i>Lepidosperma neesii</i>
Transect 2					
S101T2Q1S19	M1	0.3	2.1	40	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	10	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S101T2Q2S19	M1	0.2	1.8	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1	15	<i>Lepyrodia scariosa</i> , <i>Lepidosperma neesii</i> , <i>Xanthorrhoea resinosa</i>
S101T2Q3S19	M1	0.6	2.3	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	60	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i>
S101T2Q4S19	M1	0.4	2.1	30	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	15	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
S101T2Q5S19	M1	0.3	2	45	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>

Restioid Heath monitoring sites – Spring 2019

Swamp 101 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
	L1	0	1.3	20	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Leptocarpus tenax</i>
S101T2Q6S19	M1	0.5	2.5	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.8	30	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S101T2Q7S19	M1	0.3	2.3	30	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	70	<i>Lepidosperma neesii</i>
S101T2Q8S19	M1	1	2.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1	40	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S101T2Q9S19	M1	0.1	2.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	15	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
Transect 3					
S101T3Q1S19	M1	0.3	2.5	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Epacris microphylla</i>
	L1	0	1.3	25	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
S101T3Q2S19	M1	0.5	2	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1.1	50	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Xanthorrhoea resinosa</i>
S101T3Q3S19	M1	1.5	2.3	60	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	10	<i>Lepidosperma neesii</i> , <i>Xanthorrhoea resinosa</i>
S101T3Q4S19	M1	1	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.2		<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i> , <i>Lepyrodia scariosa</i>
S101T3Q5S19	M1	0.8	3	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	15	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S101T3Q6S19	M1	1	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1	10	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Schoenus brevifolius</i>
S101T3Q7S19	M1	0.6	2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1	20	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i> , <i>Lepyrodia scariosa</i>
S101T3Q8S19	M1	1.8	3	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.4	5	<i>Lepidosperma neesii</i> , <i>Empodisma minus</i>
S101T3Q9S19	M1	0.5	2.3	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	5	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S101T3Q10S19	M1	0.8	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Baekkea imbricata</i>
	L1	0	1.1	30	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i> , <i>Lepyrodia scariosa</i>

Restioid Heath monitoring sites – Spring 2019

Swamp 101 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
S101T3Q11S19	M1	0.2	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.9	15	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Schoenus brevifolius</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Restioid Heath monitoring sites – Spring 2019

Swamp 111a – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S111aT1Q1S19	M1	0.3	1.5	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Epacris microphylla</i>
	L1	0	0.1	20	<i>Xanthorrhoea resinosa</i> , <i>Lepyrodia scariosa</i> , <i>Leptocarpus tenax</i>
S111aT1Q2S19	M1	0	1.4	15	<i>Petrophile pulchella</i> , <i>Epacris microphylla</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0.5	2	50	<i>Xanthorrhoea resinosa</i> , <i>Chordifex fastigiatus</i> , <i>Lepidosperma filiforme</i>
S111aT1Q3S19	M1	0.3	1.5	75	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea gibbosa</i> , <i>Petrophile pulchella</i>
	L1	0	1.2	20	<i>Chordifex fastigiatus</i> , <i>Leptocarpus tenax</i> , <i>Actinotus minor</i>
S111aT1Q4S19	M1	0.4	2.3	40	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	10	<i>Chordifex fastigiatus</i> , <i>Lepyrodia scariosa</i>
S111aT1Q5S19	M1	0.4	1.4	30	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.5	10	<i>Chordifex fastigiatus</i> , <i>Lepyrodia scariosa</i>
S111aT1Q6S19	T	4	5.5	20	<i>Eucalyptus sieberi</i>
	M1	0.6	3	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.2	10	<i>Lepyrodia scariosa</i> , <i>Lepidosperma neesii</i> , <i>Entolasia stricta</i>
Transect 2					
S111aT2Q1S19	T	5	5	5	<i>Corymbia gummifera</i> , <i>Eucalyptus racemosa</i>
	M1	0.5	2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.4	20	<i>Empodisma minus</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
S111aT2Q2S19	M1	0.8	2.4	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Epacris obtusifolia</i>
	L1	0	1.2	1	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
S111aT2Q3S19	M1	1.1	2.5	55	<i>Leptospermum squarrosum</i> , <i>Baeckea imbricata</i> , <i>Hakea teretifolia</i>
	L1	0	0.9	5	<i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S111aT2Q4S19	M1	1	2.2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	5	<i>Chordifex fastigiatus</i> , <i>Lepidosperma neesii</i>
S111aT2Q5S19	T	8	8	5	<i>Eucalyptus haemastoma</i>
	M1	1	2.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	0.5	10	<i>Chordifex fastigiatus</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
Transect 3					
S111aT3Q1S19	T	8	8	10	<i>Eucalyptus sieberi</i>
	M1	0.5	3	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptomeria acida</i> , <i>Hakea gibbosa</i>

Restioid Heath monitoring sites – Spring 2019

Swamp 111a – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
	L1	0	1	25	<i>Xanthorrhoea resinosa</i> , <i>Ptilothrix deusta</i> , <i>Cyathochaeta diandra</i>
S111aT3Q2S19	M1	0.5	1.6	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Banksia oblongifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1	10	<i>Chordifex dimorphus</i> , <i>Lepidosperma filiforme</i> , <i>Cyathochaeta diandra</i>
S111aT3Q3S19	M1	1.5	3	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1.2	30	<i>Empodisma minus</i> , <i>Ptilothrix deusta</i>
S111aT3Q4S19	M1	0.5	3	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	0.4	10	<i>Cyathochaeta diandra</i> , <i>Empodisma minus</i> , <i>Schoenus brevifolius</i>
S111aT3Q5S19	M1	0.5	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	0.4	10	<i>Bauera microphylla</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>

Legend

T: Upper storey

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Restioid Heath monitoring sites – Spring 2019

Swamp 125 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S125T1Q1S19	M1	0.2	4	75	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	30	<i>Chordifex fastigiatus</i> , <i>Actinotus minor</i>
S125T1Q2S19	M1	0	2	15	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.5	5	<i>Chordifex fastigiatus</i> , <i>Lepidosperma filiforme</i> , <i>Cyathochaeta diandra</i>
S125T1Q3S19	M1	0.5	2	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Epacris microphylla</i> , <i>Isopogon anethifolius</i>
	L1	0	1.1	10	<i>Chordifex fastigiatus</i> , <i>Lepidosperma filiforme</i>
S125T1Q4S19	M1	0.4	2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Isopogon anethifolius</i> , <i>Epacris microphylla</i>
	L1	0	1.2	40	<i>Chordifex fastigiatus</i> , <i>Lepidosperma filiforme</i> , <i>Ptilothrix deusta</i>
S125T1Q5S19	M1	0.2	1.6	35	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	5	<i>Chordifex fastigiatus</i> , <i>Lepidosperma filiforme</i> , <i>Lepyrodia scariosa</i>
S125T1Q6S19	M1	0.5	2	50	<i>Banksia marginata</i> , <i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.3	40	<i>Chordifex dimorphus</i> , <i>Lepidosperma filiforme</i>
S125T1Q7S19	M1	0.3	1.6	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Banksia marginata</i>
	L1	0	1.2	20	<i>Chordifex dimorphus</i>
Transect 2					
S125T2Q1S19	M1	1	2.5	55	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	10	<i>Chordifex fastigiatus</i> , <i>Lepidosperma filiforme</i> , <i>Lepidosperma neesii</i>
S125T2Q2S19	M1	1	2.2	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1	10	<i>Chordifex fastigiatus</i> , <i>Lepyrodia scariosa</i> , <i>Lepidosperma filiforme</i>
S125T2Q3S19	M1	1	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	1	<i>Schoenus brevifolius</i> , <i>Chordifex fastigiatus</i> , <i>Epacris obtusifolia</i>
S125T2Q4S19	M1	0.3	2	80	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.3	20	<i>Chordifex fastigiatus</i> , <i>Lepyrodia scariosa</i> , <i>Schoenus brevifolius</i>
S125T2Q5S19	M1	0.8	2	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.4	10	<i>Lepidosperma filiforme</i> , <i>Chordifex fastigiatus</i> , <i>Ptilothrix deusta</i>
S125T2Q6S19	M1	0.7	2.2	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.3	20	<i>Xanthorrhoea resinosa</i> , <i>Ptilothrix deusta</i> , <i>Chordifex fastigiatus</i>
S125T2Q7S19	M1	1.2	5	70	<i>Hakea dactyloides</i> , <i>Allocasuarina distyla</i>
	L1	0	1.5	30	<i>Chordifex dimorphus</i> , <i>Xanthorrhoea resinosa</i> , <i>Ptilothrix deusta</i>

Restioid Heath monitoring sites – Spring 2019

Swamp 125 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
S125T2Q8S19	M1	0.7	2.5	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.3	25	<i>Xanthorrhoea resinosa</i>
Transect 3					
S125T3Q1S19	T	4	4	10	<i>Eucalyptus racemosa</i>
	M1	0.7	3	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	0.8	40	<i>Empodisma minus</i> , <i>Cyathochaeta diandra</i>
S125T3Q2S19	M1	1	2.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	0.7	1	<i>Empodisma minus</i> , <i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S125T3Q3S19	M1	1.5	2.8	40	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.5	5	<i>Ptilothrix deusta</i> , <i>Empodisma minus</i> , <i>Schoenus brevifolius</i>
S125T3Q4S19	M1	1	3	85	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Isopogon anethifolius</i>
	L1	0	1	1	<i>Schoenus brevifolius</i> , <i>Lepidosperma filiforme</i> , <i>Lepyrodia scariosa</i>
S125T3Q5S19	M1	1	2.5	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Isopogon anethifolius</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.8	20	<i>Ptilothrix deusta</i> , <i>Xanthorrhoea resinosa</i> , <i>Empodisma minus</i>
S125T3Q6S19	M1	1.5	3	50	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.6	5	<i>Ptilothrix deusta</i> , <i>Cyathochaeta diandra</i> , <i>Empodisma minus</i>
S125T3Q7S19	M1	1	4	50	<i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.3	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma filiforme</i> , <i>Cyathochaeta diandra</i>
S125T3Q8S19	T	10	10	20	<i>Eucalyptus racemosa</i>
	M1	1.5	2.5	55	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1	5	<i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i> , <i>Lepyrodia scariosa</i>
S125T3Q9S19	T	8	8	40	<i>Eucalyptus racemosa</i>
	M1	0.3	2.5	80	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Isopogon anethifolius</i>
	L1	0	1.5	30	<i>Lepyrodia scariosa</i>

Legend

T: Upper storey

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Restioid Heath monitoring sites – Spring 2019

Swamp 137a – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S137aT1Q1S19	M1	0.5	2.5	40	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.8	20	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S137aT1Q2S19	M1	0.4	3	65	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Isopogon anethifolius</i>
	L1	0	1.4	10	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Cyathochaeta diandra</i>
S137aT1Q3S19	M1	1	2.5	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	30	<i>Xanthorrhoea resinosa</i> , <i>Cyathochaeta diandra</i> , <i>Schoenus brevifolius</i>
S137aT1Q4S19	M1	1	3	80	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.4	5	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Schoenus brevifolius</i>
S137aT1Q5S19	M1	1.5	3	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.5	5	<i>Schoenus brevifolius</i>
S137aT1Q6S19	M1	1	3	80	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.4	5	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i> , <i>Ptilothrix deusta</i>
S137aT1Q7S19	M1	0.9	2.5	60	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.2	10	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S137aT1Q8S19	M1	1	2.6	65	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.4	25	<i>Chordifex fastigiatus</i> , <i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
S137aT1Q9S19	M1	1	2.5	50	<i>Persoonia pinifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.5	40	<i>Xanthorrhoea resinosa</i> , <i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
Transect 2					
S137aT2Q1S19	M1	0.4	2.3	35	<i>Petrophile pulchella</i> , <i>Hakea teretifolia</i> , <i>Epacris microphylla</i>
	L1	0	1	15	<i>Chordifex fastigiatus</i>
S137aT2Q2S19	M1	1	5	70	<i>Allocasuarina littoralis</i> , <i>Petrophile pulchella</i> , <i>Hakea teretifolia</i>
	L1	0	1.5	15	<i>Cyathochaeta diandra</i> , <i>Leptocarpus tenax</i> , <i>Lepidosperma neesii</i>
S137aT2Q3S19	M1	1	3.2	40	<i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i> , <i>Dillwynia floribunda</i>
	L1	0	1.4	5	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Chordifex fastigiatus</i>
S137aT2Q4S19	M1	1.5	2.2	40	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	10	<i>Lepidosperma neesii</i> , <i>Leptocarpus tenax</i>
S137aT2Q5S19	T	6.5	7	10	<i>Eucalyptus racemosa</i>
	M1	1.4	2.2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>

Restioid Heath monitoring sites – Spring 2019

Swamp 137a – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
	L1	0	0.6	15	<i>Chordifex fastigiatus</i> , <i>Ptilothrix deusta</i>
S137aT2Q6S19	M1	0.5	1.7	40	<i>Leptospermum squarrosum</i> , <i>Kunzea capitata</i> , <i>Darwinia fascicularis</i>
	L1	0	1	5	<i>Lepyrodia scariosa</i> , <i>Lepidosperma neesii</i>
Transect 3					
S137aT3Q1S19	M1	1	2.5	50	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.5	10	<i>Leptocarpus tenax</i> , <i>Lepidosperma neesii</i>
S137aT3Q2S19	M1	1	2.2	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	0.6	10	<i>Chordifex fastigiatus</i> , <i>Ptilothrix deusta</i>
S137aT3Q3S19	M1	0.4	1.8	40	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	20	<i>Cyathochaeta diandra</i> , <i>Lepyrodia scariosa</i> , <i>Chordifex fastigiatus</i>
S137aT3Q4S19	M1	1.4	4	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.4	5	<i>Leptocarpus tenax</i> , <i>Cyathochaeta diandra</i>
S137aT3Q5S19	M1	0.7	2.3	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	5	<i>Chordifex fastigiatus</i> , <i>Ptilothrix deusta</i>
S137aT3Q6S19	M1	1	1.8	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.3	5	<i>Chordifex fastigiatus</i> , <i>Cyathochaeta diandra</i> , <i>Lepyrodia scariosa</i>
S137aT3Q7S19	M1	0.5	2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.5	5	<i>Chordifex fastigiatus</i> , <i>Lepyrodia scariosa</i>

Legend

T: Upper storey

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Restioid Heath monitoring sites – Spring 2019

Swamp 138 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S138T1Q1S19	M1	0.2	1.6	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Epacris microphylla</i>
	L1	0	0.6	40	<i>Lepidosperma filiforme</i> , <i>Lepyrodia scariosa</i> , <i>Cyathochaeta diandra</i>
S138T1Q2S19	M1	0.2	2.2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Epacris microphylla</i>
	L1	0	1.4	10	<i>Lepyrodia scariosa</i> , <i>Cyathochaeta diandra</i>
S138T1Q3S19	M1	0.5	2	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Micromyrtus ciliata</i>
	L1	0	1.2	30	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i> , <i>Lepyrodia scariosa</i>
S138T1Q4S19	M1	0.4	2.2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.4	10	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S138T1Q5S19	M1	0.5	2.5	40	<i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i> , <i>Hakea teretifolia</i>
	L1	0	1	15	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i> , <i>Schoenus brevifolius</i>
S138T1Q6S19	M1	0.3	2.2	45	<i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.2	10	<i>Cyathochaeta diandra</i> , <i>Lepyrodia scariosa</i> , <i>Leptocarpus tenax</i>
S138T1Q7S19	M1	0.5	2.5	40	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	25	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
S138T1Q8S19	M1	0.2	1.9	55	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Epacris microphylla</i>
	L1	0	1	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
Transect 2					
S138T2Q1S19	M1	0.5	2	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	0.8	5	<i>Cyathochaeta diandra</i> , <i>Leptocarpus tenax</i> , <i>Lepidosperma neesii</i>
S138T2Q2S19	M1	0.4	2.4	70	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.4	10	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
S138T2Q3S19	M1	0.8	3	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	10	<i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i> , <i>Cyathochaeta diandra</i>
S138T2Q4S19	M1	1.6	3	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.5	10	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S138T2Q5S19	M1	0.2	2	20	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	15	<i>Cyathochaeta diandra</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
Transect 3					
S138T3Q1S19	M1	0.8	2.5	35	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>

Restioid Heath monitoring sites – Spring 2019

Swamp 138 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
	L1	0	1	15	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i>
S138T3Q2S19	M1	1	2.2	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	5	<i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i>
S138T3Q3S19	M1	1.3	2.2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	5	<i>Lepidosperma neesii</i>
S138T3Q4S19	M1	1	2.3	40	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.1	15	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i>
S138T3Q5S19	M1	0.5	1.8	35	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1	20	<i>Cyathochaeta diandra</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Estimated cover/abundance data – Restioid Heath

Restioid Heath monitoring sites – Spring 2019

Swamp 30 – Vegetation cover/abundance

Family	Species	Transect 1				Transect 2					Transect 3					
		S30T1Q1S19	S30T1Q2S19	S30T1Q3S19	S30T1Q4S19	S30T2Q1S19	S30T2Q2S19	S30T2Q3S19	S30T2Q4S19	S30T2Q5S19	S30T3Q1S19	S30T3Q2S19	S30T3Q3S19	S30T3Q4S19	S30T3Q5S19	S30T3Q6S19
Casuarinaceae	<i>Allocasuarina littoralis</i>	3				4								1		
Colchicaceae	<i>Burchardia umbellata</i>															1
Cunoniaceae	<i>Bauera rubioides</i>		1			1										
Cyperaceae	<i>Chorizandra cymbaria</i>								2						2	
	<i>Lepidosperma filiforme</i>									1						
	<i>Lepidosperma neesii</i>	3	3			3	3	2	4		3	4	4	3	3	3
	<i>Ptilothrix deusta</i>				2		3	3	4	3	3	2	3	4	3	2
	<i>Schoenus brevifolius</i>		2	3	3	3	2	2	2	3	3	3	3	2	3	4
Droseraceae	<i>Drosera peltata</i>													1	1	1
Ericaceae	<i>Epacris microphylla</i>	1						2	1							
	<i>Epacris obtusifolia</i>		4	3		3	2									
Fabaceae (Faboideae)	++ <i>Pultenaea aristata</i> ▲ 2V	1														
Goodeniaceae	<i>Dampiera stricta</i>					1						1				
Lauraceae	<i>Cassytha glabella</i>				1					1	2	1	1		2	
Lindsaeaceae	<i>Lindsaea linearis</i>					1										
Lomandraceae	<i>Lomandra obliqua</i>	3														
Myrtaceae	<i>Baeckea imbricata</i>				1	2		4		4	1			1	4	3
	<i>Callistemon citrinus</i>										6				1	
	<i>Callistemon linearis</i>													1	1	
	<i>Corymbia gummifera</i>					1										
	<i>Eucalyptus racemosa</i>	1														
	<i>Kunzea capitata</i>					1	1	2	1		1				2	
	<i>Leptospermum arachnoides</i>														4	
	<i>Leptospermum squarrosum</i>		1	5	5	5	5	5	4	4		4	5	4	5	
Poaceae	<i>Entolasia stricta</i>	4	1								3					
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	5	2	1	4	4		1		4	3	5			1
	<i>Grevillea patulifolia</i>															1

Restioid Heath monitoring sites – Spring 2019

Swamp 30 – Vegetation cover/abundance

Family	Species	Transect 1				Transect 2					Transect 3					
		S30T1Q1S19	S30T1Q2S19	S30T1Q3S19	S30T1Q4S19	S30T2Q1S19	S30T2Q2S19	S30T2Q3S19	S30T2Q4S19	S30T2Q5S19	S30T3Q1S19	S30T3Q2S19	S30T3Q3S19	S30T3Q4S19	S30T3Q5S19	S30T3Q6S19
	<i>Hakea teretifolia</i>											1			5	
	<i>Persoonia pinifolia</i>			4						1						
	<i>Petrophile pulchella</i>	1	1		1	1			1		1					
Restionaceae	<i>Chordifex fastigiatus</i>					3										
	<i>Empodisma minus</i>	4				3										
	<i>Leptocarpus tenax</i>	4														
	<i>Lepyrodia scariosa</i>	3			3	2	1	4	3	4	2			4	3	2
Stylidiaceae	<i>Stylidium lineare</i>					1										
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	1		1												
	Total	13	8	6	8	17	8	8	10	8	11	8	6	9	14	9

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
 2 = cover less than 5% of site and uncommon
 3 = cover of less than 5% and common
 4 = cover of 5-20% of site
 5 = cover of 21-50% of site
 6 = cover of 51-75% of site
 7 = cover of greater than 75%

▲ RoTAP species

- 2: Geographic range in Australia less than 100 km
 V: Taxon not presently Endangered, but at risk over a longer period

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Restioid Heath monitoring sites – Spring 2019

Swamp 35 – Vegetation cover/abundance

Family	Species	Transect 1								Transect 2						Transect 3						
		S35T1Q1S19	S35T1Q2S19	S35T1Q3S19	S35T1Q4S19	S35T1Q5S19	S35T1Q6S19	S35T1Q7S19	S35T1Q8S19	S35T2Q1S19	S35T2Q2S19	S35T2Q3S19	S35T2Q4S19	S35T2Q5S19	S35T2Q6S19	S35T3Q1S19	S35T3Q2S19	S35T3Q3S19	S35T3Q4S19	S35T3Q5S19	S35T3Q6S19	S35T3Q7S19
Apiaceae	<i>Actinotus minor</i>							1	1													
Casuarinaceae	<i>Allocasuarina distyla</i>				4	1		4							1							
Cunoniaceae	<i>Bauera microphylla</i>	3	4			2	3	2				4	3									
	<i>Bauera rubioides</i>									2	1		3									
Cyperaceae	<i>Chorizandra cymbaria</i>		1					1	2				1									
	<i>Cyathochaeta diandra</i>					3	3							1							2	
	<i>Lepidosperma filiforme</i>													4	3				1			
	<i>Lepidosperma neesii</i>	3			3	3	2	2		1	3	3	3	3		3	3	3	3	2	3	3
	<i>Ptilothrix deusta</i>	3	3	3	3	3	3	3	3	3				1	3	3	3		3	3		2
	<i>Schoenus brevifolius</i>	3	4	3	2	3	3	3	3	3	3	2	3	4	3	4	3	3	4	3	3	3
Dilleniaceae	<i>Hibbertia serpyllifolia</i>					3	2															
Droseraceae	<i>Drosera peltata</i>															1		1				
Ericaceae	<i>Epacris microphylla</i>											3										
	<i>Epacris obtusifolia</i>	1		3			3	2	3	3	1		2	4	4		3	4	3	2		3
	<i>Leucopogon esquamatus</i>					1																
	<i>Sprengelia incarnata</i>													1	1							
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	1	2				2	2	3	2	1	4		1				1				1
	++ <i>Pultenaea aristata</i> ▲ 2V				1	2	2	2														
Gleicheniaceae	<i>Gleichenia dicarpa</i>												3									
Goodeniaceae	<i>Dampiera stricta</i>					1			1			1										
Lauraceae	<i>Cassytha glabella</i>		2	1	3		2		1		1	1	2	1	1	1			1			
Lindsaeaceae	<i>Lindsaea linearis</i>				2	2	2											1	1			
Lomandraceae	<i>Lomandra obliqua</i>					1																
Myrtaceae	<i>Baeckea imbricata</i>			3	3	1	3	4	4							5	4		3	3	4	3
	<i>Darwinia diminuta</i> ▲ 2RCi					1																
	<i>Leptospermum squarrosum</i>	4	1	5	4	4	4	4	4	4	4	4	4	4	4	2	1	5	4	5	4	4
Poaceae	<i>Entolasia stricta</i>									1											2	

Restioid Heath monitoring sites – Spring 2019

Swamp 35 – Vegetation cover/abundance

Family	Species	Transect 1								Transect 2						Transect 3						
		S35T1Q1S19	S35T1Q2S19	S35T1Q3S19	S35T1Q4S19	S35T1Q5S19	S35T1Q6S19	S35T1Q7S19	S35T1Q8S19	S35T2Q1S19	S35T2Q2S19	S35T2Q3S19	S35T2Q4S19	S35T2Q5S19	S35T2Q6S19	S35T3Q1S19	S35T3Q2S19	S35T3Q3S19	S35T3Q4S19	S35T3Q5S19	S35T3Q6S19	S35T3Q7S19
	<i>Tetrarrhena turfosa</i>		1						1	1	1	3	3	1								
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	4	4	1	5	4	4	5	4	5	5	5	2	2	4		5	4	5	1
	<i>Grevillea oleoides</i>														1							
	<i>Grevillea patulifolia</i>								1													
	<i>Hakea teretifolia</i>			1		1			1	4			4		5	1			4	1		4
	<i>Lambertia formosa</i>					1						4										
	<i>Persoonia pinifolia</i>												1					1				
	<i>Petrophile pulchella</i>	4	4	3	4	4	5	2	4	3	4	4	1		2							4
Restionaceae	<i>Chordifex fastigiatus</i>			1	3	3	2	3	5		3	4		2	1	4	6	5	1	4	5	4
	<i>Empodisma minus</i>	3	3	4	3	3	3	3	3	3	3	4	3	2	5							
	<i>Leptocarpus tenax</i>	3	3	2		3	3	3	2			3				3						
	<i>Lepyrodia scariosa</i>		3	3			2			3	2	3		2	2	3		3	3	2		3
Rhamnaceae	<i>Cryptandra ericoides</i>																				1	
Stylidiaceae	<i>Stylidium lineare</i>														1							
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	4		5	1		4					2		1		4	2			1		1
	Total	12	13	14	14	22	20	17	18	14	13	17	15	16	16	13	9	10	13	11	9	13

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
 2 = cover less than 5% of site and uncommon
 3 = cover of less than 5% and common
 4 = cover of 5-20% of site
 5 = cover of 21-50% of site
 6 = cover of 51-75% of site
 7 = cover of greater than 75%

▲ RoTAP species

- 2: Geographic range in Australia less than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 V: Taxon not presently Endangered, but at risk over a longer period
 i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Restioid Heath monitoring sites – Spring 2019

Swamp 101 – Vegetation cover/abundance

Family	Species	Transect 1										Transect 2										Transect 3									
		S101T1Q1S19	S101T1Q2S19	S101T1Q3S19	S101T1Q4S19	S101T1Q5S19	S101T1Q6S19	S101T1Q7S19	S101T1Q8S19	S101T1Q9S19	S101T1Q10S19	S101T2Q1S19	S101T2Q2S19	S101T2Q3S19	S101T2Q4S19	S101T2Q5S19	S101T2Q6S19	S101T2Q7S19	S101T2Q8S19	S101T2Q9S19	S101T3Q1S19	S101T3Q2S19	S101T3Q3S19	S101T3Q4S19	S101T3Q5S19	S101T3Q6S19	S101T3Q7S19	S101T3Q8S19	S101T3Q9S19	S101T3Q10S19	S101T3Q11S19
Anthericaceae	<i>Thysanotus juncifolius</i>																				1					2					
Apiaceae	<i>Actinotus minor</i>											1	2		2		1				1					1					
Casuarinaceae	<i>Allocasuarina littoralis</i>																			1											
Cunoniaceae	<i>Bauera microphylla</i>									1	2			2	3					3						3	2	1			
	<i>Bauera rubioides</i>	3																													
Cyperaceae	<i>Cyathochaeta diandra</i>	2	2								2	1		4	4	4	4	2	4	4	1										
	<i>Lepidosperma filiforme</i>										4																				
	<i>Lepidosperma neesii</i>	2	4	4	3	4	2	4	4	4	3	4	3	4	4	4	4	4	3	4	4	3	3	4	4	3	4	3	3	4	4
	<i>Ptilothrix deusta</i>	3	3	3	2	3	3	4	3	3	3	3	3	2	3	3	3	3		3	4	2	3	3	3		3	2	2	3	3
	<i>Schoenus brevifolius</i>		1	2	3	3	2	3	3	4	3	4	3	1		3		1	3	3	3		2	3	1	3	3	2	3	4	3
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	1												1	1			1		1						1					
Ericaceae	<i>Epacris microphylla</i>	2									3						1	2	3	4	3										
	<i>Epacris obtusifolia</i>						1		3				2	1	3	3	3		3	3		2	4	1	1	3	3		3	3	
	<i>Leucopogon esquamatus</i>										1				3																
Fabaceae (Faboideae)	<i>Mirbelia rubiifolia</i>														1											1		1			1
	++ <i>Pultenaea aristata</i> ▲ 2V															1	1	1													
Goodeniaceae	<i>Dampiera stricta</i>								1												2	1				1	1				1
Haloragaceae	<i>Gonocarpus tetragynus</i>																		1												
Lauraceae	<i>Cassytha glabella</i>			1						1	1		2	1	1	1	1	1			1		1	3		2					1
Myrtaceae	<i>Baeckea imbricata</i>				3	1	3	1	3	3			3		2				2	1	2		3		1				1	4	4
	<i>Darwinia diminuta</i> ▲ 2RCi																								1	2					
	<i>Leptospermum arachnoides</i>										1																				
	<i>Leptospermum squarrosus</i>	4	4	4	4	4	4	4	5	4	3	5	5	4	3	5	4	4	4	4	4	5	5	4	4	4	4	5	5	4	4
Orchidaceae	<i>Cryptostylis subulata</i>																									1					
Poaceae	<i>Anisopogon avenaceus</i>												1						3												
	<i>Entolasia stricta</i>	1											1				1				1										

Restioid Heath monitoring sites – Spring 2019

Swamp 101 – Vegetation cover/abundance

		Transect 1										Transect 2										Transect 3										
Family	Species	S101T1Q1S19	S101T1Q2S19	S101T1Q3S19	S101T1Q4S19	S101T1Q5S19	S101T1Q6S19	S101T1Q7S19	S101T1Q8S19	S101T1Q9S19	S101T1Q10S19	S101T2Q1S19	S101T2Q2S19	S101T2Q3S19	S101T2Q4S19	S101T2Q5S19	S101T2Q6S19	S101T2Q7S19	S101T2Q8S19	S101T2Q9S19	S101T3Q1S19	S101T3Q2S19	S101T3Q3S19	S101T3Q4S19	S101T3Q5S19	S101T3Q6S19	S101T3Q7S19	S101T3Q8S19	S101T3Q9S19	S101T3Q10S19	S101T3Q11S19	
	<i>Tetrarrhena turfosa</i>																		2								1					
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	5	6	5	4	4	5	4	5	4	4	5	5	4	4	5	1	5	5	4	5	4	5	5	5	5	4	4	5	5	
	<i>Banksia oblongifolia</i>			1			1												1											1		
	<i>Hakea teretifolia</i>	3	4	4	5	4	3	4	4	4	4	1	4		3	4	4	1	4	4	1	4	4	4	4	4	1	1	1	2	1	
	<i>Persoonia pinifolia</i>																			1												
	<i>Petrophile pulchella</i>	2	3	1		4				3	4	1	1	2	4	4	3	1		3	4	4	3		1	4	3	3				
	<i>Petrophile sessilis</i>								3																							
Restionaceae	<i>Empodisma minus</i>	3										1	2															3				
	<i>Leptocarpus tenax</i>	1		3	1			2				1	1	3	3	3				2		2		2			2			3		
	<i>Lepyrodia scariosa</i>	3	2	3	3	2	2	1	2	2	2	3	3	2	2		3	2	3	3	4	3	3	3	3	3	3	1	3	3	4	
Santalaceae	<i>Leptomeria acida</i>																		1													
Stylidiaceae	<i>Stylidium lineare</i>										1	1	1		1		2		1												1	
Thymelaeaceae	<i>Pimelea linifolia</i> subsp. <i>linifolia</i>																										1					
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>					1							3							3	1	1	4					1				
	Total	14	9	11	9	10	10	9	10	12	16	12	18	14	17	12	13	13	17	16	18	14	11	11	9	18	15	12	9	11	12	

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
 2 = cover less than 5% of site and uncommon
 3 = cover of less than 5% and common
 4 = cover of 5-20% of site
 5 = cover of 21-50% of site
 6 = cover of 51-75% of site
 7 = cover of greater than 75%

▲ **RoTAP species**

- 2: Geographic range in Australia less than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 V: Taxon not presently Endangered, but at risk over a longer period
 i: less than 1000 plants are known to occur within a conservation reserve(s)

++ **Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)**

Restioid Heath monitoring sites – Spring 2019

Swamp 111a – Vegetation cover/abundance

Family	Species	Transect 1						Transect 2					Transect 3				
		S111aT1Q1S19	S111aT1Q2S19	S111aT1Q3S19	S111aT1Q4S19	S111aT1Q5S19	S111aT1Q6S19	S111aT2Q1S19	S111aT2Q2S19	S111aT2Q3S19	S111aT2Q4S19	S111aT2Q5S19	S111aT3Q1S19	S111aT3Q2S19	S111aT3Q3S19	S111aT3Q4S19	S111aT3Q5S19
Apiaceae	<i>Actinotus minor</i>	1	2	3			2	3					2	1			1
	<i>Platysace linearifolia</i>	1	1				3	2					1				
	<i>Xanthosia pilosa</i>							1									
Casuarinaceae	<i>Allocasuarina littoralis</i>								1								
Colchicaceae	<i>Burchardia umbellata</i>							1								1	
Cunoniaceae	<i>Bauera microphylla</i>				1									1		3	4
Cyperaceae	<i>Cyathochaeta diandra</i>	3	2					2					4	3		4	
	<i>Lepidosperma filiforme</i>		3				1							3	3		1
	<i>Lepidosperma neesii</i>					1	3	3	3	3	2	3	1		3		
	<i>Ptilothrix deusta</i>	2	2	3	1			3	2		2	3	4	3	4		3
	<i>Schoenus brevifolius</i>	3		3			1		1	3	2	2			3	3	3
Dilleniaceae	<i>Hibbertia riparia</i>	1		2									2				
	<i>Hibbertia serpyllifolia</i>							1									
Ericaceae	<i>Epacris microphylla</i>	4	4		3	3	2		4				3	1	1		
	<i>Epacris obtusifolia</i>					1							1	3	3	3	4
	<i>Leucopogon esquamatus</i>			3	1									1			
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	3	2	3													
	<i>Sprengelia incarnata</i>															1	
Fabaceae (Faboideae)	<i>Bossiaea ensata</i>													1			
	<i>Dillwynia floribunda</i>																1
	<i>Gompholobium glabratum</i>	1															
	<i>Mirbelia rubiifolia</i>						2						1		1		
	++ <i>Pultenaea aristata</i> ▲ 2V			1									1				
Goodeniaceae	<i>Dampiera stricta</i>			1	1									1			
Lauraceae	<i>Cassytha glabella</i>	1	1	1	1			1					1	1	1		1
Lomandraceae	<i>Lomandra obliqua</i>							1									

Restioid Heath monitoring sites – Spring 2019

Swamp 111a – Vegetation cover/abundance

Family	Species	Transect 1						Transect 2					Transect 3				
		S111aT1Q1S19	S111aT1Q2S19	S111aT1Q3S19	S111aT1Q4S19	S111aT1Q5S19	S111aT1Q6S19	S111aT2Q1S19	S111aT2Q2S19	S111aT2Q3S19	S111aT2Q4S19	S111aT2Q5S19	S111aT3Q1S19	S111aT3Q2S19	S111aT3Q3S19	S111aT3Q4S19	S111aT3Q5S19
Myrtaceae	<i>Baeckea imbricata</i>				2	2				4			1	2	1	2	
	<i>Corymbia gummifera</i>							1									
	<i>Darwinia diminuta</i> ▲2RCi		1														
	<i>Eucalyptus haemastoma</i>											4					
	<i>Eucalyptus racemosa</i>							1									
	<i>Eucalyptus sieberi</i>						4						4				
	<i>Leptospermum arachnoides</i>	1	2		2	4								1			
	<i>Leptospermum squarrosus</i>			1	2		4		5	5	4	4	1	3	4	4	4
	<i>Leptospermum trinervium</i>					1							1				
Poaceae	<i>Entolasia stricta</i>						3	2									
	<i>Tetrarrhena turfosa</i>																1
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	4	5	3		4	5	4		4	5	5	5	4	5	5
	<i>Banksia oblongifolia</i>		1	1										4			
	<i>Banksia serrata</i>						1										
	<i>Grevillea oleoides</i>				1									1			
	<i>Hakea gibbosa</i>	1	2	4	1					4			4				
	<i>Hakea teretifolia</i>		1		1	4		3	1	4	1	4		1	2	4	4
	<i>Persoonia levis</i>				1												
	<i>Petrophile pulchella</i>	4	5	4	4	4	4	4	2	4	1	4	1	3	4	1	4
	<i>Petrophile sessilis</i>												1				
Restionaceae	<i>Chordifex dimorphus</i>													3			
	<i>Chordifex fastigiatus</i>		4	4	4	4			2	4	3	4		2		1	1
	<i>Empodisma minus</i>						2	4							4	3	3
	<i>Leptocarpus tenax</i>	3	1	3	1			2						2		1	
	<i>Lepyrodia scariosa</i>	4			2	3	3	3	2	3	2	3	3	2	2		3
Rutaceae	<i>Boronia parviflora</i>															1	

Restioid Heath monitoring sites – Spring 2019

Swamp 111a – Vegetation cover/abundance

Family	Species	Transect 1						Transect 2					Transect 3				
		S111aT1Q1S19	S111aT1Q2S19	S111aT1Q3S19	S111aT1Q4S19	S111aT1Q5S19	S111aT1Q6S19	S111aT2Q1S19	S111aT2Q2S19	S111aT2Q3S19	S111aT2Q4S19	S111aT2Q5S19	S111aT3Q1S19	S111aT3Q2S19	S111aT3Q3S19	S111aT3Q4S19	S111aT3Q5S19
Santalaceae	<i>Leptomeria acida</i>												4				
Selaginellaceae	<i>Selaginella uliginosa</i>																1
Stylidiaceae	<i>Stylidium lineare</i>															1	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	4	4	1		1	2	4					4				
	Total	17	18	17	18	11	16	20	11	9	9	10	22	23	15	16	17

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 3 = cover of less than 5% and common
 4 = cover of 5-20% of site
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 7 = cover of greater than 75%

▲ RoTAP species

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 i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Restioid Heath monitoring sites – Spring 2019

Swamp 125 – Vegetation cover/abundance

		Transect 1							Transect 2							Transect 3									
Family	Species	S125T1Q1S19	S125T1Q2S19	S125T1Q3S19	S125T1Q4S19	S125T1Q5S19	S125T1Q6S19	S125T1Q7S19	S125T2Q1S19	S125T2Q2S19	S125T2Q3S19	S125T2Q4S19	S125T2Q5S19	S125T2Q6S19	S125T2Q7S19	S125T2Q8S19	S125T3Q1S19	S125T3Q2S19	S125T3Q3S19	S125T3Q4S19	S125T3Q5S19	S125T3Q6S19	S125T3Q7S19	S125T3Q8S19	S125T3Q9S19
Apiaceae	<i>Actinotus minor</i>	4		3	2		2	3			1		1	2	2		3				2	1	1		
	<i>Platysace linearifolia</i>		1																						
	<i>Xanthosia tridentata</i>													1											
Casuarinaceae	<i>Allocasuarina distyla</i>	1													4		1								
	<i>Allocasuarina littoralis</i>								1																
Cunoniaceae	<i>Bauera microphylla</i>				3									2											
Cyperaceae	<i>Chorizandra cymbaria</i>										1									1					
	<i>Cyathochaeta diandra</i>	3	2					1							2	2	4					3	3	3	4
	<i>Gahnia sieberiana</i>										1														
	<i>Lepidosperma filiforme</i>		2	4	4	3	3	1	3	3	3		4	3			1			3			3		
	<i>Lepidosperma neesii</i>	2			1				3	2		2	3	1		1	1	3			3				
	<i>Ptilothrix deusta</i>	2			3	3	3	1				1	3	3	3	1	2	3	3		4	3	3	3	3
	<i>Schoenus brevifolius</i>					3				1	3	4		2				1	3	3	1				
	<i>Schoenus lepidosperma</i> subsp. <i>pachylepis</i>				2		1	1																	
Dilleniaceae	<i>Hibbertia riparia</i>							1																	
	<i>Hibbertia serpyllifolia</i>			1												2	1								4
Ericaceae	<i>Epacris microphylla</i>		1	4		4		1					1		1		1	1						3	1
	<i>Epacris obtusifolia</i>						1			1	3			1											
	<i>Leucopogon esquamatus</i>				3			1																	
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	2		1			3	1								1									1
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	1	1	3	1	2	1		2	2		1		3				2	1	2	2	2	1	1	1
	<i>Mirbelia rubiifolia</i>							2																	
	<i>Pultenaea tuberculata</i>																								1
Goodeniaceae	<i>Dampiera stricta</i>		1				1	2						1			1				1				1
Haloragaceae	<i>Gonocarpus tetragynus</i>													1	1	2									1
Lauraceae	<i>Cassytha glabella</i>	1	1		1			1				1	1	1		1	1	2		1	2	1		1	1

Restioid Heath monitoring sites – Spring 2019

Swamp 125 – Vegetation cover/abundance

		Transect 1							Transect 2							Transect 3										
Family	Species	S125T1Q1S19	S125T1Q2S19	S125T1Q3S19	S125T1Q4S19	S125T1Q5S19	S125T1Q6S19	S125T1Q7S19	S125T2Q1S19	S125T2Q2S19	S125T2Q3S19	S125T2Q4S19	S125T2Q5S19	S125T2Q6S19	S125T2Q7S19	S125T2Q8S19	S125T3Q1S19	S125T3Q2S19	S125T3Q3S19	S125T3Q4S19	S125T3Q5S19	S125T3Q6S19	S125T3Q7S19	S125T3Q8S19	S125T3Q9S19	
Lindsaeaceae	<i>Lindsaea linearis</i>		1	1	1			2					1			2	1					1				
Lomandraceae	<i>Lomandra obliqua</i>	1					2								1											
Myrtaceae	<i>Angophora hispida</i>						1	1																		
	<i>Baeckea imbricata</i>			3	2	2			1	2	2	1		3						2						
	<i>Darwinia diminuta</i> ▲ 2RCi	1		1	1		3							1	1											
	<i>Darwinia fascicularis</i>	1			1																					
	<i>Eucalyptus racemosa</i>																4							4	5	
	<i>Leptospermum arachnoides</i>		1	2	2	1							1			1										
	<i>Leptospermum squarrosum</i>		2	1	4	4			4	5	5	5	4	5	4	4	4	1	4	4	5	4	4	5	4	4
	<i>Leptospermum trinervium</i>	4					3	1																		
Pittosporaceae	<i>Billardiera scandens</i>						1																			
Poaceae	<i>Anisopogon avenaceus</i>						2																			
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	4	5	5	4	4	5	5	5	5	5	5	5	4	5	5	5	4	5	5	4	4	5	5	
	<i>Banksia marginata</i>						5	4																		
	<i>Banksia oblongifolia</i>				4																					
	<i>Hakea dactyloides</i>														6											
	<i>Hakea gibbosa</i>			1		1	1			1													4	1		
	<i>Hakea teretifolia</i>	4	1	1				1	4	4	1	4			1		1	1	5	1	4	5	4	4	1	
	<i>Isopogon anethifolius</i>	3		4	4	4	1	4	1	1	1		1	1	4		1			4	5	1	4		4	
	<i>Lomatia silaifolia</i>						1																			
	<i>Persoonia pinifolia</i>						5									1								1		
	<i>Petrophile pulchella</i>	2	1			1	2	4	2		2	2			2	5	4	2		1			1			
Restionaceae	<i>Chordifex dimorphus</i>						4	4							5											
	<i>Chordifex fastigiatus</i>	5	4	4	4	3		1	3	4	3	5	3	3		4						2	3		1	
	<i>Empodisma minus</i>								2	3							4	3	3	3	3	2	1			
	<i>Leptocarpus tenax</i>	1	1				1	1								1	1							1	2	

