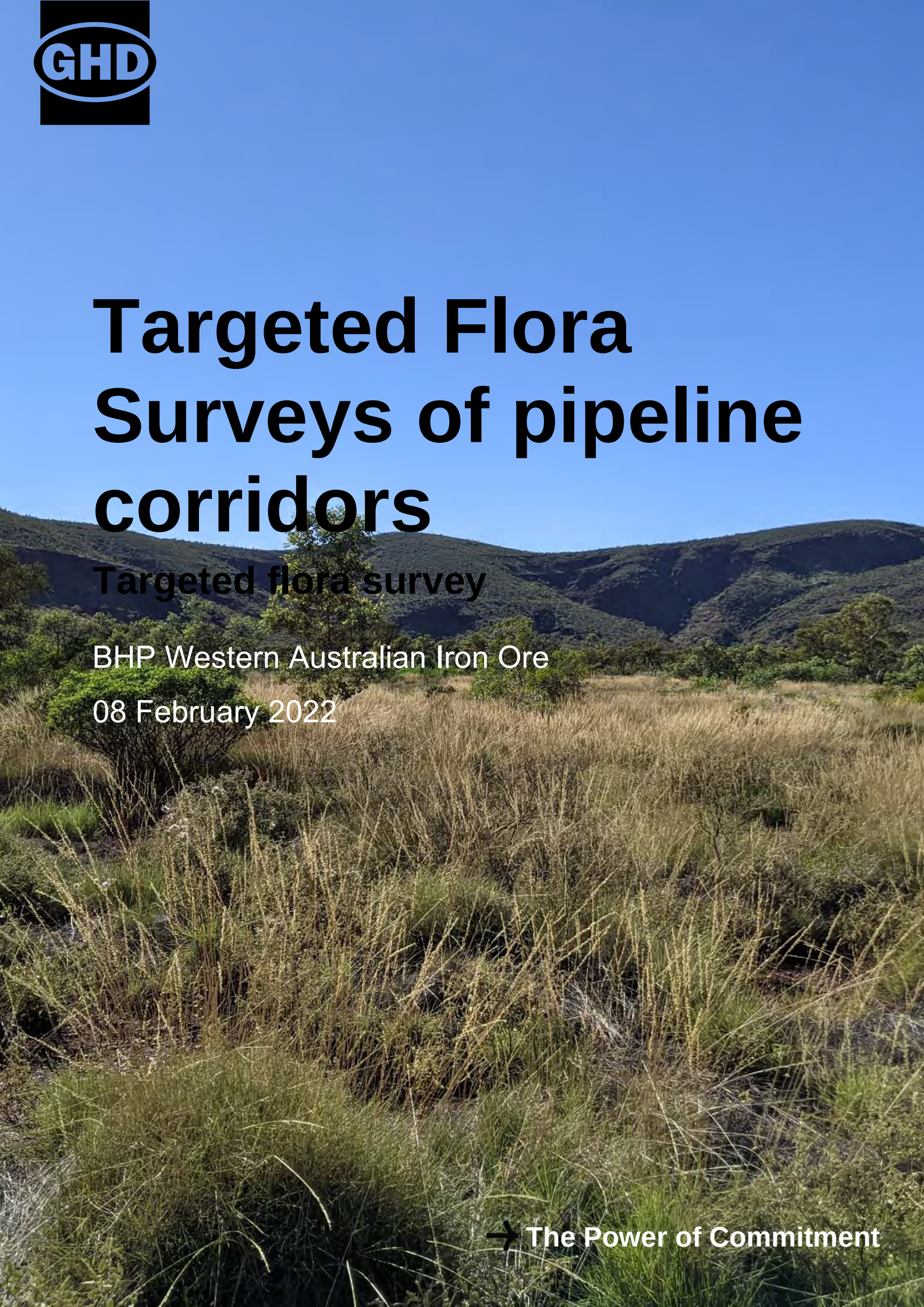

Targeted Flora Surveys of pipeline corridors

Targeted flora survey

BHP Western Australian Iron Ore

08 February 2022

The Power of Commitment

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Executive summary

BHP Western Australian Iron Ore (BHP WAIO) commissioned GHD Pty Ltd (GHD) to undertake a targeted flora survey for multiple pipeline corridors (survey area). The purpose of the survey is to identify and record conservation listed flora species within the survey area. The outcome of the biological survey report will be used to inform the environmental assessment and approvals process.

The two pipeline corridors that make up the survey area are Pineapple Hill Pipeline (Western Pipeline), Yandi Pipeline (Eastern Pipeline). In addition, the Packsaddle North Infiltration Pond was also surveyed. The survey area is located approximately 60 kilometres (km) north west of Newman, in the Pilbara region of Western Australia (WA).

GHD Senior Botanist Palitha (Pali) Jayasekara (flora license no. FB62000208-2) and Ecologist Nicola Barratt (flora license no. FB620000307) completed the targeted flora survey from 27 April to 1 May 2021. The field survey was conducted within the preferred post-wet season for the Pilbara (EPA 2016). The survey methodology employed by GHD was undertaken with reference to the Environmental Protection Authority (EPA) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016) and BHP survey guidance.

The targeted flora survey area was assessed on foot and by vehicle, with potential suitable habitat targeted and/or where previous records occur within or nearby the survey area. The survey effort was a total of 10 person days.

Four Priority flora species were recorded within the survey area: *Aristida lazaridis* (P2), *Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3), *Rostellularia adscendens* var*. latifolia* (P3) and *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3).

Approximately 50 *Aristida lazaridis* (P2) individuals were recorded within an area of 5.17 ha in Very Good vegetation condition. These individuals were associated with a medium drainage line, approximately 0.86 km south-west of Packsaddle village, within the Western Pipeline survey area.

Nine individuals of *Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3) were recorded. Most of these records occur within the Western Pipeline survey area close to or within the Packsaddle North Infiltration Pond survey area.

A total of 105 *Rostellularia adscendens var. latifolia* (P3) individuals of were recorded. The majority were in the most north-western portion of the Western Pipeline survey area The majority of records were around or within minor drainage areas that were in Very Good to Excellent vegetation condition.

Three individuals of *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3) were recorded in the survey area. Two were recorded in the Eastern Pipeline survey area close to Yandi. These occurred in areas of Very Good to Excellent vegetation condition and on low to moderate slopes. The third was recorded within the Packsaddle North Infiltration Pond survey area on rocky ground.

A species likelihood of occurrence assessment was conducted post-field survey for significant flora identified in the desktop assessment. A total of four species identified by the desktop assessment were recorded within the survey area, with the remaining 47 species considered unlikely to occur.

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1. Introduction

1.1 Project background and purpose of this report

BHP Western Australian Iron Ore (BHP WAIO) commissioned GHD Pty Ltd (GHD) to undertake a targeted flora survey for potential pipeline corridors and infiltration ponds (survey area). The purpose of the survey is to identify and record conservation listed flora species within the survey area. The outcome of the biological survey report will be used to inform the environmental assessment and approvals process.

1.2 Location

The survey area is located approximately 60 km northwest of Newman, in the Pilbara region of Western Australia (WA). The survey area consists of two pipeline corridors and an infiltration pond:

– Pineapple Hill Pipeline (Western Pipeline)
– Yandi Pipeline (Eastern Pipeline)
– Packsaddle North Infiltration Pond.

The total survey area is approximately 2993 hectares (ha). The Western pipeline corridor section is approximately 40 km in length and 200 m wide, the majority of which runs adjacent to Great Northern Highway. Its most northern point is located 9 km southwest of Juna Downs Station and the southern point is approximately 2 km west of Packsaddle village. The Eastern pipeline corridor section is approximately 60 km in length and 200 m wide, and is located near the Mujina-Roy Hill Road in the north and extends through Yandi. The Packsaddle North Infiltration Ponds survey area is approximately 0.69 km^2 and is located approximately 8 km north of the Great Northern Highway – West Angelas Road intersection.

A desktop study area (study area) was defined for the desktop-based searches and includes a 40 km buffer of the survey area. The extent of the survey and study area are displayed on Figure 1 Appendix A.

1.3 Scope of works

The scope of works included:

– A desktop review of the relevant databases and publicly available information to determine the biological values of the survey area
– A review of reports and biological survey data relevant to the survey area (as provided by BHP WAIO)
– A targeted flora survey to identify conservation listed flora taxa present in the survey area
– Produce a technical report (this document) including the survey results
– All data to be submitted in accordance with BHP WAIO Guidance.

1.4 Report limitations and assumptions

This report has been prepared by GHD for BHP WAIO and may only be used and relied on by BHP WAIO for the purpose agreed between GHD and the BHP WAIO as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than BHP WAIO arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring after the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report based on information provided by BHP WAIO and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.5 Relevant legislation, conservation codes and background information

In Western Australia (WA) some ecological communities, flora and fauna are protected under both Federal and State Government legislation. In addition, regulatory authorities also provide a range of guidance and information on expected standards and protocols for environmental surveys.

An overview of key legislation and guidelines, conservation codes and background information relevant to this biological survey is provided in Appendix B.

2. Methodology

2.1 BHP and EPA requirements

BHP requirements applied to this survey are set out in Guidance for Vegetation and Flora Section 3.5 and 3.7 (3.7.1 – 3.7.7) of guidance document 0124627 (flora and vegetation) and FRM-IEN-ADMIN-002. These documents outline BHP's expectations for survey components including the level of survey, desktop assessment, survey design and intensity, timing, vegetation assessment and reporting requirements. Biological survey spatial data requirements (SPR-IEN-EMS-015 v 11) set out biodiversity data requirements to a standard and consistent format. These standards enable analysis of survey data and comparison between surveys spatially and temporally.

The survey methodology employed by GHD was also undertaken with reference to the Environmental Protection Authority (EPA) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016).

2.2 Desktop assessment

Prior to the commencement of the field survey, a desktop assessment was undertaken to identify relevant environmental information pertaining to the study area and to assist in survey design. The desktop assessment included a review of:

– The Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) to identify communities and species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) potentially occurring within the study area (DAWE 2021) (Appendix C)
– The Department of Biodiversity, Conservation and Attractions (DBCA) *NatureMap* database for flora species previously recorded within the study area (DBCA 2007–) (Appendix C)
– Environmentally Sensitive Areas (ESAs) search (Department of Water and Environmental Regulation 2020)
– A review of reports and biological survey data relevant to the survey area as provided by BHP WAIO
– Aerial photography, climate and soils information to provide background information on the variability of the environment and likely vegetation present.

2.3 Field survey

GHD Senior Botanist Palitha (Pali) Jayasekara (flora license no. FB62000208-2) and Ecologist Nicola Barratt (flora license no. FB620000307) completed a targeted flora survey for conservation listed taxa from 27 April to 1 May 2021. The field survey was conducted within the preferred post-wet season for the Pilbara (EPA 2016). The survey effort was a total of 10 person days.

The post-wet season targeted flora survey was undertaken to identify conservation listed taxa. The survey area was assessed on foot and by vehicle by undertaking transects, with potential suitable habitat targeted and/or where previous records occur within or nearby the survey area. The seasonal conditions were considered satisfactory with suitable flowering and fruiting recorded. The survey area was not fully accessible with restrictions due to areas of the original survey area under third party tenure holder lease that had tenement restrictions. A single transect was undertaken approximately through the middle of the linear sections of the Western and Eastern Pipelines where access was approved to record conservation listed taxa if present. Through-out the full extent of the Packsaddle North Infiltration Pond transects were approximately 25 – 100 m apart. The location of the survey transects are shown in Figure 3, Appendix A.

The targeted flora survey methodology employed by GHD was undertaken with reference to the Environmental Protection Authority (EPA) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016) and BHP WAIO (2021) *Vegetation and Flora Survey Procedure*.

2.3.1 Data collection and storage

Field data collection for the targeted survey was undertaken using Global Positioning System (GPS) enabled Samsung tablets using electronic forms in Collector and tailored to BHP WAIO spatial data requirements (SPR-

IEN-EMS-015). Data was synced to the cloud at the conclusion of each field day. Field photographs were stored and where applicable have been provided as part of the Project deliverables (Table 1).

Table 1 Data collected during the field survey

Aspect	
Survey/Site ID	Significant/ Introduced/Native
Sample method	Number of individuals (count or estimate)
Date observed	Coverage
Observer name	Plant height
Species name introduced/native	Time since last fire
Genus/species	Landform
Infra rank/name	Vegetation condition
Taxonomic identification	Aspect
Collection ID	Slope
Date verified by WAH	Amount of outcropping/rock type
Vouchered/Herb reference	Soil type/colour

2.3.2 Flora identification and nomenclature

Species well known to the survey ecologist were identified in the field; all other species were collected and assigned a unique collection number to facilitate tracking. All specimens collected were identified using taxonomic literature, local and regional flora keys at the WA Herbarium by GHD Senior Botanist Pali Jayasekara.

The conservation status of all recorded flora was compared against the current lists available on *FloraBase* (WA Herbarium 1998–). Nomenclature used in this report follows that used by the WA Herbarium as reported on *FloraBase* (WA Herbarium 1998–).

Conservation significant flora

Prior to the field survey, information obtained from the desktop assessments (e.g. EPBC Act PMST, *NatureMap* and BHP WAIO flora data) was reviewed to determine conservation significant flora taxa potentially present within the survey area and existing locations. Targeted searches for conservation significant flora were undertaken throughout the survey area. Where individuals were identified, the location and number of plants present were recorded using tablet and/or handheld GPS unit.

2.4 Survey limitations

2.4.1 Desktop limitations

The EPBC Act PMST is based on bioclimatic modelling for the potential presence of species. As such, this does not represent actual records of flora and fauna species within the area. The records from the DBCA searches of Threatened (T) and Priority (P) flora provide more accurate information for the general area and local occurrence. However, some collection records cannot be dated and may misrepresent the current range of Threatened and Priority species.

2.4.2 Survey limitations

The EPA (2016) states that flora and fauna survey reports for environmental impact assessment in WA should contain a section describing the limitations of the survey methods used. The limitations and constraints associated with this field survey are discussed in Table 2.

Table 2 Survey limitations

Aspect	Constraint	Comment
Sources of information and availability of contextual information.	Nil	Adequate information is available for the survey area. Broad scale (1:250,000) mapping by Beard (1975) and digitised by Shepherd et al. (2002). Regional biogeography (Kendrick 2001).
Scope (what life forms were sampled etc).	Nil	Vascular flora was sampled during the survey. Non-vascular flora was not surveyed.
Proportion of flora collected and identified (based on sampling, timing and intensity)	Nil	The survey sampling and intensity was considered adequate for a targeted survey, and seasonal conditions were considered satisfactory.
Flora determination	Minor	Some specimens in the Asteraceae family were sterile and, therefore difficult to identify to species level.
Completeness and further work which might be needed	Minor	Parts of the survey area were not accessible due to tenement restrictions. Also, due to a Covid-19 outbreak in WA, the survey length was shortened by four person days (Figure 3 presents the survey track logs).
Mapping reliability	Minor	Data was recorded in the field using hand-held GPS tools (e.g. Samsung tablet and/or Garmin GPS). Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. The Garmin GPS units used for this survey are accurate to within ± 2 - 5 m on average, therefore the data points consisting of coordinates recorded from the GPS may contain minor inaccuracies.
Timing/weather/season cycle	Nil	The field surveys were conducted eight weeks post Pilbara wet-season (April 27 to 1 May 2021), which is consistent with EPA (2016) guidance for the region. Newman Aero weather station (no. 007176) provides the closest continuous rainfall data. Newman aero recorded 216.8 millimetres (mm) of rainfall in the three months (January to March) preceding the survey (Bureau of Meteorology (BoM) 2021), which is above the long term average of 182.4 mm. This difference is not expected to adversely impact the survey results. Similarly, the weather conditions recorded during the survey periods are considered unlikely to have impacted upon the vegetation and flora survey.
Disturbances (e.g. fire, flood, accidental human intervention)	Nil	Some of the survey area has been subject to previous disturbances, including clearing for vehicle tracks, stock fences, stock infrastructure and stock grazing. These disturbances did not limit the biological survey. Some previously known locations of *Vittadinia* sp. Coondewanna Flats (S. van Leeuwen 4684) appear to have been affected by recent heavy rain (occurs on damp clay/clay-loam which had been flooded and highly eroded). Areas impacted by recent fires may have also impacted known locations of conservation listed species.
Resources	Minor	Adequate resources were employed during the field survey. Eight person days were spent undertaking the survey using dedicated Botanists.
Access restrictions	Major	The survey area was not fully accessible with restrictions due to areas of the original survey area under third party tenure holder lease.
Experience levels	Nil	The Botanist and Ecologist who executed the survey are practitioners suitably qualified and experienced in their respective fields. The field team lead, Dr Pali Jayasekara has over 14 years' experience undertaking flora surveys in the Pilbara bioregion. Nicola Barratt (Ecologist) has two years' experience undertaking flora surveys in the Pilbara bioregion. Both Botanist and Ecologist are degree-qualified (or higher) scientists who hold the appropriate DBCA licences and are highly familiar with BHP WAIO and EPA flora and vegetation survey requirements. The identification of specimens collected in the field during was completed by GHD's taxonomist, Dr Pali Jayasekara, who has extensive botanical expertise, including 14 years' experience in WA flora identification.

3. Desktop assessment

3.1 Literature review

A literature review of surveys undertaken in and around the survey area was undertaken as part of the desktop assessment. A total of seven previous surveys were reviewed, five of which intersect the current survey area (Ecologia 2007, Mattiske 2008, Astron 2011, Onshore Environmental 2016 and Astron 2018). The reviewed reports range from 2007 to 2018, with the largest survey area spanning 18,955 ha (Onshore Environmental 2016). The literature review findings have been collated and are summarised in Table 3.

3.2 Climate

The project is in the Pilbara region of WA and experiences a semi-arid climate. Temperatures are warm to hot all year and rainfall is generally low, mostly falling in the late summer months due to the influence of tropical cyclones and monsoon. The BoM Newman Aero weather station (site number 007176) is the nearest weather station to the study area with continuous long-term data (70 km from the south-east of the survey area). Climatic data from this site indicates the mean maximum temperature of the area ranges from 39.2 °C in December to 23.1 °C in June. Mean minimum temperature ranges from 25.1 °C in January to 6.5 °C in July. The mean annual rainfall is 356.4 mm with an average of 42 rain days per year (BoM 2021). Climate statistics for the region are summarised in Plate 1 (BoM 2021).

Newman Aero recorded 216.8 mm of rainfall in the three months (January to March) preceding the survey. This is above the long-term average of 182.4 mm (Plate 1). BHP site weather data recorded 284.8 mm of rainfall at Yandi and 330 mm of rainfall at MAC in the three months (January to March) preceding the survey (Plate 1).

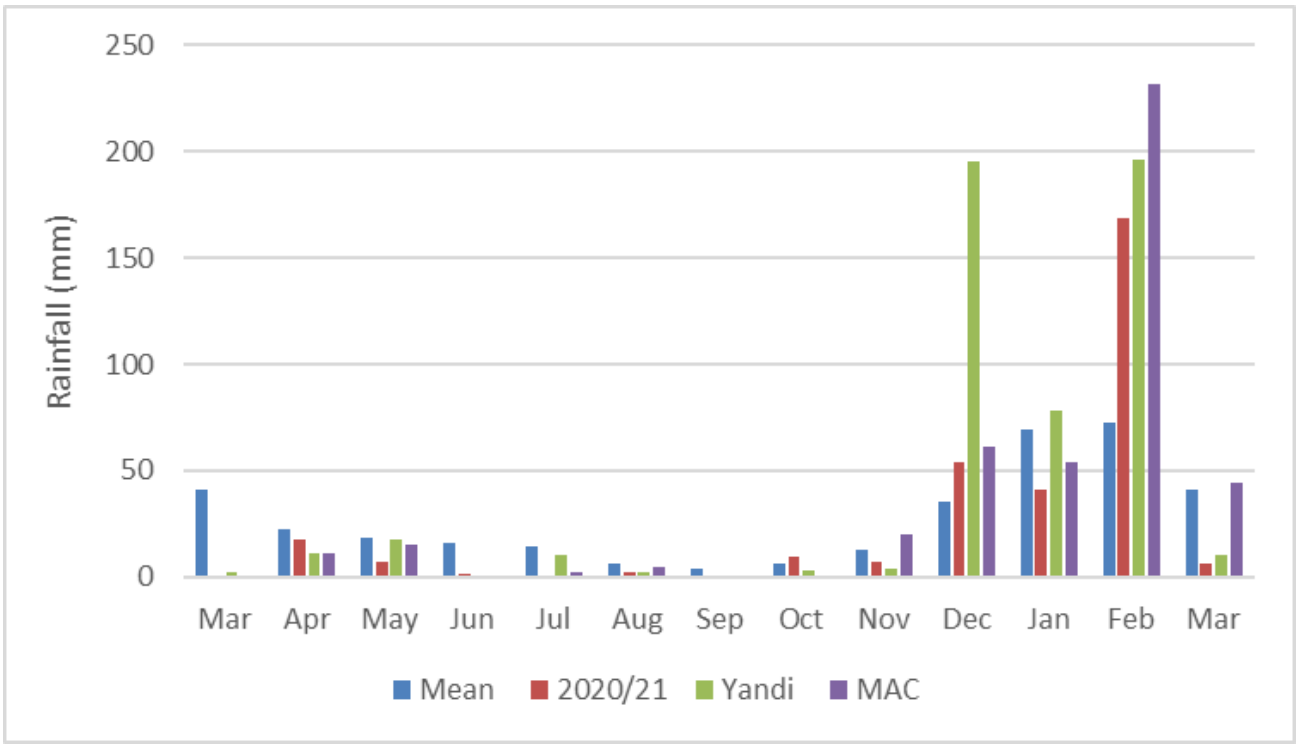


Plate 1 *Annual rainfall statistics recorded at Newman Aero (BOM 2021), MAC and Yandi (BHP site data)*

3.3 Land systems

The Department of Primary Industries and Regional Development (DPIRD) soil mapping indicates there are 11 land systems (Department of Agriculture and Food WA (DAFWA) 2007) that intersect the survey area (Table 4 and Figure 2, Appendix A).

Table 3 Literature review of reports relevant to the survey area

Citation	Location	Survey dates	Survey techniques	Flora Survey Results
Onshore Environmental (2011) Flora and vegetation survey, Area C and surrounds	The study area was situated around the existing Area C open pit iron ore mines (Area C). The study area extended approximately 44 km east-west from the Great Northern Highway to Weeli Wolli Creek and ranged between 5 km and 15 km north-south from the northern fringes of Packsaddle village Range to Weeli Wolli. The study area is located approximately 30 km east of GHD (2021) NE survey area.	Trip 1: 26 November to 6 December 2009. Trip 2: 09 – 18 February 2010. Trip 3: 14 – 21 June 2010.	The survey involved: – Targeted flora and weed survey across study area – Review of existing vegetation association mapping – First season flora and vegetation survey of Northern and Southern survey areas – Additional quadrats established in NW sector of study area – Second season flora and vegetation survey of northern and southern survey areas.	**Area C and study area:** 479 plant taxa (including varieties and subspecies) from 53 families and 166 genera were recorded. **Northern survey area:** 206 plant taxa from 45 families and 97 genera were recorded. **Southern survey area:** A total of 219 plant taxa from 36 families and 99 genera were recorded. **Priority flora recorded:** – *Lepidium catapycnon* (P4) – *Aristida jerichoensis* subsp. *subspinulifera* (P1) – *Aristida lazaridis* (P2) – *Stylidium weeliwolli* (P2) – *Vittadinia* sp. Coondewanna Flats (S. van Leeuwen 4684) (P1) – *Acacia subtiliformis* (P3) – *Euphorbia inappendiculata* (P2) – *Fimbristylis sieberiana* (P3) – *Goodenia* sp. East Pilbara (A.A. Mitchell PRP 727) (P3) – *Nicotiana umbratica* (P3) – *Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3) – *Rostellularia adscendens* var. *latifolia* (P3) – *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3) – *Eremophila magnifica* subsp. *magnifica* (P4) – *Goodenia nuda* (P4).

