



ML1124/ML7064 Rehabilitation Monitoring 2020

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Table of contents

Glossary of Terms	iv
1 Introduction	1
2 Methodology	2
2.1 Field survey	2
2.2 Analysis	2
3 Results	4
3.1 Site descriptions	4
3.2 Species composition	9
3.3 Species abundance	9
4 Discussion	13
4.1 Species composition	13
4.2 Species abundance	13
5 References	14
Appendix A – Mapping	15
Appendix B – Species List	17
Appendix C – Stem Count Data	22

Tables

Table 3-1 Description of rehabilitation and reference sites sampled on 2020	6
Table 3-2 Results of Sorenson's Index of Similarity (SIS) comparing the species composition of reference and rehabilitation sites	9
Table 3-3 Year-on-year comparison of mean Sorenson's Index of Similarity (SIS) recorded at rehabilitation sites	9
Table 3-4 Stem count (n) and proportion of site total (%) for reference and rehabilitation sites	10

Figures

Figure 3-1 North-facing slope of 2019 rehabilitation	4
Figure 3-2 Ponding in 2019 rehabilitation	4
Figure 3-3 Erosion gully in 2019 rehabilitation	4
Figure 3-4 Eroded shrub root system in 2019 rehabilitation	4

Glossary of Terms

Acronym	Description
cm	Centimetres
EA	Environmental Approval
km	Kilometres
m	Metres
ML	Mining Lease
sp.	Species (singular)
spp.	Species (plural)
sub sp.	Sub species

1 Introduction

The Mining Leases (ML) 1124 and 7064 has been mined and rehabilitated progressively since 1975. Over 2018 and 2019 Sibelco has been rehabilitating the remaining disturbed areas to allow relinquishment in the coming years. The rehabilitation must meet condition F2-1(a) of the Environmental Authority EPML00349813. This condition concerns the revegetation of rehabilitated areas and is evaluated using monitoring methods detailed in Section 5.2 of Rehabilitation of Disturbed Areas at ML1124, ML1132 and ML7064 North Stradbroke Island (UNIMIN, 2009).

Ausecology Pty Ltd ("Ausecology") was engaged by Sibelco to undertake monitoring of these rehabilitated areas to inform the relinquishment process including the extent of compliance with EA Condition F2-1(a). The primary aim of this monitoring was to compare rehabilitated vegetation to remnant vegetation to assess the progress and quality of the rehabilitation.

2 Methodology

This section details the data collected during the field survey, analysis of the data and limitations of the work.

2.1 Field survey

Two rehabilitation sites were sampled. G1 was located in rehabilitation established in 2018 and was the second year it was sampled. G2 was established located in a rehabilitation block formed in 2019. Both rehabilitation plots were located in an area mapped on the preclearance regional ecosystem (RE) map as RE 12.2.10 and contained a substantial number of *Eucalyptus planchoniana*, the key diagnostic canopy species for the RE. Three reference sites of RE 12.2.10 were sampled for comparison to rehabilitation. Due to variation within ecosystems it is more appropriate to compare rehabilitation site to a suite of reference sites to evaluate the success of the rehabilitation (Gravina, McKenna and Glenn, 2011). Therefore, rather than averaging reference site data each rehabilitation site was compared to each reference site.

At each monitoring site a 50 m tape was laid out. Within a 50 m by 2 m area (1 m either side of the tape) a stem count for each species was recorded. Some species are extremely difficult to determine how many individuals are present due to being multi-stemmed or rhizomatous with subterranean stem junctions. Therefore, for species of the sedge and rush families (Cyperaceae, Restionaceae, Hemerocallidaceae, Juncaceae), grass family (Poaceae), and the *Lomandra* (mat-rushes), *Cassytha* (dodder laurels), *Austromyrtus* (midyum) and *Xanthorrhoea* (grass-trees) genera the foliage projective cover of the individual species was recorded within the 50 m by 2 m area (1 m either side of the tape) instead of a stem count.

Additional flora species were noted within a 10 m by 50 m plot to yield a species list. A 10 m by 50 m plot is standard for measuring the species richness of a site where diversity is highest in the lower strata (Eyre et al., 2015; Neldner et al., 2020).

Start and end of the transect was geolocated using a Trimble Geoxplorer 7 with photos taken from the start and end points along the transect tape. Each site was demarcated with a star picket at the start and end of the transect for year on year replication.

Quaternary assessments as per Neldner et al. (2020) were performed at each site, to justify the selection of reference sites and the comparison of rehabilitation sites to reference sites representing a certain RE.

2.2 Analysis

Data analysis was performed as per Section 5.2 of UNIMIN (2009) and included two components: (1) Index of Similarity and (2) Species Percent Comparison.

2.2.1 Species composition

Sorenson's Index of Similarity (SIS) was employed to compare the species richness of rehabilitation sites to reference sites as measured in a 10 m by 50 m plot. It was calculated for each rehabilitation site in comparison to a corresponding reference site using the formula:

$$SIS = \frac{2c}{a + b}$$

Where:

a = species richness of the rehabilitation site

b = species richness of the reference site

c = number of species found at the rehabilitation site and the reference site

The result of this index is a value between 0 and 1 where 0 is completely different and 1 is identical. A rehabilitation site is compliant with the species composition criteria if it records an SIS value of >0.5 with any one of the three reference sites and maintains or increase that SIS value over two additional, consecutive years.

