MINISTERS NORTH

TARGETED SIGNIFICANT FLORA & VEGETATION ASSESSMENT

PREPARED FOR: BHP WAIO

Spectrum ECOLOGY & SPATIAL

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V2	Emily Crowther	Susan Murrey	13-11-2023

TABLE OF CONTENTS

TABLES

MAPS

FIGURES

PLATES

APPENDICES

EXECUTIVE SUMMARY

BHP Western Australian Iron Ore (BHP WAIO) required a targeted flora and vegetation survey at Ministers North to update and inform future environmental approvals across the area. Ministers North is located 10 km south of the Yandi Camp and covers approximately 60 km^2. The Survey Area is on the boundary of BHP WAIO Yandi mining operations in active Geoscience tenure, it also covers pastoral leases and non-BHP WAIO tenure.

Spectrum Ecology & Spatial (Spectrum) was commissioned to undertake a targeted flora and vegetation assessment at Ministers North (the Survey Area; Map 1.1). The survey was undertaken by six botanists over a 54 person-day period and comprised 22 relevés and 405 km of targeted traverses. This was considered appropriate for a targeted survey, as stipulated in the EPA technical guidance (Environmental Protection Authority, 2016b).

No Threatened flora species were previously recorded, or considered likely to occur, within the Survey Area during the desktop assessment. Sixty-eight Priority flora taxa were recorded during the desktop assessment, with seven Priority flora taxa previously 'Recorded' within the Survey Area. A total of seven Priority flora taxa were considered to have a 'High' and 26 a 'Medium' likelihood of occurrence. The remaining 28 Priority flora taxa were assigned a 'Low' likelihood of occurrence.

No Threatened flora taxa were recorded during the field assessment. Five Priority flora taxa were recorded within the Survey Area during the 2023 assessment:

- *Acacia bromilowiana* (P4) – 980 individuals (540 from current survey and 420 from previous surveys) recorded from one population on steep slopes and breakaways high in the landscape.
- *Aristida lazaridis* (P2) – 38 individuals (30 from the current survey, 8 from previous surveys) recorded from three populations on a south facing slope and disturbed ground adjacent to tracks;
- *Gymnanthera cunninghamii* (P3) – 34 individuals (23 from current survey, 11 from previous surveys) recorded from two populations across the major drainage lines;
- *Rostellularia adscendens* var. *latifolia* (P3) – 207 individuals (188 from current survey and 19 from previous surveys) recorded from five populations on major drainage lines and rocky slopes; and
- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P4) – 2,733 individuals (1,421 from current survey and 1,295 from previous surveys) recorded from four populations on gorge/gully walls and steep slopes.

An additional two were previously recorded and likely to still be present in the Survey Area:

- *Eremophila naaykensii* (P3) – one individual recorded during a previous survey, constituting one population found on a rocky slope adjacent to a drainage line; and
- *Fimbristylis sieberiana* (P3) – 731 individuals recorded from previous surveys from one population located on major drainage line.

No other significant flora taxa (as listed in section 2.4.2) were recorded within the Survey Area during the field assessment.

A total of 22 relevés were undertaken to target potential significant vegetation (Map 4.1). Based on the definitions of significant vegetation listed in section 2.4.2 (Environmental Protection Authority, 2016a), 15 of the 22 relevés contained potential groundwater dependent species *Eucalyptus camaldulensis* and/or *Eucalyptus victrix* (Table 4.2).

1. INTRODUCTION

1.1. Project Background

BHP Western Australian Iron Ore (BHP WAIO) engaged Spectrum Ecology & Spatial (Spectrum) to undertake a targeted significant flora and vegetation assessment survey covering BHP WAIO's Ministers North and infrastructure corridor area (hereafter referred to as the Survey Area; Map 1.1). The Survey Area is located approximately 10 km south of the Yandi Camp, covering an area of approximately 60 km^2. The Survey Area is on the boundary of BHP WAIO Yandi mining operations in active Geoscience tenure and covers pastoral leases and non-BHP WAIO tenure.

1.2. Project Scope

The scope of works to undertake a targeted flora and vegetation assessment at the Survey Area (Map 1.1), included:

- Desktop review of the desktop Study Area (approximately 50 km buffer of Survey Area; Map 3.1);
- Targeted flora field survey; and
- Targeted flora and vegetation assessment reporting and data provision.

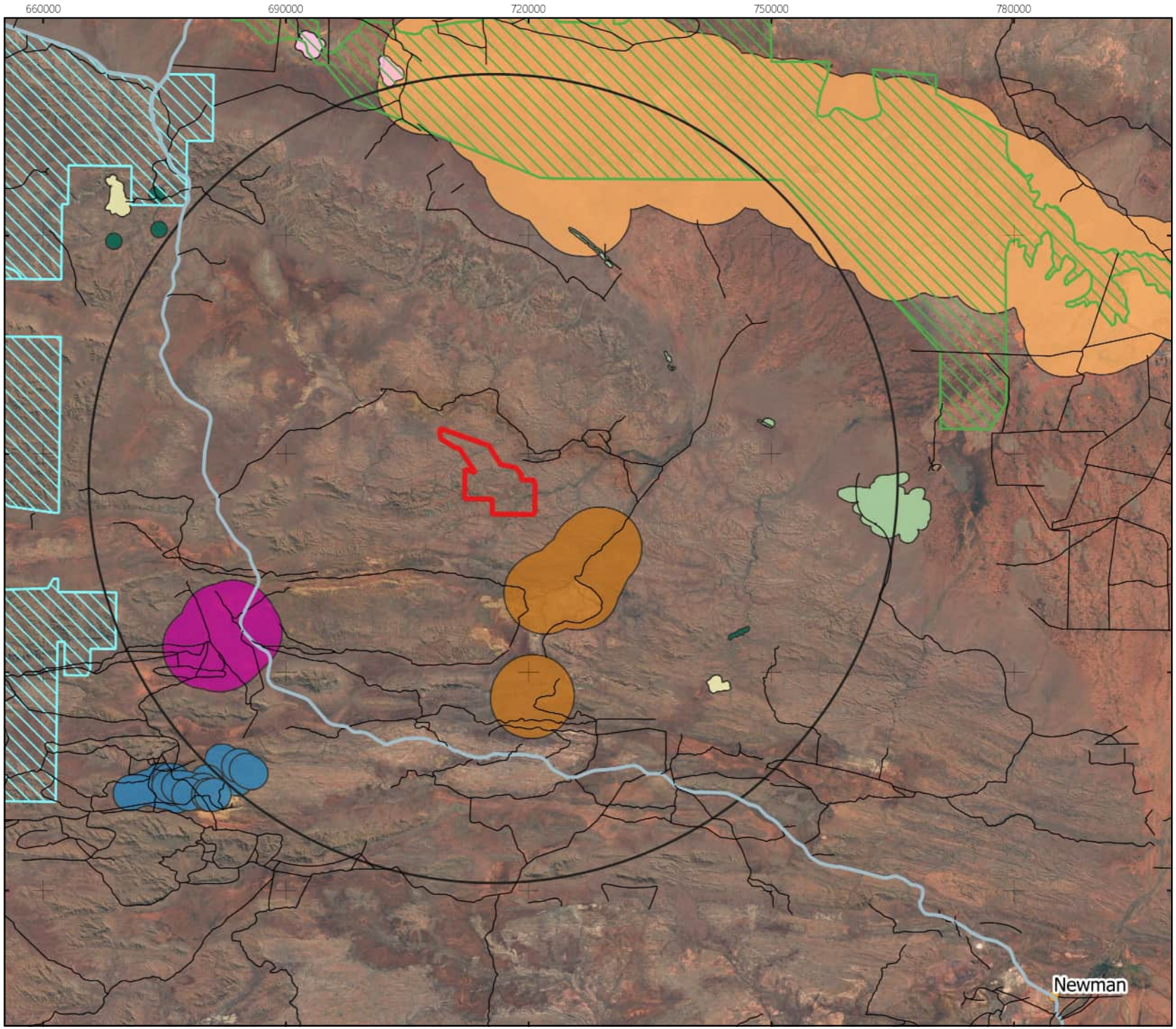
1.3. Legislation & Guidelines

Flora in Western Australia are protected by various legislation, including:

- *Biodiversity Conservation Act 2016* (BC Act);
- *Environmental Protection Act 1986* (EP Act); and
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The survey was compliant with survey guidelines, as outlined in:

- EPA Environmental Factor Guideline: Flora and Vegetation (Environmental Protection Authority, 2016a);
- EPA Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2016b);
- DBCA Threatened and Priority flora Report Form – Field Manual (Department of Biodiversity Conservation and Attractions, 2017);
- National Vegetation Information System (NVIS) Australian Vegetation Attribute Manual (ESCAVI, 2003);
- BHP WAIO. Vegetation and Flora Survey Procedure (document 0124627); and
- BHP WAIO. Biodiversity Survey Spatial Data Requirements Procedure (document SPR-IEN-EMS-015).



Legend

- Survey Area
- Desktop Study Area

Roads

- Principal Road
- Track

Significant Lands

- Karijini National Park
- Ramsar Sites

TECPEC

- Coolibah - Lignum Flats: sub type 2
- Freshwater claypans of the Fortescue Valley
- Kumina Land System
- Riparian communities of springs and pools Pilbara
- Fortescue Valley Sand Dunes
- Fortescue Marsh (Marsh Land System)
- Weeli Wolli Spring Community
- West Angelas Cracking-Clays

N

0 5 10 15 20 25 km

Scale 1:656,373.375 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Location of Survey Area & Significant Lands

Ministers Noth Targeted Significant Flora & Vegetation Assessment

Prepared for
BHP WAIO

MAP
1.1

1.4. Significant Lands

Nine significant lands were located within the desktop Study Area (a 50 km buffer of the Survey Area). None were recorded within the Survey Area. These are listed in Table 1.1, displayed on Map 1.1 and are described in the following sections.

Table 1.1: Environmentally Significant Areas within the Desktop Study Area

Reserve Name (Protected Area ID)		Distance from Survey Area (km)
Conservation Estate		
Karijini National Park		44.5
TEC/PECs		
P1	Weeli Wolli Spring Community	16.2
P3	Fortescue Valley Sand Dunes	26.0
P2	Riparian communities of springs and Pools Pilbara	36.9
P1	Coolibah - Lignum Flats: sub type 2:	38.5
P3	Kumina Land System	38.8
P1	Fortescue Marsh Land Systems	40.0
P1	West Angelas Cracking Clay	47.4
Environmentally Sensitive Areas		
Fortescue Marshes		36.2
Wetlands		
Fortescue Marshes		36.2

1.4.1. Conservation Estate

The Western Australian conservation estate includes land and waters vested in the Conservation and Parks Commission under the Conservation and Land Management Act (1984). The conservation estate is generally managed by the Department of Biodiversity, Conservation and Attractions (DBCA) to protect Western Australia's biodiversity and includes National Parks, Nature Reserves, Conservation Reserves, and other areas managed primarily for biodiversity conservation (Department of the Environment and Energy, 2016). One conservation reserve, Karijini National Park, occurs within the desktop Study Area, located approximately 44.5 km west from the Survey Area (Table 1.1; Map 1.1).

1.4.2. Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESA) are defined by the Department of Water and Environmental Regulation (Department of Water and Environmental Regulation, 2019) as:

- A defined wetland and the area within 50 m of a wetland;
- The area covered by vegetation within 50 m of Threatened flora, to the extent to which the vegetation is continuous with the vegetation in which the Threatened flora is located;
- The area covered by a Threatened Ecological Community (TEC);
- A Bush Forever site;
- Areas covered by the Gnangara Mound Crown Land Policy and Western Swamp Tortoise Policy; and
- Areas covered by lakes, wetlands, and fringing vegetation of the Swan Coastal Plain Lakes Policy, including South-west Agricultural Zone Wetlands Policy and Swan and Canning Rivers Policy.

There is one ESA, the Fortescue Marshes, located within the desktop Study Area, located approximately 36.2 km of the Survey Area (Table 1.1; Map 1.1).

1.4.3. Australian Wetlands Database

The Australian Wetlands Database includes nationally significant wetlands (as listed in the directory of important wetlands), wetlands listed under the Ramsar convention, wetlands that are representative, rare, or unique, or wetlands that are considered of international importance (Department of the Environment and Energy, 2019).

The Fortescue Marshes, which are classified as nationally significant wetlands, and as Ramsar wetlands, were mapped within the desktop Study Area (36.2 km north of the Survey Area; Table 1.1; Map 1.1).

2. METHODS

2.1. Desktop Assessment

A desktop review of relevant and available biological data sources within the desktop Study Area was undertaken prior to the field survey, to assess the flora and vegetation likely to occur across the Survey Area.

2.1.1. Biological Database Searches

The following databases were searched and incorporated into the desktop assessment (Table 2.1).

Table 2.1: Summary of Database Searches

Data Source	Custodian	Details	Buffer
Commonwealth Protected Matters Search Tool (PMST)	Department of the Environment and Energy (DoEE)	Date: 25/02/2023	50 km
DBCA Threatened & Priority Flora Databases (TPFL / WA Herbarium)	Department of Biodiversity Conservation and Attraction (DBCA)	Date: 24/02/2023 Reference: 53-0223FL	50 km
DBCA Communities Database	DBCA	Date: 24/02/2023 Reference: 48-0223EC,	50 km
Index of Biodiversity Surveys and Assessments (IBSA) Database	Department of Water and Environmental Regulation (DWER)	Date: 26/02/2023	50 km

2.1.2. Literature Review

Previously conducted assessments within the desktop Study Area were reviewed for significant flora and vegetation. Reports were incorporated if they were provided by BHP WAIO, or if they were publicly available. The 19 reports incorporated into the desktop assessment are listed in Table 2.2. Of the previous surveys, 13 overlapped with the Survey Area. Data collected from the sites located within the Survey Area have been consolidated and used in this report (Table 2.2).

Table 2.2: Previously Conducted Biological Assessments

Biological Assessment Name	Survey Level	Survey Timing	Distance to Survey Area (Km)
Ministers North Miscellaneous Licence Area Amendment Surveys, Sanders Seep and Yandicoogina Creek Flora and Vegetation (Biologic Environmental Survey, 2020)	Level 2 flora and vegetation	Mar 2020 Sept 2019	Within
Ministers North to Yandi Corridor Flora and Vegetation Survey (Onshore Environmental, 2018a)	Level 2 (currently known as detailed) flora and vegetation	Oct 2017 May 2018	Within
Minsters North Biological Survey (Ecologia Environment, 2006)	Level 1 (currently known as reconnaissance) flora and vegetation	May 2006	Within
Ministers North Detailed Flora and Vegetation Survey (Biota Environmental Science, 2017)	Level 2 flora and vegetation	Sep 2016, May 2017 & Jul 2017	Within
Minsters North Exploration lease Flora and Vegetation Assessment (ENV Australia, 2009a)	Level 2 flora and vegetation	Sep 2007	Within
Area C Rail Corridor Rare Flora Survey (Biota Environmental Science, 2002)	Level 2 flora and vegetation	Nov 2001 & Mar 2002	Within
Area C Rail Corridor Rare Flora Survey Phase 2 (Biota Environmental Science, 2003)	Level 2 flora and vegetation	Jan 2003	Within
Area C to Yandi Rail Line Weed Survey (Ecologia Environmental Consultants, 2001)	Targeted species flora and vegetation	Oct 2001	Within
Ministers North and Yandi Vegetation Association and Condition Mapping (Onshore Environmental, 2020)	Desktop flora and vegetation	Jun 2020	Within
Yandicoogina Creek GDV Survey (Onshore Environmental, 2018c)	Level 1 flora and vegetation	Jun 2018	Within
Area C West to Yandi Flora and Vegetation Assessment – ASTRON (Astron Environmental Services, 2018)	Targeted species flora and vegetation	Nov 2018	Within
West Scheme pipeline corridors Targeted flora survey (GHD, 2022)	Targeted species flora and vegetation	Apr 2021	Within
Mining Area C Biological Survey (Ecologia Environmental Consultants, 1998)	Level 2 flora and vegetation	Apr-May 1997	Within
Newman to Yandi Transmission Line Flora and Vegetation Assessment (ENV Australia, 2009b)	Level 2 flora and vegetation	May 2009	Within
Area C to Yandi Flora and Vegetation Survey (Astron Environmental Services, 2010a)	Level 2 flora and vegetation	Sep 2010	5.4
BHP Yandi Operations Targeted Flora Survey (GHD, 2022)	Targeted species flora and vegetation	2023	7.0
Flora and Vegetation Survey Lease M47/292 and E4 Drill Lines (Maunsell Australia, 2004)	Level 2 flora and vegetation	Dec 2003	7.2

Biological Assessment Name	Survey Level	Survey Timing	Distance to Survey Area (Km)
Flora and Vegetation Review, Yandi ML 270SA - July 2011 (Onshore Environmental, 2011)	Level 1 flora and vegetation	Dec 2010	7.6
Yandi Mine Site Weed Inspection (Astron Environmental Services, 2010b)	Targeted species flora and vegetation	Aug 2010	7.7
Area C West to Yandi Flora and Vegetation (Onshore Environmental, 2014)	Level 2 flora and vegetation	May-Jun 2011, July – Aug 2012 Aug 2013	17.2

2.1.3. Likelihood of Occurrence of Significant Flora

The following information was collated for each significant flora taxon or TEC/PEC identified during the desktop assessment:

- Conservation status (EPBC Act, BC Act, DBCA listing);
- Description of species and flowering period;
- Description of habitat requirements;
- Description of previous records; and
- Distance of record to the Survey Area.

A likelihood of occurrence assessment was then conducted using the criteria listed in Table 2.3. This included assessing the distance of the record from the Project (historical database records considered not accurate were excluded if required), and the presence of appropriate habitats within the Survey Area (using geology, vegetation mapping, and/or aerial imagery).

Table 2.3: Likelihood of Occurrence Criteria

Likelihood	Flora & Vegetation
Recorded	Species or vegetation community accurately recorded within the Survey Area during the desktop assessment (includes TEC/PEC buffers that intersect).
High	Species or vegetation community recorded within 10 km near the Survey Area, and suitable habitat does, or is likely, to occur.
Medium	Species or vegetation community recorded outside the Survey Area but within 30 km and suitable habitat may occur.
Low	Species or vegetation community rarely or not recorded within 50 km of the Survey Area and suitable habitat is not likely to occur within the Survey Area.