Citation	Location	Survey dates	Survey techniques	Flora Survey Results
Onshore Environmental (2012) Flora and vegetation survey, Jinidi to Mainline study area	The study area was located between BHP Billiton Iron Ore's Jinidi tenement and Mainline rail. The study area is located approximately 35 km east of GHD (2021) NE survey area.	February, March, April and September 2011.	A second season survey and review of work completed by Woodman Environmental (2010) along the eastern half of the study area between 21 and 24 February 2011. Previous quadrats established by Woodman Environmental (2010) were resurveyed by Onshore Environmental in 2011. Additional (new) quadrats were established to fill gaps in the study area. A two-season survey of the western sector of the study area was between 24 March and 6 April 2011, and 1 – 14 September 2011.	A total of 471 plant taxa (including varieties and subspecies) from 59 families and 178 genera were recorded from the study area. **Priority flora recorded:** – *Goodenia nuda* (P4) – *Rostellularia adscendens* (P3) – *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3) – *Fimbristylis sieberiana* (P3) – *Stylidium weeliwolli* (P2).
Astron Environmental Services (2011): Area C to Yandi Flora and Vegetation Survey	The survey area was located approximately 85 km north-west of the town of Newman and encompassed approximately 2,181 ha (21.81 square kilometres (km^2). The study area intersects GHD (2021) survey area.	6 – 11 September 2010.	A single season survey involved the establishment of 20 non-permanent plots (50 m x 50 m or 2500 square metre (m^2) equivalents).	A total of 91 vascular flora species representing 20 families and 43 genera were recorded within the survey area. **Priority flora recorded:** – *Acacia bromilowiana* (P4)
Ecologia (2007) Cowra to Kurrajurra Sidings and Cowra Camp Site Flora and Vegetation Survey	The survey area was located on special lease 3116/3687 and generally included 40 m either side of the centre of the rail line. The Cowra to Kurrajurra section of the line was approximately 230 km south of Port Hedland and 100 km north-west of Newman. The study area intersects GHD (2021) survey area.	Cowra and Kurrajurra Sidings survey: 5 – 9 October 2007. Cowra Camp Site survey: 22 – 23 October 2007.	Systematic flora sampling in quadrats approximately 50 m x 50 m at the proposed camp site, or of an area of 2 500 m2 to fit within the 40 m corridor on either side of the existing rail when a quadrat measuring 50 x 50 m could not be surveyed in a discrete vegetation unit and within the lease area. Thirty-six quadrats were surveyed along the rail corridor and 21 quadrats at Cowra Camp Site.	**Cowra to Kurrajurra rail duplication:** 206 flora taxa were recorded including subspecies, varieties, forms and affinities. The taxa comprised 38 families, 92 genera and 188 species. **Cowra Camp Site:** 144 flora taxa were recorded during the survey. The taxa comprised 33 families, 69 genera and 130 species.

Citation	Location	Survey dates	Survey techniques	Flora Survey Results
Mattiske (2008) Flora and Vegetation on the Hope Downs 4 Mine Infrastructure Corridor	Hope Downs 1, the Hope Downs 4 lease areas near Newman. Approximately 60 km north west of Newman in the Pilbara Region. The study area intersects GHD (2021) survey area.	April and May 2008.	The study was conducted via foot and vehicle traverses during three field trips. Recordings were taken at 226 sites, including 139 permanent sites within and near the Hope Downs 4 infrastructure corridor survey area.	A total of 392 taxa (including subspecies and varieties) from 54 families and 155 genera were recorded within the Hope Downs 4 infrastructure corridor survey area. **Priority flora recorded:** – *Rhagodia* sp. Hamersley (M.E. Trudgen 17794) (P3) – *Stylidium weeliwolli (P 3)* – *Eremophila forrestii* subsp. *viridis* (P3) – *Eremophila youngii* subsp. *lepidota* (P4).
Onshore Environmental (2016) Level 2 Flora and Vegetation Survey Pineapple Hill Tenements	The study area was situated approximately 115 km north-west of Newman and 37 km south of Auski Road House, in the Pilbara region of Western Australia. The 18,955 ha study area sits between the eastern boundary of Karijini National Park and the Great Northern Highway. The study area intersects GHD (2021) survey area.	15 – 28 September 2016.	The field survey involved systematic sampling using quadrats (63 in total). Relevé vegetation descriptions were made to increase the accuracy of vegetation mapping and targeted searches were completed in habitats where it was anticipated that significant flora may occur.	407 plant taxa (including varieties andsubspecies) from 55 families and 174 genera. **Priority flora recorded:** – *Aristida jerichoensis* var. *subspinulifera* (P3) – *Aristida lazaridis* (P2) – *Eremophila magnifica* subsp. *magnifica* (P4) – *Eremophila* sp. Hamersley Range (K. Walker KW 136) (P3) – *Goodenia nuda* (P4) – *Oxalis* sp. Pilbara (M.E. Trudgen 12725) (P2) – *Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3) – *Rostellularia adscendens* var. *latifolia* (P3) – *Triodia* sp. Karijini (S. van Leeuwen 4111) (P1) – *Triodia* sp. Mt Ella (M.E. Trudgen 12739) (P3)

Citation	Location	Survey dates	Survey techniques	Flora Survey Results
				– *Vittadinia* sp. Coondewanna Flats (S. van Leeuwen 4684) (P1).
Astron Environmental Services (2018) Area C West to Yandi Flora and Vegetation Assessment	The study area (115 km north-west of Newman) covered approximately 3,729 hectares,and comprised Marillana Creek, Pebble Mouse Creek, Yandicoogina Creek, Lamb Creek and Area C North Creekline. The study area intersects GHD (2021) survey area.	13 – 22 November 2018	The flora and vegetation survey consisted of two approaches: mapping of previously unmapped vegetation, and verification of existing vegetation mapping within the study area. The sites selected during the desktop assessment were visited to assess the vegetation present and refine the desktop mapped or existing vegetation mapping.	A total of 102 confirmed vascular flora species were recorded from 67 sampling sites (relevés and mapping note locations) **Priority flora recorded:** – *Eremophila* sp. Hamersley Range (K. Walker KW 136) (P3).

Table 4 Land systems within the survey area

Land System	Description	Landform/Vegetation Association
Boolgeeda Land System	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.	Stony plains with spinifex grasslands
Newman Land System	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.	Hills and ranges with spinifex grasslands
Platform Land System	Dissected slopes and raised plains supporting hard spinifex grasslands.	Stony plains with spinifex grasslands
Wannamunna Land System	Hardpan plains and internal drainage tracts supporting mulga shrublands and woodlands (and occasionally eucalypt woodlands).	Wash plains on hardpan with mulga shrublands
Divide Land System	Sandplains and occasional dunes supporting shrubby hard spinifex grasslands.	Sandplains and occasional dunes with spinifex grasslands
Fortescue Land System	Alluvial plains and flood plains supporting patchy grassy woodlands and shrublands and tussock grasslands.	Alluvial plains; Grassy woodlands and tussock grasslands
McKay Land System	Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands.	Hills and ranges with spinifex grasslands
River Land System	Active flood plains, major rivers and banks supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands.	Alluvial plains; Grassy woodlands and tussock grasslands
Robe Land System	Low plateaux, mesas and buttes of limonites supporting soft spinifex (and occasionally hard spinifex) grasslands.	Mesas, breakaways and stony plains with spinifex grasslands
Rocklea Land System	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands.	Hills and ranges with spinifex grasslands
Turee Land System	Stony alluvial plains with gilgaied and non-gilgaied surfaces supporting tussock grasslands and grassy shrublands of mulga and snakewood.	Alluvial plains with tussock grasslands

3.3.1 Environmentally sensitive areas

No ESAs intersect any of the survey areas, which includes Threatened Ecological Communities (TECs).

3.4 Flora and vegetation

3.4.1 Regional biogeography

The study area is located in the Eremaean Botanical Province, within the Pilbara bioregion and the Hamersley sub-region (PIL3) as described by the Interim Biogeographic Regionalisation of Australia (IBRA)

The Pilbara bioregion is characterised by vast coastal plains and inland mountain ranges with cliffs and deep gorges. Vegetation is predominantly mulga low woodlands (*Acacia aneura* complex) or *Eucalyptus leucophloia* (snappy gum) over bunch and hummock grasses. Tenure comprises Aboriginal land, leasehold (for grazing cattle)

and conservation reserves. The bioregion provides the majority of WA's exports in petroleum, natural gas and iron ore. Major population centres are Karratha, Port Hedland, Newman and Tom Price (Kendrick 2001).

The Hamersley sub-region is characterised by the presence of Mulga low woodland over bunch grasses on fine textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia brizoides* on skeletal soils of the ranges. The climate is Semi-desert tropical, average 300 mm rainfall, usually in summer cyclonic or thunderstorm events. Winter rain is not uncommon. Drainage into either the Fortescue (to the north), the Ashburton to the south, or the Robe to the west (Kendrick 2001).

3.4.2 Flora diversity

The *NatureMap* database identified 813 flora taxa, representing 89 families and 270 genera previously recorded within the survey area (DBCA 2007–). This total comprised 789 native taxa and 24 naturalised (introduced) taxa (DBCA 2007–). Dominant families recorded included Fabaceae (147 taxa), Poaceae (99 taxa) and Malvaceae (60 taxa) (DBCA 2007–). The *NatureMap* database search is provided in Appendix C. Common introduced species in the local area include **Cenchrus ciliaris*, **Malvastrum americanum, *Bidens bipinnata* and **Flaveria trinervia.*

3.4.3 Significant flora

The EPBC Act PMST, *NatureMap* database and BHP significant flora data identified the presence/potential presence of 51 significant flora taxa within the study area. The desktop searches recorded:

– One under the EPBC Act and/or as Threatened under the WC Act
– Five Priority 1 taxa
– 13 Priority 2 taxa.
– 26 Priority 3 taxa
– Six Priority 4 taxa.

The locations of conservation significant flora registered on the BHP database are mapped in Figure 2, Appendix A.

4. Field results

4.1 Significant flora

Four Priority flora species were recorded from the survey area:

– *Aristida lazaridis* (P2)
– *Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3)
– *Rostellularia adscendens* var. *latifolia* (P3)
– *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3).

4.1.1 *Aristida lazaridis* (P2)

Aristida lazaridis (P2) (Plate 2) is described a tufted perennial grass with culms from 0.4 to 1.5 m high. Habitat includes sandy or loamy soils (WA Herbarium 1998–).

Approximately 50 *Aristida lazaridis* individuals were recorded within an area of 5.17 ha in very good condition. This was in a medium drainage line with clay soils, approximately 0.86 km south-west of Packsaddle village, within the Western Pipeline survey area (Appendix A, Figure 4 and Figure 4-4). The vegetation type was dominated by *Eucalyptus xerothermica* isolated trees over *Hakea lorea* and *Acacia citrinoviridis* shrubland over *Bothriochloa ewartiana* tussock grassland.

Plate 2 ***Aristida lazaridis (P3) specimen***

4.1.2 Rhagodia sp. Hamersley (M. Trudgen 17794) (P3)

Rhagodia sp. Hamersley (M. Trudgen 17794) (P3) (Plate 3) is described as a perennial scrambling shrub with small lanceolate leaves and is recorded predominantly from plains (WA Herbarium 1998–).

Nine individuals of *Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3) were recorded in the survey area (Appendix A, Figure 4 and Figure 4-2). Most of these records occur within the Western Pipeline survey area close to or within the Packsaddle North Infiltration Pond survey area. The vegetation type was dominated by *Corymbia hamersleyana* and *Eucalyptus leucophloia* isolated trees over mixed *Acacia* sp shrubland over *Triodia epactia* open hummock grassland.

Plate 3 *Rhagodia sp. Hamersley (M. Trudgen 17794) (P3) habit*

4.1.3 Rostellularia adscendens var. *latifolia* (P3)

Rostellularia adscendens var. latifolia (P3) (Plate 4) is described as a herb growing 0.1 – 0.3 m high. It has blue/purple flowers which can be seen between April and May. It usually occurs on ironstone soils, near creeks and rocky hills (WA Herbarium 1998–).

A total of 105 individuals of were recorded within the survey area (Appendix A, Figure 4 and Figure 4-1). Flora was recorded using a count method. Numerous plants recorded in a 10 m^2 area were represented by one point and the number of plants were counted. The majority of *Rostellularia adscendens var. latifolia* (P3) were recorded in the most north-western portion of the Western Pipeline survey area The majority of records were around or within areas of minor drainage and flood plain and in areas of Very Good to Excellent condition vegetation. The vegetation type was open with limited overstorey with *Eulalia aurea* open tussock grassland and *Triodia angusta* open hummock grassland with mixed herbs on clay loam.

Plate 4 *Rostelluria adscendens var. latifolia (P3) in situ*

4.1.4 *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3)

Sida sp. Barlee Range (S. van Leeuwen 1642) (P3) (Plate 5, Plate 6) is a spreading shrub to 0.5 m high. It flowers in August with yellow flowers and is known from habitat that includes steep slopes within skeletal red soil pockets (WA Herbarium 1998–).

Three individuals of *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3) were recorded in the survey area. Two were recorded in the Eastern Pipeline survey area close to Yandi. These occurred in areas of Very Good to Excellent condition vegetation and on low to moderate rocky slopes on river embankment. The third was recorded within the Packsaddle North Infiltration Pond survey area on rocky ground. (Appendix A, Figure 4 and Figure 4-3). The vegetation type was dominated by *Acacia citrinoviridis* isolated trees over *Triodia wiseana* and *Triodia epactia* open hummock grassland over *Cymbopogon ambiguus* open tussock grassland.

Plate 5 ***Sida sp. Barlee Range (S. van Leeuwen 1642) (P3) habit (Onshore 2011)***

Plate 6 ***Sida sp. Barlee Range (S. van Leeuwen 1642) (P3)***

4.1.5 Likelihood of occurrence assessment

A likelihood of occurrence assessment (Appendix D) was conducted post-field survey for significant flora species identified in the desktop assessment (Appendix C). This assessment considered previous records, habitat requirements, efficacy and intensity of the survey, flowering times and the cryptic nature of the species. A total of four species identified by the desktop assessment were recorded within the survey area, the remaining 47 species were considered unlikely to occur.

Acacia bromilowiana (P4) was previously recorded at two locations in the survey area. Targeted searches of these locations did not record *A bromilowiana*. These records were either erroneous identifications, or the population have been impacted by a recent fire. The common species *Acacia hamersleyensis* was collected and identified from the locations, a species that is closely related to *A. bromilowiana.* There are many differences between these two species when fertile, but when sterile, the differences are not easily identified. Hairs on new shoots were used to separate these two sterile taxa as A. *hamersleyensis* has citron -sericeous hairs on new shoots (WA Herbarium 1982) (Plate 7), and *A. bromilowiana* has ferruginous microscopic hairs on new shoots (WA Herbarium 2008) (Plate 8).

Plate 7 ***Acacia hamersleyensis phyllodes showing citron-sericeous hairs on new shoots***

Plate 8 ***Acacia bromilowiana (P4) phyllodes showing ferruginous hairs on new shoots***

5. Discussion

The survey areas are located approximately 60 km north west of Newman, in the Pilbara region of Western WA.

Four Priority flora species were recorded within the survey area: *Aristida lazaridis* (P2), *Rhagodia* sp. Hamersley (M. Trudgen 17794) (P3), *Rostellularia adscendens* var*. latifolia* (P3) and *Sida* sp. Barlee Range (S. van Leeuwen 1642) (P3).

Aristida lazaridis (P2) typically grows in red clay loam, floodplain, drainage lines and claypans on plains and occasionally on hill slopes and has a distribution from the Pilbara bioregion and confined to the Hamersley subregion in WA (WA Herbarium 1998-) in Western Australia and is also known from tropical Queensland and Northern Territory (DBCA 2007–). *Aristida lazaridis* is known from an approximate range of 120 km across the Hamersley subregion (WA Herbarium 1998-). At a local or regional context the records of *Aristida lazaridis* within the survey area are unlikely to be considered significant given the species is known from other populations across its range and with additional surveys further populations are likely to be recorded in the Pilbara bioregion.

Rhagodia sp. Hamersley (M. Trudgen 17794) (P3) is a phrase-named taxon that has been recorded from mulga on cracking clays and red loam clay loam soils on plains. The species has a distribution from the Pilbara and Gascoyne bioregions (WA Herbarium 1998-). *Rhagodia* sp. Hamersley (M. Trudgen 17794 is known from an approximate range of 350 km (WA Herbarium 1998-). At a local or regional context the records of *Rhagodia* sp. Hamersley (M. Trudgen 17794) within the survey area are unlikely to be considered significant given the species is known from other populations across its range and with additional surveys further populations are likely to be recorded.

Rostellularia adscendens var*. latifolia* (P3) typically grows on ironstone soils, near creeks and rocky hills and has a widespread distribution across the Pilbara bioregion (WA Herbarium 1998–). *Rostellularia adscendens* var*. latifolia* 17794 is known from an approximate range of 450 km (WA Herbarium 1998-). At a local or regional context the records of *Rostellularia adscendens* var*. latifolia* within the survey area are unlikely to be considered significant given the species is known from other populations across its range and with additional surveys further populations are likely to be recorded.

Sida sp. Barlee Range (S. van Leeuwen 1642) (P3) is a phrase-named taxon that has been recorded from habitat that includes steep slopes within skeletal red soil pockets and has a wide spread distribution from the Pilbara and Gascoyne bioregions (WA Herbarium 1998-). *Sida* sp. Barlee Range (S. van Leeuwen 1642) is known from an approximate range of 600 km (WA Herbarium 1998-). At a local or regional context the records of *Sida* sp. Barlee Range (S. van Leeuwen 1642) within the survey area are unlikely to be considered significant given the species is known from other populations across its range and with additional surveys further populations are likely to be recorded.

No additional significant flora species are considered possible or likely to occur within the survey area. This conclusion was informed by considered previous records, habitat requirements, efficacy and intensity of the survey, flowering times and the cryptic nature of the species identified during the desktop assessment.

6. References

Astron Environmental Services 2011, Area C to Yandi Flora and Vegetation Survey, September 2010, unpublished report for BHP Billiton Iron Ore Pty Ltd.

Astron Environmental Services. 2018. Area C West to Yandi Flora and Vegetation Assessment. Unpublished report to BHP Billiton Iron Ore Pty Ltd, Perth WA.

Beard, JS 1975, *Vegetation Survey of Western Australia: Pilbara*, map and explanatory memoir 1:1,000,000 series, Nedlands, University of Western Australia Press.

BHP WAIO. 2021, *Vegetation and Flora Survey Procedure. Document number: 0124627*, *Version 3.0*.

Bureau of Meteorology (BoM) 2021, Climate Data Online, retrieved June 2021, from http://www.bom.gov.au/climate/data/

Department of Agriculture Water and the Environment (DAWE) 2021, *Environmental Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool Results*, retrieved June 2021, from http://www.environment.gov.au/epbc/pmst/index.html

Department of Biodiversity, Conservation and Attractions (DBCA) 2007–, *NatureMap*: Mapping Western Australia's Biodiversity, retrieved June 2021, from http://naturemap.dpaw.wa.gov.au/default.aspx/.

Department of Agriculture and Food WA (DAFWA) 2007, *Soil-landscape mapping in WA*, Perth, Department of Agriculture and Food.

Department of Water and Environmental Regulation. 2020, *Clearing Regulations – Environmentally Sensitive Areas (DWER-046).*

Ecologia. 2007. Cowra to Kurrajurra Sidings and Cowra Camp Site Flora and Vegetation Survey. unpublished report to BHP Billiton Iron Ore Pty Ltd, Perth WA.

Environmental Protection Authority (EPA) 2016, *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*, Perth, Environmental Protection Authority.

Kendrick, P 2001, *Pilbara 3 (PIL3 – Hamersley subregion)*, in Department of Conservation and Land Management (ed), A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002, pp 724.

Mattiske. 2008. *Flora and vegetation on the Hope Downs 4 mine infrastructure corridor.* Unpublished report to BHP Billiton Iron Ore Pty Ltd, Perth WA.

Onshore Environmental Consultants Pty Ltd 2011, *Flora and Vegetation Survey: Area C and Surrounds*, unpublished report to BHP Billiton Iron Ore Pty Ltd, Perth WA.

Onshore Environmental Consultants Pty Ltd, 2012. Flora and Vegetation Survey: Jinidi to Mainline Study Area. unpublished report to BHP Billiton Iron Ore Pty Ltd, Perth WA.

Onshore Environmental Consultants Pty Ltd. 2016. Level 2 Flora and Vegetation Survey: Pineapple Hill Tenements. Unpublished report to BHP Billiton Iron Ore Pty Ltd, Perth WA.

Shepherd, DP, Beeston, GR, and Hopkins, AJM 2002, *Native Vegetation in Western Australia – Extent, Type and Status*, Resource Management Technical Report 249, Department of Agriculture, Western Australia.

