

Brockman Syncline

Riparian Vegetation Survey

Duck Creek

Biologic Environmental Survey

Report to Rio Tinto Iron Ore

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EXECUTIVE SUMMARY

Rio Tinto Iron Ore Pty Ltd (Rio Tinto) commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake a two-phase detailed riparian flora and vegetation assessment of Duck Creek (hereafter the study area) as part of the Brockman Syncline Proposal. The study area is a 120 km watercourse located within the Pilbara bioregion of Western Australia, located approximately 53 km northwest of Tom Price.

The overarching objective of the detailed riparian flora and vegetation assessment was to identify the flora and vegetation values of the study area and to determine if there are any ecologically significant values that need to be considered during any future environmental approvals across the study area.

The detailed riparian flora and vegetation assessment was undertaken over two seasons. Phase one was split into two trips, the first from 15 to 21 October 2019, and trip two 24 October to 1 November 2019. Rainfall prior to phase one was below average but is not considered to have impacted the outcomes of the survey. Phase two was completed during one trip, occurring from 12 to 19 of June 2020. Despite substantial rainfall during February 2020, rainfall was slightly below average prior to the phase two survey. Again, this is not considered to have impacted the survey outcomes. Due to travel limitations during the COVID-19 pandemic, resampling of 15 monitoring transects was unable to occur during the 2020 survey. However, there were no other substantial limitations to the work, and it is considered that the work is of a sufficient level to meet EPA requirements and the objectives of the survey.

Vegetation was sampled in 2019 with 66 quadrats, with all quadrats resampled in 2020. A total of 277 confirmed vascular flora taxa from 58 families and 152 genera were recorded from the study area during the survey. The total number of vascular flora taxa recorded comprised 251 native taxa and 26 introduced taxa.

Six conservation significant taxa were recorded in the study area during the survey: *Aristida lazaridis* (P2), *Ipomoea racemigera* (P2), *Gymnanthera cunninghamii* (P3), *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3), *Livistona alfredii* (P4) and *Rhynchosia bungarensis* (P4). Of these, *Aristida lazaridis* is a range extension.

Twenty-six introduced taxa were recorded from the study area during the survey. These introduced taxa are not listed as weeds of national significance or declared pests. In addition, these taxa have been previously recorded from the region and are common in the Pilbara.

Fifteen vegetation types from nine broad floristic formations were recorded in the study area. None are considered to be analogous with the known threatened and priority ecological communities occurring in the Pilbara region. However, six vegetation types contained flora taxa indicative of consistent soil moisture, suggesting this vegetation has a degree of groundwater dependence and local significance.

Vegetation condition in the study area ranged from completely degraded to excellent, with the majority mapped as good condition. The most common impacts to the vegetation were from cattle grazing and trampling as well as weed invasion.

1 INTRODUCTION

1.1 Background

Rio Tinto Iron Ore Pty Ltd (Rio Tinto) is evaluating the potential development of a number of iron ore deposits in the Greater Brockman area, in the Pilbara region of Western Australia. This future development, termed the Brockman Syncline Proposal will form a revision to the existing Nammuldi-Silvergrass and Brockman (2 and 4) operations. As some of the deposits under evaluation are below water table deposits, development would require surplus water management which may include discharge to Duck Creek (the study area).

Rio Tinto commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake a two-phase detailed riparian flora and vegetation assessment (the survey) of the study area. The study area is a 120 km watercourse located within the Pilbara bioregion of Western Australia, beginning approximately 53 km northwest of Tom Price, at the Nammuldi mine (Figure 1.1). Duck Creek crosses multiple exploration tenements (Figure 1.2) and is located northwest of Brockman 4 and southwest of Brockman 2 mines.

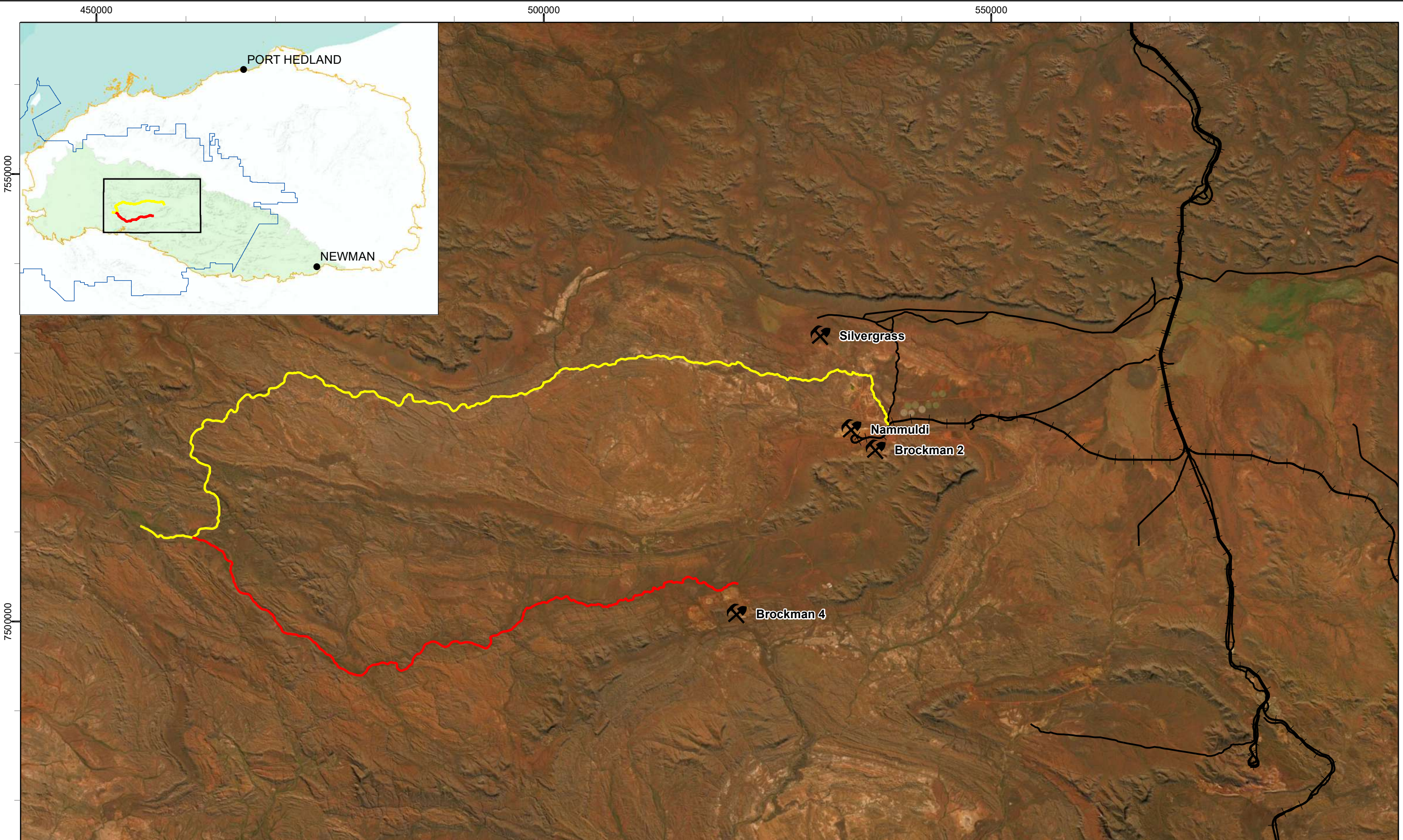
The survey was undertaken concurrently with a complimentary survey of Boolgeeda Creek, located to south of the study area. The Boolgeeda survey starts from the Brockman 4 operations, before entering Duck Creek, approximately 80 km to the west, or approximately 110 km down Duck Creek from the Nammuldi operations (Figure 1.1).

Baseline riparian vegetation data is required to provide information for potential surplus water management, which may include discharge to the study area.


1.2 Objectives

The overarching objective of the detailed riparian flora and vegetation assessment (hereafter referred to as the survey) was to identify the flora and vegetation values of the study area and to determine if there are any ecologically significant values that need to be considered during any future environmental approvals across the study area. The following work was undertaken to address the scope of works:

- A desktop assessment, including the review of previous biological surveys and government and non-government databases;
- A two-phase riparian vegetation assessment across the study area and relevant regional context;
- Establishment and sampling of riparian vegetation monitoring transects (during phase one);
- A review of the results of the vegetation assessment to determine if there are any significant environmental values within the study area;
- Identification and delineation of riparian features that potentially represent a hydrophytic or mesophytic environment; and
- A discussion of the significant environmental values (and remaining environmental values) from a regional and local context.



- Legend**
- Boolgeeda Creek
 - Duck Creek
 - RTIO Mine
 - Shire of Ashburton
 - Hamersley Subregion
 - Local road
 - + Railway


 biologic
 Environmental Survey

N
 1:385,000
 0 5 10 20 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 1.1: Study Area and regional location

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

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1.3 Background to Protection of Flora and Vegetation

Within Western Australia, all native flora is protected under the *Biodiversity Conservation Act 2016* (BC Act) and any action that has the potential to impact on native flora needs to be approved by relevant state and/ or federal departments as dictated by the Western Australian *Environmental Protection Act 1986* (EP Act) and the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Some species of flora that are determined to be at risk of extinction or in decline are afforded extra protection under these Acts. For the purposes of this report, these species are called conservation significant species. A summary of applicable legislation and status codes is provided in Table 1.1. Additional information on conservation status codes is provided in Appendix A.

The EPBC Act identifies Threatened Ecological Communities (TECs) as ecological communities at risk of extinction. The BC Act provides for the statutory listing of TECs by the Western Australian (WA) Minister for Environment. The WA Minister for Environment has endorsed 69 ecological communities as threatened under critically endangered (20 communities), endangered (17 communities), vulnerable (28 communities) and presumed totally destroyed (four communities).

For some species and ecological communities there is insufficient information to determine their status. These species are generally considered by the Environmental Protection Authority (EPA)/ Department of Biodiversity, Conservation and Attractions (DBCA) as 'conservation significant' for all development related approvals and are listed on a 'Priority List' (Priorities 1, 2 and 3 for poorly known species and Priority 4 for rare and near threatened species) (Table 1.1). The Priority List is regularly reviewed and maintained by DBCA. Possible TECs that do not meet the criteria for statutory listing by the WA Minister for Environment are added to DBCA's 'Priority Ecological Communities' (PECs) lists under Priorities 1, 2, 3, 4 (near threatened) or 5 (conservation dependent) (Table 1.1).

Groundwater dependent ecosystems (GDEs) are protected under the Environmental Factor Guideline: Inland Waters (EPA, 2018) when assessing any potential proposal that may impact GDEs. The objective of the Inland Waters Environmental Factor is "to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected" (EPA, 2018). Inland waters include both groundwater (such as superficial and confined aquifers) and surface water systems (such as waterways, wetlands and estuaries) (EPA, 2018). Both permanent systems and those which hold water for part of the year or occasionally (seasonal and ephemeral systems), are included in the Inland Waters Factor. Waterways are any river, creek, stream or brook, including its floodplain and estuary or inlet and includes systems that flow permanently, for part of the year or occasionally (EPA, 2018). For the purposes of EIA, the EPA focusses on 'significant ecosystems'. Significant ecosystems which relate to the study area will be defined based on the presence of terrestrial and aquatic GDEs and the communities or species they support.

Table 1.1: Conservation significance assessment guidelines

Agreement, Act or List	Status Codes
FEDERAL	
<p>Environment Protection and Biodiversity Conservation Act 1999</p> <p>The Department of Agriculture, Water and the Environment (DAWE) lists Threatened flora, which are determined by the Threatened Species Scientific Committee (TSSC) per criteria set out in the Act. The Act lists flora that are considered to be of conservation significance under one of the categories listed under 'Status Codes'.</p>	<ul style="list-style-type: none"> • Extinct (EX) • Extinct in the Wild (EW) • Critically Endangered (CE) • Endangered (EN) • Vulnerable (VU) • Conservation Dependent (CD)
<p>Threatened ecological communities (TECs) are those that are at risk of extinction.</p>	<ul style="list-style-type: none"> • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU)
Agreement, Act or List	Status Codes
STATE	
<p>Biodiversity Conservation Act 2016</p> <p>The <i>Biodiversity Conservation Act 2016</i> provides for the listing of threatened native flora and TECs that need protection as critically endangered, endangered or vulnerable species or ecological communities because they are under identifiable threat of extinction (species) or collapse (ecological communities).</p>	<p>Species</p> <ul style="list-style-type: none"> • Schedule 1 (Critically Endangered) (S1 or CR) • Schedule 2 (Endangered) (S2 or EN) • Schedule 3 (Vulnerable) (S3 or VU) • Schedule 4 (Extinct) (S4 or EX) • Extinct in the Wild (EW)
	<p>TECs</p> <ul style="list-style-type: none"> • Presumed Totally Destroyed (PD) • Critically Endangered (CR) • Endangered (EN) • Vulnerable (VU)
<p>DBCA Priority List</p> <p>DBCA produces a list of Priority species and ecological communities that have not been assigned statutory protection under the BC Act. This system gives a ranking from Priority 1 to Priority 4 for flora and Priority 1 to Priority 5 for ecological communities.</p>	<ul style="list-style-type: none"> • Priority 1 (P1) • Priority 2 (P2) • Priority 3 (P3) • Priority 4 (P4) • Priority 5 (P5; for PECs)

1.4 Compliance

The survey documented in this report was carried out in a manner consistent with the Western Australian EPA, DBCA and Rio Tinto guidelines for the environmental surveying and reporting of flora and vegetation. The following guidelines, procedures and documents were utilised prior to, during and after completion of the field survey:

- EPA (2020) Statement of Environmental Principles, Factors and Objectives.
- EPA (2016a) Environmental Factor Guideline: Flora and Vegetation.
- EPA (2016b) Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment.
- EPA (2018) Environmental Factor Guideline: Inland Waters.
- Rio Tinto (2018c) Rio Tinto Data Standards.
- DEC (2009) Establishing Vegetation Transects.

2 ENVIRONMENT

2.1 Biogeographical Regionalisation of Australia

The Interim Biogeographic Regionalisation for Australia (IBRA, version 7) divides Australia into 89 bioregions and 419 sub-regions based on climate, geology, landform, native vegetation and species information (Thackway & Cresswell, 1995). The study area occurs in the Pilbara bioregion (Figure 1.1), characterised by vast coastal plains and inland mountain ranges with cliffs and deep gorges (Thackway & Cresswell, 1995). Vegetation is predominantly mulga low woodlands or snappy gum over bunch and hummock grasses (Bastin, 2008).

The Pilbara bioregion is characterised by four separate subregions, Chichester (PIL01), Fortescue (PIL02), Hamersley (PIL03) and Roebourne (PIL04), with the Study Area located in the Hamersley subregion (Figure 1.1). The Hamersley subregion is characterised by mountainous area of sedimentary ranges and plateaus which receive significantly higher rainfall than the surrounding subregion. This gives rise to deeply incised gorges, up to 100 metres (m) deep, containing extensive permanent spring-fed streams and pools (Kendrick, 2001). The Hamersley contains extensive open snappy gum woodland and hummock grassland communities on ranges and plateaus, with low mulga woodlands over bunch grasses on fine textured soils in lower areas and valley floors (Kendrick, 2001).

2.2 Climate

The Pilbara bioregion has a semi-desert to tropical climate, with rainfall occurring sporadically throughout the year, although mostly during summer (Thackway & Cresswell, 1995). Summer rainfall is usually the result of tropical storms in the north or tropical cyclones that impact upon the coast and move inland (Leighton, 2004). The winter rainfall is generally lighter and is the result of cold fronts moving north easterly across the state (Leighton, 2004). The average annual rainfall ranges from 200-350 mm, although there are significant fluctuations between years (BoM, 2020a), with up to 1200 mm falling in some locations in some years (McKenzie *et al.*, 2009).

Long-term climatic data are not available for the study area itself; however, long term climatic data are available from the Bureau of Meteorology (BoM) weather station at Paraburdoo (Station 7185; 1974-2020), 98 km southwest of the study area (BoM, 2020a). Paraburdoo is expected to provide the most accurate long-term average (LTA) dataset for climatic conditions experienced within the study area (Figure 2.1).

Paraburdoo receives on average 312.4 mm of rainfall each year, with the majority during December through to March (67 % of the total rainfall; BoM, 2020a). Day time temperatures are the hottest during the summer months of December to February, with the maximum temperatures regularly exceeding 40°C. The average maximum temperature during the hottest three months is 40.0°C, while the average minimum temperature is 25.3°C (Figure 2.1) (BoM, 2020a). The coolest time of year is from June to August, with night-time temperatures regularly falling below 10°C. The average maximum temperature during the coldest three months is 25.9°C, while the average minimum temperature is 10.7°C (Figure 2.1) (BoM, 2020a).

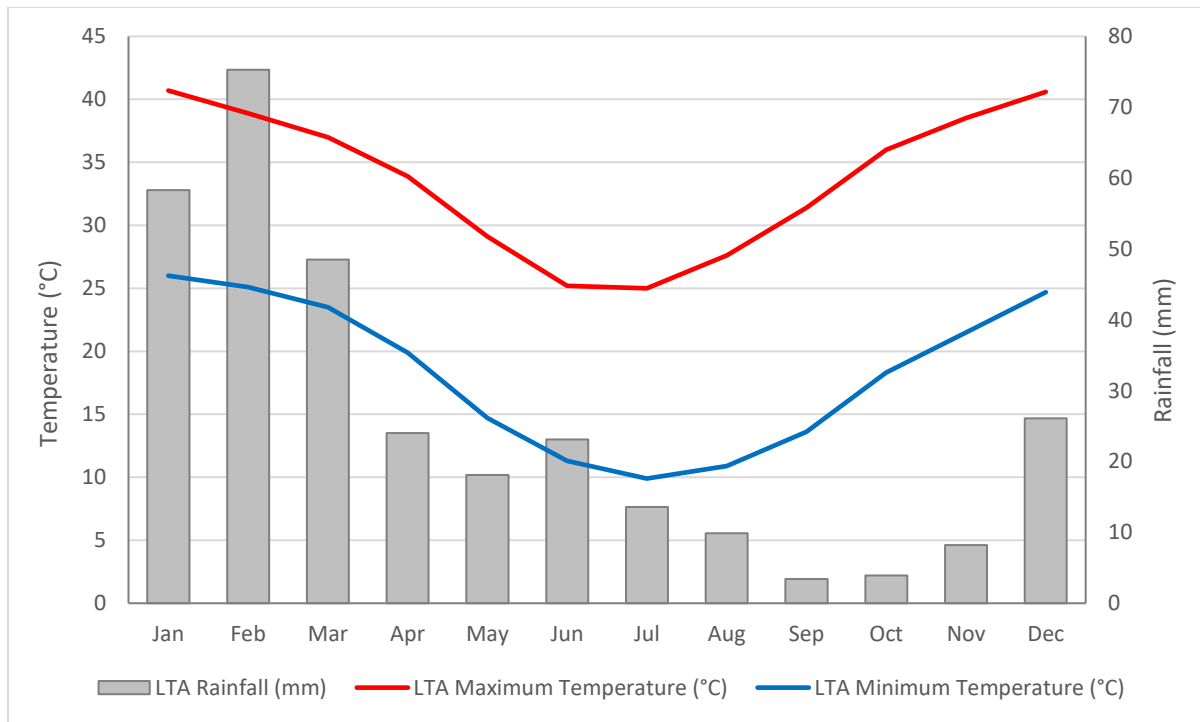


Figure 2.1: Long-term climatic averages (LTA) of monthly rainfall and temperature from Paraburdoo Station 7185 (BoM, 2020a)

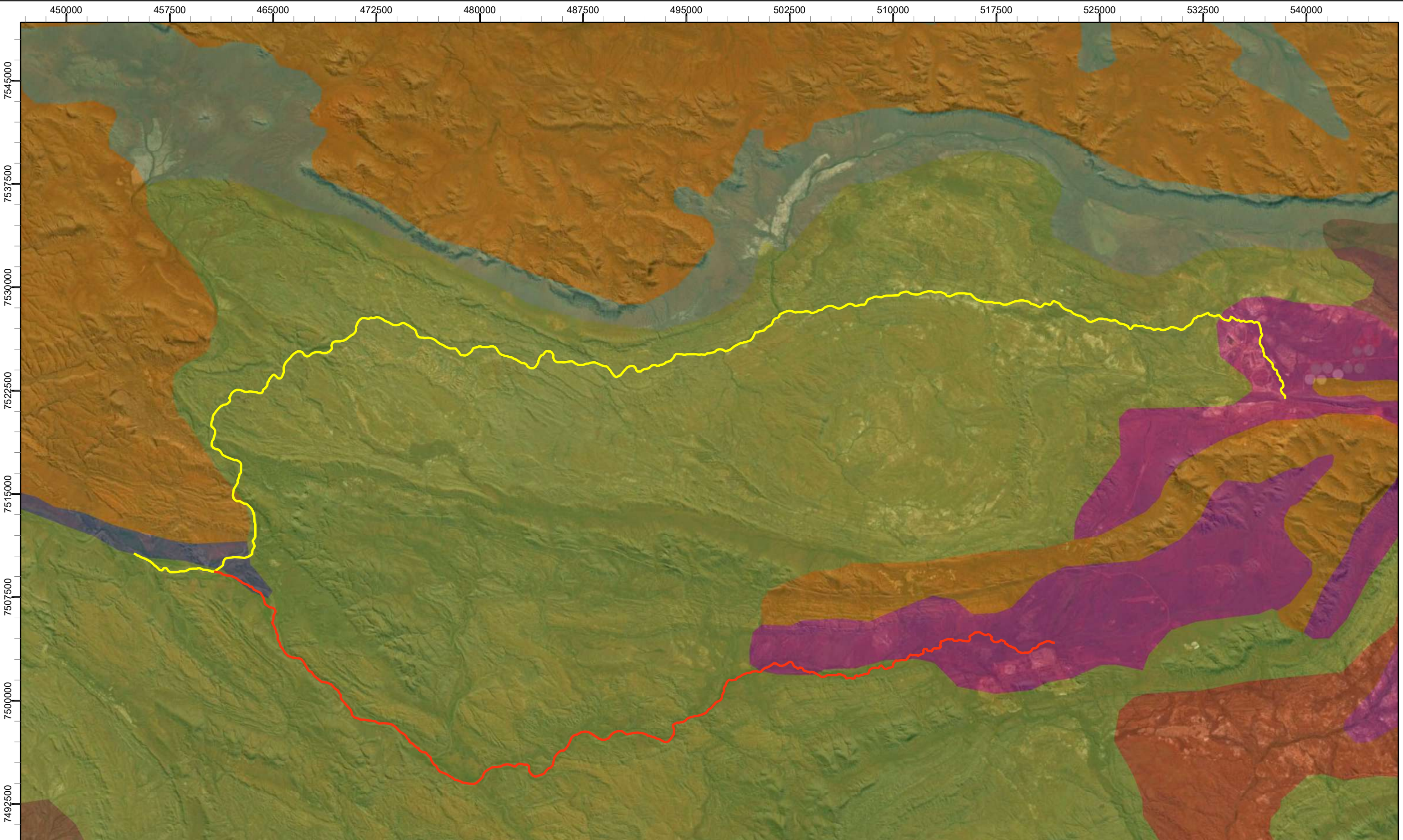
2.3 Existing Land Use

The Study Area crosses multiple exploration (14), prospecting (two), miscellaneous (five), and general purpose (two) licences (Figure 1.1), held by Blue Mist Enterprises Pty Ltd, Brockman Exploration Pty Ltd, Cazaly Iron Pty Ltd, Digirock Pty Ltd, Fortescue Metals Group Ltd, FMG Pilbara Pty Ltd, and Hamersley Iron Pty Ltd (a subsidiary of Rio Tinto). The Study Area is wholly located within the Shire of Ashburton (Figure 1.1) and passes through the Mount Stuart and Hamersley pastoral leases, which are predominantly used for grazing cattle.












2.4 Soils and Landforms


The Atlas of Australian Soils (Northcote *et al.*, 1968) was compiled by the Commonwealth Scientific and Industrial Research Organisation (CSIRO, 2009) in the 1960's to provide a consistent national description of Australia's soils. It comprises of a series of ten maps and associated explanatory notes and is published at a scale of 1:2,000,000, but the original compilation was at scales from 1:250,000 to 1:500,000.

The majority of the study area runs through Fa15, with the eastern end mapped as Oc69, and small portions of the western end in BD1 and Fa13 (Northcote *et al.*, 1968) (Figure 2.2).