2.2. Survey Timing

The assessment was undertaken from the 30 May to 7 June 2023. Monthly climate data was sourced from the nearest Bureau of Meteorology (BOM) station with complete data (Karijini North #005098), located approximately 100 km west of the Survey Area (Bureau of Meteorology, 2023). Rainfall recorded 12 months prior to the survey, median monthly rainfall, and temperature are presented in Figure 2.1.

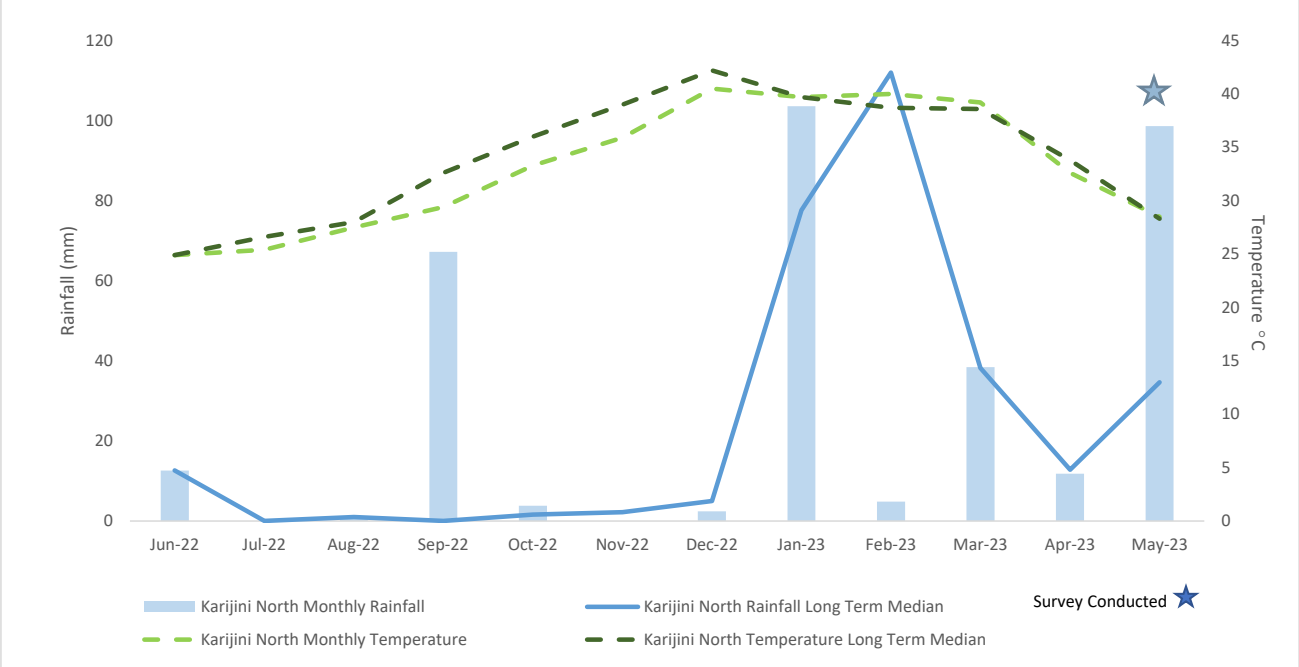


Figure 2.1: Mean Temperature & Rainfall for the 12 Months Preceding the Survey

The following rainfall was recorded at Karijini North (#005098) prior to the survey:

- The 12 months preceding the field survey (June 2022 to May 2023) recorded 344.0 mm of rainfall, 46.4 mm higher than the sum of the long-term annual median of 297.6 mm; and
- The three-months preceding the field survey (March 2023 – May 2023) recorded 148.8 mm of rainfall, 63.2 mm higher than the sum of the long-term annual median for the same three months (85.6 mm).

The survey was therefore undertaken during a period of above median rainfall and conditions for the survey were likely to have been optimal. In addition, the recommended timing for undertaking a flora survey in the Pilbara IBRA region is six to eight weeks post wet season (June). The field survey was therefore undertaken as per EPA guidance for the Pilbara IBRA bioregion. Despite above median rainfall, some areas appeared drier than in previous assessments, with no water pooling in any of the drainage lines. Very few annuals were recorded during the current survey.

As the assessment was a targeted survey, appropriate survey timing is also associated with being able to detect and identify the target species. Table 2.4 lists the desktop taxa assigned a 'Recorded', 'High', and 'Medium" likelihood of occurrence, their longevity, flowering period, and detectability during the current survey. The majority of the desktop taxa were considered likely to be present or possibly detectable at the time of the survey. There were two taxa, *Euphorbia australis* var. *glabra* and *Stylidium weeliwolli*, that were considered unlikely to be detected due to the longevity, lifeform, and known or unknown flowering time.

Table 2.4: Priority Flora Target Species – Flowering Times & Detectability

Status	Taxon	Longevity & Lifeform	Flowering Period	Likelihood of Occurrence	Detectability in Survey
P2	*Aristida lazaridis*	Perennial grass	Apr	Recorded	Possible
P3	*Eremophila naaykensii*	Perennial shrub	Jun to Sep	Recorded	Yes
P3	*Fimbristylis sieberiana*	Perennial sedge	May to Jun	Recorded	Yes
P3	*Gymnanthera cunninghamii*	Perennial shrub	Jan to Dec	Recorded	Yes
P3	*Rostellularia adscendens* var. *latifolia*	Perennial herb or shrub	Apr to May	Recorded	Possible
P4	*Acacia bromilowiana*	Perennial shrub/tree	July to Aug	Recorded	Yes
P4	*Sida* sp. Barlee Range (S. van Leeuwen 1642)	Perennial shrub	Aug	Recorded	Yes
P2	*Ipomoea racemigera*	Annual herb	Apr, Jun	High	Possible
P3	*Amaranthus centralis*	Annual herb	Flowers throughout the year	High	Possible
P3	*Aristida jerichoensis* var. *subspinulifera*	Perennial grass	Mar to Jul, Sep	High	Yes
P3	*Dampiera metallorum*	Perennial herb/shrub	Apr/Jun - Oct	High	Yes
P3	*Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727)	Biennial herb	Feb to Oct	High	Possible
P3	*Rhagodia* sp. Hamersley (M. Trudgen 17794)	Perennial shrub	Mar, May, Nov	High	Yes
P4	*Lepidium catapycnon*	Perennial shrub	Oct	High	Yes
P1	*Calotis squamigera*	Annual herb	Jul	Medium	Possible
P1	*Synostemon hamersleyensis*	Perennial shrub	Sep to Nov	Medium	Yes
P1	*Triodia* sp. Karijini (S. van Leeuwen 4111)	Perennial hummock grass	Aug to Sep	Medium	Yes
P2	*Cladium procerum*	Perennial grass	Nov	Medium	Possible
P2	*Eragrostis* sp. Mt Robinson (S. van Leeuwen 4109)	Perennial grass	Sep	Medium	Possible
P2	*Eremophila* sp. West Angelas (S. van Leeuwen 4068)	Perennial shrub	Aug to Oct	Medium	Yes
P2	*Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	Perennial shrub	Apr to Oct	Medium	Yes
P3	*Acacia effusa*	Perennial shrub	May to Aug	Medium	Yes
P3	*Acacia subtiliformis*	Perennial shrub	Jun	Medium	Yes
P3	*Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479)	Biennial herb	May, Jun, Sep	Medium	Possible
P3	*Euphorbia australis* var. *glabra*	Perennial herb	May, Sep	Medium	Unlikely
P3	*Glycine falcata*	Perennial herb	May or Jul	Medium	Possible
P3	*Goodenia lyrata*	Perennial herb	Aug	Medium	Possible
P3	*Grevillea saxicola*	Perennial shrub	Feb to Jun, Sep	Medium	Yes
P3	*Indigofera gilesii*	Perennial shrub	May or Aug	Medium	Yes
P3	*Isotropis parviflora*	Perennial shrub	Mar	Medium	Yes
P3	*Pilbara trudgenii*	Perennial shrub	Sep	Medium	Yes
P3	*Solanum kentrocaule*	Perennial shrub	Jul to Sep	Medium	Yes
P3	*Stylidium weeliwolli*	Annual herb	Aug to Sep	Medium	Unlikely
P3	*Themeda* sp. Hamersley Station (M.E. Trudgen 11431)	Perennial grass	Aug	Medium	Yes

Status	Taxon	Longevity & Lifeform	Flowering Period	Likelihood of Occurrence	Detectability in Survey
P3	*Triodia basitricha*	Perennial grass	May	Medium	Yes
P3	*Triodia* sp. Mt Ella (M.E. Trudgen 12739)	Perennial grass	Sep	Medium	Yes
P3	*Vittadinia* sp. Coondewanna Flats (S. Vanleeuwen 4684)	Annual	Jul	Medium	Possible
P4	*Eremophila magnifica* subsp. *magnifica*	Perennial shrub	Aug. to Nov	Medium	Yes
P4	*Ptilotus mollis*	Perennial shrub	May or Sep	Medium	Yes
P4	*Rhynchosia bungarensis*	Perennial shrub	May, Jul, Nov	Medium	Yes

2.3. Field Methods & Sampling Effort

A one-phase targeted significant flora and vegetation assessment was undertaken at the Survey Area. The survey was competed by six botanists over 54 person days. A total of 22 relevés, 405 km of targeted traverses, and 47 mapping notes were sampled during the assessment (Map 2.1). This was considered appropriate for a targeted survey as stipulated in the technical guidance (Environmental Protection Authority, 2016b); these techniques are described in Table 2.5.

Table 2.5: Flora & Vegetation Survey Technique

Technique	Application & Purpose
Relevés	Relevés are a survey technique for gathering information for low-intensity targeted flora and vegetation surveys. Information collected at each relevé includes: • Site code, date, location, botanist; • A photograph; • Vegetation condition and disturbances (including fire); • Landform including; slope, soil, rock type, aspect; • Flora and vegetation information including; dominant species cover and structure; and • Significant and introduced flora species and counts.
Mapping Notes	Note taken with the location and vegetation community present. Can include photographs or descriptions.
Opportunistic Sampling	Flora species not recorded through other sampling methods can be opportunistically sampled as encountered in the Survey Area. Opportunistic sampling also included recording locations of significant, introduced (weed) and unknown species.

Traverses were undertaken at an average spacing of approximately 200 m on the hills and 20-30 m in the drainage lines. However, depending on terrain, target species, and population densities the spacing ranged between 5-200 m. Where a Priority flora species was encountered, transects with a closer spacing were walked as necessary to accurately map the number of individuals. This spacing was sufficient to cover the target areas with a high confidence level for detectible flora.

When a larger population of a target species was encountered, field personnel estimated abundances every 20 m (for a 20 m width) until the extent ended resulting in a count for 20 x 20 m areas (400 m^2) per recorded location. Populations were considered distinct if the records were separated by more than 500 m or a significant landscape feature (EPA, 2016c).

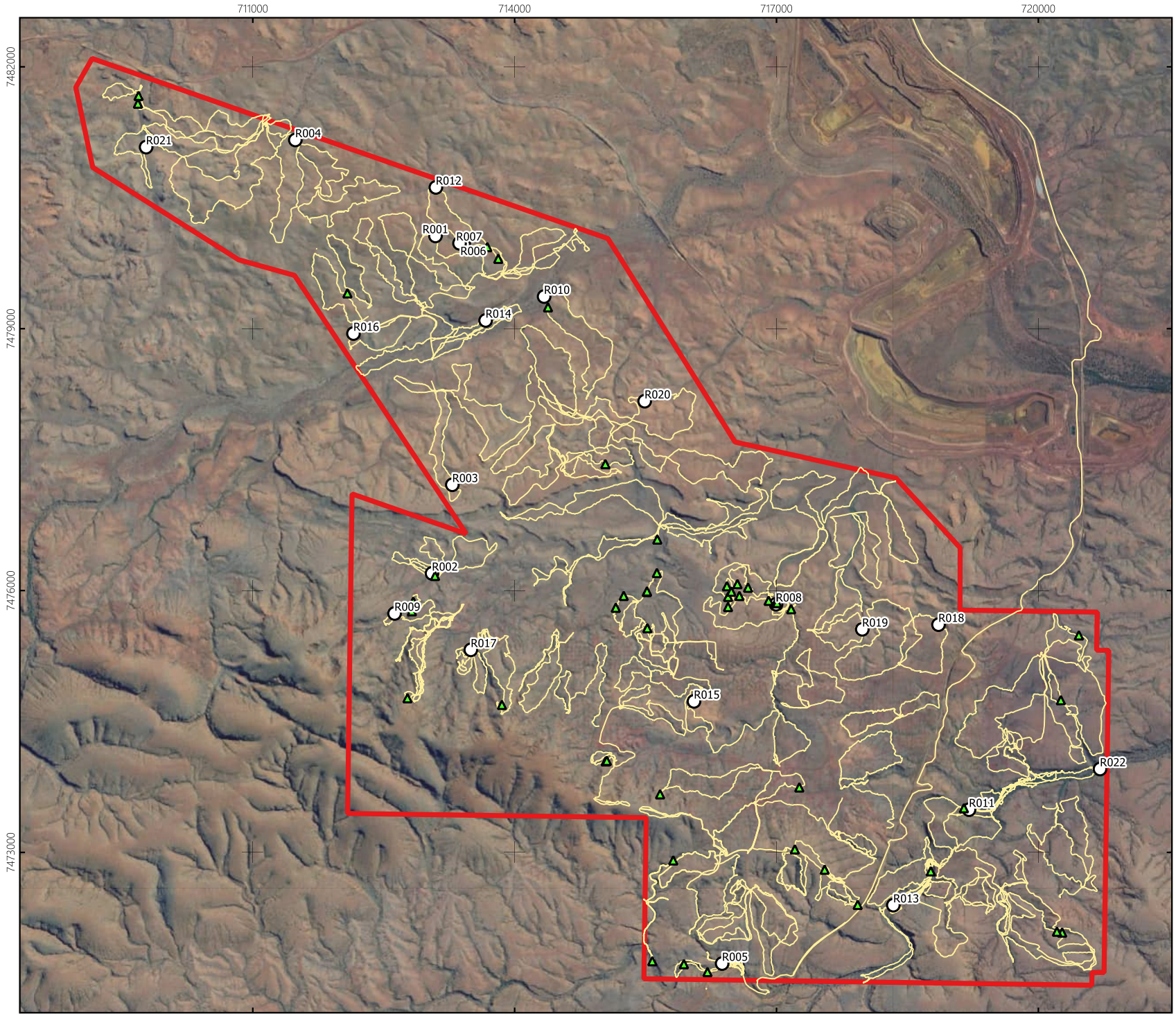
Abundances were estimated using methods consistent with the Threatened and Priority flora Report Form – Field Manual (Department of Biodiversity Conservation and Attractions, 2017). When the target species were encountered, sufficient information was collected to be compliant with the requirements of the Threatened and Priority flora Report Form, and included:

- Observation date;

- Observer, role, organisation;
- Description of location, land tenure;
- GPS coordinates;
- Abundance count; count method;
- Reproductive state (of collected specimens);
- Condition of population;
- Habitat information;
- Vegetation classification; and
- Condition of habitat, fire history etc.

Specimens were submitted to the Western Australian Herbarium (WAH) for formal identification as required. For example:

- If the species occurs outside of known population areas.
- If the species may be significant and additional taxonomic expertise is required to identify to species level.
- Specimens of potentially new species or specimens that vary from the typical form of a taxon.



Legend

- Survey Area
- Targeted Traverses
- Releves
- Mapping Notes

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000.000061 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EH

Date: 19-06-2024

Sampling Effort - Flora

Ministers North Targeted Significant Flora & Vegetation Assessment

Prepared for
BHP WAIO

MAP
2.1

2.4. Reporting & Data Analysis

2.4.1. Flora & Vegetation

2.4.1.1. Flora Nomenclature, Taxonomy & Lodgement

Flora nomenclature used in this report is consistent with the Western Australian Herbarium's plant census, provided on FloraBase (Western Australian Herbarium, 2023) and is current at the time of report preparation. Flora specimens were collected of any suspected or known significant flora and to confirm species recorded during the relevés for vegetation mapping.

Specimens were identified using the appropriate taxonomic keys. If specimens cannot be confirmed to species level, due to level of available taxonomic information, relevant taxonomic experts at the Western Australian Herbarium were consulted. One specimen of each significant species was vouchered with the Western Australian Herbarium as per guidance. Additionally significant species were vouchered when they represent new populations of Threatened or Priority flora, new occurrences of TECs or PECs, individuals that have atypical characteristics, or bioregional range extensions.

2.4.2. Significant Flora & Vegetation Definitions

As defined by the (Environmental Protection Authority, 2016a) Environmental Factor Guideline, flora and vegetation can be considered significant for a range of reasons (Appendix A).

Flora & Vegetation may be considered significant for a range of reasons, including being associated with a restricted habitat types (e.g. surface water of Groundwater Dependent Ecosystems (Environmental Protection Authority, 2016a)

The National Water Commission defines groundwater-dependent ecosystems (GDEs) as ecosystems that require access to groundwater to meet all of some of their water requirements to maintain the communities of plants and animals, the ecological processes they support and the ecosystem services they provide (Knight Merz, 2011)

2.5. Data for the Index of Biodiversity Surveys for Assessment (IBSA)

The EPA has given instruction that all biological surveys collecting data on biodiversity will submit the report and associated raw data to IBSA as an IBSA data package. All survey data collected at the Survey Area has been provided electronically to BHP WAIO and complies with IBSA and BHP WAIO data standards SPR-IEN-EMS-015.

2.6. Project Team & Licences

Spectrum personnel involved with this assessment are listed in Table 2.6, along with their role and years of experience.

Table 2.6: Project Team & Licences

Staff	Qualification	Role	Project Tasks	Years of Experience	Flora Licence
Melissa Hay	BSc Hons	Principal Botanist	Report review	15	Na
Susan Murrey	BSc, MSc	Senior Botanist	Project management, field lead, field survey, report review	5	FB62000101-1b
Emily Crowther	BSc Hons, MSc	Botanist	Logistics, field survey, data management, mapping & reporting	3	FB62000330
Sarah Boys	BSc Hons	Botanist	Field survey	3	FB62000386

Staff	Qualification	Role	Project Tasks	Years of Experience	Flora Licence
Zane Gates	BSc	Botanist	Field survey	1	FB62000426-2
Adam Crosby-Clark	BSc	Botanist	Field survey	3	FB62000349
Clem Gille	BSc Hons, PhD	Botanist	Field survey	1	FB62000562

2.7. Limitations & Constraints

Survey specific limitations and constraints for the significant flora and vegetation assessment at the Survey Area are discussed in Table 2.7.