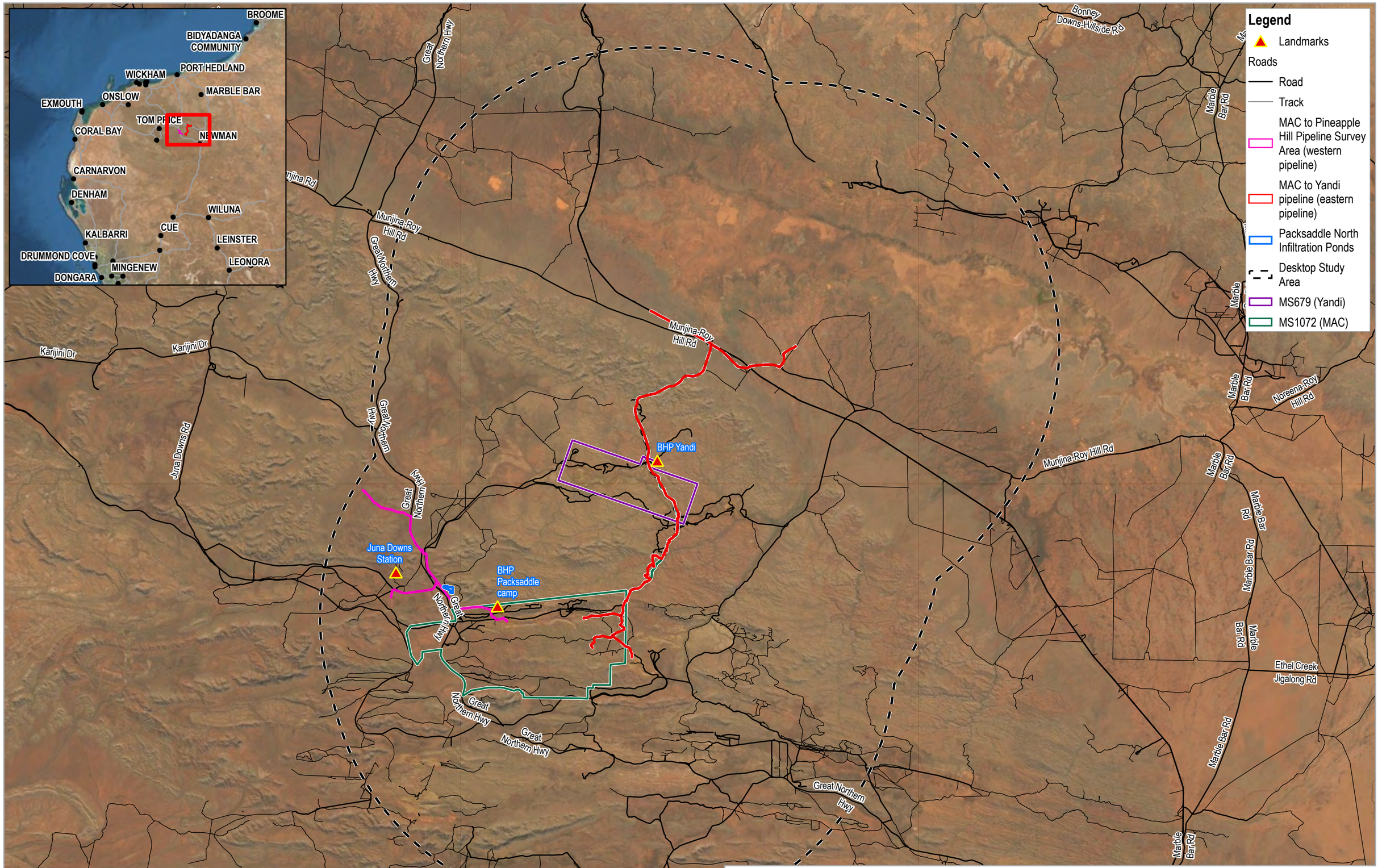
Western Australian (WA) Herbarium 1982 *Nuytsia*., *Studies in the genus Acacia (Leguminosae: Mimosoideae)—11. Acacia species of the Hamersley Range area. Western Australia. By B. R. Maslin,* vol 4, 61-105

Western Australian (WA) Herbarium 2008. *Nuytsia, Maslin, B.R. & van Leeuwen, S. New taxa of Acacia (Leguminosae: Mimosoideae) and notes on other species from the Pilbara and adjacent desert regions of Western Australia* .vol 18, 139-188

Western Australian (WA) Herbarium 1998–, *FloraBase–the Western Australian Flora*, Biodiversity, Conservation and Attractions, retrieved May 2021, from http://florabase.dpaw.wa.gov.au/.

Appendix A

Figures



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Kilometres

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Horizontal Datum: GDA 1994
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BHP targeted survey report

Study and survey area boundary

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 1

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Legend

- Significant flora
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)
- MAC to Yandi pipeline (eastern pipeline)
- Packsaddle North Infiltration Ponds
- MS679 (Yandi)
- MS1072 (MAC)

Land Systems mapping

- Adrian System
- Boolgeeda System,Boolgeeda System
- Brockman System,Brockman System
- Calcrete System
- Coolibah System
- Cowra System
- Divide System
- Egerton System
- Elimunna System
- Fan System
- Fortescue System
- Jamindie System
- Kumina System
- Marillana System
- Marsh System
- McKay System
- Newman System,Newman System
- Oakover System
- Pindering System
- Platform System
- River System
- Robe System
- Rocklea System
- Spearhole System
- Turee System
- Urandy System
- Wannamunna System

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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Project No. 12550242
Revision No. 0
Date 10/12/2021

Ecological and land use constraints

FIGURE 2

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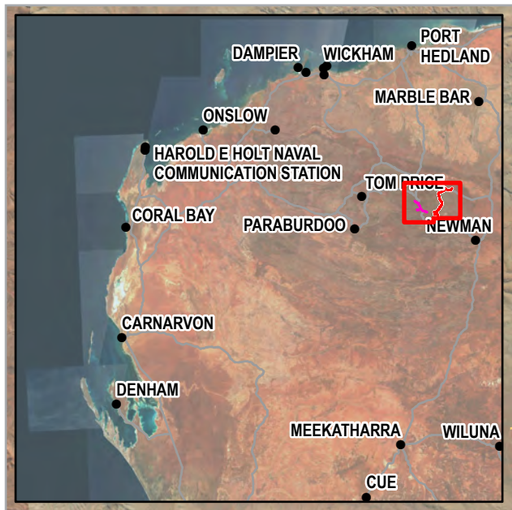

Legend

- Flora observations
- Tracks
- TrackLogs 1
- TrackLogs 2
- MAC to Yandi pipeline (eastern pipeline)
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)
- Packsaddle North Infiltration Ponds
- MS679 (Yandi)
- MS1072 (MAC)

SLIP

Paper Size ISO A3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 1

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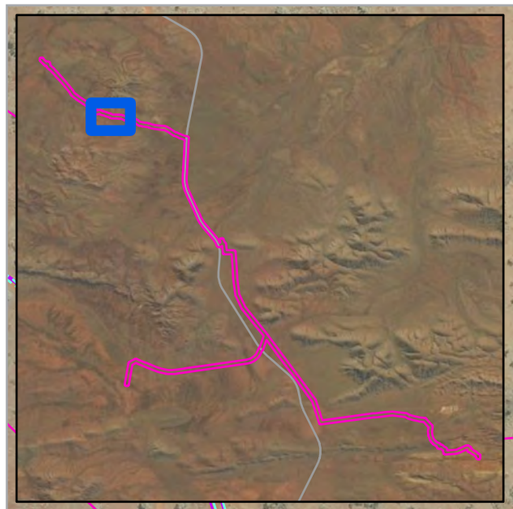

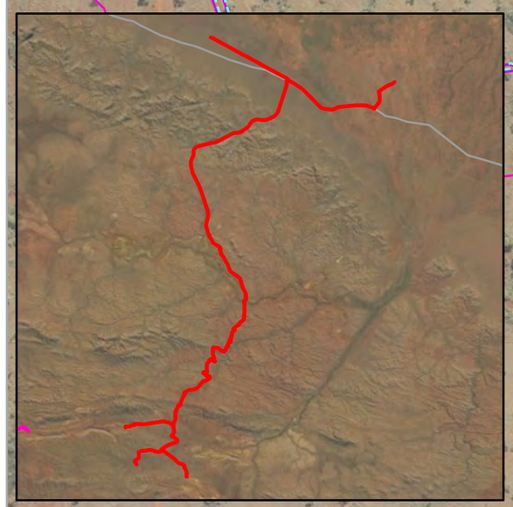

Legend

- Flora observations
- TrackLogs 1
- TrackLogs 2
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)

SLIP

Paper Size ISO A3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 2

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Legend

- Flora observations
- Tracks
- TrackLogs 1
- TrackLogs 2
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)

SLIP

Paper Size ISO A3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 3

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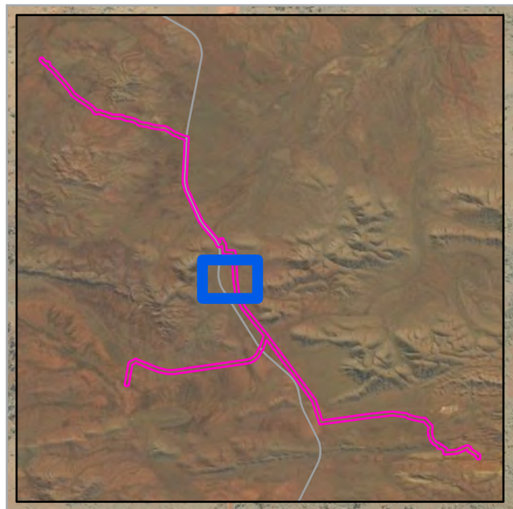

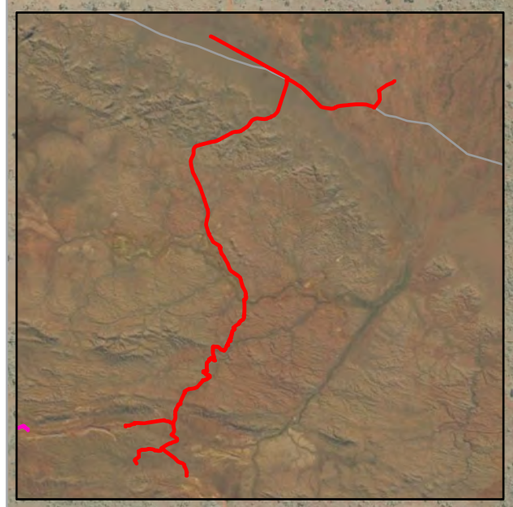

Legend

- Flora observations
- Tracks
- TrackLogs 1
- TrackLogs 2
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)

SLIP

Paper Size ISO A3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 4

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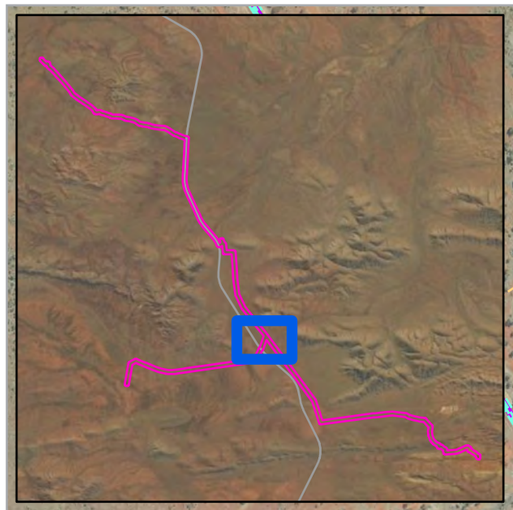

Legend

- Flora observations
- Tracks
- TrackLogs 1
- TrackLogs 2
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)
- Packsaddle North Infiltration Ponds

Paper Size ISO A3

0 0.045 0.09 0.135 0.18

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

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BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 5

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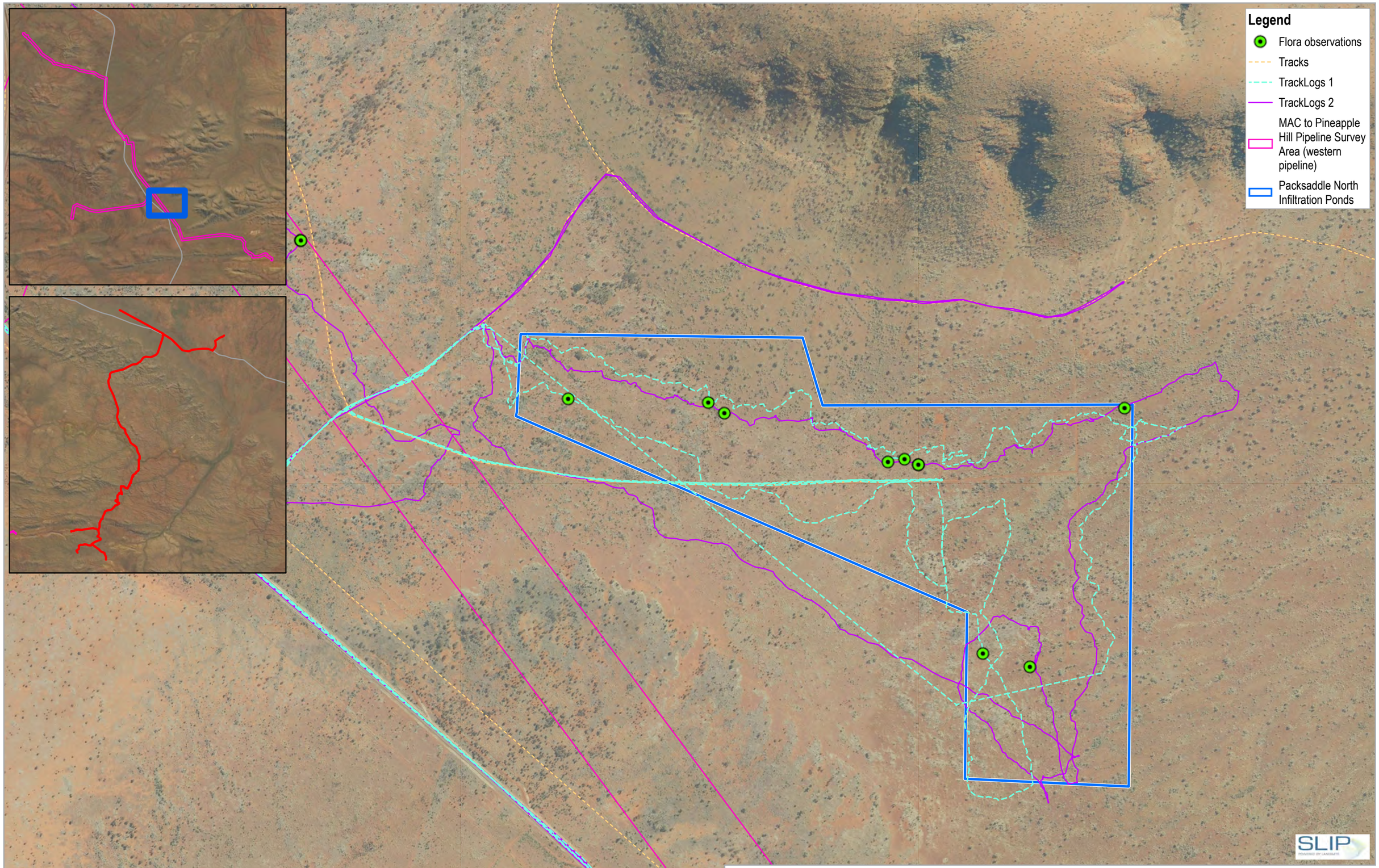

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 6

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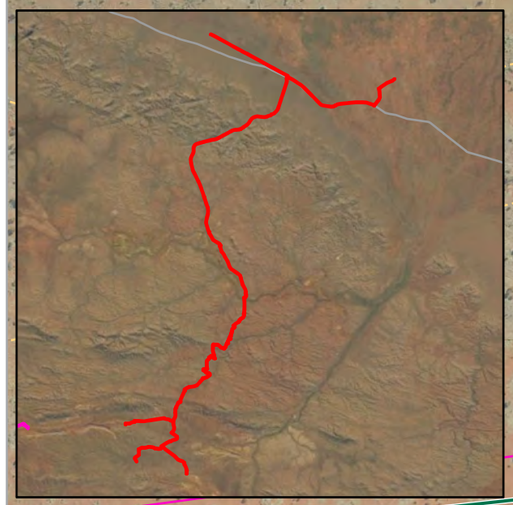

Legend

- Flora observations
- Tracks
- TrackLogs 1
- TrackLogs 2
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)
- MS1072 (MAC)

Paper Size ISO A3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 7

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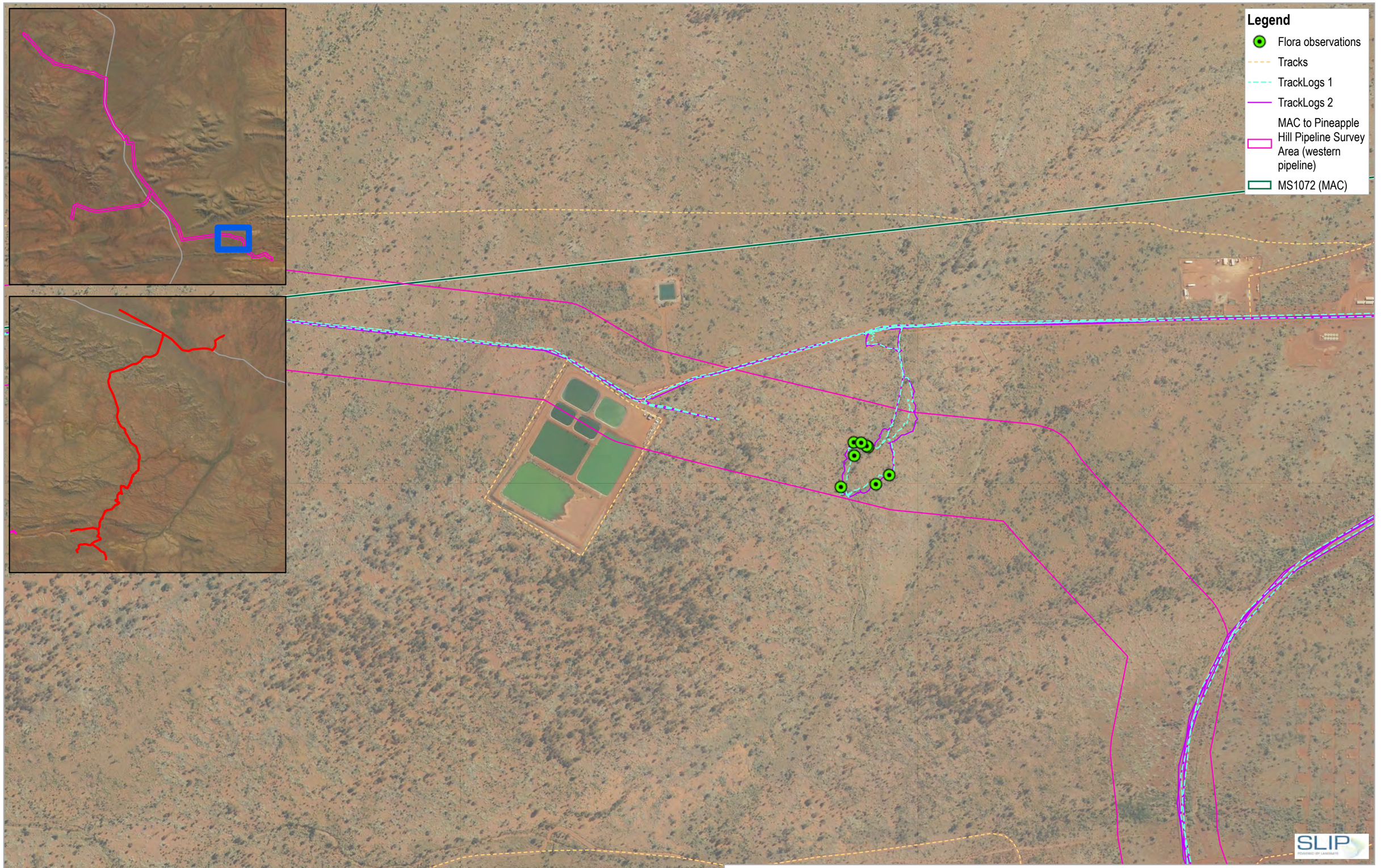

Paper Size ISO A3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 8

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_003_TrackLogs_Rev_0
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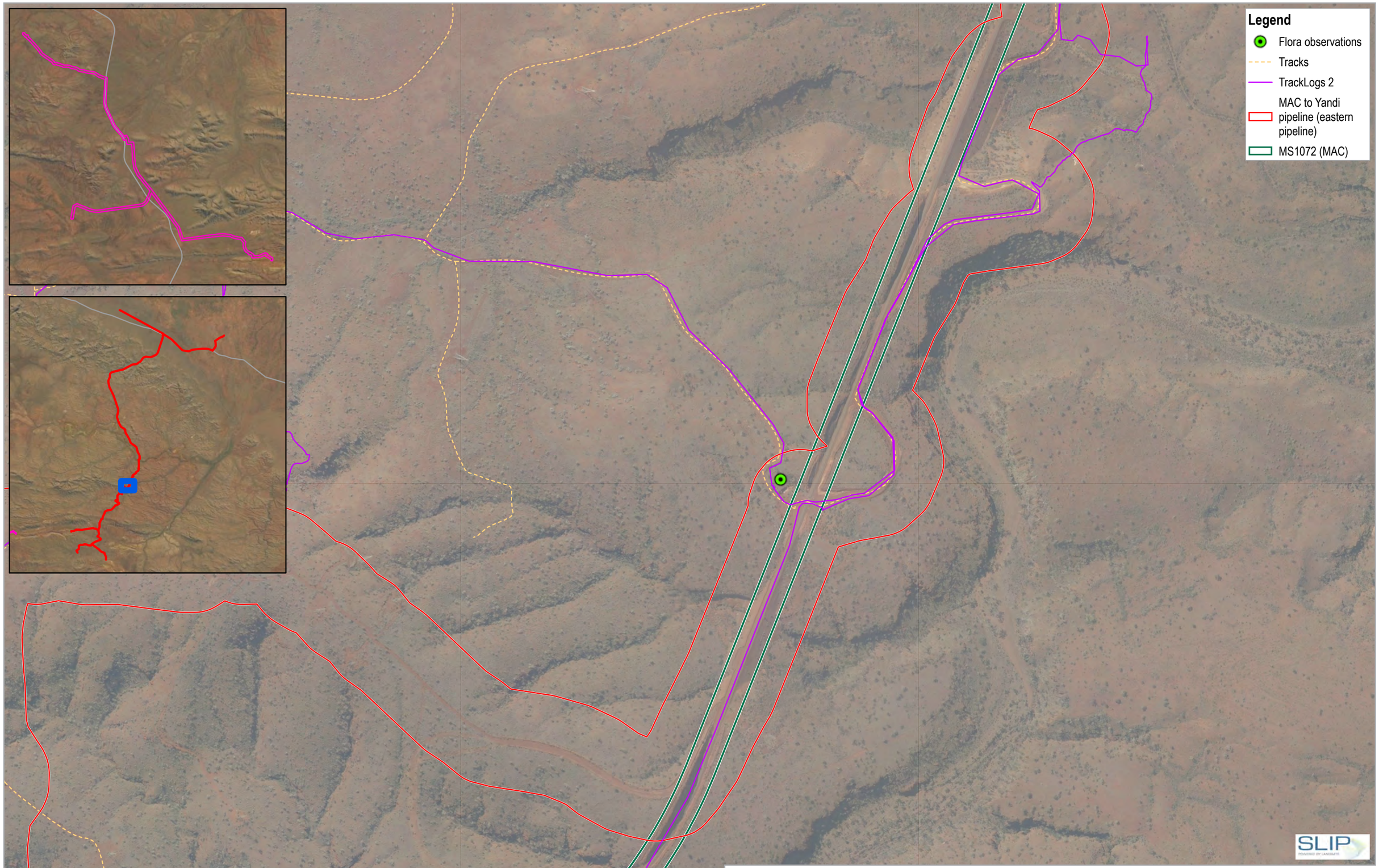
Landgate_Subscription_Imagery\WANow: Landgate / SLIP. Created by: hcariola



Paper Size ISO A3

0 0.045 0.09 0.135 0.18

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Sample locations and tracks

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 3 - 9

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_003_TrackLogs_Rev_0
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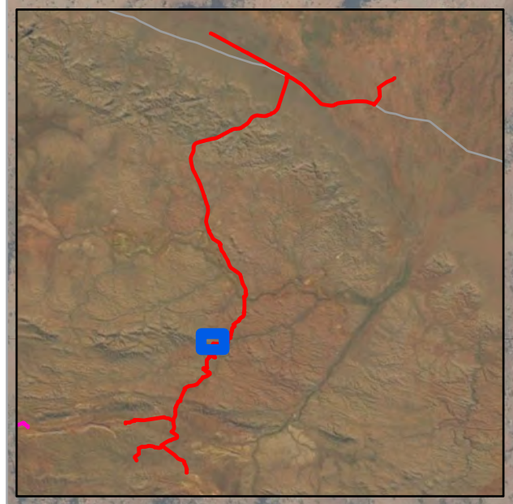

Legend

- Flora observations
- Tracks
- TrackLogs 2
- MAC to Yandi pipeline (eastern pipeline)

SLIP

Paper Size ISO A3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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BHP
BHP targeted survey report