Restioid Heath monitoring sites – Spring 2019

Swamp 125 – Vegetation cover/abundance

		Transect 1							Transect 2							Transect 3									
Family	Species	S125T1Q1S19	S125T1Q2S19	S125T1Q3S19	S125T1Q4S19	S125T1Q5S19	S125T1Q6S19	S125T1Q7S19	S125T2Q1S19	S125T2Q2S19	S125T2Q3S19	S125T2Q4S19	S125T2Q5S19	S125T2Q6S19	S125T2Q7S19	S125T2Q8S19	S125T3Q1S19	S125T3Q2S19	S125T3Q3S19	S125T3Q4S19	S125T3Q5S19	S125T3Q6S19	S125T3Q7S19	S125T3Q8S19	S125T3Q9S19
	<i>Lepyrodia scariosa</i>	2		2		3		1	1	3	3	4	2			1	4	1	1	3	1		1	2	5
Stylidiaceae	<i>Stylidium lineare</i>		1	2	1	2	1	2						1											
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>										1		1	4	4	5					4		1		
	Total	19	16	18	20	15	24	25	13	14	15	12	14	20	16	17	20	12	8	13	14	12	15	13	18

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▲ **RoTAP species**

- 2: Geographic range in Australia less than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 i: less than 1000 plants are known to occur within a conservation reserve(s)

Restioid Heath monitoring sites – Spring 2019

Swamp 137a – Vegetation cover/abundance

Family	Species	Transect 1									Transect 2						Transect 3						
		S137aT1Q1S19	S137aT1Q2S19	S137aT1Q3S19	S137aT1Q4S19	S137aT1Q5S19	S137aT1Q6S19	S137aT1Q7S19	S137aT1Q8S19	S137aT1Q9S19	S137aT2Q1S19	S137aT2Q2S19	S137aT2Q3S19	S137aT2Q4S19	S137aT2Q5S19	S137aT2Q6S19	S137aT3Q1S19	S137aT3Q2S19	S137aT3Q3S19	S137aT3Q4S19	S137aT3Q5S19	S137aT3Q6S19	S137aT3Q7S19
Apiaceae	<i>Actinotus minor</i>	1	1								2	1							1				
Casuarinaceae	<i>Allocasuarina distyla</i>												1										
	<i>Allocasuarina littoralis</i>											5											
Colchicaceae	<i>Burchardia umbellata</i>																		1				
Cunoniaceae	<i>Bauera microphylla</i>																					1	
Cyperaceae	<i>Cyathochaeta diandra</i>	4	3	4							2	4	2				3	2	4	3	2	3	2
	<i>Lepidosperma neesii</i>	3	3	3	3	2	3	3	3	3	2	3	3	3	2	3	3	1	3	3	2		2
	<i>Ptilothrix deusta</i>	3	3	3	3	2	3	3	3	3	3	3	3	3	3	2		3	3	2			2
	<i>Schoenus brevifolius</i>	2	3	3	3	3	3	4	3	3							1	1	1		1	2	1
Dilleniaceae	<i>Hibbertia serpyllifolia</i>		1																				
Droseraceae	<i>Drosera peltata</i>								1														
Ericaceae	<i>Epacris microphylla</i>	3	2	3							2	4	3	1									
	<i>Epacris obtusifolia</i>									2													
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	1																					
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	3	2	2		1			2		3	3	3	1	2		2	2	3	1		3	2
	<i>Mirbelia rubiifolia</i>															1							1
	<i>Pultenaea tuberculata</i>										2	1											
Goodeniaceae	<i>Dampiera stricta</i>		2														1	2	2	3	2		
Iridaceae	<i>Patersonia sericea</i>										2												
Lauraceae	<i>Cassytha glabella</i>		2	1					2	1	1				1		1	1	1	1		1	1
Lindsaeaceae	<i>Lindsaea linearis</i>	1																					
Lomandraceae	<i>Lomandra obliqua</i>										2												
Myrtaceae	<i>Baeckea imbricata</i>			2				1	2				2	2	2	2	3	1	2	2	2	2	2
	<i>Darwinia diminuta</i> ▲ 2RCi														1								
	<i>Darwinia fascicularis</i>										3					4				3			
	<i>Eucalyptus racemosa</i>														2								

Restioid Heath monitoring sites – Spring 2019

Swamp 137a – Vegetation cover/abundance

		Transect 1									Transect 2					Transect 3							
Family	Species	S137aT1Q1S19	S137aT1Q2S19	S137aT1Q3S19	S137aT1Q4S19	S137aT1Q5S19	S137aT1Q6S19	S137aT1Q7S19	S137aT1Q8S19	S137aT1Q9S19	S137aT2Q1S19	S137aT2Q2S19	S137aT2Q3S19	S137aT2Q4S19	S137aT2Q5S19	S137aT2Q6S19	S137aT3Q1S19	S137aT3Q2S19	S137aT3Q3S19	S137aT3Q4S19	S137aT3Q5S19	S137aT3Q6S19	S137aT3Q7S19
	<i>Kunzea capitata</i>															4							
	<i>Leptospermum arachnoides</i>										1	1	1									1	
	<i>Leptospermum squarrosum</i>	4	5	4	4	4	5	4	5	4	2	3	4	5	3	5	4	3	3	4	3	5	4
	<i>Leptospermum trinervium</i>										1	1											
	<i>Micromyrtus ciliata</i>										1												
Poaceae	<i>Anisopogon avenaceus</i>										2												
	<i>Entolasia stricta</i>					1										1							
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	2	5	6	5	5	4	4	5	2	3	1	4	4		4	4	4	4	4	5	4
	<i>Banksia oblongifolia</i>																1		2				
	<i>Grevillea oleoides</i>																1						
	<i>Hakea dactyloides</i>											4											
	<i>Hakea gibbosa</i>		4	2		1	1	1					1				1						
	<i>Hakea teretifolia</i>	4	5	3	4	3	4	5	5	3	3	4		4	2		4	3	4	4	2	4	2
	<i>Isopogon anethifolius</i>	3	4																				
	<i>Persoonia levis</i>																			1			
	<i>Persoonia pinifolia</i>									5										1			
	<i>Petrophile pulchella</i>	1	1	2	1		1				3	4	5	3				4	3	4	4	4	4
Restionaceae	<i>Chordifex fastigiatus</i>	2	3		2		2	1	3	2	4		3		3			3	4		4	3	4
	<i>Empodisma minus</i>										1												
	<i>Leptocarpus tenax</i>	2	2		2				2	2		4	2	4			3	2	2	3		2	
	<i>Lepyrodia scariosa</i>	3	2					3	2		2	3	3	3	2	3		2	4	2	2	3	2
													1										
Stylidiaceae	<i>Stylidium lineare</i>												1					1	2	2			1
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>			4						5	3						1		1	1			
	Total	17	19	14	9	9	9	10	13	12	23	17	16	11	12	9	16	16	21	17	11	14	14

Cover Abundance Scale (Modified Braun Blanquet)

1 = cover less than 5% of site and rare

▲ RoTAP species

2: Geographic range in Australia less than 100 km

2 = cover less than 5% of site and uncommon
3 = cover of less than 5% and common
4 = cover of 5-20% of site
5 = cover of 21-50% of site
6 = cover of 51-75% of site
7 = cover of greater than 75%

R: Rare in Australia but does not have an identifiable threat
C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
i: less than 1000 plants are known to occur within a conservation reserve(s)

Restioid Heath monitoring sites – Spring 2019

Swamp 138 – Vegetation cover/abundance

Family	Species	Transect 1								Transect 2					Transect 3				
		S138T1Q1S19	S138T1Q2S19	S138T1Q3S19	S138T1Q4S19	S138T1Q5S19	S138T1Q6S19	S138T1Q7S19	S138T1Q8S19	S138T2Q1S19	S138T2Q2S19	S138T2Q3S19	S138T2Q4S19	S138T2Q5S19	S138T3Q1S19	S138T3Q2S19	S138T3Q3S19	S138T3Q4S19	S138T3Q5S19
Anthericaceae	<i>Thysanotus juncifolius</i>	1	1																
Apiaceae	<i>Actinotus minor</i>		2				3	2	2	2		1		2				2	2
	<i>Platysace linearifolia</i>																		2
	<i>Xanthosia tridentata</i>							2		1									
Casuarinaceae	<i>Allocasuarina littoralis</i>		1																
Cunoniaceae	<i>Bauera microphylla</i>		3				3	3		3	2			1					
Cyperaceae	<i>Cyathochaeta diandra</i>	3	3	3	1	3	3	4	3	4	2	2	2	4	4	3		4	4
	<i>Lepidosperma filiforme</i>	4																	
	<i>Lepidosperma neesii</i>		3	3	4	4		4	3	3	4	1	4		4	3	3	4	2
	<i>Ptilothrix deusta</i>	3	2	3	3	3	2	3	4	3	3	3	3	3		3	2	3	3
	<i>Schoenus brevifolius</i>	2	1	3	2	3	1	3	2	3	2	1	1	1		2	1	2	
Dilleniaceae	<i>Hibbertia riparia</i>			1															
	<i>Hibbertia serpyllifolia</i>	1	3	1			1	2	2	2				2					1
Ericaceae	<i>Epacris microphylla</i>	3	4	3	2	1	3	3	4	3	2	3	2	2					1
	<i>Epacris obtusifolia</i>			2										1		4			
	<i>Leucopogon esquamatus</i>								1	2									
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>									3									
Fabaceae (Faboideae)	<i>Gompholobium glabratum</i>							1	1					2				1	
	<i>Mirbelia rubiifolia</i>						1											1	
	++ <i>Pultenaea aristata</i> ▲ 2V														1				2
	<i>Pultenaea tuberculata</i>		1																
Goodeniaceae	<i>Dampiera stricta</i>	1												1					1
Iridaceae	<i>Patersonia glabrata</i>														2				
Lauraceae	<i>Cassytha glabella</i>			1			1	1	1	1			1	2			1		1
Lindsaeaceae	<i>Lindsaea linearis</i>			1				2											3
Myrtaceae	<i>Baeckea imbricata</i>			3	2	2	2	2	2				1	1					

Restioid Heath monitoring sites – Spring 2019

Swamp 138 – Vegetation cover/abundance

Family	Species	Transect 1								Transect 2					Transect 3				
		S138T1Q1S19	S138T1Q2S19	S138T1Q3S19	S138T1Q4S19	S138T1Q5S19	S138T1Q6S19	S138T1Q7S19	S138T1Q8S19	S138T2Q1S19	S138T2Q2S19	S138T2Q3S19	S138T2Q4S19	S138T2Q5S19	S138T3Q1S19	S138T3Q2S19	S138T3Q3S19	S138T3Q4S19	S138T3Q5S19
	<i>Corymbia gummifera</i>							1											
	<i>Darwinia diminuta</i> ▲2RCi							1											
	<i>Eucalyptus oblonga</i>														1				
	<i>Leptospermum arachnoides</i>							2											
	<i>Leptospermum squarrosum</i>		2	3	4	5	3	4	4	4	5	4	5	3	4	5	5	5	4
	<i>Leptospermum trinervium</i>																		1
	<i>Micromyrtus ciliata</i>	3	1	4		3	2	4	2	3	2								
Poaceae	<i>Anisopogon avenaceus</i>																		3
	<i>Entolasia stricta</i>																1		
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	4	5	3	4	3	5	5	4	4	4	5	5	5	4	5
	<i>Banksia oblongifolia</i>		1				1	1		3				1					
	<i>Conospermum ellipticum</i>	1																	
	<i>Grevillea oleoides</i>	1			1				1	1									
	<i>Hakea teretifolia</i>	3	2	4	2	4	1	4		2	1		1	2					3
	<i>Petrophile pulchella</i>	4	3	4	3	4	3	4	2	4	3	3	2	4	2	1	3	3	4
	<i>Petrophile sessilis</i>			1	1	1	2		1										
Restionaceae	<i>Baloskion gracile</i>	2																	
	<i>Empodisma minus</i>										2								
	<i>Leptocarpus tenax</i>	2	1	2	2		2		2	3	3	1		1	1	1		1	2
	<i>Lepyrodia scariosa</i>	3	3	3	3	3	3	3	3	2	3	4		3	3	2	1	3	3
Rhamnaceae	<i>Cryptandra ericoides</i>							1											
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>					1								1		1			2
	Total	17	19	19	14	14	19	24	19	21	14	11	11	20	10	11	9	12	20

Cover Abundance Scale (Modified Braun Blanquet)

1 = cover less than 5% of site and rare
 2 = cover less than 5% of site and uncommon
 3 = cover of less than 5% and common

▲ **RoTAP species**

2: Geographic range in Australia less than 100 km

R: Rare in Australia but does not have an identifiable threat

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4 = cover of 5-20% of site
5 = cover of 21-50% of site
6 = cover of 51-75% of site
7 = cover of greater than 75%

V: Taxon not presently Endangered, but at risk over a longer period
i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Upland Swamp monitoring sites – Spring 2019

Species which recorded an increase in average cover/abundance (from autumn 2019)

Longwall and Control Sites	Longwall Sites Only	Control Sites Only
<i>Allocasuarina distyla</i>	<i>Bauera microphylla</i>	<i>Actinotus minor</i>
<i>Allocasuarina littoralis</i>	<i>Boronia parviflora</i>	<i>Banksia oblongifolia</i> *
<i>Anisopogon avenaceus</i>	<i>Gleichenia dicarpa</i> *	<i>Banksia serrata</i> *
<i>Baeckea imbricata</i>	<i>Hibbertia serpyllifolia</i>	<i>Bauera microphylla</i>
<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>		<i>Chordifex dimorphus</i> *
<i>Burchardia umbellata</i>		<i>Cryptandra ericoides</i>
<i>Cassytha glabella</i>		<i>Dampiera stricta</i>
<i>Chordifex fastigiatus</i>		<i>Darwinia diminuta</i> ▲2RCi
<i>Chorizandra cymbaria</i>		<i>Eucalyptus haemastoma</i> *
<i>Cyathochaeta diandra</i>		<i>Eucalyptus racemosa</i>
<i>Darwinia fascicularis</i>		<i>Eucalyptus sieberi</i> *
<i>Dillwynia floribunda</i>		<i>Gompholobium glabratum</i>
<i>Empodisma minus</i>		<i>Gonocarpus tetragynus</i>
<i>Entolasia stricta</i>		<i>Hakea gibbosa</i> *
<i>Epacris microphylla</i>		<i>Leptospermum trinervium</i>
<i>Epacris obtusifolia</i>		<i>Leucopogon esquamatus</i>
<i>Hakea dactyloides</i>		<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>
<i>Hakea teretifolia</i>		<i>Lomandra obliqua</i>
<i>Isopogon anethifolius</i>		<i>Mirbelia rubrifolia</i> *
<i>Kunzea capitata</i>		<i>Patersonia sericea</i> *
<i>Lepidosperma filiforme</i>		<i>Pimelea linifolia</i> subsp. <i>linifolia</i> *
<i>Lepidosperma neesii</i>		<i>Platysace linearifolia</i> *
<i>Leptocarpus tenax</i>		<i>Pultenaea tuberculata</i>
<i>Leptomeria acida</i>		<i>Schizaea bifida</i> *
<i>Leptospermum arachnoides</i>		<i>Schoenus lepidosperma</i> subsp. <i>pachylepis</i> *
<i>Leptospermum squarrosum</i>		<i>Sphaerolobium vimineum</i> *
<i>Lepyrodia scariosa</i>		<i>Sprengelia incarnata</i>
<i>Lindsaea linearis</i>		<i>Stylidium lineare</i>
<i>Persoonia pinifolia</i>		<i>Thysanotus juncifolius</i> *
<i>Petrophile pulchella</i>		<i>Xanthosia pilosa</i> *
<i>Petrophile sessilis</i>		<i>Xanthosia tridentata</i> *
<i>Ptilothrix deusta</i>		
++ <i>Pultenaea aristata</i> ▲2V		
<i>Schoenus brevifolius</i>		
<i>Tetrarrhena turfosa</i>		
<i>Xanthorrhoea resinosa</i>		

* Species only recorded in either longwall or control sites, spring 2019.

▲ RoTAP species

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++ Species listed as Vulnerable under NSW Threatened Species Conservation Act (1995) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Upland Swamp monitoring sites – Spring 2019

Species which recorded a decrease in average cover/abundance (from autumn 2019)

Longwall and Control Sites	Longwall Sites Only	Control Sites Only
<i>Actinotus minor</i>	<i>Bauera microphylla</i>	<i>Allocasuarina distyla</i>
<i>Baeckea imbricata</i>	<i>Bauera rubioides</i>	<i>Allocasuarina littoralis</i>
<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	<i>Callistemon citrinus</i>	<i>Anisopogon avenaceus</i>
<i>Cassytha glabella</i>	<i>Chorizandra cymbaria</i>	<i>Chordifex dimorphus</i> *
<i>Chordifex fastigiatus</i>	<i>Cyathochaeta diandra</i>	<i>Corymbia gummifera</i>
<i>Dampiera stricta</i>	<i>Drosera spatulata</i> *	<i>Cyathochaeta diandra</i>
<i>Darwinia diminuta</i> ▲2RCi	<i>Gonocarpus tetragynus</i>	<i>Empodisma minus</i> *
<i>Dillwynia floribunda</i>	<i>Lepidosperma filiforme</i>	<i>Epacris microphylla</i>
<i>Entolasia stricta</i>	<i>Persoonia pinifolia</i>	<i>Epacris obtusifolia</i>
<i>Hakea teretifolia</i>	<i>Selaginella uliginosa</i>	<i>Grevillea oleoides</i>
<i>Hibbertia serpyllifolia</i>	<i>Tetrarrhena turfosa</i>	<i>Hakea gibbosa</i> *
<i>Lepidosperma neesii</i>		<i>Hibbertia riparia</i> *
<i>Leptospermum squarrosum</i>		<i>Lepidosperma limicola</i> *
<i>Lepyrodia scariosa</i>		<i>Leptocarpus tenax</i>
<i>Lomandra obliqua</i>		<i>Leptospermum arachnoides</i>
<i>Petrophile pulchella</i>		<i>Leptospermum trinervium</i>
<i>Schoenus brevifolius</i>		<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>
<i>Stylidium lineare</i>		<i>Lindsaea linearis</i>
<i>Xanthorrhoea resinosa</i>		<i>Micromyrtus ciliata</i> *
		<i>Mirbelia rubiifolia</i> *
		<i>Persoonia pinifolia</i>
		<i>Petrophile sessilis</i> *
		<i>Platysace linearifolia</i> *
		<i>Ptilothrix deusta</i>
		++ <i>Pultenaea aristata</i> ▲2V
		<i>Thysanotus juncifolius</i> *
		<i>Xanthosia tridentata</i> *

* Species only recorded in either longwall or control sites, spring 2019.

▲ RoTAP species

2: Geographic range in Australia less than 100 km

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Vegetation condition – Restioid Heath

Restioid Heath monitoring sites – Spring 2019

Swamp 30 – Vegetation condition

Family	Species	Transect 1				Transect 2					Transect 3					
		S30T1Q1S19	S30T1Q2S19	S30T1Q3S19	S30T1Q4S19	S30T2Q1S19	S30T2Q2S19	S30T2Q3S19	S30T2Q4S19	S30T2Q5S19	S30T3Q1S19	S30T3Q2S19	S30T3Q3S19	S30T3Q4S19	S30T3Q5S19	S30T3Q6S19
Casuarinaceae	<i>Allocasuarina littoralis</i>	5				5								5		
Colchicaceae	<i>Burchardia umbellata</i>															5
Cunoniaceae	<i>Bauera rubioides</i>		5			5										
Cyperaceae	<i>Chorizandra cymbaria</i>								5						5	
	<i>Lepidosperma filiforme</i>									5						
	<i>Lepidosperma neesii</i>	5	5			5	4	5	5		5	5	5	5	4	5
	<i>Ptilothrix deusta</i>				5		4	5	5	5	5	5	5	5	4	5
	<i>Schoenus brevifolius</i>		4	5	5	5	4	5	5	5	4	4	5	4	4	5
Droseraceae	<i>Drosera peltata</i>													5	5	5
Ericaceae	<i>Epacris microphylla</i>	5						5	5							
	<i>Epacris obtusifolia</i>		4	5		5	5									
Fabaceae (Faboideae)	++ <i>Pultenaea aristata</i> ▲ 2V	5														
Goodeniaceae	<i>Dampiera stricta</i>					5						5				
Lauraceae	<i>Cassytha glabella</i>				5					5	5	5	5		5	
Lindsaeaceae	<i>Lindsaea linearis</i>					5										
Lomandraceae	<i>Lomandra obliqua</i>	5														
Myrtaceae	<i>Baeckea imbricata</i>				5	5		5		5	5			5	5	5
	<i>Callistemon citrinus</i>										5				5	
	<i>Callistemon linearis</i>													5	5	
	<i>Corymbia gummifera</i>					5										
	<i>Eucalyptus racemosa</i>	5														
	<i>Kunzea capitata</i>					5	5	5	5		5				5	
	<i>Leptospermum arachnoides</i>														5	
	<i>Leptospermum squarrosum</i>		5	5	2	5	5	5	5	5		5	5	3	5	
Poaceae	<i>Entolasia stricta</i>	5	5								5					
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	2	5	4		5		5	5	5			5
	<i>Grevillea patulifolia</i>															5

Restioid Heath monitoring sites – Spring 2019

Swamp 30 – Vegetation condition

Family	Species	Transect 1				Transect 2					Transect 3					
		S30T1Q1S19	S30T1Q2S19	S30T1Q3S19	S30T1Q4S19	S30T2Q1S19	S30T2Q2S19	S30T2Q3S19	S30T2Q4S19	S30T2Q5S19	S30T3Q1S19	S30T3Q2S19	S30T3Q3S19	S30T3Q4S19	S30T3Q5S19	S30T3Q6S19
	<i>Hakea teretifolia</i>											5			5	
	<i>Persoonia pinifolia</i>			5						5						
	<i>Petrophile pulchella</i>	5	5		5	5			5		4					
Restionaceae	<i>Chordifex fastigiatus</i>					4										
	<i>Empodisma minus</i>	5				3										
	<i>Leptocarpus tenax</i>	5														
	<i>Lepyrodia scariosa</i>	5			5	5	5	5	5	5	5			4	5	5
Stylidiaceae	<i>Stylidium lineare</i>					5										
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	5		5												
	Total	13	8	6	8	17	8	8	10	8	11	8	6	9	14	9

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

2: Geographic range in Australia less than 100 km
 V: Taxon not presently Endangered, but at risk over a longer period

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Restioid Heath monitoring sites – Spring 2019

Swamp 35 – Vegetation condition

		Transect 1								Transect 2						Transect 3							
Family	Species	S35T1Q1S19	S35T1Q2S19	S35T1Q3S19	S35T1Q4S19	S35T1Q5S19	S35T1Q6S19	S35T1Q7S19	S35T1Q8S19	S35T2Q1S19	S35T2Q2S19	S35T2Q3S19	S35T2Q4S19	S35T2Q5S19	S35T2Q6S19	S35T3Q1S19	S35T3Q2S19	S35T3Q3S19	S35T3Q4S19	S35T3Q5S19	S35T3Q6S19	S35T3Q7S19	
Apiaceae	<i>Actinotus minor</i>							5	5														
Casuarinaceae	<i>Allocasuarina distyla</i>				5	5		4							5								
Cunoniaceae	<i>Bauera microphylla</i>	5	5			5	5	5				5	5										
	<i>Bauera rubioides</i>									5	5		5										
Cyperaceae	<i>Chorizandra cymbaria</i>		3					5	4				5										
	<i>Cyathochaeta diandra</i>					5	5							5							5		
	<i>Lepidosperma filiforme</i>													5	5				5				
	<i>Lepidosperma neesii</i>	5			5	5	5	5		5	5	5	5	5		5	5	5	5	5	5	5	
	<i>Ptilothrix deusta</i>	5	5	5	5	5	5	5	5	5				5	5	5	5		5	5		5	
	<i>Schoenus brevifolius</i>	5	5	4	5	5	5	5	5	5	5	5	5	4	5	5	5	5	4	4	5	5	5
Dilleniaceae	<i>Hibbertia serpyllifolia</i>					5	5																
Droseraceae	<i>Drosera peltata</i>															5		5					
Ericaceae	<i>Epacris microphylla</i>											5											
	<i>Epacris obtusifolia</i>	5		5			5	5	5	5	5		1	5	5		5	5	5	4		5	
	<i>Leucopogon esquamatus</i>					5																	
	<i>Sprengelia incarnata</i>													5	4								
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5	5				5	5	5	5	5	5		5				5				5	
	++ <i>Pultenaea aristata</i> ▲2V				4	5	5	5															
Gleicheniaceae	<i>Gleichenia dicarpa</i>												2										
Goodeniaceae	<i>Dampiera stricta</i>					5			5			5											
Lauraceae	<i>Cassytha glabella</i>		5	5	5		5		5		5	5	5	5	5	5			5				
Lindsaeaceae	<i>Lindsaea linearis</i>				5	5	5											5	5				
Lomandraceae	<i>Lomandra obliqua</i>					5																	
Myrtaceae	<i>Baeckea imbricata</i>			5	4	5	5	5	5							4	5		5	5	5	5	
	<i>Darwinia diminuta</i> ▲2RCi					5																	
	<i>Leptospermum squarrosum</i>	5	4	5	5	5	5	5	4	5	3	5	5	5	5	5	5	5	5	5	4	4	
Poaceae	<i>Entolasia stricta</i>									5											5		

Restioid Heath monitoring sites – Spring 2019

Swamp 35 – Vegetation condition

		Transect 1								Transect 2						Transect 3							
Family	Species	S35T1Q1S19	S35T1Q2S19	S35T1Q3S19	S35T1Q4S19	S35T1Q5S19	S35T1Q6S19	S35T1Q7S19	S35T1Q8S19	S35T2Q1S19	S35T2Q2S19	S35T2Q3S19	S35T2Q4S19	S35T2Q5S19	S35T2Q6S19	S35T3Q1S19	S35T3Q2S19	S35T3Q3S19	S35T3Q4S19	S35T3Q5S19	S35T3Q6S19	S35T3Q7S19	
	<i>Tetrarrhena turfosa</i>		5						5	5	5	5	5	5		5	5						
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5		5	5	5	5	
	<i>Grevillea oleoides</i>														5								
	<i>Grevillea patulifolia</i>								5														
	<i>Hakea teretifolia</i>			5		5			5	4			5		5	5			5	5		5	
	<i>Lambertia formosa</i>					5						5											
	<i>Persoonia pinifolia</i>												5					5					
	<i>Petrophile pulchella</i>	5	5	5	4	5	5	5	5	5	5	5	5		4							5	
Restionaceae	<i>Chordifex fastigiatus</i>			5	3	5	5	5	4		5	4		5	5	5	5	5	4	4	5	5	
	<i>Empodisma minus</i>	5	4	4	5	5	5	5	5	5	5	5	5	5	4								
	<i>Leptocarpus tenax</i>	5	4	5		5	5	5	5			4				5							
	<i>Lepyrodia scariosa</i>		5	5			5			4	5	5		5	5	5		5	5	5		5	
Rhamnaceae	<i>Cryptandra ericoides</i>																				5		
Stylidiaceae	<i>Stylidium lineare</i>														5								
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	5		5	5		5					5		5		5	5			5		5	
	Total	12	13	14	14	22	20	17	18	14	13	17	15	16	16	13	9	10	13	11	9	13	

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

2: Geographic range in Australia less than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

V: Taxon not presently Endangered, but at risk over a longer period

i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Restioid Heath monitoring sites – Spring 2019

Swamp 101 – Vegetation condition

Family	Species	Transect 1										Transect 2										Transect 3									
		S101T1Q1S19	S101T1Q2S19	S101T1Q3S19	S101T1Q4S19	S101T1Q5S19	S101T1Q6S19	S101T1Q7S19	S101T1Q8S19	S101T1Q9S19	S101T1Q10S19	S101T2Q1S19	S101T2Q2S19	S101T2Q3S19	S101T2Q4S19	S101T2Q5S19	S101T2Q6S19	S101T2Q7S19	S101T2Q8S19	S101T2Q9S19	S101T3Q1S19	S101T3Q2S19	S101T3Q3S19	S101T3Q4S19	S101T3Q5S19	S101T3Q6S19	S101T3Q7S19	S101T3Q8S19	S101T3Q9S19	S101T3Q10S19	S101T3Q11S19
Anthericaceae	<i>Thysanotus juncifolius</i>																				5					5					
Apiaceae	<i>Actinotus minor</i>											5	5		5		5				5					5					
Casuarinaceae	<i>Allocasuarina littoralis</i>																				5										
Cunoniaceae	<i>Bauera microphylla</i>									5	5			5	5					5						4	5	5			
	<i>Bauera rubioides</i>	5																													
Cyperaceae	<i>Cyathochaeta diandra</i>	5	5								5	5		5	5	5	4	5	4	5	5										
	<i>Lepidosperma filiforme</i>										5																				
	<i>Lepidosperma neesii</i>	5	5	5	5	5	5	4	5	5	4	5	5	5	5	5	5	5	4	5	4	4	5	5	5	4	4	5	5	4	4
	<i>Ptilothrix deusta</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		5	5	5	5	5		5	5	5	5	5	5
	<i>Schoenus brevifolius</i>		5	5	4	5	5	4	5	4	5	5	5	5		5		5	4	5	5		5	4	5	4	4	5	5	4	5
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	5												5	5				5		5					5					
Ericaceae	<i>Epacris microphylla</i>	5									5						5	5	5	5	5										
	<i>Epacris obtusifolia</i>						5		5				5	5	5	5	5		5	5		5	5	5	5	5	5		5	5	
	<i>Leucopogon esquamatus</i>										5				5																
Fabaceae (Faboideae)	<i>Mirbelia rubiifolia</i>														5											5		5			5
	++ <i>Pultenaea aristata</i> ▲ 2V																5	5	5												
Goodeniaceae	<i>Dampiera stricta</i>									5											5	5				5	5				5
Haloragaceae	<i>Gonocarpus tetragynus</i>																		5												
Lauraceae	<i>Cassytha glabella</i>			5						5	5		5	5	5	5	5	5			5		5	5		5					5
Myrtaceae	<i>Baeckea imbricata</i>				5	5	5	5	5	5			5		5					5	5	5		5		5			5	5	5
	<i>Darwinia diminuta</i> ▲ 2RCi																									5	5				
	<i>Leptospermum arachnoides</i>										5																				
	<i>Leptospermum squarrosus</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Orchidaceae	<i>Cryptostylis subulata</i>																									5					
Poaceae	<i>Anisopogon avenaceus</i>												5						5												
	<i>Entolasia stricta</i>	5											5				5				5										

Restioid Heath monitoring sites – Spring 2019

Swamp 101 – Vegetation condition

Family	Species	Transect 1										Transect 2										Transect 3									
		S101T1Q1S19	S101T1Q2S19	S101T1Q3S19	S101T1Q4S19	S101T1Q5S19	S101T1Q6S19	S101T1Q7S19	S101T1Q8S19	S101T1Q9S19	S101T1Q10S19	S101T2Q1S19	S101T2Q2S19	S101T2Q3S19	S101T2Q4S19	S101T2Q5S19	S101T2Q6S19	S101T2Q7S19	S101T2Q8S19	S101T2Q9S19	S101T3Q1S19	S101T3Q2S19	S101T3Q3S19	S101T3Q4S19	S101T3Q5S19	S101T3Q6S19	S101T3Q7S19	S101T3Q8S19	S101T3Q9S19	S101T3Q10S19	S101T3Q11S19
	<i>Tetrarrhena turfosa</i>																	5								5					
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	<i>Banksia oblongifolia</i>			5			5											5											5		
	<i>Hakea teretifolia</i>	5	5	5	5	5	5	5	5	5	4	5	5		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	<i>Persoonia pinifolia</i>																			5											
	<i>Petrophile pulchella</i>	5	5	5		5				5	5	5	5	5	5	5	5	5		5	5	5	5		5	5	5	5			
	<i>Petrophile sessilis</i>								5																						
Restionaceae	<i>Empodisma minus</i>	5										5	5														5				
	<i>Leptocarpus tenax</i>	5		5	4			5				5	5	5	5	5				5		5		5			5			5	
	<i>Lepyrodia scariosa</i>	5	5	5	4	5	5	5	5	5	5	5	5	5	5		5	5	5	5	4	5	5	5	5	5	5	5	5	5	5
Santalaceae	<i>Leptomeria acida</i>																		5												
Stylidiaceae	<i>Stylidium lineare</i>										5	5	5		5		5		5												5
Thymelaeaceae	<i>Pimelea linifolia</i> subsp. <i>linifolia</i>																										5				
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>					5							4							5	5	5	5				5				
	Total	14	9	11	9	10	10	9	10	12	16	12	18	14	17	12	13	13	17	16	18	14	11	11	9	18	15	12	9	11	12

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

2: Geographic range in Australia less than 100 km
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 V: Taxon not presently Endangered, but at risk over a longer period
 i: less than 1000 plants are known to occur within a conservation reserve(s)

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Restioid Heath monitoring sites – Spring 2019

Swamp 111a – Vegetation condition

Family	Species	Transect 1						Transect 2					Transect 3				
		S111aT1Q1S19	S111aT1Q2S19	S111aT1Q3S19	S111aT1Q4S19	S111aT1Q5S19	S111aT1Q6S19	S111aT2Q1S19	S111aT2Q2S19	S111aT2Q3S19	S111aT2Q4S19	S111aT2Q5S19	S111aT3Q1S19	S111aT3Q2S19	S111aT3Q3S19	S111aT3Q4S19	S111aT3Q5S19
Apiaceae	<i>Actinotus minor</i>	5	5	5			5	5					5	5			5
	<i>Platysace linearifolia</i>	4	5				5	5					5				
	<i>Xanthosia pilosa</i>							5									
Casuarinaceae	<i>Allocasuarina littoralis</i>								5								
Colchicaceae	<i>Burchardia umbellata</i>							5								5	
Cunoniaceae	<i>Bauera microphylla</i>				5									5		5	5
Cyperaceae	<i>Cyathochaeta diandra</i>	5	5					5					5	5		5	
	<i>Lepidosperma filiforme</i>		5				5							4	5		5
	<i>Lepidosperma neesii</i>					5	5	5	5	5	5	5	5		5		
	<i>Ptilothrix deusta</i>	5	5	5	5			5	5		5	5	5	5	4		4
	<i>Schoenus brevifolius</i>	4		5			5		5	4	5	4			4	5	5
Dilleniaceae	<i>Hibbertia riparia</i>	5		5									5				
	<i>Hibbertia serpyllifolia</i>							5									
Ericaceae	<i>Epacris microphylla</i>	5	5		5	4	3		5				5	5	4		
	<i>Epacris obtusifolia</i>					5							5	5	4	5	5
	<i>Leucopogon esquamatus</i>			5	5									4			
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	5	5	5													
	<i>Sprengelia incarnata</i>															4	
Fabaceae (Faboideae)	<i>Bossiaea ensata</i>													5			
	<i>Dillwynia floribunda</i>																5
	<i>Gompholobium glabratum</i>	5															
	<i>Mirbelia rubiifolia</i>						5						5		5		
	++ <i>Pultenaea aristata</i> ▲ 2V			5									5				
Goodeniaceae	<i>Dampiera stricta</i>			5	5									5			
Lauraceae	<i>Cassytha glabella</i>	5	5	5	5			5					5	5	5		5
Lomandraceae	<i>Lomandra obliqua</i>							5									

Restioid Heath monitoring sites – Spring 2019

Swamp 111a – Vegetation condition

Family	Species	Transect 1						Transect 2					Transect 3				
		S111aT1Q1S19	S111aT1Q2S19	S111aT1Q3S19	S111aT1Q4S19	S111aT1Q5S19	S111aT1Q6S19	S111aT2Q1S19	S111aT2Q2S19	S111aT2Q3S19	S111aT2Q4S19	S111aT2Q5S19	S111aT3Q1S19	S111aT3Q2S19	S111aT3Q3S19	S111aT3Q4S19	S111aT3Q5S19
Myrtaceae	<i>Baeckea imbricata</i>				5	5				5			5	5	5	5	
	<i>Corymbia gummifera</i>							5									
	<i>Darwinia diminuta</i> ▲2RCi		5														
	<i>Eucalyptus haemastoma</i>											5					
	<i>Eucalyptus racemosa</i>							5									
	<i>Eucalyptus sieberi</i>						5						5				
	<i>Leptospermum arachnoides</i>	5	5		5	5								5			
	<i>Leptospermum squarrosum</i>			5	5		5		5	5	5	5	5	5	5	5	5
	<i>Leptospermum trinervium</i>					5							5				
Poaceae	<i>Entolasia stricta</i>						5	5									
	<i>Tetrarrhena turfosa</i>																5
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5		5	5	5		5	5	5	5	5	5	5
	<i>Banksia oblongifolia</i>		5	5										5			
	<i>Banksia serrata</i>						5										
	<i>Grevillea oleoides</i>				5									5			
	<i>Hakea gibbosa</i>	5	5	4	4					5			5				
	<i>Hakea teretifolia</i>		5		5	5		5	5	5	5	5		5	5	5	5
	<i>Persoonia levis</i>				5												
	<i>Petrophile pulchella</i>	5	5	4	5	5	4	5	5	5	5	5	5	5	5	4	5
	<i>Petrophile sessilis</i>												5				
Restionaceae	<i>Chordifex dimorphus</i>													5			
	<i>Chordifex fastigiatus</i>		5	5	5	4			5	4	5	4		5		5	5
	<i>Empodisma minus</i>						5	3							5	5	5
	<i>Leptocarpus tenax</i>	4	5	5	5			5						5		5	
	<i>Lepyrodia scariosa</i>	5			5	4	5	5	5	4	5	5	5	5	5		5
Rutaceae	<i>Boronia parviflora</i>															4	

Restioid Heath monitoring sites – Spring 2019

Swamp 111a – Vegetation condition

Family	Species	Transect 1						Transect 2					Transect 3				
		S111aT1Q1S19	S111aT1Q2S19	S111aT1Q3S19	S111aT1Q4S19	S111aT1Q5S19	S111aT1Q6S19	S111aT2Q1S19	S111aT2Q2S19	S111aT2Q3S19	S111aT2Q4S19	S111aT2Q5S19	S111aT3Q1S19	S111aT3Q2S19	S111aT3Q3S19	S111aT3Q4S19	S111aT3Q5S19
Santalaceae	<i>Leptomeria acida</i>												5				
Selaginellaceae	<i>Selaginella uliginosa</i>																3
Stylidiaceae	<i>Stylidium lineare</i>															5	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	5	5	5		5	5	5					5				
	Total	17	18	17	18	11	16	20	11	9	9	10	22	23	15	16	17

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

2: Geographic range in Australia less than 100 km
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 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 V: Taxon not presently Endangered, but at risk over a longer period
 i: less than 1000 plants are known to occur within a conservation reserve(s)

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Restioid Heath monitoring sites – Spring 2019

Swamp 125 – Vegetation condition

		Transect 1							Transect 2							Transect 3									
Family	Species	S125T1Q1S19	S125T1Q2S19	S125T1Q3S19	S125T1Q4S19	S125T1Q5S19	S125T1Q6S19	S125T1Q7S19	S125T2Q1S19	S125T2Q2S19	S125T2Q3S19	S125T2Q4S19	S125T2Q5S19	S125T2Q6S19	S125T2Q7S19	S125T2Q8S19	S125T3Q1S19	S125T3Q2S19	S125T3Q3S19	S125T3Q4S19	S125T3Q5S19	S125T3Q6S19	S125T3Q7S19	S125T3Q8S19	S125T3Q9S19
Apiaceae	<i>Actinotus minor</i>	5		5	5		5	5			5		5	5	5		5				5	5	5		
	<i>Platysace linearifolia</i>		5																						
	<i>Xanthosia tridentata</i>													5											
Casuarinaceae	<i>Allocasuarina distyla</i>	5													5		5								
	<i>Allocasuarina littoralis</i>								5																
Cunoniaceae	<i>Bauera microphylla</i>				5									5											
Cyperaceae	<i>Chorizandra cymbaria</i>										5									1					
	<i>Cyathochaeta diandra</i>	5	5					5							5	5	5					5	5	5	5
	<i>Gahnia sieberiana</i>										4														
	<i>Lepidosperma filiforme</i>		5	3	5	5	5	5	4	5	5		4	5			5			4			5		
	<i>Lepidosperma neesii</i>	5			5				5	5		5	5	5		5	5	5			5				
	<i>Ptilothrix deusta</i>	5			5	5	5	5				5	5	5	5	5	5	5	5	5	4	5	5	5	5
	<i>Schoenus brevifolius</i>					5				5	4	5		5				5	4	4	5				
	<i>Schoenus lepidosperma</i> subsp. <i>pachylepis</i>				5		5	5																	
Dilleniaceae	<i>Hibbertia riparia</i>							5																	
	<i>Hibbertia serpyllifolia</i>			5												5	5								5
Ericaceae	<i>Epacris microphylla</i>		4	5		5		5					5		5		5	5						5	5
	<i>Epacris obtusifolia</i>						5			5	5			5											
	<i>Leucopogon esquamatus</i>				5			5																	
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	5		5			5	5									5								5
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5	5	5	5	5	5		5	5		5		5				5	5	5	5	5	5	5	5
	<i>Mirbelia rubiifolia</i>							5																	
	<i>Pultenaea tuberculata</i>																								5
Goodeniaceae	<i>Dampiera stricta</i>		5				5	5						5			5				5				5
Haloragaceae	<i>Gonocarpus tetragynus</i>													5	5	5									5

Restioid Heath monitoring sites – Spring 2019

Swamp 125 – Vegetation condition

		Transect 1							Transect 2							Transect 3									
Family	Species	S125T1Q1S19	S125T1Q2S19	S125T1Q3S19	S125T1Q4S19	S125T1Q5S19	S125T1Q6S19	S125T1Q7S19	S125T2Q1S19	S125T2Q2S19	S125T2Q3S19	S125T2Q4S19	S125T2Q5S19	S125T2Q6S19	S125T2Q7S19	S125T2Q8S19	S125T3Q1S19	S125T3Q2S19	S125T3Q3S19	S125T3Q4S19	S125T3Q5S19	S125T3Q6S19	S125T3Q7S19	S125T3Q8S19	S125T3Q9S19
Lauraceae	Cassytha glabella	5	5		4			5				5	5	4		5	5	5		5	5	5		5	5
Lindsaeaceae	Lindsaea linearis		5	5	5			5					5			5	5					5			
Lomandraceae	Lomandra obliqua	5					5								5										
Myrtaceae	Angophora hispida						5	5																	
	Baekkea imbricata			4	5	5			5	5	5	5		5						5					
	Darwinia diminuta ▲ 2RCi	5		5	5		5							5	5										
	Darwinia fascicularis	5			5																				
	Eucalyptus racemosa																5							5	5
	Leptospermum arachnoides		5	5	5	5							5			5									
	Leptospermum squarrosum		5	5	5	5			5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Leptospermum trinervium	5					5	5																	
Pittosporaceae	Billardiera scandens						5																		
Poaceae	Anisopogon avenaceus						5																		
Proteaceae	Banksia ericifolia subsp. ericifolia	5	5	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4	5	5
	Banksia marginata						5	5																	
	Banksia oblongifolia				4																				
	Hakea dactyloides														5										
	Hakea gibbosa			4		5	5			5													5	5	
	Hakea teretifolia	5	5	5				5	5	5	5	5			5		5	5	5	5	5	5	5	5	5
	Isopogon anethifolius	5		5	5	4	5	5	4	5	5		5	5	5		5			5	5	4	5		5
	Lomatia silaifolia						5																		
	Persoonia pinifolia						5									5								5	
	Petrophile pulchella	5	5			5	5	5	4		5	5			4	5	4	5		5			4		
Restionaceae	Chordifex dimorphus						3	5							4										
	Chordifex fastigiatus	5	4	5	4	5		5	5	5	5	5	5	5		5						4	4		5
	Empodisma minus								5	5							5	4	4	4	4	5	5		