Table 2.7: Survey Limitations & Constraints

Limitation	Constraint	Comment
Availability of the contextual information at a regional and local scale.	No	Database searches provided detailed information, adequate to guide field survey design and effort for the flora survey. There were multiple assessments conducted within and in the vicinity of the Survey Area and have been included in the desktop assessment.
Competency/experience of the consultant carrying out the survey including experience in bioregion surveyed.	No	Senior Botanist Susan Murrey and Botanist Emily Crowther have suitable knowledge and experience conducting botanical surveys on BHP WAIO tenure in the Pilbara region of Western Australia.
Timing/weather/season/cycle.	Partial	The field survey timing was considered appropriate for a flora and vegetation survey conducted in the Pilbara region, where the appropriate timing is Autumn (March to June). There was higher than median rainfall at the Survey Area in the three months prior to the survey, providing optimal conditions for flora species growth. Despite above median rainfall, some areas appeared drier than in previous assessments, with no water pooling in any of the drainage lines. Very few annuals were recorded during the survey. The majority of the desktop taxa were considered likely to be present or possibly detectable at the time of the survey. There were two taxa, *Euphorbia australis* var. *glabra* (P3) and *Stylidium weeliwolli* (P3), that were considered unlikely to be detected due to the longevity, lifeform, and known or unknown flowering time.
Disturbances (e.g., fire, flood, accidental human intervention) which affected results of survey.	No	No disturbances were recorded at the Survey Area that have affected the results of the assessment.
Remoteness and/or access problems.	Partial	One small section of the Survey Area (382 ha, approximately 6.7% of the Survey Area) could not be accessed by foot due to distance from tracks and steep terrain. This section could provide suitable habitat for *Acacia bromilowiana* (P4) and *Sida* sp. Barlee Range (S. van Leeuwen 1642; P4). There were two small section that were accessible during the time of the Survey, but due to time constraints, these areas were not walked. Both sections were given low priority by the field team during the Survey and are unlikely to constitute potential habitat for Priority flora species.
Survey effort and extent.	No	The targeted flora assessment was conducted over 405 km of traverses at a spacing of approximately 5-200 m, depending on target species and population densities, through all identified potential habitat. An additional 22 relevés and 51 vegetation notes were conducted to provide sufficient data for assertation of vegetation significance.

Limitation	Constraint	Comment
Proportion of flora recorded and/or collected, any identification issues.	No	All suspected significant flora species were collected at each population for verification by an experienced plant taxonomist. Plants were identified by taxonomist Raimond Orifici who has botanical and taxonomic experience throughout Western Australia and is particularly experienced around the Pilbara area. All specimens were identified, and one was sent to the herbarium for further taxonomic identification.

3. RESULTS & DISCUSSION - FLORA

3.1. Desktop Assessment

No Threatened flora species were reported from within the Survey Area during the desktop assessment. (Appendix B).

Seven Priority flora taxa were previously 'Recorded' in the Survey Area (The number of individuals and records of the seven previously recorded significant flora taxa are listed in Table 3.2.). A further 61 Priority flora taxa were also identified, seven of which are considered to have a 'High' likelihood and 26 a 'Medium' likelihood of occurrence within the Survey Area (Table 3.1, Map 3.1, Map 3.2, Map 3.3). The remaining 28 taxa have been assigned a 'Low' likelihood of occurrence and are listed in Appendix B.

Table 3.1: Desktop Significant Flora – Recorded, High & Medium Likelihood of Occurrence

Likelihood	Status	Taxa	Longevity	Flowering Period
Recorded	P2	*Aristida lazaridis*	Perennial	Apr
	P3	*Fimbristylis sieberiana*	Short-lived perennial	May to Jun
		Gymnanthera cunninghamii	Perennial	Jan to Dec
		Rostellularia adscendens var. *latifolia*	Perennial	Apr to May
		Eremophila naaykensii	Perennial	Jun to Sep
	P4	*Acacia bromilowiana*	Perennial	Jul- Aug
		Sida sp. Barlee Range (S. van Leeuwen 1642)	Perennial	Aug
High	P2	*Ipomoea racemigera*	Annual	Apr, Jun
	P3	*Amaranthus centralis*	Annual	Flowers throughout the year
		Aristida jerichoensis var. *subspinulifera*	Perennial	Mar to Jul, Sep
		Dampiera metallorum	Perennial	Apr/June - Oct
		Goodenia sp. East Pilbara (A.A. Mitchell PRP 727)	Annual	Feb to Oct
		Rhagodia sp. Hamersley (M. Trudgen 17794)	Perennial	Mar, May, Nov
	P4	*Lepidium catapycnon*	Perennial	Oct.
Medium	P1	*Calotis squamigera*	Annual	Jul
		Synostemon hamersleyensis	Perennial	Sep to Nov
		Triodia sp. Karijini (S. van Leeuwen 4111)	Perennial	Aug to Sep
	P2	*Cladium procerum*	Perennial	Nov
		Eragrostis sp. Mt Robinson (S. van Leeuwen 4109)	Perennial	Sep
		Eremophila sp. West Angelas (S. van Leeuwen 4068)	Perennial	Aug to Oct
		Hibiscus sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	Perennial	Apr to Oct
	P3	*Acacia effusa*	Perennial	May to Aug
		Acacia subtiliformis	Perennial	June
		Dolichocarpa sp. Hamersley Station (A.A. Mitchell PRP 1479)	Annual	May, Jun, Sep
		Euphorbia australis var. *glabra*	Annual/perennial	May, Sep
		Glycine falcata	Perennial	May or Jul
		Goodenia lyrate	Annual	Aug
		Grevillea saxicola	Perennial	Feb to Jun, Sep

Likelihood	Status	Taxa	Longevity	Flowering Period
		Indigofera gilesii	Perennial	May or Aug
		Isotropis parviflora	Perennial	Mar
		Pilbara trudgenii	Perennial	Sep
		Solanum kentrocaule	Perennial	Jul to Sep
		Stylidium weeliwolli	Annual	Aug to Sep
		Themeda sp. Hamersley Station (M.E. Trudgen 11431)	Perennial	Aug
		Triodia basitricha	Perennial	May
		Triodia sp. Mt Ella (M.E. Trudgen 12739)	Perennial	Sep
		Vittadinia sp. Coondewanna Flats (S. Vanleeuwen 4684)	Annual	Jul
	P4	*Eremophila magnifica* subsp. *magnifica*	Perennial	Aug. to Nov
		Ptilotus mollis	Perennial	May or Sep
		Rhynchosia bungarensis	Perennial	May, Jul, Nov

The number of individuals and records of the seven previously recorded significant flora taxa are listed in Table 3.2.

Table 3.2: Supporting Information for Previously Recorded Flora

Status	Taxa	Number of Records Within Survey Area	Number of Individuals Within Survey Area	Number of Records Within Study Area	Number of Individuals Within Study Area
P2	*Aristida lazaridis*	2	12	17	556
P3	*Eremophila naaykensii*	1	1	9	14
	Fimbristylis sieberiana	35	731	376	13,569
	Gymnanthera cunninghamii	5	11	5	43
	Rostellularia adscendens var *latifolia*	5	19	169	102
P4	*Acacia bromilowiana*	72	430	23	208
	Sida sp. Barlee Range (S. van Leeuwen 1642)	210	1,312	56	103

3.1.1. Post Survey Review of Desktop Assessment Flora Taxa

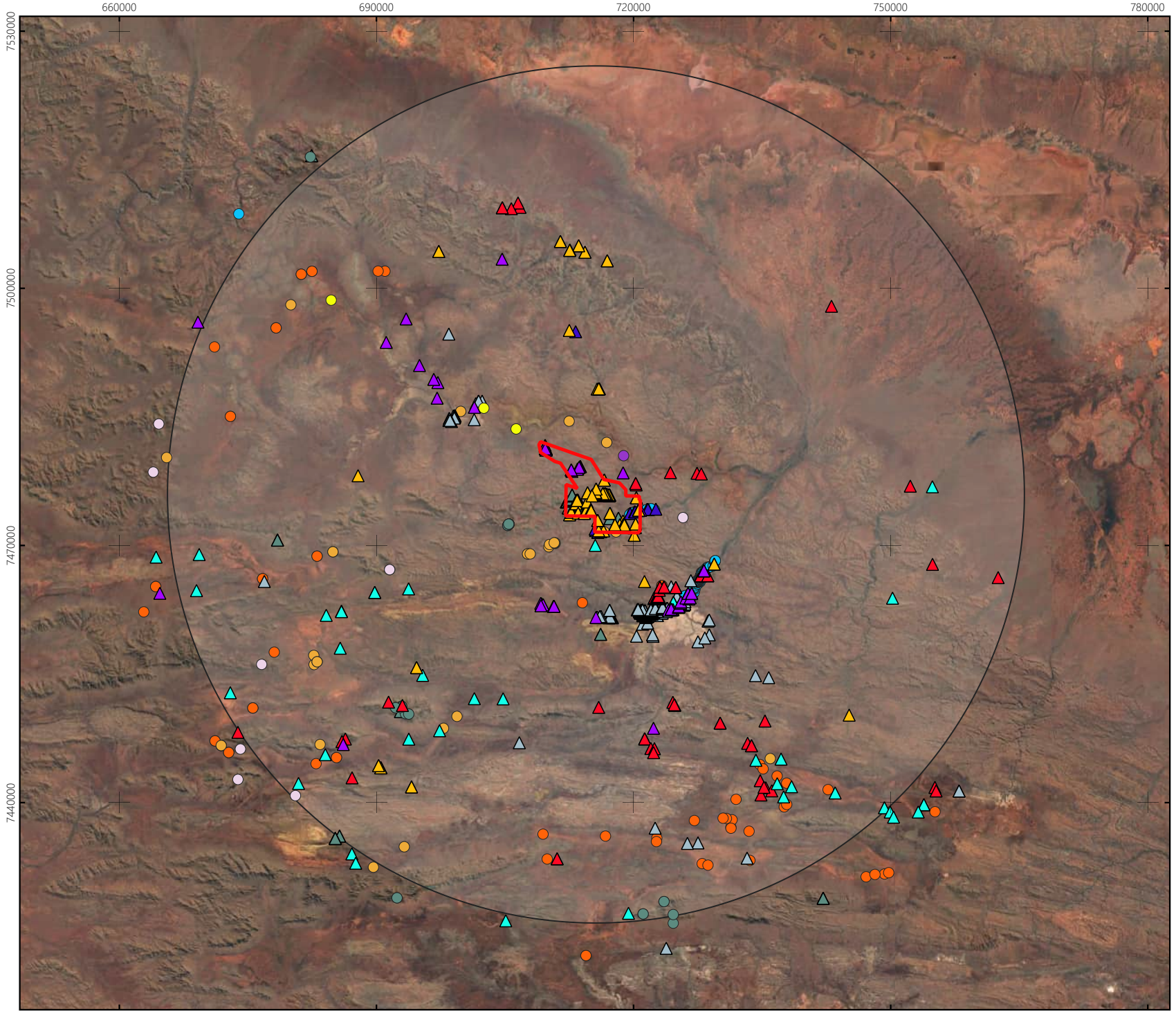
The desktop significant flora taxa assigned a 'Recorded', 'High', or 'Medium' likelihood of occurrence pre-survey and their post-survey likelihood are detailed in Table 3.3. All significant flora post survey likelihood of occurrence are detailed in Appendix B.

Table 3.3: Post Survey Likelihood of Occurrence of Desktop Assessment Flora Taxa

Likelihood of Occurrence		Taxa	Details
Pre-Survey	Post-Survey		
Recorded	Recorded	*Aristida lazaridis* (P2)	Recorded
	High	*Fimbristylis sieberiana* (P3)	Previous records were scattered throughout the north-eastern section of Yandicoogina creek, all previous records were visited, and no individuals were recorded during the current assessment despite thorough searching. This taxon was assigned a 'High' post survey likelihood, as it was recorded by multiple other surveys and it is likely that it was not recorded during the current

Likelihood of Occurrence		Taxa	Details
Pre-Survey	Post-Survey		
			survey due to dry conditions of the creek bed, and potential seasonal die back of the plants.
	Recorded	*Gymnanthera cunninghamii* (P3)	Recorded.
		Rostellularia adscendens var. *latifolia* (P3)	Recorded.
		Acacia bromilowiana (P4)	Recorded.
		Sida sp. Barlee Range (S. van Leeuwen 1642) (P4)	Recorded.
	High	*Eremophila naaykensii* (P3)	Suitable habitat, not found during survey. However is still assigned a 'High' due to multiple previous records in a close vicinity to the Survey Area.
High	Medium	*Ipomoea racemigera* (P2)	The survey effort was sufficient to suggest a 'Medium' likelihood of occurrence. It was not assigned a 'Low' as annuals can have lower detectability during surveys and suitable habitat exists.
		Amaranthus centralis (P3)	The survey effort was sufficient to suggest a 'Medium' likelihood of occurrence. It was not assigned a 'Low' as annuals can have lower detectability during surveys and suitable habitat exists.
	Low	*Aristida jerichoensis* var. *subspinulifera* (P3)	No suitable habitat (hardpan plains).
		Dampiera metallorum (P3)	No suitable habitat (banded ironstone).
	Medium	*Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3)	The survey effort was sufficient to suggest a 'Medium' likelihood of occurrence. It was not assigned a 'Low' as annuals can have lower detectability during surveys and suitable habitat exists.
	Low	*Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3)	No suitable habitat (Mulga plains).
	Medium	*Lepidium catapycnon* (P4)	Suitable habitat exists, however survey effort sufficient to suggest 'Medium' likelihood of occurrence.
Medium		*Calotis squamigera* (P1)	The survey effort was sufficient to suggest a 'Medium' likelihood of occurrence. It was not assigned a 'Low' as annuals can have lower detectability during surveys and suitable habitat exists.
		Synostemon hamersleyensis (P1)	Suitable habitat exists, however survey effort sufficient to suggest Low likelihood of occurrence.
	Low	*Triodia* sp. Karijini (S. van Leeuwen 4111) (P1)	Suitable habitat exists, however survey effort sufficient to suggest Low likelihood of occurrence.
		Cladium procerum (P2)	No suitable habitat (perennial pools and swamps).
	Medium	*Eragrostis* sp. Mt Robinson (S. van Leeuwen 4109) (P2)	Suitable habitat exists, however survey effort sufficient to suggest 'Medium' likelihood of occurrence.
	Low	*Eremophila* sp. West Angelas (S. van Leeuwen 4068) (P2)	No suitable habitat (Mulga plains).
	Medium	*Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708) (P2)	Suitable habitat exists, however survey effort sufficient to suggest 'Medium' likelihood of occurrence.

Likelihood of Occurrence		Taxa	Details
Pre-Survey	Post-Survey		
	Low	*Acacia effusa* (P3)	No suitable habitat (gentle foot slopes near floodplains)
		Acacia subtiliformis (P3)	No suitable habitat (rocky calcrete plateaux)
	Medium	*Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3)	The survey effort was sufficient to suggest a 'Medium' likelihood of occurrence. It was not assigned a 'Low' as annuals can have lower detectability during surveys and suitable habitat exists.
		Euphorbia australis var. *glabra* (P3)	The survey effort was sufficient to suggest a 'Medium' likelihood of occurrence. It was not assigned a 'Low' as annuals can have lower detectability during surveys and suitable habitat exists.
	Low	*Glycine falcata* (P3)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
		Goodenia lyrata (P3)	No suitable habitat (claypans)
		Grevillea saxicola (P3)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
	Medium	*Indigofera gilesii* (P3)	Suitable habitat exists, however survey effort sufficient to suggest 'Medium' likelihood of occurrence.
	Low	*Isotropis parviflora* (P3)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
		Pilbara trudgenii (P3)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
		Solanum kentrocaule (P3)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
		Stylidium weeliwolli (P3)	No suitable habitat (edge of permanent pools and gorges).
		Themeda sp. Hamersley Station (M.E. Trudgen 11431) (P3)	No suitable habitat (cracking clay).
		Triodia basitricha (P3)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
		Triodia sp. Mt Ella (M.E. Trudgen 12739) (P3)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
		Vittadinia sp. Coondewanna Flats (S. Vanleeuwen 4684) (P3)	No suitable habitat (gilgai and cracking clay).
		Eremophila magnifica subsp. *magnifica* (P4)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
		Ptilotus mollis (P4)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.
		Rhynchosia bungarensis (P4)	Suitable habitat exists, however survey effort sufficient to suggest 'Low' likelihood of occurrence.