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

Sample locations and tracks

FIGURE 3 - 10

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_003_TrackLogs_Rev_0
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Data source: World Imagery: Earthstar Geographics
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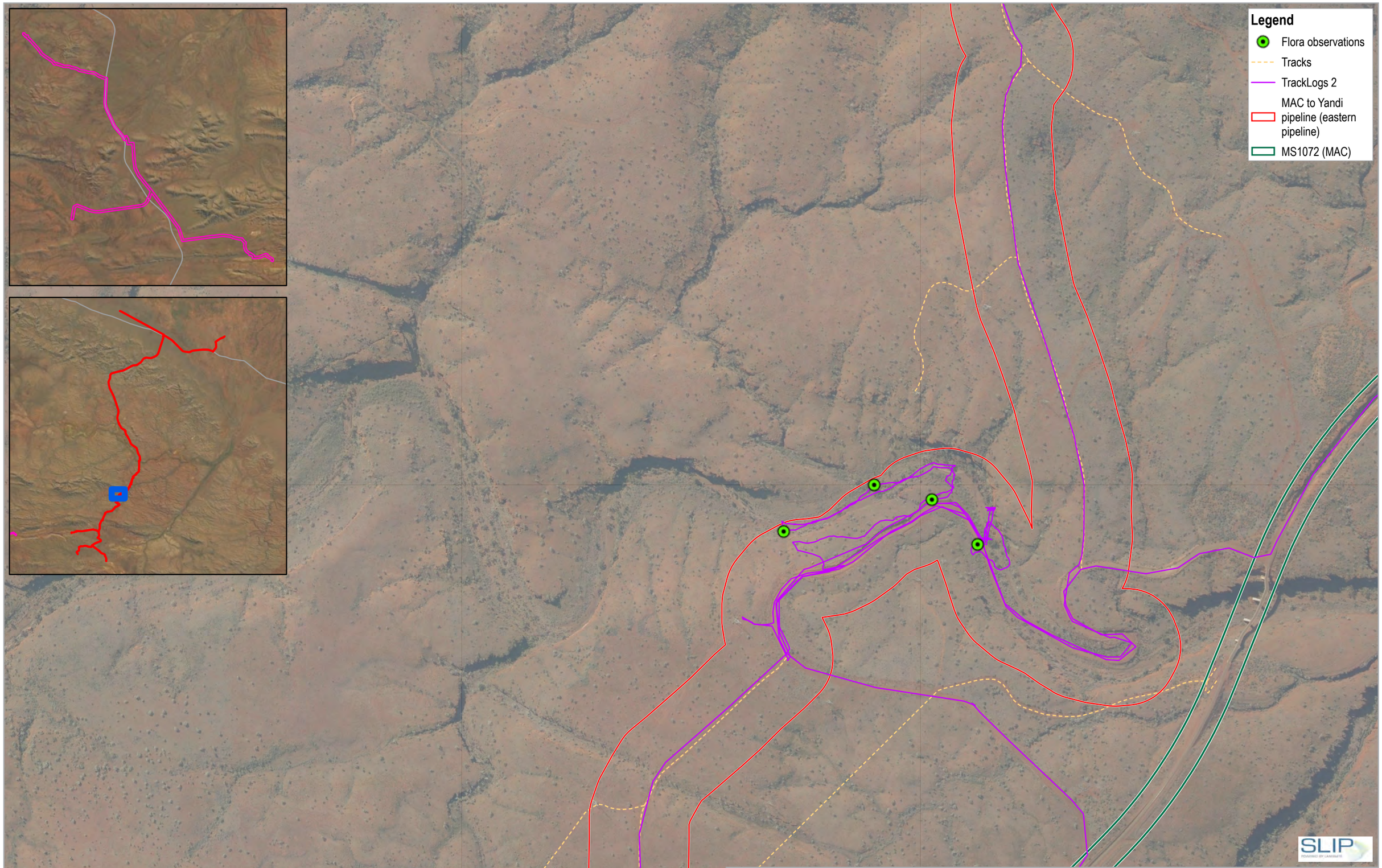

Paper Size ISO A3

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

Sample locations and tracks

FIGURE 3 - 11

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_003_TrackLogs_Rev_0
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Data source: World Imagery: Earthstar Geographics
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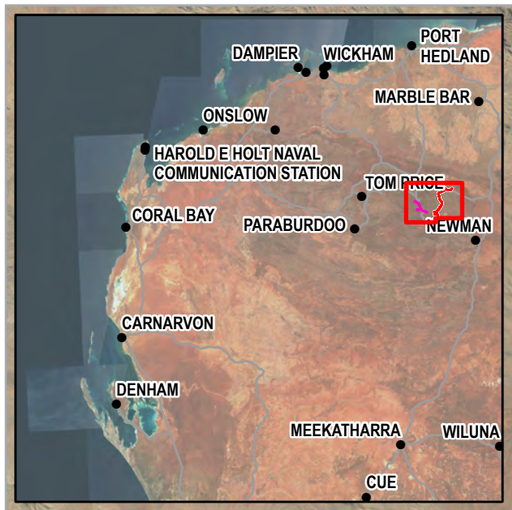

Legend

Significant Flora Species

- *Aristida lazaridis* (P2)
- *Rhagodia sp. Hamersley* (M. Trudgen 17794) (P3)
- *Rostellularia adscendens var. latifolia* (P3)
- *Sida sp. Barlee Range (S. van Leeuwen 1642)* (P3)
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)
- MAC to Yandi pipeline (eastern pipeline)
- MS679 (Yandi)
- MS1072 (MAC)

Paper Size ISO A3

0 2 4 6 8

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Significant flora species

Project No. **12550242**
Revision No. **0**
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FIGURE 4

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_004_SignificantFlora_Context_Rev_0
Print date: 10 Dec 2021 - 13:30

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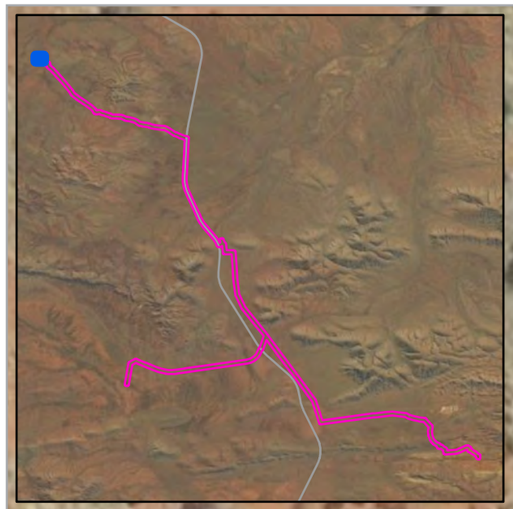

Legend

Significant Flora Species

▲ *Rostellularia adscendens var. latifolia* (P3)

MAC to Pineapple Hill Pipeline Survey Area (western pipeline)

SLIP

Paper Size ISO A3

0 6.5 13 19.5 26

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Significant flora species

Project No. **12550242**
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Date **10/12/2021**

FIGURE 4 - 1

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_004_SignificantFlora_Rev_0
Print date: 10 Dec 2021 - 13:32

Data source: World Imagery: Earthstar Geographics
Landgate_Subscription_Imagery\WANow: Landgate / SLIP. Created by: hcaricia

Legend

Significant Flora Species

- *Rhagodia sp. Hamersley* (M. Trudgen 17794) (P3)
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)

Paper Size ISO A3

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Significant flora species

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 4 - 2

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_004_SignificantFlora_Rev_0
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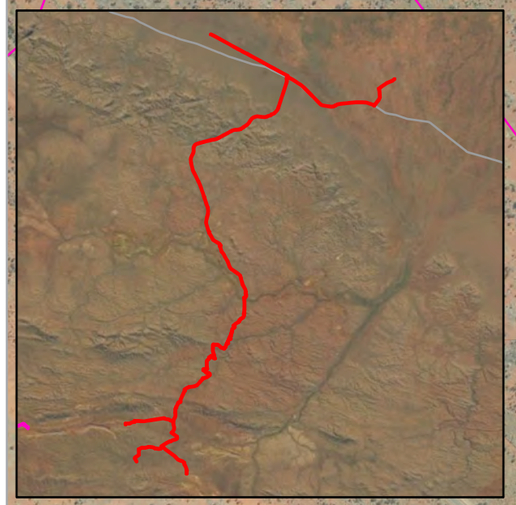

Legend

Significant Flora Species

- *Rhagodia sp. Hamersley* (M. Trudgen 17794) (P3)
- *Sida sp. Barlee Range (S. van Leeuwen 1642)* (P3)
- MAC to Pineapple Hill Pipeline Survey Area (western pipeline)

Paper Size ISO A3

0 50 100 150 200

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Significant flora species

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 4 - 3

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_004_SignificantFlora_Rev_0
Print date: 10 Dec 2021 - 13:32

Data source: World Imagery: Earthstar Geographics
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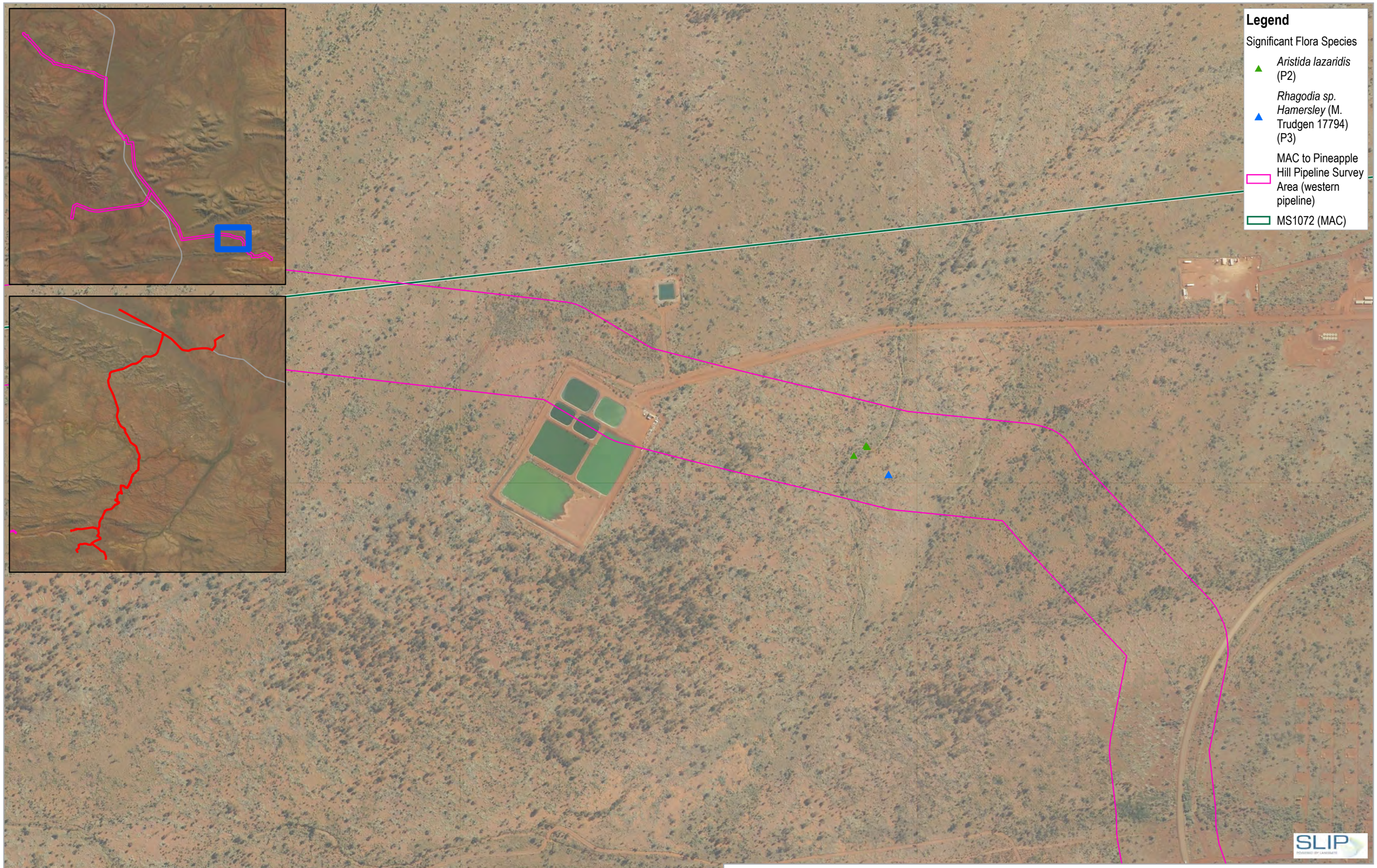

Paper Size ISO A3

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Significant flora species

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 4 - 4

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_004_SignificantFlora_Rev_0
Print date: 10 Dec 2021 - 13:32

Data source: World Imagery: Earthstar Geographics
Landgate_Subscription_Imagery\WANow: Landgate / SLIP. Created by: hcariola

Legend

Significant Flora Species

- *Sida sp. Barlee Range (S. van Leeuwen 1642)* (P3)
- MAC to Yandi pipeline (eastern pipeline)
- MS1072 (MAC)

Paper Size ISO A3

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

N

GHD

BHP
BHP targeted survey report

Significant flora species

Project No. **12550242**
Revision No. **0**
Date **10/12/2021**

FIGURE 4 - 5

G:\61\12550242\GIS\Maps\Working\12550242\12550242HA.aprx\12550242_004_SignificantFlora_Rev_0
Print date: 10 Dec 2021 - 13:33

Data source: World Imagery: Earthstar Geographics
Landgate_Subscription_Imagery\WANow: Landgate / SLIP. Created by: hcariola

Appendix B

Relevant legislation, background information and conservation code

Relevant legislation

Federal *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Federal Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora and ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

The biological aspects listed as MNES include:

– Nationally threatened flora species and ecological communities
– Migratory species

A person must not undertake an action that has, will have, or is likely to have a significant impact (direct or indirect) on MNES, without approval from the Federal Minister for the Environment.

The EPBC Act is administered by the Department of Agriculture, Water and the Environment (DAWE).

State *Environmental Protection Act 1986*

The *Environmental Protection Act 1986* (EP Act) is the primary legislative Act dealing with the protection of the environment in Western Australia. The Act allows the Environmental Protection Authority (EPA), to prevent, control and abate pollution and environmental harm, for the conservation, preservation, protection, enhancement and management of the environment and for matters incidental to or connected with the foregoing. Part IV of the EP Act is administered by the EPA and makes provisions for the EPA to undertake environmental impact assessment of significant proposals, strategic proposals and land use planning schemes.

The Department of Water and Environment Regulation (DWER) is responsible for administering the clearing provisions of the EP Act (Part V). Clearing of native vegetation in Western Australia requires a permit from the DWER, unless exemptions apply. Applications for clearing permits are assessed by the Department and decisions are made to grant or refuse the application in accordance with the Act. When making a decision the assessment considers clearing against the ten clearing principles as specified in Schedule 5 of the EP Act:

1. Native vegetation should not be cleared if it comprises a high level of biodiversity.
2. Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significance habitat for fauna indigenous to Western Australia.
3. Native vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.
4. Native vegetation should not be cleared if it comprises the whole or part of native vegetation in an area that has been extensively cleared.
5. Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
6. Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.
7. Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
8. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
9. Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

10. Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Exemptions for clearing include clearing that is a requirement of a written law or authorised under certain statutory processes (listed in Schedule 6 of the EP Act) and exemptions for prescribed low impact day-to-day activities (prescribed in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004); these exemptions do not apply in environmentally sensitive areas (ESAs).

State *Biodiversity and Conservation Act 2016*

The *Biodiversity Conservation Act 2016* (BC Act) provides for the conservation and protection of biodiversity and biodiversity components, as well as the promotion of the ecologically sustainable use of biodiversity components in Western Australia. The BC Act replaces both the repealed *Wildlife Conservation Act 1950* (WC Act) and the *Sandalwood Act 1929* (Sandalwood Act), as well as their associated regulations. To attain the objectives of the BC Act, principles of ecological sustainable development have been established:

– Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
– If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
– The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
– The conservation of biodiversity and ecological integrity should be a fundamental consideration indecision-making
– Improved valuation, pricing and incentive mechanisms should be promoted.

The BC Act is administered by the Department of Biodiversity Conservation and Attractions (DBCA).

State *Biosecurity and Agriculture Management Act 2007*

The *Biosecurity and Agriculture Management Act 2007* (BAM Act) and associated regulations are administered by the Department of Primary Industries and Regional Development (DPIRD) and replace the repealed *Agriculture and Related Resources Protection Act 1976.* The main purposes of the BAM Act and its regulations are to:

– Prevent new animal and plant pests (vermin and weeds) and diseases from entering WA
– Manage the impact and spread of those pests already present in the state
– Safely manage the use of agricultural and veterinary chemicals
– Increased control over the sale of agricultural products that contain violative chemical residues.

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act. A Declared Pest is a prohibited organism or an organism for which a declaration under Section 22(2) of the Act is in force. Declared Pests may be assigned a control category including: C1 (exclusion), C2 (eradication) and C3 (management). The category may apply to the whole of the State, LGAs, districts, individual properties or even paddocks, and all landholders are obliged to comply with the specific category of control. Categories of control are defined below.

DPIRD Categories for Declared Pests under the BAM Act

Control class code	Description
C1 (Exclusion)	Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2 (Eradication)	Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3 (Management)	Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Background information

Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are declared by the Minister for Environment under Section 51B of the EP Act. The Table below outlines the aspects of areas declared as ESA in the Environmental Protection (Environmentally Sensitive Areas) Notice 2005.

Aspects of ESAs

Aspects of Environmentally Sensitive Areas
A declared World Heritage property as defined in Section 12 of the EPBC Act.
An area that is included on the Register of the National Estate (RNE), because of its natural values, under the *Australian Heritage Commission Act 1975* of the Commonwealth (the RNE was closed in 2007 and is no longer a statutory list – all references to the RNE were removed from the EPBC Act on 19 February 2012).
A defined wetland and the area within 50 m of the wetland. Defined wetlands include Ramsar wetlands, conservation category wetlands and nationally important wetlands.
The area covered by vegetation within 50 m of rare flora, to the extent to which the vegetation is continuous with the vegetation in which the rare flora is located.
The area covered by a Threatened Ecological Community.
A Bush Forever Site listed in “Bush Forever” Volumes 1 and 2 (2000), published by the Western Australia Planning Commission, except to the extent to which the site is approved to be developed by the Western Australia Planning Commission.
The areas covered by the Environmental Protection (Gnangara Mound Crown Land) Policy 1992.
The areas covered by the Environmental Protection (Western Swamp Tortoise Habitat) Policy 2002.
The areas covered by the lakes to which the *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992* (EPP Lakes) applies.
Protected wetlands as defined in the Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998.

Reserves and conservation areas

Department of Biodiversity, Conservation and Attractions managed lands and waters

DBCA manages lands and waters throughout Western Australia to conserve ecosystems and species, and to provide for recreation and appreciation of the natural environment. DBCA managed lands and waters include national parks, conservation parks and reserves, marine parks and reserves, regional parks, nature reserves, State forest and timber reserves. Access to, or through, some areas of DBCA managed lands may require a permit or could be restricted due to management activities. Proposed land use changes and development proposals that abut DBCA managed lands will generally be referred to DBCA throughout the assessment process.

Wetlands

Wetlands include not only lakes with open water, but areas of seasonally, intermittently or permanently waterlogged soil.

Ramsar Wetlands (Wetlands of International Importance)

The Convention of Wetlands of International Importance was signed in 1971 at the Iranian town of Ramsar. The Convention has since been referred to as the Ramsar Convention. Ramsar Listed wetlands are “sites containing

representative, rare or unique wetlands, or wetlands that are important for conserving biological diversity … because of their ecological, botanical, zoological, limnological or hydrological importance" (DAWE 2020b). Once a Ramsar Listed Wetland is designated, the country agrees to manage its conservation and ensure its wise use. Under the Convention, wise use is broadly defined as "maintaining the ecological character of a wetland" (DAWE 2020b).

Nationally important wetlands

Wetlands of national significance are listed under the Directory of Important Wetlands in Australia. Nationally important wetlands are wetlands which meet at least one of the following criteria (DAWE 2020a):

– It is a good example of a wetland type occurring within a biogeographic region in Australia
– It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex
– It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail
– The wetland supports one percent or more of the national populations of any native plant or animal taxa
– The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level
– The wetland is of outstanding historical or cultural significance.

Vegetation extent and status

The National Objectives and Targets for Biodiversity Conservation 2001–2005 (Commonwealth of Australia 2001) recognise that the retention of 30 percent or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected. This is the threshold level below which species loss appears to accelerate exponentially and loss below this level should not be permitted. This level of recognition is in keeping with the targets recommended in the review of the National Strategy for the Conservation of Australia's Biological Diversity (ANZECC 2000).

The extent of remnant native vegetation in WA has been assessed by Shepherd et al. (2002) and the GoWA (2019), based on broadscale vegetation association mapping by Beard (various publications). The GoWA produces Statewide Vegetation Statistics Reports that are used for a number of purposes including conservation planning, land use planning and when assessing development applications. The reports are updated every 2-3 years.

Vegetation condition

The vegetation condition can be assessed in accordance with the vegetation condition rating scale for the South West and Interzone Botanical Provinces (EPA 2016a). The scale recognises the intactness of vegetation and consists of six rating levels as outlined below.

Vegetation condition rating scale for the Eremaean and Northern Botanical Provinces

Condition	Eremaean and Northern Botanical Provinces description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as at caused by low levels of grazing or slightly aggressive weed.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.

Condition	Eremaean and Northern Botanical Provinces description
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Conservation codes

Species of significant flora and communities are protected under both Federal and State Acts. The Federal EPBC Act provides a legal framework to protect and manage nationally important flora and communities. The State BC Act is the primary wildlife conservation legislation in Western Australia. Information on the conservation codes is summarised in the following sections.

Ecological communities

Significant communities

Ecological communities are defined as naturally occurring biological assemblages that occur in a particular type of habitat (English and Blyth 1997). Federally listed Threatened Ecological Communities (TECs) are protected under the EPBC Act. The BC Act provides for the Minister to list an ecological community as a TEC (section 27), or as a collapsed ecological community (section 31) statutory listing of State TECs by the Minister. The legislation also describes statutory processes for preparing recovery plans for TECs, the registration of their critical habitat, and penalties for unauthorised modification of TECs.

Possible TECs that do not meet survey criteria are added to the DBCA Priority Ecological Community (PEC) List under Priorities 1, 2 and 3. These are ecological communities that are adequately known; are rare but not threatened, or meet criteria for Near Threatened. PECs that have been recently removed from the threatened list are placed in Priority 4. These ecological communities require regular monitoring. Conservation dependent ecological communities are placed in Priority 5. PECs are not listed under any formal Federal or State legislation, however, may be listed as TECs under the EPBC Act.

Codes and definitions for TECs listed under the EPBC Act and/or BC Act

Categories	Definition
Federal Government Conservation Categories (EPBC Act)	
Critically Endangered (CR)	An ecological community if, at that time, is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Endangered (EN)	An ecological community if, at that time: – is not critically endangered; and – is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Vulnerable (VU)	An ecological community if, at that time: – is not critically endangered or endangered; and – is facing a high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria (as outlined in Environment Protection and Biodiversity Conservation Regulations 2000).
Western Australia Conservation Categories (BC Act)	
Threatened Ecological Communities	
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

Categories	Definition
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.
Collapsed ecological communities	
An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time – – there is no reasonable doubt that the last occurrence of the ecological community has collapsed); or – the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover – • its species composition or structure; or • its species composition and structure. Section 33 of the BC Act provides for a collapsed ecological community to be regarded as a threatened ecological community if it is discovered in a state that no longer makes it eligible for listing as a collapsed ecological community.	