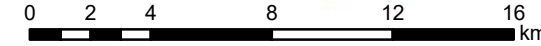


Legend

 Boolgeeda Creek	 Fa13	 Ja2
 Duck Creek	 Fa15	 MM16
Soil Unit	 Fa16	 Oc68
 BD1	 Fb3	 Oc69



1:250,000



0 2 4 8 12 16 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 2.2: Soil landscape units of the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

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The definitions of the soil units are as follows:

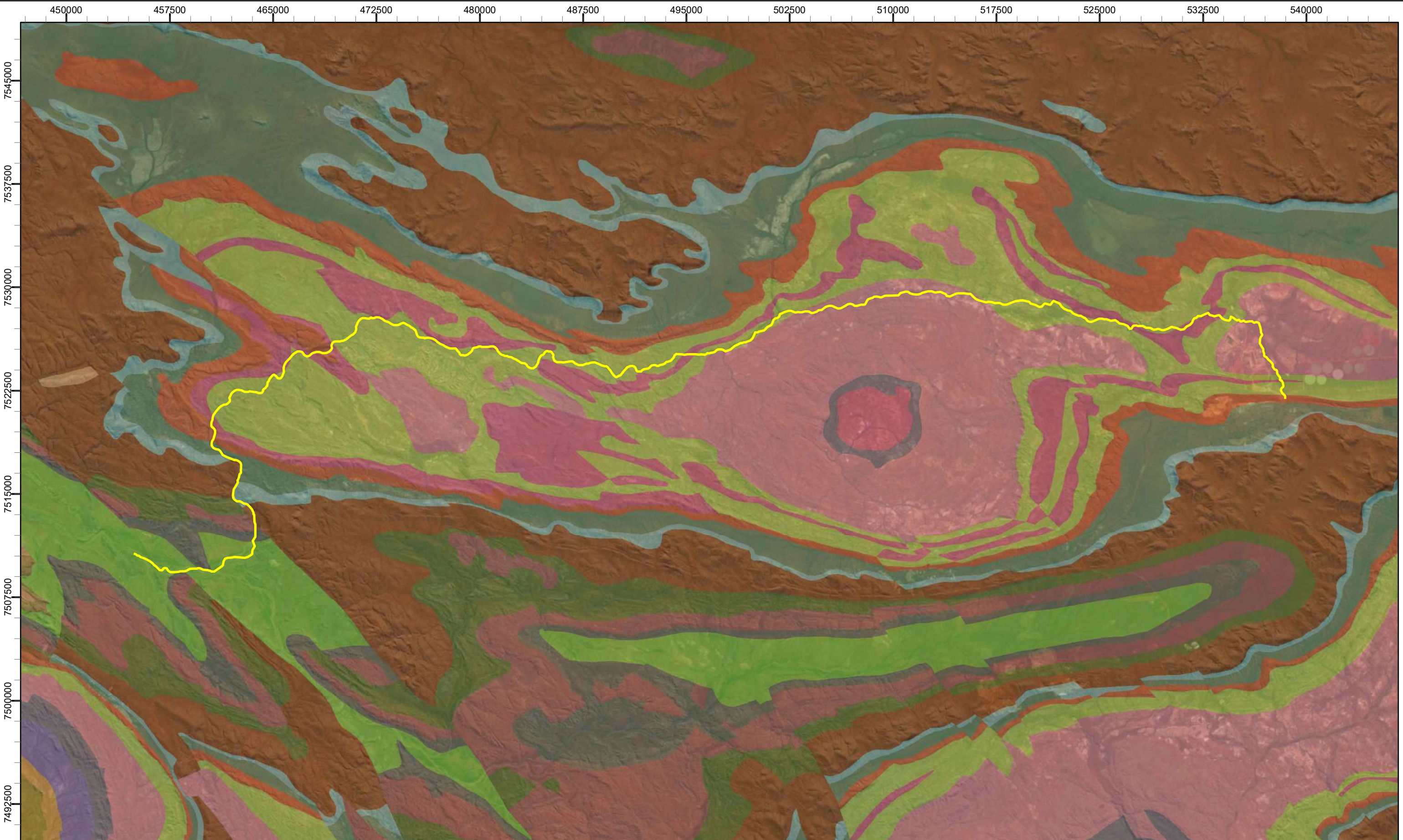
- **Fa15:** Ranges of basalt along with shale.
- **Oc69:** Valley plains with occasional low flat-topped residuals that are often capped by iron ore formations but sometimes by calcrete (kunkar): hard alkaline red soils (Dr2.33) are dominant with some areas of (Dr2.32) soils.
- **Fa13:** Ranges of banded jaspilite and chert along with shale.
- **BD1:** Plains and levees.

2.5 Geology

According to the Australian Geological Provinces database, the study area is located within the Pilbara Physiographic Province (Wingate *et al.*, 2004). The spatial data has been captured largely at approximately 1:1 Million scale.

At a finer scale (1:500,00) the study area (GSWA, 2016) is mapped (Figure 2.3) as:

- **Boolgeeda Iron Formation (P_-Hao-ci):** Fine grained, finely laminated iron formation, mudstone, siltstone, and chert; metamorphosed.
- **Brockman Iron Formation (P_-HAb-cib):** Banded iron-formation, chert, mudstone, and siltstone; metamorphosed.
- **Bunjinah Formation (A-FOu-bbo):** Pillowed and massive basaltic flows; basaltic breccia and basaltic volcanic sandstone; minor chert; amygdaloidal basalt flows occur in upper parts of formation; metamorphosed.
- **Fortescue Group (A-FO-od):** Dolerite dyke or sill.
- **Jeerinah Formation (A-FOj-xs-b):** Siliciclastic sedimentary rocks, mafic volcanic rocks, and minor felsic volcanic rocks; local carbonate rocks, chert, and dolerite sills.
- **Marra Mamba Iron Formation (A-HAm-cib):** Chert, banded iron-formation, mudstone, and siltstone; minor carbonate; metamorphosed.
- **Mount McRae Shale and Mount Sylvania Formation (A-HAu-xsl-ci):** Mudstone, siltstone, chert, banded iron-formation, and dolomite; metamorphosed.
- **Turee Creek Group (P_-TK-s):** Mudstone, siltstone, sandstone, conglomerate, dolomite; minor diamictite, limestone and iron formation; intruded by Balgara Dolerite sills.
- **Weeli Wolli Formation (P_-Haj-xci-od):** Banded iron-formation (commonly jaspilitic), mudstone, siltstone, and numerous dolerite sills; metamorphosed.
- **Wittenoom Formation (A-Had-kd):** Thinly bedded dolomite and dolomitic shale, with minor black chert, shale, banded iron formation and sandstone.
- **Woongarra Rhyolite (P_-Haw-fr):** Rhyolite, rhyodacite, rhyolitic breccia, and banded iron-formation' metamorphosed.



Legend

- Duck Creek
- Geological Unit**
- A-FOd-od; Fortescue Group
- A-FOh-xs-f; Hardey Formation
- A-FOj-xs-b; Jeerinah Formation
- A-FOo-bbo; Boongal Formation
- A-FOp-bs; Pyradie Formation
- A-FOr-b; Mount Roe Basalt
- A-FOu-bbo; Bunjinah Formation
- A-HAd-kd; Wittenoorn Formation
- A-HAm-cib; Marra Mamba Iron Formation
- A-HAu-xsl-ci; Mount McRae Shale and Mount Sylvia Formation
- P_-HAb-cib; Brockman Iron Formation
- P_-HAc-ci; Boolgeeda Iron Formation
- P_-HAr-fr; Woongarra Rhyolite
- P_-SKb-bb; Cheela Springs Basalt
- P_-SKq-stq; Beasley River Quartzite
- P_-TK-s; Turee Creek Group
- P_-HAj-xci-od; Weeli Wolli Formation

biologic
Environmental Survey

N
1:250,000
0 1 2 4 6 8 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 2.3: Broad geology of the Study Area

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 08/01/2020

Geological mapping at the finer scale (1:250,000) indicates that the study area (and Duck Creek) originates (in the east) from a large area of colluvium basin (and small areas of alluvium; geological codes Czc and Qa), before traversing across the Jeerinah Formation, and various metabasaltic flows and breccia and metadolerite sills (geological codes AFj, AFj1 and AFd, respectively) (Government of Western Australia, 2020). Duck Creek then traverses across a patch of calcrete (Czk) before crossing the Bunjinah Formation (AFu). At the confluence with Caves Creek, alluvium (Qa) dominates the creek bed, before Duck Creek then crosses the Jeerinah Formation (Fj) until the confluence of Serpentine Creek where alluvium (Qa) dominates the creek bed for the remainder of the study area (Government of Western Australia, 2020). The geology of the surrounding area consists of various pervious (alluviums and colluviums) and impervious layers (Brockman Iron Formation).

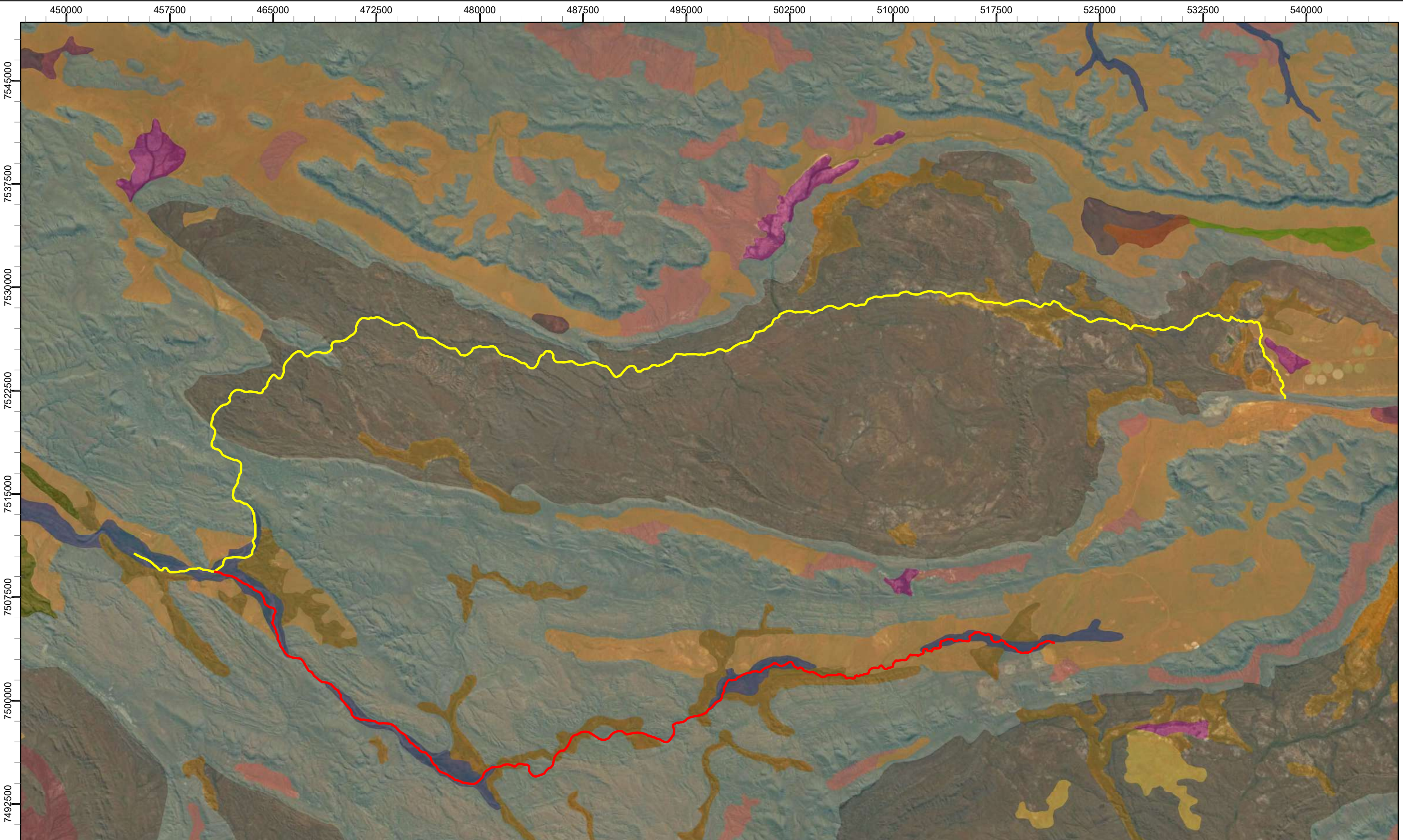
2.6 Land Systems

Work undertaken by a joint team from the Department of Primary Industries and Regional Development (formerly Department of Agriculture) and the Department of Planning, Lands and Heritage (formerly Department of Lands Administration) classified the pastoral areas of Western Australia (Payne *et al.*, 1988; van Vreeswyk *et al.*, 2004). The purpose of the surveys were to provide a comprehensive description and mapping of the biophysical resources of the pastoral areas, together with an evaluation of the pastoral potential and the condition of the soils and vegetation (Payne *et al.*, 1988; van Vreeswyk *et al.*, 2004).

Five land systems have been mapped as occurring across the study area; Boolgeeda, Newman, River, Robe and Rocklea (Payne *et al.*, 1988; van Vreeswyk *et al.*, 2004) (Figure 2.4 and Table 2.1). The dominant land system is the Rocklea land system, and the land type for this system is described as hills and ranges with spinifex grassland (Table 2.1).

Table 2.1 Land Systems of the study area

Land System	Land Type	Description
Boolgeeda	Stony plains with spinifex grasslands	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.
Newman	Hills and ranges with spinifex grasslands	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands
River	River plains with grassy woodlands and tussock grasslands.	Active flood plains, major rivers and banks supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands.
Robe	Mesas, breakaways and stony plains with spinifex grasslands	Low plateaux, mesas and buttes of limonites supporting soft spinifex (and occasionally hard spinifex) grasslands.
Rocklea	Hills and ranges with spinifex grasslands	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands.



Legend

- | | | | |
|--------------------|--------------|------------|------------|
| Boolgeeda Creek | Capricorn | Paraburdoo | Table |
| Duck Creek | Hooley | Platform | Wannamunna |
| Land System | Jurrawarrina | River | Wona |
| Boolgeeda | McKay | Robe | |
| Brockman | Newman | Rocklea | |

1:250,000

**Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 2.4: Land systems of the Study Area**

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994
Size A3. Created 03/09/2020

2.7 Hydrology

The surface and groundwater hydrology of the Pilbara is highly variable as a result of a dynamic climate with severe droughts and major flooding (DoW, 2010). Streamflows are usually a direct response to rainfall and are therefore highly seasonal and variable. Most runoff occurs from January to March as a result of episodic cyclonic activities (DoW, 2010).

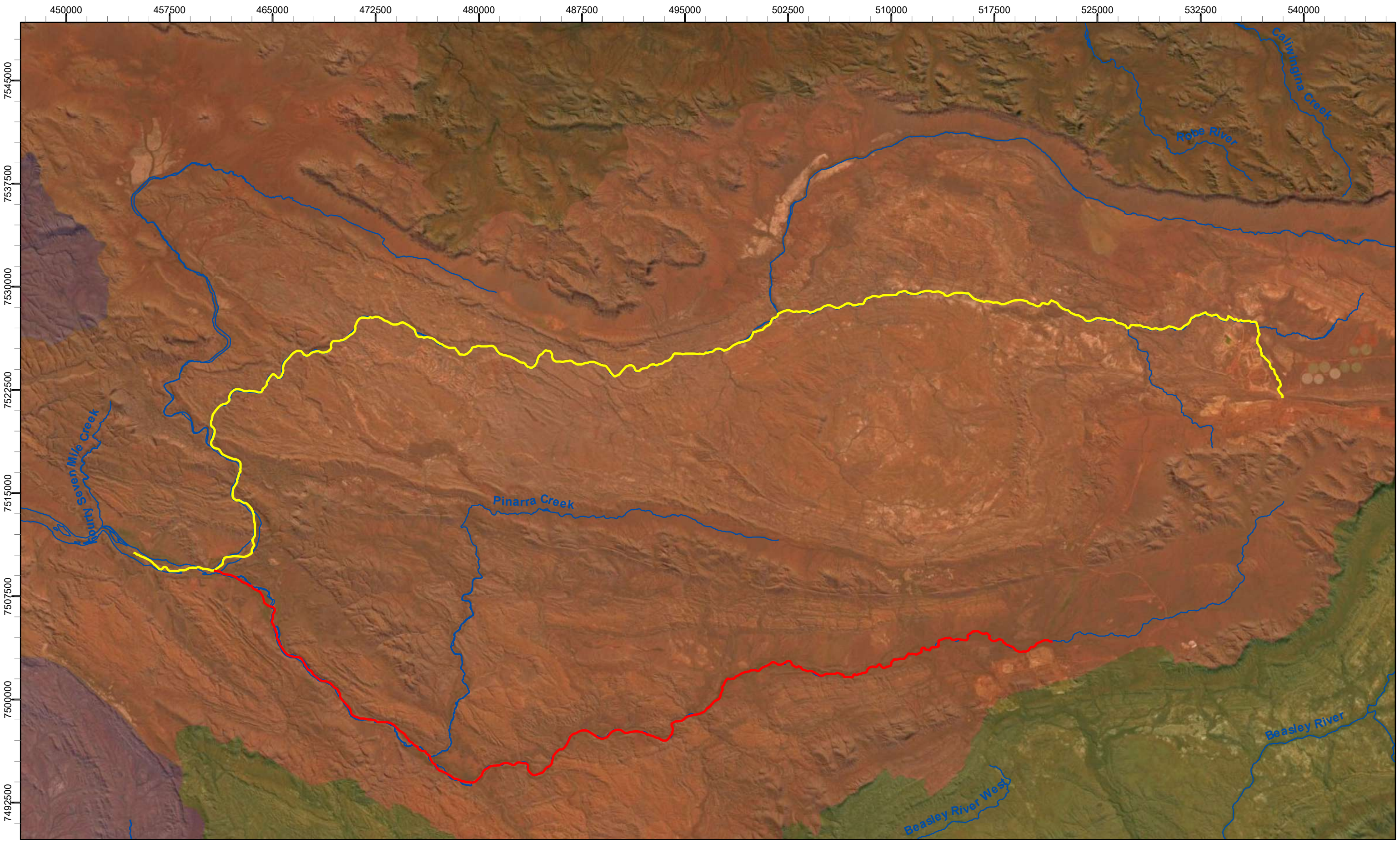
Groundwater originates from direct infiltration by rainfall and from surface water flows. Groundwater occurs throughout the Pilbara but is most easily located and accessed near surface water drainage lines (alluvial channels). The most significant aquifers can be grouped into three types: alluvial aquifers that are either unconsolidated sedimentary aquifers or chemically deposited aquifers, consolidated sedimentary (or sedimentary rock) aquifers and fractured rock aquifers. Broadly, the groundwater associated with the study area is located within fractured and weathered rock aquifers. Groundwater is stored in fractures and voids in the rocks and therefore tends to be localised. Groundwater recharge is also episodic and affected by direct infiltration of rainfall over areas where the rocks are fractured.

The study area is located within the Ashburton River basin, within the Duck Creek sub catchment (Figure 2.5). Boolgeeda Creek and Pinarra Creek are located to the south of the study area, and the study area is located approximately 51 km north-east of the Ashburton River at its closest point.


The Duck Creek catchment covers an area of approximately 6,500 km² and drains from east to west through the high relief areas of the Hamersley Ranges onto more gently sloping areas before discharging into the Ashburton River (Rio Tinto, 2011). Duck Creek maintains permanent pools and numerous waterholes, including Donkey Hole.

The upper Duck Creek catchment is dominated by outcropping Jeerinah and Bunjinah Formations associated with the Anticline in the region. Dolerite dyke intrusions are common and extensive within the Jeerinah Formation and while little is known of the hydraulic characteristics of the dykes, they can either form preferential groundwater flow paths along their margins or more commonly act as barriers to lateral groundwater flow. Thus dolerite dyke intrusions across the creek bed can potentially force groundwater to express and flow along the surface of the creek, creating small reaches with perennial flow (adapted from Rio Tinto, 2011).

The lower part of the Duck Creek system, at and down gradient from the confluence with Boolgeeda Creek, displays more extensive and potentially deeper units of the Tertiary and Quaternary sediments, comprising mainly of alluvial and colluvial deposits. This system is typical of large flood plains in the Pilbara. The groundwater table is expected to be deep in this section with transient pools within the creek bed dependent on rainfall, surface water and shallow alluvial interflow rather than regional groundwater (adapted from Rio Tinto, 2011).



- Legend**
- Boolgeeda Creek
 - Duck Creek
 - Watercourse
 - Duck Creek
 - Hardey River
 - Ashburton River
- Subcatchment**
- Ashburton River


 biologic
 Environmental Survey

N
 1:250,000
 0 1 2 4 6 8 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 2.5: Hydrology of the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 03/09/2020

2.8 Flora and Vegetation Background

2.8.1 Vegetation Associations

The study area is located in the Fortescue Botanical District, which is a part of the Eremaean Province (Beard, 1990). It is essentially a tree- and shrub-steppe with *Eucalyptus* trees, *Acacia* shrubs, *Triodia pungens* and *Triodia wiseana* hummock grasslands (Beard, 1990). Some mulga (*Acacia aneura* and close relatives) occurs in valleys and there are short-grass plains on alluvia (Beard, 1990). The vegetation associations of the Study area was mapped by Beard (1975), in which he classified the following four vegetation associations:

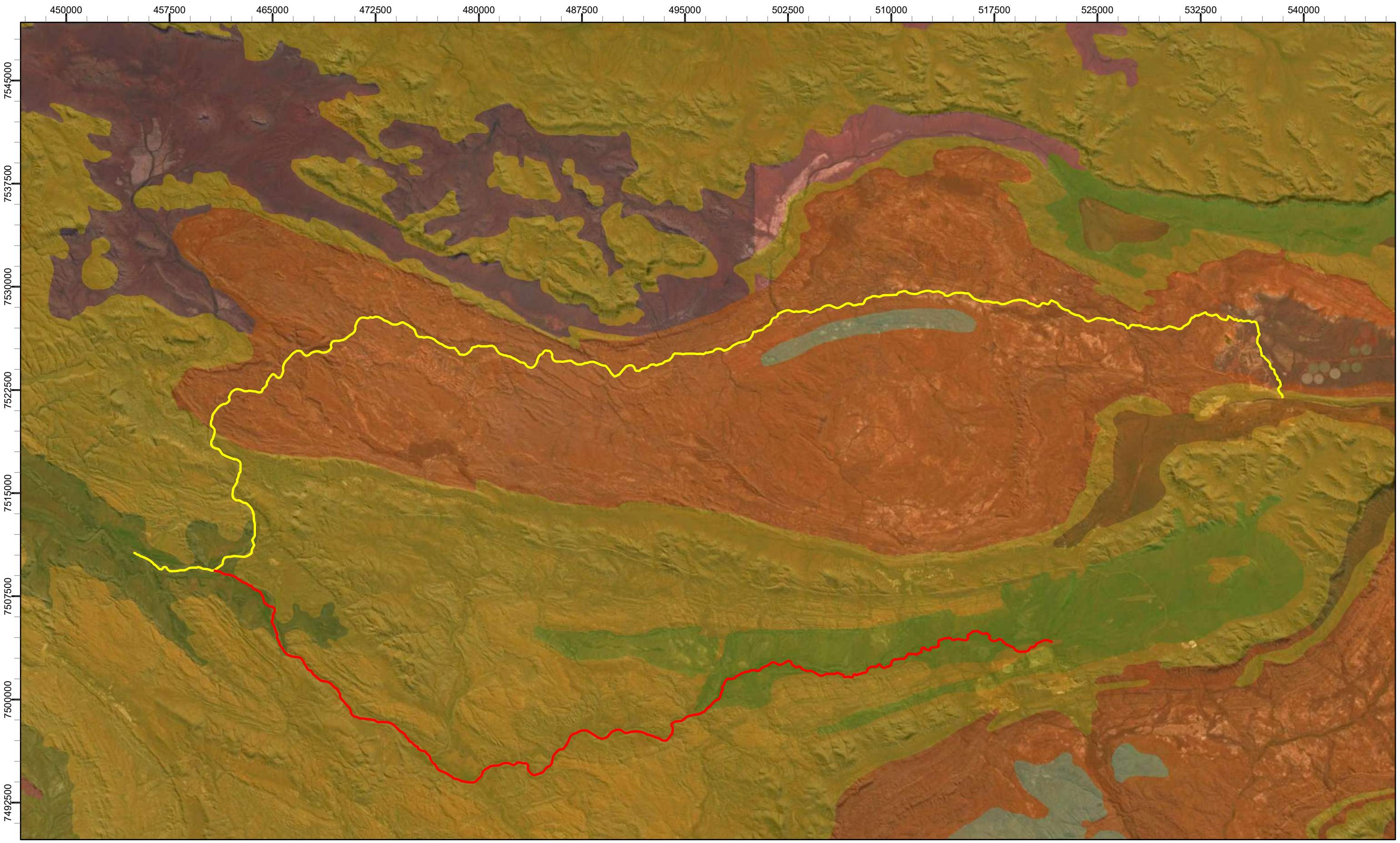
- 29: Low, open, or sparse mulga woodland (*Acacia aneura* and close relatives)
- 82: Hummock grasslands (*Triodia* sp.) with scattered bloodwoods (*Corymbia dichromophloia*) and snappy gum (*Eucalyptus leucophloia*).
- 103: Hummock grasslands (*Triodia* sp.) with scattered shrubs (*Acacia* sp., *Grevillea* sp.) or mallee (*Eucalyptus* sp.).
- 567: Hummock grasslands (*Triodia* sp.) with scattered shrubs (*Acacia* sp., *Grevillea* sp.) or mallee (*Eucalyptus* sp.).

The majority of the study area is situated within vegetation association 567, while small portions of the eastern and western sections are mapped as associations 29 and 103, respectively (Figure 2.6).

Shepherd *et al.* (2002) attempted to reinterpret and update the vegetation association mapping to reflect the National Vegetation Information System (NVIS Technical Working Group) standards (ESCAVI, 2003). The update also accounts for extensive clearing since Beard (1975) mapping. Shepherd *et al.* (2002) created a series of 'systems' to assist in removing mosaic vegetation associations originally mapped by Beard (1975); however, some mosaics still occur. The study area is located within the Stuart Hills and Hammersley Systems, as reinterpreted by Shepherd *et al.* (2002).

- Hammersley 29.7: *Acacia* open shrubland, *Ptilotus* mixed open forbland.
- Hammersley 82.3: *Eucalyptus* open woodland, *Senna* mixed sparse shrubland, *Triodia* open hummock grassland
- Stuart Hills 103: *Acacia* sparse shrubland, *Triodia* open hummock grassland.
- Hammersley 567.1: *Acacia* mixed sparse shrubland, *Triodia* open hummock grassland.

The current extent remaining of the vegetation system associations exceeds 97% across the four regional scales: State, bioregion (Pilbara), subregion (Hammersley) and Local Government Authority (Shire of Ashburton) (Government of Western Australia, 2019) (Table 2.2 and Table 2.3). Currently, three of the four vegetation system associations, 29.7, 82.3 and 567.1, are well represented within the National Reserve System, having greater than 12.8%, 12.1% and 22% of their current bioregional and subregional extent within reserves, respectively (Government of Western Australia, 2019) (Table 2.2). The remaining vegetation system association, 103, has only 2% of their current bioregional and subregional extent within reserves (Table 2.3).