Legend

- Survey Area
- 50 km buffer

Priority Flora Taxa

- P2 Aristida lazaridis
- P2 Ipomoea racemigera
- P3 Amaranthus centralis
- P3 Aristida jerichoensis var. subspinulifera
- P3 Dampiera metallorum
- P3 Eremophila naaykensii
- P3 Fimbristylis sieberiana
- P3 Goodenia sp. East Pilbara (A.A. Mitchell PRP 727)
- P3 Gymnanthera cunninghamii
- P3 Rhagodia sp. Hamersley (M. Trudgen 17794)
- P3 Rostellularia adscendens var. latifolia
- P4 Acacia bromilowiana
- P4 Lepidium catapycnon
- P4 Sida sp. Barlee Range (S. van Leeuwen 1642)

N

0 6 12 18 24 km

Scale 1:610,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

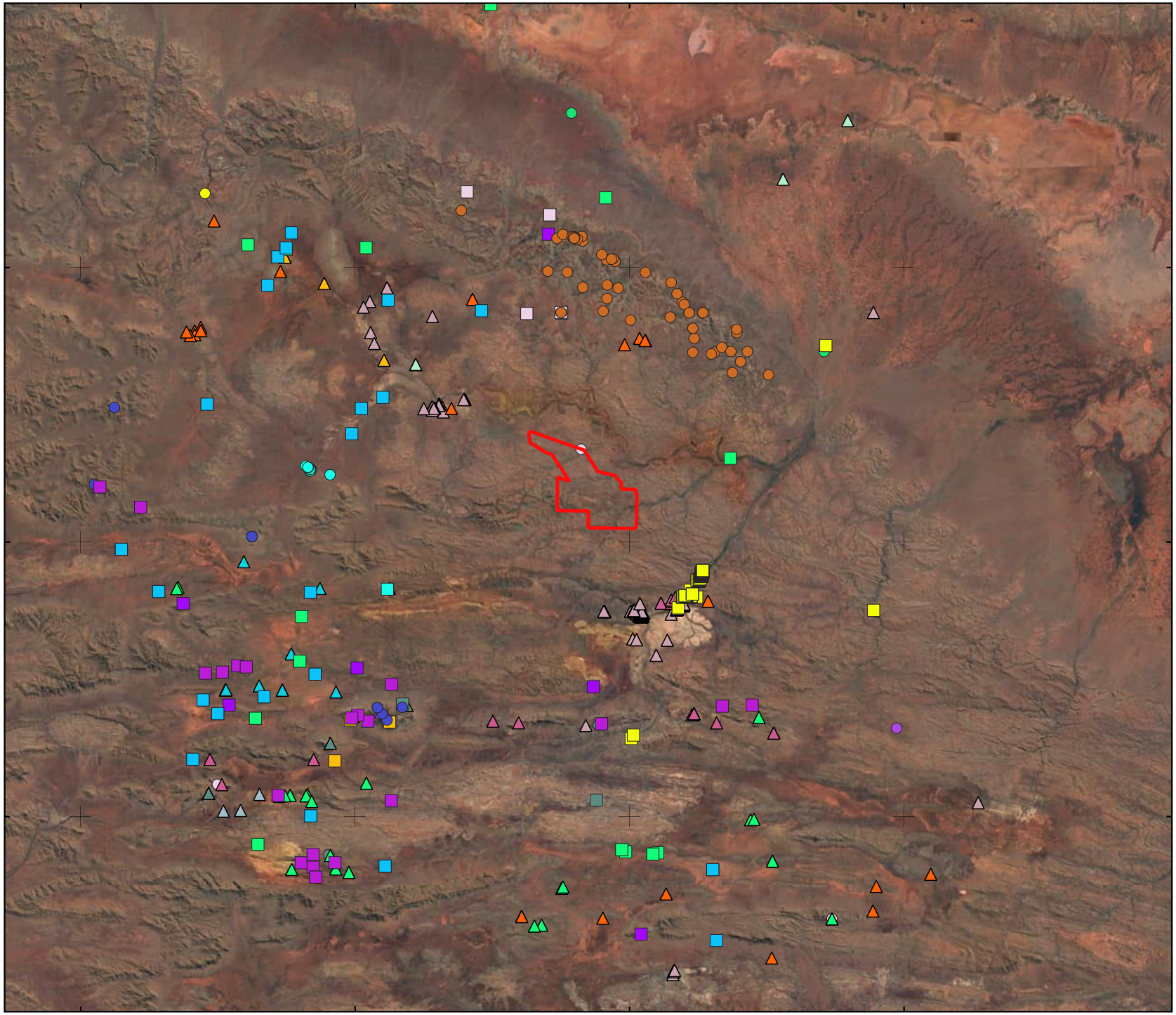
Date: 02-08-2023

Desktop Significant Flora - Recorded & High Likelihood

Ministers North Targeted Significant Flora & Vegetation Assessment

MAP 3.1

Prepared for BHP WAIO



Legend

Survey Area

Priority Flora Taxa

- P1 Calotis squamigera
- P1 Synostemon hamersleyensis
- P1 Triodia sp. Karijini (S. van Leeuwen 4111)
- P2 Cladium procerum
- P2 Eragrostis sp. Mt Robinson (S. van Leeuwen 4109)
- P2 Eremophila sp. West Angelas (S. van Leeuwen 4068)
- P2 Hibiscus sp. Gurinbiddy Range (M.E. Trudgen MET 15708)
- P3 Acacia effusa
- P3 Acacia subtiliformis
- P3 Dolichocarpa sp. Hamersley Station (A.A. Mitchell PRP 1479)
- P3 Euphorbia australis var. glabra
- P3 Glycine falcata
- P3 Goodenia lyrata
- P3 Grevillea saxicola
- P3 Indigofera gilesii
- P3 Isotropis parviflora
- P3 Pilbara trudgenii
- P3 Solanum kentrocaule
- P3 Stylidium weeliwolli
- P3 Themeda sp. Hamersley Station (M.E. Trudgen 11431)
- P3 Triodia basitricha
- P3 Triodia sp. Mt Ella (M.E. Trudgen 12739)
- P3 Vittadinia sp. Coondewanna Flats
- P4 Eremophila magnifica subsp. magnifica
- P4 Ptilotus mollis
- P4 Rhynchosia bungarensis

N

0 5 10 15 20 km

Scale 1:580,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 27-07-2023

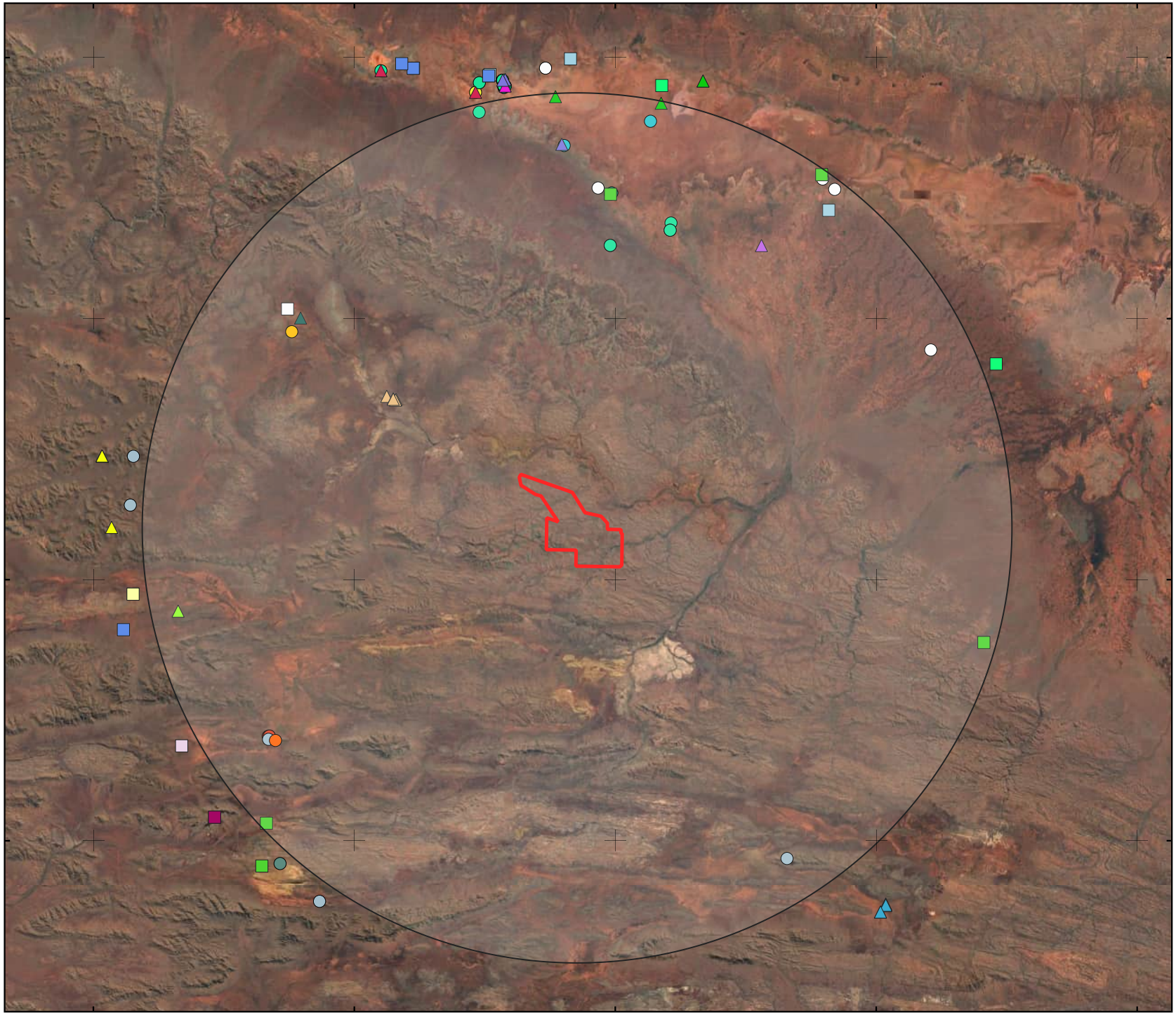
Desktop Significant Flora - Medium Likelihood

Ministers North Targeted Significant Flora & Vegetation Assessment

MAP

Prepared for BHP

3.2



Legend

- Survey Area
- 50 km buffer

Priority Flora Taxa

- P1 Calotis squamigera
- P1 Synostemon hamersleyensis
- P1 Triodia sp. Karijini (S. van Leeuwen 4111)
- P2 Cladium procerum
- P2 Eragrostis sp. Mt Robinson (S. van Leeuwen 4109)
- P2 Eremophila sp. West Angelas (S. van Leeuwen 4068)
- P2 Hibiscus sp. Gurinbiddy Range (M.E. Trudgen MET 15708)
- P3 Acacia effusa
- P3 Acacia subtiliformis
- P3 Dolichocarpa sp. Hamersley Station (A.A. Mitchell PRP 1479)
- P3 Euphorbia australis var. glabra
- P3 Glycine falcata
- P3 Goodenia lyrata
- P3 Grevillea saxicola
- P3 Indigofera gilesii
- P3 Isotropis parviflora
- P3 Pilbara trudgenii
- P3 Solanum kentrocaule
- P3 Stylidium weeliwolli
- P3 Themeda sp. Hamersley Station (M.E. Trudgen 11431)
- P3 Triodia basitricha
- P3 Triodia sp. Mt Ella (M.E. Trudgen 12739)
- P3 Vittadinia sp. Coondewanna Flats
- P4 Eremophila magnifica subsp. magnifica
- P4 Ptilotus mollis
- P4 Rhynchosia bungarensis

N

0 7 14 21 km

Scale 1:610,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 02-08-2023

Desktop Significant Flora - Low Likelihood

Ministers North Targeted Significant Flora & Vegetation Assessment

Prepared for BHP WAIO

MAP 3.3

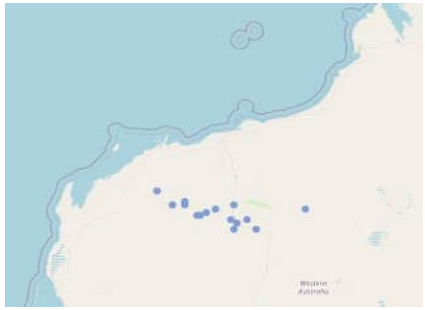
3.2. Significant Flora

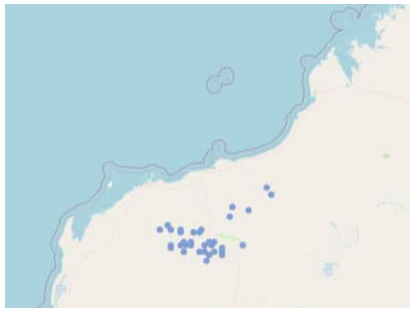
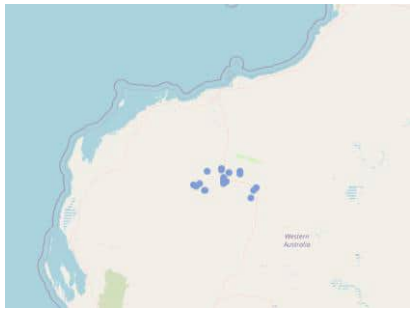
No Threatened flora taxa were recorded during the assessment or considered likely to occur in the Survey Area.

Five Priority flora taxa were recorded within the Survey Area during the current assessment: *Acacia bromilowiana* (P4), *Aristida lazaridis* (P2), *Gymnanthera cunninghamii* (P3), *Rostellularia adscendens* var. *latifolia* (P3), and *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P4). These taxa had all previously been recorded within the Survey Area. An additional two taxa were previously recorded during the desktop assessment but not found during the current assessment, however, are still considered likely to occur: *Fimbristylis sieberiana* (P3) and *Eremophila naaykensii* (P3) and are therefore included in the following sections. The Priority flora taxa are listed in Table 3.4, displayed on Map 3.5 to Map 3.11, and are described in full in sections 3.2.1 to 3.2.7.

No other significant flora taxa (as listed in section 2.4.2) were recorded at the Survey Area during the current of previous field assessments. Coordinates of all significant flora taxa have been provided electronically with this report.

Table 3.4: Significant Flora Recorded Previously & During the Current Survey

Status	Taxon	Description of Plants in Survey Area	Landforms in Survey Area	#Individuals within Survey Area	Current Distribution Map^	Current Local & Regional Distribution	Photograph
P4	*Acacia bromilowiana*	Gnarled tree or shrub 1.2-6 m tall, variably domed, and grey fissured bark. Phyllodes were asymmetrically lanceolate 65-135 mm long and 14-32 mm wide. Petioles were 3-6 mm long. Plants not flowering.	Steep slopes, breakaways, and summits.	Current: 560 Previous: 430 Excluded: 10 **Total: 980**		**Local:** Known from the local area. **Regional**: Known from scattered locations throughout the Pilbara.	
P4	*Sida* sp. Barlee Range (S. van Leeuwen 1642)	Shrub 15-80 cm high, with grey-blue leaves 6-23 mm long and 4-15 mm wide with stellate hairs. Corolla was yellow and glabrous.	Gullies, gorges and drainage lines on ironstone or sandy-clay soils.	Current: 1,421 Previous: 1,312 Excluded: 17 **Total:** 2,716		**Local:** Known from the local area. **Regional:** Known from many scattered locations throughout Western Australia: Gascoyne and Pilbara.	
P3	*Gymnanthera cunninghamii*	Shrub 1.6-2.3 m high, with pendulous, green, glossy leaves 52-115 mm long and 12-30 mm wide, petioles 20-40 mm long with milky sap in the stems. Plants not flowering.	Major drainage lines.	Current: 23 Previous: 11 **Total: 34**		**Local:** Known from the local area. **Regional**: Known from many scattered locations throughout Western Australia: Carnarvon, Gascoyne, Great Sandy Desert & Pilbara.	

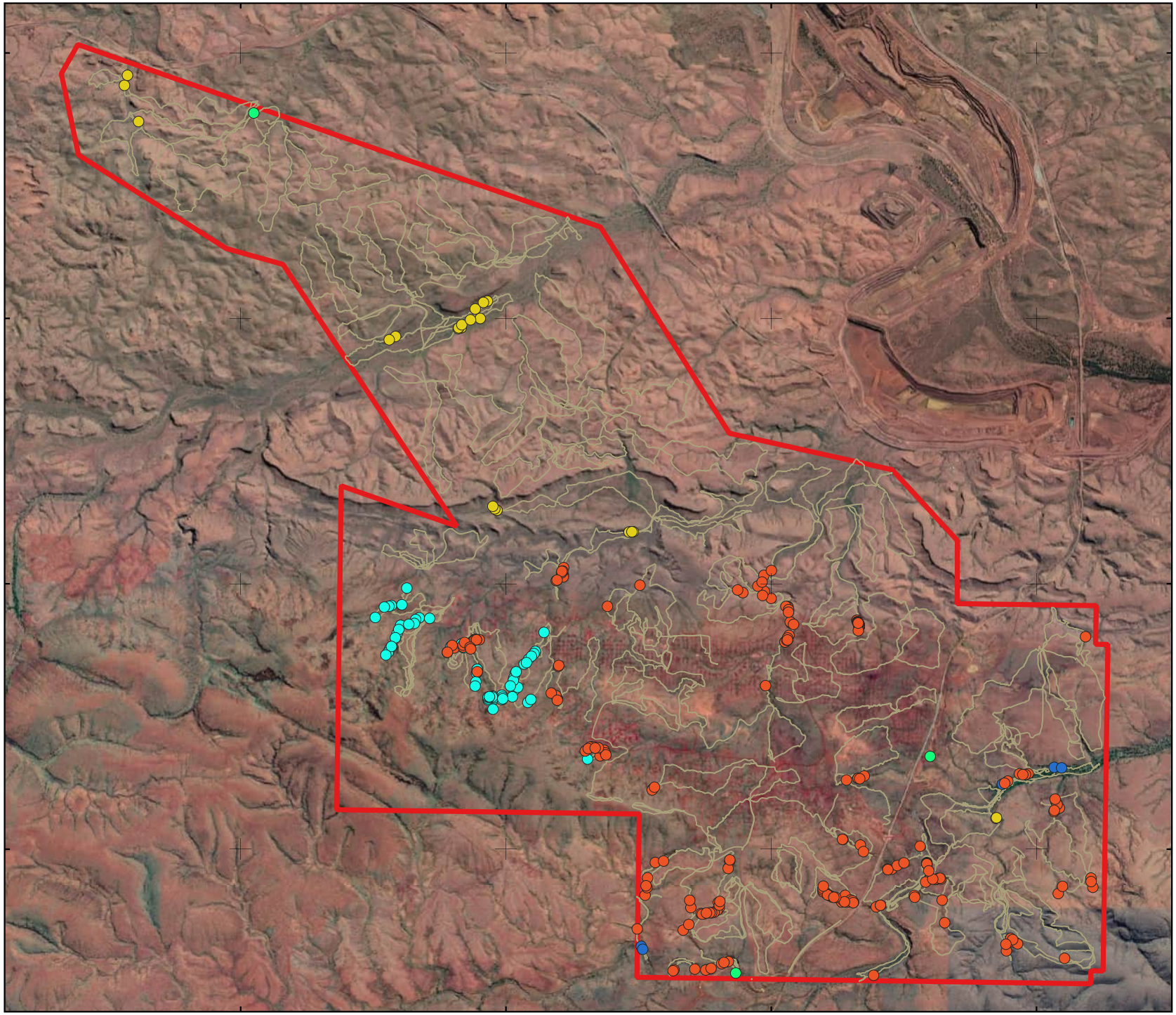
Status	Taxon	Description of Plants in Survey Area	Landforms in Survey Area	#Individuals within Survey Area	Current Distribution Map^	Current Local & Regional Distribution	Photograph
P3	*Rostellularia adscendens* var. *latifolia*	Compact herb 20-50 cm high, with a woody base with sessile leaves 7-15 mm long and 2-5 mm wide. Inflorescence in a dense terminal spike a with pink/purple corolla.	Rocky drainage lines & steep rocky gullies & gully walls.	Current: 188 Previous: 19 **Total: 207**		**Local**: Known from the local area. **Regional**: Known from many scattered locations throughout the Pilbara.	
P2	*Aristida lazaridis*	Tufted perennial grass 1.2 m high with a compound inflorescence. Leaf blade mostly flat, 120-170 mm long and 1-4 mm wide.	Disturbed areas at the side of the road.	Current: 30 Previous: 12 Excluded: 5 **Total: 38**		**Local**: Known from the local area. **Regional**: Known from many scattered locations throughout the Pilbara.	
P3	*Eremophila naaykensii*	Not recorded during current survey.	Not recorded during current survey.	Current: 0 Previous: 1 **Total: 1**		**Local**: Known from the local area. **Regional**: Known from many scattered locations throughout the Pilbara.	