2.2.2 Species abundance

To identify if certain flora species are too sparse or over abundant within rehabilitated areas compared to the reference sites, the percent contribution of dominant species (those that contribute over 15% of stems to a reference site) are compared with each corresponding rehabilitation site.

This is the methodology stated in Section 5.2 of UNIMIN (2009), and whilst it compares the percent contribution of species dominant in the reference sites to their percent contribution in rehabilitation sites, it does not reveal any information regarding which species are dominant in the rehabilitation. Therefore, the analysis was also performed in reverse by identifying species contributing more than 15% to the stem density of rehabilitation sites and comparing that to the percent contribution of those species to each of the reference sites.

3 Results

This section presents the results of the survey by first describing each site then presenting the results of the similarity analysis of species composition and analysis of species abundance.

3.1 Site descriptions

3.1.1 Rehabilitation sites

Rehabilitation site G1 is located in an area rehabilitated in 2018 (Appendix A; Table 3-1). The vegetation of the site consists of *Eucalyptus planchoniana*, *E. racemosa*, *Corymbia gummifera*, *Acacia suaveolens* and *Banksia aemula* between 1 and 2 m with a sparse low shrub layer dominated by *Acacia ulicifolia*. The ground layer is sparse and dominated by *Caustis recurvata* with native grasses also regenerating.

The 2019 rehabilitation is represented by G2 which was sampled for the first time in this monitoring event. It is dominated by tree and shrub species <1 m with a low shrub layer of mostly *Ochrosperma lineare*, *Acacia ulicifolia* and *Aotus lanigera*. The *Sorghum* sp. cover crop is still dominant in the ground layer with native grasses and some non-native grass species such as *Paspalum urvillei** and *Andropogon virginicus** (whisky grass) also regenerating. The transect was placed in rehabilitation considered 'best-on-offer', avoiding bare-patches, that are more noticeable on the north-facing slope (Figure 3-1).



Figure 3-1 North-facing slope of 2019 rehabilitation



Figure 3-2 Ponding in 2019 rehabilitation



Figure 3-3 Erosion gully in 2019 rehabilitation



Figure 3-4 Eroded shrub root system in 2019 rehabilitation

A small pond has formed in the rehabilitation area in which a vulnerable (*Nature Conservation Act 1992*; NC Act) *Crinia tinnula* (wallum froglet) was heard calling (Figure 3-2). However, as this animal was not visually observed the identification cannot be 100% confirmed. The drainage feature filling the pond is causing an erosion gully to form on the north side of the rehabilitation (Figure 3-3; Figure 3-4).

3.1.2 Reference sites

As the target RE for the rehabilitation was RE 12.2.10, three reference sites were sampled to cover the different canopy species composition and community structure of the Regional Ecosystem (RE) 12.2.10 surrounding the rehabilitation (Table 3-1; Appendix A).

P7 reference site is a woodland co-dominated by *Eucalyptus planchoniana* and *E. racemosa* with scattered *Corymbia gummifera* to 14 m. REF2 reference site is more open than P7, with smaller trees than P7 with mallee *Eucalyptus planchoniana* and *Banksia aemula* dominating the canopy to 10 m with scattered *Eucalyptus racemosa* and *Corymbia gummifera*. REF1 reference site has a similar community structure to REF2 but is co-dominated by *Eucalyptus planchoniana* and *Corymbia gummifera*, however *Eucalyptus racemosa* is absent. Common to all reference sites is a low tree layer of *Banksia aemula* at varying densities.

All three sites had a tall shrub layer, comprised of *Leptospermum trinervium*, *Ricinocarpos pinifolius* and *Monotoca* sp. (Fraser Island P.Baxter 777), which was mid-dense at P7 and REF1 but very sparse at REF2. *Xanthorrhoea johnsonii* can be considered a tall shrub in mature, undisturbed form however at all three sites was present in a trunkless form in the ground layer. At P7 *Leptospermum polygalifolium* and *Baeckea frutescens* formed a tall shrub layer over the latter half of the transect. Each site had a diverse low shrub layer with common shared shrub species being: *Ochrosperma linearis*, *Homoranthus virgatus*, *Leucopogon leptospermoides*, *Boronia rosmarinifolia*, *Acacia ulicifolia* and *Dillwynia retorta*; and common shared ground cover species being: *Caustis recurvata*, *Coleocarya gracilis* and *Platysace ericoides*.

Table 3-1 Description of rehabilitation and reference sites sampled on 2020

Site	Description	Transect Start	Transect End
Rehabilitation Sites			
G1	Shrubland of <i>Eucalyptus planchoniana</i> , <i>Corymbia gummifera</i> and <i>E. racemosa</i> with heath understorey. <i>Acacia baueri</i> subsp. <i>baueri</i> present. Rehabilitation established in 2018.		
G2	Dwarf shrubland of <i>Eucalyptus planchoniana</i> , <i>Corymbia gummifera</i> , <i>Banksia aemula</i> and <i>E. racemosa</i> with <i>Acacia suaveolens</i> . Rehabilitation established in 2019.		

Site	Description	Transect Start	Transect End
Reference Sites			
P7	Woodland to 14 m of <i>E. planchoniana</i> and <i>Eucalyptus racemosa</i> with <i>Corymbia gummifera</i> and a subcanopy of <i>Banksia aemula</i> to 7 m and a dense ground layer of native shrubs.		
REF1	Low open forest of mallee <i>Eucalyptus planchoniana</i> and <i>Corymbia gummifera</i> to 10 m with a <i>Banksia aemula</i> subcanopy to 6 m. Absence of recent fire.		

