



Memorandum

Client:	Department of Primary Industries and Regional Development
Attention:	[REDACTED] [REDACTED] [REDACTED]
From:	Ecoedge Environmental Services [REDACTED] [REDACTED] [REDACTED]
Date:	22 September 2023
Subject:	T158 Myalup Managed Aquifer Recharge Pilot

1 Introduction

The Department of Primary Industries and Regional Development (DPIRD) engaged Ecoedge Environmental Services (Ecoedge) to undertake an additional targeted flora survey of the Myalup Managed Aquifer Recharge (MAR) project site (infiltration basin site and pipeline – **Figure 1**), to ensure no significant flora is present.

The survey was carried out within the ideal flowering time for Priority and Threatened flora, spring 2023, in accordance with the EPA's (2015) Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment.

A flora and vegetation survey was conducted over a larger area adjacent the current survey area by Ecoedge (1019). This report found that Threatened or Priority flora, were highly unlikely to be present within the MAR basin area because of its highly degraded nature, being a former pine plantation almost devoid of native vegetation.



Figure 1. Myalup MAR Pilot survey area.

2 Methods

The field survey was undertaken on Thursday 14 September 2023 by senior botanist Ben Eckerman (flora licence FB62000262) and ecologist Debbie Brace (flora licence FB62000504), who both have more than 3 years' experience in targeted flora searches on the Swan Coastal Plain (SCP).

The species likely to be present were assessed and provided in **Appendix 1** and the post likelihood of occurrence assessment rationale provided in **Appendix 2**.

Transects were walked over the site with spacings of approximately 40-50 m targeting areas of native vegetation. Both sides of the access track/proposed pipeline track were walked each side by foot.

The tracklogs which indicate sufficient survey effort, for this highly degraded former pine plantation and access track, are shown in **Figure 2**.