Categories and definitions for PECs as listed by the DBCA

Category	Descriptions
Priority 1	Poorly known ecological communities. Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤100 ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority 2	Poorly known ecological communities. Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority 3	Poorly known ecological communities. – Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: – Communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or; – Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
Priority 4	Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. – Rare. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands. – Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.

Category	Descriptions
	– Ecological communities that have been removed from the list of threatened communities during the past five years.
Priority 5	Conservation Dependent ecological communities. Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Other significant vegetation

Vegetation may be significant for a range of reasons other than a statutory listing. The EPA (2016a, b) states that significant vegetation may include vegetation that includes the following:

- Restricted distribution
- Degree of historical impact from threatening processes
- A role as a refuge
- Providing an important function required to maintain ecological integrity of a significant ecosystem
- Local endemism in restricted habitats
- Novel combinations of taxa
- A role as a key habitat for Threatened species or large population representing a significant proportion of the local to regional total population of a species
- Being representative of a vegetation unit in 'pristine' condition in a highly cleared landscape, recently discovered range extensions, or isolated outliers of the main range.

This may apply at a number of levels, so the unit may be significant when considered at the fine-scale (intra-locality), intermediate-scale (locality or inter-locality) or broad-scale (local to region).

Flora

Significant flora

Species of significant flora are protected under both Federal and State legislation. Any activities that are deemed to have a significant impact on species that are recognised by the EPBC Act, and/or the BC Act can warrant referral to DAWE and/or the EPA.

The Federal conservation level of flora species and their significance status is assessed under the EPBC Act. The significance levels for flora used in the EPBC Act align with the International Union for Conservation of Nature (IUCN) Red List criteria, which are internationally recognised as providing best practice for assigning the conservation status of species.

The State conservation level of flora species and their significance status also follows the IUCN Red List criteria. Under the BC Act flora can be listed as Threatened, Extinct and as Specially Protected species.

Threatened species are those are species which have been adequately searched for and are deemed to be, in the wild, either rare, under identifiable threat of extinction, or otherwise in need of special protection, and have been gazetted as such. The assessment of the conservation status of Threatened species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria. Specially protected species meet 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 or Extinct species under the BC Act cannot also be listed as Specially Protected species.

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the 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 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, 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.

For the purposes of this assessment, all species listed under the EPBC Act, BC Act and DBCA Priority species are considered significant.

Categories and definitions for EPBC Act and BC Act listed flora species

Conservation category	Definition
Threatened species	
Critically Endangered (CR)	Threatened species 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.
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.
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.
Extinct species	
Extinct (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).
Extinct in the Wild (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).

Codes for DBCA listed Priority flora

Priority category	Definition
Priority 1	Poorly-known taxa 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.
Priority 2	Poorly-known taxa 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 taxa 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 taxa in need of monitoring

Priority category	Definition
	– Rare: Taxa 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 taxa are usually represented on conservation lands. – Near Threatened. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. – Taxa that have been removed from the list of threatened taxa during the past five years for reasons other than taxonomy.

Other significant flora

Flora species, subspecies, varieties, hybrids and ecotypes may be significant for a range of reasons, other than a statutory listing. The EPA (2016a, b) states that significant flora may include taxa that have/are:

– A keystone role in a particular habitat for Threatened or Priority flora species, or large populations representing a considerable proportion of the local or regional total population of a species
– Relictual status, being representation of taxonomic or physiognomic groups that no longer occur widely in the broader landscape
– New species or anomalous features that indicate a potential new species
– Being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range)
– Unusual species, including restricted subspecies, varieties, or naturally occurring hybrids
– Local endemism (a restricted distribution) or association with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems).

Introduced plants (weeds)

Declared Pests

Information on species considered to be Declared Pests is provided under *State Biosecurity and Agriculture Management Act 2007.*

Weeds of National Significance

The spread of weeds across a range of land uses or ecosystems is important in the context of socio-economic and environmental values. The assessment of Weeds of National Significance (WoNS) is based on four major criteria:

– Invasiveness
– Impacts
– Potential for spread
– Socio-economic and environmental values.

Australian state and territory governments have identified thirty-two Weeds of National Significance (WoNS); a list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012.

References

ANZECC 2000, Core Environmental Indicators for Reporting on the State of Environment, ANZECC State of theEnvironment Reporting Task Force.

Commonwealth of Australia 2001, National Targets and Objectives for Biodiversity Conservation 2001–2005,Canberra, AGPS.

DAWE 2020a, *Criteria for determining nationally important wetlands*, retrieved 2020, from http://www.environment.gov.au/topics/water/water-our-environment/wetlands/australian-wetlands- database/directory-important.

DAWE 2020b, *The Ramsar Convention on Wetlands*, retrieved 2020, from http://www.environment.gov.au/topics/water/water-our-environment/wetlands/ramsar-convention-wetlands.

English, V and Blyth, J 1997, Identifying and Conserving Threatened Ecological Communities in the South WestBotanical Province, Perth, Department of Conservation and Land Management.

EPA 2016a, Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment, EPA, Perth,WA.

EPA 2016b, Environmental Factor Guideline - Flora and Vegetation, EPA, Perth, WA.

GoWA 2019, *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full report)*, Currentas of March 2019, Perth Western Australia, Department of Environment and Conservation, from https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics.

Shepherd, DP, Beeston, GR & Hopkins, AJM 2002, Native Vegetation in Western Australia – Extent, Type andStatus, Resource Management Technical Report 249, Perth, Department of Agriculture

Appendix C

Desktop searches

NatureMap

PMST

NatureMap
Mapping Western Australia's biodiversity

NatureMap flora Report

Created By Guest user on 16/04/2021

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 118° 25' 19" E,22° 39' 41" S
Buffer 40km
Group By Family

Family	Species	Records
Acanthaceae	3	14
Aizoaceae	2	2
Amaranthaceae	35	159
Apiaceae	1	2
Apocynaceae	8	24
Araliaceae	3	14
Archidiaceae	1	2
Arecaceae	1	2
Asparagaceae	3	19
Asphodelaceae	1	3
Asteraceae	56	201
Bignoniaceae	1	4
Boraginaceae	13	29
Brassicaceae	10	34
Bruchiaceae	1	1
Campanulaceae	5	23
Capparaceae	5	25
Caryophyllaceae	3	12
Celastraceae	5	14
Chenopodiaceae	23	69
Cleomaceae	2	9
Commelinaceae	1	4
Convolvulaceae	15	53
Cucurbitaceae	4	9
Cupressaceae	1	18
Cyperaceae	28	102
Dilleniaceae	1	16
Droseraceae	2	2
Elaeocarpaceae	1	4
Elatinaceae	2	3
Eriocaulaceae	1	3
Euphorbiaceae	17	48
Fabaceae	147	849
Frankeniaceae	1	1
Funariaceae	1	1
Gentianaceae	2	2
Goodeniaceae	31	146
Gyrostemonaceae	1	8
Haloragaceae	5	10
Hemerocallidaceae	1	9
Hydrocharitaceae	2	3
Lamiaceae	10	42
Lauraceae	2	2
Loganiaceae	1	1
Loranthaceae	11	52
Lythraceae	4	10
Malvaceae	60	229
Marsileaceae	2	3
Menispermaceae	1	3
Molluginaceae	1	1
Montiaceae	2	8
Moraceae	5	10
Myrtaceae	30	214
Nyctaginaceae	5	12
Oleaceae	2	5
Ophioglossaceae	1	1
Orchidaceae	1	1
Oxalidaceae	1	1
Pedaliaceae	1	2
Phrymaceae	2	3
Phyllanthaceae	5	16
Pittosporaceae	1	1
Plantaginaceae	3	9
Plumbaginaceae	1	1
Poaceae	99	371
Polygalaceae	1	3
Polygonaceae	1	2
Portulacaceae	2	13
Potamogetonaceae	2	7
Pottiaceae	2	3
Primulaceae	1	1
Proteaceae	8	27
Pteridaceae	10	51
Rhamnaceae	3	12
Ricciaceae	3	3

Rubiaceae	9	28
Rutaceae	1	1
Santalaceae	4	28
Sapindaceae	10	42
Scrophulariaceae	22	89
Solanaceae	20	103
Stylidiaceae	1	20
Surianaceae	1	1
Thelypteridaceae	1	2
Thymelaeaceae	3	12
Typhaceae	1	2
Urticaceae	1	2
Violaceae	1	4
Zygophyllaceae	8	27
TOTAL	**813**	**3434**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthaceae					
1.	7165	*Dicladanthera glabra*		P2	
2.	11320	*Dipteracanthus australasicus subsp. australasicus*			
3.	11556	*Rostellularia adscendens var. latifolia*		P3	
Aizoaceae					
4.	44305	*Trianthema pilosum*			
5.	44362	*Trianthema triquetrum*			
Amaranthaceae					
6.	2645	*Achyranthes aspera (Chaff Flower)*			
7.	2646	*Aerva javanica (Kapok Bush)*	Y		
8.	2647	*Alternanthera angustifolia*			
9.	2648	*Alternanthera denticulata (Lesser Joyweed)*			
10.	2651	*Alternanthera nana (Hairy Joyweed)*			
11.	34810	*Amaranthus centralis*		P3	
12.	31076	*Amaranthus cochleitepalus*			
13.	2660	*Amaranthus cuspidifolius*			
14.	20018	*Amaranthus undulatus*			
15.	18361	*Gomphrena affinis subsp. pilbarensis*			
16.	2676	*Gomphrena canescens (Batchelors Buttons)*			
17.	18363	*Gomphrena canescens subsp. canescens*			
18.	2680	*Gomphrena cunninghamii*			
19.	18372	*Gomphrena lanata*			
20.	11131	*Gomphrena sordida*			
21.	2690	*Ptilotus aervoides*			
22.	2696	*Ptilotus astrolasius*			
23.	2704	*Ptilotus calostachyus (Weeping Mulla Mulla)*			
24.	2706	*Ptilotus carinatus*			
25.	2711	*Ptilotus clementii (Tassel Top)*			
26.	2718	*Ptilotus drummondii (Narrowleaf Mulla Mulla)*			
27.	2721	*Ptilotus exaltatus (Tall Mulla Mulla)*			
28.	2725	*Ptilotus fusiformis*			
29.	2727	*Ptilotus gaudichaudii*			
30.	2728	*Ptilotus gomphrenoides*			
31.	2731	*Ptilotus helipteroides (Hairy Mulla Mulla)*			
32.	2734	*Ptilotus incanus*			
33.	2744	*Ptilotus mollis*		P4	
34.	2746	*Ptilotus nobilis (Tall Mulla Mulla)*			
35.	2747	*Ptilotus obovatus (Cotton Bush)*			
36.	11396	*Ptilotus obovatus var. obovatus*			
37.	2751	*Ptilotus polystachyus (Prince of Wales Feather)*			
38.	2754	*Ptilotus roei*			
39.	2755	*Ptilotus rotundifolius (Royal Mulla Mulla)*			
40.	15855	*Ptilotus schwartzii var. schwartzii*			
Apiaceae					
41.	6218	*Daucus glochidiatus (Australian Carrot)*			
Apocynaceae					
42.	6569	*Catharanthus roseus (Pink Periwinkle)*	Y		
43.	6584	*Cynanchum floribundum (Dumara Bush, Tjipa)*			
44.	6585	*Cynanchum pedunculatum*			
45.		*Cynanchum sp.*			
46.	48280	*Cynanchum viminale subsp. australe*			
47.	12949	*Marsdenia australis*			
48.	48987	*Vincetoxicum flexuosum*			
49.	48986	*Vincetoxicum lineare*			
Araliaceae					
50.	6202	*Astrotricha hamptonii (Ironplant)*			
51.	6278	*Trachymene oleracea*			
52.	19043	*Trachymene oleracea subsp. oleracea*			
Archidiaceae					
53.	32314	*Archidium rehmannii*			
Arecaceae					
54.	1042	*Phoenix dactylifera (Date Palm)*	Y		
Asparagaceae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
55.	48669	*Arthropodium sp. Ironstone (J. Bull & J. Waters ONS PJ 36.01)*		P2	Y
56.	1338	*Thysanotus manglesianus (Fringed Lily)*			
57.	29457	*Thysanotus sp. Eremaean (S. van Leeuwen 1067)*			
Asphodelaceae					
58.	14312	*Bulbine pendula*			
Asteraceae					
59.	43104	*Apowollastonia hamersleyensis*			
60.	7855	*Bidens pilosa (Cobbler's Pegs)*	Y		
61.	46339	*Bidens subalternans var. araneosa*	Y		
62.	46338	*Bidens subalternans var. simulans*	Y		
63.	7866	*Blumea tenella*			
64.	7878	*Brachyscome iberidifolia*			
65.	7893	*Calocephalus knappii*			
66.	48223	*Calocephalus pilbarensis*			
67.	7903	*Calotis hispidula (Bindy Eye)*			
68.	7904	*Calotis latiuscula*			
69.	7905	*Calotis multicaulis (Many-stemmed Burr-daisy)*			
70.	7906	*Calotis plumulifera*			
71.	7907	*Calotis porphyroglossa*			
72.	7919	*Centipeda minima (Spreading Sneezewood, Kanjirralaa, Inteng-inteng, Karengkal, Kata-palkalpa, Munyu-parnti-parnti)*			
73.	19762	*Centipeda minima subsp. macrocephala*			
74.	47174	*Chrysocephalum apiculatum subsp. pilbarense*			
75.	33516	*Chrysocephalum gilesii*			
76.	12614	*Chrysocephalum pterochaetum*			
77.	35558	*Flaveria trinervia (Speedy Weed)*	Y		
78.	7988	*Gnephosis arachnoidea (Cobwebby-headed Gnephosis)*			
79.	19594	*Iotasperma sessilifolium*		P3	
80.	19726	*Leiocarpa semicalva*			
81.	19727	*Leiocarpa semicalva subsp. semicalva*			
82.	8110	*Minuria leptophylla (Minnie Daisy)*			
83.	12635	*Olearia fluvialis*			
84.	8151	*Olearia stuartii*			
85.	8153	*Olearia xerophila*			
86.	42006	*Pentalepis trichodesmoides subsp. hispida*		P2	
87.	34997	*Peripleura arida*			
88.	34998	*Peripleura obovata*			
89.	35001	*Peripleura virgata*			
90.	8167	*Pluchea dentex*			
91.	8168	*Pluchea rubelliflora*			
92.	8173	*Podolepis capillaris (Wiry Podolepis)*			
93.	8189	*Pseudognaphalium luteoalbum (Jersey Cudweed)*			
94.	8191	*Pterocaulon serrulatum*			
95.	41221	*Pterocaulon serrulatum var. velutinum*			
96.	8192	*Pterocaulon sphacelatum (Apple Bush, Fruit Salad Plant)*			
97.	13308	*Rhodanthe charsleyae*			
98.	13301	*Rhodanthe floribunda*			
99.	13310	*Rhodanthe margarethae*			
100.	45178	*Roebuckiella similis*			
101.	8198	*Rutidosis helichrysoides (Grey Wrinklewort)*			
102.	17985	*Rutidosis helichrysoides subsp. helichrysoides*			
103.	25880	*Senecio hamersleyensis*			
104.	8213	*Senecio magnificus (Showy Groundsel)*			
105.	20161	*Senecio pinnatifolius*			
106.	8223	*Sigesbeckia orientalis (Indian Weed)*	Y		
107.	9367	*Sonchus hydrophilus (Native Sowthistle)*			
108.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
109.	8235	*Streptoglossa bubakii*			
110.	8236	*Streptoglossa cylindriceps*			
111.	8237	*Streptoglossa decurrens*			
112.	8262	*Vittadinia cervicularis*			
113.	11788	*Vittadinia dissecta var. hirta*			
114.	33026	*Vittadinia sp. Coondewanna Flats (S. van Leeuwen 4684)*		P1	
Bignoniaceae					
115.	7117	*Pandorea pandorana*			
Boraginaceae					
116.	30294	*Halgania gustafsenii var. Mid West (G. Perry 370)*			
117.	17493	*Halgania gustafsenii var. gustafsenii*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
118.	17299	*Heliotropium ammophilum*			
119.	17301	*Heliotropium chrysocarpum*			
120.	6705	*Heliotropium crispatum*			
121.	6706	*Heliotropium cunninghamii*			
122.	6712	*Heliotropium heteranthum*			
123.	17307	*Heliotropium inexplicitum*			
124.	17309	*Heliotropium pachyphyllum*			
125.	6718	*Heliotropium tenuifolium (Mamukata)*			
126.	6727	*Trichodesma zeylanicum (Camel Bush, Kumbalin)*			
127.	47242	*Trichodesma zeylanicum var. latisepaleum*			
128.	11750	*Trichodesma zeylanicum var. zeylanicum*			
Brassicaceae					
129.	3010	*Cuphonotus andraeanus*			
130.	3022	*Lepidium catapycnon (Hamersley Lepidium)*		P4	
131.	3025	*Lepidium echinatum*			
132.	3032	*Lepidium muelleri-ferdinandii*			
133.	3033	*Lepidium oxytrichum*			
134.	3035	*Lepidium pedicellosum*			
135.	3037	*Lepidium phlebopetalum (Veined Peppercress)*			
136.	3074	*Stenopetalum anfractum*			
137.	3078	*Stenopetalum nutans*			
138.	3079	*Stenopetalum pedicellare*			
Bruchiaceae					
139.	32328	*Bruchia brevipes*			
Campanulaceae					
140.	7397	*Isotoma petraea (Rock Isotome, Tundiwari)*			
141.	37480	*Lobelia arnhemiaca*			
142.	36880	*Lobelia heterophylla subsp. pilbarensis*			
143.		*Wahlenbergia sp.*			
144.	7393	*Wahlenbergia tumidifructa*			
Capparaceae					
145.	2976	*Capparis lasiantha (Split Jack, Balqarda)*			
146.	2978	*Capparis mitchellii (Wild Orange)*			
147.	2981	*Capparis spinosa*			
148.	48291	*Capparis spinosa subsp. nummularia*			
149.	2982	*Capparis umbonata (Wild Orange, Nanggalu)*			
Caryophyllaceae					
150.	12075	*Polycarpaea corymbosa var. corymbosa*			
151.	2901	*Polycarpaea holtzei*			
152.	2903	*Polycarpaea longiflora*			
Celastraceae					
153.	41200	*Denhamia cunninghamii (Koonkara)*			
154.	19500	*Maytenus sp. Mt Windell (S. van Leeuwen 846)*			
155.	4729	*Stackhousia clementii*		P3	
156.	19555	*Stackhousia muricata subsp. annual (W.R. Barker 2172)*			
157.	18405	*Stackhousia sp. swollen gynophore (W.R. Barker 2041)*			
Chenopodiaceae					
158.	2451	*Atriplex bunburyana (Silver Saltbush)*			
159.	2482	*Bassia scoparia*	Y		
160.	33501	*Dysphania cristata (Crested Goosefoot)*			
161.	11632	*Dysphania glomulifera subsp. eremaea*			
162.	2502	*Dysphania kalpari (Rat's Tail, Kalpari)*			
163.	33479	*Dysphania melanocarpa (Black Crumbweed)*			
164.	33597	*Dysphania melanocarpa forma melanocarpa (Black Goosefoot)*			
165.	2504	*Dysphania plantaginella*			
166.	2506	*Dysphania rhadinostachya*			
167.	11653	*Dysphania rhadinostachya subsp. inflata*			
168.	11890	*Dysphania rhadinostachya subsp. rhadinostachya*			
169.	2511	*Enchylaena tomentosa (Barrier Saltbush)*			
170.	2544	*Maireana georgei (Satiny Bluebush)*			
171.	2551	*Maireana melanocoma (Pussy Bluebush)*			
172.	2556	*Maireana planifolia (Low Bluebush)*			
173.	2571	*Maireana villosa*			
174.	2582	*Rhagodia eremaea (Thorny Saltbush)*			
175.	20168	*Rhagodia sp. Hamersley (M. Trudgen 17794)*		P3	
176.	30434	*Salsola australis*			
177.	2603	*Sclerolaena cornishiana (Cartwheel Burr)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
178.	2607	*Sclerolaena densiflora*			
179.	2608	*Sclerolaena deserticola*			
180.	2631	*Sclerolaena tetragona*			
Cleomaceae					
181.	2985	*Cleome oxalidea*			
182.	2988	*Cleome viscosa (Tickweed, Tjinduwadhu)*			
Commelinaceae					
183.	1165	*Commelina ensifolia (Wandering Jew, Buargu)*			
Convolvulaceae					
184.	11167	*Bonamia erecta*			
185.	6612	*Convolvulus clementii*			
186.	6614	*Convolvulus remotus*			
187.	48738	*Distimake dissectus var. dissectus*	Y		
188.	31274	*Duperreya commixta*			
189.	6617	*Evolvulus alsinoides (Tropical Speedwell)*			
190.	11416	*Evolvulus alsinoides var. decumbens*			
191.	11200	*Evolvulus alsinoides var. villosicalyx*			
192.	6623	*Ipomoea coptica*			
193.	6631	*Ipomoea lonchophylla (Cowvine)*			
194.	6636	*Ipomoea plebeia (Bellvine)*			
195.	6653	*Polymeria ambigua (Morning Glory)*			
196.	6655	*Polymeria calycina*			
197.	13966	*Polymeria longifolia*			
198.	48961	*Polymeria mollis*			
Cucurbitaceae					
199.	33030	*Austrobryonia pilbarensis*			
200.	7371	*Cucumis melo (Ulcardo Melon)*			
201.	48865	*Cucumis myriocarpus subsp. myriocarpus*	Y		
202.	41721	*Cucumis variabilis*			
Cupressaceae					
203.	8466	*Callitris columellaris (White Cypress Pine)*			
Cyperaceae					
204.	747	*Baumea rubiginosa*			
205.	750	*Bulbostylis barbata*			
206.	752	*Bulbostylis turbinata*			
207.	766	*Cladium procerum*		P2	
208.	777	*Cyperus bulbosus (Bush Onion, Tjanmata)*			
209.	12811	*Cyperus cunninghamii subsp. cunninghamii*			
210.	789	*Cyperus difformis (Rice Sedge)*			
211.	12808	*Cyperus hesperius*			
212.	798	*Cyperus iria*			
213.	806	*Cyperus polystachyos (Bunchy Sedge)*			
214.	814	*Cyperus squarrosus*			
215.	818	*Cyperus vaginatus (Stiffleaf Sedge)*			
216.	823	*Eleocharis atropurpurea*			
217.	827	*Eleocharis geniculata*			
218.	850	*Fimbristylis depauperata*			
219.	851	*Fimbristylis dichotoma (Eight Day Grass)*			
220.	859	*Fimbristylis littoralis*			
221.	862	*Fimbristylis microcarya*			
222.	866	*Fimbristylis nuda*			
223.	882	*Fimbristylis sieberiana*		P3	
224.	12159	*Fimbristylis simulans*			
225.		*Fimbristylis sp.*			
226.	896	*Fuirena ciliaris*			
227.	952	*Lipocarpha microcephala*			
228.	48362	*Schoenoplectiella laevis*			
229.	48361	*Schoenoplectiella lateriflora var. lateriflora*			
230.	16257	*Schoenoplectus subulatus*			
231.	989	*Schoenus falcatus*			
Dilleniaceae					
232.	5128	*Hibbertia glaberrima*			
Droseraceae					
233.	43544	*Drosera finlaysoniana*			
234.	3103	*Drosera indica (Indian Sundew)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Elaeocarpaceae					
235.	25768	*Tetratheca fordiana*		P2	
Elatinaceae					
236.	5184	*Bergia pedicellaris*			
237.	5186	*Bergia trimera*			
Eriocaulaceae					
238.	1154	*Eriocaulon cinereum*			
Euphorbiaceae					
239.	17422	*Adriana tomentosa var. tomentosa*			
240.	4617	*Euphorbia australis (Namana)*			
241.	42843	*Euphorbia australis var. glabra*		P2	
242.	42844	*Euphorbia australis var. hispidula*			
243.	35303	*Euphorbia australis var. subtomentosa*			
244.	4619	*Euphorbia biconvexa*			
245.	4620	*Euphorbia boophthona (Gascoyne Spurge)*			
246.	9048	*Euphorbia careyi*			
247.	4623	*Euphorbia coghlanii (Namana)*			
248.	4626	*Euphorbia drummondii (Caustic Weed, Piwi)*			
249.	42861	*Euphorbia inappendiculata var. queenslandica*		P1	
250.	42867	*Euphorbia multifaria*			
251.	34757	*Euphorbia prostrata*	Y		
252.	12097	*Euphorbia tannensis subsp. eremophila (Desert Spurge)*			
253.	42879	*Euphorbia trigonosperma*			
254.	42877	*Euphorbia vaccaria var. erucoides*			
255.	42876	*Euphorbia vaccaria var. vaccaria*			
Fabaceae					
256.	3198	*Acacia acradenia*			
257.	3204	*Acacia adoxa*			
258.	11215	*Acacia adoxa var. adoxa*			
259.	3205	*Acacia adsurgens*			
260.	44579	*Acacia adsurgens x rhodophloia*			
261.	3209	*Acacia ampliceps*			
262.	3214	*Acacia ancistrocarpa (Fitzroy Wattle)*			
263.	3217	*Acacia aneura (Mulga, Wanari)*			
264.	37260	*Acacia aptaneura*			
265.	3223	*Acacia arida*			
266.	3224	*Acacia arrecta*			
267.	3228	*Acacia atkinsiana*			
268.	3232	*Acacia ayersiana*			
269.	3241	*Acacia bivenosa*			
270.	29571	*Acacia bromilowiana*		P4	
271.	23524	*Acacia catenulata subsp. occidentalis*			
272.	3260	*Acacia citrinoviridis*			
273.	13403	*Acacia colei*			
274.	13502	*Acacia coriacea subsp. pendens*			
275.	3272	*Acacia cowleana (Halls Creek Wattle)*			
276.	3286	*Acacia daweana*		P3	
277.	3300	*Acacia dictyophleba (Sandhill Wattle, Ngarkalya)*			
278.	3316	*Acacia effusa*		P3	
279.	16174	*Acacia elachantha*			
280.	3326	*Acacia eriopoda (Broome Pindan Wattle)*			
281.	45337	*Acacia exigua*			
282.	3360	*Acacia hamersleyensis*			
283.	3370	*Acacia hilliana*			
284.	3372	*Acacia holosericea (Candelbra Wattle, Liringgin)*			
285.	3377	*Acacia inaequilatera (Baderi)*			
286.	3399	*Acacia kempeana (Witchetty Bush, Ilykuwara)*			
287.	3434	*Acacia maitlandii (Maitland's Wattle)*			
288.	3435	*Acacia marramamba*			
289.	12952	*Acacia minyura*			
290.	3447	*Acacia monticola (Gawar, Lilwardi)*			
291.	36416	*Acacia mulganeura*			
292.	3475	*Acacia pachyacra*			
293.	15724	*Acacia paraneura*			
294.	3500	*Acacia pruinocarpa (Gidgee)*			
295.	3506	*Acacia pyrifolia (Ranji Bush, Kandji)*			
296.	29016	*Acacia pyrifolia var. morrisonii*			
297.	29015	*Acacia pyrifolia var. pyrifolia*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
298.	15215	*Acacia retivenea subsp. clandestina*			
299.	3519	*Acacia rhodophloia*			
300.	44584	*Acacia rhodophloia x sibirica*			
301.	13078	*Acacia sclerosperma subsp. sclerosperma*			
302.	29135	*Acacia sericophylla*			
303.	8949	*Acacia sibirica (Bastard Mulga)*			
304.	3551	*Acacia sphaerostachya*			
305.	3553	*Acacia spondylophylla*			
306.	23526	*Acacia steedmanii subsp. borealis*			
307.	23528	*Acacia subtiliformis*		P3	
308.	13070	*Acacia synchronicia*			
309.	3573	*Acacia tenuissima*			
310.	3577	*Acacia tetragonophylla (Kurara, Wakalpuka)*			
311.	3579	*Acacia trachycarpa (Minni Ritchi, Balgali)*			
312.	23521	*Acacia trudgeniana*			
313.	20319	*Acacia tumida var. pilbarensis*			
314.	19641	*Acacia tumida var. tumida*			
315.	3595	*Acacia victoriae (Bramble Wattle, Ngatunpa)*			
316.	31511	*Acacia victoriae subsp. victoriae*			
317.	3598	*Acacia wanyu*			
318.	3606	*Acacia xiphophylla*			
319.	11055	*Cajanus cinereus*			
320.	11150	*Cajanus pubescens*			
321.	19378	*Crotalaria dissitiflora subsp. benthamiana*			
322.	3783	*Crotalaria medicaginea*			
323.	20179	*Crotalaria medicaginea var. neglecta*			
324.	3785	*Crotalaria novae-hollandiae (New Holland Rattlepod)*			
325.	11231	*Crotalaria novae-hollandiae subsp. novae-hollandiae*			
326.	17117	*Cullen cinereum*			
327.	17436	*Cullen graveolens*			
328.	17118	*Cullen leucanthum*			
329.	17119	*Cullen leucochaites*			
330.	17217	*Cullen pallidum*			
331.	17120	*Cullen pogonocarpum*			
332.	17140	*Daviesia eremaea*			
333.	3852	*Desmodium campylocaulon*			
334.	3856	*Desmodium muelleri*			
335.	3903	*Gastrolobium grandiflorum (Wallflower Poison)*			
336.	3938	*Glycine canescens (Silky Glycine)*			
337.	3940	*Glycine falcata*		P3	
338.	20856	*Gompholobium karijini*		P2	
339.	41245	*Gompholobium oreophilum*			
340.	10995	*Gompholobium polyzygum*			
341.	3973	*Indigofera colutea (Sticky Indigo)*			
342.	45473	*Indigofera fractiflexa subsp. fractiflexa*			
343.	3974	*Indigofera georgei (Bovine Indigo)*			
344.	17716	*Indigofera gilesii*		P3	
345.	14329	*Indigofera ixocarpa*		P2	
346.	3980	*Indigofera linifolia*			
347.	3981	*Indigofera linnaei (Birdsville Indigo)*			
348.	3982	*Indigofera monophylla*			
349.	3987	*Indigofera trita*			
350.	3989	*Isotropis atropurpurea (Poison Sage)*			
351.	3994	*Isotropis forrestii*		P1	
352.	17790	*Isotropis parviflora*		P2	
353.	48615	*Isotropis sp. Arid zone (G. Byrne 2775)*			
354.	4061	*Lotus cruentus (Redflower Lotus)*			
355.	4105	*Mirbelia viminalis*			
356.	3614	*Neptunia dimorphantha (Sensitive Plant)*			
357.	3674	*Petalostylis cassioides*			
358.	3675	*Petalostylis labicheoides (Slender Petalostylis)*			
359.	4190	*Rhynchosia australis (Rhynchosia)*			
360.	20862	*Rhynchosia bungarensis*		P4	
361.	4191	*Rhynchosia minima (Rhynchosia)*			
362.	17645	*Senna artemisioides*			
363.	12276	*Senna artemisioides subsp. filifolia*			
364.	12279	*Senna artemisioides subsp. helmsii*			
365.	12280	*Senna artemisioides subsp. oligophylla*			
366.	12281	*Senna artemisioides subsp. petiolaris*			
367.	17558	*Senna artemisioides subsp. x artemisioides*			