Site	Description	Transect Start	Transect End
REF2	Low open forest of mallee <i>Eucalyptus planchoniana</i> with <i>Banksia aemula</i> and scattered <i>Eucalyptus racemosa</i> and <i>Corymbia gummifera</i> to 10 m. A subcanopy of <i>Banksia aemula</i> present to 6 m. <i>Acacia baueri</i> subsp. <i>baueri</i> is present at this site.		

3.2 Species composition

A total of 77 native flora species were identified across the three reference and two rehabilitation sites sampled in this monitoring event (Appendix B). A total of 23 species were common to all reference sites but of these 11 were also found at both rehabilitation sites. The species composition of reference site P7 was most similar to REF2 (SIS=0.88), and slightly less similar compared to REF1 (SIS=0.76; Table 3-2). However, the similarity between P7-REF2 (SIS=0.88) and REF2-REF1 (SIS=0.89) were the essentially same. Both G1 and G2 rehabilitation sites were most similar to the P7 reference site, with recorded SIS values of 0.71 and 0.75 respectively. Both the 2018 (G1) and 2019 (G2) rehabilitation recorded mean SIS values of >0.50.

Table 3-2 Results of Sorenson's Index of Similarity (SIS) comparing the species composition of reference and rehabilitation sites

		Species Richness	Reference Sites			Mean
			P7	REF1	REF2	
Reference Sites	P7	42	1.00			
	REF1	34	0.76	1.00		
	REF2	46	0.88	0.89	1.00	
Rehabilitation Sites	G1	37	0.71	0.69	0.67	0.69
	G2	37	0.75	0.64	0.63	0.67

Table 3-3 provides the current monitoring year 2020 results compared to the previous monitoring round results measured in 2019. Previous results are only available for G1 as 2020 is the first monitoring round for G2. The mean 2020 SIS results for the 2018 rehabilitation (G1) of 0.69 is greater than the mean 2019 SIS monitoring results of 0.50 (Table 3-3).

Table 3-3 Year-on-year comparison of mean Sorenson's Index of Similarity (SIS) recorded at rehabilitation sites

Rehabilitation Site	Comparable Reference Site	Establishment Year	SIS	
			2019	2020
G1	P7	2018	0.50	0.69
G2	P7	2019		0.67

3.3 Species abundance

Total stem counts within the 2 m by 50 m plots ranged from 107 at REF1 to 833 at REF2, with P7 having 599 stems in the same sized plot (Table 3-4). In comparison the 2018 rehabilitation sampled at G1 had 77 stems and the 2019 rehabilitation sampled at G2 had 182 stems.

Table 3-4 Stem count (n) and proportion of site total (%) for reference and rehabilitation sites

Species	Reference								Rehabilitation			
	P7		REF1		REF2		Mean		G1		G2	
	n	%	n	%	n	%	n	%	n	%	n	%
<i>Acacia baueri</i> subsp. <i>baueri</i>	0	0.0%	0	0.0%	2	0.2%	0.7	0.1%	1	1.3%	0	0.0%
<i>Acacia complanata</i>	0	0.0%	0	0.0%	1	0.1%	0.3	0.1%	0	0.0%	0	0.0%
<i>Acacia suaveolens</i>	2	0.3%	0	0.0%	0	0.0%	0.7	0.1%	3	3.9%	7	3.8%
<i>Acacia ulicifolia</i>	96	16.0%	1	0.9%	10	1.1%	35.7	6.7%	33	42.9%	55	30.2%
<i>Allocasuarina littoralis</i>	0	0.0%	0	0.0%	0	0.0%	0.0	0.0%	1	1.3%	0	0.0%
<i>Aotus lanigera</i>	11	1.8%	0	0.0%	0	0.0%	3.7	0.7%	0	0.0%	13	7.1%
<i>Baeckea frutescens</i>	53	8.8%	0	0.0%	0	0.0%	17.7	3.3%	0	0.0%	0	0.0%
<i>Banksia aemula</i>	19	3.2%	15	14.0%	35	4.0%	23.0	4.3%	4	5.2%	4	2.2%
<i>Boronia rosmarinifolia</i>	14	2.3%	10	9.3%	10	1.1%	11.3	2.1%	1	1.3%	2	1.1%
<i>Boronia saffrolifera</i>	0	0.0%	0	0.0%	11	1.2%	3.7	0.7%	0	0.0%	0	0.0%
<i>Bossiaea heterophylla</i>	24	4.0%	0	0.0%	16	1.8%	13.3	2.5%	2	2.6%	1	0.5%
<i>Brachyloma scortechinii</i>	4	0.7%	0	0.0%	14	1.6%	6.0	1.1%	0	0.0%	0	0.0%
<i>Conospermum taxifolium</i>	2	0.3%	0	0.0%	50	5.7%	17.3	3.3%	0	0.0%	0	0.0%
<i>Corunastylis psammophila</i>	0	0.0%	0	0.0%	1	0.1%	0.3	0.1%	0	0.0%	0	0.0%
<i>Corymbia gummifera</i>	3	0.5%	6	5.6%	1	0.1%	3.3	0.6%	4	5.2%	2	1.1%
<i>Dillwynia retorta</i>	18	3.0%	1	0.9%	47	5.3%	22.0	4.2%	1	1.3%	3	1.6%
<i>Dodonaea triquetra</i>	0	0.0%	0	0.0%	0	0.0%	0.0	0.0%	0	0.0%	3	1.6%
<i>Eucalyptus planchoniana</i>	1	0.2%	6	5.6%	0	0.0%	2.3	0.4%	9	11.7%	2	1.1%
<i>Eucalyptus racemosa</i>	2	0.3%	0	0.0%	0	0.0%	0.7	0.1%	1	1.3%	0	0.0%
<i>Hibbertia acicularis</i>	1	0.2%	0	0.0%	17	1.9%	6.0	1.1%	0	0.0%	0	0.0%