Restioid Heath monitoring sites – Spring 2019

Swamp 125 – Vegetation condition

		Transect 1							Transect 2							Transect 3									
Family	Species	S125T1Q1S19	S125T1Q2S19	S125T1Q3S19	S125T1Q4S19	S125T1Q5S19	S125T1Q6S19	S125T1Q7S19	S125T2Q1S19	S125T2Q2S19	S125T2Q3S19	S125T2Q4S19	S125T2Q5S19	S125T2Q6S19	S125T2Q7S19	S125T2Q8S19	S125T3Q1S19	S125T3Q2S19	S125T3Q3S19	S125T3Q4S19	S125T3Q5S19	S125T3Q6S19	S125T3Q7S19	S125T3Q8S19	S125T3Q9S19
	<i>Leptocarpus tenax</i>	5	5				5	5								5	5							5	5
	<i>Lepyrodia scariosa</i>	5		5		5		5	5	5	5	5	5			5	5	5	5	5	5		4	5	5
Stylidiaceae	<i>Stylidium lineare</i>		5	5	5	5	5	5						5											
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>										5		5	3	5	5					5		4		
	Total	19	16	18	20	15	24	25	13	14	15	12	14	20	16	17	20	12	8	13	14	12	15	13	18

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

2: Geographic range in Australia less than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 i: less than 1000 plants are known to occur within a conservation reserve(s)

Restioid Heath monitoring sites – Spring 2019

Swamp 137a – Vegetation condition

Family	Species	Transect 1									Transect 2						Transect 3						
		S137aT1Q1S19	S137aT1Q2S19	S137aT1Q3S19	S137aT1Q4S19	S137aT1Q5S19	S137aT1Q6S19	S137aT1Q7S19	S137aT1Q8S19	S137aT1Q9S19	S137aT2Q1S19	S137aT2Q2S19	S137aT2Q3S19	S137aT2Q4S19	S137aT2Q5S19	S137aT2Q6S19	S137aT3Q1S19	S137aT3Q2S19	S137aT3Q3S19	S137aT3Q4S19	S137aT3Q5S19	S137aT3Q6S19	S137aT3Q7S19
Apiaceae	<i>Actinotus minor</i>	5	5								5	5							5				
Casuarinaceae	<i>Allocasuarina distyla</i>												5										
	<i>Allocasuarina littoralis</i>											5											
Colchicaceae	<i>Burchardia umbellata</i>																		5				
Cunoniaceae	<i>Bauera microphylla</i>																					5	
Cyperaceae	<i>Cyathochaeta diandra</i>	5	5	5							5	5	5				5	5	5	5	5	4	5
	<i>Lepidosperma neesii</i>	5	5	5	5	5	5	5	4	4	5	5	4	5	5	4	5	5	5	5	5		5
	<i>Ptilothrix deusta</i>	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5		5	5	5			5
	<i>Schoenus brevifolius</i>	4	4	4	4	5	5	5	4	4							5	5	3		5	4	5
Dilleniaceae	<i>Hibbertia serpyllifolia</i>		5																				
Droseraceae	<i>Drosera peltata</i>								5														
Ericaceae	<i>Epacris microphylla</i>	5	5	5							5	5	5	5									
	<i>Epacris obtusifolia</i>									5													
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	5																					
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5	5	5		5			5		5	5	5	5	5		5	5	5	5		5	5
	<i>Mirbelia rubiifolia</i>															5							5
	<i>Pultenaea tuberculata</i>										5	5											
Goodeniaceae	<i>Dampiera stricta</i>		5														5	5	5	5	5		
Iridaceae	<i>Patersonia sericea</i>										5												
Lauraceae	<i>Cassytha glabella</i>		5	5					5	5	5				5		5	5	5	5		5	5
Lindsaeaceae	<i>Lindsaea linearis</i>	5																					
Lomandraceae	<i>Lomandra obliqua</i>										5												
Myrtaceae	<i>Baeckea imbricata</i>			5				5	5				5	5	5	5	5	5	5	5	5	5	5
	<i>Darwinia diminuta</i> ▲ 2RCi														5								
	<i>Darwinia fascicularis</i>										5					5				5			

Restioid Heath monitoring sites – Spring 2019

Swamp 137a – Vegetation condition

		Transect 1										Transect 2						Transect 3						
Family	Species	S137aT1Q1S19	S137aT1Q2S19	S137aT1Q3S19	S137aT1Q4S19	S137aT1Q5S19	S137aT1Q6S19	S137aT1Q7S19	S137aT1Q8S19	S137aT1Q9S19	S137aT2Q1S19	S137aT2Q2S19	S137aT2Q3S19	S137aT2Q4S19	S137aT2Q5S19	S137aT2Q6S19	S137aT3Q1S19	S137aT3Q2S19	S137aT3Q3S19	S137aT3Q4S19	S137aT3Q5S19	S137aT3Q6S19	S137aT3Q7S19	
	<i>Eucalyptus racemosa</i>														5									
	<i>Kunzea capitata</i>															5								
	<i>Leptospermum arachnoides</i>										5	5	5									5		
	<i>Leptospermum squarrosum</i>	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	<i>Leptospermum trinervium</i>										5	5												
	<i>Micromyrtus ciliata</i>										5													
Poaceae	<i>Anisopogon avenaceus</i>										5													
	<i>Entolasia stricta</i>					5										5								
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5	5	5	5	5	5	5	5	4	5	5		5	5	5	5	5	5	5	
	<i>Banksia oblongifolia</i>																5		5					
	<i>Grevillea oleoides</i>																5							
	<i>Hakea dactyloides</i>											5												
	<i>Hakea gibbosa</i>		5	5		5	5	5					5				5							
	<i>Hakea teretifolia</i>	4	5	4	5	5	5	5	5	5	3	5		5	5		5	5	4	5	5	3	5	
	<i>Isopogon anethifolius</i>	5	5																					
	<i>Persoonia levis</i>																			5				
	<i>Persoonia pinifolia</i>									5										5				
	<i>Petrophile pulchella</i>	5	4	5	5		5				5	5	5	5				5	5	5	5	5	5	
Restionaceae	<i>Chordifex fastigiatus</i>	5	5		5		5	5	4	4	5		4		5			5	5		5	5	5	
	<i>Empodisma minus</i>										5													
	<i>Leptocarpus tenax</i>	5	5		5				5	5		5	5	5			5	5	5	5		5		
	<i>Lepyrodia scariosa</i>	5	5					5	5		5	5	5	5	5	3		5	4	5	5	5	5	
Stylidiaceae	<i>Stylidium lineare</i>												5					5	5	5			5	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>			5						5	5						5		5	5				
	Total	17	19	14	9	9	9	10	13	12	23	17	16	11	12	9	16	16	21	17	11	14	14	

Condition Scale

▲ RoTAP species

1 = severe damage/dieback
2 = many dead stems
3 = some dead branches
4 = minor damage
5 = healthy

2: Geographic range in Australia less than 100 km
R: Rare in Australia but does not have an identifiable threat
C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
i: less than 1000 plants are known to occur within a conservation reserve(s)

Restioid Heath monitoring sites – Spring 2019

Swamp 138 – Vegetation condition

Family	Species	Transect 1								Transect 2					Transect 3				
		S138T1Q1S19	S138T1Q2S19	S138T1Q3S19	S138T1Q4S19	S138T1Q5S19	S138T1Q6S19	S138T1Q7S19	S138T1Q8S19	S138T2Q1S19	S138T2Q2S19	S138T2Q3S19	S138T2Q4S19	S138T2Q5S19	S138T3Q1S19	S138T3Q2S19	S138T3Q3S19	S138T3Q4S19	S138T3Q5S19
Anthericaceae	<i>Thysanotus juncifolius</i>	5	5																
Apiaceae	<i>Actinotus minor</i>		5				5	5	5	5		5		5				5	5
	<i>Platysace linearifolia</i>																		5
	<i>Xanthosia tridentata</i>							5		5									
Casuarinaceae	<i>Allocasuarina littoralis</i>		5																
Cunoniaceae	<i>Bauera microphylla</i>		5				5	5		5	5			5					
Cyperaceae	<i>Cyathochaeta diandra</i>	5	5	4	5	4	5	4	5	5	5	5	5	5	5	5		5	5
	<i>Lepidosperma filiforme</i>	4																	
	<i>Lepidosperma neesii</i>		5	5	5	5		5	5	5	5	5	5		5	5	4	4	5
	<i>Ptilothrix deusta</i>	5	5	5	5	5	5	5	5	5	5	5	5	5		5	5	5	5
	<i>Schoenus brevifolius</i>	5	5	5	5	4	5	4	5	4	5	5	5	5		5	5	5	
Dilleniaceae	<i>Hibbertia riparia</i>			5															
	<i>Hibbertia serpyllifolia</i>	5	5	5			5	5	5	5				5					5
Ericaceae	<i>Epacris microphylla</i>	5	5	5	5	5	5	4	5	4	5	5	5	5					5
	<i>Epacris obtusifolia</i>			5										5		5			
	<i>Leucopogon esquamatus</i>								5	5									
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>									5									
Fabaceae (Faboideae)	<i>Gompholobium glabratum</i>							5	5					5				5	
	<i>Mirbelia rubiifolia</i>						5											5	
	++ <i>Pultenaea aristata</i> ▲ 2V														5				4
	<i>Pultenaea tuberculata</i>		5																
Goodeniaceae	<i>Dampiera stricta</i>	5												5					5
Iridaceae	<i>Patersonia glabrata</i>														5				
Lauraceae	<i>Cassytha glabella</i>			5			5	5	5	5			5	5			5		5
Lindsaeaceae	<i>Lindsaea linearis</i>			5				5											5
Myrtaceae	<i>Baeckea imbricata</i>			4	5	5	5	5	5				5	5					

Restioid Heath monitoring sites – Spring 2019

Swamp 138 – Vegetation condition

Family	Species	Transect 1								Transect 2					Transect 3				
		S138T1Q1S19	S138T1Q2S19	S138T1Q3S19	S138T1Q4S19	S138T1Q5S19	S138T1Q6S19	S138T1Q7S19	S138T1Q8S19	S138T2Q1S19	S138T2Q2S19	S138T2Q3S19	S138T2Q4S19	S138T2Q5S19	S138T3Q1S19	S138T3Q2S19	S138T3Q3S19	S138T3Q4S19	S138T3Q5S19
	<i>Corymbia gummifera</i>							5											
	<i>Darwinia diminuta</i> ▲2RCi							5											
	<i>Eucalyptus oblonga</i>														5				
	<i>Leptospermum arachnoides</i>							5											
	<i>Leptospermum squarrosum</i>		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	<i>Leptospermum trinervium</i>																		5
	<i>Micromyrtus ciliata</i>	5	5	5		5	5	5	5	5	5								
Poaceae	<i>Anisopogon avenaceus</i>																		5
	<i>Entolasia stricta</i>																5		
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5
	<i>Banksia oblongifolia</i>		5				5	5		5				5					
	<i>Conospermum ellipticum</i>	5																	
	<i>Grevillea oleoides</i>	5			5				5	5									
	<i>Hakea teretifolia</i>	3	4	4	5	4	5	4		4	5		5	5					5
	<i>Petrophile pulchella</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	4
	<i>Petrophile sessilis</i>			5	5	5	5		5										
Restionaceae	<i>Baloskion gracile</i>	5																	
	<i>Empodisma minus</i>										5								
	<i>Leptocarpus tenax</i>	5	5	5	5		5		5	5	5	5		5	5	5		5	5
	<i>Lepyrodia scariosa</i>	4	5	4	5	5	5	5	5	5	5	5		5	5	5	5	5	5
Rhamnaceae	<i>Cryptandra ericoides</i>							5											
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>					5								5		5			5
	Total	17	19	19	14	14	19	24	19	21	14	11	11	20	10	11	9	12	20

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches

▲ **RoTAP species**

2: Geographic range in Australia less than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

4 = minor damage
5 = healthy

V: Taxon not presently Endangered, but at risk over a longer period
i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Upland Swamp monitoring sites – Spring 2019

Species which recorded an increase in average condition (from autumn 2019)

Longwall and Control Sites	Longwall Sites Only	Control Sites Only
<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	<i>Bauera microphylla</i>	<i>Banksia oblongifolia</i> *
<i>Cassytha glabella</i>	<i>Dampiera stricta</i>	<i>Banksia serrata</i> *
<i>Chordifex fastigiatus</i>	<i>Hakea teretifolia</i>	<i>Gleichenia microphylla</i> *
<i>Chorizandra cymbaria</i>		<i>Hakea dactyloides</i>
<i>Cyathochaeta diandra</i>		<i>Hakea gibbosa</i> *
<i>Dillwynia floribunda</i>		<i>Hakea teretifolia</i>
<i>Empodisma minus</i>		<i>Lepidosperma limicola</i> *
<i>Epacris microphylla</i>		<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>
<i>Epacris obtusifolia</i>		<i>Sprengelia incarnata</i>
<i>Lepidosperma filiforme</i>		<i>Tetrarrhena turfosa</i>
<i>Lepidosperma neesii</i>		<i>Xanthosia pilosa</i> *
<i>Leptocarpus tenax</i>		
<i>Leptospermum squarrosum</i>		
<i>Lepyrodia scariosa</i>		
<i>Petrophile pulchella</i>		
<i>Ptilothrix deusta</i>		
<i>Schoenus brevifolius</i>		
<i>Xanthorrhoea resinosa</i>		

* Species only recorded in either longwall or control sites, spring 2019.

Upland Swamp monitoring sites – Spring 2019

Species which recorded a decrease in average condition (from autumn 2019)

Longwall and Control Sites	Longwall Sites Only	Control Sites Only
<i>Baeckea imbricata</i>	<i>Bauera rubioides</i>	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
<i>Chordifex fastigiatus</i>	<i>Gleichenia dicarpa</i> *	<i>Bauera microphylla</i>
<i>Chorizandra cymbaria</i>	<i>Lepyrodia scariosa</i>	<i>Cassytha glabella</i>
<i>Empodisma minus</i>	<i>Ptilothrix deusta</i>	<i>Chordifex dimorphus</i> *
<i>Epacris obtusifolia</i>	<i>Sphaerolobium vimineum</i>	<i>Corymbia gummifera</i>
<i>Hakea teretifolia</i>	<i>Sprengelia incarnata</i>	<i>Entolasia stricta</i>
<i>Lepidosperma filiforme</i>		<i>Epacris microphylla</i>
<i>Leptospermum squarrosum</i>		<i>Hakea gibbosa</i> *
<i>Xanthorrhoea resinosa</i>		<i>Isopogon anethifolius</i>
		<i>Lepidosperma filiforme</i>
		<i>Lepidosperma neesii</i>
		<i>Leptocarpus tenax</i>
		<i>Leucopogon esquamatus</i>
		<i>Persoonia pinifolia</i>
		<i>Petrophile pulchella</i>
		<i>Platysace linearifolia</i> *
		<i>Schoenus brevifolius</i>
		<i>Selaginella uliginosa</i>
		<i>Tetrarrhena turfosa</i>
		<i>Thysanotus juncifolius</i> *

* Species only recorded in either longwall or control sites, spring 2019.

Indicator species – Restioid Heath

Restioid Heath monitoring sites – Spring 2019

Longwall Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D61	310669.41	6214809.78	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D62	310668.66	6214806.18	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D63	310669.27	6214804.79	4	4
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D64	310667.61	6214806.01	4	3
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D65	310667.05	6214805.35	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D66	310677.88	6214811.23	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D67	310677.91	6214813.03	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D68	310676.26	6214817.22	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D69	310675.49	6214817.55	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D70	310679.25	6214817.75	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D71	310680.62	6214815.93	4	2
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D72	310681.19	6214816.93	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D73	310673.51	6214822.53	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D74	310674.53	6214815.56	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D75	310672.93	6214826.89	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D76	310672.77	6214828.74	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D77	310673.77	6214826.70	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D78	310700.27	6214828.47	1	1
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D79	310703.37	6214830.04	4	3
Swamp 19	++ <i>Pultenaea aristata</i> ▲ 2V	D80	310701.23	6214825.85	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E61	310661.74	6214820.64	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E62	310660.49	6214817.18	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E63	310658.84	6214816.83	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E64	310659.70	6214814.96	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E65	310668.28	6214788.81	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E66	310671.95	6214789.38	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E67	310669.74	6214792.48	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E68	310668.53	6214793.50	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E69	310668.03	6214795.94	2	3
Swamp 19	<i>Epacris obtusifolia</i>	E70	310669.12	6214800.87	3	3
Swamp 19	<i>Epacris obtusifolia</i>	E71	310675.19	6214805.38	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E72	310717.06	6214814.74	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E73	310718.20	6214814.14	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E74	310739.65	6214814.12	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E75	310750.04	6214806.05	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E76	310749.82	6214803.89	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E77	310749.69	6214801.69	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E78	310751.22	6214803.45	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E79	310748.22	6214792.29	1	1
Swamp 19	<i>Epacris obtusifolia</i>	E80	310747.00	6214788.00	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F61	310749.55	6214803.46	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F62	310749.47	6214802.61	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F63	310741.86	6214795.19	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F64	310735.84	6214793.05	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F65	310734.49	6214792.67	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F66	310734.32	6214790.16	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F67	310734.47	6214790.73	1	1

Restioid Heath monitoring sites – Spring 2019

Longwall Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 19	<i>Sprengelia incarnata</i>	F68	310735.60	6214790.94	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F69	310736.25	6214791.23	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F70	310738.59	6214791.06	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F71	310739.19	6214791.95	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F72	310739.11	6214790.63	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F73	310739.24	6214789.12	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F74	310737.70	6214788.82	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F75	310737.05	6214788.89	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F76	310734.82	6214789.03	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F77	310735.07	6214788.26	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F78	310738.01	6214787.09	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F79	310738.64	6214786.29	1	1
Swamp 19	<i>Sprengelia incarnata</i>	F80	310739.59	6214787.87	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J161	311179.98	6215180.87	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J162	311181.94	6215181.41	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J163	311183.75	6215181.06	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J164	311185.44	6215179.15	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J165	311184.79	6215175.70	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J166	311186.70	6215180.76	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J167	311187.67	6215179.33	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J168	311183.06	6215177.87	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J169	311181.68	6215179.40	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J170	311120.40	6215103.52	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J171	311121.99	6215101.94	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J172	311119.26	6215097.89	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J173	311115.59	6215094.09	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J174	311111.54	6215093.25	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J175	311113.76	6215104.97	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J176	311115.99	6215104.69	2	2
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J177	311113.12	6215108.44	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J178	311111.56	6215104.68	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J179	311111.53	6215102.36	1	1
Swamp 30	++ <i>Pultenaea aristata</i> ▲2V	J180	311109.72	6215103.36	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L181	311179.76	6215175.23	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L182	311179.82	6215174.34	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L183	311180.38	6215176.92	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L184	311179.86	6215172.36	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L185	311181.71	6215173.38	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L186	311182.73	6215169.79	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L187	311182.09	6215172.03	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L188	311182.62	6215171.93	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L189	311159.45	6215159.48	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L190	311160.30	6215157.88	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L191	311153.64	6215160.55	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L192	311162.46	6215151.88	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L193	311169.33	6215143.79	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L194	311163.87	6215148.60	1	1

Restioid Heath monitoring sites – Spring 2019

Longwall Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 30	<i>Epacris obtusifolia</i>	L195	311167.84	6215147.11	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L196	311165.47	6215144.63	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L197	311163.32	6215145.32	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L198	311161.30	6215146.84	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L199	311157.25	6215138.00	1	1
Swamp 30	<i>Epacris obtusifolia</i>	L200	311160.28	6215137.16	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J101	311514.82	6215129.33	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J102	311517.89	6215130.95	4	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J103	311525.28	6215133.10	4	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J104	311525.48	6215141.71	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J105	311523.39	6215145.24	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J106	311520.86	6215149.86	5	2
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J107	311515.55	6215152.79	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J108	311511.63	6215153.79	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J109	311505.45	6215132.83	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J110	311503.91	6215136.08	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J111	311503.97	6215130.75	4	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J112	311460.08	6215084.95	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J113	311456.92	6215085.48	5	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J114	311456.10	6215089.13	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J115	311452.36	6215091.33	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J116	311449.04	6215090.36	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J117	311446.70	6215089.28	3	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J118	311451.15	6215086.09	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J119	311451.35	6215079.12	1	1
Swamp 35	++ <i>Pultenaea aristata</i> ▲ 2V	J120	311447.23	6215081.04	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K61	311530.81	6215124.32	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K62	311552.09	6215130.65	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K63	311548.05	6215130.99	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K64	311544.26	6215134.73	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K65	311537.32	6215133.66	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K66	311533.64	6215132.03	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K67	311516.94	6215125.25	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K68	311521.18	6215134.49	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K69	311524.38	6215132.94	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K70	311525.82	6215132.68	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K71	311518.47	6215155.61	4	5
Swamp 35	<i>Sprengelia incarnata</i>	K72	311519.63	6215157.58	2	5
Swamp 35	<i>Sprengelia incarnata</i>	K73	311516.46	6215159.23	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K74	311509.51	6215160.97	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K75	311506.89	6215154.81	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K76	311498.94	6215126.93	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K77	311490.10	6215128.08	4	5
Swamp 35	<i>Sprengelia incarnata</i>	K78	311509.66	6215123.59	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K79	311483.26	6215131.19	1	1
Swamp 35	<i>Sprengelia incarnata</i>	K80	311479.32	6215130.98	1	1

Restioid Heath monitoring sites – Spring 2019

Longwall Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 35	<i>Epacris obtusifolia</i>	L121	311524.61	6215121.76	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L122	311530.83	6215123.91	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L123	311534.79	6215122.97	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L124	311539.74	6215121.35	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L125	311547.40	6215122.30	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L126	311555.34	6215124.14	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L127	311554.51	6215131.58	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L128	311546.38	6215134.69	3	5
Swamp 35	<i>Epacris obtusifolia</i>	L129	311540.25	6215129.73	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L130	311531.55	6215128.26	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L131	311517.25	6215125.00	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L132	311518.90	6215132.40	5	4
Swamp 35	<i>Epacris obtusifolia</i>	L133	311520.68	6215149.00	5	1
Swamp 35	<i>Epacris obtusifolia</i>	L134	311515.02	6215152.21	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L135	311515.03	6215160.63	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L136	311515.55	6215119.33	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L137	311510.26	6215120.77	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L138	311508.22	6215126.62	5	1
Swamp 35	<i>Epacris obtusifolia</i>	L139	311506.27	6215131.00	1	1
Swamp 35	<i>Epacris obtusifolia</i>	L140	311496.81	6215128.02	4	1

NB: Shaded rows indicate dead individuals

Condition Scale

- 1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

Reproductive Status:

- 1 = nil
 2 = sparse (occasional flowers only)
 3 = low (under 25 percent of potential)
 4 = moderate (25 to 75 percent of potential)
 5 = high (over 75 percent of potential flowering)

▲ RoTAP species

- 2: Geographic range in Australia less than 100 km
 V: Taxon not presently Endangered, but at risk over a longer period

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Restioid Heath monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 101	<i>Epacris obtusifolia</i>	l41	308696.94	6216573.06	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l42	308698.29	6216572.77	4	4
Swamp 101	<i>Epacris obtusifolia</i>	l43	308699.65	6216575.72	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l44	308703.22	6216570.71	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l45	308706.29	6216567.89	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l46	308710.24	6216572.26	4	4
Swamp 101	<i>Epacris obtusifolia</i>	l47	308714.22	6216577.04	3	1
Swamp 101	<i>Epacris obtusifolia</i>	l48	308720.99	6216580.27	3	4
Swamp 101	<i>Epacris obtusifolia</i>	l49	308732	6216587.19	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l50	308735.89	6216589.07	4	3
Swamp 101	<i>Epacris obtusifolia</i>	l51	308739.86	6216595.96	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l52	308772.54	6216611.41	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l53	308775.64	6216619.19	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l54	308771.78	6216626.48	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l55	308781.96	6216625.59	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l56	308788.75	6216627.48	1	1
Swamp 101	<i>Epacris obtusifolia</i>	l57	308777.29	6216633.46	3	3
Swamp 101	<i>Epacris obtusifolia</i>	l58	308727.68	6216613.98	5	2
Swamp 101	<i>Epacris obtusifolia</i>	l59	308720.75	6216619.83	3	3
Swamp 101	<i>Epacris obtusifolia</i>	l60	308719.39	6216626.02	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j21	308832.7	6216613.16	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j22	308834.07	6216633.1	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j23	308831.72	6216629.96	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j24	308840.62	6216615.02	4	4
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j25	308773.28	6216625.16	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j26	308847.39	6216623.03	2	2
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j27	308836.48	6216637.63	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j28	308786.6	6216631.24	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j29	308847.25	6216615.33	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j30	308846.08	6216628.88	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j31	308822.35	6216606.11	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j32	308845.52	6216619.22	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j33	308814.53	6216599.17	2	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j34	308843.93	6216634.7	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j35	308826.15	6216609.29	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j36	308799.6	6216629.66	5	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j37	308843.86	6216631.98	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j38	308801.91	6216634.58	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j39	308797.82	6216631.93	1	1
Swamp 101	++ <i>Pultenaea aristata</i> ▲ 2V	j40	308770.53	6216620.87	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k21	308700.41	6216577.94	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k22	308703.65	6216570.92	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k23	308705.98	6216573.59	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k24	308697.24	6216572.99	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k25	308701.31	6216571.4	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k26	308700.59	6216571.96	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k27	308701.09	6216576.7	2	4

Restioid Heath monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 101	<i>Sprengelia incarnata</i>	k28	308707.17	6216569.08	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k29	308702.97	6216572.37	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k30	308693.67	6216576.57	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k31	308715.79	6216581.56	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k32	308708.71	6216565.97	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k33	308708.48	6216568.81	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k34	308707.62	6216569.96	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k35	308707.12	6216573.38	3	4
Swamp 101	<i>Sprengelia incarnata</i>	k36	308706.15	6216574.23	4	4
Swamp 101	<i>Sprengelia incarnata</i>	k37	308704.25	6216575.22	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k38	308703.14	6216577.72	3	3
Swamp 101	<i>Sprengelia incarnata</i>	k39	308704.35	6216577.59	1	1
Swamp 101	<i>Sprengelia incarnata</i>	k40	308702.33	6216578.12	3	3
Swamp 111a	<i>Epacris obtusifolia</i>	l101	308879.03	6217102.41	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l102	308884.33	6217099.34	3	1
Swamp 111a	<i>Epacris obtusifolia</i>	l103	308885.64	6217102.97	3	1
Swamp 111a	<i>Epacris obtusifolia</i>	l104	308889	6217095.55	4	1
Swamp 111a	<i>Epacris obtusifolia</i>	l105	308883.4	6217092.17	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l106	308880.87	6217085.68	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l107	308873.96	6217083.2	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l108	308876.43	6217073.33	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l109	308881.63	6217062.49	4	3
Swamp 111a	<i>Epacris obtusifolia</i>	l110	308883.68	6217056.98	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l111	308881.73	6217052	2	2
Swamp 111a	<i>Epacris obtusifolia</i>	l112	308870.83	6217049.36	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l113	308881.9	6217044.02	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l114	308882.18	6217040.11	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l115	308876.55	6217027.23	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l116	308865.24	6217021.44	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l117	308865.58	6217003.63	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l118	308873.01	6217003.43	4	2
Swamp 111a	<i>Epacris obtusifolia</i>	l119	308871.37	6216996.23	1	1
Swamp 111a	<i>Epacris obtusifolia</i>	l120	308866.31	6216985.2	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j61	308882.29	6217106.78	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j62	308885.23	6217110.52	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j63	308874.69	6217092.26	2	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j64	308874.07	6217086.92	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j65	308857.29	6216994.64	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j66	308859.13	6216988.2	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j67	308883.17	6217077.08	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j68	308887.61	6217090.67	2	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j69	308882.01	6217102.81	2	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j70	308877.67	6217099.07	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j71	308883.45	6217070.03	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j72	308870.7	6217018.82	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j73	308889.33	6217103.26	3	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j74	308866.44	6217011.86	1	1

Restioid Heath monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j75	308864.11	6217006.18	2	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j76	308883.14	6217114.36	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j77	308858.89	6216981.25	1	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j78	308890.24	6217115.29	2	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j79	308856.76	6217001.14	3	1
Swamp 111a	++ <i>Pultenaea aristata</i> ▲2V	j80	308871.34	6217052.52	1	1
Swamp 125	<i>Epacris obtusifolia</i>	l1	309717.56	6218871.68	5	5
Swamp 125	<i>Epacris obtusifolia</i>	l2	309699.12	6218867.19	1	1
Swamp 125	<i>Epacris obtusifolia</i>	l3	309695.68	6218858.68	5	5
Swamp 125	<i>Epacris obtusifolia</i>	l4	309719.64	6218868.25	3	3
Swamp 125	<i>Epacris obtusifolia</i>	l5	309704.76	6218877.7	4	4
Swamp 125	<i>Epacris obtusifolia</i>	l6	309714.38	6218871.99	4	4
Swamp 125	<i>Epacris obtusifolia</i>	l7	309701.58	6218870.57	5	5
Swamp 125	<i>Epacris obtusifolia</i>	l8	309696.02	6218860.99	2	2
Swamp 125	<i>Epacris obtusifolia</i>	l9	309701.63	6218865.22	2	2
Swamp 125	<i>Epacris obtusifolia</i>	l10	309704.28	6218860.33	5	5
Swamp 125	<i>Epacris obtusifolia</i>	l11	309697.54	6218855.47	2	2
Swamp 125	<i>Epacris obtusifolia</i>	l12	309708.63	6218861.34	1	1
Swamp 125	<i>Epacris obtusifolia</i>	l13	309694.21	6218852.71	4	4
Swamp 125	<i>Epacris obtusifolia</i>	l14	309719.81	6218859.24	3	3
Swamp 125	<i>Epacris obtusifolia</i>	l15	309722.54	6218857.19	1	1
Swamp 125	<i>Epacris obtusifolia</i>	l16	309702.71	6218857.51	2	2
Swamp 125	<i>Epacris obtusifolia</i>	l17	309698.59	6218839.05	1	1
Swamp 125	<i>Epacris obtusifolia</i>	l18	309698.98	6218864.21	1	1
Swamp 125	<i>Epacris obtusifolia</i>	l19	309710.72	6218872.64	4	4
Swamp 125	<i>Epacris obtusifolia</i>	l20	309728.52	6218860.19	4	4
Swamp 125	<i>Sprengelia incarnata</i>	k1	309696.01	6218850.47	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k2	309688.13	6218853.83	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k3	309711.09	6218865.83	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k4	309699.11	6218852.97	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k5	309695.77	6218854.6	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k6	309692.79	6218852.81	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k7	309698.88	6218841.35	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k8	309698.11	6218855.27	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k9	309710.98	6218867.15	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k10	309707.83	6218868.02	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k11	309691.02	6218855.1	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k12	309702.97	6218856.42	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k13	309690.97	6218854.15	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k14	309696.42	6218847.88	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k15	309695.72	6218843.07	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k16	309703.93	6218856.28	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k17	309695.97	6218851.16	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k18	309693.33	6218847.63	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k19	309709.69	6218868.81	1	1
Swamp 125	<i>Sprengelia incarnata</i>	k20	309704.1	6218861.7	2	2

Restioid Heath monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j121	308363.55	6217228.09	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j122	308365.35	6217229.48	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j123	308372.13	6217236.73	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j124	308372.25	6217245.45	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j125	308360.25	6217240.76	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j126	308356.25	6217232.84	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j127	308418.92	6217102.43	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j128	308401.77	6217057.38	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j129	308399.57	6217057.75	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j130	308412.49	6217079.24	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j131	308420.18	6217098.23	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j132	308355.20	6217230.37	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j133	308355.81	6217230.04	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j134	308355.33	6217232.94	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j135	308421.15	6217102.17	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j136	308358.44	6217233.00	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j137	308359.36	6217237.15	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j138	308359.64	6217238.15	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j139	308361.43	6217239.73	1	1
Swamp 137a	++ <i>Pultenaea aristata</i> ▲2V	j140	308357.08	6217241.97	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k81	308379.89	6216958.85	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k82	308379.05	6216959.74	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k83	308377.01	6216959.80	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k84	308375.75	6216961.37	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k85	308363.07	6216959.88	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k86	308365.13	6216960.02	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k87	308363.61	6216961.92	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k88	308361.23	6216962.02	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k89	308358.40	6216961.76	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k90	308355.97	6216960.24	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k91	308354.32	6216958.68	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k92	308353.41	6216956.82	4	4
Swamp 137a	<i>Sprengelia incarnata</i>	k93	308352.52	6216955.79	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k94	308346.64	6216954.02	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k95	308349.48	6216950.17	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k96	308349.93	6216946.93	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k97	308354.00	6216947.38	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k98	308348.94	6216954.57	5	4
Swamp 137a	<i>Sprengelia incarnata</i>	k99	308352.27	6216953.49	1	1
Swamp 137a	<i>Sprengelia incarnata</i>	k100	308354.68	6216953.61	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l141	308373.51	6217245.22	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l142	308333.75	6217180.11	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l143	308332.45	6217179.77	4	1
Swamp 137a	<i>Epacris obtusifolia</i>	l144	308329.22	6217178.79	4	1
Swamp 137a	<i>Epacris obtusifolia</i>	l145	308326.60	6217164.29	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l146	308326.67	6217159.54	2	1
Swamp 137a	<i>Epacris obtusifolia</i>	l147	308327.44	6217158.26	2	1

Restioid Heath monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 137a	<i>Epacris obtusifolia</i>	l148	308341.09	6217154.66	4	1
Swamp 137a	<i>Epacris obtusifolia</i>	l149	308339.95	6217149.41	5	1
Swamp 137a	<i>Epacris obtusifolia</i>	l150	308423.15	6217096.94	3	1
Swamp 137a	<i>Epacris obtusifolia</i>	l151	308438.76	6217072.44	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l152	308440.72	6217072.06	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l153	308443.25	6217069.47	3	1
Swamp 137a	<i>Epacris obtusifolia</i>	l154	308401.79	6217057.23	3	1
Swamp 137a	<i>Epacris obtusifolia</i>	l155	308380.43	6216960.75	5	1
Swamp 137a	<i>Epacris obtusifolia</i>	l156	308377.45	6216959.96	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l157	308376.12	6216961.69	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l158	308376.69	6216962.18	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l159	308369.31	6216962.37	1	1
Swamp 137a	<i>Epacris obtusifolia</i>	l160	308365.00	6216959.66	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j141	308721.36	6216506.23	2	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j142	308726.21	6216509.65	3	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j143	308713.11	6216500.15	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j144	308714.84	6216505.18	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j145	308714.10	6216501.61	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j146	308716.57	6216502.44	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j147	308719.84	6216500.76	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j148	308726.76	6216508.64	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j149	308726.08	6216512.77	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j150	308730.80	6216511.20	4	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j151	308793.87	6216523.10	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j152	308794.38	6216524.93	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j153	308797.67	6216526.64	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j154	308799.86	6216527.87	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j155	308797.92	6216529.84	4	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j156	308799.10	6216531.90	4	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j157	308794.92	6216528.77	5	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j158	308797.06	6216520.27	1	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j159	308799.11	6216518.75	4	1
Swamp 138	++ <i>Pultenaea aristata</i> ▲2V	j160	308800.60	6216515.66	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k101	308739.39	6216492.28	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k102	308739.40	6216486.61	3	4
Swamp 138	<i>Sprengelia incarnata</i>	k103	308743.59	6216483.57	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k104	308738.72	6216481.79	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k105	308735.54	6216480.24	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k106	308730.64	6216479.62	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k107	308728.97	6216484.48	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k108	308725.92	6216490.26	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k109	308725.01	6216491.69	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k110	308720.37	6216485.70	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k111	308798.54	6216491.52	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k112	308799.76	6216488.66	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k113	308804.80	6216484.74	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k114	308802.85	6216485.42	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k115	308804.96	6216485.82	1	1

Restioid Heath monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 138	<i>Sprengelia incarnata</i>	k116	308801.39	6216491.45	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k117	308806.43	6216484.92	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k118	308798.86	6216494.11	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k119	308800.76	6216494.43	1	1
Swamp 138	<i>Sprengelia incarnata</i>	k120	308801.65	6216488.80	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l161	308726.96	6216507.32	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l162	308729.14	6216511.27	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l163	308732.68	6216511.99	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l164	308736.02	6216508.18	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l165	308741.29	6216506.57	3	1
Swamp 138	<i>Epacris obtusifolia</i>	l166	308738.30	6216494.75	3	1
Swamp 138	<i>Epacris obtusifolia</i>	l167	308734.68	6216489.73	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l168	308733.22	6216483.57	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l169	308731.34	6216507.13	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l170	308739.55	6216507.79	4	3
Swamp 138	<i>Epacris obtusifolia</i>	l171	308796.08	6216502.38	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l172	308797.90	6216504.43	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l173	308802.15	6216507.51	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l174	308810.01	6216509.05	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l175	308811.60	6216502.31	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l176	308807.11	6216496.77	4	1
Swamp 138	<i>Epacris obtusifolia</i>	l177	308803.25	6216493.70	3	1
Swamp 138	<i>Epacris obtusifolia</i>	l178	308804.21	6216489.27	1	1
Swamp 138	<i>Epacris obtusifolia</i>	l179	308807.95	6216487.02	3	4
Swamp 138	<i>Epacris obtusifolia</i>	l180	308806.71	6216482.93	1	1

NB: Shaded rows indicate dead individuals

Condition Scale

- 1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

- 2: Geographic range in Australia less than 100 km
 V: Taxon not presently Endangered, but at risk over a longer period

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Reproductive Status:

- 1 = nil
 2 = sparse (occasional flowers only)
 3 = low (under 25 percent of potential)
 4 = moderate (25 to 75 percent of potential)
 5 = high (over 75 percent of potential flowering)

Appendix F: Upland swamps vegetation monitoring data – Banksia thicket

*Vegetation structure, dominant species and
estimated cover for each stratum – Banksia thicket*

Banksia Thicket monitoring sites – Spring 2019

Swamp 28 – Transect 1 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S28T1Q1S19	M1	1	4	60	<i>Hakea teretifolia</i> , <i>Lambertia formosa</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.6	15	<i>Ptilothrix deusta</i> , <i>Leptocarpus tenax</i> , <i>Empodisma minus</i>
S28T1Q2S19	M1	2	4	50	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Persoonia pinifolia</i>
	L1	0	1.1	40	<i>Lepidosperma neesii</i> , <i>Leptocarpus tenax</i> , <i>Ptilothrix deusta</i>
S28T1Q3S19	M1	1.5	4.5	65	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	2.2	30	<i>Empodisma minus</i> , <i>Leptocarpus tenax</i>
S28T1Q4S19	M1	1	4	75	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.8	15	<i>Lepidosperma neesii</i> , <i>Leptocarpus tenax</i>
S28T1Q5S19	M1	1	6	40	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.8	10	<i>Ptilothrix deusta</i> , <i>Leptocarpus tenax</i>
S28T1Q6S19	M1	2	4	50	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptomeria acida</i>
	L1	0	2	30	<i>Xanthorrhoea resinosa</i> , <i>Empodisma minus</i> , <i>Ptilothrix deusta</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Banksia Thicket monitoring sites – Spring 2019

Swamp 33 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S33T1Q1S19	M1	0.8	3	5	<i>Persoonia pinifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.5	40	<i>Xanthorrhoea resinosa</i> , <i>Leptocarpus tenax</i> , <i>Empodisma minus</i>
S33T1Q2S19	M1	1	4	55	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.3	10	<i>Leptocarpus tenax</i> , <i>Empodisma minus</i>
S33T1Q3S19	M1	1.2	3	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Baeckea imbricata</i>
	L1	0	1.5	1	<i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i> , <i>Lepyrodia scariosa</i>
S33T1Q4S19	M1	1.6	4	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	10	<i>Chordifex fastigiatus</i> , <i>Ptilothrix deusta</i>
S33T1Q5S19	M1	1.5	3.5	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.1	5	<i>Lepidosperma neesii</i> , <i>Chordifex fastigiatus</i> , <i>Schoenus brevifolius</i>
Transect 2					
S33T2Q1S19	T	4.2	5.5	1	<i>Eucalyptus luehmanniana</i> ▲2RCa
	M1	1.5	3.2	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	0.8	1	<i>Chordifex fastigiatus</i> , <i>Lepidosperma neesii</i>
S33T2Q2S19	M1	1.4	3.8	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1	5	<i>Ptilothrix deusta</i>
S33T2Q3S19	M1	1	2.5	30	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	5	<i>Lepidosperma filiforme</i> , <i>Chordifex fastigiatus</i>
S33T2Q4S19	M1	0.3	1.6	20	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Darwinia fascicularis</i>
	L1	0	0.5	5	<i>Lepyrodia scariosa</i> , <i>Chordifex fastigiatus</i>
S33T2Q5S19	M1	0.5	2.5	40	<i>Darwinia fascicularis</i> , <i>Hakea dactyloides</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.4	20	<i>Chordifex fastigiatus</i> , <i>Lepidosperma filiforme</i> , <i>Ptilothrix deusta</i>
S33T2Q6S19	M1	0.4	3	65	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Epacris microphylla</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	10	<i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
Transect 3					
S33T3Q1S19	T	3	5	10	<i>Eucalyptus luehmanniana</i> ▲2RCa
	M1	1.3	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Allocasuarina distyla</i>
	L1	0	0.8	10	<i>Chordifex fastigiatus</i> , <i>Empodisma minus</i> , <i>Ptilothrix deusta</i>
S33T3Q2S19	M1	0.8	2.2	40	<i>Dillwynia floribunda</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Epacris obtusifolia</i>

Banksia Thicket monitoring sites – Spring 2019

Swamp 33 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
	L1	0	0.9	5	<i>Empodisma minus</i> , <i>Chordifex fastigiatus</i>
S33T3Q3S19	M1	0.8	2.3	45	<i>Darwinia fascicularis</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.7	1	<i>Lepidosperma filiforme</i>
S33T3Q4S19	T	2	4	20	<i>Allocasuarina distyla</i>
	M1	0.8	2	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Darwinia fascicularis</i>
	L1	0	0.8		<i>Chordifex fastigiatus</i> , <i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S33T3Q5S19	M1	0.5	2.1	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Baeckea imbricata</i>
	L1	0	0.7	5	<i>Chordifex fastigiatus</i> , <i>Lepyrodia scariosa</i>

Legend

T: Upper storey

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

▲ RoTAP species

2: Geographic range in Australia less than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

a: 1000 plants or more are known to occur within a conservation reserve(s)

Banksia Thicket monitoring sites – Spring 2019

Swamp 94 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S94T1Q1S19	M1	1	2.5	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	15	<i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i> , <i>Lepyrodia scariosa</i>
S94T1Q2S19	M1	1	2.2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.5	10	<i>Empodisma minus</i> , <i>Chordifex fastigiatus</i>
S94T1Q3S19	M1	1	2.3	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.3	10	<i>Empodisma minus</i> , <i>Lepidosperma neesii</i>
S94T1Q4S19	M1	1.5	2.2	35	<i>Leptospermum squarrosum</i>
	L1	0	0.8	5	<i>Lepyrodia scariosa</i> , <i>Schoenus brevifolius</i>
S94T1Q5S19	M1	1	2.5	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	0.3	1	<i>Lepidosperma neesii</i>
S94T1Q6S19	M1	1	2.4	40	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1	10	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
Transect 2					
S94T2Q1S19	M1	1	3	65	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.3	20	<i>Cyathochaeta diandra</i> , <i>Empodisma minus</i>
S94T2Q2S19	M1	1.2	2.4	55	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	10	<i>Chordifex fastigiatus</i> , <i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S94T2Q3S19	M1	1.5	3	75	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.6	1	<i>Empodisma minus</i>
S94T2Q4S19	M1	2.1	3.3	70	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.6	1	<i>Empodisma minus</i> , <i>Lepidosperma neesii</i>
S94T2Q5S19	M1	2	4	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.8	5	<i>Empodisma minus</i> , <i>Lepidosperma neesii</i>
S94T2Q6S19	M1	2.5	4	60	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	1	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S94T2Q7S19	M1	1.4	4	40	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.7	1	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S94T2Q8S19	M1	1	2.1	65	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.4	1	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>