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368.	12283	*Senna artemisioides subsp. x sturtii*			
369.	18443	*Senna ferraria*			
370.	18449	*Senna glaucifolia*			
371.	18346	*Senna glutinosa*			
372.	12307	*Senna glutinosa subsp. glutinosa*			
373.	12309	*Senna glutinosa subsp. pruinosa*			
374.	12308	*Senna glutinosa subsp. x luerssenii*			
375.	18451	*Senna hamersleyensis*			
376.	12312	*Senna notabilis*			
377.	16378	*Senna pleurocarpa*			
378.	12315	*Senna pleurocarpa var. angustifolia*			
379.	18595	*Senna sp. Karijini (M.E. Trudgen 10392)*			
380.	18445	*Senna stricta*			
381.	12319	*Senna venusta*			
382.	4196	*Sesbania cannabina (Sesbania Pea)*			
383.	4220	*Swainsona canescens (Grey Swainsona)*			
384.	4223	*Swainsona decurrens*			
385.	4231	*Swainsona kingii*			
386.	4234	*Swainsona maccullochiana (Ashburton Pea)*			
387.	42142	*Swainsona thompsoniana*		P3	
388.	4252	*Templetonia egena (Round Templetonia)*			
389.	4259	*Tephrosia arenicola*			
390.	4263	*Tephrosia clementii*			
391.	49016	*Tephrosia densa*			
392.	41986	*Tephrosia oxalidea*			
393.	4280	*Tephrosia rosea (Flinders River Poison, Bungoo'dah)*			
394.	41825	*Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186)*			
395.	17768	*Tephrosia sp. Bungaroo Creek (M.E. Trudgen 11601)*			
396.	42225	*Tephrosia sp. Newman (A.A. Mitchell PRP 29)*			
397.	4285	*Tephrosia supina*			
398.	30716	*Vachellia farnesiana (Mimosa Bush)*	Y		
399.	4323	*Vigna lanceolata (Maloga Vigna, Wega)*			
400.		*Vigna lanceolata var. latifolia*			
401.		*Vigna sp.*			
402.	31391	*Vigna sp. Hamersley Clay (A.A. Mitchell PRP 113)*			
Frankeniaceae					
403.	5191	*Frankenia cinerea*			
Funariaceae					
404.	32355	*Entosthodon radians*			
Gentianaceae					
405.	41660	*Schenkia australis*			
406.	41646	*Schenkia clementii*			
Goodeniaceae					
407.	7413	*Brunonia australis (Native Cornflower)*			
408.	15885	*Brunonia australis var. A Kimberley Flora (K.F. Kenneally 5452)*			
409.	20381	*Dampiera anonyma*		P3	
410.	7424	*Dampiera candicans*			
411.	20378	*Dampiera metallorum*		P3	
412.	12517	*Goodenia cusackiana*			
413.	7509	*Goodenia forrestii*			
414.	7515	*Goodenia heterochila*			
415.	7521	*Goodenia lamprosperma*			
416.	12529	*Goodenia lyrata*		P3	
417.	7526	*Goodenia microptera*			
418.	12552	*Goodenia muelleriana*			
419.	7530	*Goodenia nuda*		P4	
420.	12571	*Goodenia pascua*			
421.	12574	*Goodenia prostrata*			
422.	7550	*Goodenia stellata*			
423.	10982	*Goodenia stobbsiana*			
424.	7558	*Goodenia triodiophila*			
425.	12578	*Scaevola acacioides*			
426.	12723	*Scaevola amblyanthera*			
427.	12579	*Scaevola browniana*			
428.	13150	*Scaevola browniana subsp. browniana*			
429.	7633	*Scaevola parvifolia (Camel Weed)*			
430.	13173	*Scaevola parvifolia subsp. parvifolia*			
431.	13172	*Scaevola parvifolia subsp. pilbarae*			

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432.	20263	*Scaevola sp. Hamersley Range basalts (S. van Leeuwen 3675)*		P2	
433.	25784	*Scaevola sp. Mt Bruce (M.E. Trudgen 1333)*			
434.	7644	*Scaevola spinescens (Currant Bush, Maroon)*			
435.	7654	*Velleia connata (Cup Velleia)*			
436.	7658	*Velleia discophora (Cabbage Poison)*			
437.	7663	*Velleia panduriformis (Cabbage Poison)*			

Gyrostemonaceae

438.	2778	*Codonocarpus cotinifolius (Native Poplar, Kundurangu)*			

Haloragaceae

439.	6174	*Haloragis gossei*			
440.	23465	*Haloragis gossei var. gossei*			
441.	23464	*Haloragis gossei var. inflata*			
442.	20669	*Haloragis maierae*			
443.	6201	*Myriophyllum verrucosum (Red Water Milfoil)*			

Hemerocallidaceae

444.	29483	*Tricoryne sp. Hamersley Range (S. van Leeuwen 915)*			

Hydrocharitaceae

445.	138	*Najas marina (Prickly Water Nymph)*			
446.	139	*Najas tenuifolia (Water Nymph)*			

Lamiaceae

447.	6729	*Clerodendrum floribundum (Lollybush)*			
448.	13692	*Clerodendrum floribundum var. angustifolium*			
449.	13689	*Clerodendrum tomentosum var. lanceolatum*			
450.	6754	*Dicrastylis cordifolia*			
451.	20252	*Newcastelia sp. Hamersley Range (S. van Leeuwen 4264)*			
452.	6910	*Plectranthus intraterraneus*			
453.	12707	*Prostanthera albiflora*			
454.	48313	*Teucrium disjunctum*			
455.	6936	*Teucrium racemosum (Grey Germander)*			
456.	48603	*Teucrium teucriiflorum*			

Lauraceae

457.	2949	*Cassytha capillaris*			
458.	11242	*Cassytha racemosa forma pilosa*			

Loganiaceae

459.	6519	*Mitrasacme connata*			

Loranthaceae

460.	2369	*Amyema benthamii*			
461.	13700	*Amyema bifurcata*			
462.	2372	*Amyema fitzgeraldii (Pincushion Mistletoe)*			
463.	2374	*Amyema hilliana*			
464.	2380	*Amyema miquelii (Stalked Mistletoe)*			
465.	29080	*Amyema sanguinea var. pulchra*			
466.	11874	*Amyema sanguinea var. sanguinea*			
467.	14307	*Amyema sp. Fortescue (M.E. Trudgen 5358)*			
468.	2395	*Diplatia grandibractea*			
469.	2396	*Lysiana casuarinae*			
470.	2398	*Lysiana murrayi (Mistletoe, Parka-Parka)*			

Lythraceae

471.	5277	*Ammannia baccifera*			
472.	5278	*Ammannia multiflora*			
473.	5285	*Rotala diandra*			
474.	5286	*Rotala mexicana*			

Malvaceae

475.	4886	*Abutilon amplum*			
476.	4889	*Abutilon cryptopetalum*			
477.	4891	*Abutilon fraseri (Lantern Bush)*			
478.	18120	*Abutilon fraseri subsp. fraseri*			
479.	4895	*Abutilon lepidum*			
480.	4898	*Abutilon macrum*			
481.	4899	*Abutilon malvifolium (Bastard Marshmallow)*			
482.	4901	*Abutilon otocarpum (Desert Chinese Lantern)*			
483.		*Abutilon sp.*			
484.	42920	*Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)*			
485.	14113	*Abutilon sp. Pilbara (W.R. Barker 2025)*			
486.	40910	*Androcalva luteiflora (Yellow-flowered Rulingia)*			

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487.	12716	*Brachychiton acuminatus*			
488.	4999	*Brachychiton gregorii (Desert Kurrajong, Ngalta)*			
489.	13560	*Corchorus crozophorifolius*			
490.	25838	*Corchorus incanus subsp. lithophilus*			
491.	17405	*Corchorus lasiocarpus*			
492.	18409	*Corchorus lasiocarpus subsp. lasiocarpus*			
493.	18408	*Corchorus lasiocarpus subsp. parvus*			
494.	4862	*Corchorus parviflorus*			
495.	4864	*Corchorus sidoides (Flannel Weed)*			
496.	18415	*Corchorus sidoides subsp. sidoides*			
497.		*Corchorus sp.*			
498.	20242	*Corchorus sp. Hamersley Range hilltops (S. van Leeuwen 3826)*			
499.	4865	*Corchorus tridens*			
500.	4867	*Corchorus walcottii (Woolly Corchorus)*			
501.	4910	*Gossypium australe (Native Cotton)*			
502.	4918	*Gossypium robinsonii (Wild Cotton)*			
503.	4924	*Hibiscus burtonii*			
504.	4925	*Hibiscus coatesii*			
505.	4931	*Hibiscus haynaldii*			
506.	43022	*Hibiscus sp. Gardneri (A.L. Payne PRP 1435)*			
507.	40620	*Hibiscus sp. Mt Brockman (E. Thoma ET 1354)*		P1	
508.	4942	*Hibiscus sturtii (Sturt's Hibiscus)*			
509.	11651	*Hibiscus sturtii var. campylochlamys*			
510.	11385	*Hibiscus sturtii var. grandiflorus*			
511.	11477	*Hibiscus sturtii var. platychlamys*			
512.	4962	*Malvastrum americanum (Spiked Malvastrum)*	Y		
513.	5051	*Melhania oblongifolia*			
514.	46816	*Seringia elliptica (Showy fire-bush)*			
515.	4966	*Sida arenicola*			
516.	4971	*Sida cardiophylla*			
517.	4976	*Sida echinocarpa*			
518.	4977	*Sida fibulifera (Silver Sida)*			
519.	4986	*Sida platycalyx (Lifesaver Burr)*			
520.	4988	*Sida rohlenae*			
521.	31859	*Sida sp. Articulation below (A.A. Mitchell PRP 1605)*			
522.	16616	*Sida sp. Barlee Range (S. van Leeuwen 1642)*		P3	
523.	31854	*Sida sp. Excedentifolia (J.L. Egan 1925)*			
524.	48867	*Sida sp. L (A.M. Ashby 4202)*			
525.	20253	*Sida sp. Shovelanna Hill (S. van Leeuwen 3842)*			
526.	31852	*Sida sp. Supplejack Station (T.S. Henshall 2345)*			
527.	16617	*Sida sp. spiciform panicles (E. Leyland s.n. 14/8/90)*			
528.	4989	*Sida spinosa (Spiny Sida)*			
529.	14694	*Triumfetta clementii*			
530.	4879	*Triumfetta leptacantha*			
531.	14942	*Triumfetta maconochieana*			
532.	17317	*Triumfetta propinqua*			
533.	5106	*Waltheria indica*			
534.	5107	*Waltheria virgata*			
Marsileaceae					
535.	76	*Marsilea hirsuta (Nardoo)*			
536.		*Marsilea sp.*			
Menispermaceae					
537.	2942	*Tinospora smilacina (Snakevine, Oondala)*			
Molluginaceae					
538.	48201	*Trigastrotheca molluginea*			
Montiaceae					
539.	2864	*Calandrinia ptychosperma*			
540.	2865	*Calandrinia pumila*			
Moraceae					
541.	19648	*Ficus brachypoda*			
542.	43508	*Ficus geniculata var. insignis*			
543.		*Ficus sp.*			
544.	1759	*Ficus virens (Albayi)*			
545.	12096	*Ficus virens var. virens*			
Myrtaceae					
546.	5446	*Calytrix carinata*			
547.	17083	*Corymbia deserticola subsp. deserticola*			