Status	Taxon	Description of Plants in Survey Area	Landforms in Survey Area	#Individuals within Survey Area	Current Distribution Map^	Current Local & Regional Distribution	Photograph
P3	*Fimbristylis sieberiana*	Not recorded during current survey.	Not recorded during current survey.	Current: 0 Previous: 731 **Total: 731**		**Local**: Known from the local area. **Regional**: Known from many scattered locations throughout the Pilbara.	

^Maps used with the permission of The Australasian Virtual Herbarium, Council of Heads of Australasian Herbaria, (https://avh.chah.org.au). Accessed on Wednesday 9 August 2023.

^*Fimbristylis sieberiana* image used with the permission of the Western Australian Herbarium, Department of Biodiversity, Conservation and Attraction (https://florabase.dpaw.wa.gov.au/help/copyright). Accessed on Wednesday 9 August 2023.

^*Eremophila naaykensii* image photographed by J. Naaykens (Curtis et al., 2022).



Legend

- Survey Area
- Traverses

Priority Flora

- P4 Acacia bromilowiana
- P2 Aristida lazaridis
- P3 Gymnanthera cunninghamii
- P3 Rostellularia adscendens var. latifolia
- P4 Sida sp. Barlee Range

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Priority Flora Records

Ministers North Targeted Significant Flora & Vegetation Assessment

MAP 3.4

Prepared for BHP WAIO

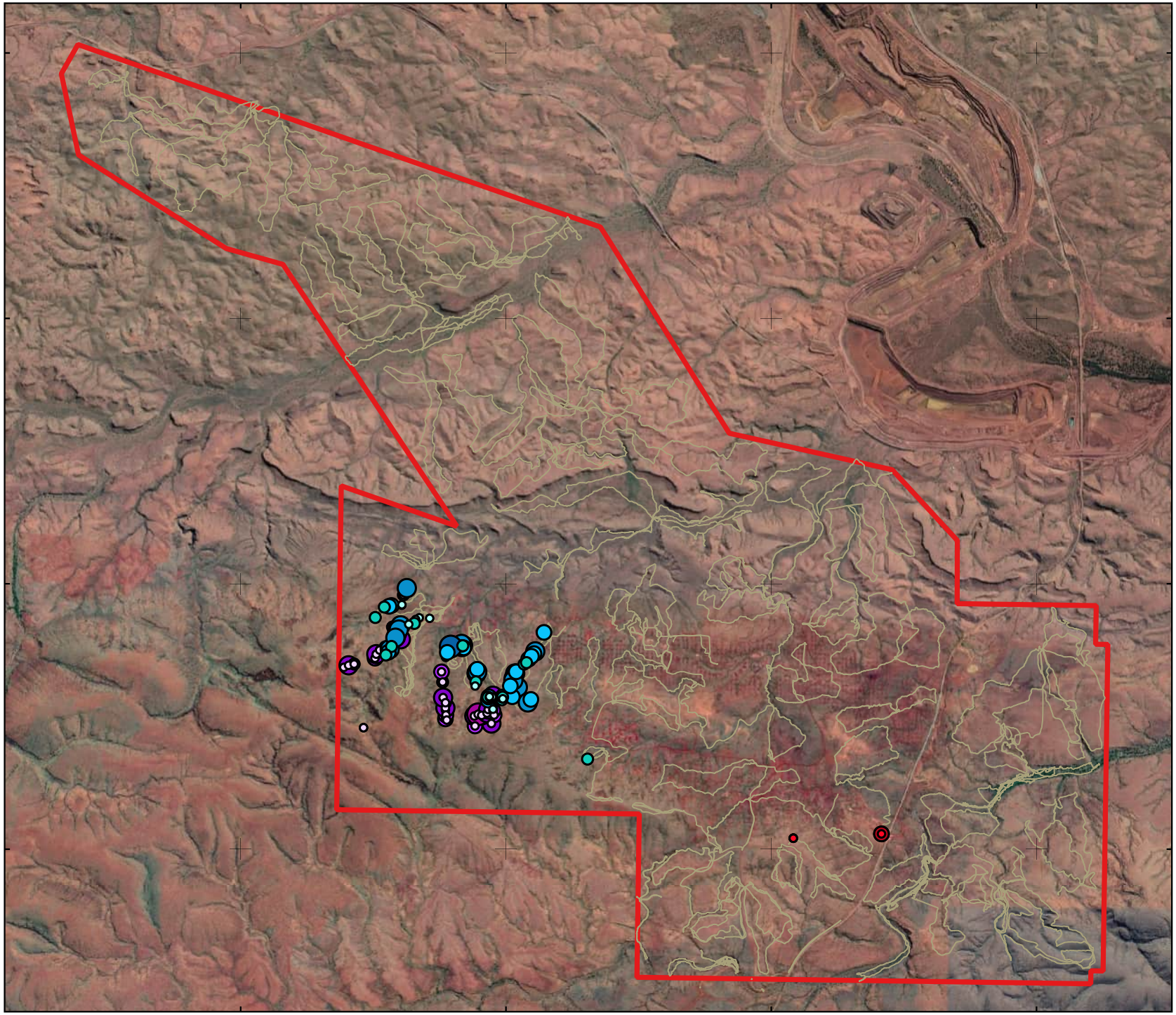
3.2.1. Acacia bromilowiana

A total of 980 individuals of *Acacia bromilowiana* (P4) were recorded from within the Survey Area (560 individuals comprised of 544 mature and 16 juveniles from the current survey and 420 from previous surveys), from 138 locations (66 from the current survey, 70 from previous surveys). All records of *Acacia bromilowiana* occurred as a single population (no records separated by >500 m) at the Survey Area (Table 3.4; Map 3.5). Several existing records of *Acacia bromilowiana* were re-visited and two records (with 10 individuals), located 2.6 km southeast of the confirmed population, were not present during the Survey and have been excluded from these calculations. These records, collected near a track, occur in unsuitable habitat for this taxon and may have been mis-identified. A specimen was collected from this location and found to be the superficially similar to *Acacia hamersleyensis*. Part of the western section of the Survey Area (382 ha, approximately 6.7% of the Survey Area) was inaccessible but it appears to be suitable habitat for *Acacia bromilowiana*, with confirmed records found 0.5 km south on the same landform.

This taxon occurred as scattered individuals throughout the hilly western sections of the Survey Area. *Acacia bromilowiana* was recorded high in the landscape on northerly facing hill crests, steep slopes, steep rocky gorges, or summits on ironstone skeletal soils with *Eucalyptus* spp. and *Triodia* spp. (Plate 3.1). This taxon intermittently formed part of the dominant mid storey for the vegetation type in those areas.

Individuals were in good condition, exhibiting healthy vegetative growth and no signs of stress. No *Acacia bromilowiana* individuals were found flowering at the time of the survey. This significant species is not expected to occur outside of the hilly western section of the Survey Area displayed on (Map 3.5).

Plate 3.1: *Acacia bromilowiana* Plant Photographs & Habitat Preferences During Field Assessment



Legend

- Survey Area
- Traverses

Acacia bromilowiana Current Assessment

- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 30
- 30 - 50

Acacia bromilowiana Desktop Assessment

- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 30
- 30 - 50

Acacia bromilowiana counts excluded

- 1 - 2
- 5 - 10

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Acacia bromilowiana Records

Ministers North Targeted Significant Flora & Vegetation Assessment

MAP 3.5

Prepared for
BHP WAIO

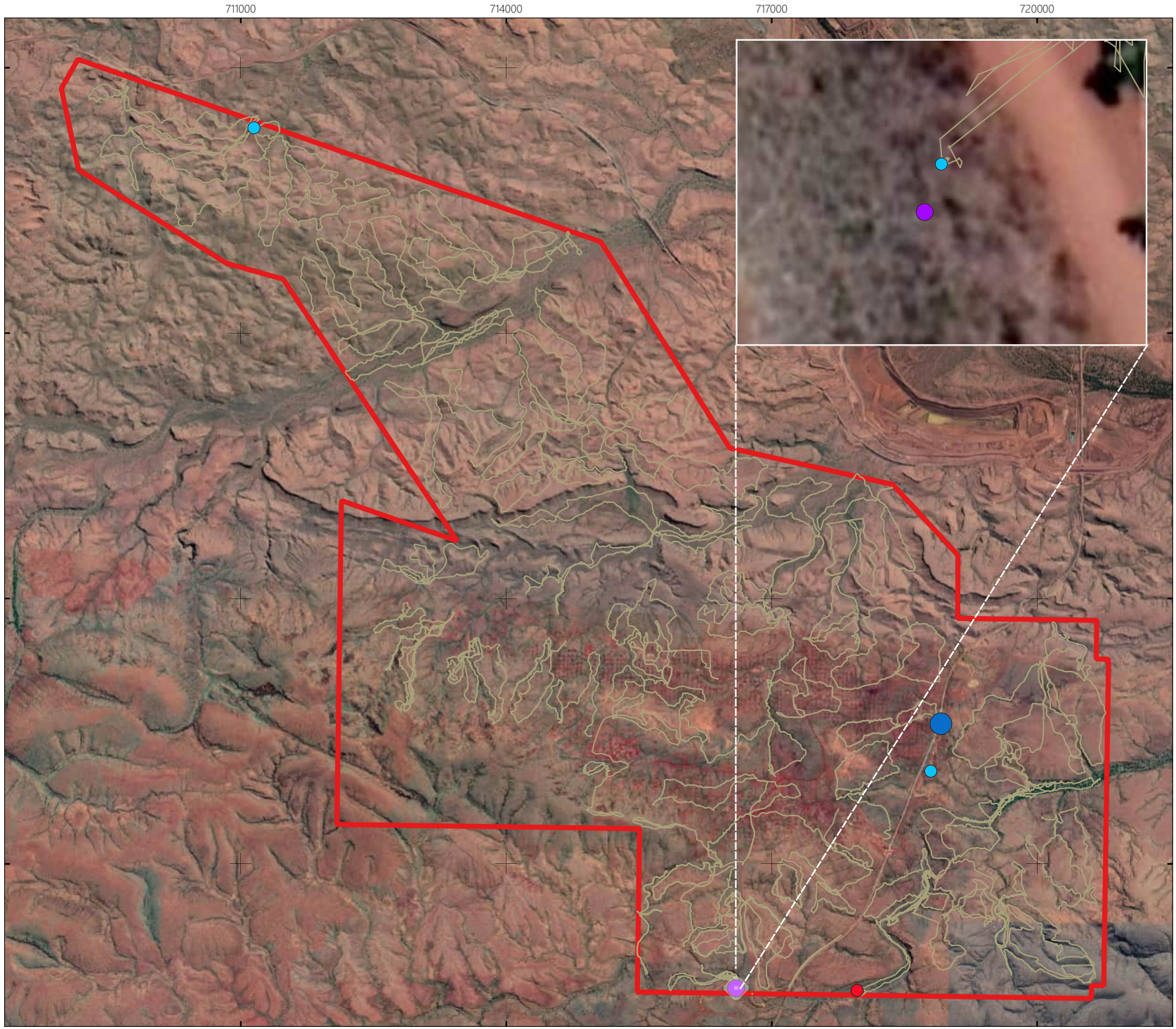
3.2.2. Aristida lazaridis

A total of 38 individuals of *Aristida lazaridis* (P2) were recorded within the Survey Area (30 from the current survey and 8 from previous surveys) from six locations (four from the current survey and one from previous surveys; Table 3.4; Map 3.6). Records of *Aristida lazaridis* occurred as three separate populations (records separated by >500 m), one confirmed a previously existing population and two constituted new populations at Ministers North. This taxon did not form any part of the dominant strata for any vegetation type in the Survey Area. Two known populations of *Aristida lazaridis* were visited during the targeted assessment, one record near a track in the south-east of the Survey Area was still present, however, the record from the major drainage line, constituting five individuals in the south of the Survey Area, was not present and was excluded from the totals counts.

This taxon occurred in small clusters on flat hard clay and were easily accessible. *Aristida lazaridis* was recorded on a south-facing slope and on disturbed roadside bunds in the Survey Area (Table 3.4; Map 3.6). Further details of habitat preferences are displayed in Plate 3.2.

Individuals appeared stressed and dry; three of the four specimens collected had flowering material. The unhealthy appearance may reflect the nature of short-lived perennial species and not a reflection of the environmental conditions this taxon was experiencing. However, this species generally colonises clay soils which retain water more effectively than the disturbed sandy clay soils it was found on. This significant species is expected to occur along the roadside bunds of the vehicle tracks in the south of the Survey Area. There may be a higher number of *Aristida lazaridis* present compared to the number recorded during the current and previous surveys (Map 3.6).

Plate 3.2: *Aristida lazaridis* Plant Photographs & Habitat Preference During Field Assessment



Legend

- Survey Area
- Traverses

Aristida lazaridis current assessment
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 20

Aristida lazaridis desktop assessment
- 2 - 5
- 5 - 10

Aristida lazaridis count excluded
- 2 - 5

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 15-08-2023

Aristida lazaridis Records

Ministers North Targeted Significant Flora & Vegetation Assessment

MAP 3.6

Prepared for BHP WAIO

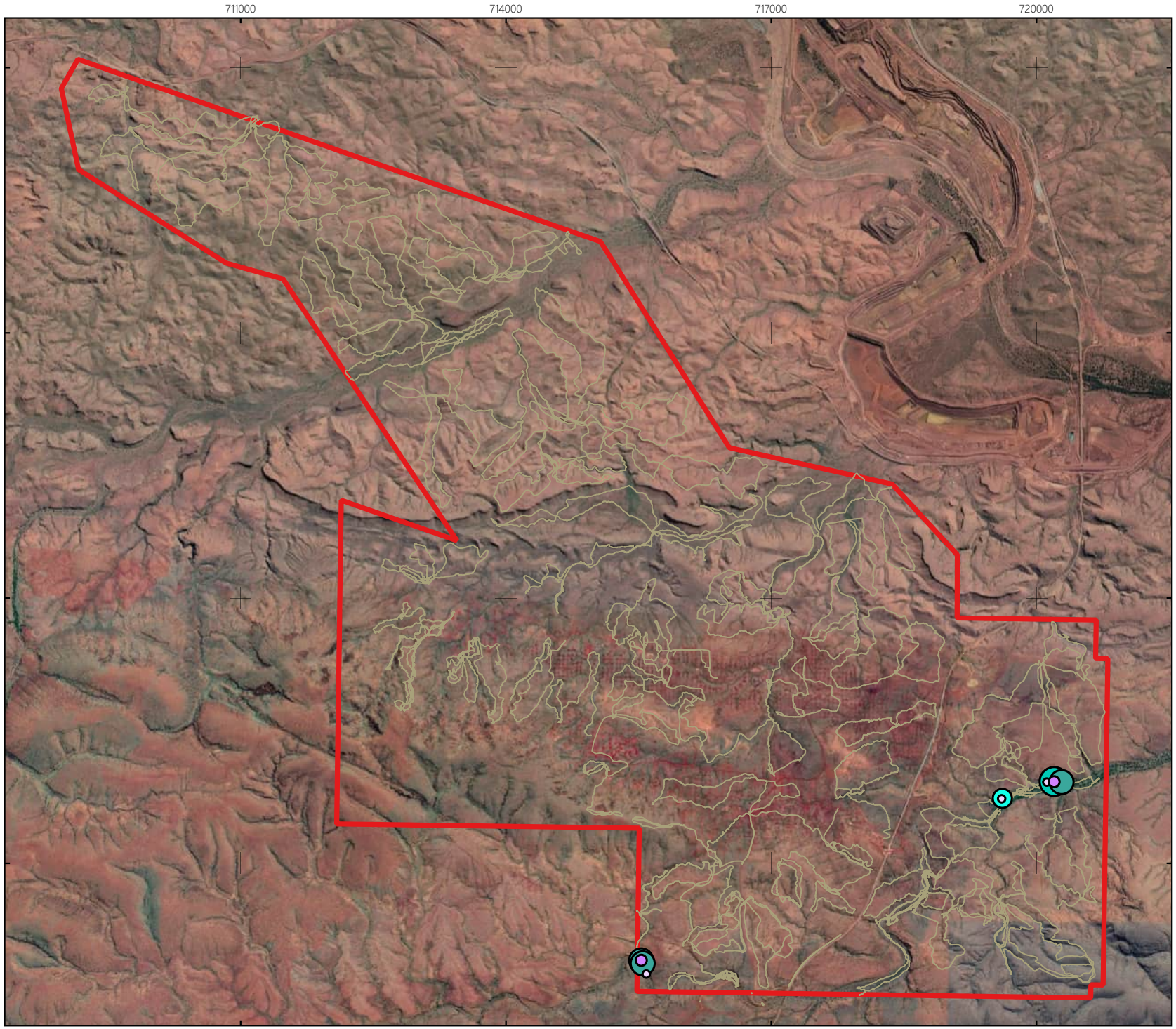
3.2.3. Gymnanthera cunninghamii

A total of 34 individuals of *Gymnanthera cunninghamii* (P3) were recorded within the Survey Area (23 from the current survey and 11 from previous surveys) from 10 locations (five within the current area and five from previous surveys) (Table 3.4; Map 3.7). Records of *Gymnanthera cunninghamii* occurred as two separate populations (records separated by >500 m), both were previously recorded populations at the Survey Area. This taxon did not form part of the dominant strata for any vegetation type in the Survey Area. The two known populations of *Gymnanthera cunninghamii* were re-visited during the targeted assessment, both records were confirmed, with no evidence of grazing or disturbance.

This taxon occurred in small clusters in the major drainage lines at Ministers North. *Gymnanthera cunninghamii* was recorded in the major drainage lines in the southern section of the Survey Area (Table 3.4; Map 3.7). Further details of habitat preferences are displayed in Plate 3.3.