Legend

Boolgeeda Creek	Hammersley 18	Hammersley 569
Duck Creek	Hammersley 29	Hammersley 82
Vegetation System Association	Hammersley 565	Stuart Hills 103
Hammersley 175	Hammersley 567	Stuart Hills 157
Hammersley 178		

1:250,000

0 1 2 4 6 8 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 2.6: Vegetation associations mapped across the Study Area (Beard, 1976)

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 03/09/2020

Table 2.2: Regional and local extent of the Hammersley System Association within the study area

Code	Scale	Pre-European extent (ha)	Current extent remaining (ha / %)	Current extent remaining within reserves (ha / %)
29.7	State	151,151	149,833 / 99.13	19,269 / 12.86
	Pilbara	151,151	149,833 / 99.13	19,269 / 12.86
	Hammersley	151,151	149,833 / 99.13	19,269 / 12.86
	Ashburton	64,473	63,169 / 97.98	19,269 / 30.50
82.3	State	2,169,997	2,157,841 / 99.44	262,983 / 12.19
	Pilbara	2,168,702	2,156,547 / 99.44	262,983 / 12.19
	Hammersley	2,158,862	2,146,708 / 99.44	262,244 / 12.22
	Ashburton	1,518,373	1,514,610 / 99.75	262,983 / 17.36
567.1	State	777,188	774,577 / 99.66	173,610 / 22.41
	Pilbara	776,833	774,213 / 99.66	173,610 / 22.42
	Hammersley	776,824	774,213 / 99.66	173,610 / 22.42
	Ashburton	777,188	774,577 / 99.66	173,610 / 22.41

NB: LGA (Local Government Authority): Shire of East Pilbara

Reserves – International Union of Nature Conservation (IUCN) Class I-IV reserves (i.e. National Parks, Strict Nature Reserves)

Source: Government of Western Australia (2019); NB: area values have been rounded to the nearest whole number.

Table 2.3: Regional and local extent of the Stuart Hills System Associations within the study area

Code	Scale	Pre-European extent (ha)	Current extent remaining (ha / %)	Current extent remaining within reserves (ha / %)
103	State	614,597	614,464 / 99.98	12,274 / 2.00
	Pilbara	614,056	613,924 / 99.98	12,274 / 2.00
	Hammersley	614,056	613,924 / 99.98	12,274 / 2.00
	Ashburton	614,597	614,464 / 99.98	12,274 / 2.00

NB: LGA (Local Government Authority): Shire of East Pilbara

Reserves – International Union of Nature Conservation (IUCN) Class I-IV reserves (i.e. National Parks, Strict Nature Reserves)

Source: Government of Western Australia (2019); NB: area values have been rounded to the nearest whole number.

2.8.2 Bioregional significance

Under the Convention of Biological Diversity, Australia has worked towards a target of 17% of the continent to be protected as part of the National Reserve System (NRS) (NRSTG, 2009). In building the NRS, priority is given to under-represented bioregions that have less than 10% of their remaining area protected in reserves (NRSTG, 2009). The Pilbara bioregion is an underrepresented bioregion, with less than 10% of the total area protected in reserves. The Hammersley subregion is adequately represented with more than 12% of the subregional area protected in reserves.

Despite the Pilbara bioregion being underrepresented within the NRS, greater than 99% of the bioregional and the Hammersley subregional areas remains uncleared, although impacted by pastoralism and mining (Government of Western Australia, 2019). Therefore, the state retains the ability to adequately reserve vegetation within the Pilbara bioregion (and the Hammersley subregion).

2.8.3 Introduced Taxa

Weeds of National Significance

The Commonwealth of Australia, in collaboration with the states and territories, has identified 32 weeds of national significance (WoNS) based on an assessment process that prioritises these weeds according to their invasiveness, potential for spread and environmental, social and economic impacts. A list of 20 WoNS was endorsed in 1999 and a further 12 were added in 2012.

Landowners and land managers at all levels are responsible for managing WoNS. State and territory governments are responsible for legislation, regulation and administration of weeds. The WoNS were selected as they require coordination among all levels of government, organisations and individuals with weed management responsibilities.

Declared Plant Pests

To protect Western Australian agriculture, the Department of Primary Industries and Regional Development (DPIRD) (formerly the Department of Agriculture and Food Western Australia, DAFWA) regulates harmful plants under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). Plants that are prevented entry into the state or have control or keeping requirements within the state are known as declared pests. The main purposes of the BAM Act and its regulations related to Declared Pests are to prevent new plant pests from entering Western Australia, manage the impact and spread of those pests already present in the state, and safely manage the use of agricultural chemicals.

The BAM Act has categorised the weeds of Western Australia into four main classifications:

- Declared Pests (under Section 22 of the Act);
- Permitted (under Section 11 of the Act);
- Prohibited (under Section 12 of the Act); and
- Permitted requiring a permit (Section 73, BAM Regulations 2013).

Under the BAM Act, all Declared Pests listed under Section 22 (not including pests listed under Section 12 of the BAM Act; Prohibited Pests) are placed in one of three control categories:

- Category 1 (C1) – Exclusion: if in the opinion of the Minister introduction of the declared pest into an area or part of an area for which it is declared should be prevented;
- Category 2 (C2) – Eradication: if in the opinion of the Minister eradication of the declared pest from an area or part of an areas for which it is declared is feasible;
- Category 3 (C3) – Management: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is not feasible but that it is necessary to:
 - Alleviate the harmful impact of the declared pest in the area; or
 - Reduce the number or distribution of the declared pest in the area; or
 - Prevent or contain the spread of the declared pest in the area.

Prohibited pests listed under Section 12 of the BAM Act are assigned separate control categories and include:

- Category 1 (C1) – Exclusion: if in the opinion of the Minister introduction of the prohibited organism into the state or a part of the state should be prevented; and
- Category 2 (C2) – Eradication: if in the opinion of the Minister eradication of the prohibited organism from the state or a part of the state is feasible.

Weed Prioritisation

In 2008 the WA government developed and implemented an integrated approach to weed management on state-managed lands in WA, called the Weed Prioritisation Process. It was updated in 2013 and further revised in 2016. Weeds were prioritised in each region, based on their invasiveness, ecological impact, potential and current distribution, and feasibility of control.

The resulting priorities focus on weeds considered to be high impact, rapidly invasive and still at a population size that can feasibly be eradicated or contained to a manageable size. This means that weed species that are already widespread may not be ranked as a high priority. The weed prioritisation for the Pilbara bioregion has recently been revised by DBCA. The key priorities are now centred on ‘priority alert’ weeds and weeds that receive a rating for ‘ecological impact’ and ‘invasiveness’.

2.9 Groundwater Dependent Ecosystems

Groundwater-dependent ecosystems (GDEs) are ecosystems that rely upon groundwater for their continued existence (BoM, 2020b). GDEs can support a range of biota which rely on groundwater, and as a result, come in many forms. The three key types of terrestrial GDE (BoM, 2020b) are;

- aquatic ecosystems that rely on the surface expression of groundwater – this includes surface water ecosystems which may have a groundwater component, such as rivers, wetlands and springs;
- terrestrial ecosystems that rely on the subsurface presence of groundwater – this includes all vegetation ecosystems or groundwater dependent vegetation (GDV); and
- subterranean ecosystems including cave and aquifer ecosystems.

In general, the structure and composition of creekline vegetation in the Pilbara is driven by the availability of moisture. Above-ground terrestrial GDEs are often characterised by the presence of flora species that rely on groundwater, and the structure and composition of vegetation types present can indicate groundwater proximity and surface water permanence.

Species that broadly use groundwater are referred to as phreatophytes, and they may be classified as either obligate or facultative depending on their reliance on groundwater (Eamus *et al.*, 2016). Obligate phreatophytes are flora species completely or highly dependent on groundwater and are therefore confined to habitats with continual, seasonal, or episodic access to groundwater. Obligate phreatophytes are highly sensitive to changes in groundwater regime and respond negatively to rapid groundwater drawdown. Such species can only inhabit areas where they have access to groundwater in order satisfy at least some proportion of their ecological water requirement (EWR) (Eamus *et al.*,

2006). As such, obligate phreatophytes are often the best indicator of consistently shallow groundwater tables, or permanent surface water presence in the Pilbara. Not all phreatophytic species display the same degree of dependency on groundwater and the dependency within species has been shown to vary both spatially and temporally (Eamus & Froend, 2006).

Facultative phreatophytes are plants that can access groundwater but are not totally reliant on it for their water requirements. Facultative phreatophytes use groundwater opportunistically, particularly during times of drought when moisture reserves in the unsaturated (vadose) zone of the soil profile become depleted. Facultative phreatophytes can use groundwater to satisfy a proportion of their EWR when it is available. However, some individuals may also satisfy their EWR by relying solely on uptake from upper unsaturated soils layers where groundwater is inaccessible (Eamus *et al.*, 2006). Facultative phreatophytes are therefore generally associated with the subsurface presence of groundwater, rather than surface expression of groundwater. Most facultative phreatophytes are large woody trees and shrubs with deep root systems capable of accessing the capillary fringe of the water table which may occur at considerable depth within the soil profile.

Riparian zones which contain obligate phreatophytes therefore provide evidence of high moisture availability and its degree of persistence and permanence. The presence of particular facultative phreatophytes within the riparian zone can also provide evidence of soil moisture availability, although the persistence, depth and degree of soil moisture may not be ideal for presence and persistence of obligate phreatophytes.

2.9.1 Bureau of Meteorology National GDE Atlas

The BoM has developed the Groundwater Dependent Ecosystems Atlas (GDE Atlas) as a national dataset of Australian Groundwater Dependent Ecosystems (GDEs) to inform groundwater planning and management (BoM, 2020b). It is the first and only national inventory of GDEs in Australia. The GDE Atlas web-based mapping application allows for visualisation, analysis and downloading of GDE information.

The GDE Atlas contains information about aquatic, terrestrial, and subterranean ecosystems. Importantly, the GDE Atlas also includes the national inflow-dependent landscapes layer which is derived from remotely sensed data. This layer indicates the likelihood that a landscape is accessing water in addition to rainfall (such as soil moisture, surface water or groundwater), and generally represents a potential GDE dataset for all areas not yet studied or investigated in any detail.

The GDE mapping in the GDE Atlas comes from two broad sources:

- National assessment – national-scale analysis based on a set of rules that describe potential for groundwater/ ecosystem interaction and available geographic information systems (GIS) data.
- Regional studies – more detailed analysis undertaken by various state and regional agencies using a range of different approaches including field work, analysis of satellite imagery and application of rules/conceptual models.

The BoM GDE Atlas indicates that Duck Creek is variously considered to have a low to moderate potential of GDEs (from the national assessment) (Figure 2.7). The review of the GDE atlas mapping indicates that the underlying geology is dictating the likely potential of having a GDE, with the presence of the Brockman Iron Formation having a moderate potential, while the alluvium, colluvium, Jeerinah Formation and Bunjinah Formation having a low potential of GDE presence. Of note is the high potential of a GDE located on Caves Creek. This high potential GDE corresponds to Palm Springs and Heritage Pool which is confirmed to variously consist of aquatic and terrestrial GDEs (Biologic & Rio Tinto, 2020).

The GDE potential from the national assessment is a result of the national-scale analysis following a set of rules which uses 25 m resolution and identifies landscape areas where evaporative loss from the landscape exceeds rainfall (Doody *et al.*, 2017; Doody *et al.*, 2019). Areas with higher evaporative losses indicate additional but undefined water sources (Doody *et al.*, 2017; Doody *et al.*, 2019).

The BoM GDE Atlas also considers features other than those ecosystems which are known GDEs, with those features that could not be confidently identified or inferred as GDEs to be Inflow Dependent Ecosystems (IDE) (BoM, 2020b). IDEs are defined in the Atlas as vegetation ecosystems that are likely to use a water source in addition to rainfall, such as water stored in the unsaturated zone, surface water or groundwater. The Atlas has identified the Jeerinah and Bunjinah Formations of Duck Creek as likely to be an IDE, while the likelihood of an IDE increases to the west of the study area, associated with the Brockman Iron Formation.

2.9.2 Groundwater Dependent Species

GDEs tend to support relatively dense and diverse vegetation communities. Such vegetation tends to contain an above average proportion of mesophytic or potentially hydrophytic species which often thrive in areas where groundwater proximity (or other sources of increased moisture) significantly increases the temporal availability of moisture. It is these species, which are indicative of the presence of perennial to sub-perennial (and ephemeral) mesic conditions/ habitats, which are typically quite restricted in their distribution and extent and therefore of elevated significance or conservation value. In an arid climate like the Pilbara, this elevated value is often attributed to the restricted nature of such mesic conditions, and the functions provided by the moisture they harbor.

It is generally recognised that obligate phreatophytes are those species with the highest degree of groundwater dependence (i.e., smallest acceptable depth to saturation which they will tolerate), and as such are often the best indicator within the Pilbara of consistently shallow groundwater tables, or permanent surface water presence. Knowledge surrounding the groundwater use strategies of plants in the Pilbara is generally restricted to the keystone phreatophytic trees species (*Melaleuca argentea*, *Eucalyptus camaldulensis* and *Eucalyptus victrix*), and as a result there is limited knowledge in this space for understorey species.



Terrestrial GDE (no data)



No ecosystems analysed

Terrestrial GDE



Known GDE
(regional study)



High potential GDE
(regional study)



Moderate potential GDE
(regional study)



Low potential GDE
(regional study)



Unclassified potential GDE
(regional study)



High potential GDE
(national assessment)



Moderate potential GDE
(national assessment)



Low potential GDE
(national assessment)



Unclassified potential GDE
(national assessment)



1:515,465

Kilometres 0 10 20

Data Source: Bureau of Meteorology, Geoscience Australia and State/Territory lead water agencies. Refer to metadata for further information: [Click here](#)

Australian Albers GDA94



The structure and composition of creekline vegetation is generally considered to be heavily driven by the degree and consistency of moisture availability. As a result, the structure and composition of vegetation types present in a riparian system can be an important longer-term indicator of groundwater proximity and surface water permanence. Furthermore, such insight to the degree of moisture permanency also provides insight into the associated values and significance of a riparian ecosystem. It is for these reasons that often the most reliable and effective indicator for moisture permanency and therefore inherent hydrological sensitivity is the composition and structure of vegetation present.

Melaleuca argentea

In the Pilbara, *Melaleuca argentea* is thought to depend on groundwater almost exclusively and is therefore considered to be an obligate phreatophyte (Graham *et al.*, 2003; Landman *et al.*, 2003; McLean, 2014; O'Grady *et al.*, 2006a; O'Grady *et al.*, 2006b). Due to its dependence on groundwater, *Melaleuca argentea* is often the best indicator of consistently shallow groundwater tables or permanent (perennial) surface water presence and subsequently, this species is also widely considered the best available indicator for the presence of GDV and therefore a GDE.

Eucalyptus camaldulensis

Eucalyptus camaldulensis is a broadly distributed tree with at least seven recognised subspecies in Australia. *Eucalyptus camaldulensis* commonly occurs along water courses and river banks, growing in deep alluvial sand and sandy loams (WAH, 1998-). Where large *Eucalyptus camaldulensis* trees are present and common, groundwater is generally within the reach of the root zone, and in some environments depth to groundwater is a good predictor of the condition of *Eucalyptus camaldulensis* stands (Collof, 2014). This extensive reach would suggest a significant reliance on soil pore water stored in the vadose zone. *Eucalyptus camaldulensis* has the ability to utilise water from a range of different sources including rainfall, floodwater, stored soil water and groundwater and is therefore considered to be a facultative phreatophyte (Mensforth *et al.*, 1994). When conditions are favourable, *Eucalyptus camaldulensis* tends to growth vigorously and increase water uptake (Gibson *et al.*, 1994; Marshall *et al.*, 1997; Morris & Collopy, 1999).

Eucalyptus victrix

Eucalyptus victrix typically draws most its required water from the vadose zone. The water use strategy of *Eucalyptus victrix* appears to be highly plastic and opportunistic, enabling survival in a wide range of ecohydrological settings (Pfautsch *et al.*, 2014). During extended dry periods *Eucalyptus victrix* can use groundwater as required and is a facultative phreatophyte in these situations. Mature *Eucalyptus victrix* trees can tolerate temporary inundation (Florentine, 1999; Florentine & Fox, 2002), with flooding events potentially important for seedling establishment (Florentine & Fox, 2002).

Other key potentially Groundwater Dependent Pilbara Species

Several other key species which occur in the Pilbara are either potentially groundwater dependent or are associated with GDEs, including *Sesbania formosa*, *Livistona alfredii*, *Acacia amplexiceps*, *Melaleuca bracteata*, *Melaleuca glomerata*, *Melaleuca linophylla*, and *Acacia coriacea* subsp. *pendens* (Rio Tinto,

2018b). Significantly less is known about the groundwater dependence of these species when compared to the key phreatophytic tree species discussed above.

3 METHODOLOGY

3.1 Desktop Assessment

3.1.1 Literature Review

Background information on the study area and surrounds was compiled prior to, during and after the field survey. Historic vegetation mapping conducted by Beard (1975) and Shepherd *et al.* (2002), land systems mapping (van Vreeswyk *et al.*, 2004), and the IBRA classification system (Desmond *et al.*, 2001) were consulted to provide broad contextual knowledge of the vegetation types likely to be encountered within the study area. The literature review considered 13 previous field surveys of relevance undertaken within 30 km of the study area (Table 3.1). The literature review was distilled to only include riparian surveys, however, the survey types had to be expanded due to the limited number of riparian surveys identified.

Table 3.1: Literature sources used for the review

Survey Title	Reference	Survey Type	Distance from study area (km)
Nammuldi Creeks Riparian Vegetation Monitoring	Astron (2017)	Riparian Vegetation Monitoring	Overlaps study area
Nammuldi Creeks Riparian Vegetation Monitoring Program	Astron (2018)	Riparian Vegetation Monitoring	Overlaps study area
Greater Nammuldi Creeks Monitoring: Report on Riparian Vegetation	Biota (2010)	Riparian Vegetation Monitoring	Overlaps study area
Nammuldi Creeks Riparian Vegetation Monitoring: Phase 4	Biota (2014)	Riparian Vegetation Monitoring	Overlaps study area
Eliwana Consolidated Detailed Flora and Vegetation Phase 2	Biota (2018b)	Detailed Flora and Vegetation Survey	Adjacent S
Flora and Vegetation Survey of the Greater Nammuldi Irrigated Agriculture Survey Area	Mattiske (2011)	Detailed Flora and Vegetation Survey	Adjacent E
Flora, Vegetation and Fauna Habitat Assessment at Bourne Highway	Rio Tinto (2018d)	Detailed Flora and Vegetation Survey	1.4 km E
Nammuldi Trial Operation Vegetation and Flora Survey	HGM (1998)	Reconnaissance Flora and Vegetation Survey	1.7 km SW
Nammuldi / Silvergrass Soils, Vegetation and Flora Survey	HGM (1999)	Reconnaissance Flora and Vegetation Survey	1.7 km SW
<i>Themeda</i> Grasslands Threatened Ecological Community – Phase 1 Botanical Survey	Biota (2011)	Detailed Flora and Vegetation Survey	5 km SW
Homestead Exploration Lease Biological Survey Report	Hamersley Iron (1996)	Biological Survey	5.8 km N
Flora and Vegetation Survey at Metawandy and Duck Creek	Rio Tinto (2014)	Reconnaissance Flora and Vegetation Survey	9.5 km S

Survey Title	Reference	Survey Type	Distance from study area (km)
Hardey Rail Corridor Vegetation and Flora Survey (Phase 1) – Interim Report	Astron (2011)	Detailed Flora and Vegetation Survey	22.5 km W

3.1.2 Database Searches

Database searches were undertaken to generate a list of vascular flora taxa previously recorded within, and near, the study area, including introduced species and taxa of conservation significance. The database searches also identified ecological communities/ vegetation types of conservation significance that occur, or may occur, within, and near, the study area. Conservation codes for flora and vegetation of conservation significance are provided in Appendix A. Six database searches were conducted with varying buffers to limit searches to the riparian zone of the study area (Table 3.2).

Table 3.2: Details of database searches conducted

Provider	Reference	Database	Parameters
Department of Biodiversity, Conservation and Attractions	DBCA (2020b)	Threatened and Priority Ecological Communities	A 50 km buffer of the Duck Creek study area shapefile
Department of Biodiversity, Conservation and Attractions	DBCA (2020c)	Threatened and Priority Flora	A 30 km buffer of the Duck Creek study area shapefile
Department of Biodiversity, Conservation and Attractions	DBCA (2020a)	NatureMap	Circle of radius 30 km centred on the coordinates: -22.35961, 116.71903 -22.34487, 117.19205
Department of Agriculture, Water and the Environment	DAWE (2020)	Protected Matters Search (MNES)	Circle of radius 30 km centred on the coordinates: -22.35961, 116.71903 -22.34487, 117.19205
Atlas of Living Australia	ALA (2020)	Occurrence search	Circle of radius 30 km centred on the coordinates: -22.35961, 116.71903 -22.34487, 117.19205
Department of Primary Industry and Regional Development (DPIRD)	DPIRD (2020)	Declared Plants Database (WAOL)	Search of the Shire of Ashburton local government area.

NB: MNES – Matters of National Environmental Significance; WAOL – Western Australian Organism List

The conservation significant flora taxa identified from the database searches were assessed and ranked on the likelihood of occurring within the study area (Appendix B). The rankings were assigned using the following matrix (Table 3.3).

The occurrence assessment was based on known information relating to species' distribution, habitat preferences (landforms, substrates and vegetation associations), locality records from database searches and previous studies within the desktop study area and the results of the current survey pertaining to species records and/ or habitats occurring within the study area. The flora species occurrence assessments assigned each species to one of six ratings, ranging from Confirmed to Highly Unlikely.

The likelihood of occurrence assessment was restricted to riparian ecosystems, which resulted in numerous species ranked as possible or unlikely, even though they occurred within 5 km of the study area, and at times, immediately adjacent to the study area. For example, *Ptilotus subspinescens* is known to occur immediately adjacent to Boolgeeda Creek, however, the habitat preference does not include riparian vegetation, so the species was considered possible to occur.

Table 3.3: Flora likelihood of occurrence decision matrix

Occurrence categories	Habitat categories (within the study area)			
	Core/ critical habitat present	Suitable habitat present/ within known distribution	Marginal habitat present/ adjacent to known distribution	No suitable habitat present/ outside of known distribution
Recorded in the study area	Confirmed	Confirmed	Confirmed	Confirmed
Recorded within <5 km	Highly Likely	Likely	Possible	Possible
Recorded within 5-15 km	Likely	Possible	Possible	Unlikely
Recorded within 15-50 km	Possible	Possible	Unlikely	Unlikely
Recorded >50 km	Possible	Unlikely	Unlikely	Highly Unlikely
Species considered locally/ regionally extinct	Unlikely	Unlikely	Highly Unlikely	Highly Unlikely

3.2 Field Survey

3.2.1 Survey Type, Timing and Weather

A two-season detailed flora and vegetation survey concentrating on the riparian zone along Duck Creek was requested by Rio Tinto and completed. The study area include an 120 km stretch of watercourse along Duck Creek. In addition to the two-season detailed flora and vegetation survey, phase one incorporated the establishment and sampling of baseline riparian vegetation monitoring transects. The monitoring transects were not sampled during the phase two field survey.

The survey was undertaken concurrently with a complimentary survey along Boolgeeda Creek. The field survey trips involved the sampling of both Duck and Boolgeeda Creeks, with workload spread across the creeks according to survey priorities and access. The study area was sampled via vehicle tracks, walking traverses and with the aid of a helicopter during both phases.

Phase one of the Duck Creek survey was undertaken from 25 October 2019 to 1 November 2019. The phase one survey was completed by two teams of two botanists, totalling approximately 368 person hours of survey effort (eight actual survey days).

Phase two of the Duck Creek survey was completed within one trip, undertaken from 13 to 17 June 2020, totalling approximately 240 person hours (five actual survey days). The phase two survey was completed by two teams of two botanists.

The day time climatic conditions during both field surveys (mild to hot temperatures with clear skies, BoM, 2020a) were not restrictive to completing the majority of the survey via vehicle, helicopter, and on foot.

The rainfall across 2019 was substantially below average, with only 105 mm received (January to October 2019) at Cheela Plains, compared to the long-term average of 256.9 mm (BoM, 2020a). Rainfall recorded at Cheela Plains during the three months (August, September and October 2019) before the late October 2019 survey was below average (no rainfall recorded, compared to a long term average of 8.8 mm for Cheela Plains and 17.1 mm for Paraburdoo; Figure 3.1) (BoM, 2020a). However, the lack of rainfall in the three month prior to the late October 2019 survey is not a constraint as winter and spring rainfall is sporadic and light in the Pilbara with fluctuations in monthly totals across the years (BoM, 2020a). Of greater constraint, is the below average rainfall during the wet season (nominally December to March for the Pilbara) which would have potentially limited the germination and growth of annual and perennial flora in the study area (discussed further in Section 0).

Following the phase one survey in 2019, above-average rainfall was recorded at Cheela Plains during February 2020, however, no rainfall was recorded during March and April 2020. The wet season (December–March) rainfall was therefore slightly below average (173 mm rainfall at Cheela Plains versus the long term average of 200.9 mm and 208.2 mm for Cheela Plains and Paraburdoo respectively) (BoM, 2020a). Furthermore, only a further 17 mm of rainfall was recorded at Cheela Plains between April and June 2020 (BoM, 2020a). The vegetation condition and floristic diversity of the study area during phase two was noted as being in comparatively better condition than the phase one survey, which was to be expected based on survey timing.

The phase two survey in 2020 occurred during large restrictions associated with the global COVID-19 pandemic. The restrictions in the movement of people across the state because of COVID-19 meant that the phase two survey was pushed back to June 2020. Ideally, the phase two survey would have occurred six to eight weeks post wet season rainfall (as detailed in EPA, 2016b), however, this was not achievable while the state and federal governments, as well as Rio Tinto, were restricting movement to limit any health and economic impacts.