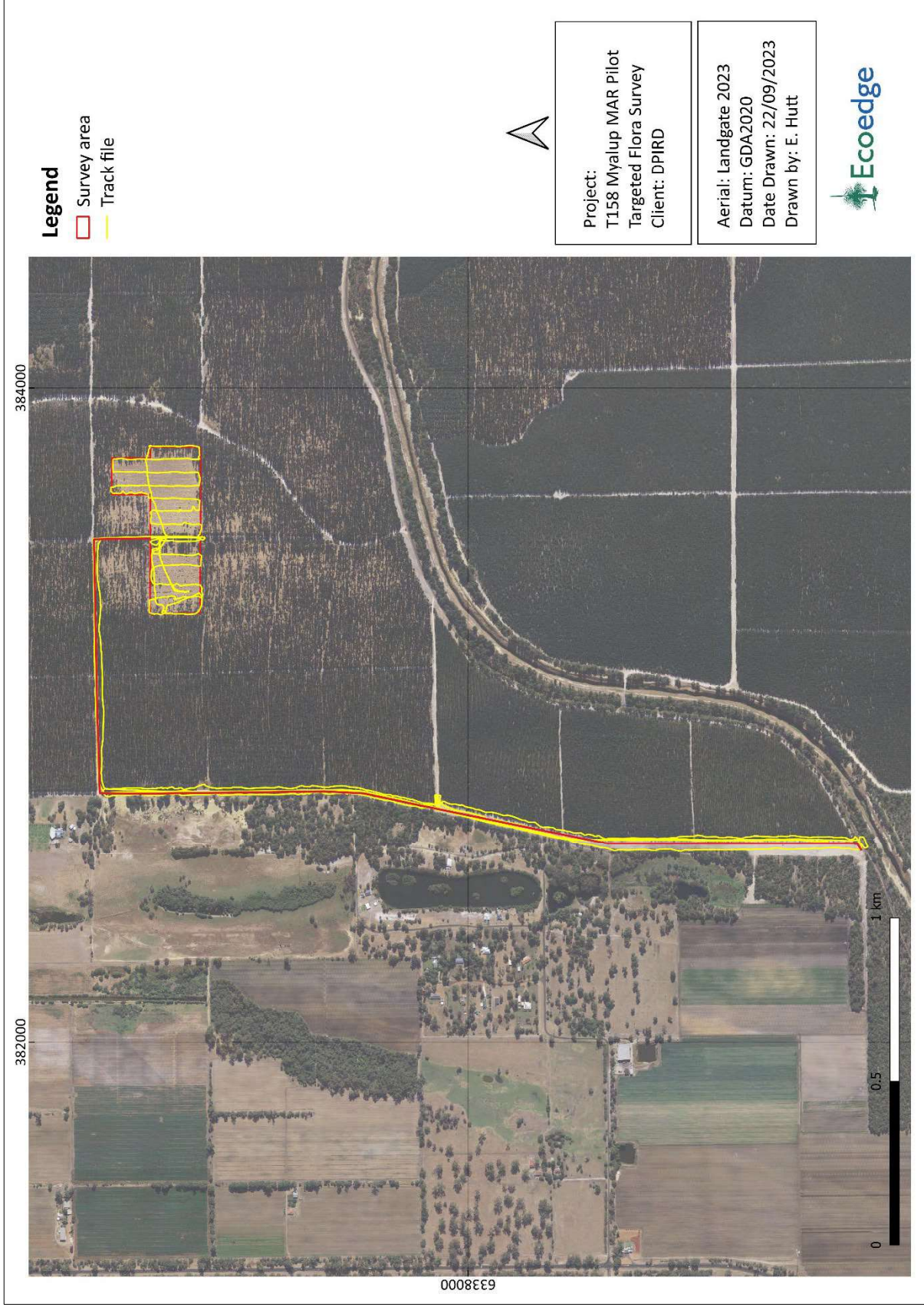


Figure 2. Tracklog and survey effort within the survey area.

3 Results

3.1 Vegetation

All of the survey area was classified as completely degraded. Soils are deep white sands, over limestone at some depth.

Main rectangle area is cleared *Pinus pinaster* left to pasture. Dominant vegetation is weedy herbs and grasses, mostly ephemerals, dominated by **Ehrharta longiflora*, **E. calycina*, **Arctotheca calendula*, **Hypochaeris glabra*, **Ursinia anthemoides*, **Pertrorhagia dubia* (**Figure 3**).

The few native species included very few scattered *Agonis flexuosa*, *Corymbia calophylla* and *Nuytsia floribunda* individuals with occasional *Macrozamia riedlei* and *Hibbertia cuneiformis* emergent from the weed beds.



Figure 3. Main rectangle area, completely degraded vegetation condition.

Main access road E-W is mainly pines over weedy herbs and grasses, mainly pine needle beds, occasional native herbs and twiners (**Figure 4** and **Figure 5**).

Main access road N-S – east side is pine plantation over weedy herbs and grasses and needle beds, occasional native low shrubs, herbs and sedges.

West side borders mix of cleared farmland or degraded condition remnants, often parkland cleared. Verge is mainly Marri/Jarra/Pine remnant trees, over weeds and natives, including several areas where the vegetation condition would be completely degraded to degraded. There are a few stands of *Agonis flexuosa*, and a couple of *Banksia attenuata*, however the vegetation condition is not good enough to be assessed as a Threatened Ecological Community (TEC) (**Figure 5**).



Figure 4. West side of main access road, completely degraded vegetation condition.



Figure 5. West and southern end of access road.

3.2 Threatened and Priority flora

No threatened or priority flora were found, and all species classified as unlikely due to the completely degraded condition of the survey area. There was no suitable habitat for any of the species that has a pre-survey likelihood of moderate or high (**Appendix 2**).

3.3 Weed species

There were three weed species found on site - namely *Asparagus asparagoides* (Bridal Creeper), *Gomphocarpus fruticosus* (Cotton Bush) and *Zantedeschia aethiopica* (Arum Lily).

The locations of these species are shown in **Figure 6**.



Figure 6. Arum Lily, Bridal Creeper and Cotton Bush found on site.