Species	Reference								Rehabilitation			
	P7		REF1		REF2		Mean		G1		G2	
	n	%	n	%	n	%	n	%	n	%	n	%
<i>Hibbertia linearis</i>	24	4.0%	0	0.0%	34	3.9%	19.3	3.7%	1	1.3%	7	3.8%
<i>Homoranthus virgatus</i>	6	1.0%	1	0.9%	27	3.1%	11.3	2.1%	3	3.9%	2	1.1%
<i>Jacksonia stackhousei</i>	0	0.0%	0	0.0%	3	0.3%	1.0	0.2%	0	0.0%	0	0.0%
<i>Leptospermum polygalifolium</i>	14	2.3%	0	0.0%	0	0.0%	4.7	0.9%	0	0.0%	1	0.5%
<i>Leptospermum semibaccatum</i>	0	0.0%	0	0.0%	23	2.6%	7.7	1.4%	0	0.0%	0	0.0%
<i>Leptospermum trinervium</i>	1	0.2%	7	6.5%	2	0.2%	3.3	0.6%	0	0.0%	2	1.1%
<i>Leucopogon deformis</i>	0	0.0%	0	0.0%	42	4.8%	14.0	2.6%	0	0.0%	0	0.0%
<i>Leucopogon ericoides</i>	17	2.8%	0	0.0%	6	0.7%	7.7	1.4%	0	0.0%	1	0.5%
<i>Leucopogon leptospermoides</i>	15	2.5%	15	14.0%	26	2.9%	18.7	3.5%	0	0.0%	0	0.0%
<i>Leucopogon virgatus</i>	0	0.0%	0	0.0%	12	1.4%	4.0	0.8%	0	0.0%	0	0.0%
<i>Monotoca scoparia</i>	4	0.7%	0	0.0%	19	2.2%	7.7	1.4%	0	0.0%	0	0.0%
<i>Monotoca</i> sp. (Fraser Island P.Baxter 777)	9	1.5%	6	5.6%	7	0.8%	7.3	1.4%	1	1.3%	0	0.0%
<i>Ochrosperma lineare</i>	67	11.2%	9	8.4%	74	8.4%	50.0	9.4%	4	5.2%	45	24.7%
<i>Persoonia virgata</i>	9	1.5%	0	0.0%	20	2.3%	9.7	1.8%	0	0.0%	11	6.0%
<i>Petrophile canescens</i>	0	0.0%	0	0.0%	0	0.0%	0.0	0.0%	1	1.3%	1	0.5%
<i>Phyllota phyllicoides</i>	0	0.0%	0	0.0%	8	0.9%	2.7	0.5%	0	0.0%	1	0.5%
<i>Pimelea linifolia</i>	19	3.2%	0	0.0%	14	1.6%	11.0	2.1%	0	0.0%	1	0.5%
<i>Platysace ericoides</i>	9	1.5%	2	1.9%	11	1.2%	7.3	1.4%	1	1.3%	0	0.0%
<i>Pseudanthus orientalis</i>	0	0.0%	0	0.0%	32	3.6%	10.7	2.0%	0	0.0%	0	0.0%
<i>Ricinocarpos pinifolius</i>	41	6.8%	1	0.9%	9	1.0%	17.0	3.2%	6	7.8%	16	8.8%
<i>Scoparia dulcis</i>	0	0.0%	0	0.0%	0	0.0%	0.0	0.0%	0	0.0%	1	0.5%

Species	Reference								Rehabilitation			
	P7		REF1		REF2		Mean		G1		G2	
	n	%	n	%	n	%	n	%	n	%	n	%
<i>Strangea linearis</i>	10	1.7%	7	6.5%	31	3.5%	16.0	3.0%	0	0.0%	0	0.0%
<i>Styphelia viridis</i> subsp. <i>breviflora</i>	0	0.0%	0	0.0%	4	0.5%	1.3	0.3%	0	0.0%	0	0.0%
<i>Woollsia pungens</i>	95	15.9%	20	18.7%	261	29.6%	125.3	23.7%	0	0.0%	0	0.0%
<i>Zieria laxiflora</i>	9	1.5%	0	0.0%	3	0.3%	4.0	0.8%	0	0.0%	1	0.5%
Total	599	100%	107	100%	883	100%	529.7	100%	77	100%	182	100%

The heath shrub *Woollsia pungens* was a dominant species at all three reference sites ranging between 15.9% of all stems at P7 and 29.6% of all stems at REF2. The mean stem count of *W. pungens* at reference sites was 125.3 stems at a mean of 23.7% of all stems. However, there were no *W. pungens* present in either rehabilitation plot.

Acacia ulicifolia was a dominant species at reference site P7 with 96 stems representing 16.0% of all stems at the site. *A. ulicifolia* was only considered an associate species at REF1 (1 individual out of 107) and REF2 (10 individuals out of 883) reference sites. *Acacia ulicifolia* was a very dominant species at the two rehabilitation sites with the species contributing 42.9% and 30.2% of the total stem count respectively at G1 and G2.