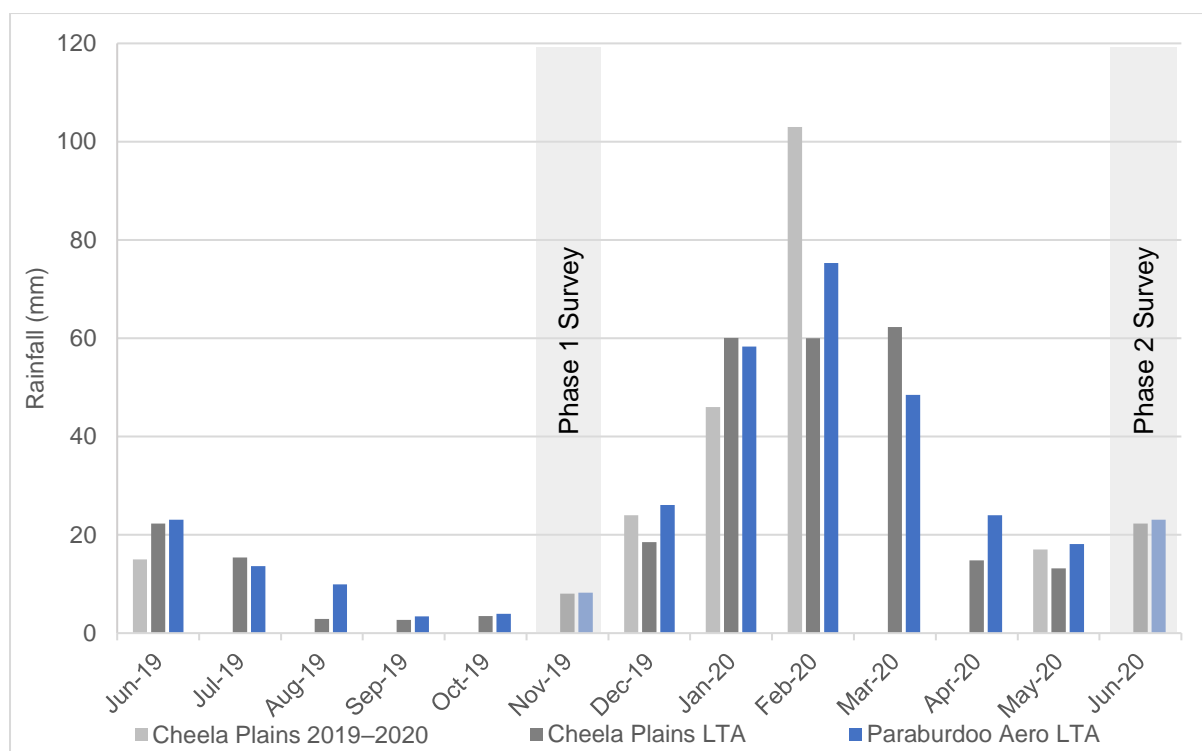


Figure 3.1: Rainfall recorded prior to the survey at Cheela Plains (station 5095) compared to the long-term average (LTA) rainfall for Paraburdoo Aero (station 7185) and Cheela Plains. Survey completed in October/ November 2019 and June 2020 (depicted by grey shading) (BoM, 2020a).

3.2.2 Survey Team and Licensing

The field survey was led by Clinton van den Bergh, a principal botanist with over 13 years' experience across the state, including the Pilbara bioregion. Clinton was assisted by Sam Coultas, a senior botanist with over 6 years' experience in the Pilbara bioregion. Clinton and Sam meet the minimum requirements (5+ years' experience in the bioregion) to lead and manage a flora survey in the Pilbara, as prescribed by the EPA (2016b). The survey teams across both phases and their flora collecting licence details are provided in Table 3.4.

Table 3.4: Survey team and licensing

Team member	Role	2019 Survey	2020 Survey	Flora Licence	Threatened Flora Licence
Clinton van den Bergh	Principal botanist Overall field lead	25 Oct–3 Nov	12–15 June	FB62000105	59-1819
Samuel Coultas	Senior botanist	28 Oct–3 Nov	12–19 June	FB62000017-2	60-1819
Emily Eakin-Busher	Botanist	25 Oct–3 Nov	12–19 June	FB62000160	53-1920
Kelby Jennings	Senior botanist	25 Oct–3 Nov		–	–
Morgan Lythe	Senior ecologist	25 Oct–28 Oct		–	–
Kaylin Geelhoed	Botanist		12–19 June	FB62000238	–
Jake Eckersley	Botanist		12–19 June	FB62000237	–

3.2.3 Flora and Vegetation Survey Design

Prior to the field survey, desktop vegetation mapping of high resolution aerial imagery (30 cm Worldview Imagery, provided by Rio Tinto) was undertaken to identify and broadly map sections of the study area into broad functional units:

- Eucalyptus camaldulensis dominated vegetation;
- Eucalyptus victrix dominated vegetation;
- Eucalyptus co-dominated vegetation; and
- Other, consisting of Acacia woodlands/ shrublands, Melaleuca shrublands, tussock grasslands, hummock grasslands and bare/ scoured bed.

The four broad categories were delineated from aerial imagery due to the colour differences (Plate 3.1) of the leaves in the canopy and the more open and sparser canopy of *Eucalyptus victrix* allowing the white trunks to be visible (Plate 3.1). Sections of the creek were dominated by one of the two eucalypt species if one species occupied more than 70% of the upper stratum. If the upper stratum was evenly occupied by both eucalypt species (for example 60:40 or 50:50 splits), then the community was co-dominated.



Plate 3.1: High resolution (100 cm) aerial imagery (lower reaches of Boolgeeda Creek near confluence with Duck Creek) showing the difference in canopy colour between *Eucalyptus victrix* (orange circle) and *Eucalyptus camaldulensis* (blue circle). Note the blue foliage and open canopy showing the white trunks of *Eucalyptus victrix*.

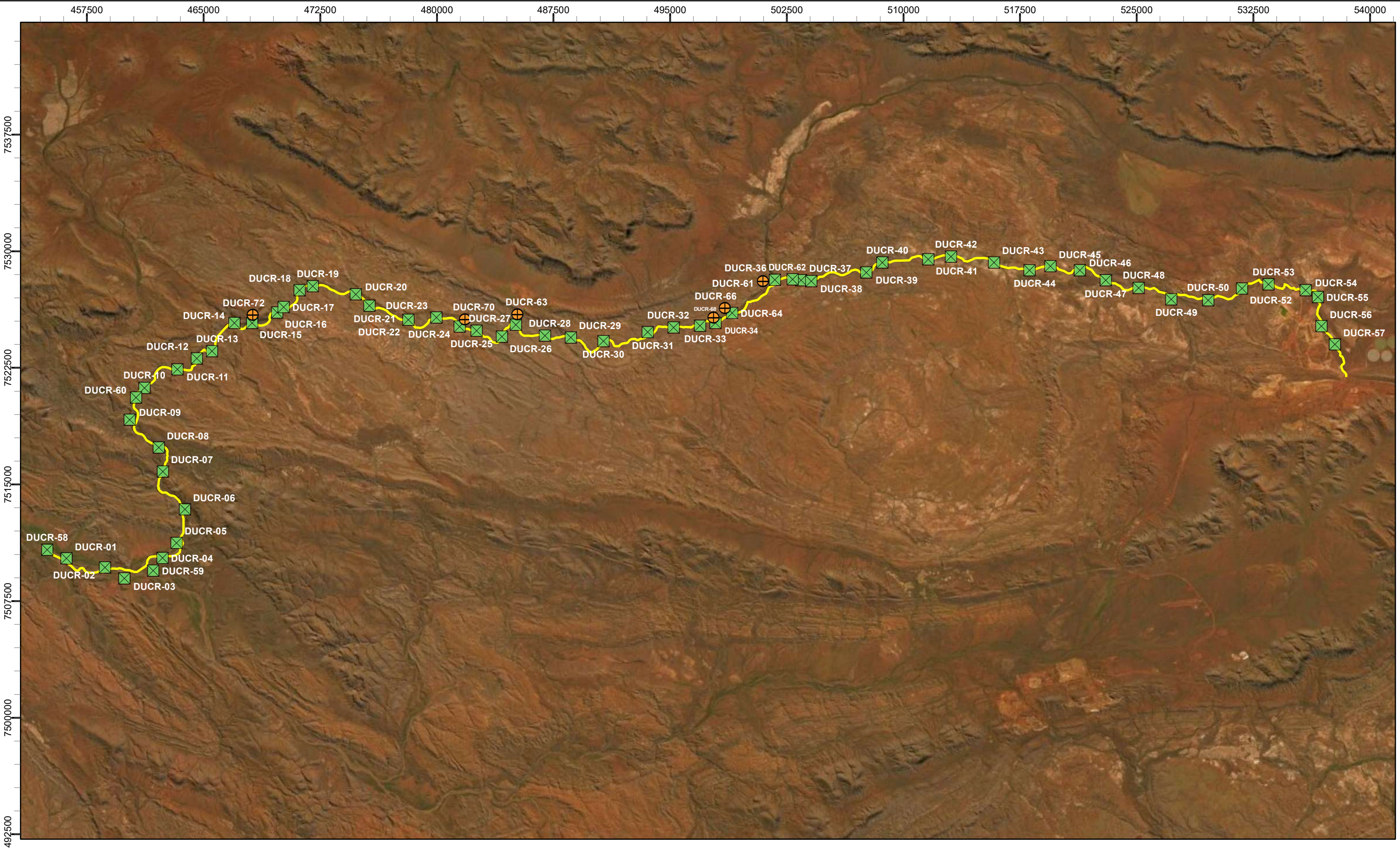
The desktop vegetation mapping was undertaken prior to the phase one survey to assist in the field survey design and placement of sampling sites (and monitoring transects). Following the completion of the desktop vegetation mapping, further interrogation of aerial imagery (scale 1:30,000) of the study area and Google Earth Pro®, were reviewed, along with previous vegetation mapping (Biota, 2019), land systems mapping (van Vreeswyk *et al.*, 2004) and soil landscape mapping (Northcote *et al.*, 1968), to further refine the broad functional units into broad preliminary vegetation units. Following the completion of the desktop vegetation mapping, review of the aerial imagery and the broad contextual information, survey plans were designed to ensure the study area was appropriately traversed, sampled and targeted to capture the data required for a detailed riparian flora and vegetation survey.

As the study area is 120 km in length with limited accessibility via vehicle, quadrats were strategically spaced within the study area to ensure a sampling intensity of one quadrat per 2 km of watercourse. The quadrats were then placed within the broad functional units to ensure adequate representation. Where practical, at least three quadrats were established in each of the preliminary vegetation unit areas, to ensure that each vegetation unit occurring within the study area was captured by the survey and described appropriately and in accordance with EPA (2016b).

In total, 60 quadrats and six relevés were established and sampled during phase one (Figure 3.2; Appendix C), with quadrats measuring 2,500 m² in size (either 50 × 50 m or 100 × 25 m, depending on target vegetation structure and location). In general, the quadrats were orientated north west, north east, south west and south east, with any deviation from this recorded in the site data. The north-west corner (or west/ north end of linear quadrats) of each quadrat was marked with pink flagging tape with the corner coordinate recorded with a Differential Global Positioning System (DGPS; Trimble Catalyst Antenna) to an accuracy ranging from 10 cm to 70 cm (depending on canopy cover, cloud cover and mobile reception) to allow for future re-sampling. During the phase two survey all 60 quadrats and the six relevés were resampled (Figure 3.2; Appendix C).

Within each quadrat, all vascular flora taxa and their corresponding height and cover classes were recorded. A brief summary of the vegetation assemblage at each site was also recorded to aid in producing vegetation unit descriptions (NVIS Technical Working Group, 2017) (Appendix D). In addition, the following information was recorded:

- site identification number
- date of survey;
- personnel;
- GPS coordinates of each corner (GDA 94) (only a central coordinate was taken for relevés);
- site photograph – taken from the north-west corner, facing south-east;
- soil characteristics (texture and colour);
- geology (type, size and nature of any rocks, stones, gravel, or outcropping);
- topography (landform type and aspect);
- vegetation condition (based on Trudgen, 1988) (Appendix E);
- disturbance (if present); and
- approximate time since last fire.



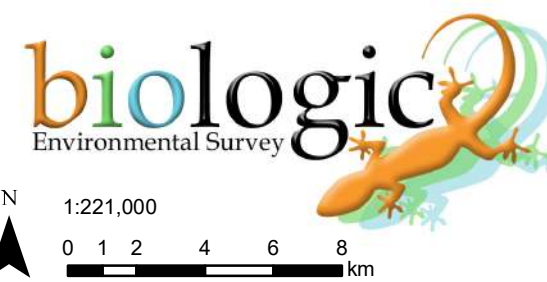
Legend

— Duck Creek

Site Type

⊠ Quadrat - Phase 1 and Phase 2

⊕ Relevé - Phase 1 and Phase 2



**Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 3.2: Sample sites in the Study Area**

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 03/09/2020

Any flora taxa observed opportunistically near sampling sites, or while completing meandering traverses in the study area were also recorded. For any observed populations of conservation significance (including environmentally significant introduced flora), a GPS location and a count of the individuals present, or percentage foliage cover for a given area, were recorded.

3.2.4 Riparian Vegetation Monitoring Methods

In addition to the quadrat establishment and sampling, 15 riparian monitoring transects were also established and surveyed. The riparian vegetation monitoring methods were developed to ensure consistency with existing riparian vegetation monitoring conducted along Duck and Caves Creeks (Astron, 2018) and Boolgeeda Creek (Biota, 2018a).

The riparian vegetation monitoring transects consisted of a series of quadrats (10x10 m in size), with the number of quadrats (ranging from 3 to 12 quadrats) determined by the width of the creek. The quadrats were either established as a continuous belt or separated by a nominal distance (generally 5 to 10 m) if the riparian zone was wide. The transect widths ranged from 30 m to 190 m, depending on the width of the riparian zone.

At each transect, a tree health monitoring survey of ten *Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* and/ or *Melaleuca argentea* trees was also undertaken. The trees were selected to be a representative sample of the tree species present at the transect location, with age and health taken into consideration during the selection process. The trees were loosely tagged with an aluminium identification tag to facilitate future sampling, with the location of the tree also captured using the DGPS to an accuracy ranging from 10 cm to 70 cm.

Further information on the riparian vegetation monitoring methods is provided in Appendix F. Riparian vegetation monitoring transects were not resampled during the phase two survey due to the global COVID-19 pandemic.

3.2.5 Targeted Conservation Significant Flora Searches

Prior to the survey, a list of conservation significant flora known to occur, or considered highly likely, likely, or possible to occur within the study area was compiled. Field personnel familiarised themselves with photographs, reference samples and descriptions of these taxa before conducting the survey and once on the ground actively searched for these taxa while traversing the study area. Field personnel focused on known locations or preferred habitat encountered in the field. During the phase two survey, records of conservation significant flora from phase one were visited (the majority of them) to further refine the population extent.

Targeted searching was undertaken for flora of conservation significance, focusing on taxa that were confirmed, very likely, likely or possible to occur within the study area. Targeted searches were conducted over large portions of the study area during targeted meandering traverses, with particular focus on habitat considered likely to support conservation significant flora.

In addition to targeted searching for specific priority listed flora taxa in particular habitats, personnel actively searched for all priority listed flora taxa and opportunistic flora taxa while completing quadrats

and traversing the study area. Personnel also identified suitable habitat for targeted searches while travelling within the study area.

When a conservation significant taxon was identified, a GPS coordinate of the individual was taken when occurring in isolation, or a central GPS coordinate was taken for a small population (central coordinate with an approximate 20 m radius). Information collected at each location included:

- Number of individuals, for a small population;
- Condition and reproductive status of the plants in each population;
- Photographs of vegetation habitat; and
- Broad information on vegetation type and condition.

Threatened and Priority Flora Report Forms were completed for each taxon and will be provided to the Parks and Wildlife Division (Parks and Wildlife) of DBCA, as required under the flora collecting permits. Conservation significant flora specimens will also be vouchered with the Western Australian Herbarium (WAH) where required.

If significant environmental weeds (weeds of national significance and declared plants listed under Section 22 of the *Biosecurity and Agriculture Management Act 2007*) were identified in the field, searches were conducted within a minimum radius of 20 m from the given specimen, to document the number of individual plants and map the spatial extent of the infestation. The methodology and information collected for significant environmental weeds was consistent with the methodology and information collected for the conservation significant flora.

3.2.6 Targeted Mesophytic/ Hydrophytic Flora Searches

In addition to targeted searches for conservation significant flora species, the field personnel also completed targeted searches for flora species that may indicate the presence of surface or subsurface soil moisture persistence. The taxa, mesophytes and hydrophytes, that were targeted provided supporting evidence for the delineation of vegetation type boundaries and the identification and justification for vegetation type importance not directly related to presence of conservation significant flora or ecological communities.

A non-exhaustive list of Pilbara mesophytic/ hydrophytic species indicative of sub-perennial to perennial moisture availability that were targeted and recorded while surveying the study area is listed in Table 3.5 (adapted from information provided by ALA (2020); DBCA (2020a); WAH (1998-), and Pilbara environmental observations by J. Naaykens (Rio Tinto)).

Table 3.5: Pilbara mesophytic/ hydrophytic species likely to indicate sub-perennial to perennial moisture availability

Species	Lifeform
<i>Melaleuca argentea</i>	Tree
<i>Sesbania formosa</i>	Tree
<i>Eucalyptus camaldulensis</i>	Tree
<i>Eucalyptus victrix</i>	Tree
<i>Cladium procerum</i>	Macrophyte/ sedge

Species	Lifeform
<i>Imperata cylindrica</i>	Reed/ Grass
<i>Acacia ampliceps</i>	Shrub
<i>Cullen leucanthum</i>	Shrub
<i>Melaleuca bracteata</i>	Shrub
<i>Pteris vittata</i>	Fern
<i>Adiantum capillus-veneris</i>	Fern
Lobelia spp.	Herb
Stylidium spp.	Herb
<i>Melaleuca linophylla</i>	Shrub
<i>Melaleuca glomerata</i>	Shrub
<i>Atalaya hemiglauca</i>	Tree
<i>Acacia coriacea</i> subsp. <i>pendens</i>	Tree/ shrub
*Phoenix dactylifera	Palm
<i>Eleocharis</i> spp. (Particularly <i>E. geniculata</i>)	Macrophyte/ sedge
Various sedge spp. including <i>Schoenus</i> spp., <i>Baumea</i> spp., <i>Fimbristylis</i> spp., etc.	Macrophyte/ sedge
<i>Cyperus iria</i>	Macrophyte/ sedge
<i>Marsilea</i> spp.	Macrophyte/ fern
<i>Potamogeton</i> spp.	Aquatic Macrophyte
<i>Typha domingensis</i>	Macrophyte/ sedge
Muehlenbeckia spp.	Macrophyte/ shrub
<i>Cyperus vaginatus</i>	Macrophyte/ sedge
<i>Schoenoplectiella/ Schoenoplectus</i> spp.	Macrophyte/ sedge
<i>Fuirena ciliaris</i>	Macrophyte/ sedge
<i>Gossypium sturtianum</i>	Shrub
<i>Acacia citrinoviridis</i>	Tree
<i>Acacia sclerosperma</i>	Shrub
<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)	Herb
Sesbania spp.	Shrub
<i>Sorghum</i> spp.	Grass
<i>Eragrostis surreyana</i>	Grass
<i>Vallisneria nana</i>	Aquatic Macrophyte
<i>Senecio hamersleyensis</i>	Shrub
Geijera salicifolia	Tree
<i>Commelina ensifolia</i>	Herb
<i>Trigonella suavissima</i>	Herb

Note: Species in **bold** identify some of the best upper level indicators of moisture availability/ permanence

3.2.7 Groundwater Dependent Vegetation

The survey included an assessment of vegetation that may be reliant on groundwater for all or part of its lifecycle. Groundwater dependency was determined by reviewing the GDE Atlas (Section 2.9.1) prior to the survey and reviewing the flora assemblage present within the study area during the survey.

The presence of phreatophytic tree species, as well as a disproportionately higher representation of mesophytic/ hydrophytic species was used to determine the presence (and importantly, absence) of groundwater dependent vegetation (GDV). The floristic assemblage and mesophytic/ hydrophytic assemblage determined the level of importance or “significance” of the GDV.

3.2.8 Identification of Flora Specimens

Plant taxa that could not be identified during the field surveys were collected for subsequent identification. Identifications were carried out by Biologic’s taxonomists, Mrs Sharyna Yates and Dr Rachel Meissner, under the management of senior botanist Sam Coultas. The specimens were completed utilising personal reference collections, Western Australian Herbarium’s (WAH) reference collection, taxonomic keys and reference material. A subset of specimens were also submitted to the Rio Tinto sponsored botanist, Steven Dillon, for identification. These specimens included conservation significant species, range extensions, unusual specimens potentially representing novel taxa and difficult to identify specimens that required further investigation. The specimens were submitted to the Rio Tinto sponsored botanist via the Herbarium Specimen Submission procedure and chain of custody forms (Appendix G).

All taxa were checked against Florabase® (version 2.9.31; WAH, 1998-) and the Pilbara Species list prepared and released by Steven Dillon to ensure their currency and validity. Any conservation significant flora taxa, including potential threatened and priority species, range extensions and potential new taxa have been verified and have/ will be vouchered (if appropriate) at the WAH.

3.3 Statistical Analysis

Data Transformation and Reconciliation

All statistics were carried out using R version 4.0.0 (R Core Team, 2018). The observed taxa in the quadrats were recorded on a cover abundance basis, with an estimate of the foliage cover of each species made at each site. The hummock grassland layer of the Pilbara can exceed 50 % cover within a quadrat, while most other taxa cover less than 1 % of a quadrat. To allow for this large disparity in cover and the potential for ambiguities in determining cover between observers, the cover values were reduced to cover codes, based on an adapted Braun-Blanquet method (1 = <1 %; 2 = 1–5 %; 3 = 6–25 %; 4 = 26–50 %; 5 = 51–75 %; and 6 = >75 %).

Species Accumulation Curve

To determine the adequacy of the survey, species accumulation curves were plotted using the number of species observed (sobs), and richness estimators Chao 1, Jackknife 1, and Bootstrap to predict the total number of flora taxa that could potentially be recorded. When a curve approaches an asymptote it suggests that sampling effort has been sufficient to adequately collect the species comprising the floral

assemblage at the locations sampled (Thompson & Withers, 2003). The value at which the curve asymptotes can also be used as an approximate measure of the total size of the species complement at that location (Thompson *et al.*, 2003).

Hierarchical clustering

The flora species list was reconciled to amalgamate selected taxa e.g., varieties of the same species (Appendix H). The cover code values for the flora in each quadrat were compiled in R and a resemblance matrix was created. Weeds and singletons were removed for the analysis.

The dataset used in the analysis comprised 252 native flora taxa from 66 sample sites from the present study, and 191 flora taxa from 40 adjacent sample sites (Biologic, in prep). The overall dataset was therefore 298 flora taxa from 106 sample sites. The similarity testing was undertaken using the BrayCurtis coefficient. Vegetation units were defined based on 40–80% similarity and distinguished visually in a dendrogram based on a Similarity Profile Test (SIMPROF) cluster analysis.

Information from previous surveys undertaken in the area are also included in the current data analysis to provide context for our results.

3.4 Vegetation Association Mapping

Broad vegetation mapping was conducted prior to the field survey, with vegetation boundaries delineated over aerial photography. Following the completion of the quadrat sampling and taxonomic identifications, the broad vegetation mapping was refined based on the review of the floristic data collected from the quadrats, the outputs from the statistical analysis (i.e., hierarchical cluster tree) and review of the existing vegetation mapping occurring across the study area. The vegetation type mapping was then digitised using GIS software.

Vegetation types were delineated and described from aerial imagery using the data collected during the survey and the outputs of the statistical analysis. The vegetation structure information from the quadrats, relevés and mapping points was reviewed to describe the vegetation associations based on the dominant taxa, foliage cover and height of the three traditional strata (upper, mid and lower/ground). This method of vegetation type determination is consistent with EPA (2016b). The vegetation types have been described to Level 5 (Vegetation Association) in the NVIS hierarchical structure (NVIS Technical Working Group, 2017). Due to the large extent of the study area (48 km stretch of watercourse), the mapping reliability is considered to be moderate, as major vegetation types were traversed and sampled, but mapping was extrapolated using aerial imagery and surrounding vegetation for areas that were not as readily accessible.

3.5 Vegetation Condition Mapping

Vegetation condition was defined within the study area using a vegetation condition scale adapted from Keighery (1994) and Trudgen (2002) (and presented in EPA, 2016b) (Appendix E), based on the level of disturbance observed in each area. Condition was recorded at each sampling site, while additional notes were taken while traversing the study area and used to broadly map vegetation condition boundaries. The vegetation condition mapping was then digitised using GIS software.

3.6 Potential Limitation and Constraints

There are a number of possible limitations and constraints that can affect the adequacy of vegetation and flora surveys (EPA, 2016b). The limitations of the current assessment are presented in accordance with the Technical Guidance (EPA, 2016b) (Table 3.6).