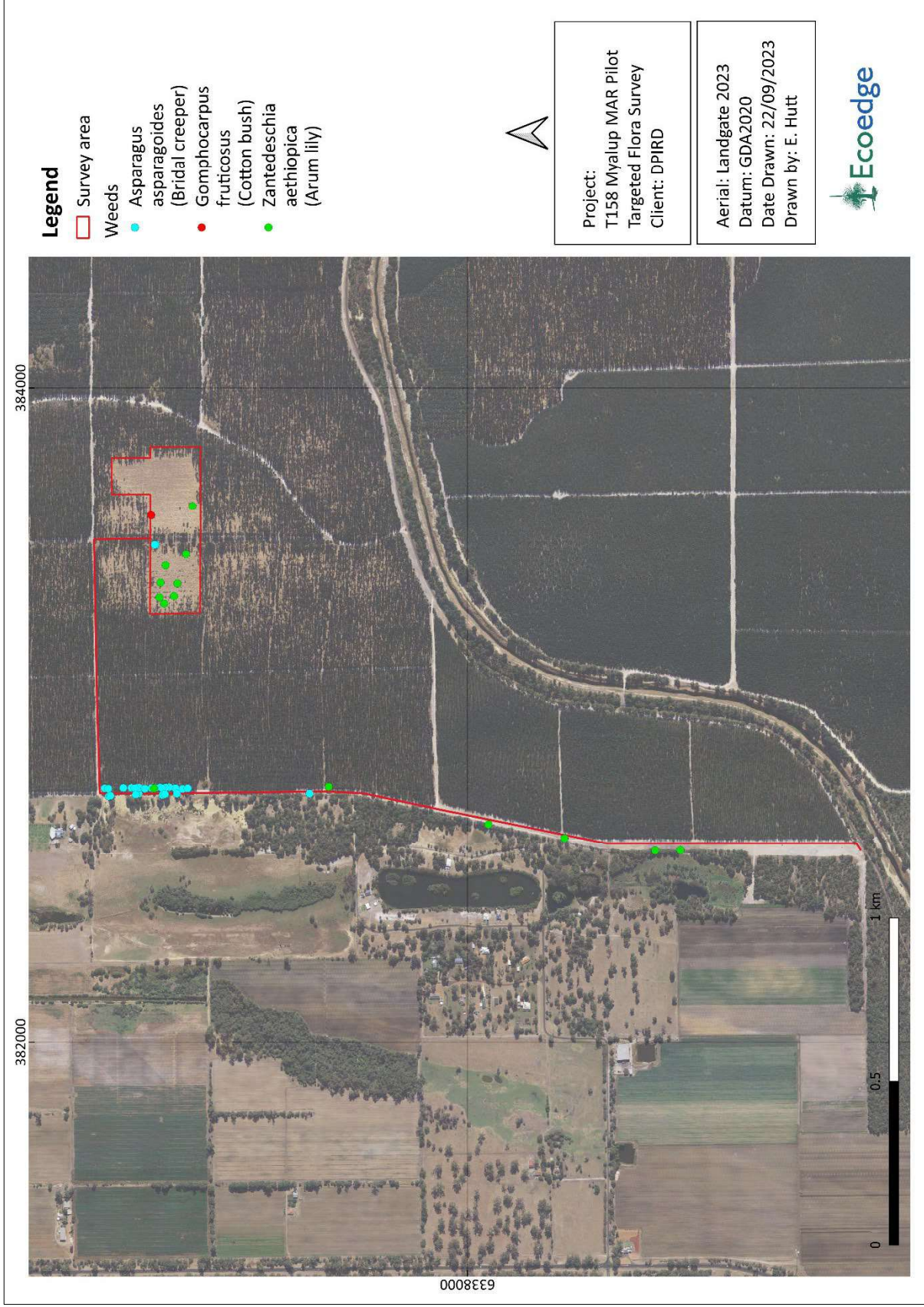


Figure 7. Location of weed species found within the survey area.

4 Conclusions

A targeted flora survey for potentially known flora species was undertaken at the project site on 14 September 2023, in accordance with the EPA's (2015) Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment.

The vegetation within the survey area was classified as completely degraded due to the lack of native species and high number of grassy weeds.

No threatened flora species were found onsite during the survey.

Three weeds of national significance were found on site - *Asparagus asparagoides* (Bridal creeper), *Gomphocarpus fruticosus* (Cotton bush) and *Zantedeschia aethiopica* (Arum lily).

5 References

Environmental Protection Authority of WA (2016). *Technical Guidance Flora and Vegetation Surveys for Environmental Impact*. EPA, Perth, Western Australia.
http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA/Technical/Guidance/FloraandVegetationsurvey_Dec13.pdf

Ecoedge (2019), *Myalup Primary Industries Reserve Flora and Vegetation Survey Report*. Unpublished report for RPS.