Individuals were in good condition, exhibiting healthy vegetative growth and no signs of stress. None of the *Gymnanthera cunninghamii* individuals were found flowering at the time of the survey. This significant species is not expected to occur outside of the major drainage lines in the south of the Survey Area, as displayed on Map 3.7.

Plate 3.3: *Gymnanthera cunninghamii* Plant Photographs & Habitat Preferences During Field Assessment.



Legend

Survey Area

Traverses

Gymnanthera cunninghamii current assessment

- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 30
- 30 - 50

Gymnanthera cunninghamii desktop assessment

- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 30
- 30 - 50

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Gymnanthera cunninghamii Records

Ministers North Targeted Significant Flora & Vegetation Assessment

Prepared for BHP WAIO

MAP 3.7

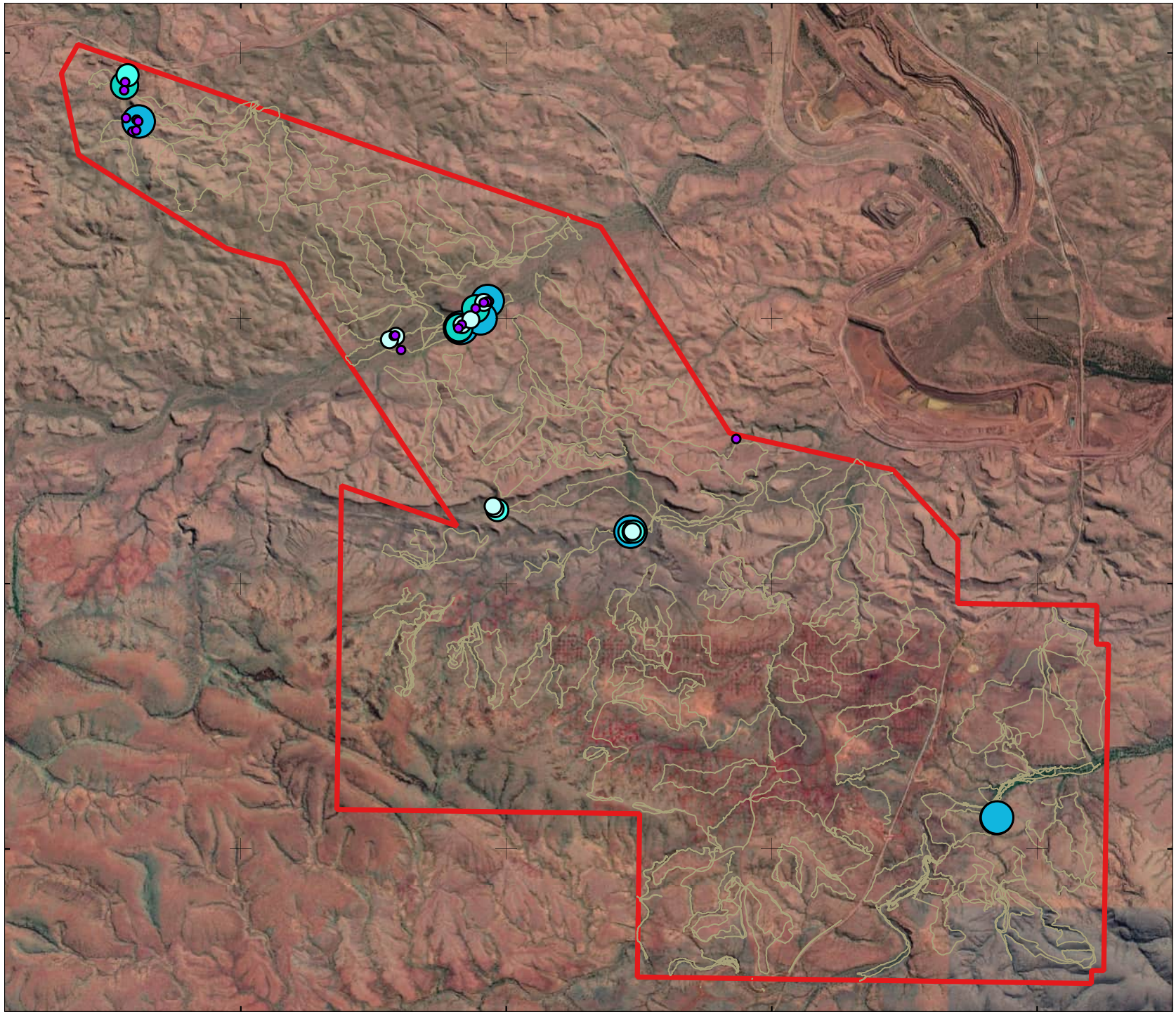
3.2.4. *Rostellularia adscendens* var. *latifolia*

A total of 207 individuals of *Rostellularia adscendens* var. *latifolia* (P3) were recorded from the Survey Area (188 from the current survey, 19 from previous surveys) from 34 locations (23 from the current survey and 11 from previous surveys (Table 3.4). *Rostellularia adscendens* var. *latifolia* occurred as five separate populations (records separated by >500 m), a continuation of the three previously recorded populations at Ministers North as well as two additional populations, one following the known population in the centre of the Survey Area and one in the south. Two known populations of *Rostellularia adscendens* var. *latifolia* were re-visited during the targeted assessment, both records were confirmed, with no evidence of grazing or disturbance.

This taxon occurred in small clusters; the field team had some difficultly navigating the steep rocky terrain this taxon occupies. *Rostellularia adscendens* var. *latifolia* was recorded on the rocky slopes adjacent to drainage lines throughout the Survey Area (Table 3.4; Map 3.8). Further details of habitat preferences are displayed in Plate 3.4. Records were from lower hillslopes, gully walls, moderate slopes, and stony drainage lines. *Rostellularia adscendens* var. *latifolia*, which occurs on rocky slopes and rocky drainage lines, is superficially similar to the non-priority taxon *Rostellularia adscendens* var. *clementii* which occurs predominantly on sandy drainage lines.

Individuals were in good condition, exhibiting healthy vegetative growth and no signs of stress. Approximately 60% of the *Rostellularia adscendens* var. *latifolia* individuals were found flowering at the time of the survey. This taxon did not form part of the dominant ground strata for any of the vegetation types in the Survey Area. This significant species is expected to occur on the rocky slopes adjacent to the major and moderate drainage lines within Survey Area displayed on Map 3.8.

Plate 3.4: *Rostellularia ascendens* var *latifolia* Plant Photographs & Habitat Preferences During Field Assessment



Legend

Survey Area

Traverses

Rostellularlia adscendens var. latifolia current assessment

- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 30
- 30 - 50

Rostellularlia adscendens var. latifolia desktop assessment

- 1 - 2

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Rostellularia adscendens var. latifolia Records

Ministers North Targeted Significant Flora & Vegetation Assessment

MAP

Prepared for
BHP WAIO

3.8

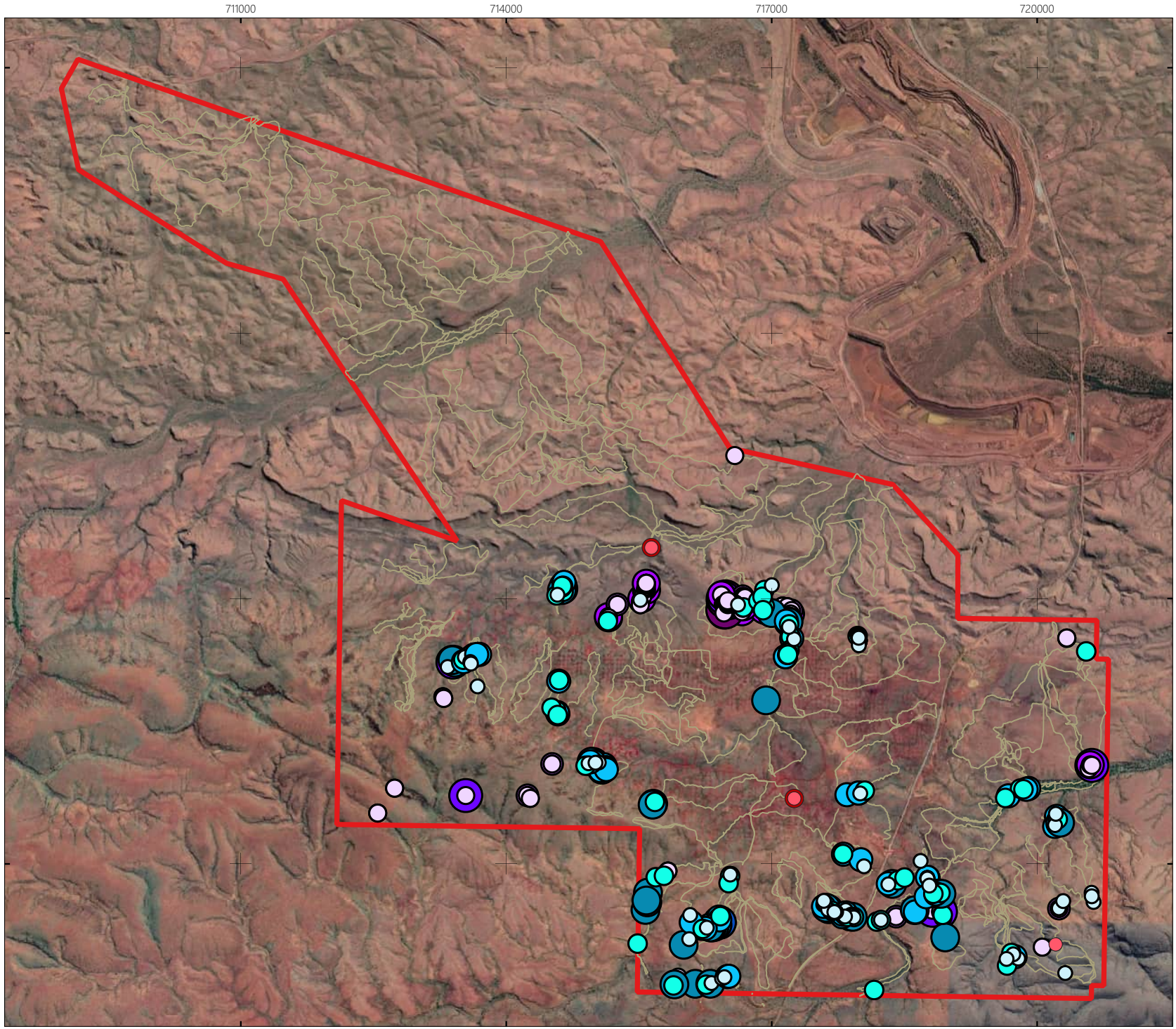
3.2.5. *Sida* sp. Barlee Range (S. van Leeuwen 1642)

A total of 2,716 individuals of *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P4) were recorded from the Survey Area (1,421 from the current survey and 1,295 from previous surveys) from 449 locations (239 from current survey and 207 from previous surveys; Table 3.4; Map 3.9). This taxon regularly occurred in small clusters, though occasionally grew in larger numbers. Fourteen known records of *Sida* sp. Barlee Range (S. van Leeuwen 1642) were re-visited during the targeted assessment, 11 of which were confirmed, with three that could not be confirmed during the assessment and were removed from the total numbers. Records of *Sida* sp. Barlee Range (S. van Leeuwen 1642) occurred as four separate populations (records separated by >500 m), merging some of the eight previously recorded population at Ministers North.

Sida sp. Barlee Range (S. van Leeuwen 1642) was recorded in the deep rocky gorges, rocky slopes, and gullies on skeletal soil in the central and southern section of the Survey Area (Table 3.4; Map 3.9): further details of habitat preferences are displayed in Plate 3.5.

Individuals were in very good condition, exhibiting healthy vegetative growth and no signs of stress. Approximately 60% of the *Sida* sp. Barlee Range (S. van Leeuwen 1642) individuals recorded were flowering at the time of the survey. This significant species is expected to occur in the deep rocky gorges in the southern half of the Survey Area displayed on Map 3.9.

Plate 3.5: *Sida* sp. Barlee Range (S. van Leeuwen 1642) Plant Photographs & Habitat Preferences During Field Assessment



Legend

Survey Area

Traverses

Sids sp. Barlee Range (S. van Leeuwen 1642)
Current Assessment

- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 30
- 30 - 50

Sids sp. Barlee Range (S. van Leeuwen 1642)
Desktop Assessment

- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 30
- 30- 50

Sida sp. Barlee Range (S. van Leeuwen 1642)
counts excluded

- 1 - 1
- 6 - 7

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Sida sp. Barlee Range Records

Ministers North Targeted Significant Flora & Vegetation Assessment

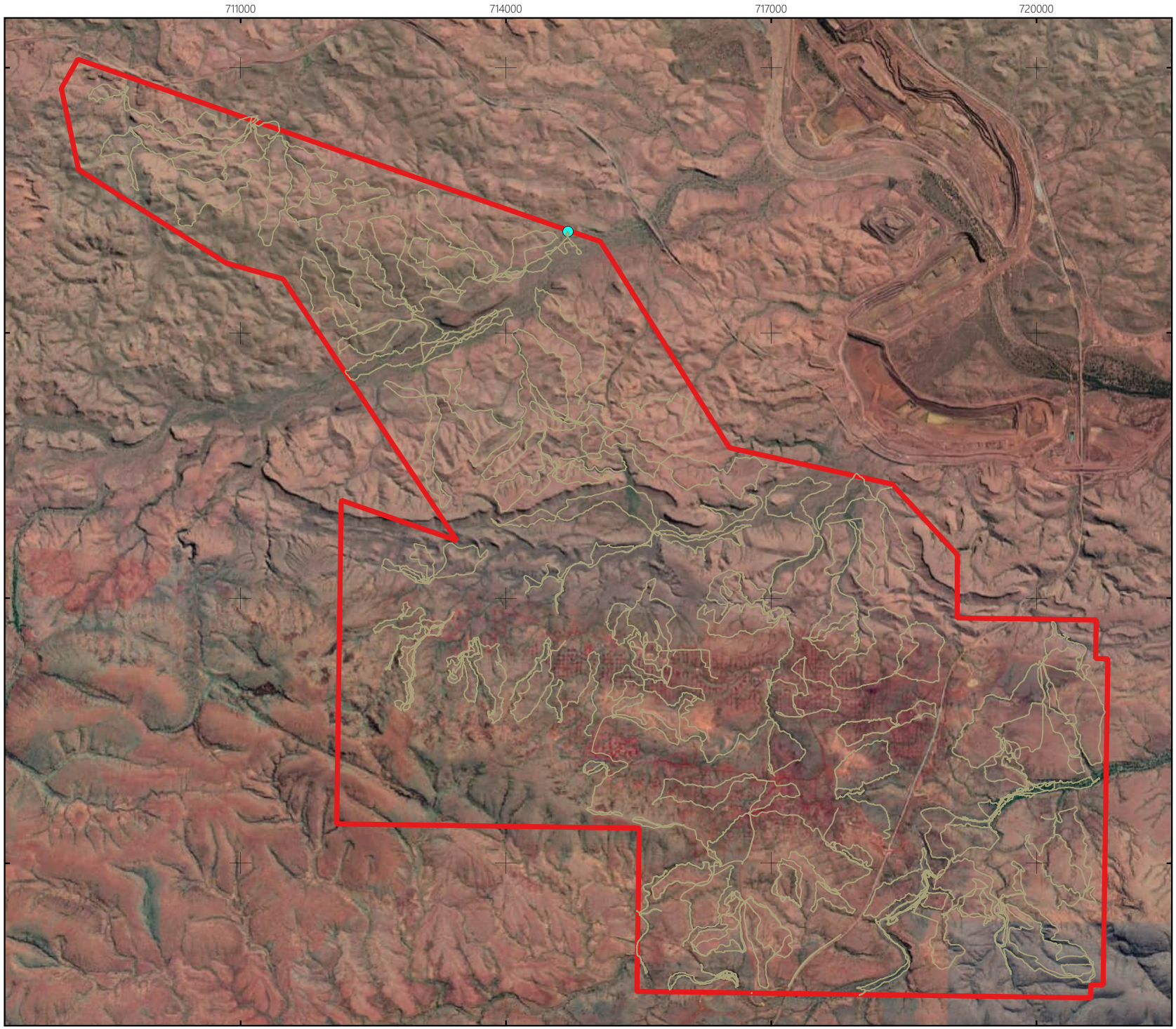
MAP 3.9

Prepared for BHP WAIO

3.2.6. Eremophila naaykensii

One individual was recorded from one location in the Survey Area during a previous survey. No records of *Eremophila naaykensii* (P4) were found during the targeted assessment for the current survey. The known location was visited during the current survey, and the only *Eremophila* species present was *Eremophila longifolia* (Map 3.10). It was assigned a post-survey likelihood of 'High' due to the occurrence of records in the vicinity of the Survey Area.

Eremophila naaykensii occurs on creek embankments, north-facing gullies, hill crests and rocky hill slopes. The preferential soil type was pebbly loam, cobbles, sandy loam soil, rocky iron ore soil or red clay loam (Curtis *et al.*, 2022). While the habitat types were all present within the Survey Area, the preferred soil types were less abundant, with a distinct lack of pebbly loam and cobbles. Sandy loam soils, rocky iron ore and red clay loam were present in the Survey Area and could provide suitable conditions for this Priority flora taxon to occur.