Table 3.6: Survey limitations and constraints

Limitation	Constraint	Comment
Availability of contextual information at a regional and local scale	No	Sufficient contextual information was available for the study area, including broad information on land systems and vegetation associations. Sections of the creeks adjacent to the study area (i.e., Caves Creek (Biota, 2018a) and Boolgeeda Creek (Biota, 2018a; Eco Logical, 2015) have previously been surveyed, with data and reports available for this assessment.
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed	No	The field survey was led by an experienced botanist with over 13 years of experience. The lead botanist met the minimum requirements to manage flora and vegetation surveys in the Pilbara bioregion (EPA, 2016b). Field teams were led by experienced botanists including a senior botanist with 6 years' experience.
Proportion of flora recorded and/or collected, any identification issues	Yes Minor	<p>The phase one survey was undertaken following below-average rainfall, (see survey timing below), and as a result, a proportion of the flora expected to occur (i.e., annuals and ephemerals) are considered to be under-represented. In addition, some perennial species lacked the flowering and fruiting material required for confirmation of taxonomic identifications.</p> <p>A total of 35 specimens could not be confirmed to species level due to lack of diagnostic material. None of these unconfirmed specimens were expected to be of conservation significance (Table 4.1).</p> <p>The phase two survey was undertaken during a time considered to be optimal for the Pilbara bioregion (optimal timing is considered to be between March and June, EPA, 2016b), with numerous ephemeral taxa present. This limitation is therefore thought to be minor.</p>
Was the appropriate area fully surveyed (effort and extent)	Yes Minor	Due to the global pandemic occurring during the time of the phase two survey, the initial objective was altered to prioritise resampling quadrats over transects. Therefore transects were not resampled. Given that transect locations are marked with a differential GPS, this limitation was only deemed to be minor, as transects can be resampled at a later date.
Access restrictions within the survey area	Yes Minor	The study area was 120 km long, thus some sections were not accessible by vehicle. Using vehicles, a helicopter, and foot traverses, all quadrat locations were accessed in both phases of the survey, however quadrats were only established in areas that could be accessed within the given survey time.
Survey timing, rainfall, season of survey	No	The phase one survey was undertaken following below-average rainfall, with the soil and surrounds noted as being dry. As a result, a proportion of the flora expected to occur were under-represented. However, phase two was undertaken during a time considered to be optimal for the Pilbara bioregion (March to June for the Eremaean region; EPA, 2016b) and followed substantial summer rainfall. Pools and flowing water were observed in the study area during the phase two survey.

Limitation	Constraint	Comment
<p>Disturbance that may have affected the results of survey such as fire, flood or clearing</p>	<p>Yes Minor</p>	<p>During the phase two survey, some of the Duck Creek study sites had flooded. The flora recorded from the creek banks at these sites may not have been representative of the vegetation that would have grown in the creek bed in drier conditions.</p> <p>Furthermore, large stretches (in excess of 500 m) of water was present within Duck Creek. The water was deep (beyond 1 m in numerous occasions) with the survey team not approved to cross deep water. As a result, some quadrats only re-scored one side of the creek bank, as it was not possible to access the other bank. This may have resulted in an under-representation of the floristic diversity present. Although, this limitation is deemed to be only minor as floristic diversity in the quadrats was high, a high number of quadrats (and relevés) was sampled, and the field work was supplemented by additional surveys completed in the immediate area.</p>

4 RESULTS

4.1 Literature Review

The results and outcomes of the review of 14 flora and vegetation reports identified from the literature review are presented in Appendix I. The literature review identified six conservation significant flora taxa as being previously recorded within the study area (*Ipomoea racemigera* (P2), *Oxalis* sp. Pilbara (M.E. Trudgen 12725) (P2), *Euphorbia australis* var. *glabra* (P3), *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3), *Livistona alfredii* (P4) and *Rhynchosia bungarensis* (P4)), while an additional six conservation significant flora taxa have been previously recorded in close proximity to the study area (*Glycine falcata* (P3), *Rostellularia adscendens* var. *latifolia* (P3), *Sida* sp. Hamersley Range (K. Newbey 10692) (P3), *Triodia pisolitica* (P3), *Eremophila magnifica* subsp. *magnifica* (P4) and *Ptilotus mollis* (P4)). Biota (2018b) recorded conservation significant vegetation occurring just south of the study area comprising 'Themeda grasslands on cracking clays' TEC and PECs 'Triodia sp. Robe River assemblages of mesas of the West Pilbara'¹ (P3) and 'Brockman Iron cracking clay communities of the Hamersley Range' (P1).

4.2 Database Search Results

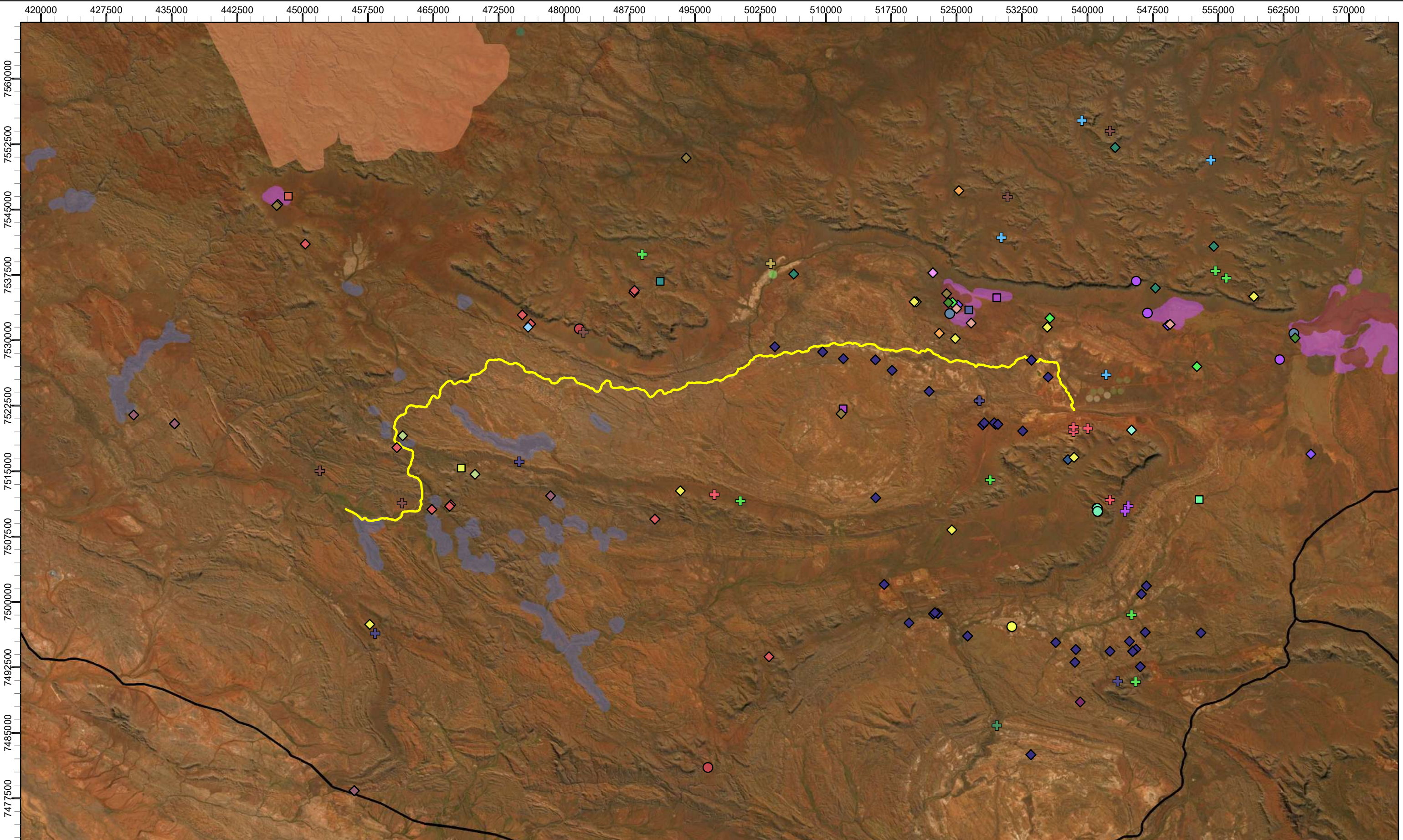
The results of the database search returned 626 flora taxa that have previously been recorded either within 30 km of the study area, or, in the case of declared plants, in the Shire of Ashburton (Appendix J). These taxa include flora of conservation significance and introduced taxa, detailed below.

4.2.1 Flora of Conservation Significance

A total of 48 conservation significant flora taxa (those listed under the EPBC Act, BC Act, or DBCA's Priority List) were identified from the database searches (Appendix B). None of the taxa are listed as Threatened under the EPBC Act or the BC Act. Of the 48 priority listed taxa, nine are listed as Priority 1, seven are listed as Priority 2, twenty-four are listed as Priority 3, and the remaining eight taxa are listed as Priority 4.

Based on the results of the database searches, six priority listed taxa have been previously recorded within the study area. Flora taxa of conservation significance identified by the desktop assessment were assessed and ranked on the likelihood of occurring within the study area (Appendix B). Excluding the five taxa previously confirmed to occur in the study area, one priority taxon is considered likely to occur and 27 were considered to possibly occur within the study area (Table 4.1). The remaining 15 taxa were considered unlikely or highly unlikely to occur within the study area (Appendix B).

¹ 'Triodia sp. Robe River assemblages of mesas of the West Pilbara' is not current and is now known as 'Triodia pisolitica assemblages of mesas of the West Pilbara'.



Legend

- Duck Creek
- Highway
- Threatened and Priority Ecological Communities**
- Themeda grasslands; Vulnerable
- Brockman Iron cracking clay communities; Priority 1

- Bungaroo; Priority 1
- Riparian communities of springs and Pools Pilbara; Priority 2
- Kumina LS; Priority 3
- *Triodia pisolitcola* Assemblages; Priority 3

1:395,000

0 2 4 8 12 16 20 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.1: Conservation significant flora and ecological communities database searches results

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 03/09/2020

Legend

Taxon (Status)





































-  *Euphorbia inappendiculata* var. *queenslandica* (P1)
 -  *Goodenia pedicellata* (P1)
 -  *Helichrysum oligochaetum* (P1)
 -  *Hibiscus campanulatus* (P1)
 -  *Tetratheca butcheriana* (P1)
 -  *Dicladanthera glabra* (P2)
 -  *Euphorbia inappendiculata* var. *inappendiculata* (P2)
 -  *Gompholobium karjini* (P2)
 -  *Paspalidium retiglume* (P2)
 -  *Pentalepis trichodesmoides* subsp. *hispida* (P2)
 -  *Teucrium pilbaranum* (P2)
 -  *Aristida jerichoensis* var. *subspinulifera* (P3)
 -  *Astrebla lappacea* (P3)
 -  *Cyanthillium gracile* (P3)
 -  *Dampiera anonyma* (P3)
 -  *Eremophila magnifica* subsp. *velutina* (P3)
 -  *Euphorbia australis* var. *glabra* (P3)
 -  *Glycine falcata* (P3)
 -  *Grevillea saxicola* (P3)
 -  *Gymnanthera cunninghamii* (P3)
 -  *Iotasperma sessilifolium* (P3)
 -  *Ptilotus subspinescens* (P3)
 -  *Rostellularia adscendens* var. *latifolia* (P3)
 -  *Solanum kentrocaule* (P3)
 -  *Swainsona thompsoniana* (P3)
 -  *Terminalia supranitifolia* (P3)
 -  *Triodia basitricha* (P3)
 -  *Triodia pisoliticola* (P3)
 -  *Acacia bromilowiana* (P4)
 -  *Eremophila magnifica* subsp. *magnifica* (P4)
 -  *Goodenia nuda* (P4)
 -  *Lepidium catapycnon* (P4)
 -  *Livistona alfredii* (P4)
 -  *Ptilotus mollis* (P4)
-  *Ptilotus trichocephalus* (P4)
-  *Rhynchosia bungarensis* (P4)

Table 4.1: Conservation significant flora taxa known to occur near the study area based on the desktop assessment

Taxon	Description (WAH, 1998-)	Location
Confirmed		
<i>Euphorbia australis</i> var. <i>glabra</i> (P3)	Annual prostrate herb, leaves green with a red tinged margins. Drainage lines on clay loam and river sand	Within
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	Perennial, upright shrub, to 2 m high. Fl. red/pink/purple. Red/brown sandy clay loam. Drainage lines, floodplains, gullies.	Within
<i>Ipomoea racemigera</i> (P2)	Creeping annual, herb or climber. Fl. white.	Within
<i>Livistona alfredii</i> (P4)	Tree-like monocot (palm), to 10 m high. Fl. cream, Jul to Sep. Edges of permanent pools.	Within
<i>Oxalis</i> sp. Pilbara (M.E. Trudgen 12725) (P2)	Annual herb, 0.1-0.3 m high. Fl. Yellow. Brown sandy loam or clay. Gorge, ironstone outcrops, gully, shaded areas, creeklines.	Within
<i>Rhynchosia bungarensis</i> (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. Granite	Within
Likely		
<i>Gymnanthera cunninghamii</i> (P3)	Erect shrub, 1-2 m high. Fl. cream-yellow-green, Jan to Dec. Sandy soils.	10.1 km N
Possible		
<i>Acacia bromilowiana</i> (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.	3.3 km S
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i> (P3)	Compactly tufted perennial, grass-like or herb, 0.3-0.8 m high, lemma groove muricate. Hardpan plains.	6.6 km E
<i>Astrebula lappacea</i> (P3)	Tufted perennial, grass-like or herb, 0.3-0.8 m high. Fl. green/purple, Jun to Jul. Clay, loam.	7.3 km NNE
<i>Cyanthillium gracile</i> (P3)	Spreading or rounded shrub, to 0.5 m high. Fl. purple. Skeletal red soil, rocky ironstone outcropping. Steep slopes, mesas, gullies.	0.1 km E
<i>Dampiera anonyma</i> (P3)	Multi-stemmed 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 1,000 m).	4.2 km S
<i>Dicladantha glabra</i> (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.	3.6 km ENE
<i>Eremophila magnifica</i> subsp. <i>velutina</i> (P3)	Shrub, 0.5-1.5 m high. Fl. blue-purple, Aug to Sep. Skeletal soils over ironstone. Summits.	3.8 km NNE
<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i> (P2)	Prostrate annual herb, to 0.1 m high. Red brown clay loam. Flat plain, cracking clay floodplain, gentle slopes.	7.1 km SSE
<i>Glycine falcata</i> (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.	6.4 km S
<i>Gompholobium karijini</i> (P2)	Shrub, to 1 m high. Fl. yellow/green. Red/brown gravelly loam or clay. Undulating hills, hilltops, drainage lines.	12.2 km NNE
<i>Goodenia nuda</i> (P4)	Erect to ascending herb, to 0.5 m high. Fl. yellow, Apr to Aug.	4.1 km ENE
<i>Helichrysum oligochaetum</i> (P1)	Erect annual, herb, to ca 0.25 m high. Fl. yellow, Aug to Nov. Red clay. Alluvial plains.	13 km ENE
<i>Hibiscus campanulatus</i> (P1)	Erect bushy shrub, 1-3.5 m high. Fl. White/pale pink. Brown loamy to skeletal soils. Rocky gullies, ironstone range.	6 km NNE

Taxon	Description (WAH, 1998-)	Location
<i>Iotasperma sessilifolium</i> (P3)	Erect herb. Fl. pink. Cracking clay, black loam. Edges of waterholes, plains	7.1 km NNE
<i>Lepidium catapycnon</i> (P4)	Open, woody perennial, herb or shrub, 0.2-0.3 m high, stems zigzag. Fl. white, Oct. Skeletal soils. Hillsides.	13.8 km SSE
<i>Ptilotus mollis</i> (P4)	Compact, perennial shrub, to 0.5 m high, soft grey foliage. Fl. white/pink, May or Sep. Stony hills and screes.	5.3 km SSE
<i>Ptilotus subspinescens</i> (P3)	Compact shrub, to 0.8 m high. Gentle rocky slopes, screes and the bases of screes.	0.1 km SSW
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794) (P3)	Tall spindly shrub, 1.5-4 m high. Fl. yellow. Red brown sandy loam or clay, ironstone plain. Undulating plains, floodplain.	6.7 km E
<i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3)	Herb or shrub, 0.1-0.3 m high. Fl. blue-purple-violet, Apr to May. Ironstone soils. Near creeks, rocky hills.	9.9 km NNW
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642) (P3)	Spreading shrub, to 0.5 m high. Fl. yellow, Aug. Skeletal red soils pockets. Steep slope.	2.7 km S
<i>Sida</i> sp. Hamersley Range (K. Newbey 10692) (P3)	Low, spreading shrub, to 0.5 m high. Fl. yellow. Brown loamy soil. Base of breakaways, gullies, hill summits.	0.3 km NNE
<i>Terminalia supranitifolia</i> (P3)	Spreading, tangled shrub or tree, 1.5-3 m high. Fl. green-yellow, May or Jul or Dec. Sand. Among basalt rocks.	0.8 km ESE
<i>Teucrium pilbaranum</i> (P2)	Upright shrub, 0.2 m high. Fl. white, May or Sep. Clay. Crab hole plain in a river floodplain, margin of calcrete table	5.5 km NNE
<i>Themeda</i> 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.	5.8 km NNE
<i>Triodia basitricha</i> (P3)	Hummock grass to 0.8 m high, non-resinous. Red/brown clay loam over ironstone. Floodplains, flat hill crest, lower slopes.	3.4 km NNE
<i>Triodia</i> sp. Karijini (S. van Leeuwen 4111) (P1)	Hummock grass to 0.9 m high. Steep hillslopes, hillcrests, ironstone outcrops on grey-brown silty loam	1.4 km N
<i>Triodia</i> sp. Silvergrass (P.-L. de Kock BES 00808) (P1)	Hummock grass to 0.6 m high, copiously resinous. Red/brown silty loam, shale. Slope of low shale hills, shale gullies, rocky shale ridge.	3.4 km SE

4.2.2 Vegetation of Conservation Significance

One Threatened Ecological Community (TEC) listed under the BC Act and relevant to vegetation, Themeda Grasslands on Cracking Clays, is recognised in the Pilbara region of Western Australia. The TEC is restricted to cracking clay alluvial soils, with the nearest occurrence being approximately 5 km north of the study area (Figure 4.1 and Table 4.2).

The TEC and PEC database search (DBCA, 2018) identified five PECs within 50 km of the study area (Figure 4.1 and Table 4.2). The study area crosses sections of the *Triodia pisolitica* (previously *Triodia* sp. Robe River) assemblages of mesas of the West Pilbara PEC (Figure 4.1). The remaining PECs: Brockman Iron cracking clay communities, Riparian flora and plant communities of springs and river pools with high water permanence of the Pilbara Region, Stygofaunal Community of the Bungaroo Aquifer, and Kumina Land System did not occur within the study area.

The *Triodia pisolitica* assemblages of mesas of the West Pilbara PEC is restricted to mesas and upland landforms on robe pisolite geologies. Although Robe Pisolite geologies occur adjacent to the study area, the PEC does not occur in association with drainage corridors and creeks. As such, the PEC is not considered to occur within the riparian zone of Duck Creek.

Table 4.2: Threatened and priority ecological communities known to occur in close proximity (50 km) to the study area

Ecological Community	Conservation Rating		Nearest Location
	BC Act	DBCA	
Themeda grasslands on cracking clays (Hamersley Station, Pilbara)	VU	–	5 km north (at Silvergrass)
Brockman Iron cracking clay communities of the Hamersley Range	–	P1	4 km north (at Silvergrass)
Stygofaunal Community of the Bungaroo Aquifer	–	P1	25 km north (in the Bungaroo valley)
Riparian flora and plant communities of springs and river pools with high water permanence of the Pilbara Region	–	P2	9 km north (along Caves Creek at Heritage Pool)
Kumina Land System	–	P3	34 km north (within the Hamersley Ranges)
<i>Triodia pisolitica</i> (previously <i>Triodia</i> sp. Robe River) assemblages of mesas of the West Pilbara	–	P3	Adjacent (in the west of the study area)

4.2.3 Introduced Taxa

The NatureMap (DBCA, 2020a), Protected Matters (DAWE, 2020), ALA (ALA, 2020) and WAOL (DPIRD, 2020) database searches returned a list of 58 introduced taxa that may potentially occur within the study area. The list of introduced taxa known to occur or potentially occur within the study area was reviewed to identify weeds of national significance (WoNS) and declared pests (DP) (Appendix K).

Weeds of National Significance

Of the list of introduced taxa identified during the desktop assessment as occurring in or near the study area, 26 are listed as WoNS (Appendix K). The 26 WoNS were identified from the WAOL database search for the entire Shire of Ashburton and occur or may potentially occur within the shire boundaries. No other database search or the literature review identified any WoNS. The taxa include numerous *Austrocylindropuntia*, *Opuntia*, and *Cylindropuntia* species that are grouped together in the WoNS listing.

Declared Pests

Of the list of introduced taxa identified during the desktop assessment, 48 DPs were identified (including numerous cacti species that are all listed as DPs, Appendix K). The desktop assessment did not identify any DPs as occurring within, or immediately adjacent to, the study area.

Weed Prioritisation

Fifteen introduced taxa have been identified by Parks and Wildlife as ‘priority alerts’ for the Pilbara region, comprising **Azadirachta indica*, **Calotropis procera*, **Chloris gayana*, **Clitoria ternatea*, **Cryptostegia grandiflora*, **Cylindropuntia* spp., **Euphorbia tirucalli*, **Jatropha gossypifolia*, **Lantana*

camara, **Moringa oleifera*, **Ricinus communis*, **Schinus molle* var. *areira*, **Vachellia nilotica*, **Washingtonia robusta* and **Xanthium strumarium*. None of these introduced 'priority alert' taxa are expected to occur in the study area.

4.3 Flora Composition

A total of 277 confirmed vascular flora taxa from 58 families and 152 genera were recorded within the study area (Appendix L). The total number of vascular flora taxa recorded comprised of 251 native taxa and 26 introduced taxa (Appendix L). A matrix showing which taxa were recorded in each sample site is provided in Appendix M. Quadrats sampled during phase one averaged 22.05 unique taxa per quadrat with a range of 5 to 42 taxa. The average number of unique taxa per quadrat during phase two increased markedly to 44.50 unique taxa per quadrat, with a range of 17 to 71 taxa.

An additional 35 specimens could not be confirmed due to lack of diagnostic material for identification. One specimen was too immature for identification, three specimens were identified to family level, and 21 specimens were identified to genus level only. Ten taxa were given tentative (?) identifications at either the genus, species, or subspecies level. None of these unconfirmed specimens were expected to be taxa of conservation significance.

The dominant families equate to 46.5% of the total taxa recorded and comprised Poaceae (48 taxa), Fabaceae (41 taxa), Malvaceae (25 taxa), Asteraceae (15 taxa). Of the 58 families recorded, 27 were represented by one taxon, which equates to 9.7% of the total taxa recorded.

The dominant genera equate to 8.7% of the total taxa recorded and comprised *Acacia* (17 taxa), *Euphorbia* (seven taxa). Eight genera had five representatives each (*Abutilon*, *Dysphania*, *Eriachne*, *Goodenia*, *Heliotropium*, *Indigofera*, *Ipomoea* and *Senna*). Of the 152 genera recorded, 101 were represented by only one taxon, which equates 36.5% of the total taxa recorded.

4.4 Survey Adequacy

During phase one, a total of 66 quadrats and 15 transects were established, with an additional 40 quadrats and 10 transects sampled at Boolgeeda Creek. The reconciled list of confirmed flora taxa from quadrats comprised 252 different species, which increased to 289 when the Boolgeeda Creek survey was included (Table 4.3).

Our sampling intensity (one quadrat every 1.8 kilometres, calculated from 66 quadrats with a study area of 120 km) was consistent with other surveys in the area. Two previous surveys undertaken in nearby Boolgeeda Creek averaged one quadrat per 2.47 kilometres and 2.73 kilometres (Biota, 2013; Eco Logical, 2015 respectively). A survey of a 3,974 ha area at Caves Creek (approx. 25 km north) was undertaken with 40 quadrats, totalling approximately one quadrat per square kilometre (Biota, 2019). The concurrent survey of Boolgeeda Creek resulted in one quadrat per 2 km (Biologic, in prep).

Table 4.3: Expected native species richness for the study area

Treatment	Results	Richness Estimates (Duck only)	Results (including Boolgeeda)	Richness Estimates (including Boolgeeda)
Chao 1	321	79%	387	75%
Jackknife 1	316	80%	357	81%
Bootstrap	281	90%	319	91%
Sobs	252	N/A	289	N/A

NB: percentage values have been rounded to the nearest whole number.

The species accumulation curve for the study area produced a curve that is slightly increasing (Figure 4.2). Using the observed native taxa value (252), richness estimators indicated that the survey was approximately 79% (Chao 1) to 90% (Bootstrap) adequate (Table 4.3). When additional survey effort (Boolgeeda Creek) was considered, a greater number of vascular flora taxa were recorded; however, the species accumulation curve is similar (Figure 4.3) and the richness estimates were comparable to the Duck-only results (Table 4.3). Greater survey effort could have resulted in more taxa being recorded but given the extent of the creekline and the past surveys undertaken nearby, the sampling intensity is considered to be adequate.