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548.	17077	*Corymbia ferriticola*			
549.	17093	*Corymbia hamersleyana*			
550.	17092	*Corymbia opaca*			
551.	41301	*Eucalyptus aridimontana*			
552.	35345	*Eucalyptus camaldulensis subsp. obtusa (Blunt-budded River Red Gum)*			
553.	35343	*Eucalyptus camaldulensis subsp. refulgens*			
554.	5641	*Eucalyptus ewartiana (Ewart's Mallee)*			
555.	5655	*Eucalyptus gamophylla (Twin-leaf Mallee, Warilu)*			
556.	5684	*Eucalyptus kingsmillii (Kingsmill's Mallee)*			
557.	5698	*Eucalyptus leucophloia (Snappy Gum, Migum)*			
558.	18088	*Eucalyptus leucophloia subsp. leucophloia*			
559.	5703	*Eucalyptus lucasii (Barlee Box)*			
560.	5744	*Eucalyptus pilbarensis*			
561.	18058	*Eucalyptus repullulans*			
562.	20264	*Eucalyptus rowleyi*		P3	
563.	5773	*Eucalyptus socialis (Red Mallee, Altarpa)*			
564.	19576	*Eucalyptus socialis subsp. eucentrica*			
565.	18219	*Eucalyptus tephrodes*			
566.	29733	*Eucalyptus trivalva (Victoria Spring Mallee)*			
567.	14548	*Eucalyptus victrix*			
568.	15592	*Eucalyptus xerothermica*			
569.	5875	*Melaleuca argentea (Silver Cadjeput, Bandaran)*			
570.	5879	*Melaleuca bracteata (River Teatree)*			
571.	5908	*Melaleuca eleuterostachya*			
572.	5915	*Melaleuca glomerata*			
573.	5923	*Melaleuca lasiandra*			
574.	5933	*Melaleuca linophylla*			
575.	6069	*Thryptomene wittweri*		T	
Nyctaginaceae					
576.	2770	*Boerhavia coccinea (Tar Vine, Wituka)*			
577.	2774	*Boerhavia repleta*			
578.	2775	*Boerhavia schomburgkiana*			
579.		*Boerhavia sp.*			
580.	2776	*Commicarpus australis (Perennial Tar Vine)*			
Oleaceae					
581.	6501	*Jasminum didymum*			
582.	12059	*Jasminum didymum subsp. lineare (Desert Jasmine)*			
Ophioglossaceae					
583.	17	*Ophioglossum lusitanicum (Adders Tongue)*			
Orchidaceae					
584.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
Oxalidaceae					
585.	30374	*Oxalis sp. Pilbara (M.E. Trudgen 12725)*		P2	
Pedaliaceae					
586.	7118	*Josephinia eugeniae (Josephinia Burr)*			
Phrymaceae					
587.	7082	*Mimulus gracilis*			
588.	7092	*Peplidium muelleri*			
Phyllanthaceae					
589.	38421	*Notoleptopus decaisnei*			
590.	9056	*Phyllanthus baccatus*			
591.	17626	*Phyllanthus erwinii*			
592.	14462	*Phyllanthus exilis*			
593.	4680	*Phyllanthus maderaspatensis*			
Pittosporaceae					
594.	19744	*Pittosporum angustifolium*			
Plantaginaceae					
595.	34760	*Plantago cunninghamii*			
596.	7098	*Stemodia grossa (Marsh Stemodia, Mindjaara)*			
597.	7102	*Stemodia viscosa (Pagurda)*			
Plumbaginaceae					
598.	6491	*Plumbago zeylanica (Native Plumbago)*			
Poaceae					
599.	172	*Acrachne racemosa*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
600.	19835	*Amphipogon sericeus*			
601.	204	*Aristida burbidgeae*			
602.	207	*Aristida contorta (Bunched Kerosene Grass)*			
603.	210	*Aristida holathera*			
604.	12063	*Aristida holathera var. holathera*			
605.	212	*Aristida inaequiglumis (Feathertop Threeawn)*			
606.	213	*Aristida ingrata*			
607.	17918	*Aristida jerichoensis var. subspinulifera*		P3	
608.	215	*Aristida latifolia (Feathertop Wiregrass)*			
609.	216	*Aristida lazaridis*		P2	
610.	218	*Aristida obscura (Brush Threeawn)*			
611.	221	*Aristida pruinosa (Gulf Feathertop Wiregrass)*			
612.		*Aristida sp.*			
613.	227	*Astrebla elymoides (Weeping Mitchell Grass)*			
614.	240	*Bothriochloa ewartiana (Desert Bluegrass)*			
615.	258	*Cenchrus ciliaris (Buffel Grass)*	Y		
616.	259	*Cenchrus echinatus (Burrgrass)*	Y		
617.	29721	*Cenchrus setiger (Birdwood Grass)*	Y		
618.	269	*Chloris pectinata (Comb Chloris)*			
619.	272	*Chloris virgata (Feathertop Rhodes Grass)*	Y		
620.	273	*Chrysopogon fallax (Golden Beard Grass)*			
621.	279	*Cymbopogon ambiguus (Scentgrass)*			
622.	281	*Cymbopogon obtectus (Silkyheads)*			
623.	282	*Cymbopogon procerus (Lemon Grass)*			
624.	283	*Cynodon dactylon (Couch)*	Y		
625.	46555	*Cynodon prostratus*			
626.	46556	*Cynodon tenellus*			
627.	290	*Dactyloctenium radulans (Button Grass)*			
628.	304	*Dichanthium sericeum (Queensland Blue Grass)*			
629.	13741	*Dichanthium sericeum subsp. humilius*			
630.	13740	*Dichanthium sericeum subsp. polystachyum*			
631.	308	*Digitaria ammophila (Silky Umbrella Grass)*			
632.	310	*Digitaria brownii (Cotton Panic Grass)*			
633.	355	*Elytrophorus spicatus (Spikegrass)*			
634.	357	*Enneapogon caerulescens (Limestone Grass)*			
635.	360	*Enneapogon lindleyanus (Wiry Nineawn, Purple-head Nineawn)*			
636.	363	*Enneapogon pallidus (Conetop Nineawn)*			
637.	365	*Enneapogon polyphyllus (Leafy Nineawn)*			
638.	20377	*Enneapogon robustissimus*			
639.	375	*Eragrostis cumingii (Cuming's Love Grass)*			
640.	377	*Eragrostis desertorum (Desert Lovegrass)*			
641.	378	*Eragrostis dielsii (Mallee Lovegrass)*			
642.	379	*Eragrostis elongata (Clustered Lovegrass)*			
643.	380	*Eragrostis eriopoda (Woollybutt Grass, Wangurnu)*			
644.	388	*Eragrostis leptocarpa (Drooping Lovegrass)*			
645.	392	*Eragrostis pergracilis*			
646.	393	*Eragrostis setifolia (Neverfail Grass)*			
647.	398	*Eragrostis tenellula (Delicate Lovegrass)*			
648.	400	*Eriachne aristidea*			
649.	403	*Eriachne benthamii (Swamp Wanderrie)*			
650.	404	*Eriachne ciliata (Slender Wandarrie Grass)*			
651.	408	*Eriachne flaccida (Claypan Grass)*			
652.	413	*Eriachne mucronata (Mountain Wanderrie Grass)*			
653.	414	*Eriachne obtusa (Northern Wandarrie Grass)*			
654.	417	*Eriachne pulchella (Pretty Wanderrie)*			
655.	16485	*Eriachne pulchella subsp. dominii*			
656.	16486	*Eriachne pulchella subsp. pulchella*			
657.	421	*Eriachne tenuiculmis*			
658.	11011	*Eulalia aurea*			
659.	453	*Imperata cylindrica (Kunai Grass)*			
660.	12663	*Ischaemum albovillosum*			
661.	458	*Iseilema dolichotrichum*			
662.	461	*Iseilema fragile*			
663.	464	*Iseilema membranaceum (Small Flinders Grass)*			
664.	465	*Iseilema vaginiflorum (Red Flinders Grass)*			
665.	471	*Leptochloa digitata (Whorled Cane Grass)*			
666.	487	*Mnesithea formosa*			
667.	503	*Panicum decompositum (Native Millet, Kaltu-kaltu)*			
668.	504	*Panicum effusum (Hairy Panic Grass)*			
669.	515	*Paraneurachne muelleri (Northern Mulga Grass)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
670.	518	*Paspalidium clementii (Clements Paspalidium)*			
671.	523	*Paspalidium rarum (Rare Paspalidium)*			
672.	546	*Perotis rara (Comet Grass)*			
673.	556	*Phragmites karka (Tropical Reed, Gamagurd)*			
674.	606	*Setaria dielsii (Diels' Pigeon Grass)*			
675.	612	*Setaria surgens (Pigeon Grass)*			
676.	613	*Setaria verticillata (Whorled Pigeon Grass)*	Y		
677.	619	*Sorghum plumosum (Plume Canegrass)*			
678.	629	*Sporobolus australasicus (Fairy Grass)*			
679.	672	*Themeda avenacea (Native Oatgrass)*			
680.	17820	*Themeda sp. Hamersley Station (M.E. Trudgen 11431)*		P3	
681.	17819	*Themeda sp. Mt Barricade (M.E. Trudgen 2471)*			
682.	673	*Themeda triandra*			
683.	678	*Tragus australianus (Small Burrgrass)*			
684.	17886	*Triodia biflora*			
685.	681	*Triodia brizoides*			
686.	689	*Triodia lanigera*			
687.	17877	*Triodia melvillei*			
688.	696	*Triodia pungens (Soft Spinifex)*			
689.	41101	*Triodia sp. Karijini (S. van Leeuwen 4111)*		P1	
690.	19534	*Triodia sp. Mt Ella (M.E. Trudgen 12739)*		P3	
691.	48463	*Triodia vanleeuwenii*			
692.	704	*Triodia wiseana (Limestone Spinifex)*			
693.	48319	*Tripogonella loliiformis*			
694.	29270	*Urochloa occidentalis var. ciliata*			
695.	29269	*Urochloa occidentalis var. occidentalis*			
696.	717	*Urochloa piligera*			
697.	11894	*Yakirra australiensis var. australiensis*			
Polygalaceae					
698.	41365	*Polygala glaucifolia*			
Polygonaceae					
699.	44508	*Duma florulenta*			
Portulacaceae					
700.	2884	*Portulaca oleracea (Purslane, Wakati)*			
701.	2886	*Portulaca pilosa (Djanggara)*	Y		
Potamogetonaceae					
702.	20426	*Potamogeton tepperi*			
703.	113	*Potamogeton tricarinatus (Floating Pondweed)*			
Pottiaceae					
704.	20164	*Barbula ehrenbergii*		P1	
705.	32318	*Barbula indica*			
Primulaceae					
706.	14108	*Samolus repens var. floribundus*			
Proteaceae					
707.	1963	*Grevillea berryana*			
708.	2096	*Grevillea stenobotrya*			
709.	2121	*Grevillea wickhamii (Wickham's Grevillea)*			
710.	13440	*Grevillea wickhamii subsp. aprica*			
711.	19478	*Grevillea wickhamii subsp. hispidula*			
712.	2138	*Hakea chordophylla*			
713.	2177	*Hakea lorea (Witinti)*			
714.	19137	*Hakea lorea subsp. lorea*			
Pteridaceae					
715.	26	*Adiantum capillus-veneris (Maidenhair)*		P2	
716.	31	*Cheilanthes austrotenuifolia*			
717.	32	*Cheilanthes brownii*			
718.	37	*Cheilanthes lasiophylla (Woolly Cloak Fern)*			
719.	41	*Cheilanthes sieberi (Mulga Fern)*			
720.	12818	*Cheilanthes sieberi subsp. sieberi*			
721.		*Cheilanthes sp.*			
722.	8462	*Cheilanthes tenuifolia (Rock Fern)*			
723.	43	*Paraceterach reynoldsii*			
724.	45	*Pteris vittata (Chinese Brake)*			
Rhamnaceae					
725.	16189	*Cryptandra monticola*			
726.	16199	*Stenanthemum petraeum*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
727.	4846	*Ventilago viminalis (Supplejack, Barndaragu)*			
Ricciaceae					
728.		*Riccia corrugata*			
729.		*Riccia sp.*			
730.		*Riccia vesiculosa*			
Rubiaceae					
731.	7338	*Oldenlandia crouchiana*			
732.	7339	*Oldenlandia galioides*			
733.	12964	*Pomax rupestris*			
734.	18154	*Psydrax latifolia*			
735.	18210	*Psydrax rigidula*			
736.	18155	*Psydrax suaveolens*			
737.	13575	*Spermacoce brachystema*			
738.	7363	*Synaptantha tillaeacea*			
739.	13339	*Synaptantha tillaeacea var. tillaeacea*			
Rutaceae					
740.	4482	*Geijera salicifolia*		P3	
Santalaceae					
741.	2333	*Anthobolus leptomerioides*			
742.	10765	*Exocarpos sparteus (Broom Ballart, Djuk)*			
743.	2357	*Santalum lanceolatum (Northern Sandalwood, Yarnguli)*			
744.	2359	*Santalum spicatum (Sandalwood, Wilarak)*			
Sapindaceae					
745.	11487	*Alectryon oleifolius subsp. oleifolius*			
746.	4740	*Atalaya hemiglauca (Whitewood)*			
747.	4749	*Diplopeltis stuartii*			
748.	12023	*Diplopeltis stuartii var. stuartii (Desert Pepperflower)*			
749.	4759	*Dodonaea coriacea*			
750.	11406	*Dodonaea lanceolata var. lanceolata*			
751.	4772	*Dodonaea pachyneura*			
752.	4773	*Dodonaea petiolaris*			
753.	11674	*Dodonaea viscosa subsp. mucronata*			
754.	11202	*Dodonaea viscosa subsp. spatulata (Sticky Hop-bush)*			
Scrophulariaceae					
755.	17154	*Eremophila conferta*			
756.	7192	*Eremophila cuneifolia (Pinyuru, T'iranju)*			
757.	7205	*Eremophila exilifolia*			
758.	17153	*Eremophila flaccida subsp. flaccida*			
759.	7208	*Eremophila forrestii (Wilcox Bush)*			
760.	15052	*Eremophila forrestii subsp. forrestii*			
761.	16696	*Eremophila fraseri subsp. fraseri*			
762.	17171	*Eremophila jucunda subsp. jucunda*			
763.	17519	*Eremophila jucunda subsp. pulcherrima*			
764.	16940	*Eremophila lanceolata*			
765.	17597	*Eremophila latrobei subsp. filiformis*			
766.	17169	*Eremophila latrobei subsp. glabra*			
767.	7234	*Eremophila longifolia (Berrigan, Tulypurpa)*			
768.	16363	*Eremophila maculata subsp. brevifolia (Native Fuchsia)*			
769.	16362	*Eremophila maculata subsp. maculata*			
770.	14893	*Eremophila magnifica subsp. magnifica*		P4	
771.	14894	*Eremophila magnifica subsp. velutina*		P3	
772.	15164	*Eremophila petrophila subsp. petrophila*			
773.	48236	*Eremophila pusilliflora*		P2	
774.		*Eremophila sp.*			
775.	7273	*Eremophila strongylophylla*			
776.	23997	*Eremophila tietkensii*			
Solanaceae					
777.	47241	*Datura leichhardtii subsp. leichhardtii*	Y		
778.	6971	*Nicotiana benthamiana (Tjuntiwari)*			
779.	49095	*Nicotiana karijini*			
780.	6976	*Nicotiana occidentalis (Native Tobacco)*			
781.	11331	*Nicotiana occidentalis subsp. obliqua*			
782.	11856	*Nicotiana occidentalis subsp. occidentalis*			
783.	11410	*Nicotiana rosulata subsp. ingulba*			
784.	11734	*Nicotiana rosulata subsp. rosulata*			
785.	6979	*Nicotiana simulans*			
786.	6998	*Solanum cleistogamum*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
787.	7002	*Solanum diversiflorum*			
788.	42544	*Solanum elatius*			
789.	7008	*Solanum ferocissimum*			
790.	7009	*Solanum gabrielae*			
791.	7014	*Solanum horridum*			
792.	42542	*Solanum kentrocaule*		P3	
793.	7018	*Solanum lasiophyllum (Flannel Bush, Mindjulu)*			
794.	7029	*Solanum phlomoides*			
795.	42546	*Solanum piceum*			
796.	7036	*Solanum sturtianum (Thargomindah Nightshade)*			
Stylidiaceae					
797.	7729	*Stylidium fluminense*			
Surianaceae					
798.	3182	*Stylobasium spathulatum (Pebble Bush)*			
Thelypteridaceae					
799.	52	*Ampelopteris prolifera*		P3	
Thymelaeaceae					
800.	5245	*Pimelea forrestiana*			
801.	5250	*Pimelea holroydii*			
802.	11185	*Pimelea microcephala subsp. microcephala*			
Typhaceae					
803.	98	*Typha domingensis (Bulrush, Djandjid)*			
Urticaceae					
804.	12670	*Parietaria cardiostegia*			
Violaceae					
805.	5215	*Hybanthus aurantiacus*			
Zygophyllaceae					
806.	48889	*Roepera eichleri*			
807.	4368	*Tribulopis angustifolia*			
808.	4374	*Tribulus astrocarpus*			
809.	4377	*Tribulus hirsutus*			
810.	4379	*Tribulus macrocarpus*			
811.	4381	*Tribulus platypterus (Cork Hopbush)*			
812.	18072	*Tribulus suberosus*			
813.	4383	*Tribulus terrestris (Caltrop)*	Y		

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Australian Government

Department of Agriculture, Water and the Environment

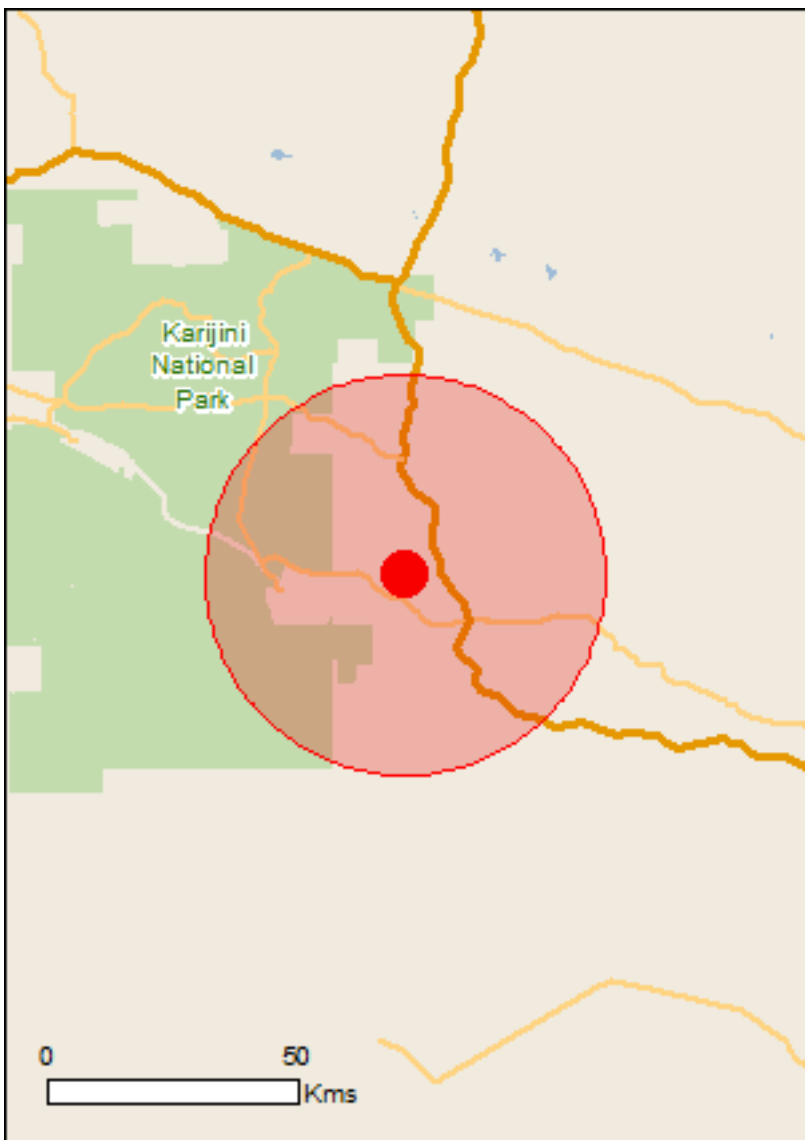
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

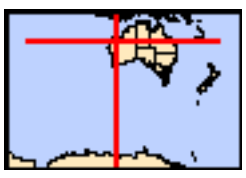
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 02/06/21 11:03:39



Coordinates

Buffer: 40.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	10
Listed Migratory Species:	9

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	9
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Falco hypoleucos		
Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area
Pezoporus occidentalis		
Night Parrot [59350]	Endangered	Species or species habitat likely to occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus hallucatus		
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat known to occur within area
Macroderma gigas		
Ghost Bat [174]	Vulnerable	Breeding known to occur within area
Macrotis lagotis		
Greater Bilby [282]	Vulnerable	Species or species habitat likely to occur within area
Rhinonicteris aurantia (Pilbara form)		
Pilbara Leaf-nosed Bat [82790]	Vulnerable	Species or species habitat known to occur within area
Plants		
Thryptomene wittweri		
Mountain Thryptomene [16645]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Liasis olivaceus barroni		
Olive Python (Pilbara subspecies) [66699]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
Migratory Terrestrial Species		
Hirundo rustica		
Barn Swallow [662]		Species or species habitat may occur within area
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius veredus		
Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat known to occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Karijini	WA
Unnamed WA41696	WA

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Mammals		
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus asinus Donkey, Ass [4]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-22.85713 118.7069

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
15.	42843	*Euphorbia australis var. glabra*		P2	
16.	42861	*Euphorbia inappendiculata var. queenslandica*		P1	
Fabaceae					
17.	29571	*Acacia bromilowiana*		P4	
18.	3286	*Acacia daweana*		P3	
19.	3316	*Acacia effusa*		P3	
20.	23528	*Acacia subtiliformis*		P3	
21.	3940	*Glycine falcata*		P3	
22.	20856	*Gompholobium karijini*		P2	
23.	17716	*Indigofera gilesii*		P3	
24.	14329	*Indigofera ixocarpa*		P2	
25.	3994	*Isotropis forrestii*		P1	
26.	17790	*Isotropis parviflora*		P2	
27.	20862	*Rhynchosia bungarensis*		P4	
28.	42142	*Swainsona thompsoniana*		P3	
Goodeniaceae					
29.	20381	*Dampiera anonyma*		P3	
30.	20378	*Dampiera metallorum*		P3	
31.	12529	*Goodenia lyrata*		P3	
32.	7530	*Goodenia nuda*		P4	
33.	20263	*Scaevola sp. Hamersley Range basalts (S. van Leeuwen 3675)*		P2	
Malvaceae					
34.	40620	*Hibiscus sp. Mt Brockman (E. Thoma ET 1354)*		P1	
35.	16616	*Sida sp. Barlee Range (S. van Leeuwen 1642)*		P3	
Myrtaceae					
36.	20264	*Eucalyptus rowleyi*		P3	
37.	6069	*Thryptomene wittweri*		T	
Oxalidaceae					
38.	30374	*Oxalis sp. Pilbara (M.E. Trudgen 12725)*		P2	
Poaceae					
39.	17918	*Aristida jerichoensis var. subspinulifera*		P3	
40.	216	*Aristida lazaridis*		P2	
41.	17820	*Themeda sp. Hamersley Station (M.E. Trudgen 11431)*		P3	
42.	41101	*Triodia sp. Karijini (S. van Leeuwen 4111)*		P1	
43.	19534	*Triodia sp. Mt Ella (M.E. Trudgen 12739)*		P3	
Pottiaceae					
44.	20164	*Barbula ehrenbergii*		P1	
Pteridaceae					
45.	26	*Adiantum capillus-veneris (Maidenhair)*		P2	
Rutaceae					
46.	4482	*Geijera salicifolia*		P3	
Scrophulariaceae					
47.	14893	*Eremophila magnifica subsp. magnifica*		P4	
48.	14894	*Eremophila magnifica subsp. velutina*		P3	
49.	48236	*Eremophila pusilliflora*		P2	
Solanaceae					
50.	42542	*Solanum kentrocaule*		P3	
Thelypteridaceae					
51.	52	*Ampelopteris prolifera*		P3	

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap
Mapping Western Australia's biodiversity

NatureMap CS flora Report

Created By Guest user on 16/04/2021

Kingdom Plantae
Conservation Status Conservation Taxon (T, X, IA, S, P1-P5)
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 118° 25' 19" E,22° 39' 41" S
Buffer 40km
Group By Family

Family	Species	Records
Acanthaceae	2	11
Amaranthaceae	2	2
Asparagaceae	1	5
Asteraceae	3	7
Brassicaceae	1	3
Celastraceae	1	1
Chenopodiaceae	1	3
Cyperaceae	2	13
Elaeocarpaceae	1	4
Euphorbiaceae	2	4
Fabaceae	12	69
Goodeniaceae	5	35
Malvaceae	2	4
Myrtaceae	2	7
Oxalidaceae	1	1
Poaceae	5	20
Pottiaceae	1	2
Pteridaceae	1	16
Rutaceae	1	1
Scrophulariaceae	3	20
Solanaceae	1	2
Thelypteridaceae	1	2
TOTAL	**51**	**232**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acanthaceae					
1.	7165	*Dicladanthera glabra*		P2	
2.	11556	*Rostellularia adscendens var. latifolia*		P3	
Amaranthaceae					
3.	34810	*Amaranthus centralis*		P3	
4.	2744	*Ptilotus mollis*		P4	
Asparagaceae					
5.	48669	*Arthropodium sp. Ironstone (J. Bull & J. Waters ONS PJ 36.01)*		P2	Y
Asteraceae					
6.	19594	*Iotasperma sessilifolium*		P3	
7.	42006	*Pentalepis trichodesmoides subsp. hispida*		P2	
8.	33026	*Vittadinia sp. Coondewanna Flats (S. van Leeuwen 4684)*		P1	
Brassicaceae					
9.	3022	*Lepidium catapycnon (Hamersley Lepidium)*		P4	
Celastraceae					
10.	4729	*Stackhousia clementii*		P3	
Chenopodiaceae					
11.	20168	*Rhagodia sp. Hamersley (M. Trudgen 17794)*		P3	
Cyperaceae					
12.	766	*Cladium procerum*		P2	
13.	882	*Fimbristylis sieberiana*		P3	
Elaeocarpaceae					
14.	25768	*Tetratheca fordiana*		P2	
Euphorbiaceae					

NatureMap
Mapping Western Australia's biodiversity

NatureMap flora stats Report

Created By Guest user on 16/04/2021

Kingdom	Plantae
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	118° 25' 19" E,22° 39' 41" S
Buffer	40km
Group By	Family

Area (ha)		502569.66
Taxa:	Naturalised	24
	Native	789
Endemics:		1
Families:		89
Genera:		270
Conservation Status:	-	762
	1	6
	3	24
	T	1
	4	6
	2	14
MS Status:	-	775
	PN	37
	MS	1
Rank:	-	678
	forma	2
	subsp.	80
	var.	53

Top Ten Families

		Species	Records
1.	Fabaceae	147	849
2.	Poaceae	99	371
3.	Malvaceae	60	229
4.	Asteraceae	56	201
5.	Amaranthaceae	35	159
6.	Goodeniaceae	31	146
7.	Myrtaceae	30	214
8.	Cyperaceae	28	102
9.	Chenopodiaceae	23	69
10.	Scrophulariaceae	22	89

Top Ten Genera

		Species	Records
1.	*Acacia*	63	504
2.	*Eremophila*	22	89
3.	*Senna*	20	134
4.	*Ptilotus*	20	120
5.	*Eucalyptus*	18	147
6.	*Euphorbia*	16	47
7.	*Sida*	14	33
8.	*Goodenia*	13	69
9.	*Aristida*	12	44
10.	*Corchorus*	12	28