The percent contribution of *Ochrosperma lineare* at reference sites ranged between 8.4% at REF1 and REF2 to 11.2% at P7, with a mean across all sites of 9.4%. This was similar to the percent contribution of this species at G1 of 5.2%. However, *O. lineare* was a dominant species at G2 with 45 out of 182 stems (or 24.7%).

4 Discussion

The objective of the survey was to assess rehabilitation established in 2018 and 2019 on ML1124 and ML7064 against success criteria to fulfil condition F2-1(a) of the Environmental Authority EPML00349813 using methodology detailed in Section 5.2 of Rehabilitation of Disturbed Areas at ML1124, ML1132 and ML7064 North Stradbroke Island (UNIMIN, 2009). Both rehabilitation blocks are on track to fully comply with species composition in the future. However, both sites do not currently meet species abundance criteria.

4.1 Species composition

The species composition of the 2018 rehabilitation, represented by G1, recorded an average Sorenson's Index of Similarity (SIS) value of 0.69. This is higher than the value reported in the 2019 monitoring results of 0.5, which indicates the site is progressing to have a more similar species composition to the reference sites. The 2019 rehabilitation, sampled at G2, recorded a mean SIS value of 0.67 in the 2020 monitoring results. One key difference between the rehabilitation sites and reference sites was the absence of key reference site low shrub species *Leucopogon leptospermoides* and *Woollisia pungens* from both rehabilitation sites. Neither species are planted or incorporated in the seed mix for rehabilitation and therefore would rely on seed from topsoil spreading for establishment. The other major difference in species composition was the presence of native grasses (i.e. *Eragrostis* spp., *Eriachne* spp., *Panicum simile*, *Paspalidium distans* and *Paspalum scrobiculatum*) in both or one rehabilitation block that were not found in reference sites. It is anticipated that these species will diminish as the low shrub layer develops. The target SIS value for the 2018 rehabilitation will be ≥ 0.69 at the next monitoring event to meet the criteria. The 2019 rehabilitation requires two more consecutive years with a value ≥ 0.67 to meet the criteria for species composition.

4.2 Species abundance

The only species to contribute more than 15% of stems to all three reference sites was *Woollisia pungens*, which was not present in either rehabilitation block. *W. pungens* is a small, erect, few branched shrub, usually 1 m in height and while often numerous, does not end up contributing a lot of biomass and cover to the low shrub layer compared to less numerous but spreading and bushy low shrubs such as *Leptospermum semibaccatum*, *Leucopogon leptospermoides*, *Monotoca scoparia* and *Strangea linearis*. Therefore, although a dominant species in terms of stem density it is not necessarily an important species in relation to biomass or ecological dominance. The dominant species in both rehabilitation blocks was *Acacia ulicifolia* contributing 42.9% of stems in the 2018 rehabilitation and 30.2% of stems in the 2019 rehabilitation. There are two likely reasons for this occurrence; one, the species has been seeded as part of rehabilitation, and two, *Acacia ulicifolia* is a pioneer species which favours colonising bare ground in disturbed areas. It is expected that over time this species will thin down to be less dominant. The differences in species dominance between remnant reference sites and young rehabilitation sites is expected given their position in different stages of succession. However, these transects were placed in best on offer sections within each rehabilitation year, meaning the rest of the rehabilitation area is assumed to be of poorer condition, and therefore infill planting will likely be required in the short-term across the rehabilitation areas. This is particularly the case on the north-facing slope of the 2019 rehabilitation area which was observed to be more sparsely vegetated.