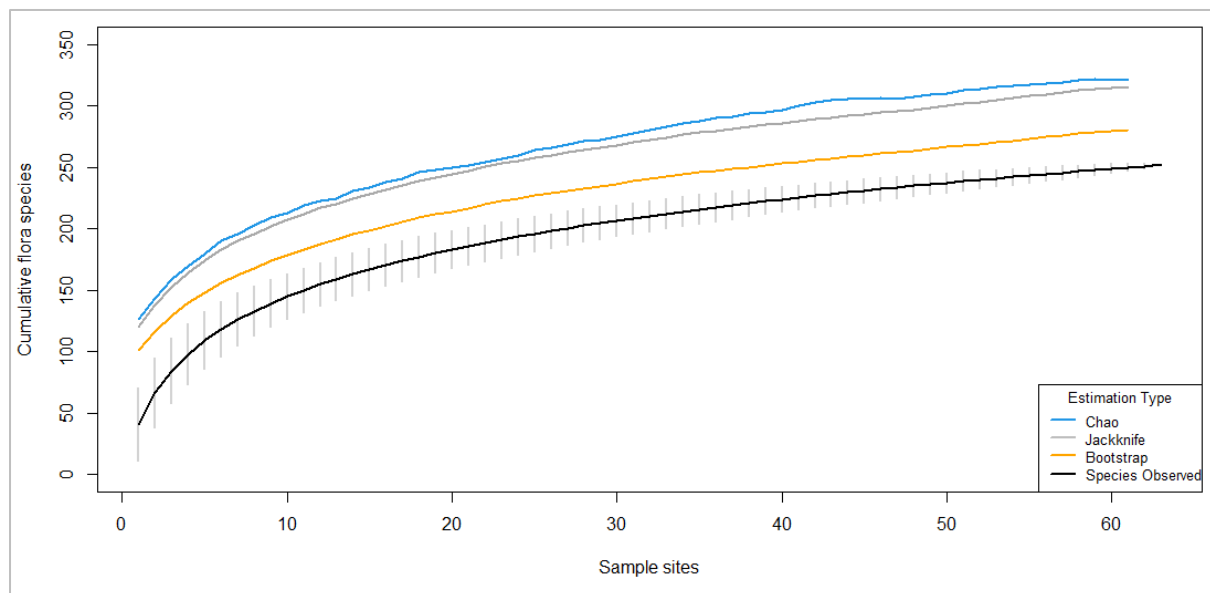


Figure 4.2: Species accumulation curve for the study area (Duck Creek)

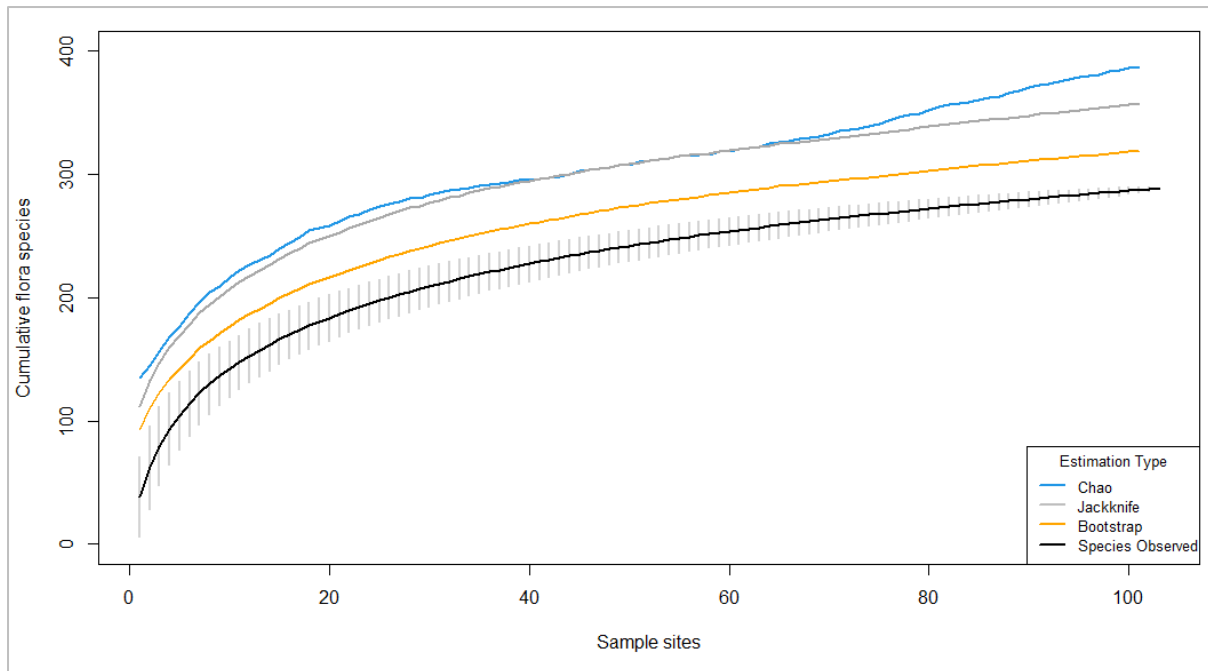


Figure 4.3: Species accumulation curve for Boolgeeda Creek and Duck Creek

4.5 Flora of Conservation Significance

4.5.1 Federal and State Listing

The desktop assessment did not identify any federal or state listed threatened flora species occurring within, or near, the study area. During the field survey, no threatened flora taxa were recorded or were deemed likely to occur within the study area (Appendix B). The vegetation and habitats present within the study area and known locations of threatened flora suggest that no threatened flora species exist within the study area.

During the field survey, six priority-listed flora taxa were recorded in the study area: *Aristida lazaridis* (P2), *Ipomoea racemigera* (P2), *Gymnanthera cunninghamii* (P3), *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3), *Livistona alfredii* (P4) and *Rhynchosia bungarensis* (P4) (Figure 4.4).

Aristida lazaridis (P2)

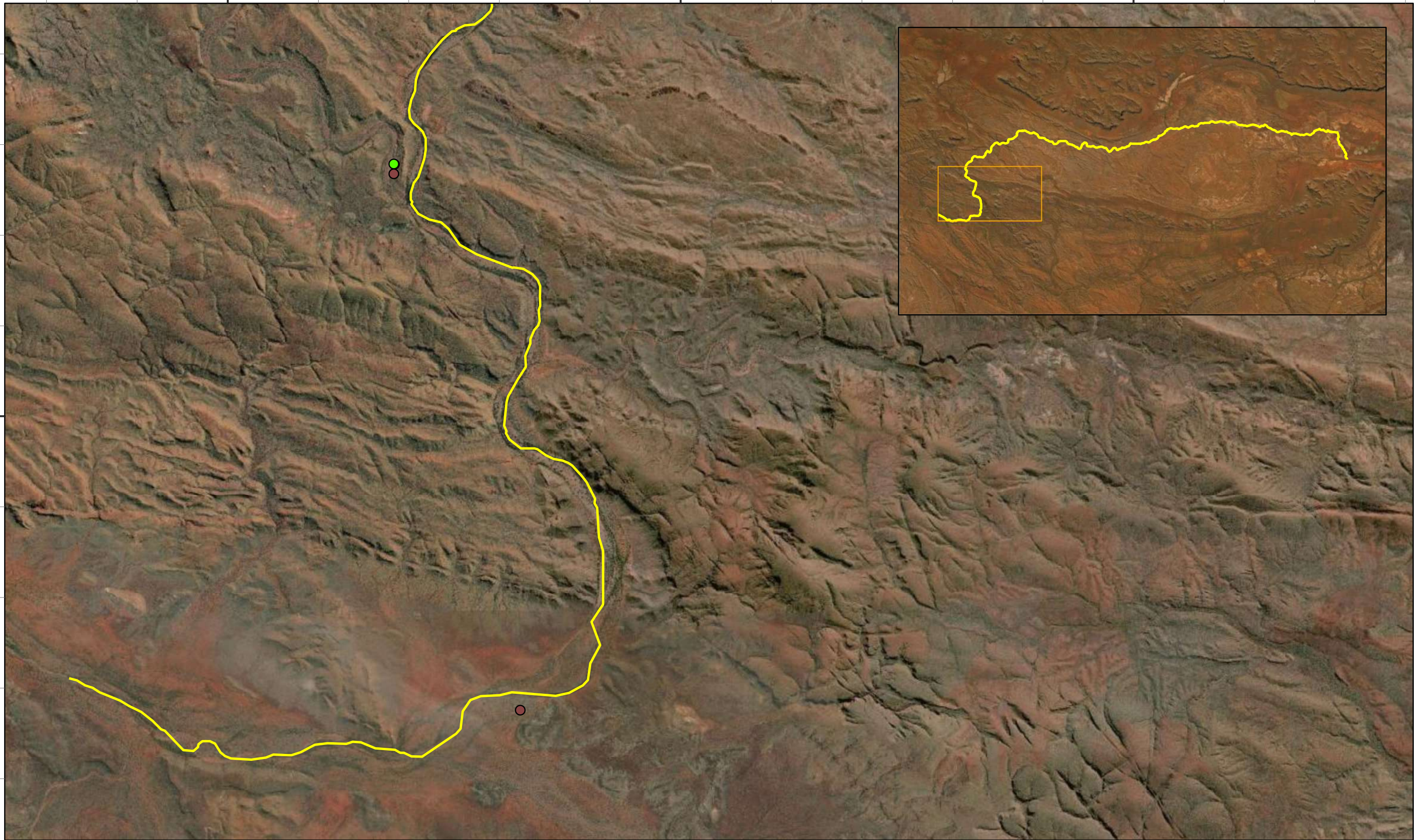
Aristida lazaridis (P2) is a tufted perennial grass with a distinctly open and loose panicle inflorescence and forms dense clumps to a height of 1.5 m (Plate 4.1). It has been recorded from 21 vouchered specimens with the WAH mainly in association with drainage lines and clayey plains (WAH, 1998-). The nearest known record of *Aristida lazaridis* is ~130 km to the east and it was recorded from a single quadrat (DUCR-45) within the study area (Appendix N and Figure 4.4). *Aristida lazaridis* was recorded from the northern bank of Duck Creek at quadrat DUCR-45, with a total of five individuals observed. This record is considered to be a substantial range extension to the west of the known distribution, with previous records from east of Karijini National Park. A voucher specimen will be submitted to WAH in due course.

457500

465000

472500

7515000



Legend

- Duck Creek
- Biologic Survey**
- *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)
- *Rhynchosia bungarensis* (P4)

1:58,300

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.4a: Conservation significant flora recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994
 Size A3. Created 08/01/2020

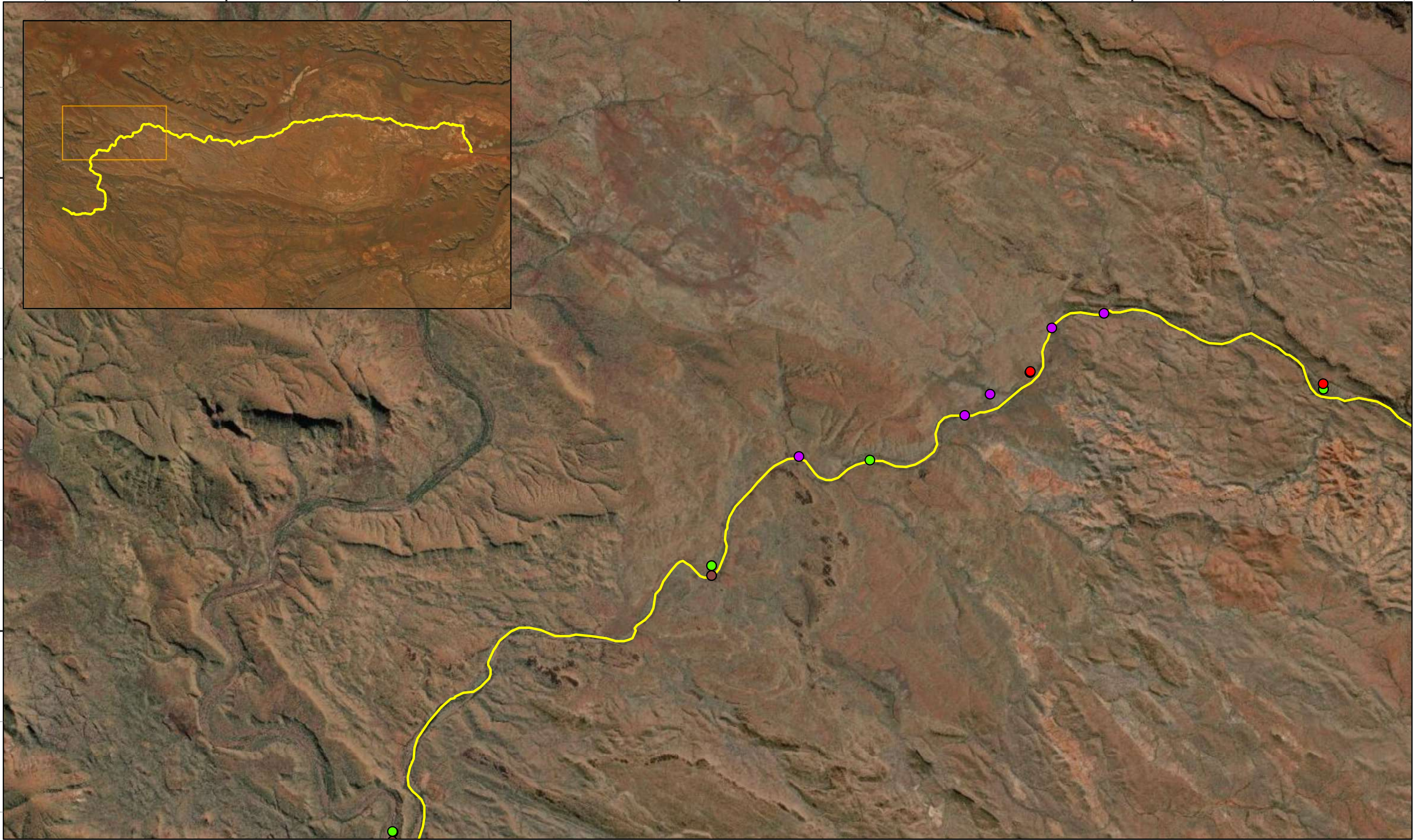
457500

465000

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Legend

- Duck Creek
- Biologic Survey**
- *Ipomoea racemigera* (P2)
- *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)
- *Livistona alfredii* (P4)
- *Rhynchosia bungarensis* (P4)

biologic
Environmental Survey

N
1:58,300

0 1 2 4 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.4b: Conservation significant flora recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020

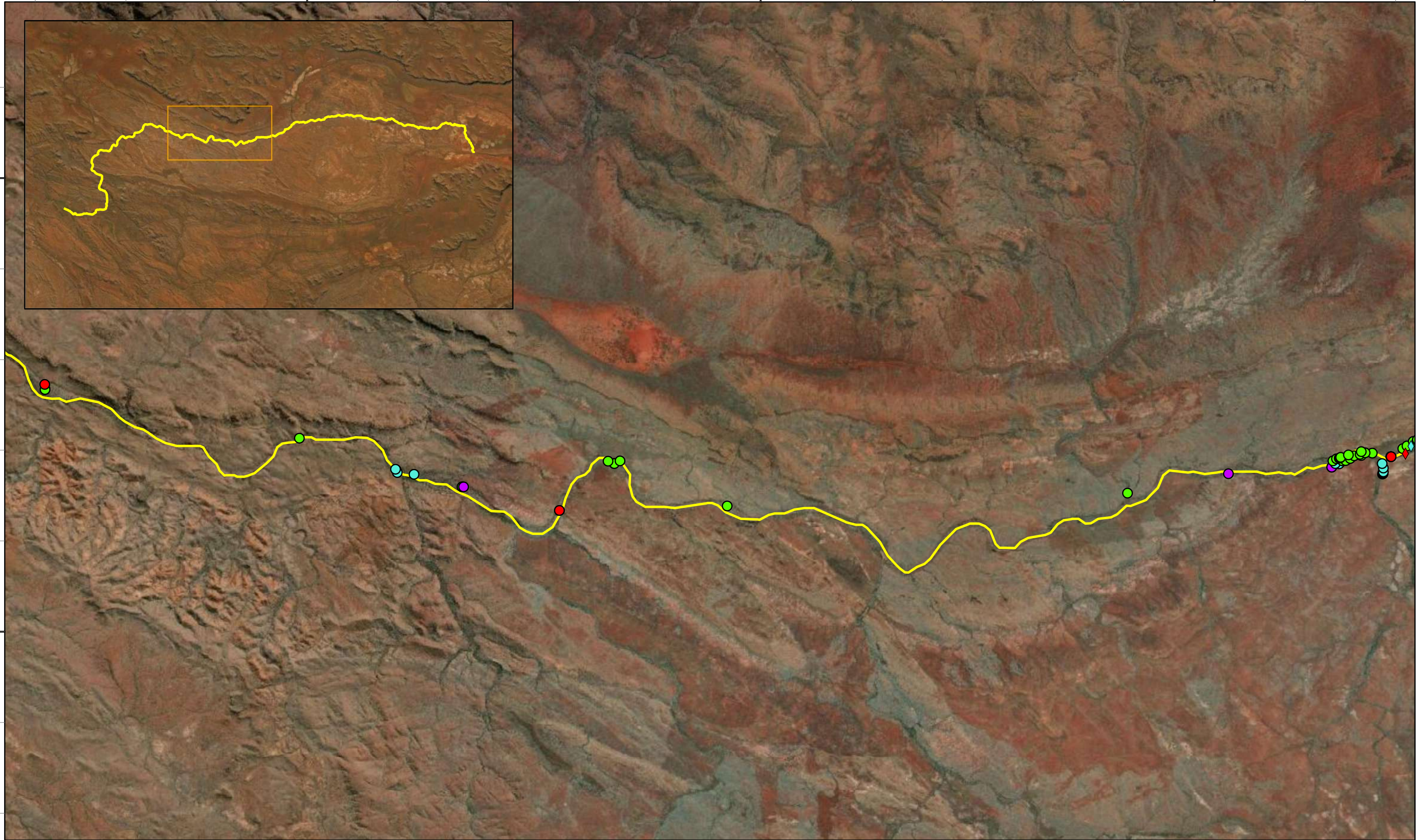
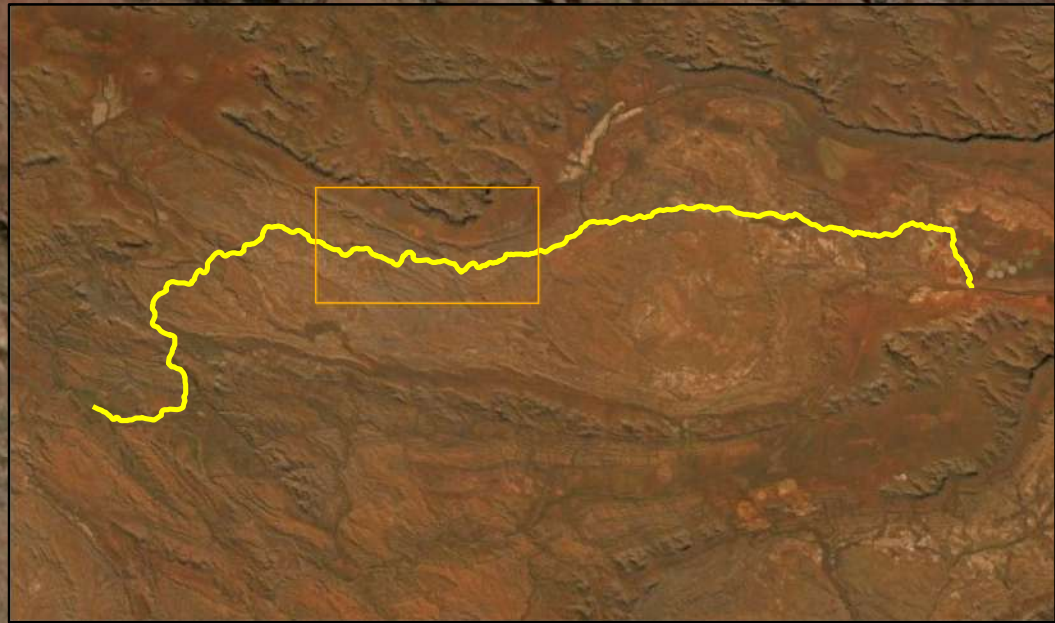
480000

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Legend

- Duck Creek
- Rio Tinto Records**
- ◆ *Gymnanthera cunninghamii* (P3)
- ◆ *Livistona alfredii* (P4)

- Biologic Survey**
- *Ipomoea racemigera* (P2)
- *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)
- *Gymnanthera cunninghamii* (P3)
- *Livistona alfredii* (P4)

biologic
Environmental Survey

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Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.4c: Conservation significant
flora recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020

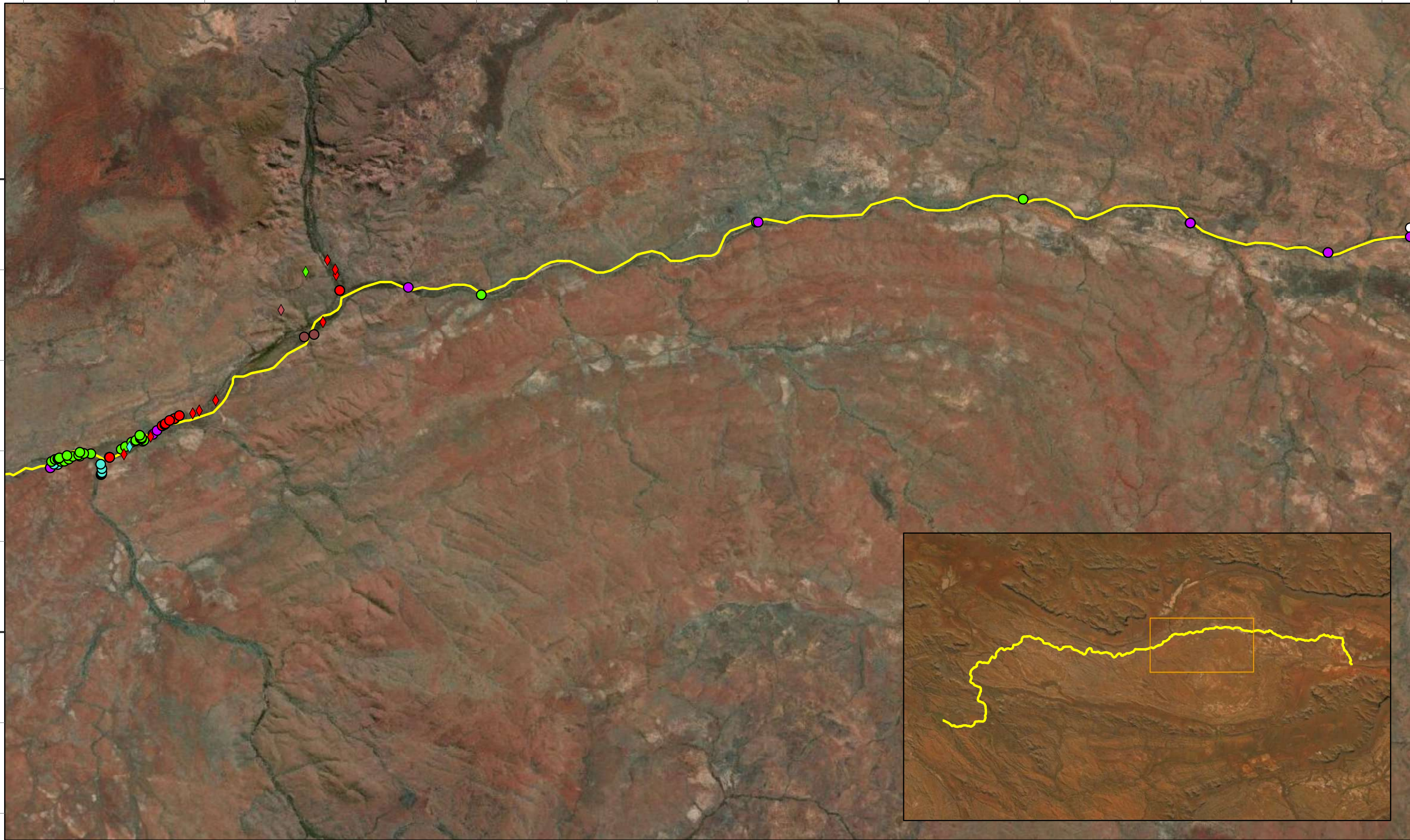
502500

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517500

7530000

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Legend

- Duck Creek
- Rio Tinto Records**
- ◆ *Pentalepis trichodesmoides* subsp. *hispid* (P2)
- ◆ *Gymnanthera cunninghamii* (P3)
- ◆ *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)
- ◆ *Livistona alfredii* (P4)

- Biologic Survey**
- *Aristida lazaridis* (P2)
- *Ipomoea racemigera* (P2)
- *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)
- *Gymnanthera cunninghamii* (P3)
- *Livistona alfredii* (P4)
- *Rhynchosia bungarensis* (P4)

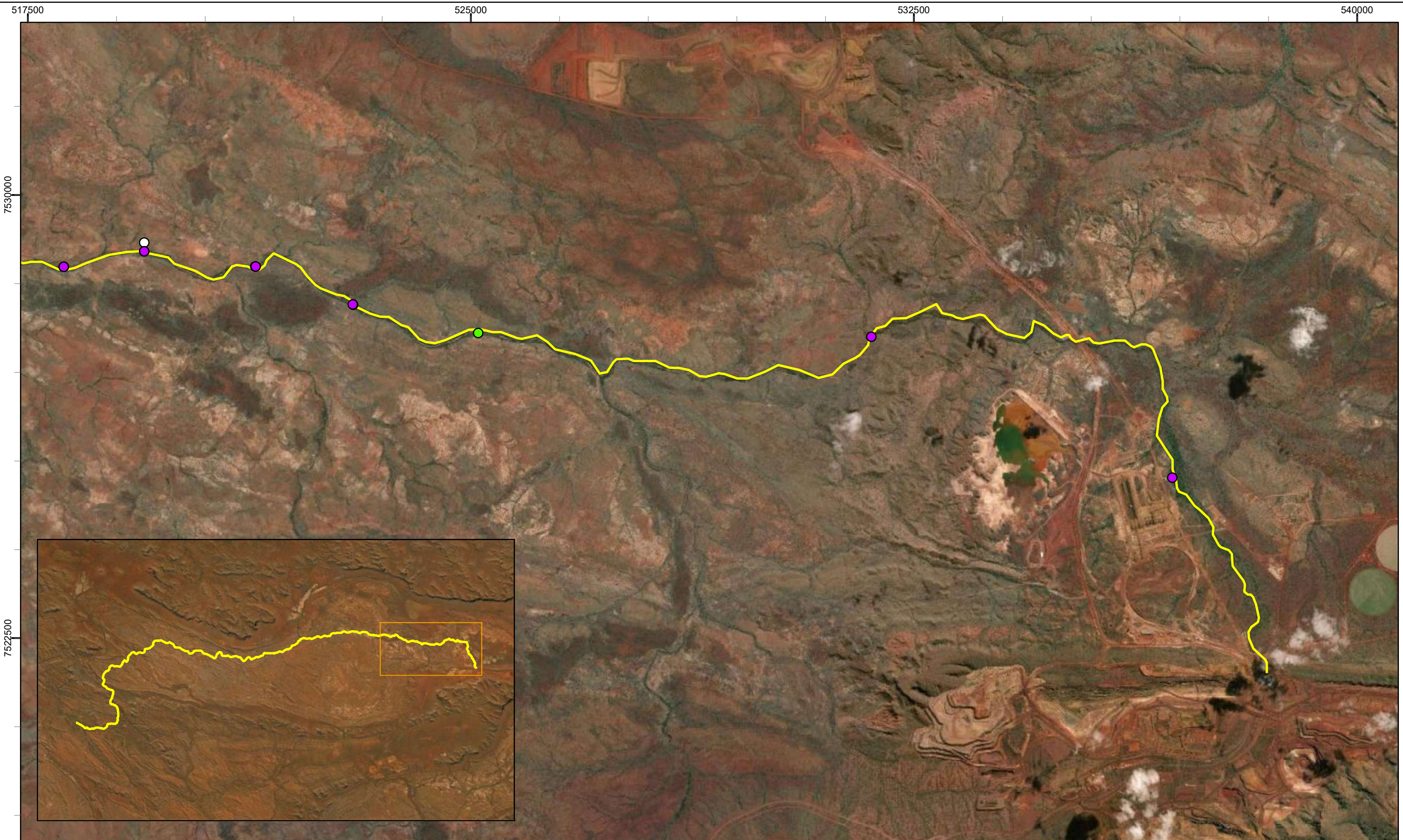
1:58,300

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Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.4d: Conservation significant flora recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020



517500

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- Legend**
- Duck Creek
 - Biologic Survey**
 - *Aristida lazaridis* (P2)
 - *Ipomoea racemigera* (P2)
 - *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)

biologic
Environmental Survey

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1:58,300
0 1 2 4 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.4e: Conservation significant flora recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020



Plate 4.1: *Aristida lazaridis* (P2) showing open, loose panicle inflorescence (Biologic photo, taken from another survey in the Pilbara)

Ipomoea racemigera (P2)

Ipomoea racemigera is described as a pilose, creeping annual herb or climber with twining stems (WAH, 1998-) (Plate 4.2). *Ipomoea racemigera* has a cymose inflorescence bearing 1–2, funnel-shaped white flowers from March to August, or throughout the year under favourable conditions (WAH, 1998-). It closely resembles *Ipomoea plebeia*, differing only in having glabrous to very sparsely hairy upper leaf surfaces and moderately pilose lower surfaces, compared to the evenly pilose upper and lower surface of *Ipomoea plebeia* (Keybase, 2020). *Ipomoea racemigera* has previously been recorded on sandy soils occurring along medium and major watercourses in the Pilbara region of Western Australia from Newman to Kununurra, as well as in similar habitats in the Northern Territory, South Australia, and Queensland (ALA, 2020; WAH, 1998-). FloraBase currently has seven records for *Ipomoea racemigera* (WAH, 1998-) and it was recorded from 23 locations during the survey, totalling in excess of 25 individuals (Appendix N). *Ipomoea racemigera* locations were scattered along Duck Creek from the far east of the study area to the west (Figure 4.4). Individuals were generally recorded from the creek channel and occasionally within the banks and floodplains.