[1]Endemic To Query Area

Name ID	Species	Conservation Status
48669	*Arthropodium sp. Ironstone (J. Bull & J. Waters ONS PJ 36.01)*	P2

Conservation Codes
T - Rare or likely to become extinct
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S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix D

Flora data

Flora species list

Raw field data

Significant flora locations

Flora likelihood of occurrence assessment

Significant flora species list

Family	Taxon	Status
Poaceae	*Aristida lazaridis*	P2
Chenopodiaceae	*Rhagodia* sp. *Hamersley* (M. Trudgen 17794)	P3
Acanthaceae	*Rostellularia adscendens* var. *latifolia*	P3
Malvaceae	*Sida* sp. Barlee Range (S. van Leeuwen 1642)	P3

Significant taxa locations

Taxa	Site	Count	Location
Rhagodia sp. *Hamersley* (M. Trudgen 17794)	Packsaddle	1	603007 E 13216927 N
Rhagodia sp. *Hamersley* (M. Trudgen 17794)	Pond	1	601321 E 13210634 N
Rhagodia sp. *Hamersley* (M. Trudgen 17794)	Pond	1	601558 E 13210987 N
Rhagodia sp. *Hamersley* (M. Trudgen 17794)	Pond	2	601232 E 13209837 N
Rhagodia sp. *Hamersley* (M. Trudgen 17794)	Pond	1	601319 E 13210676 N
Rhagodia sp. *Hamersley* (M. Trudgen 17794)	TrackNW	1	601011 E 13209028 N
Rhagodia sp. *Hamersley* (M. Trudgen 17794)	TrackNW	1	601040 E 13209170 N
Rhagodia sp. *Hamersley* (M. Trudgen 17794)	TrackNW	1	600713 E 13208544 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593796 E 13196388 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593795 E 13196390 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593777 E 13196380 N
Rostellularia adscendens var. *latifolia*	Pineapple	11	593768 E 13196414 N
Rostellularia adscendens var. *latifolia*	Pineapple	5	593775 E 13196363 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593751 E 13196425 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593756 E 13196413 N
Rostellularia adscendens var. *latifolia*	Pineapple	2	593757 E 13196375 N
Rostellularia adscendens var. *latifolia*	Pineapple	4	593755 E 13196414 N
Rostellularia adscendens var. *latifolia*	Pineapple	2	593748 E 13196425 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593774 E 13196363 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593773 E 13196377 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593794 E 13196387 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593775 E 13196395 N

Taxa	Site	Count	Location
Rostellularia adscendens var. *latifolia*	Pineapple	1	593775 E 13196390 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593762 E 13196425 N
Rostellularia adscendens var. *latifolia*	Pineapple	12	593773 E 13196377 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593779 E 13196384 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593777 E 13196393 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593756 E 13196412 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593774 E 13196411 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593775 E 13196398 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593746 E 13196442 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593781 E 13196369 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593780 E 13196384 N
Rostellularia adscendens var. *latifolia*	Pineapple	2	593760 E 13196399 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593762 E 13196421 N
Rostellularia adscendens var. *latifolia*	Pineapple	5	593759 E 13196418 N
Rostellularia adscendens var. *latifolia*	Pineapple	2	593773 E 13196397 N
Rostellularia adscendens var. *latifolia*	Pineapple	3	593771 E 13196448 N
Rostellularia adscendens var. *latifolia*	Pineapple	10	593755 E 13196412 N
Rostellularia adscendens var. *latifolia*	Pineapple	3	593776 E 13196408 N
Rostellularia adscendens var. *latifolia*	Pineapple	3	593764 E 13196390 N
Rostellularia adscendens var. *latifolia*	Pineapple	4	593766 E 13196390 N
Rostellularia adscendens var. *latifolia*	Pineapple	3	593762 E 13196387 N
Rostellularia adscendens var. *latifolia*	Pineapple	2	593758 E 13196379 N
Rostellularia adscendens var. *latifolia*	Pineapple	5	593778 E 13196392 N

Taxa	Site	Count	Location
Rostellularia adscendens var. *latifolia*	Pineapple	1	593767 E 13196437 N
Rostellularia adscendens var. *latifolia*	Pineapple	2	593764 E 13196381 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593776 E 13196375 N
Rostellularia adscendens var. *latifolia*	Pineapple	2	593759 E 13196403 N
Rostellularia adscendens var. *latifolia*	Pineapple	1	593794 E 13196398 N
Sida sp. Barlee Range (S. van Leeuwen 1642)	P2 TRACK	1	600318 E 13243981 N
Sida sp. Barlee Range (S. van Leeuwen 1642)	P2 TRACK	1	600342 E 13243659 N
Sida sp. Barlee Range (S. van Leeuwen 1642)	Pond	1	601325 E 13210710 N
Aristida lazaridis	Packsaddle	1	602979 E 13216881 N
Aristida lazaridis	Packsaddle	3	602986 E 13216852 N
Aristida lazaridis	Packsaddle	1	602978 E 13216878 N
Aristida lazaridis	Packsaddle	20	602978 E 13216878 N
Aristida lazaridis	Packsaddle	10	602978 E 13216878 N
Aristida lazaridis	Packsaddle	20	602978 E 13216878 N

Flora likelihood of occurrence assessment guidelines

Likelihood of occurrence	Guideline
Known	
Likely	Species previously recorded within the study area (40 km radius) and large areas of suitable habitat occur in the survey area.
Possible	Species previously recorded within the study area and areas of suitable habitat occur/may occur in the survey area.
Unlikely	Species previously recorded within the study area, but suitable habitat does not occur in the survey area or suitable habitat occurs in the survey area, however, suitable search effort did not record the species.
Highly unlikely	Species not previously recorded within the study area, suitable habitat does not occur in the survey area and/or the survey area is outside the natural distribution of the species.
Other considerations	Intensity of survey, availability of access, growth form type, recorded flowering times, cryptic nature of species

Source information - desktop searches

NM – DBCA *NatureMap* (accessed June 2021)

PMST – DAWE Protected Matters Search Tool (PMST) to identify flora listed under the EPBC Act potentially occurring within the study area

Family	Taxon	WA Status	EPBC Status	Description (FloraBase) and closest record information (if available)	Likelihood of occurrence	Source
Acanthaceae	*Dicladanthera glabra*	P2		Spreading perennial, herb or shrub, to 0.6(-1) m high. Fl. white/white-blue, Apr or Aug to Oct. Alluvium. Along watercourses, near rock pools.	Unlikely- species is found in growing along watercourses and pools. The closest known record is located approximately 14 km north east of the survey area. No habitat is present in the survey area.	NatureMap
Acanthaceae	*Rostellularia adscendens* var. *latifolia*	P3		Herb or shrub, 0.1-0.3 m high. Fl. blue-purple-violet, Apr to May. Ironstone soils. Near creeks, rocky hills.	Known. Species was recorded in the survey area during the current survey.	NatureMap BHP WAIO
Amaranthaceae	*Amaranthus centralis*	P3		Herbaceous shrub to 0.6 m. Flat terrain, alluvial flat, gritty red damp clay loam.	Unlikely- species is found in growing on alluvial flats. The closest known record is located approximately 20 km north of the survey area. No habitat is present in the survey area.	NatureMap

Family	Taxon	WA Status	EPBC Status	Description (FloraBase) and closest record information (if available)	Likelihood of occurrence	Source
Amaranthaceae	*Ptilotus mollis*	P4		Compact, perennial shrub, to 0.5 m high, soft grey foliage. Fl. white/pink, May or Sep. Stony hills and screes.	Unlikely- species is found in growing on stony hills and screes. The closest known record is located approximately 22 km north of the survey area. No habitat is present in the survey area.	NatureMap
Apocynaceae	*Gymnanthera cunninghamii*	P3		Erect shrub, 1-2 m high. Fl. cream-yellow-green, Jan to Dec. Sandy soils.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	BHP WAIO
Asteraceae	*Iotasperma sessilifolium*	P3		Erect herb. Fl. pink. Cracking clay, black loam. Edges of waterholes, plains.	Unlikely- species is found in growing on cracking clay. The closest known record is located approximately 30 km north east of the survey area. Suitable habitat is present suitable search effort did not record the species	NatureMap
Asteraceae	*Pentalepis trichodesmoides* subsp. *hispida*	P2		Upright perennial shrub. Skeletal red gritty soil over massive basalt type rock	Unlikely- species is found in growing on basalt. The closest known record is located approximately 15 km north west of the survey area. Whilst suitable habitat is present suitable search effort did not record the species.	NatureMap
Asteraceae	*Vittadinia* sp. Coondewanna Flats (S. van Leeuwen 4684)	P1		Herb, 0.4 m tall. Drainage area/floodplain with silty clay loam soil.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	NatureMap BHP
Brassicaceae	*Lepidium catapycnon*	P4		Open, woody perennial, herb or shrub, 0.2-0.3 m high, stems zigzag. Fl. white, Oct. Skeletal soils. Hillsides.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	NatureMap BHP
Celastraceae	*Stackhousia clementii*	P3		Dense broom-like perennial, herb, to 0.45 m high. Fl. green/yellow/brown. Skeletal soils. Sandstone hills.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	NatureMap
Chenopodiaceae	*Rhagodia* sp. Hamersley (M. Trudgen 17794)	P3		Tall spindly shrub to 2.5 m. Flat red brown hardpan plain	Known. Species was recorded in the survey area during the current survey.	NatureMap BHP
Cyperaceae	*Cladium procerum*	P2		Densely tufted perennial, grass-like or herb (sedge), 2 m high. Fl. Nov. Perennial pools.	Unlikely- species is found in growing along pool edges. The closest known record is located approximately 40 km north of the survey area. No habitat is present in the survey area.	NatureMap

Family	Taxon	WA Status	EPBC Status	Description (FloraBase) and closest record information (if available)	Likelihood of occurrence	Source
Cyperaceae	*Fimbristylis sieberiana*	P3		Shortly rhizomatous, tufted perennial, grass-like or herb (sedge), 0.25-0.6 m high. Fl. brown, May to Jun. Mud, skeletal soil pockets. Pool edges, sandstone cliffs.	Unlikely - Nearest record is 20 km north east while suitable habitat is present suitable search effort did not record the species.	NatureMap
Euphorbiaceae	*Euphorbia australis* var. *glabra*	P3		Prostrate annual herb to 0.05 m tall. Red-brown clay-loam with loam surface	Unlikely- species is found in growing on clay-loam soils. The closest known record is located approximately 50 km east of the survey area. No habitat is present in the survey area.	NatureMap
Euphorbiaceae	*Euphorbia inappendiculata* var. *queenslandica*	P2		Prostrate herb, 0.03 m high. Cracking clay pan with light brown light clay.	Unlikely- species is found on cracking clay. The closest known record is located approximately 30 km east of the survey area. No habitat is present in the survey area.	NatureMap
Elaeocarpaceae	*Tetratheca fordiana*	P2		Dwarf shrub, 0.3-0.4 m high. Shale pocket anongst ironstone.	Unlikely- species is found in growing on banded ironstone. The closest known record is located approximately 30 km east of the survey area. No habitat is present in the survey area.	NatureMap
Fabaceae	*Acacia bromilowiana*	P4		Tree or shrub, to 12 m high, bark dark grey, fibrous; phyllodes more or less glaucous & slightly pruinose; inflorescence in spikes. Fl. yellow/pink, Jul to Aug. Red skeletal stony loam, orange-brown pebbly,gravel loam, laterite, banded ironstone, basalt. Rocky hills, breakaways, scree slopes, gorges, creek beds.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	NatureMap BHP
Fabaceae	*Acacia daweana*	P3		Spreading shrub, 0.3-1.5(-2) m high. Fl. yellow, Jul to Sep. Stony red loamy soils. Low rocky rises, along drainage lines.	Unlikely- species is found in growing on rocky slopes, along drainage lines. The closest known record is located approximately 20 km east of the survey area.	NatureMap
Fabaceae	*Acacia effusa*	P3		Low, dense, spreading, somewhat viscid shrub, 0.3-1 m high, bark 'minni-ritchi'. Fl. yellow, May to Aug. Stony red loam. Scree slopes of low ranges.	Unlikely- species is found in growing stony red loam. The closest known record is located approximately 20 km east of the survey area. No habitat is present in the survey area.	NatureMap

Family	Taxon	WA Status	EPBC Status	Description (FloraBase) and closest record information (if available)	Likelihood of occurrence	Source
Fabaceae	*Acacia subtiliformis*	P3		Spindly, slender, erect shrub, to 3.5 m high, phyllodes green, new growth slightly viscid, resinous, aromatic; inflorescence in heads to 6 mm diameter; peduncles red. Fl. yellow, Jun. On rocky calcrete plateau	Unlikely- species is found in growing on rocky plateaus. The closest known record is located approximately 40 km east of the survey area. No habitat is present in the survey area.	NatureMap
Fabaceae	*Glycine falcata*	P3		Mat-forming perennial, herb, to 0.2 m high. Fl. blue-purple, May or Jul. Black clayey sand. Along drainage depressions in crabhole plains on river floodplains.	Unlikely- species is found in growing on cracking clay. The closest known record is located approximately 40 km east of the survey area. No habitat is present in the survey area.	NatureMap
Fabaceae	*Gompholobium karijini*	P2		Erect, shrub, spindly shrub (broom-like) to 0.5 m high. Fl. yellow Recorded from skeletal soils on the edges of deep ravines and plateau on banded ironstone.	Unlikely- the closest known record is located approximately 40 km north west of the survey area. No habitat is present in the survey area.	NatureMap
Fabaceae	*Indigofera gilesii*	P3		Shrub, to 1.5 m high. Fl. purple-pink, May or Aug. Pebbly loam. Amongst boulders & outcrops, hills.	Unlikely- species is found in growing on ironstone outcrops. The closest known record is located approximately 40 km west of the survey area. No habitat is present in the survey area.	NatureMap.
Fabaceae	*Indigofera ixocarpa*	P2		Shrub, to 1 m high. Fl. pink, May. Skeletal red soils over massive ironstone.	Unlikely- species is found in growing on ironstone outcrops The closest known record is located approximately 40 km west of the survey area. No habitat is present in the survey area.	NatureMap
Fabaceae	*Isotropis forrestii*	P1		Erect shrub, 0.4-1.5 m high. Fl. yellow/orange & red, Apr to Sep or Dec. Stony clay loam, sandy alluvium. Along drainage lines	Unlikely- species is found in growing on stony/clay loam. The closest known record is located approximately 40 km south west of the survey area. No habitat is present in the survey area.	NatureMap
Fabaceae	*Isotropis parviflora*	P2		Shrub, 0.1 m high. Fl. white/pink, Mar. Valley slope of ironstone plateau.	Unlikely- species is found in growing on ironstone plateaus. The closest known record is located approximately 40 km south of the survey area. No habitat is present in the survey area.	NatureMap

Family	Taxon	WA Status	EPBC Status	Description (FloraBase) and closest record information (if available)	Likelihood of occurrence	Source
Fabaceae	*Rhynchosia bungarensis*	P4		Compact, prostrate shrub, to 0.5 m high. Fl. yellow. Pebbly, shingly coarse sand amongst boulders. Banks of flow line in the mouth of a gully in a valley wall.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	NatureMap BHP
Fabaceae	*Swainsona thompsoniana*	P3		Annual herb, c. 20 cm tall. Cracking clay floodplain.	Unlikely- species is found in growing on cracking clay. The closest known record is located approximately 40 km east of the survey area. No habitat is present in the survey area.	NatureMap
Goodeniaceae	*Dampiera anonyma*	P3		Multistemmed perennial, herb, to 0.5(-1) m high. Fl. blue-purple, Jun to Sep. Skeletal red-brown to brown gravelly soil over banded ironstone, basalt, shale and jaspilite. Hill summits, upper slopes (above 1000m).	Unlikely- species is found in growing on hill summits. The closest known record is located approximately 40 km north of the survey area. No habitat is present in the survey area.	NatureMap
Goodeniaceae	*Dampiera metallorum*	P3		Rounded, multistemmed perennial, herb, to 0.5 m high. Fl. blue, Apr or Jun to Oct. Skeletal red-brown gravelly soil over banded ironstone. Steep slopes, summits of hills.	Unlikely- species is found in growing on steep hill summits The closest known record is located approximately 40 km east of the survey area. No habitat is present in the survey area.	NatureMap
Goodeniaceae	*Goodenia lyrata*	P3		Prostrate herb, with lyrate leaves. Fl. yellow, Aug. Red sandy loam. Near claypan.	Unlikely- species is found in growing on claypans The closest known record is located approximately 40 km east of the survey area. No habitat is present in the survey area.	NatureMap
Goodeniaceae	*Goodenia nuda*	P4		Erect to ascending herb, to 0.5 m high. Fl. yellow, Apr to Aug.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	NatureMap BHP
Goodeniaceae	*Scaevola* sp. Hamersley Range basalts (S. van Leeuwen 3675)	P2		Shrub, to 1 m high. Fl. Jul to Aug. Skeletal, brown gritty soil over basalt. Summits of hills, steep hills	Unlikely- species is found in growing hill summits.The closest known record is located approximately 40 km north of the survey area. No habitat is present in the survey area.	NatureMap
Malvaceae	*Hibiscus* sp. Mt Brockman (E. Thoma ET 1354)	P1		Spindly erect shrub to 3.5 m, mauve flowers..Gullies and below breakaways.	Unlikely- species is found in growing in gullies. The closest known record is located approximately 40 km west of the survey area. No habitat is present in the survey area.	NatureMap

Family	Taxon	WA Status	EPBC Status	Description (FloraBase) and closest record information (if available)	Likelihood of occurrence	Source
Malvaceae	*Sida* sp. Barlee Range (S. van Leeuwen 1642)	P3		Spreading shrub, to 0.5 m high. Fl. yellow, Aug. Skeletal red soils pockets. Steep slope.	Known. Species was recorded in the survey area during the current survey.	NatureMap BHP
Myrtaceae	*Eucalyptus rowleyi*	P3		Mallee, 3 m high. Dry grey sandy loam; seasonally inundated.	Unlikely- species is found in growing on dry sandy loam. The closest known record is located approximately 25 km west of the survey area. No habitat is present in the survey area.	NatureMap
Myrtaceae	*Thryptomene wittweri*	T(VU)	T(VU)	Spreading or rounded shrub, 0.5-1.5(-2.1) m high. Fl. white-cream, Apr or Jul or Aug. Skeletal red stony soils. Breakaways, stony creek beds.	Unlikely- species is found in growing on stony creek beds. The closest known record is located approximately 40 km east of the survey area. No habitat is present in the survey area.	NatureMap
Oxalidaceae	*Oxalis* sp. Pilbara (M.E. Trudgen 12725)	P2		Herb to 0.1 mcm high. Gorge with sandy loam soil.	Unlikely- species is found in growing in gorges. The closest known record is located approximately 10 km east of the survey area. Suitable habitat is present suitable search effort did not record the species	NatureMap
Poaceae	*Aristida jerichoensis* var. *subspinulifera*	P3		Compactly tufted perennial, grass-like or herb, 0.3-0.8 m high, lemma groove muricate. Hardpan plains.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	NatureMap BHP
Poaceae	*Aristida lazaridis*	P2		Tufted perennial, grass-like or herb, 0.4-1.5 m high. Fl. green/purple, Apr. Sand or loam.	Known. Species was recorded in the survey area during the current survey.	NatureMap BHP
Poaceae	*Themeda* sp. Hamersley Station (M.E. Trudgen 11431)	P3		Tussocky perennial, grass-like or herb, 0.9-1.8 m high. Fl. Aug. Red clay. Clay pan, grass plain.	Unlikely- species is found in growing on clay pans and grass plains The closest known record is located approximately 10 km east of the survey area. Suitable habitat is present suitable search effort did not record the species	NatureMap
Poaceae	*Triodia* sp. Karijini (S. van Leeuwen 4111)	P1		Hummock grass 0.5 m high. Hillcrest with sandy loam soil.	Unlikely- species is found in hillcrests. The closest known record is located approximately 40 km north of the survey area. No habitat is present in the survey area.	NatureMap
Poaceae	*Triodia* sp. Mt Ella (M.E. Trudgen 12739)	P3		Perennial, grass-like or herb, 0.4 m high. Light orange-brown, pebbly loam. Amongst rocks & outcrops, gully slopes.	Unlikely- species is found in growing on gully slopes. The closest known record is located approximately 10 km west of the survey area. Suitable habitat is present suitable search effort did not record the species	NatureMap

Family	Taxon	WA Status	EPBC Status	Description (FloraBase) and closest record information (if available)	Likelihood of occurrence	Source
Pottiaceae	*Barbula ehrenbergii*	P1		Dales Gorge, Hamersley Range National Park - On rock iron rich, weathered conglomerate.	Unlikely- species is found in growing on conglomerate.The closest known record is located approximately 30 km north of the survey area. No habitat is present in the survey area, however the survey of non-vascular species is outside the scope of this assessment..	NatureMap
Pteridaceae	*Adiantum capillus-veneris*	P2		Rhizomatous, perennial, herb or (fern), 0.1-0.2 m high, frond 1-2-pinnate; stipe blackish-brown, hard, glossy; sori marginal between sinuses, oblong. Moist, sheltered sites in gorges and on cliff walls.	Unlikely- species is found in growing on cliff walls. The closest known record is located approximately 40 km north of the survey area. No habitat is present in the survey area.	NatureMap
Rutaceae	*Geijera salicifolia*	P3		Tree, 1.5-6 m high. Fl. white, Sep. Skeletal soils, stony soils. Massive rock scree, gorges.	Unlikely- species is found in growing in gorges. The closest known record is located approximately 40 km west of the survey area. Suitable habitat is present suitable search effort did not record the species	NatureMap
Scrophulariaceae	*Eremophila magnifica* subsp. *magnifica*	P4		Shrub, 0.5-1.5 m high. Fl. blue, Aug to Nov. Skeletal soils over ironstone. Rocky screes.	Unlikely – Previously recorded within survey area and suitable habitat is present suitable search effort did not record the species	NatureMap BHP
Scrophulariaceae	*Eremophila magnifica* subsp. *velutina*	P3		Shrub, 0.5-1.5 m high. Fl. blue-purple, Aug to Sep. Skeletal soils over ironstone. Summits.	Unlikely- species is found in growing on hill summits. The closest known record is located approximately 30 km east of the survey area. No habitat is present in the survey area.	NatureMap
Scrophulariaceae	*Eremophila pusilliflora*	P2		Compact small shrub up to 40 cm tall. Flat land with red brown loam over ironstone.	Unlikely- species is found in growing on ironstone outcrops. The closest known record is located approximately 20 km west of the survey area. No habitat is present in the survey area.	NatureMap
Solanaceae	*Solanum kentrocaule*	P3		Spiny, erect perennial shrub, 70 cm tall. Gorge. Red-brown loam. Exposed outcrops - cliff face.	Unlikely- species is found in growing on exposed outcrops and cliff faces. The closest known record is located approximately 20 km north of the survey area. No habitat is present in the survey area.	NatureMap

Family	Taxon	WA Status	EPBC Status	Description (FloraBase) and closest record information (if available)	Likelihood of occurrence	Source
Thelypteridaceae	*Ampelopteris prolifera*	P3		Rhizomatous, perennial, herb or (fern), to 4 m high, fronds 1-pinnate, pinnae shallowly lobed; buds on pinnae can form new plants; sori lacking indusia. Near water or in wet ground.	Unlikely- species is found in growing on, near wet ground. The closest known record is located approximately 40 km east of the survey area. No habitat is present in the survey area.	NatureMap

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