Banksia Thicket monitoring sites – Spring 2019

Swamp 94 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
S94T2Q9S19	M1	1	1.8	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	0.9	1	<i>Lepyrodia scariosa</i> , <i>Lepidosperma neesii</i>
S94T2Q10S19	M1	1.4	2.8	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1	1	<i>Lepidosperma filiforme</i> , <i>Lepidosperma neesii</i> , <i>Hakea teretifolia</i>
S94T2Q11S19	M1	1.2	2	35	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.1	5	<i>Lepyrodia scariosa</i> , <i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
Transect 3					
S94T3Q1S19	M1	0.4	2.2	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	15	<i>Empodisma minus</i>
S94T3Q2S19	M1	0.8	1.7	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.1	30	<i>Empodisma minus</i> , <i>Bauera microphylla</i>
S94T3Q3S19	M1	0	1.2	35	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Baeckea imbricata</i>
	L1	0.3	1.7	70	<i>Chordifex fastigiatus</i> , <i>Empodisma minus</i>
S94T3Q4S19	M1	0.2	1.2	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Baeckea imbricata</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	20	<i>Empodisma minus</i> , <i>Lepyrodia scariosa</i> , <i>Schoenus brevifolius</i>
S94T3Q5S19	M1	0.5	1.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	0.5	1	<i>Lepidosperma filiforme</i> , <i>Empodisma minus</i> , <i>Lepyrodia scariosa</i>
S94T3Q6S19	M1	0.4	2.3	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.7	5	<i>Chordifex fastigiatus</i> , <i>Empodisma minus</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Banksia Thicket monitoring sites – Spring 2019

Swamp 135 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S135T1Q1S19	M1	0.4	2.2	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	40	<i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i> , <i>Leptocarpus tenax</i>
S135T1Q2S19	M1	1.4	2.6	0.8	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1.4	10	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i> , <i>Chordifex fastigiatus</i>
S135T1Q3S19	M1	0.5	2.4	85	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1	1	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S135T1Q4S19	M1	1.7	2.3	65	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	0.8	1	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i> , <i>Schoenus brevifolius</i>
S135T1Q5S19	M1	0.6	2.4	65	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.3	5	<i>Xanthorrhoea resinosa</i> , <i>Cyathochaeta diandra</i>
Transect 2					
S135T2Q1S19	M1	0.6	2	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.1	20	<i>Cyathochaeta diandra</i> , <i>Leptocarpus tenax</i> , <i>Lepidosperma neesii</i>
S135T2Q2S19	M1	0.7	2	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	10	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S135T2Q3S19	M1	1	2.5	60	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.1	5	<i>Lepidosperma neesii</i> , <i>Xanthorrhoea resinosa</i> , <i>Cyathochaeta diandra</i>
S135T2Q4S19	M1	0.4	3.1	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
S135T2Q5S19	M1	1	2.5	60	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.3	10	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S135T2Q6S19	M1	1.2	2.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.4	5	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Schoenus brevifolius</i>
S135T2Q7S19	M1	1	2.8		<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	20	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i> , <i>Ptilothrix deusta</i>
Transect 3					
S135T3Q1S19	M1	10	25	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Epacris microphylla</i>
	L1	0	1.4	25	<i>Xanthorrhoea resinosa</i> , <i>Ptilothrix deusta</i>
S135T3Q2S19	M1	0.5	1.6	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	30	<i>Xanthorrhoea resinosa</i> , <i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>

Banksia Thicket monitoring sites – Spring 2019

Swamp 135 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
S135T3Q3S19	M1	0.4	2.2	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.5	15	<i>Lepidosperma neesii</i> , <i>Leptocarpus tenax</i>
S135T3Q4S19	M1	0.1	2	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	5	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S135T3Q5S19	M1	0.1	2	5	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.5	10	<i>Schoenus brevifolius</i> , <i>Drosera peltata</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Banksia Thicket monitoring sites – Spring 2019

Swamp 136 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S136T1Q1S19	T	6	8	40	<i>Corymbia gummifera</i>
	M1	1	3	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.1	50	<i>Cyathochaeta diandra</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
S136T1Q2S19	M1	1.3	3.3	65	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Epacris obtusifolia</i>
	L1	0	1.1	15	<i>Ptilothrix deusta</i> , <i>Cyathochaeta diandra</i>
S136T1Q3S19	M1	1.5	3	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.8	10	<i>Ptilothrix deusta</i> , <i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i>
S136T1Q4S19	M1	1.2	3.5	45	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.2	15	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S136T1Q5S19	M1	1.3	3	40	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.6	20	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S136T1Q6S19	M1	1.7	4	55	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S136T1Q7S19	M1	1.2	2.5	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.8	15	<i>Lepidosperma neesii</i> , <i>Leptospermum squarrosum</i> , <i>Cyathochaeta diandra</i>
S136T1Q8S19	M1	1.6	3.3	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S136T1Q9S19	M1	0.3	2	25	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1	10	<i>Ptilothrix deusta</i>
Transect 2					
S136T2Q1S19	M1	1	2.5	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Hakea teretifolia</i>
	L1	0	1	40	<i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S136T2Q2S19	M1	0.7	2.5	65	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S136T2Q3S19	M1	0.5	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.2	30	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i> , <i>Lepyrodia scariosa</i>
S136T2Q4S19	M1	2	3.7	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S136T2Q5S19	M1	1.7	3.7	65	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>

Banksia Thicket monitoring sites – Spring 2019

Swamp 136 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
	L1	0	1.1	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S136T2Q6S19	M1	2	3.5	45	<i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1	20	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S136T2Q7S19	M1	1.7	4.2	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.5	1	<i>Entolasia stricta</i>
Transect 3					
S136T3Q1S19	M1	0.3	1.8	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	0.6	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S136T3Q2S19	M1	0.2	2.2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1	5	<i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i>
S136T3Q3S19	M1	0.2	2	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1.2	10	<i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i>
S136T3Q4S19	M1	0.3	2	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	0.3	20	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Ptilothrix deusta</i>
S136T3Q5S19	M1	1	2.5	60	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i>
	L1	0	1.5	10	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i>
S136T3Q6S19	M1	0.6	2	25	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.5	50	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i>
S136T3Q7S19	M1	0.3	1.8	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1	5	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i> , <i>Chordifex fastigiatus</i>
S136T3Q8S19	M1	0.3	2	30	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	15	<i>Ptilothrix deusta</i> , <i>Cassytha glabella</i> , <i>Dampiera stricta</i>

Legend

T: Upper storey

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Banksia Thicket monitoring sites – Spring 2019

Swamp 137b – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
S137bT1Q1S19	M1	0.8	3	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.4	10	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i>
S137bT1Q2S19	M1	0.3	2.4	65	<i>Petrophile pulchella</i> , <i>Hakea teretifolia</i>
	L1	0	0.7	15	<i>Lepidosperma neesii</i> , <i>Lepyrodia scariosa</i>
S137bT1Q3S19	M1	0.7	2.5	45	<i>Petrophile pulchella</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.1	5	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i> , <i>Schoenus brevifolius</i>
S137bT1Q4S19	M1	1	2.5	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1	10	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i>
S137bT1Q5S19	M1	1	2.3	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Leptospermum squarrosum</i>
	L1	0	0.6	15	<i>Lepidosperma neesii</i>
S137bT1Q6S19	M1	1.3	2.8	45	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	0.6	30	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
S137bT1Q7S19	M1	1	2.5	40	<i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.2	5	<i>Chordifex fastigiatus</i> , <i>Lepidosperma neesii</i>
Transect 2					
S137bT2Q1S19	M1	2	5	20	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Petrophile pulchella</i>
	L1	0	1.5	15	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i>
S137bT2Q2S19	M1	2	4	40	<i>Leptospermum squarrosum</i>
	L1	0	0.6	10	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S137bT2Q3S19	M1	3	4.5	45	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	1	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S137bT2Q4S19	M1	1.9	4.2	70	<i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.5	10	<i>Lepidosperma neesii</i> , <i>Schoenus brevifolius</i> , <i>Chorizandra cymbaria</i>
S137bT2Q5S19	M1	2.5	4	40	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.2	5	<i>Schoenus brevifolius</i> , <i>Cyathochaeta diandra</i>
S137bT2Q6S19	M1	2	4	30	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.3	25	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S137bT2Q7S19	M1	2	3.5	50	<i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.8	10	<i>Schoenus brevifolius</i> , <i>Ptilothrix deusta</i>

Banksia Thicket monitoring sites – Spring 2019

Swamp 137b – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
S137bT2Q8S19	M1	1	4	30	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.6	10	<i>Schoenus brevifolius</i>
S137bT2Q9S19	M1	1.5	3.2	65	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i>
	L1	0	1.3	15	<i>Schoenus brevifolius</i> , <i>Lepidosperma neesii</i>
S137bT2Q10S19	M1	1.7	3.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	2	25	<i>Schoenus brevifolius</i> , <i>Ptilothrix deusta</i>
Transect 3					
S137bT3Q1S19	M1	1.7	3	50	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.5	15	<i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i>
S137bT3Q2S19	M1	1.4	3.7	60	<i>Hakea teretifolia</i> , <i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	15	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Cyathochaeta diandra</i>
S137bT3Q3S19	M1	2	4	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	15	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i>
S137bT3Q4S19	M1	1.5	3.2	60	<i>Leptospermum squarrosum</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.2	15	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Empodisma minus</i>
S137bT3Q5S19	M1	1.5	3	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1.4	10	<i>Lepidosperma neesii</i> , <i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i>
S137bT3Q6S19	M1	1.5	3	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum squarrosum</i> , <i>Hakea teretifolia</i>
	L1	0	1	25	<i>Lepidosperma neesii</i> , <i>Ptilothrix deusta</i> , <i>Schoenus brevifolius</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Banksia Thicket monitoring sites – Spring 2019

Bee Creek Swamp – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
BEECKT1Q1S19	M1	2.3	4.5	25	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1	15	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i> , <i>Burchardia umbellata</i>
BEECKT1Q2S19	M1	2	4	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	0.3	1	<i>Ptilothrix deusta</i> , <i>Gleichenia microphylla</i> , <i>Burchardia umbellata</i>
BEECKT1Q3S19	M1	2	5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	2	5	<i>Gleichenia microphylla</i>
BEECKT1Q4S19	M1	1	5	50	<i>Persoonia pinifolia</i> , <i>Hakea teretifolia</i>
	L1	0	1.5	5	<i>Gleichenia microphylla</i>
Transect 2					
BEECKT2Q1S19	T	10	10	10	<i>Eucalyptus racemosa</i>
	M1	2	6	70	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Petrophile pulchella</i> , <i>Allocasuarina littoralis</i>
	L1	0	1.5	15	<i>Cyathochaeta diandra</i> , <i>Ptilothrix deusta</i>
BEECKT2Q2S19	M1	0.3	3.7	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Gleichenia microphylla</i>
	L1	0	0.1	1	<i>Burchardia umbellata</i>
BEECKT2Q3S19	M1	3	5	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	2	1	<i>Gleichenia microphylla</i>
BEECKT2Q4S19	M1	1.3	4.5	25	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	2.7	5	<i>Gleichenia microphylla</i> , <i>Lepidosperma limicola</i>
Transect 3					
BEECKT3Q1S19	M1	2	4	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.5	20	<i>Lepyrodia scariosa</i> , <i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i>
BEECKT3Q2S19	M1	2.3	6	65	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Allocasuarina littoralis</i>
	L1	0	1.3	10	<i>Ptilothrix deusta</i> , <i>Lepidosperma neesii</i>
BEECKT3Q3S19	M1	2.5	6	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Hakea teretifolia</i>
	L1	0	0.1	1	<i>Burchardia umbellata</i>
BEECKT3Q4S19	M1	2.5	3	35	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	2.5	5	<i>Gleichenia microphylla</i> , <i>Chorizandra cymbaria</i>
BEECKT3Q5S19	M1	4	6	50	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	2	5	<i>Gleichenia microphylla</i>

Legend

T: Upper storey

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Estimated cover/abundance data – Banksia Thicket

Banksia Thicket monitoring sites – Spring 2019

Swamp 28 Transect 1 – Vegetation cover/abundance

Family	Species	Transect 1					
		S28T1Q1S19	S28T1Q2S19	S28T1Q3S19	S28T1Q4S19	S28T1Q5S19	S28T1Q6S19
Apiaceae	<i>Actinotus minor</i>	1	1	1			
Colchicaceae	<i>Burchardia umbellata</i>		1	3			
Cunoniaceae	<i>Bauera microphylla</i>	1					
	<i>Bauera rubioides</i>				1		
Cyperaceae	<i>Lepidosperma neesii</i>		4	2	3	3	2
	<i>Ptilothrix deusta</i>	3	3	4	3	4	3
Ericaceae	<i>Epacris microphylla</i>	1	1	1			
	<i>Epacris obtusifolia</i>	2	3		3	3	3
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	1	3	1	1		2
Lindsaeaceae	<i>Lindsaea linearis</i>	1	3	1			
Lomandraceae	<i>Lomandra obliqua</i>	1					
Myrtaceae	<i>Corymbia gummifera</i>					1	
	<i>Leptospermum squarrosus</i>		1		4		
Poaceae	<i>Entolasia stricta</i>	1		1	2		2
	<i>Tetrarrhena turfosa</i>		1	1		3	
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	5	4	5	4	4
	<i>Hakea teretifolia</i>	5	5	5	5	4	5
	<i>Isopogon anethifolius</i>				4		
	<i>Lambertia formosa</i>	4					
	<i>Persoonia pinifolia</i>		4		1		
	<i>Petrophile pulchella</i>			1		4	1
Restionaceae	<i>Empodisma minus</i>	3	3	4	3	3	3
	<i>Leptocarpus tenax</i>	3	3	4	3	3	3
	<i>Lepyrodia scariosa</i>	2	2				
Santalaceae	<i>Leptomeria acida</i>						4
Selaginellaceae	<i>Selaginella uliginosa</i>	1		1			
Stylidiaceae	<i>Stylidium lineare</i>	1					
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	1				1	5
Xyridaceae	<i>Xyris gracilis</i>			1			
	Total	18	16	16	13	11	12

Cover Abundance Scale (Modified Braun Blanquet)

1 = cover less than 5% of site and rare

2 = cover less than 5% of site and uncommon

3 = cover of less than 5% and common

4 = cover of 5-20% of site

5 = cover of 21-50% of site

6 = cover of 51-75% of site

7 = cover of greater than 75%

Banksia Thicket monitoring sites – Spring 2019

Swamp 33 – Vegetation cover/abundance

Family	Species	Transect 1					Transect 2						Transect 3				
		S33T1Q1S19	S33T1Q2S19	S33T1Q3S19	S33T1Q4S19	S33T1Q5S19	S33T2Q1S19	S33T2Q2S19	S33T2Q3S19	S33T2Q4S19	S33T2Q5S19	S33T2Q6S19	S33T3Q1S19	S33T3Q2S19	S33T3Q3S19	S33T3Q4S19	S33T3Q5S19
Apiaceae	<i>Actinotus minor</i>						1						2				
Casuarinaceae	<i>Allocasuarina distyla</i>					1		2			2		4	3		4	1
Colchicaceae	<i>Burchardia umbellata</i>												1				
Cunoniaceae	<i>Bauera microphylla</i>		3														
	<i>Bauera rubioides</i>												2				
Cyperaceae	<i>Lepidosperma filiforme</i>							1	4	2	4	2			2		
	<i>Lepidosperma neesii</i>	1	2	1	2	3	3					2		1		3	1
	<i>Ptilothrix deusta</i>	3	3		3	2		3			3	3	3			3	
	<i>Schoenus brevifolius</i>			2		3	2	2						1	1		1
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	1															
Droseraceae	<i>Drosera peltata</i>									1							
Ericaceae	<i>Epacris microphylla</i>	3			2	1			3		3	4	2				1
	<i>Epacris obtusifolia</i>		1	1		1						2	1	4	2		
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	3					1										
	<i>Styphelia tubiflora</i>	1															
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	4		1		1	1						1	4			
	<i>Gompholobium glabratum</i>	2															
	<i>Pultenaea tuberculata</i>		1					1									
Goodeniaceae	<i>Dampiera stricta</i>	1	2			1							1				
Haloragaceae	<i>Gonocarpus tetragynus</i>	1															
Lauraceae	<i>Cassytha glabella</i>	1	1			1					1						
Lindsaeaceae	<i>Lindsaea linearis</i>			1													
Lomandraceae	<i>Lomandra obliqua</i>	2															
Myrtaceae	<i>Baeckea imbricata</i>	1		4	2			1	1	1	2	2		3	1	3	4
	<i>Darwinia fascicularis</i>									2	5	3			4	5	
	<i>Eucalyptus luehmanniana</i> ▲2RCa						1						4				
	<i>Kunzea capitata</i>	4		1													

Banksia Thicket monitoring sites – Spring 2019

Swamp 33 – Vegetation cover/abundance

Family	Species	Transect 1					Transect 2						Transect 3				
		S33T1Q1S19	S33T1Q2S19	S33T1Q3S19	S33T1Q4S19	S33T1Q5S19	S33T2Q1S19	S33T2Q2S19	S33T2Q3S19	S33T2Q4S19	S33T2Q5S19	S33T2Q6S19	S33T3Q1S19	S33T3Q2S19	S33T3Q3S19	S33T3Q4S19	S33T3Q5S19
	<i>Leptospermum arachnoides</i>											1				2	1
	<i>Leptospermum squarrosus</i>		2	5	5	4		4	4	2	3	4			3		3
	<i>Leptospermum trinervium</i>	3															
Orchidaceae	<i>Cryptostylis erecta</i>	2															
Poaceae	<i>Anisopogon avenaceus</i>										1						
	<i>Entolasia stricta</i>											1					
	<i>Tetrarrhena turfosa</i>	1	1										1				
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	4	4	4	5	5	4	4	1	5	5	4	3	5	5
	<i>Grevillea patulifolia</i>														1		
	<i>Hakea dactyloides</i>										4						
	<i>Hakea teretifolia</i>	1		3	1	1		4	4				3	1			
	<i>Persoonia pinifolia</i>	5													1		
	<i>Petrophile pulchella</i>	4	5	1			4							1			
Restionaceae	<i>Baloskion gracile</i>	1															
	<i>Chordifex fastigiatus</i>		1	3	4	3	4		3	2	4		4	2		4	3
	<i>Empodisma minus</i>	3	3										3	3			
	<i>Leptocarpus tenax</i>	3	3				2						3				
	<i>Lepyrodia scariosa</i>	2		2	3		3	2	2	2	3	4	1		1	3	2
Selaginellaceae	<i>Selaginella uliginosa</i>	2															
Stylidiaceae	<i>Stylidium lineare</i>			1										1		1	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	5	1										1			1	
	Total	27	15	14	9	13	11	10	8	8	13	12	18	12	10	11	10

Cover Abundance Scale (Modified Braun Blanquet)

1 = cover less than 5% of site and rare

2 = cover less than 5% of site and uncommon

3 = cover of less than 5% and common

4 = cover of 5-20% of site

5 = cover of 21-50% of site

6 = cover of 51-75% of site

7 = cover of greater than 75%

▲ **RoTAP species**

2: Geographic range in Australia less than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

a: 1000 plants or more are known to occur within a conservation reserve(s)

Banksia Thicket monitoring sites – Spring 2019

Swamp 94 – Vegetation cover/abundance

		Transect 1						Transect 2										Transect 3						
Family	Species	S94T1Q1S19	S94T1Q2S19	S94T1Q3S19	S94T1Q4S19	S94T1Q5S19	S94T1Q6S19	S94T2Q1S19	S94T2Q2S19	S94T2Q3S19	S94T2Q4S19	S94T2Q5S19	S94T2Q6S19	S94T2Q7S19	S94T2Q8S19	S94T2Q9S19	S94T2Q10S19	S94T2Q11S19	S94T3Q1S19	S94T3Q2S19	S94T3Q3S19	S94T3Q4S19	S94T3Q5S19	S94T3Q6S19
Apiaceae	<i>Actinotus minor</i>							1																
	<i>Xanthosia</i> spp.																					1		
Casuarinaceae	<i>Allocasuarina littoralis</i>							2																
Cunoniaceae	<i>Bauera microphylla</i>							2											3	4				3
Cyperaceae	<i>Chorizandra cymbaria</i>																					1		
	<i>Cyathochaeta diandra</i>	4						5					1							2	2		1	
	<i>Lepidosperma filiforme</i>	2															2		2			2	2	
	<i>Lepidosperma limicola</i>					1																3	2	
	<i>Lepidosperma neesii</i>			3	2	3	4	3	3	1	3	3	3	3	3	2	2	3	2	3	3			
	<i>Ptilothrix deusta</i>	3	3				2	3	3		3	2	3	2	3	1		3		3	2			
	<i>Schoenus brevifolius</i>			2	3		1								1	3			3			1	3	
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	1						3																
Droseraceae	<i>Drosera peltata</i>				2																			
	<i>Drosera spatulata</i>																					2		
Ericaceae	<i>Epacris microphylla</i>	1			2																			
	<i>Epacris obtusifolia</i>	2		2				2	2	2							1		2	1	2	3	1	2
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	1	3	3				2		2								1	2			3		2
	<i>Mirbelia rubiifolia</i>																						1	1
	++ <i>Pultenaea aristata</i> ▲2V																	1						
	<i>Sphaerolobium vimineum</i>																	1						
Goodeniaceae	<i>Dampiera stricta</i>							1	1															1
Lauraceae	<i>Cassytha glabella</i>	1	2					1	1										1					
Myrtaceae	<i>Baeckea imbricata</i>	3																	3	3	3	4		3
	<i>Corymbia gummifera</i>																	1						
	<i>Darwinia diminuta</i> ▲2RCi	1																	1	1				
	<i>Leptospermum arachnoides</i>	2																						

Banksia Thicket monitoring sites – Spring 2019

Swamp 94 – Vegetation cover/abundance

		Transect 1						Transect 2										Transect 3						
Family	Species	S94T1Q1S19	S94T1Q2S19	S94T1Q3S19	S94T1Q4S19	S94T1Q5S19	S94T1Q6S19	S94T2Q1S19	S94T2Q2S19	S94T2Q3S19	S94T2Q4S19	S94T2Q5S19	S94T2Q6S19	S94T2Q7S19	S94T2Q8S19	S94T2Q9S19	S94T2Q10S19	S94T2Q11S19	S94T3Q1S19	S94T3Q2S19	S94T3Q3S19	S94T3Q4S19	S94T3Q5S19	S94T3Q6S19
	<i>Leptospermum squarrosum</i>	4	4	4	4	4	4	4	4	5	5	3	5	4	4	4	4	4	4	5	5	3	3	4
Poaceae	<i>Anisopogon avenaceus</i>																			2				
	<i>Tetrarrhena turfosa</i>																			1	1			
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	2	5	3	5	4	5	5	5	4	4	6	5	6	5	4	5	4	4	5	5
	<i>Banksia oblongifolia</i>	1																						
	<i>Hakea dactyloides</i>	1																						
	<i>Hakea gibbosa</i>										1													
	<i>Hakea teretifolia</i>	4	2	1	1	4	4		2		4	4	5	5	1	1	4	4	3	4	1	2	2	3
	<i>Isopogon anethifolius</i>		2																					
	<i>Petrophile pulchella</i>	3	3	3			1	2	1								1							
	<i>Petrophile sessilis</i>									3														
	<i>Symphionema paludosum</i>																					1		
Restionaceae	<i>Baloskion gracile</i>	1																						
	<i>Chordifex fastigiatus</i>		3		1				3	1					1						4			4
	<i>Empodisma minus</i>	3	4	3				3	2	2	3	3							5	4	3	4	1	3
	<i>Leptocarpus tenax</i>	2	2	2															1	2	2			3
	<i>Lepyrodia scariosa</i>	3	2	2	4	1	3		2							3	3	2	3	2		1	3	
Rutaceae	<i>Boronia parviflora</i>																					3		
Stylidiaceae	<i>Stylidium lineare</i>	1																						
	Total	22	12	11	9	6	8	15	12	8	7	6	6	6	8	6	8	11	14	14	16	15	8	13

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
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 3 = cover of less than 5% and common
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 5 = cover of 21-50% of site
 6 = cover of 51-75% of site
 7 = cover of greater than 75%

▲ **RoTAP species**

- 2: Geographic range in Australia less than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 V: Taxon not presently Endangered, but at risk over a longer period
 i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Threatened Species Conservation Act (1995) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Banksia Thicket monitoring sites – Spring 2019

Swamp 135 – Vegetation cover/abundance

Family	Species	Transect 1					Transect 2							Transect 3				
		S135T1Q1S19	S135T1Q2S19	S135T1Q3S19	S135T1Q4S19	S135T1Q5S19	S135T2Q1S19	S135T2Q2S19	S135T2Q3S19	S135T2Q4S19	S135T2Q5S19	S135T2Q6S19	S135T2Q7S19	S135T3Q1S19	S135T3Q2S19	S135T3Q3S19	S135T3Q4S19	S135T3Q5S19
Apiaceae	<i>Actinotus minor</i>	2					1							2	2			
Casuarinaceae	<i>Allocasuarina littoralis</i>									1								
Colchicaceae	<i>Burchardia umbellata</i>														1			
Cunoniaceae	<i>Bauera microphylla</i>						3									1		
Cyperaceae	<i>Cyathochaeta diandra</i>	4	4		1	3	4	1	3	1	3					3		
	<i>Lepidosperma neesii</i>	2	4	2	3	2	3	3	3	2	3	3	4	3	4	3	3	
	<i>Ptilothrix deusta</i>	4	3			2	3	3	2	2	3	3	3	3	3	3	2	2
	<i>Schoenus brevifolius</i>		3	2	1			2		1	2	3	3	2	3		3	2
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	2																
Droseraceae	<i>Drosera peltata</i>																	1
Ericaceae	<i>Epacris microphylla</i>						4	1						4	3	1		
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	3	3	1		2	3	1		1	2	2	2				4	
	<i>Mirbelia rubiifolia</i>															1		
	++ <i>Pultenaea aristata</i> ▲ 2V															1		
	<i>Sphaerolobium vimineum</i>										1							
Goodeniaceae	<i>Dampiera stricta</i>	1						1										
Lauraceae	<i>Cassytha glabella</i>	1						1	1			2	2		1	1		
Lindsaeaceae	<i>Lindsaea linearis</i>														1			
Myrtaceae	<i>Baeckea imbricata</i>						1				1	3	2		1		3	1
	<i>Callistemon citrinus</i>																1	
	<i>Leptospermum arachnoides</i>	1																
	<i>Leptospermum squarrosum</i>	3	4	4	4	4	4	4	5	4	5	4	4	3	2	4	4	1
	<i>Micromyrtus ciliata</i>						3							3	3			
Poaceae	<i>Entolasia stricta</i>								1						2	1		
	<i>Tetrarrhena turfosa</i>	1																
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	3	6	5	5	4	5	4	5	4	5	5	5	5	5	4	5	

Banksia Thicket monitoring sites – Spring 2019

Swamp 135 – Vegetation cover/abundance

Family	Species	Transect 1					Transect 2							Transect 3				
		S135T1Q1S19	S135T1Q2S19	S135T1Q3S19	S135T1Q4S19	S135T1Q5S19	S135T2Q1S19	S135T2Q2S19	S135T2Q3S19	S135T2Q4S19	S135T2Q5S19	S135T2Q6S19	S135T2Q7S19	S135T3Q1S19	S135T3Q2S19	S135T3Q3S19	S135T3Q4S19	S135T3Q5S19
	<i>Banksia oblongifolia</i>						1											
	<i>Banksia serrata</i>	1																
	<i>Hakea gibbosa</i>	2		1			3		1	4	3							
	<i>Hakea teretifolia</i>	4	4		4	3	4	2		4	4	4	4	4		4	4	3
	<i>Persoonia pinifolia</i>					1												
	<i>Petrophile pulchella</i>	4	4	4	1	3	5	3	3	4	3			4	5	4	4	
Restionaceae	<i>Chordifex fastigiatus</i>	3	3				2	1	1				2		2		3	
	<i>Empodisma minus</i>	3												1				
	<i>Leptocarpus tenax</i>	3				2	3	1		2	2	1		1	1	3	2	
	<i>Lepyrodia scariosa</i>	3		2		2		1	3	1			2	3	2		4	3
Stylidiaceae	<i>Stylidium lineare</i>														1			
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>					3	1		2	1			2	4	4		1	
	Total	20	10	8	7	12	18	15	12	14	13	10	12	14	19	14	14	7

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 3 = cover of less than 5% and common
 4 = cover of 5-20% of site
 5 = cover of 21-50% of site
 6 = cover of 51-75% of site
 7 = cover of greater than 75%

▲ RoTAP species

- 2: Geographic range in Australia less than 100 km
 V: Taxon not presently Endangered, but at risk over a longer period

++ Species listed as Vulnerable under NSW Threatened Species Conservation Act (1995) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Banksia Thicket monitoring sites – Spring 2019

Swamp 136 – Vegetation cover/abundance

		Transect 1									Transect 2							Transect 3							
Family	Species	S136T1Q1S19	S136T1Q2S19	S136T1Q3S19	S136T1Q4S19	S136T1Q5S19	S136T1Q6S19	S136T1Q7S19	S136T1Q8S19	S136T1Q9S19	S136T2Q1S19	S136T2Q2S19	S136T2Q3S19	S136T2Q4S19	S136T2Q5S19	S136T2Q6S19	S136T2Q7S19	S136T3Q1S19	S136T3Q2S19	S136T3Q3S19	S136T3Q4S19	S136T3Q5S19	S136T3Q6S19	S136T3Q7S19	S136T3Q8S19
Anthericaceae	<i>Thysanotus juncifolius</i>			1																					
Apiaceae	<i>Actinotus minor</i>	1						2			2								2	3	1				2
	<i>Platysace linearifolia</i>	2																							
	<i>Xanthosia tridentata</i>									1										1					2
Casuarinaceae	<i>Allocasuarina littoralis</i>								2																
Cunoniaceae	<i>Bauera microphylla</i>	2						1	3										2	2	4	1		2	
Cyperaceae	<i>Cyathochaeta diandra</i>	4	3	3				3	2	3	3	2	2						3	3		1			3
	<i>Lepidosperma neesii</i>	3	2	3	4	4	4	4	3		4	3	4	3	3	4	1	3	1	3		3	5	3	3
	<i>Ptilothrix deusta</i>	4	4	4	3	3	4	3	3	3	4	3	3	3	4	4		3	3	3	3	3	3	3	4
	<i>Schoenus brevifolius</i>					1	1	3				1	4	2	2	3		2	2		3	3	4	3	
Dilleniaceae	<i>Hibbertia riparia</i>								2	2	1							1	3						3
	<i>Hibbertia serpyllifolia</i>	2									1								1	2					
Droseraceae	<i>Drosera peltata</i>									2									1	1					
Ericaceae	<i>Epacris microphylla</i>	4	3								3	2						1	3	2	1				3
	<i>Epacris obtusifolia</i>																							2	
	<i>Leucopogon esquamatus</i>										1									2					
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>																			1					
	<i>Sprengelia incarnata</i>					1																			
Euphorbiaceae	<i>Micrantheum ericoides</i>																		1						
Fabaceae (Faboideae)	<i>Gompholobium glabratum</i>									1									1						
	++ <i>Pultenaea aristata</i> ▲ 2V		1								2								1						
Fabaceae (Mimosoideae)	<i>Acacia</i> spp.									1															
Goodeniaceae	<i>Dampiera stricta</i>	1							2	1	1		1					1	2	2	1	1	1	1	2
Iridaceae	<i>Patersonia sericea</i>									1															1
Lauraceae	<i>Cassytha glabella</i>	1	1	1			1			1		1						1	1	1	1				1

Banksia Thicket monitoring sites – Spring 2019

Swamp 136 – Vegetation cover/abundance

		Transect 1									Transect 2							Transect 3							
Family	Species	\$136T1Q1S19	\$136T1Q2S19	\$136T1Q3S19	\$136T1Q4S19	\$136T1Q5S19	\$136T1Q6S19	\$136T1Q7S19	\$136T1Q8S19	\$136T1Q9S19	\$136T2Q1S19	\$136T2Q2S19	\$136T2Q3S19	\$136T2Q4S19	\$136T2Q5S19	\$136T2Q6S19	\$136T2Q7S19	\$136T3Q1S19	\$136T3Q2S19	\$136T3Q3S19	\$136T3Q4S19	\$136T3Q5S19	\$136T3Q6S19	\$136T3Q7S19	\$136T3Q8S19
Lindsaeaceae	<i>Lindsaea linearis</i>		2						2	3	1				1			2		2	2	2	1		2
Lomandraceae	<i>Lomandra obliqua</i>	2								1															
Myrtaceae	<i>Baeckea imbricata</i>									1		2						1	1	2	2		3	2	
	<i>Corymbia gummifera</i>	5																							
	<i>Darwinia diminuta</i> ▲ 2RCi																		2						
	<i>Leptospermum arachnoides</i>									1	2									1					
	<i>Leptospermum squarrosum</i>	4	5	5	4	4	3	4	3		3	3	5	3	4	5	4	4	4	3	4	4	4	4	
	<i>Leptospermum trinervium</i>																								2
	<i>Micromyrtus ciliata</i>												1												
Poaceae	<i>Anisopogon avenaceus</i>									3															3
	<i>Entolasia stricta</i>	1		2		1		1									1			1	2	1			
	<i>Tetrarrhena turfosa</i>	1																							
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	4	4	3	4	4	4	4	3	5	4	5	4	3	4	3	5		4	4	4	4	5	4
	<i>Banksia oblongifolia</i>									1			1							1					
	<i>Grevillea oleoides</i>											1													
	<i>Hakea teretifolia</i>	4	2	4	2	4	3	4		2	3			1	3	5		1	1	1	1	1	1	1	2
	<i>Lomatia silaifolia</i>									1															
	<i>Petrophile pulchella</i>	1	2						3	2	4	4			2			4	4	4	4	4	3	3	4
	<i>Petrophile sessilis</i>	1																							
Restionaceae	<i>Baloskion gracile</i>										1														
	<i>Chordifex dimorphus</i>																		1						
	<i>Chordifex fastigiatus</i>																						3	3	
	<i>Empodisma minus</i>			1			1									2	2						1		
	<i>Leptocarpus tenax</i>		1						1		1	3	2		2			1	2	2	2		1		
	<i>Lepyrodia scariosa</i>	4	2	2	2		1	3	2	2	4	2	4				1	3	1		4		1	3	3
Rhamnaceae	<i>Cryptandra ericoides</i>										1														

Banksia Thicket monitoring sites – Spring 2019

Swamp 136 – Vegetation cover/abundance

		Transect 1									Transect 2							Transect 3							
Family	Species	S136T1Q1S19	S136T1Q2S19	S136T1Q3S19	S136T1Q4S19	S136T1Q5S19	S136T1Q6S19	S136T1Q7S19	S136T1Q8S19	S136T1Q9S19	S136T2Q1S19	S136T2Q2S19	S136T2Q3S19	S136T2Q4S19	S136T2Q5S19	S136T2Q6S19	S136T2Q7S19	S136T3Q1S19	S136T3Q2S19	S136T3Q3S19	S136T3Q4S19	S136T3Q5S19	S136T3Q6S19	S136T3Q7S19	S136T3Q8S19
Schizaeaceae	<i>Schizaea bifida</i>									1															
Stylidiaceae	<i>Stylidium lineare</i>																	2						2	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>		1							1									1						
	Total	20	14	11	6	8	9	11	13	23	20	13	11	6	9	7	6	16	24	23	16	12	12	15	18

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
 2 = cover less than 5% of site and uncommon
 3 = cover of less than 5% and common
 4 = cover of 5-20% of site
 5 = cover of 21-50% of site
 6 = cover of 51-75% of site
 7 = cover of greater than 75%

▲ RoTAP species

- 2: Geographic range in Australia less than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 V: Taxon not presently Endangered, but at risk over a longer period
 i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Banksia Thicket monitoring sites – Spring 2019

Swamp 137b – Vegetation cover/abundance

		Transect 1							Transect 2								Transect 3							
Family	Species	S137bT1Q1S19	S137bT1Q2S19	S137bT1Q3S19	S137bT1Q4S19	S137bT1Q5S19	S137bT1Q6S19	S137bT1Q7S19	S137bT2Q1S19	S137bT2Q2S19	S137bT2Q3S19	S137bT2Q4S19	S137bT2Q5S19	S137bT2Q6S19	S137bT2Q7S19	S137bT2Q8S19	S137bT2Q9S19	S137bT2Q10S19	S137bT3Q1S19	S137bT3Q2S19	S137bT3Q3S19	S137bT3Q4S19	S137bT3Q5S19	S137bT3Q6S19
Casuarinaceae	<i>Allocasuarina distyla</i>		1																	1				
Cyperaceae	<i>Chorizandra cymbaria</i>											3	1	1			2	3						
	<i>Cyathochaeta diandra</i>	4	3	3	3	2	2		4				3						4	3	4		3	1
	<i>Lepidosperma limicola</i>																				1			
	<i>Lepidosperma neesii</i>	3	3	3	4	4	4	3	4	3	3	4	2	3			4		3	3	4	3	4	4
	<i>Ptilothrix deusta</i>	3	2	3	3	2	4	2	3	2	2	2	2		3		3	3	3	3	3	3	3	3
	<i>Schoenus brevifolius</i>		2	3	2	2	1	3	3	4	3	3	3	4	4	4	5	4					2	
Dilleniaceae	<i>Hibbertia serpyllifolia</i>			2																				
Ericaceae	<i>Epacris obtusifolia</i>					2										1	3	2	1	1		4	3	
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	1	1	2					1			1	1	2	3	1	2		1	1	1	2		
Lauraceae	<i>Cassytha glabella</i>	1		1	1	1	1									1				1		2		1
Myrtaceae	<i>Baeckea imbricata</i>	3	1	2	2			1																
	<i>Darwinia fascicularis</i>					2	1																	
	<i>Leptospermum arachnoides</i>			1																				
	<i>Leptospermum squarrosum</i>	3	3	4	4	4	4	4	5	4	5	5	5	4	5		4	4	5	4	4	4	4	4
Orchidaceae	<i>Cryptostylis erecta</i>						1																	
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	3	4	5	5	5	3	5	3	4	4	4	4	2	4	5	5	4	4	5	4	5	5
	<i>Hakea teretifolia</i>	3	4	3	2	1	4	4	3	1	5	4	3	5	4	4	4	4		4	4	4	4	4
	<i>Petrophile pulchella</i>	3	4	4	4	4	4	3	4	2	1	1		4	3		1		3	4	3	4	3	3
Restionaceae	<i>Chordifex fastigiatus</i>			1				3					1											2
	<i>Empodisma minus</i>			2															3			3	2	
	<i>Leptocarpus tenax</i>											1		1				2	3	2			2	
	<i>Lepyrodia scariosa</i>	3	3	1	3	3	2	1												2		2		5
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>			3																				2
	Total	11	12	17	11	12	12	10	9	7	7	10	10	9	7	6	10	8	10	13	9	12	10	12

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
- 2 = cover less than 5% of site and uncommon
- 3 = cover of less than 5% and common
- 4 = cover of 5-20% of site
- 5 = cover of 21-50% of site
- 6 = cover of 51-75% of site
- 7 = cover of greater than 75%

Banksia Thicket monitoring sites – Spring 2019

Bee Creek Swamp – Vegetation cover/abundance

Family	Species	Transect 1				Transect 2				Transect 3				
		BEECKT1Q1S19	BEECKT1Q2S19	BEECKT1Q3S19	BEECKT1Q4S19	BEECKT2Q1S19	BEECKT2Q2S19	BEECKT2Q3S19	BEECKT2Q4S19	BEECKT3Q1S19	BEECKT3Q2S19	BEECKT3Q3S19	BEECKT3Q4S19	BEECKT3Q5S19
Anthericaceae	<i>Thysanotus juncifolius</i>									1				
Apiaceae	<i>Actinotus minor</i>									1				
Casuarinaceae	<i>Allocasuarina littoralis</i>					4					4			
Colchicaceae	<i>Burchardia umbellata</i>	3	2				1	2		1		1		
Cyperaceae	<i>Baumea</i> spp.							1						
	<i>Chorizandra cymbaria</i>								2				2	
	<i>Cyathochaeta diandra</i>					4				4	1			
	<i>Gahnia sieberiana</i>													1
	<i>Lepidosperma limicola</i>				2	2			2		2			
	<i>Lepidosperma neesii</i>	3				3	1			3	3			
	<i>Ptilothrix deusta</i>	4	3			3		1		2	4			
	<i>Schoenus brevifolius</i>		1		1					1				
Euphorbiaceae	<i>Monotaxis linifolia</i>													1
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>									2	1			
	<i>Gompholobium glabratum</i>									1				
Gleicheniaceae	<i>Gleichenia microphylla</i>		1	4	3		3	3	2				3	3
Iridaceae	<i>Patersonia sericea</i>									2				
Lauraceae	<i>Cassytha glabella</i>	2									1			
Lindsaeaceae	<i>Lindsaea linearis</i>					3		2		2				
Myrtaceae	<i>Eucalyptus racemosa</i>					4								
Poaceae	<i>Anisopogon avenaceus</i>					2				3				
	<i>Entolasia stricta</i>	1	1			2				2	1			
	<i>Tetrarrhena turfosa</i>													1
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	5	5	3	5	4	6	3	6	4	6	4	5
	<i>Banksia oblongifolia</i>									1				
	<i>Hakea teretifolia</i>	1	4	1	4	4	1					3		

Banksia Thicket monitoring sites – Spring 2019

Bee Creek Swamp – Vegetation cover/abundance

Family	Species	Transect 1				Transect 2				Transect 3				
		BEECKT1Q1S19	BEECKT1Q2S19	BEECKT1Q3S19	BEECKT1Q4S19	BEECKT2Q1S19	BEECKT2Q2S19	BEECKT2Q3S19	BEECKT2Q4S19	BEECKT3Q1S19	BEECKT3Q2S19	BEECKT3Q3S19	BEECKT3Q4S19	BEECKT3Q5S19
	<i>Persoonia pinifolia</i>				5									
	<i>Petrophile pulchella</i>					5								
Restionaceae	<i>Empodisma minus</i>	1			1	1	1				1			
	<i>Leptocarpus tenax</i>									1				
	<i>Lepyrodia scariosa</i>	2								4				
Stylidiaceae	<i>Stylidium lineare</i>	1												
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>							1		1				
	Total	10	7	3	7	13	6	7	4	18	10	3	3	5

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
- 2 = cover less than 5% of site and uncommon
- 3 = cover of less than 5% and common
- 4 = cover of 5-20% of site
- 5 = cover of 21-50% of site
- 6 = cover of 51-75% of site
- 7 = cover of greater than 75%

Vegetation condition – Banksia Thicket

Banksia Thicket monitoring sites – Spring 2019

Swamp 28 Transect 1 – Vegetation condition

Family	Species	Transect 1					
		S28T1Q1S19	S28T1Q2S19	S28T1Q3S19	S28T1Q4S19	S28T1Q5S19	S28T1Q6S19
Apiaceae	<i>Actinotus minor</i>	5	5	5			
Colchicaceae	<i>Burchardia umbellata</i>		5	5			
Cunoniaceae	<i>Bauera microphylla</i>	5					
	<i>Bauera rubioides</i>				5		
Cyperaceae	<i>Lepidosperma neesii</i>		5	5	4	5	5
	<i>Ptilothrix deusta</i>	5	5	5	5	5	5
Ericaceae	<i>Epacris microphylla</i>	5	5	5			
	<i>Epacris obtusifolia</i>	5	5		5	5	5
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5	5	5	5		5
Lindsaeaceae	<i>Lindsaea linearis</i>	5	5	5			
Lomandraceae	<i>Lomandra obliqua</i>	5					
Myrtaceae	<i>Corymbia gummifera</i>					5	
	<i>Leptospermum squarrosum</i>		5		5		
Poaceae	<i>Entolasia stricta</i>	5		5	5		5
	<i>Tetrarrhena turfosa</i>		5	5		5	
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	3	5	5	5
	<i>Hakea teretifolia</i>	5	5	3	5	5	4
	<i>Isopogon anethifolius</i>				5		
	<i>Lambertia formosa</i>	5					
	<i>Persoonia pinifolia</i>		5		5		
	<i>Petrophile pulchella</i>			5		5	5
Restionaceae	<i>Empodisma minus</i>	5	4	4	4	5	4
	<i>Leptocarpus tenax</i>	5	5	4	5	5	5
	<i>Lepyrodia scariosa</i>	5	5				
Santalaceae	<i>Leptomeria acida</i>						5
Selaginellaceae	<i>Selaginella uliginosa</i>	5		5			
Stylidiaceae	<i>Stylidium lineare</i>	5					
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	5				5	4
Xyridaceae	<i>Xyris gracilis</i>			5			
	Total	18	16	16	13	11	12