Plate 4.2: *Ipomoea racemigera* (P2) recorded from the study area (Biologic photo taken during phase two survey)

Gymnanthera cunninghamii (P3)

Gymnanthera cunninghamii (Plate 4.3) is a Priority 3 taxon that is described as an erect, woody shrub that grows to 1.5 m high with cylindrical, glabrous stems. It releases a milky latex if cut, and is conspicuously lenticellate (Rio Tinto & WAH, 2015). It produces cream to green yellow flowers from January to December (Rio Tinto & WAH, 2015). *Gymnanthera cunninghamii* generally occurs in situations with a consistent source of soil moisture, and is a high (when abundant) to moderate (when scattered or isolated) mesophyte indicator. The survey recorded 15 point-locations, totalling approximately 43 individuals (Figure 4.4 and Appendix N). Individuals were observed from three main populations spread across the study area (Figure 4.4), occurring on the banks and areas receiving low fluvial energies.



Plate 4.3: *Gymnanthera cunninghamii* (P3) recorded from the study area (Biologic photo, taken during the field survey)

***Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)**

Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) is a tall shrub with simple leaves which are crowded towards terminal branches (Plate 4.4). It produces deep pink flowers, generally from May to July (WAH, 1998-). This species is generally recorded growing in coarse alluvium in high-energy creek lines, or along steep slopes in skeletal soils overlaying coarse breccias from the Brockman Ironstone Formation (Rio Tinto & WAH, 2015). At present *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) is known from the Bungaroo and Mt Brockman area in the Pilbara, however it is noted that this *Indigofera* group requires work, and *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) could be more widespread than is currently known (Rio Tinto & WAH, 2015). *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) superficially resembles *Indigofera monophylla*, which was also present in the study area. This species was distinguished by its sparse, adpressed indumentum, and leaf midrib with fine secondary venation (opposed to tertiary venation in *I. monophylla*). During the survey, *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) was recorded 61 point-locations, totalling more than 720 individuals (Figure 4.4 and Appendix N). Individuals were recorded throughout the study area, generally outside of the main creek channel, and associated with alluvial sediments.



Plate 4.4: *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) observed in the study area (Biologic photo, taken during the field survey)

***Livistona alfredii* (P4)**

Livistona alfredii is a functionally dioecious palm endemic to Western Australia, growing adjacent to watercourses and along drainage lines in well-drained sites. Individuals can grow up to 12 m in height, and is adapted to seasonal wet communities (i.e. mesic environments) (Rio Tinto & WAH, 2015). *Livistona alfredii* produces flowers from September to January and fruits December to May. In the Pilbara, *Livistona alfredii* is now restricted to two key spring derived refugia; Millstream (located in the Millstream-Chichester National Park) and Palm Springs (located on Caves Creek). If this is the case it seems likely that, of the refugia currently present in the Pilbara, and in light of the long term preservation of this relictual species which the hydrogeology of Palm springs and Millstream has supported; these two sites may represent some of the most stable hydrologic refugia present in the Pilbara (Biologic &

Rio Tinto, 2020). This is further supported by the classification of permanent pools at the Palm Springs heritage site as deep time sites by local indigenous groups.

Individuals of *Livistona alfredii* within the study area were generally juveniles with only scattered mature individuals recorded close to the confluence with Caves Creek (Plate 4.5). The presence of juveniles along Duck Creek suggest individuals have been spread by flood events or birds during periods of high soil moisture availability. Individuals were recorded from banks, terrace habitats and areas of low fluvial energies. *Livistona alfredii* was recorded from 18 point locations, totalling 49 individuals (Figure 4.4 and Appendix N).



Plate 4.5: *Livistona alfredii* (P4) in the study area. Mature individuals on the right, compared with juvenile individual on the left (Biologic photos, taken during the field survey)

Rhynchosia bungarensis (P4)

Rhynchosia bungarensis is a trifoliate shrub with sticky leaves covered in golden, glandular hairs and orange-brown vesicular glands. It is a compact, prostrate shrub that grows up to 0.5 m high and produces small, yellow pea flowers (Rio Tinto & WAH, 2015). *Rhynchosia bungarensis* has been recorded from rock piles, gorges, riverbeds and alluvial soils in shrubland or gallery woodland and occurs in and near the Hammersley Range, with records on the Burrup Peninsula and adjacent Dampier Archipelago (DBCA, 2020a; Rio Tinto & WAH, 2015; WAH, 1998-).

During the survey, *Rhynchosia bungarensis* was recorded in five locations, totalling 10 individuals (Figure 4.4 and Appendix N). Individuals were recorded from banks, terraces and areas exposed to low fluvial energies.



Plate 4.6: *Rhynchosia bungalowensis* (P4) in the study area (Biologic photo, taken during the field survey)

4.5.2 Flora of Other Significance

The EPA (2016b) advises that flora species, subspecies, varieties, hybrids and ecotypes may be considered significant for reasons other than listing as Threatened or Priority Flora taxa. This may include, but is not limited to, range extensions, keystone species, relic status, local endemism, and anomalous features. Two taxa recorded from the study area are of importance, *Aristida lazaridis* (P2) and *Sporobolus* aff. *virginicus*.

As discussed above in Section 4.5.1, the observation of *Aristida lazaridis* in the study area represents a range extensions of approximately 130 km to the west from the nearest known location (DBCA, 2020a; WAH, 1998-). The current knowledge on *Aristida lazaridis* indicates that it is only known from east of Karijini National Park, from near Wittenoom in the northwest to near Newman in the southeast.

During the phase one survey a specimen was collected from quadrat DUCR-19 that was later identified by Steve Dillon as *Sporobolus* aff. *virginicus*. Unfortunately, the specimen could not be relocated during the phase two survey due to the flooding and presence of a large pool (more than 500 m in length) that restricted movement around the quadrat. Steve Dillon indicated that the specimen collected was atypical in habit, habitat and the florets appear to have only one anther, as opposed to the three that are usually present (see Appendix G). The specimen collected most resembles either *Sporobolus virginicus* or *Sporobolus mitchellii*, with the specimen placed under the former as an affinity (denoted by aff.). The spikelet dimensions and leaves of the specimen fit with *S. virginicus* (anther length 1.5 mm with convolute leaf blades) compared to *S. mitchellii* (maximum anther length 1 mm and flat and/ or folded leaf blades) (Simon, 2020).

No other taxa recorded in the study area during the survey were considered to be flora of other significance, however, numerous taxa may be groundwater dependent, or otherwise associated with GDEs and represent local importance.

4.5.3 Mesophytic/ Hydrophytic Flora

The flora of the study area included *Melaleuca argentea*, which is an obligate phreatophyte and almost entirely dependent on groundwater (Graham *et al.*, 2003; Landman *et al.*, 2003; McLean, 2014; O'Grady *et al.*, 2006a; O'Grady *et al.*, 2006b). In addition to *Melaleuca argentea*, other overstorey and understorey species which indicate the consistent presence of surface or sub-surface water were also recorded within the study area (Table 4.4 and Figure 4.5).

The key additional mesophytic and hydrophytic species observed in the study area included *Sesbania formosa*, *Livistona alfredii* and *Samolus* sp. Millstream (M.I.H. Brooker 2076). *Sesbania formosa* was recorded from one location in the west of the study area, while *Livistona alfredii* was recorded from numerous locations downstream from the confluence with Caves Creek (Figure 4.5). As mentioned in Section 4.5.1, the majority of the individuals of *Livistona alfredii* were juvenile, suggesting recent emergence along Duck Creek. *Samolus* sp. Millstream (M.I.H. Brooker 2076) was recorded from numerous locations, generally from the confluence with Caves Creek, further downstream (Figure 4.5).

Additional understorey species likely to provide a high indication of moisture availability were *Acacia ampliceps*, *Cullen leucanthum*, *Gymnanthera cunninghamii* and *Melaleuca bracteata* (Table 4.4). *Acacia ampliceps* was recorded in multiple quadrats in the study area, generally located throughout (Figure 4.5). *Cullen leucanthum* was recorded from one location in the west of the study area (Figure 4.5). *Gymnanthera cunninghamii* was generally recorded as scattered (one to three) to numerous individuals (up to six individuals), with a higher proportion of the records from the Caves Creek confluence, downstream (Figure 4.5). *Melaleuca bracteata* was recorded from several locations, upstream and downstream of Caves Creek (Figure 4.5).

In addition to the above species, *Eucalyptus camaldulensis* subsp. *refulgens* and *Eucalyptus victrix* were recorded throughout the study area. There was a higher concentration of mesic and hydric species located near the confluence with Caves Creek and further downstream (Figure 4.5). An approximate stretch of 60 km, from just upstream of Caves Creek confluence, downstream to near the confluence with Boolgeeda Creek supported the highest proportion of mesic and hydric species representation.

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Terrestrial Mesic Taxa
Moderate
 ▲ *Melaleuca linophylla*
Low
 ● *Acacia coriacea* subsp. *pendens*
 ● *Melaleuca glomerata*
Aquatic Mesic Taxa
Low
 ● *Cyperus vaginatus*

Legend
 — Duck Creek

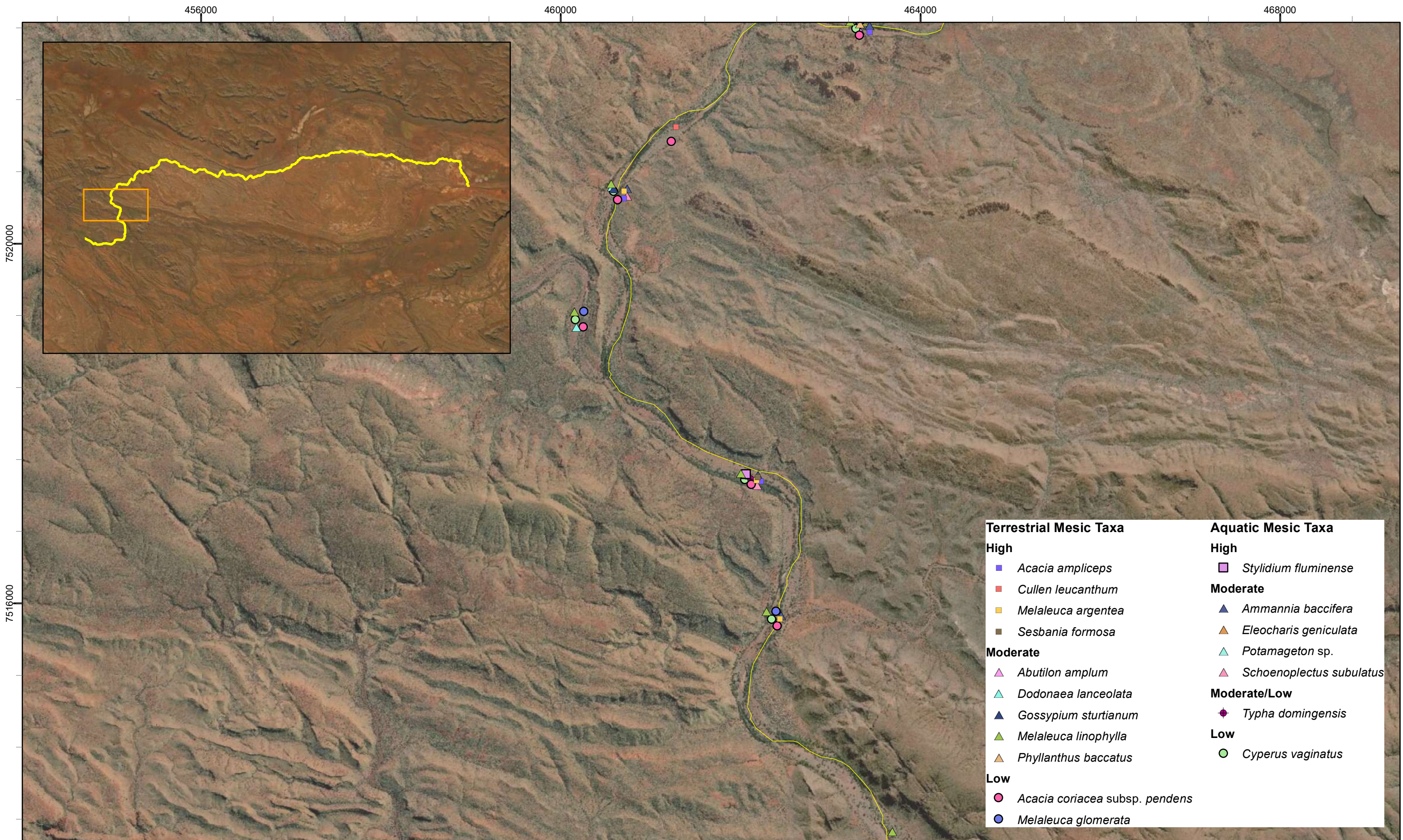
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Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.5a: Mesic indicator taxa
in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020



Terrestrial Mesic Taxa		Aquatic Mesic Taxa	
High	<ul style="list-style-type: none"> ■ <i>Acacia ampliceps</i> ■ <i>Cullen leucanthum</i> ■ <i>Melaleuca argentea</i> ■ <i>Sesbania formosa</i> 	High	<ul style="list-style-type: none"> ■ <i>Stylidium fluminense</i>
Moderate	<ul style="list-style-type: none"> ▲ <i>Abutilon amplum</i> ▲ <i>Dodonaea lanceolata</i> ▲ <i>Gossypium sturtianum</i> ▲ <i>Melaleuca linophylla</i> ▲ <i>Phyllanthus baccatus</i> 	Moderate	<ul style="list-style-type: none"> ▲ <i>Ammannia baccifera</i> ▲ <i>Eleocharis geniculata</i> ▲ <i>Potamogeton</i> sp. ▲ <i>Schoenoplectus subulatus</i>
Low	<ul style="list-style-type: none"> ● <i>Acacia coriacea</i> subsp. <i>pendens</i> ● <i>Melaleuca glomerata</i> 	Moderate/Low	<ul style="list-style-type: none"> ◆ <i>Typha domingensis</i>
		Low	<ul style="list-style-type: none"> ○ <i>Cyperus vaginatus</i>

Legend
 Duck Creek

biologic
 Environmental Survey

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Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.5b: Mesic indicator taxa
in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020

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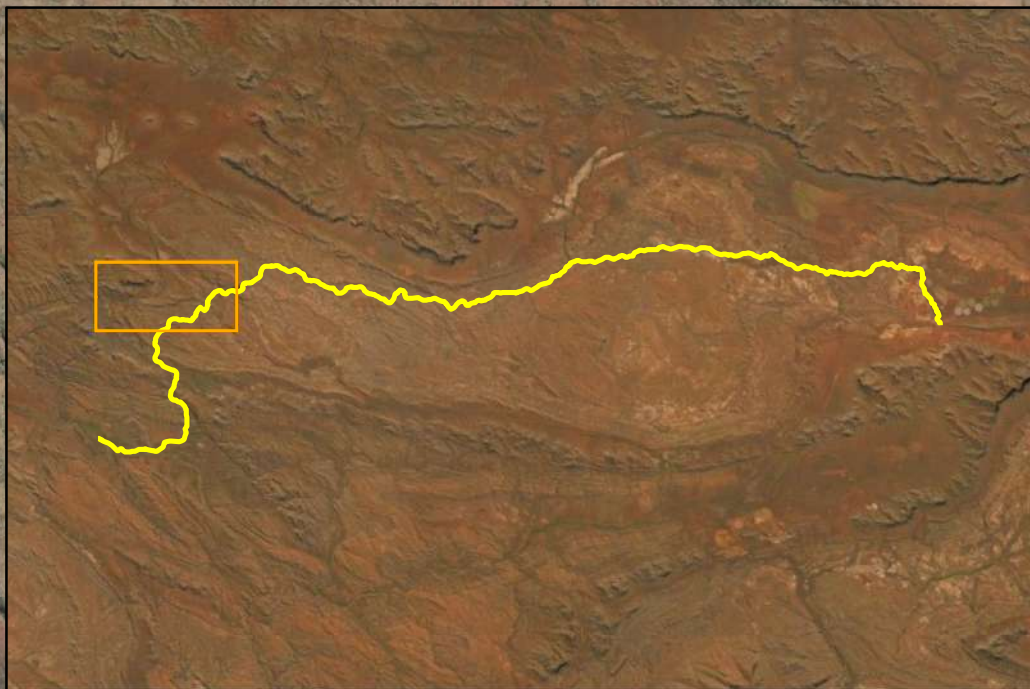
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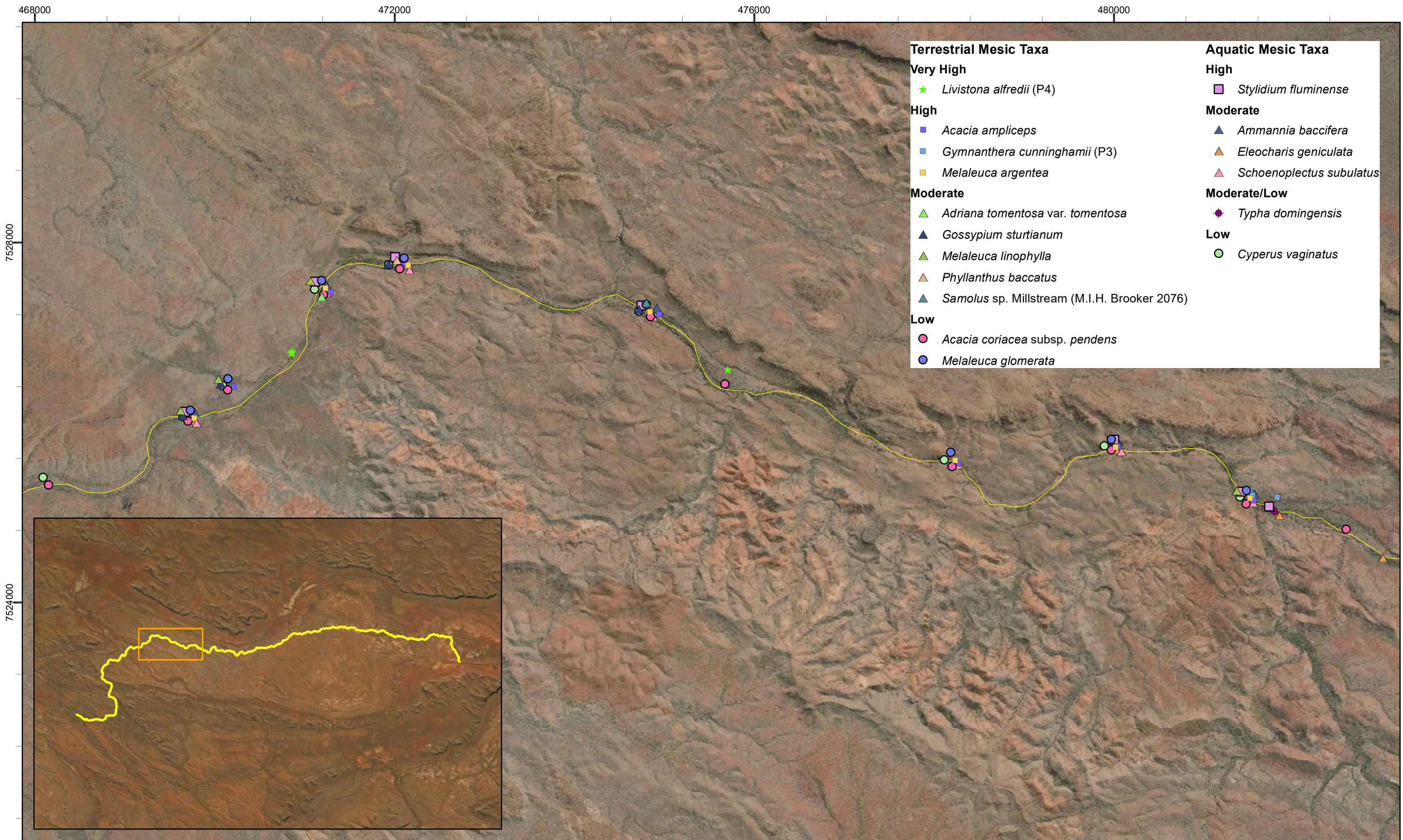
Terrestrial Mesic Taxa		Aquatic Mesic Taxa	
High		Moderate	
■ <i>Acacia ampliceps</i>		▲ <i>Ammannia baccifera</i>	
■ <i>Cullen leucanthum</i>		▲ <i>Potamogeton</i> sp.	
■ <i>Melaleuca argentea</i>		▲ <i>Schoenoplectus subulatus</i>	
Moderate		Low	
▲ <i>Abutilon amplum</i>		○ <i>Cyperus vaginatus</i>	
▲ <i>Gossypium sturtianum</i>			
▲ <i>Gossypium sturtianum</i> var. <i>sturtianum</i>			
▲ <i>Melaleuca linophylla</i>			
▲ <i>Phyllanthus baccatus</i>			
Low			
○ <i>Acacia coriacea</i> subsp. <i>pendens</i>			
○ <i>Melaleuca glomerata</i>			

Legend
 Duck Creek

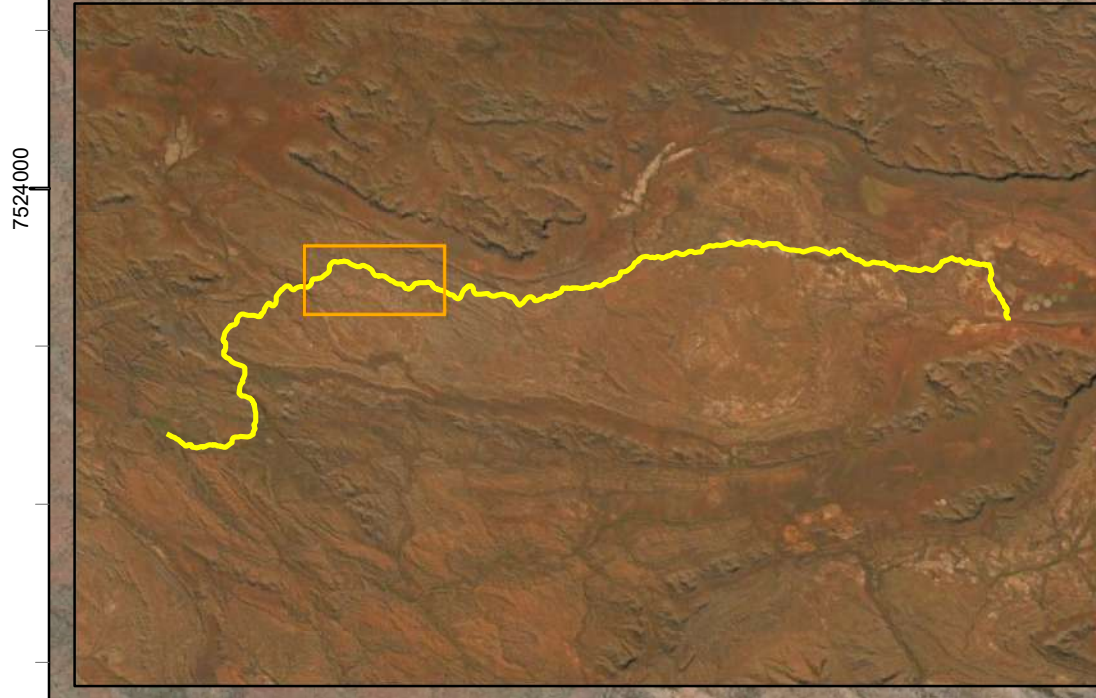
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Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.5c: Mesic indicator taxa
in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994
 Size A3. Created 08/01/2020