Legend

- Survey Area
- Traverses

Eremophila naaykensii Desktop Assessment

- 1 - 1

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Eremophila naaykensii Records

Ministers North Targeted Significant Flora & Vegetation Assessment

MAP

Prepared for
BHP WAIO

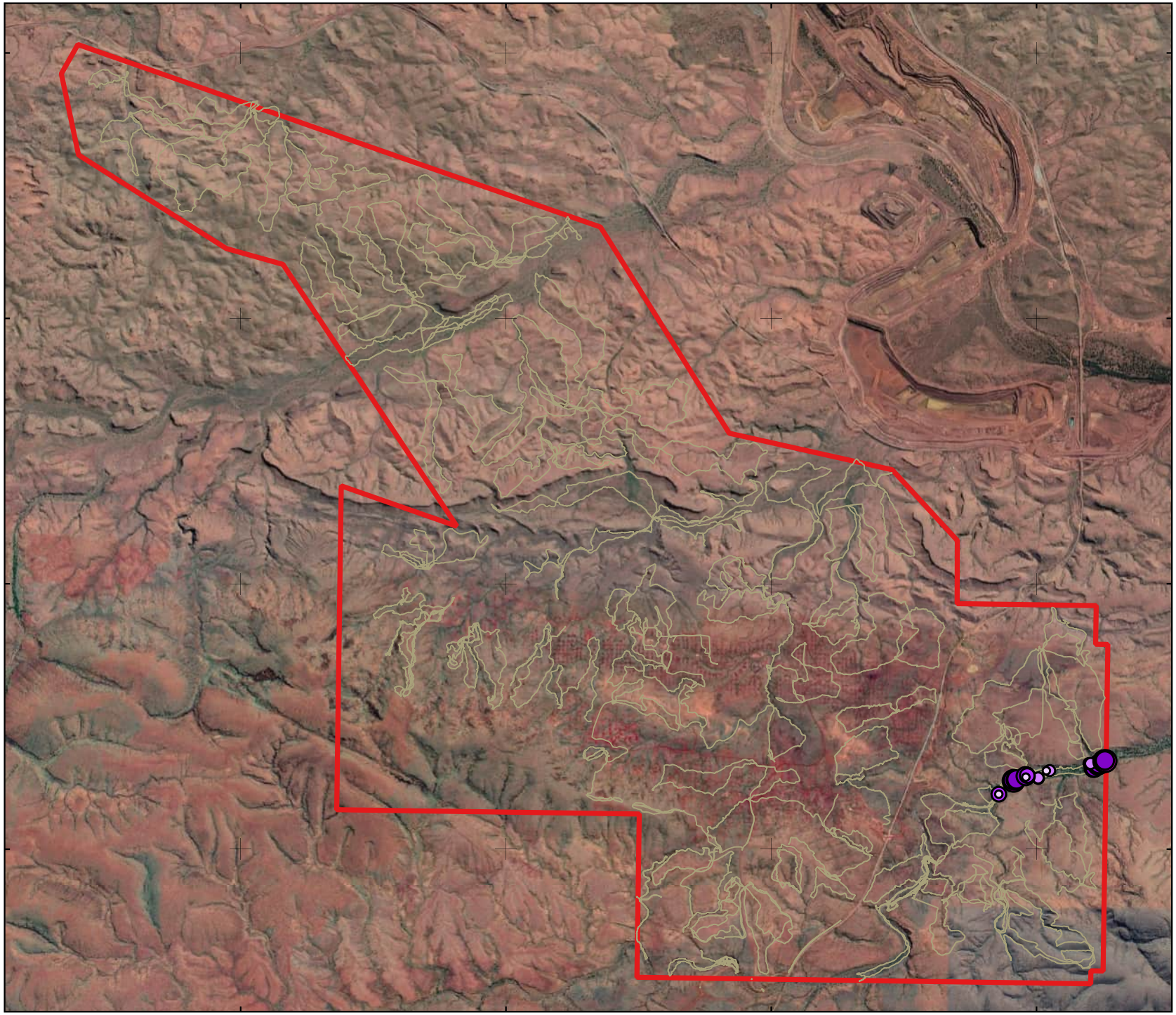
3.10

3.2.7. Fimbristylis sieberiana

A total of 731 individuals of *Fimbristylis sieberiana* (P3) were recorded from the Survey Area (none from the current survey and 731 from previous surveys) from 35 locations (Map 3.11). No records of *Fimbristylis sieberiana* were found during the current targeted assessment. Known records were visited and no *Fimbristylis* specimens were confirmed. In addition, more traverses were undertaken through appropriate habitat in the vicinity of the previously known locations. This is a short-lived perennial sedge and records may have died off since the last flora assessment in 2019. The regrowth of this species within the major creek may be still likely post-rain and was therefore a post survey likelihood of 'High'

This taxon was previously recorded throughout the major drainage line in the south of the Survey Area, which was heavily dominated by *Cyperus vaginatus* (Biologic Environmental Survey, 2020). Records outside of the Survey Area were from the edges of watercourses, major creeks, and small waterfalls. It was recorded on sand over ironstone, silty sand, clay soils and gravelly drainage lines.

Based on previous surveys, this Priority flora species appears to need a more stable supply of water than was present at the time of the current survey (Onshore Environmental, 2018c). Photos from sites where *Fimbristylis sieberiana* was previously recorded show water bodies still present at the time of the Survey. Water was not present in any drainage line during the current survey.



Legend

- Survey Area
- Fimbristylis sierberiana Desktop Assessment
  - 1 - 2
  - 2 - 5
  - 5 - 10
  - 10 - 30
  - 30 - 50
- Traverses

N

0 0.5 1 1.5 2 2.5 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Fimbristylis sieberiana Records

Ministers North Targeted Significant Flora & Vegetation Assessment

Prepared for
BHP WAIO

MAP
3.11

4. RESULTS & DISCUSSION – VEGETATION

4.1. Desktop Assessment

4.1.1. TEC/PECs

Seven PECs were identified in the desktop review for the Project (Table 4.1). Known occurrences of all PECs are more than 15 km from the Survey Area, and neither are related to land systems or vegetation associations occurring within the Survey Area. Therefore, the PECs were assigned a 'Low' likelihood of occurrence (Table 4.1; Map 1.1).

Table 4.1: Threatened & Priority Ecological Communities

Pre & Post-survey Likelihood	Status	Name	Description	Distance from Survey Area (km)
Low	P1	Weeli Wolli	Spring Community	16.2
	P3	Fortescue Valley Sand Dunes	Vegetation of sand dunes of the Hamersley Range/Fortescue Valley	26.0
	P2	Riparian communities of springs and Pools Pilbara	Riparian flora and plant communities of springs and river pools with high water permanence of the Pilbara Region	36.9
	P1	Coolibah - Lignum Flats: sub type 2	Coolibah woodlands over lignum (Duma florulenta) over swamp wanderrie (Lake Robinson)	38.5
	P3	Kumina Land System	-	38.8
	P1	Fortescue Marsh	Marsh Land System	40.0
	P1	West Angelas	Cracking-Clays	47.4

4.1.2. Literature Review Significant Vegetation

Of the previous surveys undertaken at Ministers North, two reports by Onshore in 2018 recorded potentially significant vegetation:

- *Eucalyptus camaldulensis*, a phreatophytic groundwater dependent species, and *Eucalyptus victrix* were recorded from a drainage line in the north of the Survey Area (Onshore Environmental, 2018b); and
- *Eucalyptus camaldulensis*, *Eucalyptus victrix* and *Melaleuca argentea* were reported as a Groundwater Dependent Ecosystem in Yandicoogina Creek in the south of the Survey Area (Onshore Environmental, 2018d).

These two reports also consolidated significant vegetation data from previous reports and highlighted the significance of Yandicoogina Creek not only as a Groundwater Dependent Ecosystem, but as an important refuge for several Priority flora taxa (*Gymnanthera cunninghamii*, *Rostellularia adscendens* var. *latifolia*, and *Fimbristylis sieberiana*).

4.2. Significant Vegetation

No vegetation recorded within the Survey Area resembles any known TEC or PEC communities.

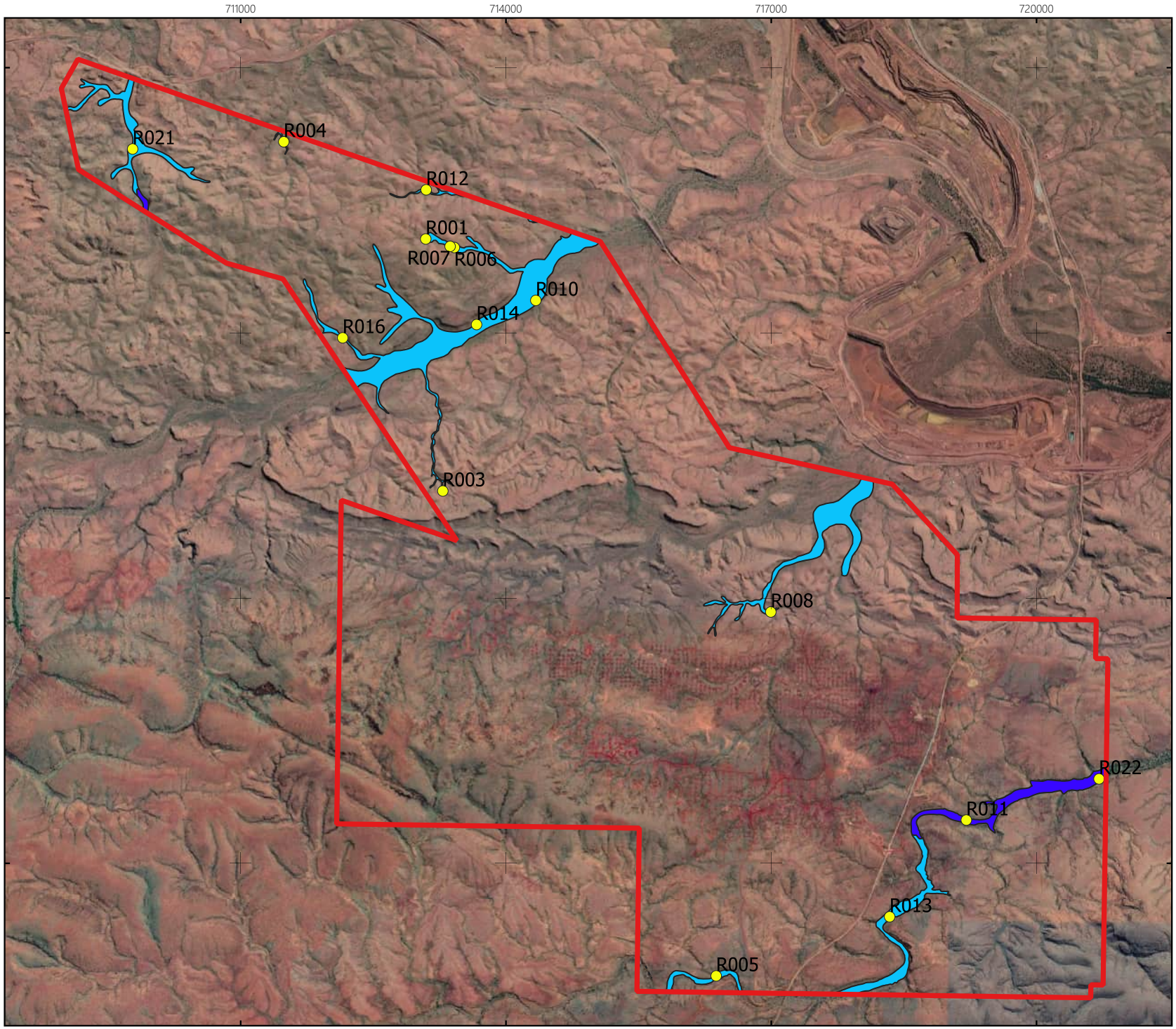
A total of 22 relevés were undertaken to target potential significant vegetation (Map 4.1). Based on the definitions of significant vegetation listed in section 2.4.2 (Environmental Protection Authority, 2016a), 15 of the 22 relevés contained potential groundwater dependent species *Eucalyptus camaldulensis* and/or *Eucalyptus victrix* (Table 4.2).

For the current assessment, a relevé (R021) was conducted further upstream of the GDE from the Onshore Environmental, 2018b report and recorded *Eucalyptus victrix* only, indicating that the vegetation type may be a potential GDE.

Four relevés (R005, R011, R013, R022) were undertaken throughout Yandicoogina Creek and found *Eucalyptus camaldulensis*, *Eucalyptus victrix*, and *Acacia coriacea* subsp. *pendens* woodland over *Cyperus vaginatus*, transitioning into *Eucalyptus victrix* and *Melaleuca glomerata* woodland over *Sorghum plumosum*, **Cenchrus ciliaris*, and *Eulalia aurea* further downstream. The relevés from the eastern section of Yandicoogina Creek support the notion that the vegetation type is in accord with the definitions of significant vegetation listed in section 2.4.2 (Environmental Protection Authority, 2016a), concerning Groundwater Dependent Ecosystems. All other potentially significant vegetation relevés were undertaken in areas containing woodlands dominated by *Eucalyptus victrix* and a variety of other dominant species that were not associated with groundwater (Table 4.2).

Table 4.2: Significant Vegetation Descriptions

Vegetation Description	Associated Significant Flora	Site	Significance	Representative Photo
Major Drainage Line - Yandicoogina Creek NVIS: ***Eucalyptus camaldulensis, Eucalyptus victrix*** and *Acacia coriacea subsp.* pendens tall woodland over *Grevillea wickhamii* and *Acacia tumida* tall sparse shrubland over *Cyperus vaginatus* tall open sedgeland. BHP: Woodland of ***Eucalyptus camaldulensis, Eucalyptus victrix*** and *Acacia coriacea* subsp. *pendens* over High Open Shrubland of *Grevillea wickhamii* and *Acacia tumida* over Open Sedges of *Cyperus vaginatus*.	*Fimbristylis sieberiana* (P3) *Gymnanthera cunninghamii* (P3)	R022	GDE	
Minor Creeks NVIS: ***Eucalyptus victrix,*** (+-) *Corymbia hamersleyana,* (+-) *Acacia citrinoviridis* mid open woodland over *Acacia tumida* (+-) *Acacia monticola* and (+-) *Grevillea wickhamii* tall sparse shrubland over *Eulalia aurea* mid sparse tussock grassland and *Isotropis atropurpurea* low sparse shrubland (+-) *Triodia epactia* mid sparse hummock grassland. BHP: Open Woodland of ***Eucalyptus victrix,*** (+-) *Corymbia hamersleyana,* (+-) *Acacia citrinoviridis* over Open Shrubland of *Acacia tumida,* (+-) *Acacia monticola* and (+-) *Grevillea wickhamii* over Very Open Tussock Grassland of *Eulalia aurea* and a Low Open Shrubland of *Isotropis atropurpurea* (+-) Very Open Hummock Grassland of *Triodia epactia*.	-	R005 R006 R007 R008 R011 R012 R013 R016	Potential GDE	
Flood Plains NVIS: ***Eucalyptus victrix*** and *Corymbia hamersleyana* (+- *Melaleuca glomerata)* mid open woodland over *Acacia maitlandii, Acacia spp.* and *Hakea lorea* tall sparse shrubland over *Triodia wiseana* mid sparse hummock grassland, *Themeda triandra* mid sparse tussock grassland and *Salsola australis* low sparse chenopod shrubland. Other groundcover dominants may vary between: *Eriachne mucronata, Cyperus cunninghamii, Sorghum plumosum, Eulalia aurea* and *Chrysopogon ambiguus.* BHP: Low Open Woodland of ***Eucalyptus victrix,*** and *Corymbia hamersleyana* (+- *Melaleuca glomerata)* over Open Shrubland of *Acacia maitlandii, Acacia inaequilatera* and *Hakea lorea* over Ver y Open Hummock Grassland of *Triodia wiseana* with, Very Open Tussock Grassland of *Themeda triandra* and a Low Open Shrubland of *Salsola australis*.	-	R001 R003 R004 R021	Potential GDE	



Legend

- Survey Area

Significant & Potentially Significant Vegetation

- Releves

Significant Vegetation Mapping

- GDE
- pGDE

N

0 0.4 0.8 1.2 1.6 2 km

Scale 1:60,000 @ A4

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Units: Meter

Spectrum

Author: EC

Date: 09-08-2023

Potentially Significant Vegetation

Ministers North Targeted Significant Flora & Vegetation Assessment

MAP 4.1

Prepared for BHP WAIO

5. CONCLUSION

5.1. Significant Flora

No Threatened flora were recorded or considered likely to occur within the Survey Area.

Five Priority flora taxa were recorded during the current assessment:

- *Acacia bromilowiana* (P4) – 980 individuals (540 from current survey and 420 from previous surveys) recorded from one population on steel slopes and breakaways high in the landscape.
- *Aristida lazaridis* (P2)– 38 individuals (30 from the current survey, 8 from previous surveys) recorded from three populations on a south facing slope and disturbed ground adjacent to tracks;
- *Gymnanthera cunninghamii* (P3) – 34 individuals (23 from current survey, 11 from previous surveys) recorded from two populations across the major drainage lines;
- *Rostellularia adscendens* var. *latifolia* (P3) – 207 individuals (188 from current survey and 19 from previous surveys) recorded from five populations on major drainage lines and rocky slopes;
- *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P4) – 2,733 individuals (1,421 from current survey and 1,295 from previous surveys) recorded from four populations on gorge/gully walls and steep slopes.

An additional two were previously recorded and assigned a 'High' likelihood of occurrence post survey:

- *Eremophila naaykensii* (P3) – one individual recorded during a previous survey, constituting one population found on a rocky slope adjacent to a drainage line; and
- *Fimbristylis sieberiana* (P3) – 731 recorded at from previous surveys from one populations located on major drainage line.

5.2. Significant Vegetation

Based on the definitions of significant vegetation listed in section 2.4.2 (Environmental Protection Authority, 2016a) the Yandicoogina Creek in the south of the Survey Area is considered significant as a Groundwater Dependent Ecosystem. Additionally, multiple major and minor *Eucalyptus victrix* drainage lines throughout the Survey Area are considered potential Groundwater Dependent Ecosystems.

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Onshore Environmental (2018d) Yandicoogina Creek Reconnaissance Vegetation Survey.

Onshore Environmental (2020) Ministers North and Yandi Vegetation Association and Condition Mapping.

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Appendix A: Conservation Codes

Appendix A1: Definitions of Conservation Categories under the EPBC Act

Category	Definition
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
Conservation Dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered, or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish; (ii) the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised; (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory; (iv) cessation of the plan of management would adversely affect the conservation status of the species.

Appendix A2: Definitions of Conservation Categories Under the BC Act

Code	Definition (BC Act)
Threatened Species (T) Listed by order of the Minister as Threatened in the category of critically endangered, endangered, or vulnerable under section 19(1), or is a rediscovered species to be regarded as Threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act). **Threatened fauna** is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna. **Threatened flora** is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened flora. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.	
Critically Endangered (CR)	Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under **schedule 1** of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
Endangered (EN)	Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under **schedule 2** of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.
Vulnerable (VU)	Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under **schedule 3** of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.