Appendix 1. Threatened and Priority List flora known to occur within 5 km of the DAA (DBCA, 2018c, 2018d; DotEE, 2018b.)

Species	Cons Status*	Flowering	Description and Habitat	Pre-Likelihood	Post likelihood
<i>Drakaea elastica</i>	T (EN)	Oct-Nov	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red, green, yellow. White or grey sand. Low-lying situations adjoining winter-wet swamps.	Moderate	U3
<i>Drakaea micrantha</i>	T (VU)	Sep-Oct	Tuberous, perennial, herb, 0.15–0.3 m high. Fl. red, yellow. White-grey sand.	Moderate	U3
<i>Boronia juncea</i> subsp. <i>juncea</i>	P1	Apr	Slender or straggly shrub, pedicels and sepals glabrous. Fl. pink. Sand. Low scrub.	Moderate	U3
<i>Alyogyne</i> sp. Rockingham (G.J. Keighery 14463)	P2	Dec	Found within Yalgorup National Park and Kemerton Nature Reserve	Moderate	U3
<i>Pterostylis frenchii</i>	P2	Nov-Dec	Tuberous, herb, to 0.35 m high, with rosette leaves. Fl. white. Calcareous sand with limestone, laterite. Flatlands and gentle slopes.	Moderate	U3
<i>Boronia capitata</i> subsp. <i>gracilis</i>	P3	Jun-Nov	Slender shrub, 0.3-0.6(-3) m high, branches pilose. Fl. pink. White/grey or black sand. Winter-wet swamps,	Moderate	U3
<i>Cyathochaeta teretifolia</i>	P3	Oct-Jan	Rhizomatous, clumped, robust perennial, grass-like or herb (sedge), to 2 m high, to 1.0 m wide. Fl. brown. Grey sand, sandy clay. Swamps, creek edges.	Moderate	U3
<i>Dillwynia dillwynioides</i>	P3	Aug-Dec	Decumbent or erect, slender shrub, 0.3–1.2 m high. Fl. red, yellow, orange. Sandy soils. Winter-wet depressions, inundated flats generally alongside rivers or deeper swamps.	Moderate	U3
<i>Hibbertia spicata</i> subsp. <i>leptotheca</i>	P3	Jul-Oct	Erect or spreading shrub, 0.2-0.5 m high. Fl. yellow. Sand. Near-coastal limestone ridges, outcrops & cliffs.	Moderate	U3
<i>Lasiopetalum membranaceum</i>	P3	Sep-Dec	Multi-stemmed shrub, 0.2-1 m high. Fl. pink, blue, purple. Sand over limestone.	High	U3

Species	Cons Status*	Flowering	Description and Habitat	Pre-Likelihood	Post Likelihood
<i>Meionectes tenuifolia</i>	P3	Oct	Haloragaceae family, broadly distributed across the Swan Coastal Plain, northern and southern Jarrah forests.	Moderate	U3
<i>Pimelea calcicola</i>	P3	Sep-Nov	Erect to spreading shrub, 0.2-1 m high. Fl. pink. Sand. Coastal limestone ridges.	Moderate	U3
<i>Platysace ramosissima</i>	P3	Oct-Nov	Perennial, herb, to 0.3 m high. Fl. white, cream. Sandy soils.	Moderate	U3
<i>Stylidium maritimum</i>	P3	Sep-Nov	Caespitose perennial, herb, 0.3-0.7 m high. Inflorescence paniculate. Fl. white/purple. Sand over limestone. Dune slopes and flats.	Moderate	U3
<i>Stylidium paludicola</i>	P3	Oct-Dec	Reed-like perennial, herb, 0.35-1 m high. Inflorescence racemose. Fl. pink. Peaty sand over clay. Winter wet habitats.	Moderate	U3
<i>Stylidium trudgenii</i>	P3		Caespitose perennial, herb, 0.05-0.5 m high. Grey sand, dark grey to black sandy peat. Margins of winter-wet swamps, depressions.	Moderate	U3
<i>Styphelia filifolia</i>	P3	Mar - May	Erect shrubs to 90 cm high, 70 cm wide, Inflorescence axillary, pendulous; 1-4-flowered; flowers pendulous, Fl white. Sandy soils usually in Banksia or Jarrah woodland and in low-lying situations.	Moderate	U3
<i>Acacia flagelliformis</i>	P4	May-Sep	Rush-like, erect or sprawling shrub, 0.3-0.75(-1.6) m high. Fl. yellow. Sandy soils. Winter-wet areas.	High	U3
<i>Acacia semitrullata</i>	P4	May-Oct	Slender, erect, pungent shrub, (0.1-)0.2-0.7(-1.5) m high. Fl. cream, white. White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	High	U3
<i>Caladenia speciosa</i>	P4	Sep-Oct	Tuberous, perennial, herb, 0.35-0.6 m high. Fl. white, pink. White, grey or black sand.	High	U3
<i>Conostylis pauciflora</i> subsp. <i>pauciflora</i>	P4	Aug-Oct	Rhizomatous, stoloniferous perennial, grass-like or herb, 0.1-0.35 m high. Fl. yellow. Grey sand, limestone. Hillslopes, consolidated dunes.	Moderate	U3
<i>Stylidium longitubum</i>	P4	Oct-Dec	Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. Pink. Sandy clay, clay. Seasonal wetlands.	Moderate	U3