Condition Scale

- 1 = severe damage/dieback
- 2 = many dead stems
- 3 = some dead branches
- 4 = minor damage
- 5 = healthy

Banksia Thicket monitoring sites – Spring 2019

Swamp 33 – Vegetation condition

		Transect 1					Transect 2					Transect 3					
Family	Species	S33T1Q1S19	S33T1Q2S19	S33T1Q3S19	S33T1Q4S19	S33T1Q5S19	S33T2Q1S19	S33T2Q2S19	S33T2Q3S19	S33T2Q4S19	S33T2Q5S19	S33T2Q6S19	S33T3Q1S19	S33T3Q2S19	S33T3Q3S19	S33T3Q4S19	S33T3Q5S19
Apiaceae	<i>Actinotus minor</i>						5						5				
Casuarinaceae	<i>Allocasuarina distyla</i>					5		5			5		5	5		5	5
Colchicaceae	<i>Burchardia umbellata</i>												5				
Cunoniaceae	<i>Bauera microphylla</i>		5														
	<i>Bauera rubioides</i>												4				
Cyperaceae	<i>Lepidosperma filiforme</i>							5	4	2	4	4			5		
	<i>Lepidosperma neesii</i>	5	5	5	5	5	5					5		5		5	5
	<i>Ptilothrix deusta</i>	5	5		5	5		4			5	5	5			5	
	<i>Schoenus brevifolius</i>			5		5	5	4						5	5		5
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	5															
Droseraceae	<i>Drosera peltata</i>									5							
Ericaceae	<i>Epacris microphylla</i>	4			5	5			5		5	5	5				5
	<i>Epacris obtusifolia</i>		5	5		5						5	5	5	5		
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>	5					5										
	<i>Styphelia tubiflora</i>	5															
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5		5		5	5						5	5			
	<i>Gompholobium glabratum</i>	5															
	<i>Pultenaea tuberculata</i>		5					5									
Goodeniaceae	<i>Dampiera stricta</i>	5	5			5							5				
Haloragaceae	<i>Gonocarpus tetragynus</i>	5															
Lauraceae	<i>Cassytha glabella</i>	5	5			5					5						
Lindsaeaceae	<i>Lindsaea linearis</i>			5													
Lomandraceae	<i>Lomandra obliqua</i>	5															
Myrtaceae	<i>Baeckea imbricata</i>	5		5	5			5	5	5	5	5		5	5	5	5
	<i>Darwinia fascicularis</i>									5	5	5			5	5	
	<i>Eucalyptus luehmanniana</i> ▲2RCa						5						5				
	<i>Kunzea capitata</i>	5		5													

Banksia Thicket monitoring sites – Spring 2019

Swamp 33 – Vegetation condition

		Transect 1					Transect 2					Transect 3					
Family	Species	S33T1Q1S19	S33T1Q2S19	S33T1Q3S19	S33T1Q4S19	S33T1Q5S19	S33T2Q1S19	S33T2Q2S19	S33T2Q3S19	S33T2Q4S19	S33T2Q5S19	S33T2Q6S19	S33T3Q1S19	S33T3Q2S19	S33T3Q3S19	S33T3Q4S19	S33T3Q5S19
	<i>Leptospermum arachnoides</i>											5				5	5
	<i>Leptospermum squarrosus</i>		5	5	5	5		5	5	5	5	5			5		5
	<i>Leptospermum trinervium</i>	5															
Orchidaceae	<i>Cryptostylis erecta</i>	5															
Poaceae	<i>Anisopogon avenaceus</i>										5						
	<i>Entolasia stricta</i>											5					
	<i>Tetrarrhena turfosa</i>	5	5										5				
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5
	<i>Grevillea patulifolia</i>														5		
	<i>Hakea dactyloides</i>										5						
	<i>Hakea teretifolia</i>	5		5	5	5		5	5				5	5			
	<i>Persoonia pinifolia</i>	5													5		
	<i>Petrophile pulchella</i>	5	4	5			3							5			
Restionaceae	<i>Baloskion gracile</i>	5															
	<i>Chordifex fastigiatus</i>		5	5	5	5	5		4	5	4		5	5		4	5
	<i>Empodisma minus</i>	4	4										5	4			
	<i>Leptocarpus tenax</i>	5	5				5						5				
	<i>Lepyrodia scariosa</i>	5		5	5		5	5	5	5	5	5	5		5	5	5
Selaginellaceae	<i>Selaginella uliginosa</i>	5															
Stylidiaceae	<i>Stylidium lineare</i>			5										5		5	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	5	5										5			5	
	Total	27	15	14	9	13	11	10	8	8	13	12	18	12	10	11	10

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ **RoTAP species**

2: Geographic range in Australia less than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

a: 1000 plants or more are known to occur within a conservation reserve(s)

Banksia Thicket monitoring sites – Spring 2019

Swamp 94 – Vegetation condition

		Transect 1						Transect 2										Transect 3						
Family	Species	S94T1Q1S19	S94T1Q2S19	S94T1Q3S19	S94T1Q4S19	S94T1Q5S19	S94T1Q6S19	S94T2Q1S19	S94T2Q2S19	S94T2Q3S19	S94T2Q4S19	S94T2Q5S19	S94T2Q6S19	S94T2Q7S19	S94T2Q8S19	S94T2Q9S19	S94T2Q10S19	S94T2Q11S19	S94T3Q1S19	S94T3Q2S19	S94T3Q3S19	S94T3Q4S19	S94T3Q5S19	S94T3Q6S19
Apiaceae	<i>Actinotus minor</i>							5																
	<i>Xanthosia</i> spp.																					5		
Casuarinaceae	<i>Allocasuarina littoralis</i>							5																
Cunoniaceae	<i>Bauera microphylla</i>							5											5	5				5
Cyperaceae	<i>Chorizandra cymbaria</i>																					1		
	<i>Cyathochaeta diandra</i>	5						5					5							5	5		5	
	<i>Lepidosperma filiforme</i>	5															5		5			5	2	
	<i>Lepidosperma limicola</i>					5															4	3		
	<i>Lepidosperma neesii</i>			5	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5			
	<i>Ptilothrix deusta</i>	5	5				5	5	5		5	5	5	5	5	5		5		5	5			
	<i>Schoenus brevifolius</i>			5	5		5								5	5			5			5	5	
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	5						5																
Droseraceae	<i>Drosera peltata</i>				5																			
	<i>Drosera spatulata</i>																					5		
Ericaceae	<i>Epacris microphylla</i>	5			5																			
	<i>Epacris obtusifolia</i>	5		5				5	5	5							5		5	5	5	5	5	5
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5	5	5				5		5								5	5		5			5
	<i>Mirbelia rubiifolia</i>																						5	5
	++ <i>Pultenaea aristata</i> ▲2V																	5						
	<i>Sphaerolobium vimineum</i>																	4						
Goodeniaceae	<i>Dampiera stricta</i>							5	5															5
Lauraceae	<i>Cassytha glabella</i>	5	4					5	5										5					
Myrtaceae	<i>Baeckea imbricata</i>	5																	5	5	4	5		5
	<i>Corymbia gummifera</i>																	5						
	<i>Darwinia diminuta</i> ▲2RCi	5																	5	5				
	<i>Leptospermum arachnoides</i>	5																						

Banksia Thicket monitoring sites – Spring 2019

Swamp 94 – Vegetation condition

		Transect 1						Transect 2										Transect 3						
Family	Species	S94T1Q1S19	S94T1Q2S19	S94T1Q3S19	S94T1Q4S19	S94T1Q5S19	S94T1Q6S19	S94T2Q1S19	S94T2Q2S19	S94T2Q3S19	S94T2Q4S19	S94T2Q5S19	S94T2Q6S19	S94T2Q7S19	S94T2Q8S19	S94T2Q9S19	S94T2Q10S19	S94T2Q11S19	S94T3Q1S19	S94T3Q2S19	S94T3Q3S19	S94T3Q4S19	S94T3Q5S19	S94T3Q6S19
	<i>Leptospermum squarrosum</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Poaceae	<i>Anisopogon avenaceus</i>																			5				
	<i>Tetrarrhena turfosa</i>																			5	5			
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5	5	4	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	4	5
	<i>Banksia oblongifolia</i>	5																						
	<i>Hakea dactyloides</i>	5																						
	<i>Hakea gibbosa</i>										5													
	<i>Hakea teretifolia</i>	5	5	5	5	5	5		5		5	5	5	5	5	5	5	5	5	5	5	5	5	5
	<i>Isopogon anethifolius</i>		5																					
	<i>Petrophile pulchella</i>	5	5	5			5	5	5								5							
	<i>Petrophile sessilis</i>									5														
	<i>Symphionema paludosum</i>																					5		
Restionaceae	<i>Baloskion gracile</i>	5																						
	<i>Chordifex fastigiatus</i>		5		5				5	4					5						5			5
	<i>Empodisma minus</i>	5	5	4				5	5	4	4	3							5	4	5	4	5	5
	<i>Leptocarpus tenax</i>	5	5	5															5	5	5			5
	<i>Lepyrodia scariosa</i>	5	5	5	5	5	5		5						5	5	5	5	5		5	5		5
Rutaceae	<i>Boronia parviflora</i>																					5		
Stylidiaceae	<i>Stylidium lineare</i>	5																						
	Total	22	12	11	9	6	8	15	12	8	7	6	6	6	8	6	8	11	14	14	16	15	8	13

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

2: Geographic range in Australia less than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 V: Taxon not presently Endangered, but at risk over a longer period
 i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Threatened Species Conservation Act (1995) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Banksia Thicket monitoring sites – Spring 2019

Swamp 135 – Vegetation condition

Family	Species	Transect 1					Transect 2							Transect 3				
		S135T1Q1S19	S135T1Q2S19	S135T1Q3S19	S135T1Q4S19	S135T1Q5S19	S135T2Q1S19	S135T2Q2S19	S135T2Q3S19	S135T2Q4S19	S135T2Q5S19	S135T2Q6S19	S135T2Q7S19	S135T3Q1S19	S135T3Q2S19	S135T3Q3S19	S135T3Q4S19	S135T3Q5S19
Apiaceae	<i>Actinotus minor</i>	5					5							5	5			
Casuarinaceae	<i>Allocasuarina littoralis</i>									5								
Colchicaceae	<i>Burchardia umbellata</i>														5			
Cunoniaceae	<i>Bauera microphylla</i>						5									5		
Cyperaceae	<i>Cyathochaeta diandra</i>	4	5		4	5	5	5	4	5	5					4		
	<i>Lepidosperma neesii</i>	5	4	5	4	5	5	5	5	5	5	4	4	5	5	4	4	
	<i>Ptilothrix deusta</i>	5	5			5	5	5	5	5	5	5	5	5	5	4	5	5
	<i>Schoenus brevifolius</i>		4	5	5			5		5	5	5	4	5	5		4	4
Dilleniaceae	<i>Hibbertia serpyllifolia</i>	5																
Droseraceae	<i>Drosera peltata</i>																	5
Ericaceae	<i>Epacris microphylla</i>						5	5						5	5	5		
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5	5	5		5	5	5		5	5	5	5				5	
	<i>Mirbelia rubiifolia</i>															5		
	++ <i>Pultenaea aristata</i> ▲ 2V															5		
	<i>Sphaerolobium vimineum</i>										5							
Goodeniaceae	<i>Dampiera stricta</i>	5						5										
Lauraceae	<i>Cassytha glabella</i>	5						5	5			5	5		5	5		
Lindsaeaceae	<i>Lindsaea linearis</i>														5			
Myrtaceae	<i>Baeckea imbricata</i>						5				5	5	5		5		5	5
	<i>Callistemon citrinus</i>																5	
	<i>Leptospermum arachnoides</i>	5																
	<i>Leptospermum squarrosum</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	<i>Micromyrtus ciliata</i>						5							5	5			
Poaceae	<i>Entolasia stricta</i>								5						5	5		
	<i>Tetrarrhena turfosa</i>	5																
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	

Banksia Thicket monitoring sites – Spring 2019

Swamp 135 – Vegetation condition

Family	Species	Transect 1					Transect 2							Transect 3				
		S135T1Q1S19	S135T1Q2S19	S135T1Q3S19	S135T1Q4S19	S135T1Q5S19	S135T2Q1S19	S135T2Q2S19	S135T2Q3S19	S135T2Q4S19	S135T2Q5S19	S135T2Q6S19	S135T2Q7S19	S135T3Q1S19	S135T3Q2S19	S135T3Q3S19	S135T3Q4S19	S135T3Q5S19
	<i>Banksia oblongifolia</i>						5											
	<i>Banksia serrata</i>	5																
	<i>Hakea gibbosa</i>	5		5			5		5	5	5							
	<i>Hakea teretifolia</i>	5	5		5	5	5	5		5	5	5	4	5		5	5	5
	<i>Persoonia pinifolia</i>					5												
	<i>Petrophile pulchella</i>	5	5	5	5	5	5	5	5	5	5			5	4	5	5	
Restionaceae	<i>Chordifex fastigiatus</i>	5	5				5	5	5				5		5		5	
	<i>Empodisma minus</i>	4												5				
	<i>Leptocarpus tenax</i>	5				5	5	5		5	5	5		5	5	5	5	
	<i>Lepyrodia scariosa</i>	5		5		5		5	5	5			5	5	5		5	5
Stylidiaceae	<i>Stylidium lineare</i>														5			
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>					5	5		4	5			5	4	5		5	
Total		20	10	8	7	12	18	15	12	14	13	10	12	14	19	14	14	7

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

2: Geographic range in Australia less than 100 km

V: Taxon not presently Endangered, but at risk over a longer period

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Banksia Thicket monitoring sites – Spring 2019

Swamp 136 – Vegetation condition

Family	Species	Transect 1								Transect 2								Transect 3							
		S136T1Q1S19	S136T1Q2S19	S136T1Q3S19	S136T1Q4S19	S136T1Q5S19	S136T1Q6S19	S136T1Q7S19	S136T1Q8S19	S136T1Q9S19	S136T2Q1S19	S136T2Q2S19	S136T2Q3S19	S136T2Q4S19	S136T2Q5S19	S136T2Q6S19	S136T2Q7S19	S136T3Q1S19	S136T3Q2S19	S136T3Q3S19	S136T3Q4S19	S136T3Q5S19	S136T3Q6S19	S136T3Q7S19	S136T3Q8S19
Anthericaceae	<i>Thysanotus juncifolius</i>			5																					
Apiaceae	<i>Actinotus minor</i>	5						5			5								5	5	5				5
	<i>Platysace linearifolia</i>	5																							
	<i>Xanthosia tridentata</i>									5										5					5
Casuarinaceae	<i>Allocasuarina littoralis</i>								5																
Cunoniaceae	<i>Bauera microphylla</i>	5						5	5										5	5	5	5		5	
Cyperaceae	<i>Cyathochaeta diandra</i>	5	5	5				4	4	5	5	5	5						5	5		5			5
	<i>Lepidosperma neesii</i>	5	5	5	5	5	5	5	5		5	5	5	5	5	5	5	5	5	5		5	5	4	5
	<i>Ptilothrix deusta</i>	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		5	5	5	4	5	5	5	5
	<i>Schoenus brevifolius</i>					5	5	5				5	4	5	5	4		5	5		4	5	5	4	
Dilleniaceae	<i>Hibbertia riparia</i>								5	5	5							5	5						5
	<i>Hibbertia serpyllifolia</i>	5									5								5	5					
Droseraceae	<i>Drosera peltata</i>									5									5	5					
Ericaceae	<i>Epacris microphylla</i>	4	5								5	5							5	5	5				5
	<i>Epacris obtusifolia</i>																							5	
	<i>Leucopogon esquamatus</i>										5									5					
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>																			5					
	<i>Sprengelia incarnata</i>					5																			
Euphorbiaceae	<i>Micrantheum ericoides</i>																		5						
Fabaceae (Faboideae)	<i>Gompholobium glabratum</i>									5									5						
	++ <i>Pultenaea aristata</i> ▲ 2V		5								5								5						
Fabaceae (Mimosoideae)	<i>Acacia</i> spp.									5															
Goodeniaceae	<i>Dampiera stricta</i>	5							5	5	5		5					5	5	5	5	5	5	5	5
Iridaceae	<i>Patersonia sericea</i>									5															5
Lauraceae	<i>Cassytha glabella</i>	5	5	5			5			5		5						5	5	5	5				5
Lindsaeaceae	<i>Lindsaea linearis</i>		5						5	5	5				5			5		5	5	5	5		5

Banksia Thicket monitoring sites – Spring 2019

Swamp 136 – Vegetation condition

Family	Species	Transect 1								Transect 2								Transect 3							
		S136T1Q1S19	S136T1Q2S19	S136T1Q3S19	S136T1Q4S19	S136T1Q5S19	S136T1Q6S19	S136T1Q7S19	S136T1Q8S19	S136T1Q9S19	S136T2Q1S19	S136T2Q2S19	S136T2Q3S19	S136T2Q4S19	S136T2Q5S19	S136T2Q6S19	S136T2Q7S19	S136T3Q1S19	S136T3Q2S19	S136T3Q3S19	S136T3Q4S19	S136T3Q5S19	S136T3Q6S19	S136T3Q7S19	S136T3Q8S19
Lomandraceae	<i>Lomandra obliqua</i>	5								5															
Myrtaceae	<i>Baeckea imbricata</i>									5		5						5	5	5	5			5	4
	<i>Corymbia gummifera</i>	4																							
	<i>Darwinia diminuta</i> ▲ 2RCi																	5							
	<i>Leptospermum arachnoides</i>									5	5									5					
	<i>Leptospermum squarrosum</i>	5	5	5	5	5	5	5	5		5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	<i>Leptospermum trinervium</i>																								5
	<i>Micromyrtus ciliata</i>												5												
Poaceae	<i>Anisopogon avenaceus</i>									5															5
	<i>Entolasia stricta</i>	5		5		5		5									5			5	5	5			
	<i>Tetrarrhena turfosa</i>	5																							
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	5	5	5	4	5	4	5	5	5	4	5	5	5	3	5	5		5	5	5	5	5	5
	<i>Banksia oblongifolia</i>									5			5							5					
	<i>Grevillea oleoides</i>											5													
	<i>Hakea teretifolia</i>	5	5	5	5	5	5	5		5	5			5	5	5		5	5	5	5	5	5	5	5
	<i>Lomatia silaifolia</i>									5															
	<i>Petrophile pulchella</i>	5	5						5	5	5	5			5			5	5	5	4	5	5	5	5
	<i>Petrophile sessilis</i>	5																							
Restionaceae	<i>Baloskion gracile</i>										5														
	<i>Chordifex dimorphus</i>																		5						
	<i>Chordifex fastigiatus</i>																							4	5
	<i>Empodisma minus</i>			5			5									3	3							5	
	<i>Leptocarpus tenax</i>		5						5		5	5	5		5			5	5	5	5		5		
	<i>Lepyrodia scariosa</i>	5	5	5	5		5	4	5	5	5	5	5				2	5	5		5		5	5	5
Rhamnaceae	<i>Cryptandra ericoides</i>										5														
Schizaeaceae	<i>Schizaea bifida</i>									5															

Banksia Thicket monitoring sites – Spring 2019

Swamp 136 – Vegetation condition

Family	Species	Transect 1									Transect 2							Transect 3							
		S136T1Q1S19	S136T1Q2S19	S136T1Q3S19	S136T1Q4S19	S136T1Q5S19	S136T1Q6S19	S136T1Q7S19	S136T1Q8S19	S136T1Q9S19	S136T2Q1S19	S136T2Q2S19	S136T2Q3S19	S136T2Q4S19	S136T2Q5S19	S136T2Q6S19	S136T2Q7S19	S136T3Q1S19	S136T3Q2S19	S136T3Q3S19	S136T3Q4S19	S136T3Q5S19	S136T3Q6S19	S136T3Q7S19	S136T3Q8S19
Stylidiaceae	<i>Stylidium lineare</i>																	5							5
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>		5							5									5						
	Total	20	14	11	6	8	9	11	13	23	20	13	11	6	9	7	6	15	24	23	16	12	12	15	18

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

2: Geographic range in Australia less than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

V: Taxon not presently Endangered, but at risk over a longer period

i: less than 1000 plants are known to occur within a conservation reserve(s)

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Banksia Thicket monitoring sites – Spring 2019

Swamp 137b – Vegetation condition

		Transect 1							Transect 2								Transect 3								
Family	Species	S137bT1Q1S19	S137bT1Q2S19	S137bT1Q3S19	S137bT1Q4S19	S137bT1Q5S19	S137bT1Q6S19	S137bT1Q7S19	S137bT2Q1S19	S137bT2Q2S19	S137bT2Q3S19	S137bT2Q4S19	S137bT2Q5S19	S137bT2Q6S19	S137bT2Q7S19	S137bT2Q8S19	S137bT2Q9S19	S137bT2Q10S19	S137bT3Q1S19	S137bT3Q2S19	S137bT3Q3S19	S137bT3Q4S19	S137bT3Q5S19	S137bT3Q6S19	
Casuarinaceae	<i>Allocasuarina distyla</i>		5										5	5	1			5	2		5				
Cyperaceae	<i>Chorizandra cymbaria</i>											5	5	1			5	2							
	<i>Cyathochaeta diandra</i>	5	5	5	5	5	5		5				4						5	5	5		5	4	
	<i>Lepidosperma limicola</i>																				5				
	<i>Lepidosperma neesii</i>	5	5	5	5	5	5	5	5	5	4	5	5	5			5		5	5	5	4	4	5	
	<i>Ptilothrix deusta</i>	5	5	5	5	5	5	5	5	5	5	5	5	5		5		5	5	5	5	4	5	5	
	<i>Schoenus brevifolius</i>		5	4	4	5	4	5	5	5	5	4	5	5	4	4	5	5	4				4		4
Dilleniaceae	<i>Hibbertia serpyllifolia</i>			5																					
Ericaceae	<i>Epacris obtusifolia</i>					5										5	5	5	5	5		5	5		
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5	5	5					5			5	5	5	5	5	5		5	5	5	5	5		
Lauraceae	<i>Cassytha glabella</i>	5		5	5	5	5									5				5		3		5	
Myrtaceae	<i>Baeckea imbricata</i>	5	5	5	5			5																	
	<i>Darwinia fascicularis</i>					5	5																		
	<i>Leptospermum arachnoides</i>			5																					
	<i>Leptospermum squarrosum</i>	5	5	5	5	5	4	5	5	5	5	5	5	5	5		5	5	5	5	5	5	5	5	
Orchidaceae	<i>Cryptostylis erecta</i>						5																		
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5	5	5	5	5	5	2	5	5	5	5	5	5	5	5	5	5	5	5	5	
	<i>Hakea teretifolia</i>	5	5	3	5	5	5	5	5	5	5	5	5	5	4	5	5	5		5	5	5	5	5	
	<i>Petrophile pulchella</i>	5	5	5	4	5	4	5	5	5	5	5		4	5		5		5	5	5	5	5	5	
Restionaceae	<i>Chordifex fastigiatus</i>			5				5					5											4	
	<i>Empodisma minus</i>			4															5			5	5		
	<i>Leptocarpus tenax</i>											5		5				4	5	5			4		
	<i>Lepyrodia scariosa</i>	5	5	5	5	5	5	5												5		5		5	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>			5																				5	
	Total	11	12	17	11	12	12	10	9	7	7	10	10	9	7	6	10	8	10	13	9	12	10	12	

Condition Scale

- 1 = severe damage/dieback
- 2 = many dead stems
- 3 = some dead branches
- 4 = minor damage
- 5 = healthy

Banksia Thicket monitoring sites – Spring 2019

Bee Creek Swamp – Vegetation condition

Family	Species	Transect 1				Transect 2				Transect 3				
		BEECKT1Q1S19	BEECKT1Q2S19	BEECKT1Q3S19	BEECKT1Q4S19	BEECKT2Q1S19	BEECKT2Q2S19	BEECKT2Q3S19	BEECKT2Q4S19	BEECKT3Q1S19	BEECKT3Q2S19	BEECKT3Q3S19	BEECKT3Q4S19	BEECKT3Q5S19
Anthericaceae	<i>Thysanotus juncifolius</i>									5				
Apiaceae	<i>Actinotus minor</i>									5				
Casuarinaceae	<i>Allocasuarina littoralis</i>					5					5			
Colchicaceae	<i>Burchardia umbellata</i>	5	5				5	5		5		5		
Cyperaceae	<i>Baumea</i> spp.							5						
	<i>Chorizandra cymbaria</i>								5				5	
	<i>Cyathochaeta diandra</i>					5				4	5			
	<i>Gahnia sieberiana</i>													5
	<i>Lepidosperma limicola</i>				5	5			5		5			
	<i>Lepidosperma neesii</i>	5				5	5			5	5			
	<i>Ptilothrix deusta</i>	5	5			5		5		5	5			
	<i>Schoenus brevifolius</i>		5		5					5				
Euphorbiaceae	<i>Monotaxis linifolia</i>													5
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>									5	5			
	<i>Gompholobium glabratum</i>									5				
Gleicheniaceae	<i>Gleichenia microphylla</i>		5	3	3		5	5	5				5	3
Iridaceae	<i>Patersonia sericea</i>									5				
Lauraceae	<i>Cassytha glabella</i>	5									5			
Lindsaeaceae	<i>Lindsaea linearis</i>					5		5		5				
Myrtaceae	<i>Eucalyptus racemosa</i>					5								
Poaceae	<i>Anisopogon avenaceus</i>					5				5				
	<i>Entolasia stricta</i>	5	4			5				5	5			
	<i>Tetrarrhena turfosa</i>													5
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5	5	5	4	5	5	5	5	5	5
	<i>Banksia oblongifolia</i>									5				
	<i>Hakea teretifolia</i>	5	5	5	5	5	5					5		

Banksia Thicket monitoring sites – Spring 2019

Bee Creek Swamp – Vegetation condition

Family	Species	Transect 1				Transect 2				Transect 3				
		BEECKT1Q1S19	BEECKT1Q2S19	BEECKT1Q3S19	BEECKT1Q4S19	BEECKT2Q1S19	BEECKT2Q2S19	BEECKT2Q3S19	BEECKT2Q4S19	BEECKT3Q1S19	BEECKT3Q2S19	BEECKT3Q3S19	BEECKT3Q4S19	BEECKT3Q5S19
	<i>Persoonia pinifolia</i>				5									
	<i>Petrophile pulchella</i>					5								
Restionaceae	<i>Empodisma minus</i>	5			5	5	5				5			
	<i>Leptocarpus tenax</i>									5				
	<i>Lepyrodia scariosa</i>	5								4				
Stylidiaceae	<i>Stylidium lineare</i>	5												
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>							5		5				
	Total	10	7	3	7	13	6	7	4	18	10	3	3	5

Condition Scale

- 1 = severe damage/dieback
- 2 = many dead stems
- 3 = some dead branches
- 4 = minor damage
- 5 = healthy

Indicator species data – Banksia Thicket

Banksia Thicket monitoring sites – Spring 2019

Longwall Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D01	311629.63	6214549.99	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D02	311626.06	6214553.84	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D03	311627.56	6214555.69	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D04	311594.19	6214522.48	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D05	311599.40	6214522.40	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D06	311600.98	6214522.05	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D07	311601.33	6214522.35	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D08	311604.29	6214521.07	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D09	311636.10	6214519.49	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D10	311648.05	6214523.83	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D11	311667.88	6214532.88	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D12	311679.14	6214536.95	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D13	311681.99	6214534.25	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D14	311685.72	6214537.42	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D15	311688.26	6214533.78	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D16	311698.00	6214547.35	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D17	311701.94	6214550.74	4	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D18	311703.54	6214554.22	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D19	311706.96	6214561.17	1	1
Swamp 33	++ <i>Pultenaea aristata</i> ▲ 2V	D20	311704.15	6214564.20	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E01	311589.59	6214529.14	4	2
Swamp 33	<i>Epacris obtusifolia</i>	E02	311594.17	6214529.93	4	2
Swamp 33	<i>Epacris obtusifolia</i>	E03	311599.44	6214531.68	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E04	311605.07	6214529.15	3	1
Swamp 33	<i>Epacris obtusifolia</i>	E05	311609.24	6214529.98	4	1
Swamp 33	<i>Epacris obtusifolia</i>	E06	311613.11	6214532.68	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E07	311616.37	6214528.35	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E08	311628.26	6214531.53	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E09	311637.62	6214538.12	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E10	311641.39	6214538.54	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E11	311644.49	6214539.94	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E12	311705.39	6214553.91	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E13	311707.38	6214557.70	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E14	311710.90	6214561.85	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E15	311710.07	6214562.74	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E16	311706.59	6214563.77	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E17	311700.11	6214564.63	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E18	311692.78	6214562.11	4	1
Swamp 33	<i>Epacris obtusifolia</i>	E19	311688.36	6214560.09	1	1
Swamp 33	<i>Epacris obtusifolia</i>	E20	311682.47	6214559.09	4	1
Swamp 33	<i>Sprengelia incarnata</i>	F01	311599.01	6214530.12	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F02	311600.12	6214529.72	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F03	311599.88	6214530.75	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F04	311600.68	6214530.90	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F05	311600.33	6214532.66	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F06	311599.61	6214533.92	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F07	311603.42	6214531.02	1	1

Banksia Thicket monitoring sites – Spring 2019

Longwall Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 33	<i>Sprengelia incarnata</i>	F08	311602.98	6214529.10	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F09	311601.98	6214530.13	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F10	311611.21	6214531.15	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F11	311608.32	6214533.10	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F12	311610.86	6214530.51	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F13	311612.12	6214529.98	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F14	311612.96	6214532.20	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F15	311615.18	6214534.33	4	3
Swamp 33	<i>Sprengelia incarnata</i>	F16	311616.08	6214535.03	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F17	311614.50	6214531.31	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F18	311616.65	6214535.90	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F19	311616.92	6214535.08	1	1
Swamp 33	<i>Sprengelia incarnata</i>	F20	311616.35	6214535.12	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D21	310036.69	6215621.42	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D22	310035.54	6215625.20	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D23	310038.15	6215629.09	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D24	310034.47	6215649.01	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D25	310037.74	6215654.98	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D26	310038.00	6215659.36	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D27	310036.74	6215662.62	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D28	310099.32	6215638.27	3	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D29	310102.03	6215641.28	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D30	310104.72	6215645.42	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D31	310111.11	6215651.46	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D32	310112.20	6215654.87	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D33	310113.62	6215657.31	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D34	310139.15	6215659.89	4	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D35	310148.22	6215672.62	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D36	310156.46	6215672.50	3	3
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D37	310159.50	6215676.09	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D38	310163.45	6215673.44	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D39	310167.98	6215673.23	1	1
Swamp 94	++ <i>Pultenaea aristata</i> ▲ 2V	D40	310170.20	6215672.26	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E21	309982.41	6215669.14	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E22	309987.29	6215674.97	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E23	309994.81	6215677.13	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E24	310002.75	6215682.38	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E25	310013.09	6215691.04	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E26	310016.74	6215692.13	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E27	310034.18	6215696.77	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E28	310039.41	6215696.94	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E29	310061.44	6215668.87	2	1
Swamp 94	<i>Epacris obtusifolia</i>	E30	310066.44	6215667.11	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E31	310083.47	6215649.59	4	5
Swamp 94	<i>Epacris obtusifolia</i>	E32	310089.61	6215643.36	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E33	310093.67	6215648.80	3	5
Swamp 94	<i>Epacris obtusifolia</i>	E34	310098.88	6215650.29	1	1

Banksia Thicket monitoring sites – Spring 2019

Longwall Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 94	<i>Epacris obtusifolia</i>	E35	310101.83	6215649.29	5	3
Swamp 94	<i>Epacris obtusifolia</i>	E36	310106.78	6215644.02	3	5
Swamp 94	<i>Epacris obtusifolia</i>	E37	310114.23	6215645.96	5	5
Swamp 94	<i>Epacris obtusifolia</i>	E38	310120.04	6215651.68	1	1
Swamp 94	<i>Epacris obtusifolia</i>	E39	310123.24	6215656.88	4	5
Swamp 94	<i>Epacris obtusifolia</i>	E40	310133.02	6215664.00	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F21	310081.46	6215647.33	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F22	310081.59	6215646.69	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F23	310081.49	6215646.62	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F24	310082.52	6215647.22	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F25	310083.76	6215645.04	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F26	310083.68	6215643.78	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F27	310093.12	6215643.96	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F28	310125.27	6215657.90	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F29	310124.68	6215659.81	3	5
Swamp 94	<i>Sprengelia incarnata</i>	F30	310123.32	6215661.11	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F31	310125.74	6215660.11	2	5
Swamp 94	<i>Sprengelia incarnata</i>	F32	310174.33	6215673.06	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F33	310175.79	6215674.03	4	5
Swamp 94	<i>Sprengelia incarnata</i>	F34	310178.27	6215673.17	4	1
Swamp 94	<i>Sprengelia incarnata</i>	F35	310182.09	6215673.18	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F36	310185.19	6215672.99	4	5
Swamp 94	<i>Sprengelia incarnata</i>	F37	310185.81	6215674.08	1	1
Swamp 94	<i>Sprengelia incarnata</i>	F38	310183.57	6215676.15	3	5
Swamp 94	<i>Sprengelia incarnata</i>	F39	310188.08	6215676.84	3	4
Swamp 94	<i>Sprengelia incarnata</i>	F40	310187.96	6215679.19	1	1

NB: Shaded rows indicate dead individuals

Condition Scale

- 1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

▲ RoTAP species

- 2: Geographic range in Australia less than 100 km
 V: Taxon not presently Endangered, but at risk over a longer period

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Reproductive Status:

- 1 = nil
 2 = sparse (occasional flowers only)
 3 = low (under 25 percent of potential)
 4 = moderate (25 to 75 percent of potential)
 5 = high (over 75 percent of potential flowering)

Banksia Thicket monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D41	308928.84	6217215.91	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D42	308925.14	6217213.41	5	5
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D43	308921.02	6217215.70	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D44	308923.98	6217208.96	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D45	308923.95	6217206.18	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D46	308923.38	6217202.10	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D47	308926.73	6217201.65	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D48	308932.74	6217203.29	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D49	308936.66	6217200.13	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D50	308934.28	6217196.95	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D51	308934.54	6217194.36	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D52	308931.13	6217192.37	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D53	308934.43	6217187.22	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D54	308928.15	6217175.39	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D55	308925.61	6217173.21	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D56	308929.42	6217185.23	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D57	308932.33	6217188.04	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D58	308931.35	6217190.75	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D59	308929.38	6217192.18	1	1
Swamp 135	++ <i>Pultenaea aristata</i> ▲ 2V	D60	308931.88	6217194.34	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E41	308955.49	6217222.11	4	5
Swamp 135	<i>Epacris obtusifolia</i>	E42	308954.42	6217220.97	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E43	308954.04	6217220.84	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E44	308952.74	6217218.34	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E45	308953.32	6217218.65	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E46	308952.47	6217218.55	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E47	308955.94	6217224.88	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E48	308955.58	6217225.33	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E49	308931.05	6217154.35	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E50	308923.33	6217147.10	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E51	308925.34	6217150.17	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E52	308924.57	6217150.41	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E53	308922.85	6217152.29	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E54	308924.60	6217154.97	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E55	308930.87	6217158.93	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E56	308931.54	6217157.70	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E57	308931.63	6217153.77	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E58	308933.04	6217153.54	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E59	308934.42	6217152.45	1	1
Swamp 135	<i>Epacris obtusifolia</i>	E60	308935.35	6217152.93	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F41	308930.57	6217170.08	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F42	308934.44	6217170.44	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F43	308933.64	6217166.40	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F44	308938.53	6217169.53	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F45	308941.50	6217170.40	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F46	308943.38	6217165.32	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F47	308941.02	6217163.38	1	1

Banksia Thicket monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 135	<i>Sprengelia incarnata</i>	F48	308944.48	6217160.57	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F49	308937.54	6217150.79	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F50	308934.24	6217150.73	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F51	308930.93	6217151.34	2	3
Swamp 135	<i>Sprengelia incarnata</i>	F52	308927.99	6217151.74	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F53	308930.07	6217155.14	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F54	308930.40	6217158.01	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F55	308924.78	6217155.21	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F56	308924.51	6217154.03	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F57	308923.99	6217150.42	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F58	308931.88	6217160.30	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F59	308936.86	6217162.85	1	1
Swamp 135	<i>Sprengelia incarnata</i>	F60	308937.55	6217169.76	4	4
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D81	308779.40	6216695.82	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D82	308786.07	6216700.12	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D83	308792.70	6216701.60	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D84	308800.88	6216698.60	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D85	308805.34	6216711.28	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D86	308815.90	6216755.22	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D87	308804.81	6216766.50	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D88	308802.49	6216763.14	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D89	308785.64	6216746.00	5	4
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D90	308781.37	6216745.20	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D91	308782.89	6216742.13	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D92	308788.35	6216736.24	5	4
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D93	308786.95	6216732.25	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D94	308775.78	6216715.93	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D95	308771.54	6216706.66	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D96	308773.70	6216700.25	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D97	308766.50	6216694.12	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D98	308758.37	6216688.55	1	1
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D99	308760.70	6216682.75	4	5
Swamp 136	++ <i>Pultenaea aristata</i> ▲ 2V	D100	308753.89	6216685.15	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E81	308804.99	6216722.92	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E82	308803.00	6216717.75	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E83	308814.89	6216729.48	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E84	308818.39	6216733.80	4	5
Swamp 136	<i>Epacris obtusifolia</i>	E85	308816.44	6216738.15	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E86	308815.03	6216745.45	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E87	308814.15	6216753.53	4	4
Swamp 136	<i>Epacris obtusifolia</i>	E88	308813.79	6216759.87	3	5
Swamp 136	<i>Epacris obtusifolia</i>	E89	308802.70	6216759.81	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E90	308794.70	6216750.86	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E91	308787.87	6216750.76	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E92	308784.79	6216746.00	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E93	308784.86	6216725.19	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E94	308769.51	6216703.01	1	1

Banksia Thicket monitoring sites – Spring 2019

Control Sites – Condition and Reproductive Status for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 136	<i>Epacris obtusifolia</i>	E95	308774.66	6216699.04	4	5
Swamp 136	<i>Epacris obtusifolia</i>	E96	308827.74	6216731.51	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E97	308827.86	6216742.00	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E98	308815.80	6216761.45	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E99	308804.49	6216755.08	1	1
Swamp 136	<i>Epacris obtusifolia</i>	E100	308807.77	6216761.37	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F81	308805.36	6216722.53	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F82	308803.75	6216722.00	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F83	308810.94	6216722.89	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F84	308813.33	6216729.59	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F85	308816.58	6216734.95	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F86	308813.94	6216741.68	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F87	308816.69	6216749.40	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F88	308812.23	6216756.47	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F89	308803.22	6216759.72	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F90	308794.04	6216750.59	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F91	308813.26	6216724.82	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F92	308812.35	6216734.04	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F93	308821.76	6216736.75	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F94	308825.00	6216739.04	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F95	308810.18	6216749.07	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F96	308807.24	6216758.59	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F97	308805.15	6216750.73	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F98	308814.91	6216756.57	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F99	308813.18	6216738.94	1	1
Swamp 136	<i>Sprengelia incarnata</i>	F100	308810.31	6216738.16	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E101	308352.29	6216962.37	2	1
Swamp 137b	<i>Epacris obtusifolia</i>	E102	308354.27	6216961.12	3	1
Swamp 137b	<i>Epacris obtusifolia</i>	E103	308350.62	6216959.45	3	1
Swamp 137b	<i>Epacris obtusifolia</i>	E104	308354.69	6216954.55	3	1
Swamp 137b	<i>Epacris obtusifolia</i>	E105	308355.16	6216951.71	5	1
Swamp 137b	<i>Epacris obtusifolia</i>	E106	308357.74	6216950.58	3	1
Swamp 137b	<i>Epacris obtusifolia</i>	E107	308359.65	6216952.22	3	1
Swamp 137b	<i>Epacris obtusifolia</i>	E108	308355.61	6216948.20	4	1
Swamp 137b	<i>Epacris obtusifolia</i>	E109	308354.79	6216945.16	2	1
Swamp 137b	<i>Epacris obtusifolia</i>	E110	308350.22	6216947.86	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E111	308347.52	6216950.99	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E112	308347.35	6216947.40	4	1
Swamp 137b	<i>Epacris obtusifolia</i>	E113	308347.28	6216945.73	5	1
Swamp 137b	<i>Epacris obtusifolia</i>	E114	308348.79	6216943.97	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E115	308346.14	6216945.24	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E116	308344.33	6216945.84	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E117	308342.90	6216943.57	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E118	308340.82	6216942.51	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E119	308349.35	6216951.76	1	1
Swamp 137b	<i>Epacris obtusifolia</i>	E120	308352.00	6216950.00	4	1

NB: Shaded rows indicate dead individuals

Condition Scale

1 = severe damage/dieback
2 = many dead stems
3 = some dead branches
4 = minor damage
5 = healthy

Reproductive Status:

1 = nil
2 = sparse (occasional flowers only)
3 = low (under 25 percent of potential)
4 = moderate (25 to 75 percent of potential)
5 = high (over 75 percent of potential flowering)

▲ RoTAP species

2: Geographic range in Australia less than 100 km

V: Taxon not presently Endangered, but at risk over a longer period

++ Species listed as Vulnerable under NSW Biodiversity Conservation Act (2016) and Commonwealth Environment Protection and Biodiversity Conservation Act (1999)

Appendix G: Upland swamp vegetation monitoring data – Tea tree thicket swamps

Vegetation structure, dominant species and estimated cover for each stratum – Tea tree thicket swamps

Tea Tree Thicket monitoring sites – Spring 2019

Swamp 28 – Transect 2 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 2					
S28T2Q1S19	M1	1.8	4.5	75	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Callistemon citrinus</i>
	L1	0	0.1	1	<i>Empodisma minus</i>
S28T2Q2S19	M1	1.5		40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Callistemon citrinus</i> , <i>Persoonia pinifolia</i>
S28T2Q3S19	L1	0	1	1	<i>Empodisma minus</i>
	M1	2	3	65	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Callistemon citrinus</i>
S28T2Q4S19	L1	0	0.8	1	<i>Empodisma minus</i> , <i>Leptocarpus tenax</i>
S28T2Q5S19	M1	2.3	5.5	35	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Callistemon citrinus</i>
	L1	0	0.4	1	<i>Xanthorrhoea resinosa</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Tea Tree Thicket monitoring sites – Spring 2019

Woronora River 1 – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
WORT1Q1S19	T	8	10	40	<i>Eucalyptus racemosa</i>
	M1	0.8	4	30	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Dillwynia floribunda</i>
	L1	0	1.1	60	<i>Gleichenia microphylla</i> , <i>Lepidosperma limicola</i> , <i>Lepidosperma quadrangulatum</i>
WORT1Q2S19	M1	0.5	3.5	25	<i>Melaleuca squarrosa</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.2	25	<i>Gleichenia microphylla</i> , <i>Lepidosperma quadrangulatum</i> , <i>Lepidosperma limicola</i>
WORT1Q3S19	M1	2	3	1	<i>Banksia robur</i>
	L1	0	0.3	1	<i>Empodisma minus</i> , <i>Gleichenia microphylla</i>
WORT1Q4S19	M1	0.1	2.5	1	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Leptospermum juniperinum</i>
	L1	0	1.1	5	<i>Lepidosperma quadrangulatum</i> , <i>Gleichenia microphylla</i>
WORT1Q5S19	M1	0.6	4	35	<i>Persoonia pinifolia</i>
	L1	0	0.5	5	<i>Gleichenia microphylla</i>
WORT1Q6S19	T	10	12	25	<i>Eucalyptus sieberi</i>
	M1	1.8	5	60	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Persoonia pinifolia</i> , <i>Bauera rubioides</i>
	L1	0	2.2	5	<i>Lepidosperma quadrangulatum</i>

Legend

T: Upper storey

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Tea Tree Thicket monitoring sites – Spring 2019