5 References

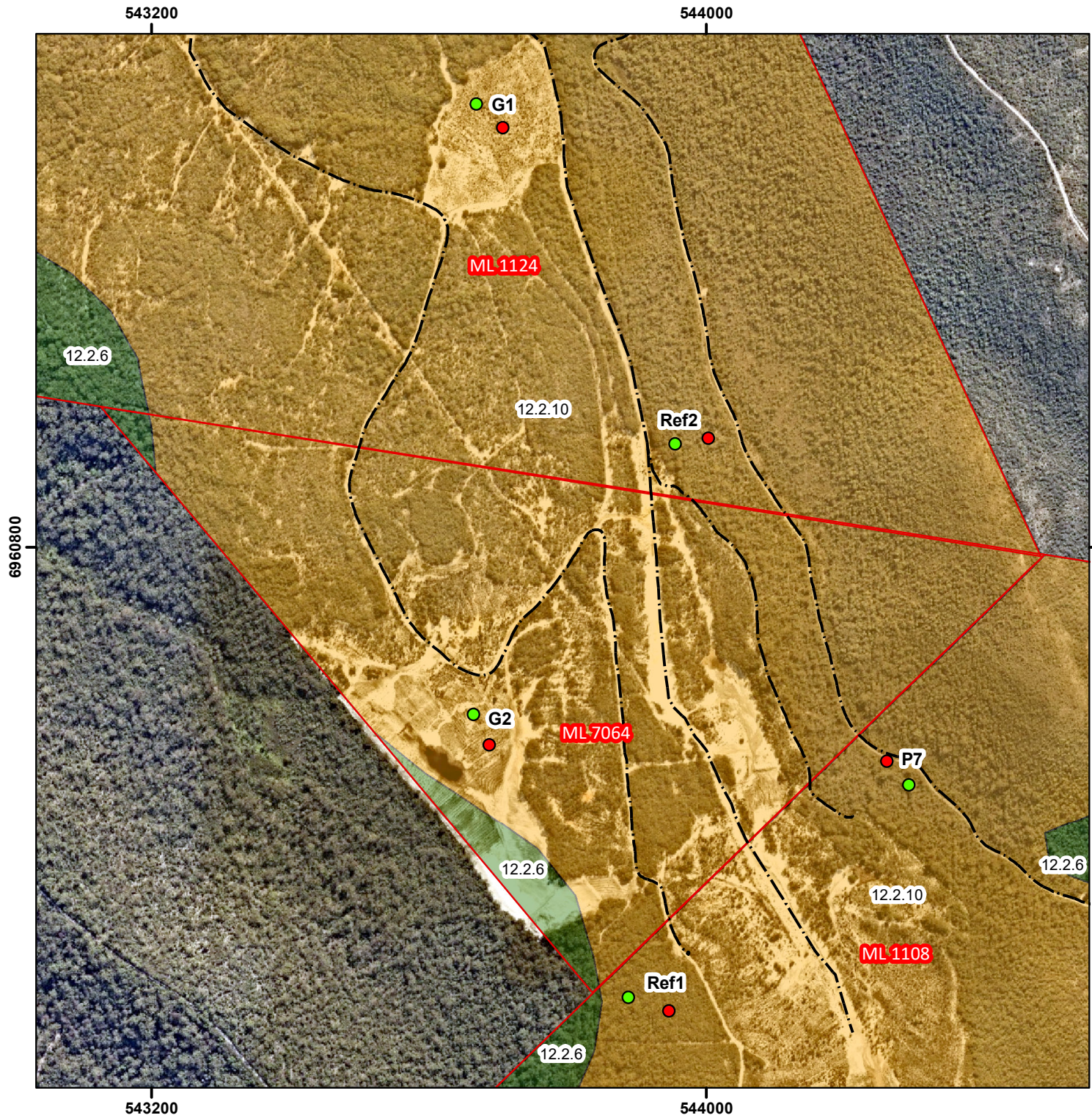
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Appendix A – Mapping



Appendix B:

Vegetation Monitoring Sites
Glass Mining Lease
Stradbroke 2020



0 100 200 300 400
Meters

Scale: 1:8,000

Page Number: 1 of 1

Coordinate System: GDA 1994 MGA Zone 56

Datum: GDA 1994

Legend

Transect Position

- End
- Start

Mining Leases

Pre-clearance RE Status

- Of Concern (Dominant)
- Least Concern
- Access Tracks

Data sources:

Mining Lease Boundaries
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Imagery
Nearmap

Document History:

Rev	Reason for Issue	Author	Reviewer	Approver	Date
A	Internal Draft	NC	RE	BJ	10/08/2020
0	Issued for Information	NC	RE	BJ	11/08/2020

Appendix B – Species List

Species	Life Form	NC Act Status	Reference Sites			Rehabilitation Sites	
			P7	REF1	REF2	G1	G2
<i>Acacia baueri</i> subsp. <i>baueri</i>	Forb	V			✓	✓	
<i>Acacia complanata</i>	Shrub				✓		
<i>Acacia suaveolens</i>	Shrub		✓		✓	✓	✓
<i>Acacia ulicifolia</i>	Shrub		✓	✓	✓	✓	✓
<i>Allocasuarina littoralis</i>	Tree					✓	
<i>Andropogon virginicus</i>	Grass	*					✓
<i>Angophora leiocarpa</i>	Tree					✓	
<i>Aotus lanigera</i>	Shrub		✓				✓
<i>Aristida jerichoensis</i>	Grass					✓	
<i>Austromyrtus dulcis</i>	Shrub		✓	✓			
<i>Baeckea frutescens</i>	Shrub		✓				
<i>Baloskion pallens</i>	Forb		✓				
<i>Banksia aemula</i>	Tree		✓	✓	✓	✓	✓
<i>Boronia rosmarinifolia</i>	Shrub		✓	✓	✓	✓	✓
<i>Boronia saffrolifera</i>	Shrub				✓		
<i>Bossiaea heterophylla</i>	Forb		✓		✓	✓	✓
<i>Brachyloma scortechinii</i>	Shrub		✓	✓	✓	✓	
<i>Cassytha pubescens</i>	Forb		✓	✓	✓		
<i>Caustis recurvata</i>	Forb		✓	✓	✓	✓	✓
<i>Coleocarya gracilis</i>	Forb		✓	✓	✓	✓	
<i>Conospermum taxifolium</i>	Shrub		✓		✓		
<i>Corunastylis psammophila</i>	Forb				✓		

Species	Life Form	NC Act Status	Reference Sites			Rehabilitation Sites	
			P7	REF1	REF2	G1	G2
<i>Corymbia gummifera</i>	Tree		✓	✓	✓	✓	✓
<i>Cyperus polystachyos</i>	Forb						✓
<i>Dianella caerulea</i>	Forb					✓	
<i>Dillwynia retorta</i>	Shrub		✓	✓	✓	✓	✓
<i>Dodonaea triquetra</i>	Shrub		✓				✓
<i>Elaeocarpus reticulatus</i>	Tree			✓			
<i>Entolasia marginata</i>	Grass		✓	✓		✓	✓
<i>Eragrostis brownii</i>	Grass						✓
<i>Eragrostis interrupta</i>	Grass					✓	✓
<i>Eragrostis parviflora</i>	Grass					✓	
<i>Eriachne insularis</i>	Grass						✓
<i>Eriachne pallescens</i>	Grass					✓	
<i>Eucalyptus planchoniana</i>	Tree		✓	✓	✓	✓	✓
<i>Eucalyptus racemosa</i>	Tree		✓		✓	✓	
<i>Gompholobium virgatum</i>	Shrub					✓	
<i>Gonocarpus chinensis</i>	Forb			✓			
<i>Hardenbergia violacea</i>	Forb					✓	✓
<i>Hibbertia acicularis</i>	Forb		✓	✓	✓		
<i>Hibbertia linearis</i>	Shrub		✓		✓	✓	✓
<i>Homoranthus virgatus</i>	Shrub		✓	✓	✓	✓	✓
<i>Imperata cylindrica</i>	Grass			✓			✓
<i>Jacksonia stackhousei</i>	Shrub				✓		