Species	Cons Status*	Flowering	Description and Habitat	Pre-Likelihood	Post Likelihood
<i>Hakea oligoneura</i>	P4	Sept	Shrubs to 2 m high x 2 m wide. Bark smooth or finely fissured. Inflorescences white; pedicels 2-2.5 mm long. White-brown sand on limestone ridges in open Mallee over <i>Melaleuca acerosa</i> , <i>Xanthorrhoea</i> and <i>Hibbertia</i> .	Moderate	U3

Note: The WC Act Conservation Status is shown, EPBC Act status, where relevant, is in brackets.

1 Appendix 2. Threatened and Priority flora Likelihood of occurrence assessment methodology.

Rating	Presurvey rationale	Post survey rationale
Recorded		Taxon was or has been recorded in the survey area.
Likely	Known to occur within one kilometre (km) of the survey area with suitable habitat known or predicted to occur within the survey area.	<p>The taxon is known to occur within one km of the survey area and very suitable habitat was present, but the taxon was not observed for one of the following reasons.</p> <ul style="list-style-type: none"> L1. The taxon was dormant at the time of survey and could therefore not be located. L2. The habitat was compromised, for example due to a recent fire. L3. The survey area is challenging to survey. The taxon is non- descript and difficult to find because, for example, it occurs in large areas of rocky granite outcrops, or within an expanse of open water.
Possible	Known to occur within a five-ten km of the survey area with suitable habitat known or predicted to occur within the survey area.	<p>The taxon is known from within a 1 to 10 km radius of the survey area, and suitable habitat for the species was present, but despite a thorough search being carried out, the species was not observed. The taxon may however be present for any of the following reasons.</p> <ul style="list-style-type: none"> P1. The taxon was dormant at the time of survey and could therefore not be located. P2. The habitat was compromised, for example, due to a recent fire. P3. The survey area is challenging to survey. The taxon is non- descript and difficult to find because, for example, it occurs in large areas of rocky granite outcrops, or within an expanse of open water.
Unlikely	Known or predicted to occur within ten km, but no suitable habitat is known or predicted to occur within the survey area.	<p>The taxon was not found and is unlikely to be present for one or more of the following reasons:</p> <ul style="list-style-type: none"> U1. A thorough search for the taxon was conducted and no suitable habitat was present given that the taxon is known to be generally restricted to a clearly defined habitat type. U2. Suitable or potential habitat was present and appropriately searched, but the taxon was not observed. U3. Suitable or potential habitat was present, but these areas were too degraded for the taxon to occur, for example, due to weed invasion and/or clearing.

1 Appendix 2. Threatened and Priority flora Likelihood of occurrence assessment methodology.

Example of application of pre and post-survey likelihood of occurrence,

Taxon	Cons Status	Flowering	Description	Pre survey likelihood	Post Survey Likelihood
<i>Drakaea elastica</i>	T (EN)	Sep -Oct	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red, green, yellow. White or grey sand. Low-lying situations adjoining winter-wet swamps.	Likely	Unlikely (U3)