Woronora River South Arm – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
WORSTHT1Q1S19	M1	1	3.5	40	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Banksia oblongifolia</i> , <i>Leptospermum grandifolium</i>
	L1	0	1.5	50	<i>Gleichenia microphylla</i> , <i>Lepidosperma limicola</i> , <i>Chorizandra cymbaria</i>
WORSTHT1Q2S19	M1	1.5	3	20	<i>Banksia robur</i> , <i>Hakea teretifolia</i> , <i>Leptospermum grandifolium</i>
	L1	0	1.6	5	<i>Gleichenia microphylla</i> , <i>Lepidosperma limicola</i> , <i>Chorizandra cymbaria</i>
WORSTHT1Q3S19	M1	1.1	3	30	<i>Hakea teretifolia</i> , <i>Banksia robur</i>
	L1	0	1.7	80	<i>Gleichenia microphylla</i> , <i>Gahnia sieberiana</i>
WORSTHT1Q4S19	M1	1	2.5	30	<i>Banksia robur</i> , <i>Leptospermum grandifolium</i> , <i>Callistemon citrinus</i>
	L1	0	1.7	20	<i>Gleichenia microphylla</i> , <i>Chorizandra cymbaria</i> , <i>Empodisma minus</i>
WORSTHT1Q5S19	M1	0.6	3.3	40	<i>Epacris paludosa</i> , <i>Leptospermum juniperinum</i>
	L1	0	1.3	25	<i>Chorizandra cymbaria</i> , <i>Gleichenia microphylla</i>
WORSTHT1Q6S19	M1	1.2	3	60	<i>Hakea teretifolia</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i> , <i>Persoonia pinifolia</i>
	L1	0	1.3	40	<i>Gleichenia microphylla</i> , <i>Chorizandra cymbaria</i> , <i>Schoenus brevifolius</i>
WORSTHT1Q7S19	M1	2.5	4.3	15	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	0.5	1	<i>Schoenus brevifolius</i> , <i>Chorizandra cymbaria</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Tea Tree Thicket monitoring sites – Spring 2019

Dahlia Swamp – Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
Transect 1					
DAHT1Q1S19	M1	0.8	3	40	<i>Callistemon citrinus</i> , <i>Hakea teretifolia</i> , <i>Epacris pulchella</i>
	L1	0	1.5	30	<i>Gleichenia microphylla</i> , <i>Empodisma minus</i> , <i>Baumea</i> spp.
DAHT1Q2S19	M1	1.5	3.5	20	<i>Leptospermum juniperinum</i> , <i>Banksia robur</i>
	L1	0	1.5	60	<i>Gleichenia microphylla</i> , <i>Lepidosperma limicola</i> , <i>Chorizandra cymbaria</i>
DAHT1Q3S19	M1	1	3	40	<i>Hakea teretifolia</i> , <i>Callistemon citrinus</i>
	L1	0	2	80	<i>Gleichenia microphylla</i> , <i>Empodisma minus</i>
DAHT1Q4S19	M1	1	2.5	5	<i>Banksia robur</i> , <i>Melaleuca squarrosa</i> , <i>Baeckea linifolia</i>
	L1	0	1.4	60	<i>Gleichenia microphylla</i> , <i>Empodisma minus</i> , <i>Baumea</i> spp.
DAHT1Q5S19	M1	1.4	4	50	<i>Melaleuca squarrosa</i> , <i>Leptospermum juniperinum</i>
	L1	0	1.5	80	<i>Gleichenia microphylla</i> , <i>Chorizandra cymbaria</i>
DAHT1Q6S19	M1	1.5	4.5	60	<i>Melaleuca squarrosa</i> , <i>Leptospermum grandifolium</i>
	L1	0	1.4	50	<i>Gleichenia microphylla</i> , <i>Chorizandra cymbaria</i>
DAHT1Q7S19	M1	0.8	4	30	<i>Melaleuca squarrosa</i> , <i>Callistemon citrinus</i> , <i>Leptospermum juniperinum</i>
	L1	0	0.6	30	<i>Gleichenia microphylla</i> , <i>Baumea rubiginosa</i>
DAHT1Q8S19	M1	1.8	3.5	15	<i>Banksia robur</i> , <i>Leptospermum juniperinum</i> , <i>Leptospermum grandifolium</i>
	L1	0	1.6	40	<i>Gleichenia microphylla</i> , <i>Empodisma minus</i>
DAHT1Q9S19	M1	1.4	4.5	50	<i>Callistemon citrinus</i> , <i>Leptospermum juniperinum</i>
	L1	0	2	95	<i>Gleichenia microphylla</i> , <i>Sporadanthus gracilis</i>
DAHT1Q10S19	M1	2	4	10	<i>Acacia</i> spp., <i>Baeckea linifolia</i> , <i>Melaleuca squarrosa</i>
	L1	0	1.7	90	<i>Gleichenia microphylla</i>
DAHT1Q11S19	M1	2	4	5	<i>Leptospermum juniperinum</i> , <i>Acacia rubida</i> , <i>Banksia robur</i>
	L1	0	2	90	<i>Gleichenia microphylla</i>

Legend

M1: Mid storey 1

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

Estimated cover/abundance data – Tea tree thicket swamps

Banksia Thicket monitoring sites – Spring 2019

Swamp 28 Transect 2 – Vegetation cover/abundance

Family	Species	Transect 2				
		S28T2Q1S19	S28T2Q2S19	S28T2Q3S19	S28T2Q4S19	S28T2Q5S19
Cunoniaceae	<i>Bauera rubioides</i>				3	
Cyperaceae	<i>Cyathochaeta diandra</i>				1	1
	<i>Schoenus brevifolius</i>			1		
Ericaceae	<i>Epacris obtusifolia</i>	2	2			
Myrtaceae	<i>Callistemon citrinus</i>	4	4	5	4	1
	<i>Leptospermum grandifolium</i>		3			
Orchidaceae	<i>Cryptostylis erecta</i>	1				
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	6	5	5	4	1
	<i>Hakea teretifolia</i>			4	1	5
	<i>Persoonia pinifolia</i>		3			1
Restionaceae	<i>Empodisma minus</i>	1	1	1		1
	<i>Leptocarpus tenax</i>			1		
Santalaceae	<i>Leptomeria acida</i>		3			
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>			1	1	
	Total	5	7	7	6	6

Cover Abundance Scale (Modified Braun Blanquet)

1 = cover less than 5% of site and rare

2 = cover less than 5% of site and uncommon

3 = cover of less than 5% and common

4 = cover of 5-20% of site

5 = cover of 21-50% of site

6 = cover of 51-75% of site

7 = cover of greater than 75%

Tea Tree Thicket monitoring sites – Spring 2019

Woronora River 1 – Vegetation cover/abundance

Family	Species	Transect 1					
		WORT1Q1S19	WORT1Q2S19	WORT1Q3S19	WORT1Q4S19	WORT1Q5S19	WORT1Q6S19
Cunoniaceae	<i>Bauera rubioides</i>						4
Cyperaceae	<i>Lepidosperma limicola</i>	2	2				
	<i>Lepidosperma quadrangulatum</i>	2	3		3	1	3
Ericaceae	<i>Epacris obtusifolia</i>	1					
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	2					
Gleicheniaceae	<i>Gleichenia microphylla</i>	6	5	1	2	3	
Myrtaceae	<i>Eucalyptus racemosa</i>	5					
	<i>Eucalyptus sieberi</i>						4
	<i>Leptospermum grandifolium</i>	1					
	<i>Leptospermum juniperinum</i>				1		4
	<i>Melaleuca squarrosa</i>		5				
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	1				5
	<i>Banksia robur</i>		1	1	1	1	
	<i>Hakea teretifolia</i>	5				1	
	<i>Persoonia pinifolia</i>					5	4
	<i>Petrophile pulchella</i>	1					
Restionaceae	<i>Empodisma minus</i>		1	1			
	Total	10	7	3	4	5	6

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
- 2 = cover less than 5% of site and uncommon
- 3 = cover of less than 5% and common
- 4 = cover of 5-20% of site
- 5 = cover of 21-50% of site
- 6 = cover of 51-75% of site
- 7 = cover of greater than 75%

Tea Tree Thicket monitoring sites – Spring 2019
Woronora River South Arm – Vegetation cover/abundance

Family	Species	Transect 1						
		WORSTHT1Q1S19	WORSTHT1Q2S19	WORSTHT1Q3S19	WORSTHT1Q4S19	WORSTHT1Q5S19	WORSTHT1Q6S19	WORSTHT1Q7S19
Casuarinaceae	<i>Allocasuarina littoralis</i>	1						
Colchicaceae	<i>Burchardia umbellata</i>							1
Cunoniaceae	<i>Bauera microphylla</i>	1						
Cyperaceae	<i>Chorizandra cymbaria</i>	3	3	2	4	4	3	2
	<i>Gahnia sieberiana</i>			5	1	3	1	
	<i>Lepidosperma limicola</i>	3	3				2	
	<i>Lepidosperma neesii</i>	2						
	<i>Schoenus brevifolius</i>		1	1			3	3
	<i>Schoenus lepidosperma</i>				2			
Ericaceae	<i>Epacris paludosa</i>		1	2	2	3	1	
	<i>Sprengelia incarnata</i>	2						
Gleicheniaceae	<i>Gleichenia microphylla</i>	5	3	7	4	3	5	2
Myrtaceae	<i>Baeckea linifolia</i>				1	1		
	<i>Callistemon citrinus</i>				4			
	<i>Leptospermum grandifolium</i>	4	1		4	1	4	
	<i>Leptospermum juniperinum</i>			2	4	3	2	
	<i>Melaleuca squarrosa</i>				1			
Poaceae	<i>Hemarthria uncinata</i>		1					
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5					5	4
	<i>Banksia oblongifolia</i>	4						
	<i>Banksia robur</i>	1	5	4	5	2	4	
	<i>Grevillea oleoides</i>	1						
	<i>Hakea gibbosa</i>	1						
	<i>Hakea teretifolia</i>	3	1	5			5	1
	<i>Persoonia pinifolia</i>						4	
Restionaceae	<i>Empodisma minus</i>	2	3	2	3	2		
	<i>Leptocarpus tenax</i>	2	2	1				
Santalaceae	<i>Leptomeria acida</i>	1						
	Total	17	11	10	12	9	12	6

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
- 2 = cover less than 5% of site and uncommon
- 3 = cover of less than 5% and common
- 4 = cover of 5-20% of site
- 5 = cover of 21-50% of site
- 6 = cover of 51-75% of site
- 7 = cover of greater than 75%

Tea Tree Thicket monitoring sites – Spring 2019

Dahlia Swamp – Vegetation cover/abundance

Family	Species	Transect 1										
		DAHT1Q1S19	DAHT1Q2S19	DAHT1Q3S19	DAHT1Q4S19	DAHT1Q5S19	DAHT1Q6S19	DAHT1Q7S19	DAHT1Q8S19	DAHT1Q9S19	DAHT1Q10S19	DAHT1Q11S19
Apiaceae	<i>Hydrocotyle laxiflora</i>							1				
Aspleniaceae	<i>Asplenium flabellifolium</i>							1				
Cyperaceae	<i>Baumea rubiginosa</i>							3	2			
	<i>Baumea</i> spp.	2	2	2	2		1	1	2			
	<i>Chorizandra cymbaria</i>	2	2		2	2	2		1	2	1	
	<i>Lepidosperma limicola</i>	2	2	3								
	<i>Lepidosperma quadrangulatum</i>									1		
	<i>Schoenus brevifolius</i>		1									
Dicksoniaceae	<i>Calochlaena dubia</i>							1				
Ericaceae	<i>Epacris paludosa</i>	3										
Fabaceae (Mimosoideae)	<i>Acacia rubida</i>										2	2
Gleicheniaceae	<i>Gleichenia microphylla</i>	5	6	6	6	7	5	5	5	7	7	7
Haloragaceae	<i>Gonocarpus micranthus</i>							2	1			
Lobeliaceae	<i>Lobelia anceps</i>							3				
Myrtaceae	<i>Baeckea linifolia</i>				2						1	
	<i>Callistemon citrinus</i>	5	1	5	1	1	1	4		5		
	<i>Leptospermum grandifolium</i>						4		4		1	
	<i>Leptospermum juniperinum</i>		4			5	1	3	4	3	1	4
	<i>Melaleuca squarrosa</i>		1		2	5	6	5		1	1	
Plantaginaceae	<i>Veronica plebeia</i>								3			
Poaceae	<i>Entolasia stricta</i>	1										
	<i>Tetrarrhena turfosa</i>							1				
Proteaceae	<i>Banksia robur</i>	1	4		2	4			4	1	1	1
	<i>Hakea teretifolia</i>	4	1	5								
Restionaceae	<i>Empodisma minus</i>	3		3	3				3			
	<i>Leptocarpus tenax</i>	1	1	1								
	<i>Sporadanthus gracilis</i>									4		
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	1										
	Total	12	11	7	8	6	7	12	10	8	8	4

Cover Abundance Scale (Modified Braun Blanquet)

1 = cover less than 5% of site and rare

2 = cover less than 5% of site and uncommon

3 = cover of less than 5% and common

4 = cover of 5-20% of site

5 = cover of 21-50% of site

6 = cover of 51-75% of site

7 = cover of greater than 75%

Vegetation condition – Tea tree thicket swamps

Tea Tree Thicket monitoring sites – Spring 2019

Swamp 28 Transect 2 – Vegetation condition

Family	Species	Transect 2				
		S28T2Q1S19	S28T2Q2S19	S28T2Q3S19	S28T2Q4S19	S28T2Q5S19
Cunoniaceae	<i>Bauera rubioides</i>				5	
Cyperaceae	<i>Cyathochaeta diandra</i>				5	5
	<i>Schoenus brevifolius</i>			5		
Ericaceae	<i>Epacris obtusifolia</i>	5	4			
Myrtaceae	<i>Callistemon citrinus</i>	5	5	5	5	5
	<i>Leptospermum grandifolium</i>		5			
Orchidaceae	<i>Cryptostylis erecta</i>	5				
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5	5	5	5
	<i>Hakea teretifolia</i>			5	5	3
	<i>Persoonia pinifolia</i>		5			5
Restionaceae	<i>Empodisma minus</i>	5	3	4		5
	<i>Leptocarpus tenax</i>			4		
Santalaceae	<i>Leptomeria acida</i>		5			
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>			5	5	
	Total	5	7	7	6	6

Condition Scale

1 = severe damage/dieback

2 = many dead stems

3 = some dead branches

4 = minor damage

5 = healthy

Tea Tree Thicket monitoring sites – Spring 2019

Woronora River 1 – Vegetation condition

Family	Species	Transect 1					
		WORT1Q1S19	WORT1Q2S19	WORT1Q3S19	WORT1Q4S19	WORT1Q5S19	WORT1Q6S19
Cunoniaceae	<i>Bauera rubioides</i>						5
Cyperaceae	<i>Lepidosperma limicola</i>	5	4				
	<i>Lepidosperma quadrangulatum</i>	5	5		5	5	4
Ericaceae	<i>Epacris obtusifolia</i>	5					
Fabaceae (Faboideae)	<i>Dillwynia floribunda</i>	5					
Gleicheniaceae	<i>Gleichenia microphylla</i>	5	5	1	2	5	
Myrtaceae	<i>Eucalyptus racemosa</i>	5					
	<i>Eucalyptus sieberi</i>						5
	<i>Leptospermum grandifolium</i>	5					
	<i>Leptospermum juniperinum</i>				5		5
	<i>Melaleuca squarrosa</i>		5				
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	5				5
	<i>Banksia robur</i>		5	5	5	5	
	<i>Hakea teretifolia</i>	5				5	
	<i>Persoonia pinifolia</i>					5	5
	<i>Petrophile pulchella</i>	5					
Restionaceae	<i>Empodisma minus</i>		5	3			
	Total	10	7	3	4	5	6

Condition Scale

- 1 = severe damage/dieback
- 2 = many dead stems
- 3 = some dead branches
- 4 = minor damage
- 5 = healthy

Tea Tree Thicket monitoring sites – Spring 2019
Woronora River South Arm – Vegetation condition

Family	Species	Transect 1						
		WORSTHT1Q1S19	WORSTHT1Q2S19	WORSTHT1Q3S19	WORSTHT1Q4S19	WORSTHT1Q5S19	WORSTHT1Q6S19	WORSTHT1Q7S19
Casuarinaceae	<i>Allocasuarina littoralis</i>	5						
Colchicaceae	<i>Burchardia umbellata</i>							5
Cunoniaceae	<i>Bauera microphylla</i>	5						
Cyperaceae	<i>Chorizandra cymbaria</i>	4	3	2	3	5	5	5
	<i>Gahnia sieberiana</i>			5	5	5	5	
	<i>Lepidosperma limicola</i>	4	3				5	
	<i>Lepidosperma neesii</i>	5						
	<i>Schoenus brevifolius</i>		5	5			5	5
	<i>Schoenus lepidosperma</i>				5			
Ericaceae	<i>Epacris paludosa</i>		5	5	5	5	5	
	<i>Sprengelia incarnata</i>	4						
Gleicheniaceae	<i>Gleichenia microphylla</i>	3	4	5	4	5	4	5
Myrtaceae	<i>Baeckea linifolia</i>				5	5		
	<i>Callistemon citrinus</i>				5			
	<i>Leptospermum grandifolium</i>	4	3		3	5	5	
	<i>Leptospermum juniperinum</i>			5	5	5	5	
	<i>Melaleuca squarrosa</i>				5			
Poaceae	<i>Hemarthria uncinata</i>		5					
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	3					5	5
	<i>Banksia oblongifolia</i>	4						
	<i>Banksia robur</i>	1	4	5	5	5	5	
	<i>Grevillea oleoides</i>	5						
	<i>Hakea gibbosa</i>	3						
	<i>Hakea teretifolia</i>	4	2	4			5	5
	<i>Persoonia pinifolia</i>						5	
Restionaceae	<i>Empodisma minus</i>	5	4	5	5	5		
	<i>Leptocarpus tenax</i>	5	5	5				
Santalaceae	<i>Leptomeria acida</i>	5						
	Total	17	11	10	12	9	12	6

Condition Scale

1 = severe damage/dieback
2 = many dead stems
3 = some dead branches
4 = minor damage
5 = healthy

Tea Tree Thicket monitoring sites – Spring 2019

Dahlia Swamp – Vegetation condition

Family	Species	Transect 1										
		DAHT1Q1S19	DAHT1Q2S19	DAHT1Q3S19	DAHT1Q4S19	DAHT1Q5S19	DAHT1Q6S19	DAHT1Q7S19	DAHT1Q8S19	DAHT1Q9S19	DAHT1Q10S19	DAHT1Q11S19
Apiaceae	<i>Hydrocotyle laxiflora</i>							5				
Aspleniaceae	<i>Asplenium flabellifolium</i>							5				
Cyperaceae	<i>Baumea rubiginosa</i>							5	5			
	<i>Baumea</i> spp.	5	5	4	5		5	5	5			
	<i>Chorizandra cymbaria</i>	5	4		4	3	3		5	5	5	
	<i>Lepidosperma limicola</i>	5	4	4								
	<i>Lepidosperma quadrangulatum</i>									5		
	<i>Schoenus brevifolius</i>		5									
Dicksoniaceae	<i>Calochlaena dubia</i>							5				
Ericaceae	<i>Epacris paludosa</i>	5										
Fabaceae (Mimosoideae)	<i>Acacia rubida</i>										5	5
Gleicheniaceae	<i>Gleichenia microphylla</i>	4	5	5	4	4	4	4	5	5	5	5
Haloragaceae	<i>Gonocarpus micranthus</i>							5	5			
Lobeliaceae	<i>Lobelia anceps</i>							5				
Myrtaceae	<i>Baeckea linifolia</i>				5						5	
	<i>Callistemon citrinus</i>	5	5	5	5	5	5	5		5		
	<i>Leptospermum grandifolium</i>						3		5		5	
	<i>Leptospermum juniperinum</i>		5			5	1	5	5	4	5	5
	<i>Melaleuca squarrosa</i>		5		5	5	5	5		5	5	
Plantaginaceae	<i>Veronica plebeia</i>								5			
Poaceae	<i>Entolasia stricta</i>	5										
	<i>Tetrarrhena turfosa</i>							5				
Proteaceae	<i>Banksia robur</i>	4	5		5	5			5	5	5	5
	<i>Hakea teretifolia</i>	5	5	5								
Restionaceae	<i>Empodisma minus</i>	5		5	5				5			
	<i>Leptocarpus tenax</i>	5	5	5								
	<i>Sporadanthus gracilis</i>									5		
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	3										
	Total	12	11	7	8	6	7	12	10	8	8	4

Condition Scale

- 1 = severe damage/dieback
- 2 = many dead stems
- 3 = some dead branches
- 4 = minor damage
- 5 = healthy

Indicator species data – Tea tree thicket swamps

Tea Tree Thicket monitoring sites – Spring 2019

Condition and Reproductive Rating for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Swamp 28	<i>Banksia robur</i>	a81	310984.02	6214824.96	1	1
Swamp 28	<i>Banksia robur</i>	a82	310982.86	6214823.30	1	1
Swamp 28	<i>Banksia robur</i>	a83	310982.57	6214815.98	1	1
Swamp 28	<i>Banksia robur</i>	a84	310984.46	6214813.89	1	1
Swamp 28	<i>Banksia robur</i>	a85	310979.88	6214809.10	1	1
Swamp 28	<i>Banksia robur</i>	a86	310980.96	6214805.75	1	1
Swamp 28	<i>Banksia robur</i>	a87	310981.14	6214824.61	1	1
Swamp 28	<i>Banksia robur</i>	a88	310993.03	6214817.04	1	1
Swamp 28	<i>Banksia robur</i>	a89	310991.62	6214815.90	1	1
Swamp 28	<i>Banksia robur</i>	a90	310993.76	6214810.02	1	1
Swamp 28	<i>Banksia robur</i>	a91	310996.03	6214807.69	1	1
Swamp 28	<i>Banksia robur</i>	a92	310995.45	6214805.41	1	1
Swamp 28	<i>Banksia robur</i>	a93	310996.91	6214802.77	1	1
Swamp 28	<i>Banksia robur</i>	a94	310996.63	6214802.72	1	1
Swamp 28	<i>Banksia robur</i>	a95	310993.37	6214820.01	1	1
Swamp 28	<i>Banksia robur</i>	a96	310988.74	6214816.92	1	1
Swamp 28	<i>Banksia robur</i>	a97	310981.68	6214823.90	1	1
Swamp 28	<i>Banksia robur</i>	a98	310976.42	6214822.00	1	1
Swamp 28	<i>Banksia robur</i>	a99	310978.81	6214829.25	1	1
Swamp 28	<i>Banksia robur</i>	a100	310984.28	6214827.64	1	1
Swamp 28	<i>Callistemon citrinus</i>	c81	310982.47	6214823.23	5	1
Swamp 28	<i>Callistemon citrinus</i>	c82	310983.69	6214817.24	4	1
Swamp 28	<i>Callistemon citrinus</i>	c85	310984.46	6214814.19	5	1
Swamp 28	<i>Callistemon citrinus</i>	c83	310982.74	6214812.35	4	1
Swamp 28	<i>Callistemon citrinus</i>	c84	310980.04	6214808.57	4	1
Swamp 28	<i>Callistemon citrinus</i>	c86	310980.04	6214806.11	5	1
Swamp 28	<i>Callistemon citrinus</i>	c87	310978.52	6214799.28	3	1
Swamp 28	<i>Callistemon citrinus</i>	c88	310980.80	6214823.71	4	1
Swamp 28	<i>Callistemon citrinus</i>	c89	310988.10	6214819.62	3	1
Swamp 28	<i>Callistemon citrinus</i>	c90	310992.95	6214816.43	4	1
Swamp 28	<i>Callistemon citrinus</i>	c91	310994.30	6214812.20	4	1
Swamp 28	<i>Callistemon citrinus</i>	c92	310994.75	6214810.61	4	1
Swamp 28	<i>Callistemon citrinus</i>	c93	310994.17	6214808.73	3	1
Swamp 28	<i>Callistemon citrinus</i>	c94	310991.17	6214797.19	3	1
Swamp 28	<i>Callistemon citrinus</i>	c95	310989.98	6214817.86	5	1
Swamp 28	<i>Callistemon citrinus</i>	c96	310991.25	6214818.27	4	1
Swamp 28	<i>Callistemon citrinus</i>	c97	310979.88	6214824.23	5	1
Swamp 28	<i>Callistemon citrinus</i>	c98	310979.96	6214824.17	5	1
Swamp 28	<i>Callistemon citrinus</i>	c99	310978.79	6214822.04	4	1
Swamp 28	<i>Callistemon citrinus</i>	c100	310978.21	6214822.62	5	1
Woronora River 1	<i>Banksia robur</i>	a41	306401.7	6214962.98	1	1
Woronora River 1	<i>Banksia robur</i>	a42	306407.92	6214965.22	5	1
Woronora River 1	<i>Banksia robur</i>	a43	306404.19	6214974.24	1	1
Woronora River 1	<i>Banksia robur</i>	a44	306419.95	6214966.04	2	1
Woronora River 1	<i>Banksia robur</i>	a45	306419	6214976.87	1	1
Woronora River 1	<i>Banksia robur</i>	a46	306414.62	6214957.67	4	1
Woronora River 1	<i>Banksia robur</i>	a47	306409.14	6214956.21	3	1

Tea Tree Thicket monitoring sites – Spring 2019

Condition and Reproductive Rating for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Woronora River 1	<i>Banksia robur</i>	a48	306423.67	6214951.13	1	1
Woronora River 1	<i>Banksia robur</i>	a49	306428.82	6214945.2	4	1
Woronora River 1	<i>Banksia robur</i>	a50	306431.82	6214934.92	4	1
Woronora River 1	<i>Banksia robur</i>	a51	306434.41	6214924.93	5	1
Woronora River 1	<i>Banksia robur</i>	a52	306427.73	6214912.51	4	1
Woronora River 1	<i>Banksia robur</i>	a53	306427.12	6214906.48	4	1
Woronora River 1	<i>Banksia robur</i>	a54	306431.52	6214892.4	5	4
Woronora River 1	<i>Banksia robur</i>	a55	306434.82	6214875.09	5	3
Woronora River 1	<i>Banksia robur</i>	a56	306424.89	6214882.73	4	1
Woronora River 1	<i>Banksia robur</i>	a57	306419.65	6214892.85	5	1
Woronora River 1	<i>Banksia robur</i>	a58	306411.72	6214874.18	1	1
Woronora River 1	<i>Banksia robur</i>	a59	306420.26	6214869.8	1	1
Woronora River 1	<i>Banksia robur</i>	a60	306417.93	6214873.32	4	1
Woronora River 1	<i>Callistemon citrinus</i>	c41	306401.96	6214970.47	5	1
Woronora River 1	<i>Callistemon citrinus</i>	c42	306400.42	6214971.53	5	1
Woronora River 1	<i>Callistemon citrinus</i>	c43	306417.54	6214974.53	5	1
Woronora River 1	<i>Callistemon citrinus</i>	c44	306434.12	6214937.53	3	1
Woronora River 1	<i>Callistemon citrinus</i>	c45	306429.56	6214936.66	4	1
Woronora River 1	<i>Callistemon citrinus</i>	c46	306432.67	6214913.81	5	3
Woronora River 1	<i>Callistemon citrinus</i>	c47	306435.93	6214898.93	5	3
Woronora River 1	<i>Callistemon citrinus</i>	c48	306423.54	6214886.18	4	1
Woronora River 1	<i>Callistemon citrinus</i>	c49	306416.34	6214877.5	5	1
Woronora River 1	<i>Callistemon citrinus</i>	c50	306428.78	6214885.46	4	1
Woronora River 1	<i>Callistemon citrinus</i>	c51	306445.06	6214897.96	4	1
Woronora River 1	<i>Callistemon citrinus</i>	c52	306439.92	6214899.7	5	3
Woronora River 1	<i>Callistemon citrinus</i>	c53	306431.61	6214865.05	4	5
Woronora River 1	<i>Callistemon citrinus</i>	c54	306421.52	6214876.11	5	1
Woronora River 1	<i>Callistemon citrinus</i>	c55	306434.79	6214891.97	5	4
Woronora River 1	<i>Callistemon citrinus</i>	c56	306435.89	6214894.2	5	1
Woronora River 1	<i>Callistemon citrinus</i>	c57	306439.85	6214903.03	4	1
Woronora River 1	<i>Callistemon citrinus</i>	c58	306438.61	6214920.13	4	1
Woronora River 1	<i>Callistemon citrinus</i>	c59	306438.42	6214920.8	5	1
Woronora River 1	<i>Callistemon citrinus</i>	c60	306427.6	6214951.55	5	1
Woronora South Arm	<i>Banksia robur</i>	a21	306406.69	6213941.19	3	1
Woronora South Arm	<i>Banksia robur</i>	a22	306411.29	6213946.13	3	1
Woronora South Arm	<i>Banksia robur</i>	a23	306414.41	6213950.56	4	1
Woronora South Arm	<i>Banksia robur</i>	a24	306425.46	6213958.65	1	1
Woronora South Arm	<i>Banksia robur</i>	a25	306425.28	6213950.71	4	1
Woronora South Arm	<i>Banksia robur</i>	a26	306430.15	6213944.57	4	1
Woronora South Arm	<i>Banksia robur</i>	a27	306433.83	6213944.62	1	1
Woronora South Arm	<i>Banksia robur</i>	a28	306433.77	6213939.06	4	1
Woronora South Arm	<i>Banksia robur</i>	a29	306431.1	6213934.79	5	1
Woronora South Arm	<i>Banksia robur</i>	a30	306436.4	6213926.17	5	1
Woronora South Arm	<i>Banksia robur</i>	a31	306439.87	6213923.56	4	1
Woronora South Arm	<i>Banksia robur</i>	a32	306438.5	6213918	5	1
Woronora South Arm	<i>Banksia robur</i>	a33	306434.61	6213916.78	5	1
Woronora South Arm	<i>Banksia robur</i>	a34	306429.51	6213920.71	5	1

Tea Tree Thicket monitoring sites – Spring 2019

Condition and Reproductive Rating for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Woronora South Arm	<i>Banksia robur</i>	a35	306427.73	6213921.53	3	1
Woronora South Arm	<i>Banksia robur</i>	a36	306423.98	6213922.93	4	1
Woronora South Arm	<i>Banksia robur</i>	a37	306419.51	6213928.79	4	1
Woronora South Arm	<i>Banksia robur</i>	a38	306414.11	6213937.56	5	1
Woronora South Arm	<i>Banksia robur</i>	a39	306410.99	6213937.46	5	1
Woronora South Arm	<i>Banksia robur</i>	a40	306405.39	6213939.72	1	1
Woronora South Arm	<i>Callistemon citrinus</i>	c21	306408.01	6213944.25	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c22	306421.87	6213957.3	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c23	306427.84	6213946.92	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c24	306427.1	6213942.16	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c25	306434.06	6213937.33	4	1
Woronora South Arm	<i>Callistemon citrinus</i>	c26	306436.15	6213932.97	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c27	306434.43	6213929.13	4	1
Woronora South Arm	<i>Callistemon citrinus</i>	c28	306438.52	6213923.15	4	1
Woronora South Arm	<i>Callistemon citrinus</i>	c29	306417.65	6213935.4	4	1
Woronora South Arm	<i>Callistemon citrinus</i>	c30	306432.75	6213918.33	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c31	306409.88	6213954.72	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c32	306408.64	6213956.81	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c33	306418.1	6213964.33	4	1
Woronora South Arm	<i>Callistemon citrinus</i>	c34	306417.39	6213967.54	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c35	306414.54	6213972.55	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c36	306414.92	6213971.23	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c37	306413.26	6213972.52	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c38	306421.8	6213975.7	5	1
Woronora South Arm	<i>Callistemon citrinus</i>	c39	306430.51	6213976.11	3	1
Woronora South Arm	<i>Callistemon citrinus</i>	c40	306429.3	6213978.34	4	1
Dahlia Swamp	<i>Banksia robur</i>	a61	306129.26	6212863.29	4	1
Dahlia Swamp	<i>Banksia robur</i>	a62	306134.54	6212866.25	4	1
Dahlia Swamp	<i>Banksia robur</i>	a63	306132.78	6212870.01	3	1
Dahlia Swamp	<i>Banksia robur</i>	a64	306127.95	6212871.72	1	1
Dahlia Swamp	<i>Banksia robur</i>	a65	306125.3	6212876.39	4	1
Dahlia Swamp	<i>Banksia robur</i>	a66	306123.34	6212877.65	1	1
Dahlia Swamp	<i>Banksia robur</i>	a67	306122.03	6212880.57	4	1
Dahlia Swamp	<i>Banksia robur</i>	a68	306119.44	6212882.36	4	1
Dahlia Swamp	<i>Banksia robur</i>	a69	306112.9	6212885.99	4	1
Dahlia Swamp	<i>Banksia robur</i>	a70	306112.61	6212888.5	4	1
Dahlia Swamp	<i>Banksia robur</i>	a71	306115.38	6212893.47	3	1
Dahlia Swamp	<i>Banksia robur</i>	a72	306120.71	6212897.02	1	1
Dahlia Swamp	<i>Banksia robur</i>	a73	306125.45	6212892.84	1	1
Dahlia Swamp	<i>Banksia robur</i>	a74	306119.46	6212886.2	4	1
Dahlia Swamp	<i>Banksia robur</i>	a75	306122.35	6212884.16	4	1
Dahlia Swamp	<i>Banksia robur</i>	a76	306126.69	6212880.57	1	1
Dahlia Swamp	<i>Banksia robur</i>	a77	306134.99	6212874.83	3	1
Dahlia Swamp	<i>Banksia robur</i>	a78	306136.14	6212871.66	4	1
Dahlia Swamp	<i>Banksia robur</i>	a79	306150.43	6212867.42	4	1
Dahlia Swamp	<i>Banksia robur</i>	a80	306139.36	6212861.48	4	1

Tea Tree Thicket monitoring sites – Spring 2019

Condition and Reproductive Rating for swamp indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
Dahlia Swamp	<i>Callistemon citrinus</i>	c61	306130.47	6212864.63	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c62	306136.08	6212869.24	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c63	306129.3	6212874.48	4	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c64	306117.94	6212878.38	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c65	306122.2	6212898.73	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c66	306130.24	6212875.94	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c67	306134.07	6212874.14	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c68	306137.69	6212871.37	4	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c69	306150.27	6212867.68	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c70	306147.14	6212864.33	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c71	306127.46	6212862.59	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c72	306134.04	6212863.52	4	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c73	306116.73	6212879.65	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c74	306116.94	6212887.24	5	2
Dahlia Swamp	<i>Callistemon citrinus</i>	c75	306133.45	6212879.31	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c76	306135.4	6212872.9	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c77	306141.41	6212868.85	5	1
Dahlia Swamp	<i>Callistemon citrinus</i>	c78	306153.46	6212875	5	2
Dahlia Swamp	<i>Callistemon citrinus</i>	c79	306164.34	6212866.9	5	5
Dahlia Swamp	<i>Callistemon citrinus</i>	c80	306151.94	6212848.69	5	4

NB: Shaded rows indicate dead individuals

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

Reproductive Status:

1 = nil
 2 = sparse (occasional flowers only)
 3 = low (under 25 percent of potential)
 4 = moderate (25 to 75 percent of potential)
 5 = high (over 75 percent of potential flowering)

Appendix H: Riparian vegetation monitoring raw data

*Vegetation structure, dominant species and
estimated cover for each stratum – Riparian sites*

Riparian monitoring sites – Spring 2019

Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
MRIP01S19	T	15	15	5	<i>Eucalyptus sieberi</i>
	M2	0.2	2.5	25	<i>Lomatia myricoides</i> , <i>Acacia obtusifolia</i> , <i>Tristania neriifolia</i>
	M1	5	10	15	<i>Allocasuarina littoralis</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.1	60	<i>Gleichenia microphylla</i> , <i>Bauera rubioides</i> , <i>Eurychorda complanata</i>
MRIP02S19	T	8	12	5	<i>Angophora costata</i> , <i>Eucalyptus piperita</i>
	M2	0.2	3	20	<i>Dodonaea triquetra</i> , <i>Acacia longifolia</i> subsp. <i>longifolia</i>
	M1	2	6	10	<i>Allocasuarina littoralis</i>
	L1	0	1	25	<i>Sticherus flabellatus</i> var. <i>flabellatus</i> , <i>Gleichenia microphylla</i> , <i>Bauera rubioides</i>
MRIP03S19	T	10	15	3	<i>Eucalyptus agglomerata</i> , <i>Angophora costata</i>
	M2	1.2	3	5	<i>Lomatia myricoides</i> , <i>Persoonia pinifolia</i>
	M1	6	8	30	<i>Acacia obtusifolia</i> , <i>Allocasuarina littoralis</i> , <i>Leptospermum morrisonii</i>
	L1	0	1.2	40	<i>Gleichenia microphylla</i> , <i>Bauera rubioides</i>
MRIP04S19	T	8	10	2	<i>Corymbia gummifera</i> , <i>Angophora costata</i>
	M1	1.5	8	35	<i>Allocasuarina littoralis</i> , <i>Stenocarpus salignus</i> , <i>Acacia obtusifolia</i>
	L1	0	0.6	1	<i>Entolasia stricta</i> , <i>Schoenus melanostachys</i> , <i>Isolepis</i> spp.
MRIP05S19	T	12	17	10	<i>Eucalyptus piperita</i> , <i>Eucalyptus sieberi</i>
	M2	0.2	1.5	30	<i>Hibbertia nitida</i> ▲2RC-, <i>Lambertia formosa</i>
	M1	2	5	40	<i>Allocasuarina littoralis</i> , <i>Dodonaea triquetra</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	1.5	10	<i>Schoenus melanostachys</i> , <i>Sporadanthus gracilis</i> , <i>Bauera rubioides</i>
MRIP06S19	T	5	15	5	<i>Eucalyptus sieberi</i> , <i>Eucalyptus piperita</i>
	M2	0.2	1.5	5	<i>Banksia oblongifolia</i> , <i>Dodonaea triquetra</i> , <i>Prostanthera linearis</i>
	M1	1.5	5	30	<i>Allocasuarina littoralis</i> , <i>Lomatia myricoides</i>
	L1	0	1.4	10	<i>Schoenus melanostachys</i> , <i>Sporadanthus gracilis</i> , <i>Bauera rubioides</i>
MRIP07S19	T	12	15	5	<i>Eucalyptus piperita</i>
	M1	0.6	4	35	<i>Allocasuarina littoralis</i> , <i>Lomatia myricoides</i> , <i>Dodonaea triquetra</i>
	L1	0	1.8	4	<i>Sticherus flabellatus</i> var. <i>flabellatus</i> , <i>Bauera rubioides</i> , <i>Baumea juncea</i>
MRIP08S19	M1	0.8	3.5	35	<i>Allocasuarina littoralis</i> , <i>Lomatia myricoides</i> , <i>Tristania neriifolia</i>
	L1	0	0.8	40	<i>Lomandra fluviatilis</i> ▲3RCa
MRIP11S19	T	10	15	5	<i>Eucalyptus sieberi</i> , <i>Eucalyptus piperita</i>
	M2	0.2	1.8	30	<i>Hibbertia nitida</i> ▲2RC-, <i>Lomatia myricoides</i> , <i>Bauera rubioides</i>

Riparian monitoring sites – Spring 2019

Vegetation structure, dominant species and estimated cover for each stratum

Site Number	Stratum	Lower Height (m)	Upper Height (m)	Percent Cover (%)	Dominant Species
MRIP12S19	M1	2	5	30	<i>Hakea salicifolia</i> , <i>Banksia serrata</i> , <i>Banksia ericifolia</i> subsp. <i>ericifolia</i>
	L1	0	2	20	<i>Gahnia sieberiana</i> , <i>Baumea juncea</i> , <i>Schoenus melanostachys</i>
	T	5	8	5	<i>Eucalyptus piperita</i>
	M1	0.5	4	25	<i>Allocasuarina littoralis</i> , <i>Lomatia myricoides</i> , <i>Hibbertia nitida</i> ▲2RC-
	L1	0	0.5	20	<i>Sporadanthus gracilis</i> , <i>Leptocarpus tenax</i> , <i>Bauera rubioides</i> , <i>Chordifex dimorphus</i>

Legend

T: Upper storey

M1: Mid storey 1

M2: Mid storey 2

L1: Lower stratum 1

Height values provide a guide to the vegetation layers, or strata, recorded per plot. Some overlap of values will occur.

Percent foliage cover includes all living vegetation per strata. Woody debris, litter and ground layer dieback, soil and rock are not included in these values.