Species	Life Form	NC Act Status	Reference Sites			Rehabilitation Sites	
			P7	REF1	REF2	G1	G2
<i>Juncus</i> sp.	Forb					✓	✓
<i>Laxmannia gracilis</i>	Forb		✓			✓	✓
<i>Leptospermum polygalifolium</i>	Shrub		✓				✓
<i>Leptospermum semibaccatum</i>	Shrub				✓		
<i>Leptospermum trinervium</i>	Shrub		✓	✓	✓		✓
<i>Leucopogon deformis</i>	Shrub		✓		✓		
<i>Leucopogon ericoides</i>	Shrub		✓		✓		✓
<i>Leucopogon leptospermoides</i>	Shrub		✓	✓	✓		
<i>Leucopogon margarodes</i>	Shrub		✓	✓			
<i>Leucopogon virgatus</i>	Shrub				✓		
<i>Lomandra elongata</i>	Forb		✓	✓	✓	✓	
<i>Lomandra longifolia</i>	Forb			✓			
<i>Lophostemon confertus</i>	Tree					✓	
<i>Megathyrsus maximus</i>	Grass	*				✓	
<i>Melinis repens</i>	Grass	*				✓	
<i>Monotoca scoparia</i>	Shrub		✓	✓	✓		
<i>Monotoca</i> sp. (Fraser Island P.Baxter 777)	Shrub		✓	✓	✓	✓	
<i>Ochrosperma lineare</i>	Shrub		✓	✓	✓	✓	✓
<i>Panicum simile</i>	Grass						✓
<i>Paspalidium distans</i>	Grass						✓
<i>Paspalum scrobiculatum</i>	Grass						✓
<i>Paspalum urvillei</i>	Grass	*				✓	✓

Species	Life Form	NC Act Status	Reference Sites			Rehabilitation Sites	
			P7	REF1	REF2	G1	G2
<i>Patersonia sericea</i>	Forb			✓	✓	✓	
<i>Persoonia virgata</i>	Shrub		✓		✓		✓
<i>Petrophile canescens</i>	Shrub					✓	✓
<i>Phyllota phyllicoides</i>	Shrub			✓	✓		✓
<i>Pimelea linifolia</i>	Shrub		✓		✓		✓
<i>Platysace ericoides</i>	Forb		✓	✓	✓	✓	
<i>Praxelis clematidea</i>	Forb	*				✓	✓
<i>Pseudanthus orientalis</i>	Shrub			✓	✓		
<i>Ricinocarpos pinifolius</i>	Shrub		✓	✓	✓	✓	✓
<i>Schizaea dichotoma</i>	Forb			✓	✓		
<i>Schoenus paludosus</i>	Forb				✓		
<i>Scoparia dulcis</i>	Forb	*					✓
<i>Sorghum sp.</i>	Grass	Cover Crop					✓
<i>Strangea linearis</i>	Shrub		✓	✓	✓		✓
<i>Styphelia viridis</i> subsp. <i>breviflora</i>	Shrub				✓		
<i>Woollsia pungens</i>	Shrub		✓	✓	✓		
<i>Xanthorrhoea johnsonii</i>	Shrub		✓	✓	✓	✓	✓
<i>Zieria laxiflora</i>	Shrub		✓		✓	✓	✓

Appendix C – Stem Count Data

Count Type	Species	Life Form	Status	Reference Sites			Rehabilitation Sites	
				P7	REF1	REF2	G1	G2
Area	<i>Andropogon virginicus</i>	Grass	*	0	0	0	0	0.01
	<i>Aristida jerichoensis</i>	Grass		0	0	0	1.15	0
	<i>Baloskion pallens</i>	Forb		3.78	0	0	0	0
	<i>Cassytha pubescens</i>	Forb		0	0	0.74	0	0
	<i>Caustis recurvata</i>	Forb		0.5	5.8	4.67	8.25	0.32
	<i>Coleocarya gracilis</i>	Forb		2.02	0	3.45	0.7	0
	<i>Cyperus polystachyos</i>	Forb		0	0	0	0	0.1
	<i>Dianella caerulea</i>	Forb		0	0	0	0.8	0
	<i>Entolasia marginata</i>	Grass		0	0	0	0.1	0.03
	<i>Eragrostis brownii</i>	Grass		0	0	0	0	0.01
	<i>Eragrostis interrupta</i>	Grass		0	0	0	0.1	0.04
	<i>Eragrostis parviflora</i>	Grass		0	0	0	2.25	0
	<i>Eriachne insularis</i>	Grass		0	0	0	0	0.23
	<i>Eriachne pallescens</i>	Grass		0	0	0	0.85	0
	<i>Hardenbergia violacea</i>	Forb		0	0	0	0.1	0
	<i>Laxmannia gracilis</i>	Forb		0	0	0	0.01	0.04
	<i>Lomandra elongata</i>	Forb		0.01	0.25	0.03	0.4	0
	<i>Lomandra longifolia</i>	Forb		0	0.45	0	0	0
	<i>Melinis repens</i>	Grass	*	0	0	0	0.1	0
	<i>Panicum simile</i>	Grass		0	0	0	0	0.25
	<i>Paspalidium distans</i>	Grass		0	0	0	0	0.06
	<i>Paspalum scrobiculatum</i>	Grass		0	0	0	0	0.26