Code	Definition (BC Act)
Extinct species Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.	
Extinct species (EX)	Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under **schedule 4** of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
Extinct in the wild species (EW)	Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no Threatened fauna or Threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially protected species Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection. Species that are listed as Threatened species (critically endangered, endangered, or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.	
Migratory species (MI)	Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under **schedule 5** of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
Conservation Dependent (CD)	Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as Threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under **schedule 6** of the Wildlife Conservation (Specially Protected Fauna) Notice 2018
Other specially protected fauna (OS)	Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under **schedule 7** of the Wildlife Conservation (Specially Protected Fauna) Notice 2018
Priority species (P) Possibly Threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of Priority for survey and evaluation of conservation status so that consideration can be given to their declaration as Threatened fauna or flora. Species that are adequately known, are rare but not Threatened, or meet criteria for near Threatened, or that have been recently removed from the Threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.	
Priority 1: Poorly-known species (P1)	Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

Code	Definition (BC Act)
Priority 2: Poorly-known species (P2)	Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. National Parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
Priority 3: Poorly-known species (P3)	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
Priority 4: Rare, Near Threatened and other species in need of monitoring (P4)	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently Threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of Threatened species during the past five years for reasons other than taxonomy.

Appendix A3: Legal Status Definition of Listed Plants in Western Australia

Legal Status	Definition
Declared Pest, Prohibited – s12	Prohibited organisms are declared pests by virtue of section 22(1) and may only be imported and kept subject to permits.
Declared Pest – s22(2)	Declared pests must satisfy any applicable import requirements when imported and may be subject to control keeping requirements.
Permitted – s11	Permitted organisms must satisfy applicable import requirements and import permits (where required).
Permitted, Requires Permit – r73	Regulation 73 permitted organisms may be subject to restriction under legislation other than the BAM Act (2007).
Unlisted	Unlisted organisms are prohibited in WA.
Control Categories	**Definition**
C1 Exclusion	Organisms should be excluded from parts or all of WA.
C2 Eradication	Organisms should be eradicated from all or parts of WA.
C3 Management	Organisms should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism, or prevent or contain the spread of the organism.
Unassigned	Declared pest that are recognised as having a harmful impact under certain circumstances where their subsequent control requirements are determined by a plan or other legislative arrangements under the Act.
Keeping Categories	**Definition**
Prohibited keeping	Can only be kept under a permit for public display, education, or scientific purposes.
Restricted keeping	Kept under a permit by private individuals due to a low risk of becoming a problem for the environment.
Exempt keeping	No permit or conditions are required for keeping. Organism may be subject to restrictions under the Wildlife Conservation Act (WCA, 1950).

Appendix B: Likelihood of Occurrence Assessment – Flora

Likelihood of Occurrence		Status	Taxa	Habitat	Description	Flowering Period	Pre-Survey Distance to Survey Area (km)
Pre-Survey	Post-Survey						
Recorded	Recorded	P2	*Aristida lazaridis*	Clay plains of an ephemeral lake. Floodplain/drainage zone. Sand or loam.	Tufted perennial, grass-like or herb, 0.4-1.5 m high. Flowers green/purple.	Apr	0
	High	P3	*Fimbristylis sieberiana*	Hill crest. Creek embankments. Gullies.	Shrub up to 2.0 m tall with a rounded, crowded canopy and white-cream-yellow-pink-purple flowers.	Jun to Sep	0
	Recorded	P3	*Gymnanthera cunninghamii*	Mud, skeletal soil pockets. Pool edges. Sandstone cliffs.	Shortly rhizomatous, tufted perennial, grass-like or herb (sedge), 0.25-0.6 m high. Flowers Brown.	May to Jun	0
		P3	*Rostellularia adscendens* var. *latifolia*	Sandy soils. Drainage lines.	Erect shrub, 1-2 m high. Flowers cream/yellow/green.	Jan to Dec	0
		P4	*Acacia bromilowiana*	Drainage area with red-brown loam soils. Ironstone soils. Creeks. Rocky hills.	Herb or shrub, 0.1-0.3 m high. Flowers blue/purple/violet.	Apr to May	0
		P4	*Sida* sp. Barlee Range (S. van Leeuwen 1642)	High in landscape. Edge of cliff. Rocky ironstone scree. Skeletal soil.	Tree or shrub, to 12 m high, bark dark grey, fibrous; phyllodes more or less glaucous & slightly pruinose; inflorescence in spikes. Flowers yellow/pink, Jul to Aug.	Jul- Aug	0
	High	P3	*Eremophila naaykensii*	Skeletal red soils pockets. Steep slope.	Spreading shrub, to 0.5 m high. Fl. Yellow.	Aug	0
High	Medium	P2	*Ipomoea racemigera*	Fringing vegetation of river.	Creeping annual, herb or climber with white flowers.	Apr, Jun	3.2
		P3	*Amaranthus centralis*	Red sand in ephemeral watercourses. Sandy to clayey loam. River banks. Edges of permanent pools in eucalypt lined channels.	Erect, to 60 cm high. Stems angular, sometimes reddish, sparsely hairy with glandular or multicellular hairs or becoming glabrous; leaf axils spineless. Leaves: petiole 20 to 35 mm long. Inflorescences of axillary	Flowers throughout the year	3.2

Likelihood of Occurrence		Status	Taxa	Habitat	Description	Flowering Period	Pre-Survey Distance to Survey Area (km)
Pre-Survey	Post-Survey						
					globular clusters and sometimes erect terminal spikes to 60 mm long, with male and female flowers.		
	Low	P3	*Aristida jerichoensis* var. *subspinulifera*	Flat terrain. Red clay loam, low in landscape. Hardpan plains.	Compactly tufted perennial, grass-like or herb, 0.3-0.8 m high, with a muricate lemma groove.	Mar to Jul, Sep	6.7
		P3	*Dampiera metallorum*	Skeletal red-brown gravelly soil over banded ironstone. Steep slopes. Summits of hills.	Rounded, multi-stemmed perennial, herb, up to 0.5 m high with blue flowers.	Apr/Jun – Oct	6.7
	Medium	P3	*Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727)	Red-brown clay soil. Calcrete pebbles. Low undulating plain, swampy plains.	Open, erect annual or biennial, herb, up to 0.2 m high with yellow flowers.	Feb to Oct	7.4
	Low	P3	*Rhagodia* sp. Hamersley (M. Trudgen 17794)	Flat plain. Floodplain. Hillslope. Red sandy loam with surface cobbles.	Erect shrub to 1.5 m.	Mar, May, Nov	1.5
	Medium	P4	*Lepidium catapycnon*	Skeletal soils. Hillsides.	Open, woody perennial, herb or shrub, 0.2-0.3 m high, stems zigzag. Flowers white.	Oct.	1.3
Medium		P1	*Calotis squamigera*	Pebbly loam. Flat. Red brown loam clay.	Procumbent annual, herb, to 0.21 m high.	Jul	25.5
		P1	*Synostemon hamersleyensis*	Narrow gorge in upper hillslope.	Glabrous monoecious or dioecious subshrub from a perennating, woody rootstock with stems much branched. Up to 50.0 cm high, bright green when fresh, becoming grey green on drying with cuticular wax shed in flakes.	Sep to Nov	13.4
	Low	P1	*Triodia* sp. Karijini (S. van Leeuwen 4111)	Upper hill slope. Moderately steep ridgeline. Ironstone outcropping with	Hummock grass up to 1.0 m high.	Aug to Sep	27.4

Likelihood of Occurrence		Status	Taxa	Habitat	Description	Flowering Period	Pre-Survey Distance to Survey Area (km)
Pre-Survey	Post-Survey						
				boulders and cobbles. Skeletal dark orange-brown loam soil.			
		P2	*Cladium procerum*	Perennial pools.	Densely tufted perennial, grass-like or herb (sedge), up to 2.0 m high.	Nov	8.8
	Medium	P2	*Eragrostis* sp. Mt Robinson (S. van Leeuwen 4109)	Red-brown skeletal soils. Ironstone. Steep slopes. Summits.	Tussock-forming perennial, grass-like or herb, up to 0.3 m high.	Sep	29.3
	Low	P2	*Eremophila* sp. West Angelas (S. van Leeuwen 4068)	Summits of hills. Slopes.	Spindly shrub up to 3.0 m high.	Aug to Oct	29.4
	Medium	P2	*Hibiscus* sp. Gurinbiddy Range (M.E. Trudgen MET 15708)	Rocky (boulder) slope below low cliffs. Gully. Gravelly, pebbly red-brown loam.	Spindly upright shrub up to 3.0 m tall with purple flowers.	Apr to Oct	21.6
	Low	P3	*Acacia effusa*	Gently inclined footslope. Brown sandy loam soil.	Low, dense, spreading, somewhat viscid shrub, 0.3-1.0 m high, 'minni-ritchi' bark and yellow flowers.	May to Aug	22.2
		P3	*Acacia subtiliformis*	Rocky calcrete plateau.	Spindly, slender, erect shrub, up to 3.5 m high, with green phyllodes. The new growth is slightly viscid, resinous, and aromatic while the inflorescence occurs in heads to 6 mm diameter with red peduncles and yellow flowers.	Jun	8.2
	Medium	P3	*Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479)	Cracking clay.	Prostrate herb with fleshy leaves, blue-mauve petals, and immature fruit brown.	May, Jun, Sep	17.8

Likelihood of Occurrence		Status	Taxa	Habitat	Description	Flowering Period	Pre-Survey Distance to Survey Area (km)
Pre-Survey	Post-Survey						
		P3	*Euphorbia australis* var. *glabra*	Broad, flat plain calcrete platform. Plains.	Prostrate annual or perennial herb, up to 0.02-0.1 m high with red-pink flowers.	May, Sep	14.5
	Low	P3	*Glycine falcata*	Minor drainage line. Brown medium clay soil. Floodplains.	Mat forming perennial herb up to 0.2 m with blue/purple flowers.	May or Jul	17.8
		P3	*Goodenia lyrata*	Red sandy loam. Near claypan. Clay soiled broad drainage tract in hardpan plain.	Prostrate herb, with lyrate leaves and yellow flowers.	Aug	27.3
		P3	*Grevillea saxicola*	Breakaway. Scree slope.	Tall shrub to 2.5 m.	Feb to Jun, Sep	8.6
	Medium	P3	*Indigofera gilesii*	Pebbly loam. Amongst boulders & outcrops, hills.	Shrub up to 1.5 m high with purple-pink flowers.	May or Aug	24.7
	Low	P3	*Isotropis parviflora*	Low rocky hill. Red-brown loam soils and ironstone gravel.	Shrub, up to 0.1 m high with white/pink flowers.	Mar	8.9
		P3	*Pilbara trudgenii*	Skeletal, red stony soil over ironstone. Hill summits. Steep slopes. Screes. Cliff faces.	Gnarled, aromatic shrub, up to 1.0 m high.	Sep	26.9
		P3	*Solanum kentrocaule*	Brown/rocky soil. Gorge. Drainage line.	Shrub to 1.5 m high, extremely prickly with purple flowers.	Jul to Sep	29.5
		P3	*Stylidium weeliwolli*	Gritty sand soil, sandy clay. Edge of watercourses.	Annual, herb, 0.1-0.25 m high with four red-shaped throat appendages and pink/red flowers.	Aug to Sep	8.7
		P3	*Themeda* sp. Hamersley Station (M.E. Trudgen 11431)	Flat terrain, low in landscape. Red loamy soil with some alluvial sand material and stones.	Tussock grass.	Aug	10.9

Likelihood of Occurrence		Status	Taxa	Habitat	Description	Flowering Period	Pre-Survey Distance to Survey Area (km)
Pre-Survey	Post-Survey						
		P3	*Triodia basitricha*	Hill slopes. Crest of range. Skeletal clay loam over ironstone.	Curly leaf spinifex to 0.5 m.	May	20.5
		P3	*Triodia* sp. Mt Ella (M.E. Trudgen 12739)	Gullies. Hill slopes. Drainage lines.	Perennial, grass-like or herb, 0.4 m high.	Sep	21.5
		P3	*Vittadinia* sp. Coondewanna Flats (S. Vanleeuwen 4684)	Flat terrain, low in landscape. Red clay loam with some stone. Gilgai. Drainage lines.	Tall daisy to 1.0 m, open canopy with cream/white flowers.	Jul	14.2
		P4	*Eremophila magnifica subsp. magnifica*	Skeletal soils over ironstone. Rocky screes.	Shrub up to 0.5-1.5 m high with blue flowers.	Aug. to Nov	17.4
		P4	*Ptilotus mollis*	Moderately steep midslope of BIF.	Compact, perennial shrub, up to 0.5 m high, soft grey foliage with white/pink flowers.	May or Sep	27.1
		P4	*Rhynchosia bungarensis*	Gently inclined drainage depression. Brown silty loam soil.	Compact, prostrate, or spreading shrub, to 0.5 m high.	May, Jul, Nov	12.9
Low		P1	*Lindernia* sp. Pilbara (M.N. Lyons & L. Lewis FV 1069)	Water's edge, base of dunes.	Slender annual herb with blue/purple/white flowers.	-	44.2
		P1	*Paranotis* sp. Pilbara (H. Ajduk HAOP04a)	Drainage lines.	Erect ephemeral herb to 0.25 m tall with white flowers and mature fruit.	Feb to Mar	49.3
		P1	*Samolus* sp. Fortescue Marsh (A. Markey & R. Coppen FM 9702)	Lake margins.	Domed, mid dense, perennial, leafless, woody shrub.	May, Jul, Sep to Oct	44.7
		P1	*Tecticornia globulifera*	Moderately saline flats on red-brown gritty clay.	Perennial shrub up to 0.3 to 0.5 m high. The vegetative articles are globular to obovoid	May	43.6

Likelihood of Occurrence		Status	Taxa	Habitat	Description	Flowering Period	Pre-Survey Distance to Survey Area (km)
Pre-Survey	Post-Survey						
					and not compressed, occurring as green, pink or red.		
		P1	*Tecticornia* sp. Christmas Creek (K.A. Shepherd & T. Colmer et al. KS 1063)	Moderately saline flats on red-brown gritty clay.	Perennial shrub.	Aug to Oct	38.2
		P2	*Arthropodium vanleeuwenii*	Steep, south facing slopes.	Perennial herb with pendulous, mauve flowers.	Sep	47.2
		P2	*Eremophila pusilliflora*	Ironstone.	Semi prostrate, yellowish green, hairy shrub.	Mar to Jul	42.0
		P2	*Euphorbia inappendiculata* var. *inappendiculata*	Flat, red brown loam. Cracking clay.	Herb up to 2.0 cm.	May	35.7
		P2	*Euphorbia inappendiculata* var. *queenslandica*	Drainage, clay, flat.	Upright to prostrate herb up to 11.0 cm.	Oct	31.1
		P2	*Kohautia australiensis*	Low stony calcrete hill.	Erect sparsely or much-branched annual herb up to 0.1-0.5 m high and blue flowers.	-	16.7
		P2	*Oxalis* sp. Pilbara (M.E. Trudgen 12725)	Gully. Brown-red loam.	Small herb up to 10.0 cm tall, the leaves are green on upper surface and purple below and the flowers are yellow.	May, Jun to Jul	38.6
		P2	*Teucrium pilbaranum*	Clay. Crab hole plain in a river floodplain, margin of calcrete table.	Upright shrub, up to 0.2 m high with white flowers.	May or Sep	38.1
		P3	*Atriplex flabelliformis*	Clay loam, loam. Saline flats or marshes.	Monoecious, erect, rounded perennial herb up to 0.35 m high.	Apr-May	34.1

Likelihood of Occurrence		Status	Taxa	Habitat	Description	Flowering Period	Pre-Survey Distance to Survey Area (km)
Pre-Survey	Post-Survey						
		P3	*Dysphania congestiflora*	Edge of saline flood plain and lake bed, on deep red - brown saline clays. Seasonally inundated flats towards centre of flood plain and lake bed. Deep, uniform, saline heavy clays - wet at time of collection.	Annual herb 5-10 cm tall.	Jul	38.1
		P3	*Eleocharis papillosa*	Red clay over granite, open clay flats. Claypans.	Annual herb with brown flowers.	Nov	44.2
		P3	*Eragrostis crateriformis*	Clayey loam or clay. Creek banks. Depressions.	Annual, grass-like or herb, 0.2-0.4 m high.	Jan to May or Jul	31.0
		P3	*Eragrostis* sp. Erect spikelets (P.K. Latz 2122)	Saline areas.	Tufted perennial grass up to 30.0 cm high.	-	44.5
		P3	*Eremophila magnifica* subsp. *velutina*	Skeletal soils over ironstone. Summits.	Shrub, 0.5-1.5 m high with blue-purple flowers.	Aug to Sep	38.4
		P3	*Eremophila spongiocarpa*	Alluvial semi saline clay plain.	Compact succulent-leaved shrub up to 1.0 m.	May, Jul to Sep	28.3
		P3	*Euphorbia clementii*	Gravelly hillsides, stony grounds.	Erect herb, up to 0.6 m high.	May	47.3
		P3	*Iotasperma sessilifolium*	Cracking clay, black loam. Edges of waterholes, plains.	Erect herb with pink flowers.	Jul to Sep	32.9
		P3	*Olearia mucronata*	Schistose hills. Drainage channels.	Densely branched, unpleasantly aromatic shrub, 0.6-1.0 m high with white and yellow flowers.	Aug to Dec or Jan	49.0
		P3	*Stackhousia clementii*	Skeletal soils. Sandstone hills.	Dense broom-like perennial herb up to 0.5 m high with green/yellow/brown flowers.	Feb to Jun, Nov	45.9

Likelihood of Occurrence		Status	Taxa	Habitat	Description	Flowering Period	Pre-Survey Distance to Survey Area (km)
Pre-Survey	Post-Survey						
		P3	*Streptoglossa* sp. Cracking clays (S. van Leeuwen et al. PBS 7353)	Cracking clay.	Erect annual herb with light green stems and mid green leaves and slightly greyish hairs.	Jun	33.8
		P3	*Swainsona thompsoniana*	Flat crabhole plain.	Erect herb with terete, non-spiny, glabrous stems.	Mar, Jun, Aug	46.3
		P3	*Tecticornia medusa*	Saline plains	Erect shrub with bright green articles.	Nov	47.1
		P3	*Xerochrysum boreale*	Stony surface. Red brown clay loam.	Erect perennial, branched herb to 0.5 m high with glandular to hirtellus stems.	Sep	47.6
		P4	*Eremophila youngii* subsp. *lepidota*	Stony red sandy loam. Flats plains. Floodplains, sometimes semi saline. Clay flats.	An erect, highly branched, shrub which grows to a height of between 1.0-4.0 m.	Jan-Jun or Aug-Sep	43.8