▲ RoTAP species

2: Geographic range in Australia less than 100 km

3: Geographic range in Australia more than 100 km

R: Rare in Australia but does not have an identifiable threat

C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve

a: 1000 plants or more are known to occur within a conservation reserve(s)

-: reserved population size is not accurately known

Estimated cover/abundance data – Riparian sites

Riparian monitoring sites – Spring 2019

Vegetation cover/abundance

Family	Species	MRIP01S19	MRIP02S19	MRIP03S19	MRIP04S19	MRIP05S19	MRIP06S19	MRIP07S19	MRIP08S19	MRIP11S19	MRIP12S19
Apiaceae	<i>Actinotus minor</i>						1				1
	<i>Xanthosia pilosa</i>					1	2				1
	<i>Xanthosia tridentata</i>	3					2				1
Asteraceae	<i>Gamochaeta</i> spp.*		1								
	<i>Hypochaeris radicata</i> *										1
Blandfordiaceae	<i>Blandfordia nobilis</i>	1									
Casuarinaceae	<i>Allocasuarina distyla</i>							1	1	1	
	<i>Allocasuarina littoralis</i>	4	4	4	5	4	4	3	4	3	4
Centrolepidaceae	<i>Centrolepis strigosa</i> subsp. <i>strigosa</i>		1								1
Cunoniaceae	<i>Bauera rubioides</i>	4	2	4	1	4	3	4	2	3	4
	<i>Callicoma serratifolia</i>		3					4		1	1
	<i>Ceratopetalum apetalum</i>		1					1			1
	<i>Ceratopetalum gummiferum</i>					1					
Cupressaceae	<i>Callitris rhomboidea</i>				4						
Cyperaceae	<i>Baumea juncea</i>							3	1	4	
	<i>Baumea rubiginosa</i>									2	1
	<i>Baumea</i> spp.					1					
	<i>Caustis flexuosa</i>										1
	<i>Caustis pentandra</i>			1							
	<i>Chorizandra cymbaria</i>				1		1			1	1
	<i>Cyathochaeta diandra</i>						1				
	<i>Cyperus gracilis</i>						1				
	<i>Eleocharis gracilis</i>		1								
	<i>Gahnia sieberiana</i>									4	
	<i>Gymnoschoenus sphaerocephalus</i>	3									
	<i>Isolepis cernua</i>		2								
	<i>Isolepis</i> spp.				3						
	<i>Lepidosperma laterale</i>		1			3					
	<i>Schoenus melanostachys</i>	3	2	3	2	4	4	3		3	2
Dennstaedtiaceae	<i>Pteridium esculentum</i>					1	1				
Dilleniaceae	<i>Hibbertia aspera</i>								1		
	<i>Hibbertia nitida</i> ▲ 2RC-	2	1	2		4	1	2	1	4	4
Doryanthaceae	<i>Doryanthes excelsa</i>		1			1	1			1	
Droseraceae	<i>Drosera binata</i>	3									
	<i>Drosera peltata</i>						1				
	<i>Drosera spatulata</i>		2							2	1
Ericaceae	<i>Epacris longiflora</i>								1		3
	<i>Epacris microphylla</i>	3									2
	<i>Epacris obtusifolia</i>	2	1				1	2			3
	<i>Epacris pulchella</i>						1				
	<i>Leucopogon amplexicaulis</i>		1			1	1	1		1	3
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>						1				
	<i>Monotoca scoparia</i>					1					
	<i>Woolfsia pungens</i>						1				1
Euphorbiaceae	<i>Micrantheum ericoides</i>					1	1				
	<i>Pseudanthus pimeleoides</i>	2						2	3		3

Riparian monitoring sites – Spring 2019

Vegetation cover/abundance

Family	Species	MRIP01S19	MRIP02S19	MRIP03S19	MRIP04S19	MRIP05S19	MRIP06S19	MRIP07S19	MRIP08S19	MRIP11S19	MRIP12S19
Fabaceae (Faboideae)	<i>Aotus ericoides</i>							1			
	<i>Dillwynia floribunda</i>	2									1
	<i>Dillwynia retorta</i>										1
	<i>Gompholobium glabratum</i>								1		
	<i>Pultenaea blakelyi</i>		2								
	<i>Pultenaea daphnoides</i>									1	
	<i>Pultenaea stipularis</i>						1				1
Fabaceae (Mimosoideae)	<i>Acacia linifolia</i>					1					
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		2			2	2	2	1	1	
	<i>Acacia obtusifolia</i>	4	1	5	4						
	<i>Acacia</i> spp.									1	
	<i>Acacia terminalis</i>						1	1			1
	<i>Acacia ulicifolia</i>						1				
Gleicheniaceae	<i>Gleichenia microphylla</i>	5	4	5				3		1	1
	<i>Sticherus flabellatus</i> var. <i>flabellatus</i>		5					4			
Goodeniaceae	<i>Dampiera stricta</i>					1					1
Haloragaceae	<i>Gonocarpus micranthus</i>		1								
	<i>Gonocarpus teucrioides</i>		2		1	1	2	1	1	2	
Juncaceae	<i>Juncus planifolius</i>									1	
	<i>Juncus prismatocarpus</i>		1		2						
Juncaginaceae	<i>Triglochin procera</i>		3	1							
Lamiaceae	<i>Prostanthera linearis</i>	2	2	1	3	3	4			2	
Lauraceae	<i>Cassythia glabella</i>		2	1		1		3	4		
Loganiaceae	<i>Logania albiflora</i>		2	1	1			1	3	1	1
	<i>Mitrasacme polymorpha</i>									1	
Lomandraceae	<i>Lomandra cylindrica</i>					1					
	<i>Lomandra fluviatilis</i> ▲ 3RCa	1			3			2	5	1	3
	<i>Lomandra glauca</i>										1
	<i>Lomandra gracilis</i>	1				3					1
	<i>Lomandra longifolia</i>	1			1	3		1	1		
	<i>Lomandra obliqua</i>					1				1	
Myrtaceae	<i>Angophora costata</i>		4	1	1		1		1		1
	<i>Baeckea linifolia</i>	3				1	3	3		2	3
	<i>Callistemon citrinus</i>				4			1		1	
	<i>Corymbia gummiifera</i>				1						
	<i>Darwinia fascicularis</i>	1									
	<i>Eucalyptus agglomerata</i>			1							
	<i>Eucalyptus piperita</i>		1	2		4	1	4		1	4
	<i>Eucalyptus sieberi</i>	4				1	1			1	
	<i>Kunzea ambigua</i>							1			
	<i>Kunzea ericoides</i>										1
	<i>Leptospermum grandifolium</i>						2				
	<i>Leptospermum morrisonii</i>	2	2	4	4		1	1		1	2
	<i>Leptospermum polygalifolium</i>		1			1	1	1	1		1
	<i>Leptospermum squarrosus</i>			1	1	2	2	1		2	1
	<i>Leptospermum trinervium</i>				1		1				
	<i>Melaleuca squarrosa</i>						1	2			

Riparian monitoring sites – Spring 2019

Vegetation cover/abundance

Family	Species	MRIP01S19	MRIP02S19	MRIP03S19	MRIP04S19	MRIP05S19	MRIP06S19	MRIP07S19	MRIP08S19	MRIP11S19	MRIP12S19
	<i>Tristania neriifolia</i>	4					1		2	2	2
	<i>Tristaniopsis collina</i>				1						
	<i>Tristaniopsis laurina</i>							1	4		
Orchidaceae	<i>Cryptostylis erecta</i>					1					
Phormiaceae	<i>Dianella caerulea</i>			1		1		1			
Phyllanthaceae	<i>Phyllanthus hirtellus</i>					1	1				
Pittosporaceae	<i>Billardiera scandens</i>		1			1	1				
Poaceae	<i>Anisopogon avenaceus</i>					1					
	<i>Austrostipa pubescens</i>							1			
	<i>Austrostipa</i> spp.						1				
	<i>Entolasia stricta</i>	2	3	2	3	3	2	2	1	3	2
	<i>Microlaena stipoides</i>				1				1		
	<i>Tetrarrhena juncea</i>					1					
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	4	1	2	1	4	2	3	1	3	3
	<i>Banksia marginata</i>		1	1			1	1		1	1
	<i>Banksia oblongifolia</i>						2				
	<i>Banksia serrata</i>			1		1				4	1
	<i>Grevillea diffusa</i> subsp. <i>diffusa</i>			1							
	<i>Hakea dactyloides</i>	1		1		2	1			3	2
	<i>Hakea gibbosa</i>									1	
	<i>Hakea salicifolia</i>		1	1	1	2	1	4	1	4	1
	<i>Hakea teretifolia</i>	1			1	1	2		4		4
	<i>Lambertia formosa</i>					4					
	<i>Lomatia myricoides</i>	4		4	1		4	3	4	4	4
	<i>Lomatia silaifolia</i>					1					
	<i>Persoonia pinifolia</i>	3	2	3	1	1	3	3	3	2	1
	<i>Petrophile pulchella</i>					2					1
	<i>Stenocarpus salignus</i>				4			2	1	1	
Restionaceae	<i>Baloskion gracile</i>									1	
	<i>Chordifex dimorphus</i>						1		1		3
	<i>Chordifex fastigiatus</i>	3									2
	<i>Empodisma minus</i>		2			3	1				
	<i>Eurychorda complanata</i>	4	1	1							
	<i>Leptocarpus tenax</i>	1			1	1	1				3
	<i>Lepyrodia scariosa</i>	1					2				2
	<i>Sporadanthus gracilis</i>	3			1	3	3	3		3	3
Rhamnaceae	<i>Cryptandra ericoides</i>									1	
	<i>Pomaderris elliptica</i> subsp. <i>elliptica</i>		1	1				1			
Rubiaceae	<i>Opercularia aspera</i>				1	1	1	1	1		
Rutaceae	<i>Leonema dentatum</i>							2		1	1
	<i>Leonema diosmeum</i>	1	1								
	<i>Nematolepis squamea</i> subsp. <i>squamea</i>	1			1		1				1
Santalaceae	<i>Leptomeria acida</i>					1					
Sapindaceae	<i>Dodonaea triquetra</i>	2	4	3	3	4	4	3	3	3	2
Scrophulariaceae	<i>Gratiola peruviana</i>		1		1						
Selaginellaceae	<i>Selaginella uliginosa</i>										1
Smilacaceae	<i>Smilax glycyphylla</i>		2					1	1		1

Riparian monitoring sites – Spring 2019

Vegetation cover/abundance

Family	Species	MRIP01S19	MRIP02S19	MRIP03S19	MRIP04S19	MRIP05S19	MRIP06S19	MRIP07S19	MRIP08S19	MRIP11S19	MRIP12S19
Sterculiaceae	<i>Lasiopetalum ferrugineum</i>	1	1		1			1	1		
Stylidiaceae	<i>Stylidium graminifolium</i>										1
Thymelaeaceae	<i>Pimelea linifolia</i> subsp. <i>linifolia</i>					1			1		
Xanthorrhoeaceae	<i>Xanthorrhoea media</i>	2				2					
Xyridaceae	<i>Xyris gracilis</i>						1				1
	<i>Xyris operculata</i>	1									
	<i>Xyris</i> spp.										1
	Total	40	45	29	35	52	57	46	33	46	62

Cover Abundance Scale (Modified Braun Blanquet)

- 1 = cover less than 5% of site and rare
 2 = cover less than 5% of site and uncommon
 3 = cover of less than 5% and common
 4 = cover of 5-20% of site
 5 = cover of 21-50% of site
 6 = cover of 51-75% of site
 7 = cover of greater than 75%

▲ **RoTAP species**

- 2: Geographic range in Australia less than 100 km
 3: Geographic range in Australia more than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 a: 1000 plants or more are known to occur within a conservation reserve(s)
 -: reserved population size is not accurately known

* Non-native species

Vegetation condition – Riparian sites

Riparian monitoring sites – Spring 2019

Vegetation condition

Family	Species	MRIP01S19	MRIP02S19	MRIP03S19	MRIP04S19	MRIP05S19	MRIP06S19	MRIP07S19	MRIP08S19	MRIP11S19	MRIP12S19
Apiaceae	<i>Actinotus minor</i>						5				5
	<i>Xanthosia pilosa</i>					5	5				5
	<i>Xanthosia tridentata</i>	5					5				5
Asteraceae	<i>Gamochaeta</i> spp.*		5								
	<i>Hypochaeris radicata</i> *										5
Blandfordiaceae	<i>Blandfordia nobilis</i>	5									
Casuarinaceae	<i>Allocasuarina distyla</i>							5	5	5	
	<i>Allocasuarina littoralis</i>	5	5	5	5	5	5	5	5	5	5
Centrolepidaceae	<i>Centrolepis strigosa</i> subsp. <i>strigosa</i>		5								5
Cunoniaceae	<i>Bauera rubioides</i>	5	5	4	5	5	5	5	5	5	5
	<i>Callicoma serratifolia</i>		5					5		5	5
	<i>Ceratopetalum apetalum</i>		4					5			4
	<i>Ceratopetalum gummiferum</i>					5					
Cupressaceae	<i>Callitris rhomboidea</i>				5						
Cyperaceae	<i>Baumea juncea</i>							5	5	5	
	<i>Baumea rubiginosa</i>									5	5
	<i>Baumea</i> spp.					5					
	<i>Caustis flexuosa</i>										5
	<i>Caustis pentandra</i>			5							
	<i>Chorizandra cymbaria</i>				5		5			5	5
	<i>Cyathochaeta diandra</i>						5				
	<i>Cyperus gracilis</i>						5				
	<i>Eleocharis gracilis</i>		5								
	<i>Gahnia sieberiana</i>									5	
	<i>Gymnoschoenus sphaerocephalus</i>	5									
	<i>Isolepis cernua</i>		5								
	<i>Isolepis</i> spp.				5						
	<i>Lepidosperma laterale</i>		5			5					
	<i>Schoenus melanostachys</i>	5	5	5	5	5	5	3		5	5
Dennstaedtiaceae	<i>Pteridium esculentum</i>					5	5				
Dilleniaceae	<i>Hibbertia aspera</i>								5		
	<i>Hibbertia nitida</i> ▲ 2RC-	5	5	5		5	5	5	5	5	5
Doryanthaceae	<i>Doryanthes excelsa</i>		5			5	5			5	
Droseraceae	<i>Drosera binata</i>	5									
	<i>Drosera peltata</i>						5				
	<i>Drosera spatulata</i>		5							5	5
Ericaceae	<i>Epacris longiflora</i>								5		5
	<i>Epacris microphylla</i>	5									5
	<i>Epacris obtusifolia</i>	5	5				5	5			5
	<i>Epacris pulchella</i>						5				
	<i>Leucopogon amplexicaulis</i>		5			5	5	5		5	5
	<i>Leucopogon microphyllus</i> var. <i>microphyllus</i>						5				
	<i>Monotoca scoparia</i>					5					
	<i>Woolfsia pungens</i>						5				5
Euphorbiaceae	<i>Micrantheum ericoides</i>					5	5				
	<i>Pseudanthus pimeleoides</i>	5						5	5		5

Riparian monitoring sites – Spring 2019

Vegetation condition

Family	Species	MRIP01S19	MRIP02S19	MRIP03S19	MRIP04S19	MRIP05S19	MRIP06S19	MRIP07S19	MRIP08S19	MRIP11S19	MRIP12S19
Fabaceae (Faboideae)	<i>Aotus ericoides</i>							5			
	<i>Dillwynia floribunda</i>	5									5
	<i>Dillwynia retorta</i>										5
	<i>Gompholobium glabratum</i>								5		
	<i>Pultenaea blakelyi</i>		5								
	<i>Pultenaea daphnoides</i>									5	
	<i>Pultenaea stipularis</i>						5				5
Fabaceae (Mimosoideae)	<i>Acacia linifolia</i>					5					
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		5			5	5	5	5	5	
	<i>Acacia obtusifolia</i>	5	5	5	5						
	<i>Acacia</i> spp.									5	
	<i>Acacia terminalis</i>						5	5			5
	<i>Acacia ulicifolia</i>						5				
Gleicheniaceae	<i>Gleichenia microphylla</i>	5	5	4				3		5	3
	<i>Sticherus flabellatus</i> var. <i>flabellatus</i>		5					3			
Goodeniaceae	<i>Dampiera stricta</i>					5					5
Haloragaceae	<i>Gonocarpus micranthus</i>		5								
	<i>Gonocarpus teucrioides</i>		5		5	5	5	5	5	5	
Juncaceae	<i>Juncus planifolius</i>									5	
	<i>Juncus prismatocarpus</i>		5		5						
Juncaginaceae	<i>Triglochin procera</i>		5	5							
Lamiaceae	<i>Prostanthera linearis</i>	5	5	1	5	5	5			5	
Lauraceae	<i>Cassytha glabella</i>		4	5		5		5	5		
Loganiaceae	<i>Logania albiflora</i>		5	5	5			5	5	5	5
	<i>Mitrasacme polymorpha</i>									5	
Lomandraceae	<i>Lomandra cylindrica</i>					5					
	<i>Lomandra fluviatilis</i> ▲ 3RCa	4			5			5	5	5	4
	<i>Lomandra glauca</i>										5
	<i>Lomandra gracilis</i>	5				5					5
	<i>Lomandra longifolia</i>	5			5	5		5	5		
	<i>Lomandra obliqua</i>					5				5	
Myrtaceae	<i>Angophora costata</i>		5	5	5		5		5		5
	<i>Baeckea linifolia</i>	4				5	5	5		5	4
	<i>Callistemon citrinus</i>				5			5		5	
	<i>Corymbia gummiifera</i>				5						
	<i>Darwinia fascicularis</i>	5									
	<i>Eucalyptus agglomerata</i>			3							
	<i>Eucalyptus piperita</i>		5	5		5	5	5		5	5
	<i>Eucalyptus sieberi</i>	5				5	5			5	
	<i>Kunzea ambigua</i>							5			
	<i>Kunzea ericoides</i>										5
	<i>Leptospermum grandifolium</i>						5				
	<i>Leptospermum morrisonii</i>	3	5	5	5		5	4		5	5
	<i>Leptospermum polygalifolium</i>		5			5	5	5	3		5
	<i>Leptospermum squarrosum</i>			5	5	5	5	5		5	5
	<i>Leptospermum trinervium</i>				5		5				
	<i>Melaleuca squarrosa</i>						5	5			

Riparian monitoring sites – Spring 2019

Vegetation condition

Family	Species	MRIP01S19	MRIP02S19	MRIP03S19	MRIP04S19	MRIP05S19	MRIP06S19	MRIP07S19	MRIP08S19	MRIP11S19	MRIP12S19
	<i>Tristania neriifolia</i>	3					5		5	5	5
	<i>Tristaniopsis collina</i>				5						
	<i>Tristaniopsis laurina</i>							4	3		
	<i>Cryptostylis erecta</i>					5					
Phormiaceae	<i>Dianella caerulea</i>			5		5		5			
Phyllanthaceae	<i>Phyllanthus hirtellus</i>					5	5				
Pittosporaceae	<i>Billardiera scandens</i>		5			5	5				
Poaceae	<i>Anisopogon avenaceus</i>					5					
	<i>Austrostipa pubescens</i>							5			
	<i>Austrostipa</i> spp.						5				
	<i>Entolasia stricta</i>	5	5	5	5	5	5	5	5	5	5
	<i>Microlaena stipoides</i>				5				5		
	<i>Tetrarrhena juncea</i>					5					
Proteaceae	<i>Banksia ericifolia</i> subsp. <i>ericifolia</i>	5	3	4	5	5	5	4	5	4	4
	<i>Banksia marginata</i>		5	5			5	5		5	5
	<i>Banksia oblongifolia</i>						5				
	<i>Banksia serrata</i>			5		5				5	5
	<i>Grevillea diffusa</i> subsp. <i>diffusa</i>			5							
	<i>Hakea dactyloides</i>	5		5		5	5			5	5
	<i>Hakea gibbosa</i>									3	
	<i>Hakea salicifolia</i>		5	5	5	5	5	5	5	3	5
	<i>Hakea teretifolia</i>	5			5	5	5		5		5
	<i>Lambertia formosa</i>					5					
	<i>Lomatia myricoides</i>	5		5	5		5	5	3	5	5
	<i>Lomatia silaifolia</i>					5					
	<i>Persoonia pinifolia</i>	5	5	5	5	5	5	5	5	5	5
	<i>Petrophile pulchella</i>					5					5
	<i>Stenocarpus salignus</i>				5			5	5	5	
Restionaceae	<i>Baloskion gracile</i>									5	
	<i>Chordifex dimorphus</i>						5		5		5
	<i>Chordifex fastigiatus</i>	5									5
	<i>Empodisma minus</i>		5			5	5				
	<i>Eurychorda complanata</i>	5	5	5							
	<i>Leptocarpus tenax</i>	5			5	5	5				4
	<i>Lepyrodia scariosa</i>	5					5				5
	<i>Sporadanthus gracilis</i>	5			5	5	5	4		5	4
Rhamnaceae	<i>Cryptandra ericoides</i>									5	
	<i>Pomaderris elliptica</i> subsp. <i>elliptica</i>		5	5				5			
Rubiaceae	<i>Opercularia aspera</i>				5	5	5	5	5		
Rutaceae	<i>Leonema dentatum</i>							5		5	5
	<i>Leonema diosmeum</i>	5	5								
	<i>Nematolepis squamea</i> subsp. <i>squamea</i>	5			5		5				5
Santalaceae	<i>Leptomeria acida</i>					5					
Sapindaceae	<i>Dodonaea triquetra</i>	5	5	5	5	5	5	5	5	5	5
Scrophulariaceae	<i>Gratiola peruviana</i>		5		5						
Selaginellaceae	<i>Selaginella uliginosa</i>										5
Smilacaceae	<i>Smilax glycyphylla</i>		5					5	5		5

Riparian monitoring sites – Spring 2019

Vegetation condition

Family	Species	MRIP01S19	MRIP02S19	MRIP03S19	MRIP04S19	MRIP05S19	MRIP06S19	MRIP07S19	MRIP08S19	MRIP11S19	MRIP12S19
Sterculiaceae	<i>Lasiopetalum ferrugineum</i>	5	5		5			5	5		
Stylidiaceae	<i>Stylidium graminifolium</i>										5
Thymelaeaceae	<i>Pimelea linifolia</i> subsp. <i>linifolia</i>					5			5		
Xanthorrhoeaceae	<i>Xanthorrhoea media</i>	5				5					
Xyridaceae	<i>Xyris gracilis</i>						5				5
	<i>Xyris operculata</i>	5									
	<i>Xyris</i> spp.										5
	Total	40	45	29	35	52	57	46	33	46	62

Condition Scale

- 1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

* Non-native species

▲ **RoTAP species**

- 2: Geographic range in Australia less than 100 km
 3: Geographic range in Australia more than 100 km
 R: Rare in Australia but does not have an identifiable threat
 C: Reserved in that at least one population is found in a national park or other proclaimed conservation reserve
 a: 1000 plants or more are known to occur within a conservation reserve(s)
 -: reserved population size is not accurately known

Indicator species data – Riparian sites

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP01	<i>Lomatia myricoides</i>	g1	309837.05	6214400.19	5	1
MRIP01	<i>Lomatia myricoides</i>	g2	309837.62	6214399.31	5	1
MRIP01	<i>Lomatia myricoides</i>	g3	309833.83	6214408.03	5	1
MRIP01	<i>Lomatia myricoides</i>	g4	309834.08	6214414.09	5	1
MRIP01	<i>Lomatia myricoides</i>	g5	309833.24	6214421.61	4	1
MRIP01	<i>Lomatia myricoides</i>	g6	309834.45	6214418.39	5	1
MRIP01	<i>Lomatia myricoides</i>	g7	309833.21	6214422.30	5	1
MRIP01	<i>Lomatia myricoides</i>	g8/g201	309835.42	6214423.21	4	1
MRIP01	<i>Lomatia myricoides</i>	g9	309835.66	6214424.22	4	1
MRIP01	<i>Lomatia myricoides</i>	g10	309831.98	6214425.37	5	1
MRIP01	<i>Lomatia myricoides</i>	g11	309834.56	6214437.71	4	1
MRIP01	<i>Lomatia myricoides</i>	g12	309836.93	6214437.47	5	1
MRIP01	<i>Lomatia myricoides</i>	g13	309832.58	6214449.33	5	1
MRIP01	<i>Lomatia myricoides</i>	g14	309848.87	6214503.10	5	1
MRIP01	<i>Lomatia myricoides</i>	g15	309847.80	6214507.66	4	1
MRIP01	<i>Lomatia myricoides</i>	g16	309859.87	6214465.50	1	1
MRIP01	<i>Lomatia myricoides</i>	g17	309865.17	6214385.45	4	1
MRIP01	<i>Lomatia myricoides</i>	g18	309856.19	6214409.62	5	1
MRIP01	<i>Lomatia myricoides</i>	g19	309861.03	6214396.51	4	1
MRIP01	<i>Lomatia myricoides</i>	g20	309854.59	6214392.10	4	1
MRIP01	<i>Prostanthera linearis</i>	h1	309835.83	6214401.73	1	1
MRIP01	<i>Prostanthera linearis</i>	h2	309833.89	6214404.88	1	1
MRIP01	<i>Prostanthera linearis</i>	h3	309833.73	6214406.01	1	1
MRIP01	<i>Prostanthera linearis</i>	h4	309830.52	6214410.46	1	1
MRIP01	<i>Prostanthera linearis</i>	h5	309833.02	6214415.31	5	1
MRIP01	<i>Prostanthera linearis</i>	h6	309834.98	6214437.33	1	1
MRIP01	<i>Prostanthera linearis</i>	h7	309835.48	6214439.12	1	1
MRIP01	<i>Prostanthera linearis</i>	h8	309839.38	6214478.91	1	1
MRIP01	<i>Prostanthera linearis</i>	h9	309852.30	6214437.60	3	1
MRIP01	<i>Prostanthera linearis</i>	h10	309855.42	6214426.52	1	1
MRIP01	<i>Prostanthera linearis</i>	h11	309871.29	6214376.62	1	1
MRIP01	<i>Prostanthera linearis</i>	h12	309857.10	6214409.67	1	1
MRIP01	<i>Prostanthera linearis</i>	h13	309855.70	6214413.75	1	1
MRIP01	<i>Prostanthera linearis</i>	h14	309856.74	6214411.92	1	1
MRIP01	<i>Prostanthera linearis</i>	h15	309857.35	6214405.90	4	1
MRIP01	<i>Prostanthera linearis</i>	h16	309856.26	6214408.28	1	1
MRIP01	<i>Prostanthera linearis</i>	h17	309857.99	6214398.62	1	1
MRIP01	<i>Prostanthera linearis</i>	h18	309859.32	6214400.36	1	1
MRIP01	<i>Prostanthera linearis</i>	h19	309858.06	6214402.33	1	1
MRIP01	<i>Prostanthera linearis</i>	h20	309856.96	6214405.66	5	1
MRIP01	<i>Schoenus melanostachys</i>	i1	309836.48	6214402.00	5	5
MRIP01	<i>Schoenus melanostachys</i>	i2	309833.11	6214412.77	1	1
MRIP01	<i>Schoenus melanostachys</i>	i3 / i202	309835.86	6214421.74	3	5
MRIP01	<i>Schoenus melanostachys</i>	i4	309832.37	6214421.94	3	3
MRIP01	<i>Schoenus melanostachys</i>	i5	309835.65	6214426.47	5	4
MRIP01	<i>Schoenus melanostachys</i>	i6	309835.17	6214428.48	4	4
MRIP01	<i>Schoenus melanostachys</i>	i7	309832.80	6214448.35	4	5

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP01	<i>Schoenus melanostachys</i>	i8	309835.93	6214466.55	3	2
MRIP01	<i>Schoenus melanostachys</i>	i9	309839.58	6214478.86	3	2
MRIP01	<i>Schoenus melanostachys</i>	i10	309836.80	6214485.48	5	5
MRIP01	<i>Schoenus melanostachys</i>	i11	309837.25	6214479.07	2	2
MRIP01	<i>Schoenus melanostachys</i>	i12	309843.97	6214490.82	3	1
MRIP01	<i>Schoenus melanostachys</i>	i13	309845.61	6214505.91	3	4
MRIP01	<i>Schoenus melanostachys</i>	i14	309862.07	6214483.87	3	3
MRIP01	<i>Schoenus melanostachys</i>	i15	309860.10	6214466.75	1	1
MRIP01	<i>Schoenus melanostachys</i>	i16	309859.70	6214464.60	2	2
MRIP01	<i>Schoenus melanostachys</i>	i17	309859.33	6214463.14	1	1
MRIP01	<i>Schoenus melanostachys</i>	i18/i201	309859.74	6214464.24	2	1
MRIP01	<i>Schoenus melanostachys</i>	i19	309851.68	6214448.23	4	4
MRIP01	<i>Schoenus melanostachys</i>	i20	309861.46	6214401.95	3	4
MRIP02	<i>Lomatia myricoides</i>	g21	310017.33	6214640.81	2	1
MRIP02	<i>Lomatia myricoides</i>	g22	310021.92	6214643.97	4	1
MRIP02	<i>Lomatia myricoides</i>	g23	310029.02	6214646.43	1	1
MRIP02	<i>Lomatia myricoides</i>	g24	310038.73	6214649.66	1	1
MRIP02	<i>Lomatia myricoides</i>	g25	310017.62	6214643.23	3	1
MRIP02	<i>Lomatia myricoides</i>	g26	310015.69	6214645.06	5	1
MRIP02	<i>Lomatia myricoides</i>	g27	310047.56	6214654.63	3	1
MRIP02	<i>Lomatia myricoides</i>	g28	310048.71	6214654.16	5	1
MRIP02	<i>Lomatia myricoides</i>	g29	310049.46	6214654.27	1	1
MRIP02	<i>Lomatia myricoides</i>	g30	310052.11	6214656.77	3	1
MRIP02	<i>Lomatia myricoides</i>	g31	310053.74	6214655.79	5	1
MRIP02	<i>Lomatia myricoides</i>	g32	310058.19	6214660.87	5	1
MRIP02	<i>Lomatia myricoides</i>	g33	310063.83	6214660.46	3	1
MRIP02	<i>Lomatia myricoides</i>	g34	310000.94	6214625.13	1	1
MRIP02	<i>Lomatia myricoides</i>	g35	310001.97	6214620.28	3	1
MRIP02	<i>Lomatia myricoides</i>	g36	310003.86	6214626.73	1	1
MRIP02	<i>Lomatia myricoides</i>	g37	310008.64	6214625.29	1	1
MRIP02	<i>Lomatia myricoides</i>	g38	310014.13	6214629.20	1	1
MRIP02	<i>Lomatia myricoides</i>	g39	310020.71	6214622.93	2	1
MRIP02	<i>Lomatia myricoides</i>	g40	310025.36	6214629.70	2	1
MRIP02	<i>Prostanthera linearis</i>	h21	310018.57	6214642.40	1	1
MRIP02	<i>Prostanthera linearis</i>	h22	310023.46	6214645.59	5	1
MRIP02	<i>Prostanthera linearis</i>	h23	310028.14	6214644.77	1	1
MRIP02	<i>Prostanthera linearis</i>	h24	310028.66	6214643.88	1	1
MRIP02	<i>Prostanthera linearis</i>	h25	310032.27	6214644.86	1	1
MRIP02	<i>Prostanthera linearis</i>	h26	310033.36	6214647.67	1	1
MRIP02	<i>Prostanthera linearis</i>	h27	310035.35	6214649.21	1	1
MRIP02	<i>Prostanthera linearis</i>	h28	310036.09	6214649.23	1	1
MRIP02	<i>Prostanthera linearis</i>	h29	310037.13	6214650.01	3	1
MRIP02	<i>Prostanthera linearis</i>	h30	310057.12	6214658.39	1	1
MRIP02	<i>Prostanthera linearis</i>	h31	310038.65	6214650.02	1	1
MRIP02	<i>Prostanthera linearis</i>	h32	310016.54	6214643.40	2	2
MRIP02	<i>Prostanthera linearis</i>	h33	310017.74	6214645.23	1	1
MRIP02	<i>Prostanthera linearis</i>	h34	310041.32	6214652.06	1	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP02	<i>Prostanthera linearis</i>	h35	310042.35	6214652.24	1	1
MRIP02	<i>Prostanthera linearis</i>	h36	310046.77	6214654.71	5	1
MRIP02	<i>Prostanthera linearis</i>	h37	310051.44	6214656.51	1	1
MRIP02	<i>Prostanthera linearis</i>	h38	310039.83	6214650.09	4	1
MRIP02	<i>Prostanthera linearis</i>	h39	310058.81	6214659.13	3	5
MRIP02	<i>Prostanthera linearis</i>	h40	310057.77	6214659.11	1	1
MRIP02	<i>Schoenus melanostachys</i>	i21	310023.60	6214643.06	1	1
MRIP02	<i>Schoenus melanostachys</i>	i22	310024.05	6214645.35	1	1
MRIP02	<i>Schoenus melanostachys</i>	i23	310027.04	6214643.88	1	1
MRIP02	<i>Schoenus melanostachys</i>	i24	310030.42	6214645.26	1	1
MRIP02	<i>Schoenus melanostachys</i>	i25	310034.82	6214648.10	1	1
MRIP02	<i>Schoenus melanostachys</i>	i26	310018.01	6214639.72	1	1
MRIP02	<i>Schoenus melanostachys</i>	i27	310016.64	6214644.70	1	1
MRIP02	<i>Schoenus melanostachys</i>	i28	310041.89	6214652.00	4	5
MRIP02	<i>Schoenus melanostachys</i>	i29	310043.11	6214652.56	1	1
MRIP02	<i>Schoenus melanostachys</i>	i30	310052.20	6214654.31	1	1
MRIP02	<i>Schoenus melanostachys</i>	i31	310054.31	6214654.94	1	1
MRIP02	<i>Schoenus melanostachys</i>	i32	310005.79	6214624.20	1	1
MRIP02	<i>Schoenus melanostachys</i>	i33	310005.67	6214623.93	1	1
MRIP02	<i>Schoenus melanostachys</i>	i34	310007.89	6214626.86	1	1
MRIP02	<i>Schoenus melanostachys</i>	i35	310010.04	6214626.39	1	1
MRIP02	<i>Schoenus melanostachys</i>	i36	310014.83	6214626.73	1	1
MRIP02	<i>Schoenus melanostachys</i>	i37	310014.39	6214628.16	1	1
MRIP02	<i>Schoenus melanostachys</i>	i38	310021.72	6214629.48	1	1
MRIP02	<i>Schoenus melanostachys</i>	i39	310024.65	6214630.31	1	1
MRIP02	<i>Schoenus melanostachys</i>	i40	310034.17	6214633.12	5	4
MRIP03	<i>Lomatia myricoides</i>	g101	310514.87	6215342.81	5	1
MRIP03	<i>Lomatia myricoides</i>	g102	310501.18	6215333.12	5	1
MRIP03	<i>Lomatia myricoides</i>	g103	310497.38	6215330.40	5	1
MRIP03	<i>Lomatia myricoides</i>	g104	310483.20	6215320.88	5	1
MRIP03	<i>Lomatia myricoides</i>	g105	310493.94	6215320.73	4	1
MRIP03	<i>Lomatia myricoides</i>	g106	310453.34	6215293.74	5	1
MRIP03	<i>Lomatia myricoides</i>	g107	310452.40	6215292.80	5	1
MRIP03	<i>Lomatia myricoides</i>	g108	310448.73	6215292.57	5	1
MRIP03	<i>Lomatia myricoides</i>	g109	310448.10	6215290.27	5	1
MRIP03	<i>Lomatia myricoides</i>	g110	310450.75	6215289.20	5	1
MRIP03	<i>Lomatia myricoides</i>	g111	310511.17	6215338.40	5	1
MRIP03	<i>Lomatia myricoides</i>	g112	310508.09	6215337.03	5	1
MRIP03	<i>Lomatia myricoides</i>	g113	310490.84	6215324.19	5	1
MRIP03	<i>Lomatia myricoides</i>	g114	310492.02	6215328.78	5	1
MRIP03	<i>Lomatia myricoides</i>	g115	310477.74	6215316.09	5	1
MRIP03	<i>Lomatia myricoides</i>	g116	310458.56	6215302.23	5	1
MRIP03	<i>Lomatia myricoides</i>	g117	310462.08	6215303.66	4	1
MRIP03	<i>Lomatia myricoides</i>	g118	310448.63	6215284.67	5	1
MRIP03	<i>Lomatia myricoides</i>	g119	310445.74	6215285.40	3	1
MRIP03	<i>Lomatia myricoides</i>	g120	310415.57	6215305.10	4	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP03	<i>Prostanthera linearis</i>	h101	310504.75	6215334.00	1	1
MRIP03	<i>Prostanthera linearis</i>	h102	310496.20	6215328.43	5	3
MRIP03	<i>Prostanthera linearis</i>	h103	310496.53	6215327.78	1	1
MRIP03	<i>Prostanthera linearis</i>	h104	310496.37	6215327.49	1	1
MRIP03	<i>Prostanthera linearis</i>	h105	310494.72	6215325.03	1	1
MRIP03	<i>Prostanthera linearis</i>	h106	310492.91	6215321.99	1	1
MRIP03	<i>Prostanthera linearis</i>	h107/h203	310490.88	6215324.01	1	1
MRIP03	<i>Prostanthera linearis</i>	h108	310474.30	6215322.91	1	1
MRIP03	<i>Prostanthera linearis</i>	h109	310459.63	6215297.08	1	1
MRIP03	<i>Prostanthera linearis</i>	h110	310457.72	6215296.59	4	1
MRIP03	<i>Prostanthera linearis</i>	h111	310457.38	6215296.27	5	2
MRIP03	<i>Prostanthera linearis</i>	h112	310452.49	6215290.79	1	1
MRIP03	<i>Prostanthera linearis</i>	h113	310418.06	6215303.87	1	1
MRIP03	<i>Prostanthera linearis</i>	h114	310425.33	6215313.07	1	1
MRIP03	<i>Prostanthera linearis</i>	h115	310433.64	6215311.76	5	1
MRIP03	<i>Prostanthera linearis</i>	h116	310437.45	6215313.88	1	1
MRIP03	<i>Prostanthera linearis</i>	h117	310436.89	6215313.54	1	1
MRIP03	<i>Prostanthera linearis</i>	h118	310445.64	6215316.86	5	1
MRIP03	<i>Prostanthera linearis</i>	h119	310448.29	6215318.67	5	1
MRIP03	<i>Prostanthera linearis</i>	h120	310448.94	6215317.09	3	1
MRIP03	<i>Schoenus melanostachys</i>	i121	310520.35	6215342.50	2	1
MRIP03	<i>Schoenus melanostachys</i>	i122/i204	310509.34	6215337.58	3	1
MRIP03	<i>Schoenus melanostachys</i>	i123	310501.99	6215335.06	1	2
MRIP03	<i>Schoenus melanostachys</i>	i124	310501.79	6215331.97	1	1
MRIP03	<i>Schoenus melanostachys</i>	i125	310495.51	6215331.40	1	1
MRIP03	<i>Schoenus melanostachys</i>	i126/i205	310486.08	6215322.63	4	4
MRIP03	<i>Schoenus melanostachys</i>	i127	310485.46	6215319.97	2	1
MRIP03	<i>Schoenus melanostachys</i>	i128	310479.33	6215316.91	4	4
MRIP03	<i>Schoenus melanostachys</i>	i129	310475.94	6215315.09	2	1
MRIP03	<i>Schoenus melanostachys</i>	i130	310460.21	6215298.50	4	4
MRIP03	<i>Schoenus melanostachys</i>	i131	310459.11	6215297.78	1	1
MRIP03	<i>Schoenus melanostachys</i>	i132/i206	310455.42	6215294.93	2	2
MRIP03	<i>Schoenus melanostachys</i>	i133/i207	310445.00	6215282.00	2	1
MRIP03	<i>Schoenus melanostachys</i>	i134	310440.62	6215285.05	5	5
MRIP03	<i>Schoenus melanostachys</i>	i135	310409.10	6215302.50	2	3
MRIP03	<i>Schoenus melanostachys</i>	i136	310424.44	6215312.50	1	1
MRIP03	<i>Schoenus melanostachys</i>	i137	310427.48	6215311.81	2	1
MRIP03	<i>Schoenus melanostachys</i>	i138	310441.21	6215288.02	3	5
MRIP03	<i>Schoenus melanostachys</i>	i139	310447.44	6215280.99	3	3
MRIP03	<i>Schoenus melanostachys</i>	i140	310497.55	6215323.12	3	1
MRIP04	<i>Lomatia myricoides</i>	g121	311009.17	6215481.13	1	1
MRIP04	<i>Lomatia myricoides</i>	g122	311006.53	6215475.78	4	1
MRIP04	<i>Lomatia myricoides</i>	g123	311062.49	6215496.47	5	1
MRIP04	<i>Lomatia myricoides</i>	g124	311060.59	6215493.29	5	1
MRIP04	<i>Lomatia myricoides</i>	g125	311068.13	6215499.66	5	1
MRIP04	<i>Lomatia myricoides</i>	g126	311070.42	6215498.34	5	1
MRIP04	<i>Lomatia myricoides</i>	g127	311071.93	6215504.89	4	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP04	<i>Lomatia myricoides</i>	g128	311075.17	6215506.75	4	1
MRIP04	<i>Lomatia myricoides</i>	g129	311073.20	6215498.96	5	1
MRIP04	<i>Lomatia myricoides</i>	g130	311073.72	6215498.61	5	1
MRIP04	<i>Lomatia myricoides</i>	g131	311076.14	6215500.68	5	1
MRIP04	<i>Lomatia myricoides</i>	g132	311075.85	6215501.94	4	1
MRIP04	<i>Lomatia myricoides</i>	g133	311077.16	6215502.92	5	1
MRIP04	<i>Lomatia myricoides</i>	g134	311073.60	6215503.85	5	1
MRIP04	<i>Lomatia myricoides</i>	g135	311084.99	6215504.97	4	1
MRIP04	<i>Lomatia myricoides</i>	g136	311089.89	6215505.30	4	1
MRIP04	<i>Lomatia myricoides</i>	g137	311064.71	6215516.30	4	1
MRIP04	<i>Lomatia myricoides</i>	g138	311074.25	6215520.67	4	1
MRIP04	<i>Lomatia myricoides</i>	g139	311068.53	6215519.91	4	1
MRIP04	<i>Lomatia myricoides</i>	g140	311082.29	6215517.28	5	1
MRIP04	<i>Prostanthera linearis</i>	h121	311020.93	6215482.89	1	1
MRIP04	<i>Prostanthera linearis</i>	h122	311030.16	6215476.69	3	1
MRIP04	<i>Prostanthera linearis</i>	h123	311041.99	6215486.94	1	1
MRIP04	<i>Prostanthera linearis</i>	h124	311049.86	6215488.02	4	3
MRIP04	<i>Prostanthera linearis</i>	h125	311049.72	6215483.21	1	1
MRIP04	<i>Prostanthera linearis</i>	h126	311053.16	6215487.44	1	1
MRIP04	<i>Prostanthera linearis</i>	h127	311054.22	6215488.99	1	1
MRIP04	<i>Prostanthera linearis</i>	h128	311053.91	6215487.27	1	1
MRIP04	<i>Prostanthera linearis</i>	h129	311062.90	6215489.38	1	1
MRIP04	<i>Prostanthera linearis</i>	h130	311060.13	6215491.91	5	1
MRIP04	<i>Prostanthera linearis</i>	h131	311063.06	6215492.35	1	1
MRIP04	<i>Prostanthera linearis</i>	h132	311063.71	6215495.15	1	1
MRIP04	<i>Prostanthera linearis</i>	h133	311060.45	6215497.58	1	1
MRIP04	<i>Prostanthera linearis</i>	h134	311067.72	6215492.01	1	1
MRIP04	<i>Prostanthera linearis</i>	h135	311077.80	6215498.34	1	1
MRIP04	<i>Prostanthera linearis</i>	h136	311077.89	6215499.63	4	1
MRIP04	<i>Prostanthera linearis</i>	h137	311080.63	6215501.37	1	1
MRIP04	<i>Prostanthera linearis</i>	h138/h192	311080.13	6215500.54	1	1
MRIP04	<i>Prostanthera linearis</i>	h139	311069.72	6215520.17	1	1
MRIP04	<i>Prostanthera linearis</i>	h140	311066.37	6215518.28	1	1
MRIP04	<i>Schoenus melanostachys</i>	i101	311008.30	6215470.76	3	3
MRIP04	<i>Schoenus melanostachys</i>	i102	311006.16	6215479.08	3	3
MRIP04	<i>Schoenus melanostachys</i>	i103	311042.12	6215488.07	4	2
MRIP04	<i>Schoenus melanostachys</i>	i104	311051.84	6215486.33	4	4
MRIP04	<i>Schoenus melanostachys</i>	i105	311063.11	6215496.46	5	3
MRIP04	<i>Schoenus melanostachys</i>	i106	311068.60	6215500.54	5	5
MRIP04	<i>Schoenus melanostachys</i>	i107	311070.51	6215501.81	5	5
MRIP04	<i>Schoenus melanostachys</i>	i108	311076.05	6215504.98	5	5
MRIP04	<i>Schoenus melanostachys</i>	i109	311074.72	6215508.03	5	4
MRIP04	<i>Schoenus melanostachys</i>	i110	311083.67	6215504.78	4	4
MRIP04	<i>Schoenus melanostachys</i>	i111	311087.18	6215503.52	4	4
MRIP04	<i>Schoenus melanostachys</i>	i112	311074.35	6215521.23	3	2
MRIP04	<i>Schoenus melanostachys</i>	i113	311054.08	6215513.12	5	4
MRIP04	<i>Schoenus melanostachys</i>	i114	311018.85	6215509.38	3	3