Count Type	Species	Life Form	Status	Reference Sites			Rehabilitation Sites	
				P7	REF1	REF2	G1	G2
Area	<i>Paspalum urvillei</i>	Grass	*	0	0	0	0.3	0.57
	<i>Patersonia sericea</i>	Forb		0	0.11	0.05	0.1	0
	<i>Praxelis clematidea</i>	Forb	*	0	0	0	0.1	0.01
	<i>Schizaea dichotoma</i>	Forb		0	0.01	0.01	0	0
	<i>Schoenus paludosus</i>	Forb		0	0	2.51	0	0
	<i>Sorghum</i> sp.	Grass	Cover Crop	0	0	0	0	2.01
	<i>Xanthorrhoea johnsonii</i>	Shrub		6.99	25.75	12.93	0.6	0.6
Stem	<i>Acacia baueri</i> subsp. <i>baueri</i>	Forb	V	0	0	2	1	0
	<i>Acacia complanata</i>	Shrub		0	0	1	0	0
	<i>Acacia suaveolens</i>	Shrub		2	0	0	3	7
	<i>Acacia ulicifolia</i>	Shrub		96	1	10	33	55
	<i>Allocasuarina littoralis</i>	Tree		0	0	0	1	0
	<i>Aotus lanigera</i>	Shrub		11	0	0	0	13
	<i>Baeckea frutescens</i>	Shrub		53	0	0	0	0
	<i>Banksia aemula</i>	Tree		19	15	35	4	4
	<i>Boronia rosmarinifolia</i>	Shrub		14	10	10	1	2
	<i>Boronia saefrolifera</i>	Shrub		0	0	11	0	0
	<i>Bossiaea heterophylla</i>	Forb		24	0	16	2	1
	<i>Brachyloma scortechinii</i>	Shrub		4	0	14	0	0
	<i>Conospermum taxifolium</i>	Shrub		2	0	50	0	0
	<i>Corunastylis psammophila</i>	Forb		0	0	1	0	0
	<i>Corymbia gummifera</i>	Tree		3	6	1	4	2

Count Type	Species	Life Form	Status	Reference Sites			Rehabilitation Sites	
				P7	REF1	REF2	G1	G2
Stem	<i>Dillwynia retorta</i>	Shrub		18	1	47	1	3
	<i>Dodonaea triquetra</i>	Shrub		0	0	0	0	3
	<i>Eucalyptus planchoniana</i>	Tree		1	6	0	9	2
	<i>Eucalyptus racemosa</i>	Tree		2	0	0	1	0
	<i>Hibbertia acicularis</i>	Forb		1	0	17	0	0
	<i>Hibbertia linearis</i>	Shrub		24	0	34	1	7
	<i>Homoranthus virgatus</i>	Shrub		6	1	27	3	2
	<i>Jacksonia stackhousei</i>	Shrub		0	0	3	0	0
	<i>Leptospermum polygalifolium</i>	Shrub		14	0	0	0	1
	<i>Leptospermum semibaccatum</i>	Shrub		0	0	23	0	0
	<i>Leptospermum trinervium</i>	Shrub		1	7	2	0	2
	<i>Leucopogon deformis</i>	Shrub		0	0	42	0	0
	<i>Leucopogon ericoides</i>	Shrub		17	0	6	0	1
	<i>Leucopogon leptospermoides</i>	Shrub		15	15	26	0	0
	<i>Leucopogon virgatus</i>	Shrub		0	0	12	0	0
	<i>Monotoca scoparia</i>	Shrub		4	0	19	0	0
	<i>Monotoca</i> sp. (Fraser Island P.Baxter 777)	Shrub		9	6	7	1	0
	<i>Ochrosperma lineare</i>	Shrub		67	9	74	4	45
	<i>Persoonia virgata</i>	Shrub		9	0	20	0	11
	<i>Petrophile canescens</i>	Shrub		0	0	0	1	1
	<i>Phyllota phyllicoides</i>	Shrub		0	0	8	0	1
	<i>Pimelea linifolia</i>	Shrub		19	0	14	0	1

Count Type	Species	Life Form	Status	Reference Sites			Rehabilitation Sites	
				P7	REF1	REF2	G1	G2
Stem	<i>Platysace ericoides</i>	Forb		9	2	11	1	0
	<i>Pseudanthus orientalis</i>	Shrub		0	0	32	0	0
	<i>Ricinocarpos pinifolius</i>	Shrub		41	1	9	6	16
	<i>Scoparia dulcis</i>	Forb	*	0	0	0	0	1
	<i>Strangea linearis</i>	Shrub		10	7	31	0	0
	<i>Styphelia viridis</i> subsp. <i>breviflora</i>	Shrub		0	0	4	0	0
	<i>Woollsia pungens</i>	Shrub		95	20	261	0	0
	<i>Zieria laxiflora</i>	Shrub		9	0	3	0	1