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP04	<i>Schoenus melanostachys</i>	i115	311063.43	6215518.08	3	1
MRIP04	<i>Schoenus melanostachys</i>	i116	311024.12	6215511.47	3	2
MRIP04	<i>Schoenus melanostachys</i>	i117	311023.34	6215510.88	4	1
MRIP04	<i>Schoenus melanostachys</i>	i118	311019.97	6215511.47	5	4
MRIP04	<i>Schoenus melanostachys</i>	i119	311019.72	6215493.75	4	4
MRIP04	<i>Schoenus melanostachys</i>	i120	311017.06	6215508.65	3	3
MRIP05	<i>Lomatia myricoides</i>	g61	311462.67	6213713.33	5	1
MRIP05	<i>Lomatia myricoides</i>	g62	311462.19	6213709.16	1	1
MRIP05	<i>Lomatia myricoides</i>	g63	311460.42	6213720.26	1	1
MRIP05	<i>Lomatia myricoides</i>	g64	311460.96	6213722.25	4	1
MRIP05	<i>Lomatia myricoides</i>	g65	311464.70	6213721.90	4	1
MRIP05	<i>Lomatia myricoides</i>	g66	311461.49	6213725.56	1	1
MRIP05	<i>Lomatia myricoides</i>	g67	311495.51	6213780.20	4	1
MRIP05	<i>Lomatia myricoides</i>	g68/ g205	311526.37	6213808.77	1	1
MRIP05	<i>Lomatia myricoides</i>	g69/g204	311526.12	6213809.95	5	1
MRIP05	<i>Lomatia myricoides</i>	g70	311524.26	6213811.72	1	1
MRIP05	<i>Lomatia myricoides</i>	g71	311524.60	6213811.33	1	1
MRIP05	<i>Lomatia myricoides</i>	g72	311524.20	6213818.07	4	1
MRIP05	<i>Lomatia myricoides</i>	g73	311523.63	6213818.38	4	1
MRIP05	<i>Lomatia myricoides</i>	g74	311520.64	6213814.59	4	1
MRIP05	<i>Lomatia myricoides</i>	g75	311519.78	6213812.96	4	1
MRIP05	<i>Lomatia myricoides</i>	g76	311502.57	6213794.07	3	1
MRIP05	<i>Lomatia myricoides</i>	g77	311500.90	6213793.99	1	1
MRIP05	<i>Lomatia myricoides</i>	g78	311494.86	6213785.28	5	1
MRIP05	<i>Lomatia myricoides</i>	g79	311521.25	6213820.94	5	1
MRIP05	<i>Lomatia myricoides</i>	g80	311529.32	6213815.57	4	1
MRIP05	<i>Prostanthera linearis</i>	h61	311462.89	6213722.39	1	1
MRIP05	<i>Prostanthera linearis</i>	h62/h202	311463.82	6213723.92	1	1
MRIP05	<i>Prostanthera linearis</i>	h63	311462.07	6213722.06	1	1
MRIP05	<i>Prostanthera linearis</i>	h64	311464.61	6213726.57	1	1
MRIP05	<i>Prostanthera linearis</i>	h65	311465.24	6213726.49	1	1
MRIP05	<i>Prostanthera linearis</i>	h66	311465.61	6213729.74	1	1
MRIP05	<i>Prostanthera linearis</i>	h67	311466.97	6213731.80	1	1
MRIP05	<i>Prostanthera linearis</i>	h68	311469.31	6213733.21	4	1
MRIP05	<i>Prostanthera linearis</i>	h69	311471.02	6213733.77	4	1
MRIP05	<i>Prostanthera linearis</i>	h70	311473.82	6213744.67	1	1
MRIP05	<i>Prostanthera linearis</i>	h71	311479.54	6213759.90	1	1
MRIP05	<i>Prostanthera linearis</i>	h72	311486.40	6213769.73	3	1
MRIP05	<i>Prostanthera linearis</i>	h73	311485.87	6213771.97	1	1
MRIP05	<i>Prostanthera linearis</i>	h74	311490.80	6213774.20	5	1
MRIP05	<i>Prostanthera linearis</i>	h75	311494.11	6213776.26	1	1
MRIP05	<i>Prostanthera linearis</i>	h76	311503.44	6213776.72	1	1
MRIP05	<i>Prostanthera linearis</i>	h77	311503.00	6213784.91	1	1
MRIP05	<i>Prostanthera linearis</i>	h78	311510.51	6213790.11	5	1
MRIP05	<i>Prostanthera linearis</i>	h79	311524.97	6213805.82	3	1
MRIP05	<i>Prostanthera linearis</i>	h80	311525.62	6213807.69	1	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP05	<i>Schoenus melanostachys</i>	i61	311465.40	6213721.59	1	1
MRIP05	<i>Schoenus melanostachys</i>	i62	311463.37	6213727.12	4	1
MRIP05	<i>Schoenus melanostachys</i>	i63	311467.68	6213733.43	4	1
MRIP05	<i>Schoenus melanostachys</i>	i64	311474.04	6213737.50	4	1
MRIP05	<i>Schoenus melanostachys</i>	i65	311474.82	6213738.59	4	1
MRIP05	<i>Schoenus melanostachys</i>	i66	311474.08	6213744.63	4	1
MRIP05	<i>Schoenus melanostachys</i>	i67	311473.14	6213742.00	1	1
MRIP05	<i>Schoenus melanostachys</i>	i68	311480.08	6213760.04	4	1
MRIP05	<i>Schoenus melanostachys</i>	i69	311483.58	6213758.74	1	1
MRIP05	<i>Schoenus melanostachys</i>	i70	311481.03	6213761.76	3	1
MRIP05	<i>Schoenus melanostachys</i>	i71	311488.44	6213767.98	3	1
MRIP05	<i>Schoenus melanostachys</i>	i72	311488.29	6213769.51	3	1
MRIP05	<i>Schoenus melanostachys</i>	i73	311498.73	6213781.09	1	1
MRIP05	<i>Schoenus melanostachys</i>	i74	311503.12	6213780.74	4	1
MRIP05	<i>Schoenus melanostachys</i>	i75	311503.41	6213785.15	2	1
MRIP05	<i>Schoenus melanostachys</i>	i76	311505.67	6213784.05	2	1
MRIP05	<i>Schoenus melanostachys</i>	i77	311506.01	6213786.56	3	1
MRIP05	<i>Schoenus melanostachys</i>	i78	311513.03	6213791.94	3	1
MRIP05	<i>Schoenus melanostachys</i>	i79	311523.25	6213817.64	1	1
MRIP05	<i>Schoenus melanostachys</i>	i80	311523.83	6213819.00	2	1
MRIP06	<i>Lomatia myricoides</i>	g81	311571.09	6213885.94	5	1
MRIP06	<i>Lomatia myricoides</i>	g82/g253	311572.45	6213887.90	5	1
MRIP06	<i>Lomatia myricoides</i>	g83	311572.68	6213888.32	5	1
MRIP06	<i>Lomatia myricoides</i>	g84	311573.77	6213894.66	4	1
MRIP06	<i>Lomatia myricoides</i>	g85	311580.35	6213896.08	4	1
MRIP06	<i>Lomatia myricoides</i>	g86	311576.62	6213893.67	4	1
MRIP06	<i>Lomatia myricoides</i>	g87	311569.17	6213877.91	5	1
MRIP06	<i>Lomatia myricoides</i>	g88	311586.74	6213896.08	4	1
MRIP06	<i>Lomatia myricoides</i>	g89	311585.86	6213899.64	4	1
MRIP06	<i>Lomatia myricoides</i>	g90	311588.16	6213900.74	4	1
MRIP06	<i>Lomatia myricoides</i>	g91	311590.42	6213909.49	4	1
MRIP06	<i>Lomatia myricoides</i>	g92	311592.83	6213923.13	5	1
MRIP06	<i>Lomatia myricoides</i>	g93/g254	311599.11	6213931.93	3	1
MRIP06	<i>Lomatia myricoides</i>	g94	311602.59	6213935.17	1	1
MRIP06	<i>Lomatia myricoides</i>	g95	311603.16	6213934.66	4	1
MRIP06	<i>Lomatia myricoides</i>	g96	311605.35	6213936.02	3	1
MRIP06	<i>Lomatia myricoides</i>	g97	311599.64	6213940.48	5	1
MRIP06	<i>Lomatia myricoides</i>	g98	311609.01	6213949.69	3	1
MRIP06	<i>Lomatia myricoides</i>	g99	311596.36	6213932.90	4	1
MRIP06	<i>Lomatia myricoides</i>	g100	311611.83	6213971.72	4	1
MRIP06	<i>Prostanthera linearis</i>	h81	311569.10	6213886.04	4	1
MRIP06	<i>Prostanthera linearis</i>	h82/h204	311570.42	6213887.42	1	1
MRIP06	<i>Prostanthera linearis</i>	h83	311571.44	6213890.12	1	1
MRIP06	<i>Prostanthera linearis</i>	h84/h205	311572.98	6213893.89	1	1
MRIP06	<i>Prostanthera linearis</i>	h85	311575.57	6213895.86	1	1
MRIP06	<i>Prostanthera linearis</i>	h86	311575.40	6213898.04	1	1
MRIP06	<i>Prostanthera linearis</i>	h87	311581.66	6213898.01	1	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP06	<i>Prostanthera linearis</i>	h88	311579.48	6213900.32	5	1
MRIP06	<i>Prostanthera linearis</i>	h89	311583.44	6213903.68	3	1
MRIP06	<i>Prostanthera linearis</i>	h90	311578.81	6213875.86	1	1
MRIP06	<i>Prostanthera linearis</i>	h91	311595.65	6213895.17	1	1
MRIP06	<i>Prostanthera linearis</i>	h92	311588.52	6213902.08	3	1
MRIP06	<i>Prostanthera linearis</i>	h93	311591.18	6213906.49	1	1
MRIP06	<i>Prostanthera linearis</i>	h94	311591.38	6213911.33	1	1
MRIP06	<i>Prostanthera linearis</i>	h95/h206	311592.61	6213911.87	1	1
MRIP06	<i>Prostanthera linearis</i>	h96/h207	311592.93	6213912.72	1	1
MRIP06	<i>Prostanthera linearis</i>	h97/h208	311597.52	6213921.43	1	1
MRIP06	<i>Prostanthera linearis</i>	h98	311597.11	6213922.78	1	1
MRIP06	<i>Prostanthera linearis</i>	h99/h209	311601.36	6213934.28	4	1
MRIP06	<i>Prostanthera linearis</i>	h100	311601.82	6213930.93	1	1
MRIP06	<i>Schoenus melanostachys</i>	i81	311569.91	6213889.70	4	1
MRIP06	<i>Schoenus melanostachys</i>	i82	311568.20	6213889.95	3	1
MRIP06	<i>Schoenus melanostachys</i>	i83	311571.93	6213893.12	3	1
MRIP06	<i>Schoenus melanostachys</i>	i84	311581.75	6213898.45	5	1
MRIP06	<i>Schoenus melanostachys</i>	i85	311582.53	6213902.10	4	1
MRIP06	<i>Schoenus melanostachys</i>	i86	311576.65	6213893.05	3	1
MRIP06	<i>Schoenus melanostachys</i>	i87	311571.37	6213873.78	2	1
MRIP06	<i>Schoenus melanostachys</i>	i88	311587.31	6213900.33	2	1
MRIP06	<i>Schoenus melanostachys</i>	i89/i209	311588.00	6213902.00	3	1
MRIP06	<i>Schoenus melanostachys</i>	i90	311586.31	6213904.15	3	1
MRIP06	<i>Schoenus melanostachys</i>	i91	311590.24	6213906.60	4	1
MRIP06	<i>Schoenus melanostachys</i>	i210	311595.74	6213919.86	3	1
MRIP06	<i>Schoenus melanostachys</i>	i93	311595.97	6213924.95	3	1
MRIP06	<i>Schoenus melanostachys</i>	i94	311599.82	6213925.85	3	1
MRIP06	<i>Schoenus melanostachys</i>	i251	311603.85	6213923.76	3	1
MRIP06	<i>Schoenus melanostachys</i>	i96	311604.89	6213937.52	4	1
MRIP06	<i>Schoenus melanostachys</i>	i97/i252	311600.73	6213938.54	4	1
MRIP06	<i>Schoenus melanostachys</i>	i98	311596.17	6213934.90	2	1
MRIP06	<i>Schoenus melanostachys</i>	i99	311595.05	6213932.76	4	1
MRIP06	<i>Schoenus melanostachys</i>	i100	311600.13	6213940.30	3	1
MRIP07	<i>Lomatia myricoides</i>	g161	312157.03	6215252.97	1	1
MRIP07	<i>Lomatia myricoides</i>	g162	312156.25	6215254.65	5	1
MRIP07	<i>Lomatia myricoides</i>	g163	312158.94	6215257.64	5	1
MRIP07	<i>Lomatia myricoides</i>	g164	312153.70	6215262.63	5	1
MRIP07	<i>Lomatia myricoides</i>	g165	312156.94	6215269.27	3	1
MRIP07	<i>Lomatia myricoides</i>	g166	312160.16	6215274.28	4	1
MRIP07	<i>Lomatia myricoides</i>	g167	312160.18	6215277.56	4	1
MRIP07	<i>Lomatia myricoides</i>	g168	312159.92	6215282.65	4	1
MRIP07	<i>Lomatia myricoides</i>	g169	312157.76	6215287.82	1	1
MRIP07	<i>Lomatia myricoides</i>	g170/g208	312159.82	6215297.59	4	1
MRIP07	<i>Lomatia myricoides</i>	g171	312159.97	6215304.48	5	1
MRIP07	<i>Lomatia myricoides</i>	g172	312159.82	6215313.03	4	1
MRIP07	<i>Lomatia myricoides</i>	g173	312150.07	6215266.88	5	1
MRIP07	<i>Lomatia myricoides</i>	g174	312144.99	6215267.78	3	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP07	<i>Lomatia myricoides</i>	g175	312150.36	6215272.46	2	1
MRIP07	<i>Lomatia myricoides</i>	g176	312149.95	6215274.61	5	1
MRIP07	<i>Lomatia myricoides</i>	g177	312146.49	6215276.77	4	1
MRIP07	<i>Lomatia myricoides</i>	g178	312151.46	6215280.33	3	1
MRIP07	<i>Lomatia myricoides</i>	g179	312148.90	6215292.09	3	1
MRIP07	<i>Lomatia myricoides</i>	g180	312152.78	6215311.31	3	1
MRIP07	<i>Prostanthera linearis</i>	h161	312164.01	6215325.03	4	2
MRIP07	<i>Prostanthera linearis</i>	h162	312165.16	6215325.37	5	3
MRIP07	<i>Prostanthera linearis</i>	h163	312150.05	6215266.75	1	1
MRIP07	<i>Prostanthera linearis</i>	h164	312148.87	6215285.11	4	1
MRIP07	<i>Prostanthera linearis</i>	h165	312149.54	6215287.48	5	1
MRIP07	<i>Prostanthera linearis</i>	h166	312150.42	6215285.00	4	1
MRIP07	<i>Prostanthera linearis</i>	h167	312150.76	6215301.54	1	1
MRIP07	<i>Prostanthera linearis</i>	h168	312152.83	6215309.40	1	1
MRIP07	<i>Prostanthera linearis</i>	h169	312152.79	6215310.49	5	1
MRIP07	<i>Prostanthera linearis</i>	h170	312154.61	6215308.46	5	1
MRIP07	<i>Prostanthera linearis</i>	h171/h193	312152.77	6215309.50	4	1
MRIP07	<i>Prostanthera linearis</i>	h172	312150.23	6215312.30	3	1
MRIP07	<i>Prostanthera linearis</i>	h173/h194	312151.62	6215310.88	1	1
MRIP07	<i>Prostanthera linearis</i>	h174	312153.51	6215310.52	5	1
MRIP07	<i>Prostanthera linearis</i>	h175	312152.85	6215314.22	4	1
MRIP07	<i>Prostanthera linearis</i>	h176	312154.76	6215314.00	3	1
MRIP07	<i>Prostanthera linearis</i>	h177/h195	312153.48	6215312.38	3	1
MRIP07	<i>Prostanthera linearis</i>	h178	312153.16	6215316.44	1	1
MRIP07	<i>Prostanthera linearis</i>	h179	312154.66	6215322.06	1	1
MRIP07	<i>Prostanthera linearis</i>	h180	312148.57	6215331.48	5	1
MRIP07	<i>Schoenus melanostachys</i>	i161	312159.61	6215259.47	2	1
MRIP07	<i>Schoenus melanostachys</i>	i162	312156.76	6215268.16	3	1
MRIP07	<i>Schoenus melanostachys</i>	i163	312161.30	6215270.97	1	1
MRIP07	<i>Schoenus melanostachys</i>	i164	312160.63	6215274.19	2	1
MRIP07	<i>Schoenus melanostachys</i>	i165	312157.33	6215278.10	3	1
MRIP07	<i>Schoenus melanostachys</i>	i166	312156.92	6215287.95	4	1
MRIP07	<i>Schoenus melanostachys</i>	i167	312159.36	6215292.64	1	1
MRIP07	<i>Schoenus melanostachys</i>	i168	312164.60	6215309.12	3	1
MRIP07	<i>Schoenus melanostachys</i>	i169	312166.03	6215313.11	2	4
MRIP07	<i>Schoenus melanostachys</i>	i170	312150.30	6215269.97	4	1
MRIP07	<i>Schoenus melanostachys</i>	i171	312150.63	6215266.52	2	1
MRIP07	<i>Schoenus melanostachys</i>	i172	312144.34	6215267.51	3	3
MRIP07	<i>Schoenus melanostachys</i>	i173	312145.63	6215256.76	1	1
MRIP07	<i>Schoenus melanostachys</i>	i174	312151.01	6215276.25	3	1
MRIP07	<i>Schoenus melanostachys</i>	i175	312148.93	6215287.39	5	1
MRIP07	<i>Schoenus melanostachys</i>	i176	312147.84	6215295.25	3	3
MRIP07	<i>Schoenus melanostachys</i>	i177	312146.17	6215298.07	5	1
MRIP07	<i>Schoenus melanostachys</i>	i178	312149.54	6215297.70	3	1
MRIP07	<i>Schoenus melanostachys</i>	i179	312150.48	6215302.79	4	1
MRIP07	<i>Schoenus melanostachys</i>	i180	312153.05	6215309.58	3	4

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP08	<i>Lomatia myricoides</i>	g181	312167.00	6215486.96	4	1
MRIP08	<i>Lomatia myricoides</i>	g182/g209	312166.19	6215490.00	4	1
MRIP08	<i>Lomatia myricoides</i>	g183	312163.61	6215490.88	3	1
MRIP08	<i>Lomatia myricoides</i>	g184	312162.85	6215494.49	1	1
MRIP08	<i>Lomatia myricoides</i>	g185	312166.08	6215498.35	4	1
MRIP08	<i>Lomatia myricoides</i>	g186	312157.40	6215492.79	4	1
MRIP08	<i>Lomatia myricoides</i>	g187	312156.48	6215492.78	2	1
MRIP08	<i>Lomatia myricoides</i>	g188/g210	312158.21	6215496.84	3	1
MRIP08	<i>Lomatia myricoides</i>	g189	312156.43	6215496.97	3	1
MRIP08	<i>Lomatia myricoides</i>	g190	312158.36	6215498.37	4	1
MRIP08	<i>Lomatia myricoides</i>	g191	312157.92	6215501.42	4	1
MRIP08	<i>Lomatia myricoides</i>	g192	312159.94	6215502.37	4	1
MRIP08	<i>Lomatia myricoides</i>	g193/g251	312155.80	6215504.32	4	1
MRIP08	<i>Lomatia myricoides</i>	g194	312153.34	6215502.02	3	1
MRIP08	<i>Lomatia myricoides</i>	g195	312152.84	6215501.41	4	1
MRIP08	<i>Lomatia myricoides</i>	g196	312152.07	6215504.52	4	1
MRIP08	<i>Lomatia myricoides</i>	g197/g252	312152.98	6215506.22	3	1
MRIP08	<i>Lomatia myricoides</i>	g198	312152.86	6215510.83	4	1
MRIP08	<i>Lomatia myricoides</i>	g199	312155.06	6215513.72	5	1
MRIP08	<i>Lomatia myricoides</i>	g200	312154.85	6215515.81	5	1
MRIP08	<i>Prostanthera linearis</i>	h181	312179.02	6215457.71	4	1
MRIP08	<i>Prostanthera linearis</i>	h182	312179.39	6215459.68	1	1
MRIP08	<i>Prostanthera linearis</i>	h183	312168.89	6215506.53	4	3
MRIP08	<i>Prostanthera linearis</i>	h184/h196	312154.07	6215492.16	1	1
MRIP08	<i>Prostanthera linearis</i>	h185	312149.34	6215499.87	4	1
MRIP08	<i>Prostanthera linearis</i>	h186	312150.07	6215498.51	1	3
MRIP08	<i>Prostanthera linearis</i>	h187	312146.17	6215532.19	1	1
MRIP08	<i>Prostanthera linearis</i>	h188	312158.91	6215548.28	1	1
MRIP08	<i>Prostanthera linearis</i>	h189	312163.39	6215555.89	5	1
MRIP08	<i>Prostanthera linearis</i>	h190	312177.63	6215573.32	1	1
MRIP08	<i>Schoenus melanostachys</i>	i181	312163.55	6215490.29	1	1
MRIP08	<i>Schoenus melanostachys</i>	i182	312165.00	6215499.22	3	1
MRIP08	<i>Schoenus melanostachys</i>	i183	312159.28	6215498.84	1	1
MRIP08	<i>Schoenus melanostachys</i>	i184	312153.13	6215527.03	1	1
MRIP08	<i>Schoenus melanostachys</i>	i185	312152.04	6215528.26	3	1
MRIP08	<i>Schoenus melanostachys</i>	i186	312151.98	6215531.69	3	1
MRIP08	<i>Schoenus melanostachys</i>	i187	312151.60	6215532.84	4	1
MRIP08	<i>Schoenus melanostachys</i>	i188	312151.39	6215534.11	5	4
MRIP08	<i>Schoenus melanostachys</i>	i189	312150.46	6215536.12	2	1
MRIP08	<i>Schoenus melanostachys</i>	i190	312148.53	6215536.56	2	1
MRIP08	<i>Schoenus melanostachys</i>	i191	312148.64	6215536.74	1	1
MRIP08	<i>Schoenus melanostachys</i>	i192	312147.77	6215538.52	2	1
MRIP08	<i>Schoenus melanostachys</i>	i193	312150.85	6215544.73	5	2
MRIP08	<i>Schoenus melanostachys</i>	i194	312147.86	6215546.04	3	1
MRIP08	<i>Schoenus melanostachys</i>	i195	312148.26	6215551.16	4	1
MRIP08	<i>Schoenus melanostachys</i>	i196	312172.89	6215491.21	2	1
MRIP08	<i>Schoenus melanostachys</i>	i197	312172.32	6215502.96	3	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP08	<i>Schoenus melanostachys</i>	i198	312169.93	6215505.14	4	3
MRIP08	<i>Schoenus melanostachys</i>	i199	312170.30	6215506.92	3	1
MRIP08	<i>Schoenus melanostachys</i>	i200	312167.79	6215509.63	4	2
MRIP09	<i>Lomatia myricoides</i>	g41/g202	311423.68	6213567.45	5	1
MRIP09	<i>Lomatia myricoides</i>	g42/g203	311422.77	6213566.64	5	1
MRIP09	<i>Lomatia myricoides</i>	g43	311438.01	6213610.51	4	1
MRIP09	<i>Lomatia myricoides</i>	g44	311432.92	6213615.63	5	1
MRIP09	<i>Lomatia myricoides</i>	g45	311427.31	6213615.46	1	1
MRIP09	<i>Lomatia myricoides</i>	g46	311421.42	6213626.47	4	1
MRIP09	<i>Lomatia myricoides</i>	g47	311426.95	6213628.22	5	1
MRIP09	<i>Lomatia myricoides</i>	g48	311430.07	6213629.71	5	1
MRIP09	<i>Lomatia myricoides</i>	g49	311427.97	6213628.32	5	1
MRIP09	<i>Lomatia myricoides</i>	g50	311441.57	6213647.06	4	1
MRIP09	<i>Lomatia myricoides</i>	g51	311444.36	6213651.94	2	1
MRIP09	<i>Lomatia myricoides</i>	g52	311441.40	6213645.19	4	1
MRIP09	<i>Lomatia myricoides</i>	g53	311437.91	6213663.08	4	1
MRIP09	<i>Lomatia myricoides</i>	g54	311438.22	6213669.28	3	1
MRIP09	<i>Lomatia myricoides</i>	g55	311447.06	6213686.06	5	1
MRIP09	<i>Lomatia myricoides</i>	g56	311434.98	6213655.95	4	1
MRIP09	<i>Lomatia myricoides</i>	g57	311439.97	6213651.18	4	1
MRIP09	<i>Lomatia myricoides</i>	g58	311450.06	6213654.36	5	1
MRIP09	<i>Lomatia myricoides</i>	g59	311451.16	6213658.85	3	1
MRIP09	<i>Lomatia myricoides</i>	g60	311433.81	6213642.43	5	1
MRIP09	<i>Prostanthera linearis</i>	h41	311424.49	6213567.14	4	1
MRIP09	<i>Prostanthera linearis</i>	h42	311423.95	6213574.22	1	1
MRIP09	<i>Prostanthera linearis</i>	h43	311426.13	6213572.82	3	1
MRIP09	<i>Prostanthera linearis</i>	h44	311427.19	6213571.69	4	1
MRIP09	<i>Prostanthera linearis</i>	h45	311440.62	6213592.46	1	1
MRIP09	<i>Prostanthera linearis</i>	h46	311441.82	6213604.54	4	1
MRIP09	<i>Prostanthera linearis</i>	h47	311438.61	6213610.84	4	1
MRIP09	<i>Prostanthera linearis</i>	h48	311436.79	6213613.74	3	1
MRIP09	<i>Prostanthera linearis</i>	h49	311435.01	6213615.47	3	1
MRIP09	<i>Prostanthera linearis</i>	h50	311432.83	6213626.87	3	1
MRIP09	<i>Prostanthera linearis</i>	h51/h201	311431.15	6213629.20	1	1
MRIP09	<i>Prostanthera linearis</i>	h52	311430.28	6213629.74	3	1
MRIP09	<i>Prostanthera linearis</i>	h53	311428.16	6213629.63	1	1
MRIP09	<i>Prostanthera linearis</i>	h54	311432.64	6213631.15	1	1
MRIP09	<i>Prostanthera linearis</i>	h55	311432.15	6213637.11	4	1
MRIP09	<i>Prostanthera linearis</i>	h56	311446.54	6213651.86	1	1
MRIP09	<i>Prostanthera linearis</i>	h57	311446.24	6213652.32	1	1
MRIP09	<i>Prostanthera linearis</i>	h58	311442.51	6213647.59	3	1
MRIP09	<i>Prostanthera linearis</i>	h59	311438.84	6213665.94	5	1
MRIP09	<i>Prostanthera linearis</i>	h60	311438.12	6213669.43	1	1
MRIP09	<i>Schoenus melanostachys</i>	i41	311424.94	6213571.37	4	1
MRIP09	<i>Schoenus melanostachys</i>	i42	311424.10	6213574.74	4	1
MRIP09	<i>Schoenus melanostachys</i>	i43	311430.49	6213580.51	3	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP09	<i>Schoenus melanostachys</i>	i44	311432.28	6213580.27	2	1
MRIP09	<i>Schoenus melanostachys</i>	i45	311432.70	6213587.80	5	1
MRIP09	<i>Schoenus melanostachys</i>	i46	311437.12	6213595.98	4	1
MRIP09	<i>Schoenus melanostachys</i>	i47	311439.32	6213598.00	4	1
MRIP09	<i>Schoenus melanostachys</i>	i48	311440.79	6213603.98	4	1
MRIP09	<i>Schoenus melanostachys</i>	i49	311438.28	6213612.23	2	1
MRIP09	<i>Schoenus melanostachys</i>	i50	311428.96	6213614.90	1	1
MRIP09	<i>Schoenus melanostachys</i>	i51	311427.71	6213618.42	4	1
MRIP09	<i>Schoenus melanostachys</i>	i52	311430.75	6213628.60	4	1
MRIP09	<i>Schoenus melanostachys</i>	i53	311432.80	6213627.64	3	1
MRIP09	<i>Schoenus melanostachys</i>	i54	311432.82	6213630.80	3	1
MRIP09	<i>Schoenus melanostachys</i>	i55	311445.79	6213652.95	2	1
MRIP09	<i>Schoenus melanostachys</i>	i56	311441.47	6213678.65	4	1
MRIP09	<i>Schoenus melanostachys</i>	i57	311442.36	6213683.92	4	1
MRIP09	<i>Schoenus melanostachys</i>	i58	311444.67	6213654.76	1	1
MRIP09	<i>Schoenus melanostachys</i>	i59	311448.83	6213658.22	4	1
MRIP09	<i>Schoenus melanostachys</i>	i60	311422.48	6213646.12	3	1
MRIP10	<i>Lomatia myricoides</i>	g141	311145.93	6215581.65	5	1
MRIP10	<i>Lomatia myricoides</i>	g142	311138.53	6215591.28	5	1
MRIP10	<i>Lomatia myricoides</i>	g143	311136.08	6215601.18	5	1
MRIP10	<i>Lomatia myricoides</i>	g144	311134.45	6215603.96	5	1
MRIP10	<i>Lomatia myricoides</i>	g145	311129.75	6215610.34	5	1
MRIP10	<i>Lomatia myricoides</i>	g146	311128.79	6215613.61	3	1
MRIP10	<i>Lomatia myricoides</i>	g147	311121.36	6215626.16	4	1
MRIP10	<i>Lomatia myricoides</i>	g148	311117.61	6215631.09	5	1
MRIP10	<i>Lomatia myricoides</i>	g149	311100.59	6215637.36	5	1
MRIP10	<i>Lomatia myricoides</i>	g150	311098.18	6215646.19	5	1
MRIP10	<i>Lomatia myricoides</i>	g151/g206	311097.47	6215652.44	4	1
MRIP10	<i>Lomatia myricoides</i>	g152	311111.00	6215661.00	5	1
MRIP10	<i>Lomatia myricoides</i>	g153	311124.00	6215643.00	1	1
MRIP10	<i>Lomatia myricoides</i>	g154	311120.00	6215651.00	4	1
MRIP10	<i>Lomatia myricoides</i>	g155	311131.00	6215647.00	4	1
MRIP10	<i>Lomatia myricoides</i>	g156	311129.00	6215639.00	5	1
MRIP10	<i>Lomatia myricoides</i>	g157	311130.00	6215639.00	5	1
MRIP10	<i>Lomatia myricoides</i>	g158	311129.00	6215635.00	5	1
MRIP10	<i>Lomatia myricoides</i>	g159	311141.00	6215629.00	5	1
MRIP10	<i>Lomatia myricoides</i>	g160	311146.00	6215622.00	5	1
MRIP10	<i>Prostanthera linearis</i>	h141	311151.15	6215567.38	1	1
MRIP10	<i>Prostanthera linearis</i>	h142	311147.66	6215565.51	1	1
MRIP10	<i>Prostanthera linearis</i>	h143	311149.40	6215572.19	5	1
MRIP10	<i>Prostanthera linearis</i>	h144	311146.25	6215574.29	1	1
MRIP10	<i>Prostanthera linearis</i>	h145	311135.96	6215591.55	1	1
MRIP10	<i>Prostanthera linearis</i>	h146	311134.85	6215587.90	5	1
MRIP10	<i>Prostanthera linearis</i>	h147	311123.30	6215616.34	1	1
MRIP10	<i>Prostanthera linearis</i>	h148	311114.93	6215630.12	1	1
MRIP10	<i>Prostanthera linearis</i>	h149	311102.96	6215636.98	1	1
MRIP10	<i>Prostanthera linearis</i>	h150	311128.00	6215649.00	1	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP10	<i>Prostanthera linearis</i>	h151	311133.00	6215651.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h152	311133.00	6215646.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h153	311128.00	6215638.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h154	311132.00	6215635.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h155	311139.00	6215629.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h156	311134.00	6215624.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h157	311145.00	6215623.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h158	311143.00	6215620.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h159	311126.00	6215618.00	1	1
MRIP10	<i>Prostanthera linearis</i>	h160	311125.00	6215608.00	1	1
MRIP10	<i>Schoenus melanostachys</i>	i141/i203	311153.01	6215565.92	3	3
MRIP10	<i>Schoenus melanostachys</i>	i142	311136.15	6215601.71	3	2
MRIP10	<i>Schoenus melanostachys</i>	i143	311135.33	6215603.34	3	1
MRIP10	<i>Schoenus melanostachys</i>	i144	311132.73	6215609.57	4	4
MRIP10	<i>Schoenus melanostachys</i>	i145	311134.98	6215587.70	2	1
MRIP10	<i>Schoenus melanostachys</i>	i146	311129.79	6215612.52	1	1
MRIP10	<i>Schoenus melanostachys</i>	i147	311117.12	6215630.11	3	3
MRIP10	<i>Schoenus melanostachys</i>	i148	311116.61	6215630.60	3	4
MRIP10	<i>Schoenus melanostachys</i>	i149	311105.74	6215650.40	4	4
MRIP10	<i>Schoenus melanostachys</i>	i150	311093.09	6215653.73	4	3
MRIP10	<i>Schoenus melanostachys</i>	i151	311099.20	6215673.72	4	5
MRIP10	<i>Schoenus melanostachys</i>	i152	311115.34	6215670.38	3	2
MRIP10	<i>Schoenus melanostachys</i>	i153	311120.00	6215652.00	5	5
MRIP10	<i>Schoenus melanostachys</i>	i154	311133.00	6215636.00	4	4
MRIP10	<i>Schoenus melanostachys</i>	i155	311132.00	6215632.00	5	5
MRIP10	<i>Schoenus melanostachys</i>	i156	311136.00	6215626.00	5	5
MRIP10	<i>Schoenus melanostachys</i>	i157	311151.00	6215552.00	4	4
MRIP10	<i>Schoenus melanostachys</i>	i158	311157.00	6215552.00	1	1
MRIP10	<i>Schoenus melanostachys</i>	i159	311159.00	6215551.00	2	1
MRIP10	<i>Schoenus melanostachys</i>	i160	311168.00	6215559.00	4	3
MRIP11	<i>Lomatia myricoides</i>	g211	311692.08	6214310.48	2	1
MRIP11	<i>Lomatia myricoides</i>	g212	311695.25	6214317.92	3	1
MRIP11	<i>Lomatia myricoides</i>	g213	311705.63	6214342.10	5	1
MRIP11	<i>Lomatia myricoides</i>	g214	311707.29	6214347.77	5	1
MRIP11	<i>Lomatia myricoides</i>	g215	311707.94	6214348.42	4	1
MRIP11	<i>Lomatia myricoides</i>	g216	311709.10	6214350.36	5	1
MRIP11	<i>Lomatia myricoides</i>	g217	311711.34	6214346.11	4	1
MRIP11	<i>Lomatia myricoides</i>	g218	311711.71	6214343.83	5	1
MRIP11	<i>Lomatia myricoides</i>	g219	311710.56	6214354.29	5	1
MRIP11	<i>Lomatia myricoides</i>	g220	311709.30	6214362.93	5	1
MRIP11	<i>Lomatia myricoides</i>	g221	311723.34	6214390.17	4	1
MRIP11	<i>Lomatia myricoides</i>	g222	311725.41	6214394.24	4	1
MRIP11	<i>Lomatia myricoides</i>	g223	311728.45	6214398.62	3	1
MRIP11	<i>Lomatia myricoides</i>	g224	311731.58	6214413.13	3	1
MRIP11	<i>Lomatia myricoides</i>	g225	311741.88	6214432.67	4	1
MRIP11	<i>Lomatia myricoides</i>	g226	311744.45	6214435.94	5	1
MRIP11	<i>Lomatia myricoides</i>	g227	311750.43	6214438.37	3	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP11	<i>Lomatia myricoides</i>	g228	311748.77	6214435.03	4	1
MRIP11	<i>Lomatia myricoides</i>	g229	311745.10	6214436.73	5	1
MRIP11	<i>Lomatia myricoides</i>	g230	311742.81	6214434.07	5	1
MRIP11	<i>Prostanthera linearis</i>	h211	311692.46	6214315.22	5	4
MRIP11	<i>Prostanthera linearis</i>	h212	311693.53	6214315.79	1	1
MRIP11	<i>Prostanthera linearis</i>	h213	311695.76	6214318.42	1	1
MRIP11	<i>Prostanthera linearis</i>	h214	311702.87	6214337.20	5	4
MRIP11	<i>Prostanthera linearis</i>	h215	311708.35	6214348.72	4	2
MRIP11	<i>Prostanthera linearis</i>	h216	311712.69	6214363.30	5	2
MRIP11	<i>Prostanthera linearis</i>	h217	311712.64	6214364.09	4	3
MRIP11	<i>Prostanthera linearis</i>	h218	311724.24	6214390.03	5	3
MRIP11	<i>Prostanthera linearis</i>	h219	311726.20	6214394.87	4	3
MRIP11	<i>Prostanthera linearis</i>	h220	311725.83	6214395.54	4	2
MRIP11	<i>Prostanthera linearis</i>	h221	311726.39	6214396.02	4	3
MRIP11	<i>Prostanthera linearis</i>	h222	311726.64	6214396.78	1	1
MRIP11	<i>Prostanthera linearis</i>	h223	311728.72	6214401.46	5	5
MRIP11	<i>Prostanthera linearis</i>	h224	311741.29	6214432.08	4	2
MRIP11	<i>Prostanthera linearis</i>	h225	311751.11	6214435.98	1	1
MRIP11	<i>Prostanthera linearis</i>	h226	311749.18	6214434.52	1	1
MRIP11	<i>Prostanthera linearis</i>	h227	311751.08	6214434.73	4	2
MRIP11	<i>Prostanthera linearis</i>	h228	311749.65	6214432.02	3	3
MRIP11	<i>Prostanthera linearis</i>	h229	311746.68	6214430.64	1	1
MRIP11	<i>Prostanthera linearis</i>	h230	311748.25	6214432.01	1	1
MRIP11	<i>Schoenus melanostachys</i>	i211	311696.93	6214322.55	4	4
MRIP11	<i>Schoenus melanostachys</i>	i212	311700.47	6214332.02	4	2
MRIP11	<i>Schoenus melanostachys</i>	i213	311706.86	6214345.00	4	1
MRIP11	<i>Schoenus melanostachys</i>	i214	311712.37	6214346.49	4	4
MRIP11	<i>Schoenus melanostachys</i>	i215	311712.20	6214344.10	4	3
MRIP11	<i>Schoenus melanostachys</i>	i216	311711.87	6214344.49	4	2
MRIP11	<i>Schoenus melanostachys</i>	i217	311711.60	6214351.03	4	2
MRIP11	<i>Schoenus melanostachys</i>	i218	311711.52	6214356.75	5	5
MRIP11	<i>Schoenus melanostachys</i>	i219	311712.18	6214362.81	2	1
MRIP11	<i>Schoenus melanostachys</i>	i220	311712.88	6214362.60	4	5
MRIP11	<i>Schoenus melanostachys</i>	i221	311712.33	6214363.88	3	4
MRIP11	<i>Schoenus melanostachys</i>	i222	311711.47	6214364.53	5	4
MRIP11	<i>Schoenus melanostachys</i>	i223	311723.90	6214388.00	5	5
MRIP11	<i>Schoenus melanostachys</i>	i224	311722.86	6214393.04	5	4
MRIP11	<i>Schoenus melanostachys</i>	i225	311729.09	6214397.36	4	4
MRIP11	<i>Schoenus melanostachys</i>	i226	311730.61	6214415.83	4	5
MRIP11	<i>Schoenus melanostachys</i>	i227	311737.08	6214425.05	4	3
MRIP11	<i>Schoenus melanostachys</i>	i228	311750.41	6214438.82	2	2
MRIP11	<i>Schoenus melanostachys</i>	i229	311750.25	6214436.55	5	5
MRIP11	<i>Schoenus melanostachys</i>	i230	311747.40	6214425.62	5	5
MRIP12	<i>Lomatia myricoides</i>	g231	312211.68	6214866.26	5	1
MRIP12	<i>Lomatia myricoides</i>	g232	312217.57	6214854.10	3	1
MRIP12	<i>Lomatia myricoides</i>	g233	312225.55	6214843.91	3	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP12	<i>Lomatia myricoides</i>	g234	312226.08	6214837.74	5	1
MRIP12	<i>Lomatia myricoides</i>	g235	312227.55	6214836.18	4	1
MRIP12	<i>Lomatia myricoides</i>	g236	312231.55	6214822.99	5	1
MRIP12	<i>Lomatia myricoides</i>	g237	312228.98	6214819.89	4	1
MRIP12	<i>Lomatia myricoides</i>	g238	312231.41	6214817.10	3	1
MRIP12	<i>Lomatia myricoides</i>	g239	312229.23	6214814.46	5	1
MRIP12	<i>Lomatia myricoides</i>	g240	312228.01	6214813.80	4	1
MRIP12	<i>Lomatia myricoides</i>	g241	312228.33	6214808.09	3	1
MRIP12	<i>Lomatia myricoides</i>	g242	312230.57	6214852.61	3	1
MRIP12	<i>Lomatia myricoides</i>	g243	312230.23	6214846.96	1	1
MRIP12	<i>Lomatia myricoides</i>	g244	312238.72	6214830.02	4	1
MRIP12	<i>Lomatia myricoides</i>	g245	312240.26	6214826.08	3	1
MRIP12	<i>Lomatia myricoides</i>	g246	312239.97	6214820.13	3	1
MRIP12	<i>Lomatia myricoides</i>	g247	312238.45	6214809.10	5	1
MRIP12	<i>Lomatia myricoides</i>	g248	312235.06	6214801.10	5	1
MRIP12	<i>Lomatia myricoides</i>	g249	312231.51	6214795.79	4	1
MRIP12	<i>Lomatia myricoides</i>	g250	312223.51	6214790.62	3	1
MRIP12	<i>Prostanthera linearis</i>	h231	312232.28	6214817.35	4	1
MRIP12	<i>Prostanthera linearis</i>	h232	312227.48	6214813.85	1	1
MRIP12	<i>Prostanthera linearis</i>	h233	312231.48	6214841.27	1	1
MRIP12	<i>Prostanthera linearis</i>	h234	312232.17	6214840.97	5	1
MRIP12	<i>Prostanthera linearis</i>	h235	312233.59	6214840.39	1	1
MRIP12	<i>Prostanthera linearis</i>	h236	312235.36	6214844.19	5	1
MRIP12	<i>Prostanthera linearis</i>	h237	312242.25	6214822.23	1	1
MRIP12	<i>Prostanthera linearis</i>	h238	312242.57	6214823.91	5	1
MRIP12	<i>Prostanthera linearis</i>	h239	312237.21	6214806.73	1	1
MRIP12	<i>Prostanthera linearis</i>	h240	312237.14	6214796.52	3	1
MRIP12	<i>Prostanthera linearis</i>	h241	312238.02	6214796.54	4	1
MRIP12	<i>Prostanthera linearis</i>	h242	312231.48	6214789.81	5	4
MRIP12	<i>Prostanthera linearis</i>	h243	312230.54	6214786.60	1	1
MRIP12	<i>Prostanthera linearis</i>	h244	312230.68	6214785.54	4	1
MRIP12	<i>Prostanthera linearis</i>	h245	312229.66	6214786.09	4	1
MRIP12	<i>Prostanthera linearis</i>	h246	312232.41	6214786.52	4	1
MRIP12	<i>Prostanthera linearis</i>	h247	312232.11	6214786.86	3	1
MRIP12	<i>Prostanthera linearis</i>	h248	312232.83	6214788.68	1	1
MRIP12	<i>Prostanthera linearis</i>	h249	312232.19	6214787.98	1	1
MRIP12	<i>Prostanthera linearis</i>	h250	312228.31	6214784.02	5	1
MRIP12	<i>Schoenus melanostachys</i>	I231	312222.42	6214842.76	2	1
MRIP12	<i>Schoenus melanostachys</i>	I232	312226.38	6214836.82	3	1
MRIP12	<i>Schoenus melanostachys</i>	I233	312227.68	6214837.06	3	1
MRIP12	<i>Schoenus melanostachys</i>	I234	312228.00	6214830.69	2	2
MRIP12	<i>Schoenus melanostachys</i>	I235	312227.20	6214830.37	2	1
MRIP12	<i>Schoenus melanostachys</i>	I236	312230.19	6214818.47	2	1
MRIP12	<i>Schoenus melanostachys</i>	I237	312227.63	6214809.49	4	1
MRIP12	<i>Schoenus melanostachys</i>	I238	312226.95	6214805.91	3	2
MRIP12	<i>Schoenus melanostachys</i>	I239	312225.69	6214805.42	3	1
MRIP12	<i>Schoenus melanostachys</i>	I240	312231.57	6214853.54	1	1

Riparian monitoring sites – Spring 2019

Condition and Reproductive Rating for riparian indicator species

Site	Species	Tag	Coordinates		Condition	Reproductive Status
			Easting	Northing		
MRIP12	<i>Schoenus melanostachys</i>	I241	312231.20	6214845.78	3	2
MRIP12	<i>Schoenus melanostachys</i>	I242	312231.94	6214842.60	5	3
MRIP12	<i>Schoenus melanostachys</i>	I243	312240.64	6214833.77	3	1
MRIP12	<i>Schoenus melanostachys</i>	I244	312241.44	6214812.72	5	1
MRIP12	<i>Schoenus melanostachys</i>	I245	312237.23	6214806.12	5	5
MRIP12	<i>Schoenus melanostachys</i>	I246	312235.26	6214800.21	4	1
MRIP12	<i>Schoenus melanostachys</i>	I247	312232.50	6214796.95	3	1
MRIP12	<i>Schoenus melanostachys</i>	I248	312227.67	6214785.29	1	1
MRIP12	<i>Schoenus melanostachys</i>	I249	312227.15	6214779.94	3	2
MRIP12	<i>Schoenus melanostachys</i>	I250	312223.39	6214781.53	3	4

NB: Shaded rows indicate dead individuals

Condition Scale

1 = severe damage/dieback
 2 = many dead stems
 3 = some dead branches
 4 = minor damage
 5 = healthy

Reproductive Status:

1 = nil
 2 = sparse (occasional flowers only)
 3 = low (under 25 percent of potential)
 4 = moderate (25 to 75 percent of potential)
 5 = high (over 75 percent of potential flowering)

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