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| <p>Terrestrial Mesic Taxa</p> <p>Very High</p> <ul style="list-style-type: none"> ★ <i>Livistona alfreddii</i> (P4) <p>High</p> <ul style="list-style-type: none"> ■ <i>Acacia amplexiceps</i> ■ <i>Gymnanthera cunninghamii</i> (P3) ■ <i>Melaleuca argentea</i> <p>Moderate</p> <ul style="list-style-type: none"> ▲ <i>Adriana tomentosa</i> var. <i>tomentosa</i> ▲ <i>Gossypium sturtianum</i> ▲ <i>Melaleuca linophylla</i> ▲ <i>Phyllanthus baccatus</i> ▲ <i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076) <p>Low</p> <ul style="list-style-type: none"> ● <i>Acacia coriacea</i> subsp. <i>pendens</i> ● <i>Melaleuca glomerata</i> | <p>Aquatic Mesic Taxa</p> <p>High</p> <ul style="list-style-type: none"> ■ <i>Stylidium fluminense</i> <p>Moderate</p> <ul style="list-style-type: none"> ▲ <i>Ammannia baccifera</i> ▲ <i>Eleocharis geniculata</i> ▲ <i>Schoenoplectus subulatus</i> <p>Moderate/Low</p> <ul style="list-style-type: none"> ◆ <i>Typha domingensis</i> <p>Low</p> <ul style="list-style-type: none"> ● <i>Cyperus vaginatus</i> |
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Legend

— Duck Creek

biologic
Environmental Survey

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Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.5d: Mesic indicator taxa in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 08/01/2020

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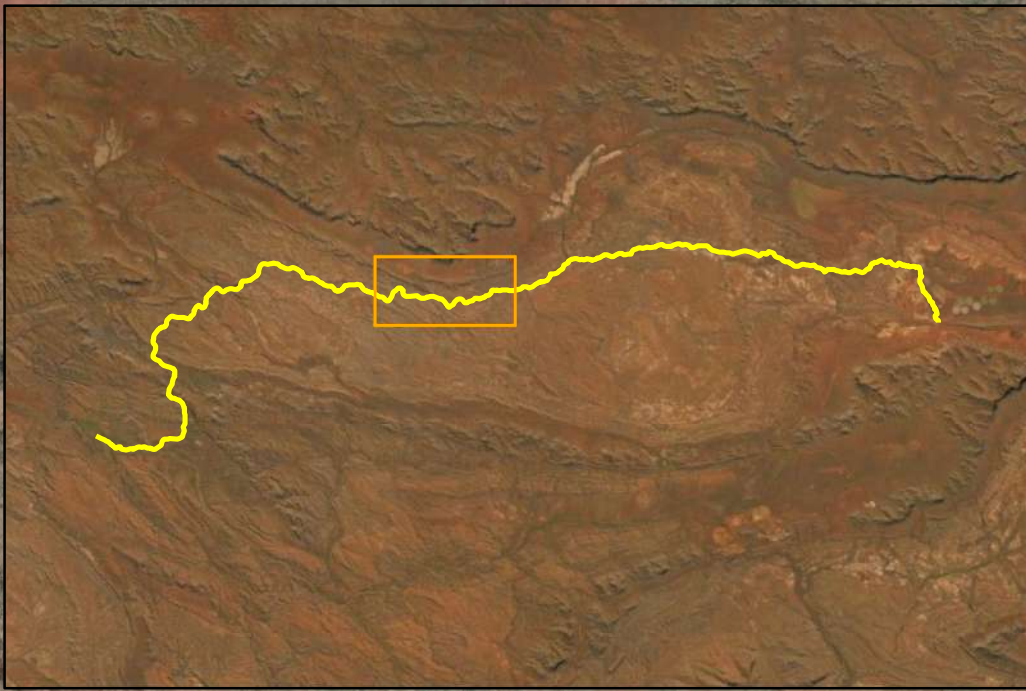
488000

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Terrestrial Mesic Taxa

Very High

★ *Livistona alfredii* (P4)

High

■ *Acacia ampliceps*

■ *Gymnanthera cunninghamii* (P3)

■ *Melaleuca argentea*

■ *Melaleuca bracteata*

Moderate

▲ *Gossypium sturtianum*

▲ *Samolus* sp. Millstream (M.I.H. Brooker 2076)

Low

● *Acacia coriacea* subsp. *pendens*

● *Melaleuca glomerata*

Aquatic Mesic Taxa

High

■ *Stylidium fluminense*

Moderate

▲ *Ammannia baccifera*

▲ *Eleocharis geniculata*

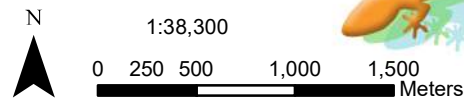
▲ *Schoenoplectus subulatus*

Low

● *Cyperus vaginatus*

Legend

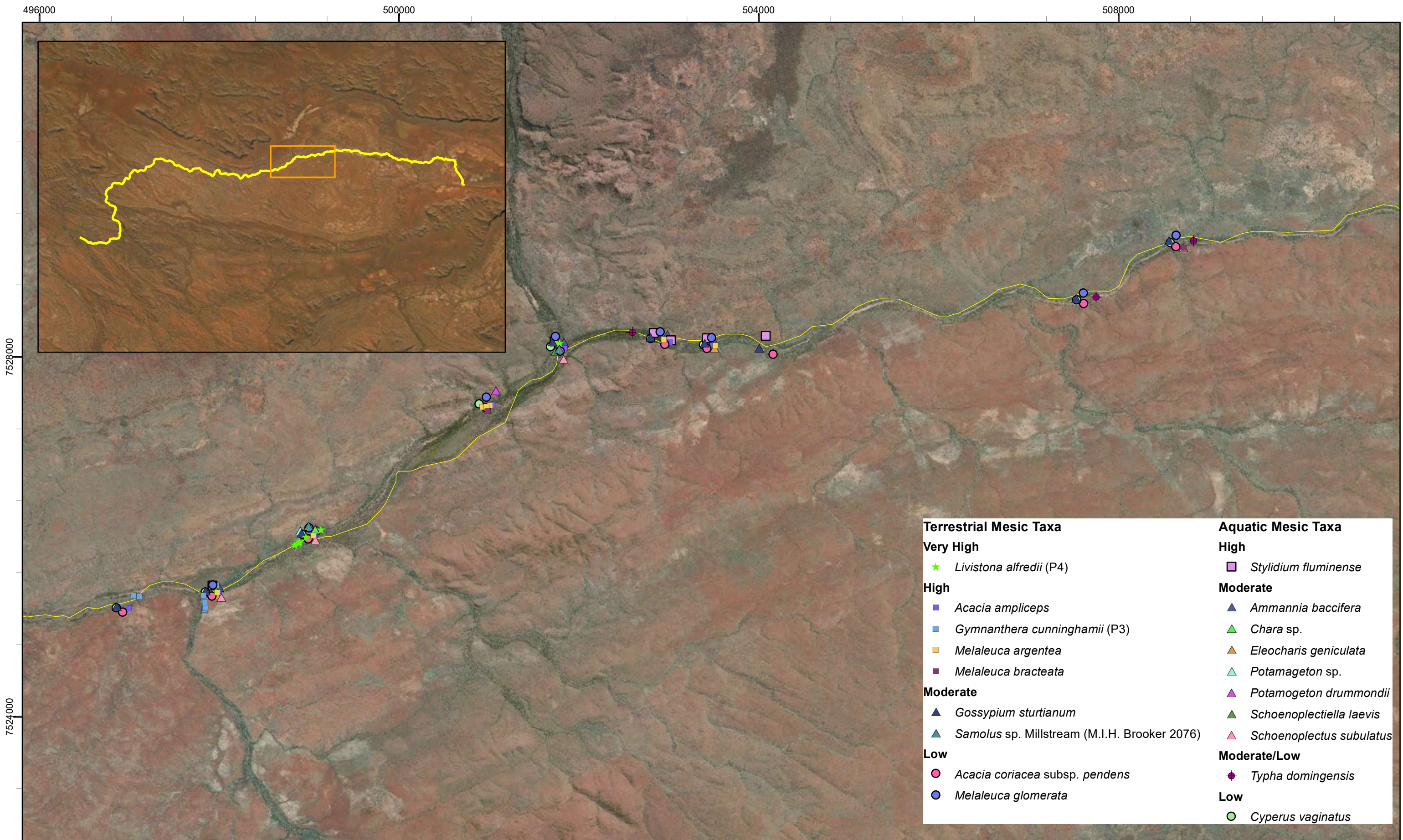
— Duck Creek



**Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.5e: Mesic indicator taxa
in the Study Area**

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 08/01/2020



Terrestrial Mesic Taxa		Aquatic Mesic Taxa	
Very High		High	
★ <i>Livistona alfredii</i> (P4)		□ <i>Stylidium fluminense</i>	
High		Moderate	
■ <i>Acacia ampliceps</i>		▲ <i>Ammannia baccifera</i>	
■ <i>Gymnanthera cunninghamii</i> (P3)		▲ <i>Chara</i> sp.	
■ <i>Melaleuca argentea</i>		▲ <i>Eleocharis geniculata</i>	
■ <i>Melaleuca bracteata</i>		▲ <i>Potamogeton</i> sp.	
Moderate		Moderate/Low	
▲ <i>Gossypium sturtianum</i>		◆ <i>Typha domingensis</i>	
▲ <i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)		Low	
Low		○ <i>Cyperus vaginatus</i>	
○ <i>Acacia coriacea</i> subsp. <i>pendens</i>			
○ <i>Melaleuca glomerata</i>			

Legend
 Duck Creek

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Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.5f: Mesic indicator taxa in the Study Area

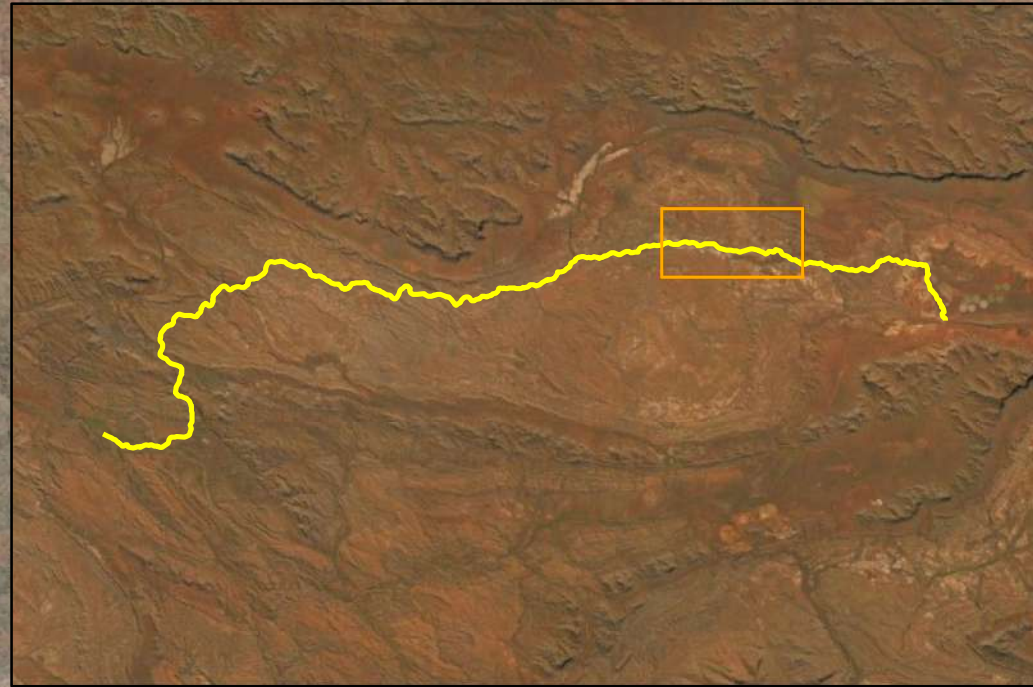
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 Projection: Transverse Mercator
 Datum: GDA 1994
 Size A3. Created 08/01/2020

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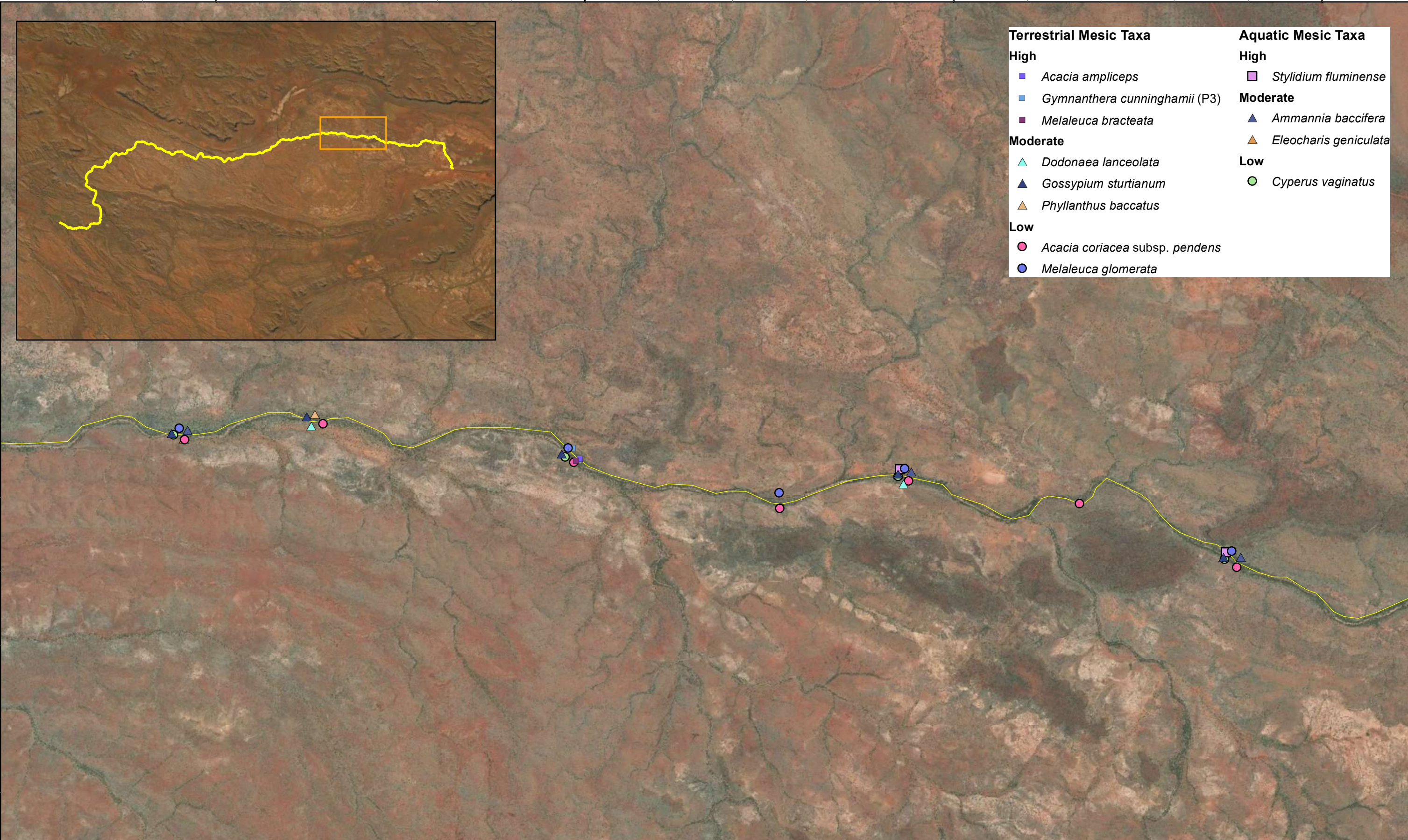
524000



Terrestrial Mesic Taxa		Aquatic Mesic Taxa	
High		High	
■ <i>Acacia ampliceps</i>		■ <i>Stylidium fluminense</i>	
■ <i>Gymnanthera cunninghamii</i> (P3)			
■ <i>Melaleuca bracteata</i>		Moderate	
Moderate		▲ <i>Ammannia baccifera</i>	
▲ <i>Dodonaea lanceolata</i>		▲ <i>Eleocharis geniculata</i>	
▲ <i>Gossypium sturtianum</i>		Low	
▲ <i>Phyllanthus baccatus</i>		○ <i>Cyperus vaginatus</i>	
Low			
○ <i>Acacia coriacea</i> subsp. <i>pendens</i>			
○ <i>Melaleuca glomerata</i>			

7532000

7528000



Legend
 — Duck Creek

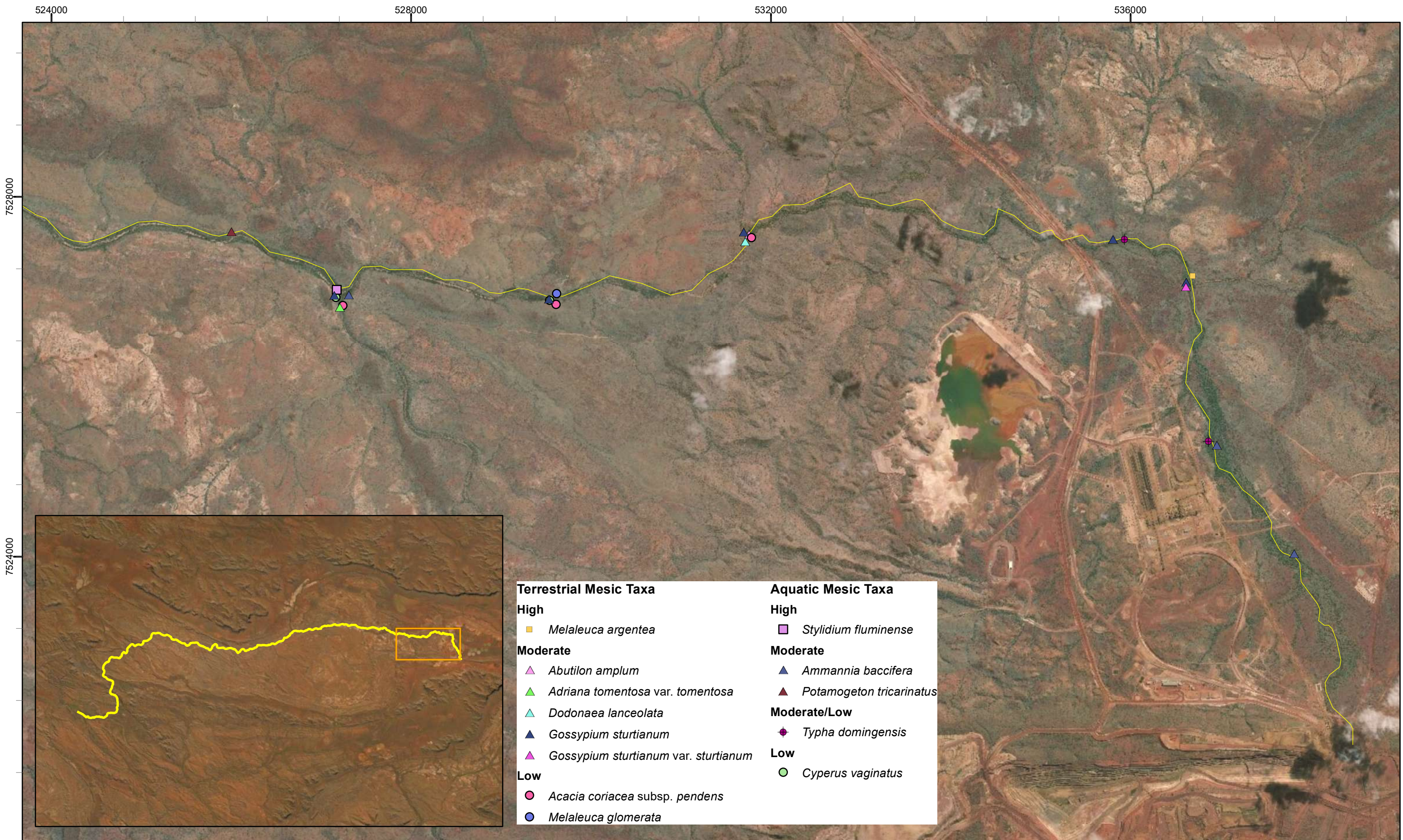
biologic
 Environmental Survey

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 1:38,300
 0 250 500 1,000 1,500 Meters

**Rio Tinto Iron Ore
 Brockman Syncline Riparian Vegetation
 Figure 4.5g: Mesic indicator taxa
 in the Study Area**

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020



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| <p>Terrestrial Mesic Taxa</p> <p>High</p> <ul style="list-style-type: none"> ■ <i>Melaleuca argentea</i> <p>Moderate</p> <ul style="list-style-type: none"> ▲ <i>Abutilon amplum</i> ▲ <i>Adriana tomentosa</i> var. <i>tomentosa</i> ▲ <i>Dodonaea lanceolata</i> ▲ <i>Gossypium sturtianum</i> ▲ <i>Gossypium sturtianum</i> var. <i>sturtianum</i> <p>Low</p> <ul style="list-style-type: none"> ● <i>Acacia coriacea</i> subsp. <i>pendens</i> ● <i>Melaleuca glomerata</i> | <p>Aquatic Mesic Taxa</p> <p>High</p> <ul style="list-style-type: none"> ■ <i>Stylidium fluminense</i> <p>Moderate</p> <ul style="list-style-type: none"> ▲ <i>Ammannia baccifera</i> ▲ <i>Potamogeton tricarinatus</i> <p>Moderate/Low</p> <ul style="list-style-type: none"> ◆ <i>Typha domingensis</i> <p>Low</p> <ul style="list-style-type: none"> ● <i>Cyperus vaginatus</i> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Legend
 Duck Creek

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0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.5h: Mesic indicator taxa
in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020

Table 4.4: Key mesophytic/ hydrophytic indicator species recorded from the study area

Key GDE Habitat Type	Increasingly Mesophytic/ Hydrophytic Indicator Species			
	Very High Level i.e., soil moisture availability or surface water availability is perennial	High Level i.e., soil moisture availability or surface water availability is perennial to sub-perennial	Moderate Level i.e., soil moisture availability or surface water availability is sub-perennial	Low Level i.e., soil moisture availability or surface water availability is sub-perennial to ephemeral
Terrestrial Habitats i.e. habitats with increasingly consistent sub-surface soil moisture only	<i>Melaleuca argentea</i> <i>Sesbania formosa</i> <i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076) <i>Livistona alfredii</i>	<i>Acacia ampliceps</i> <i>Cullen leucanthum</i> <i>Melaleuca bracteata</i> <i>Gymnanthera cunninghamii</i> (abundant)	<i>Gossypium sturtianum</i> <i>Abutilon amplum</i> <i>Adriana tomentosum</i> var. <i>tomentosum</i> <i>Melaleuca linophylla</i> <i>Cyperus vaginatus</i> (abundant) <i>Phyllanthus baccatus</i> <i>Gymnanthera cunninghamii</i> (scattered)	<i>Melaleuca glomerata</i> <i>Acacia coriacea</i> subsp. <i>pendens</i> <i>Cyperus vaginatus</i> (scattered) <i>Typha domingensis</i> (scattered)
Aquatic Habitats i.e. surface water habitats (including sub-surface moisture)	<i>Melaleuca argentea</i>	–	<i>Potamogeton</i> spp. <i>Eleocharis geniculata</i> <i>Stylidium fluminense</i> <i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076) <i>Schoenoplectiella laevis</i> <i>Schoenoplectus subulatus</i>	<i>Cyperus vaginatus</i> (abundant) <i>Typha domingensis</i> (abundant) <i>Ammannia baccifera</i> <i>Chara</i> spp.

Indicator species presented has been adapted from Biologic and Rio Tinto (2020) and Rio Tinto (2018a, 2018b, 2020)

4.6 Introduced Flora Taxa

Twenty-six introduced taxa were recorded within the study area, comprising **Aerva javanica*, **Argemone ochroleuca subsp. ochroleuca*, **Bidens bipinnata*, **Bidens pilosa var. pilosa*, **Bothriochloa pertusa*, **Cenchrus ciliaris*, **Cenchrus clandestinus*, **Cenchrus echinatus*, **Cenchrus setiger*, **Cyclosporum leptophyllum*, **Cynodon dactylon*, **Datura leichhardtii subsp. leichhardtii*, **Echinochloa colona*, **Erigeron bonariensis*, **Euphorbia hirta*, **Flaveria trinervia*, **Heliotropium europaeum*, **Malvastrum americanum*, **Rumex vesicarius*, **Setaria verticillata*, **Sigesbeckia orientalis*, **Solanum nigrum*, **Sonchus oleraceus*, **Symphyotrichum squamatum*, **Tribulus terrestris*, and **Vachellia farnesiana* (Figure 4.6 and Table 4.5). Many of these taxa are typically found in creekline systems and habitats impacted by grazing livestock and associated disturbance.

None of the recorded introduced taxa are listed as WoNS or Declared Pests under the BAM Act, but some (i.e., **Cenchrus ciliaris*, **Cenchrus setiger*, **Tribulus terrestris*) are considered to be rapidly invasive and can alter ecosystems.

**Flaveria trinervia*, **Cenchrus ciliaris* and **Argemone ochroleuca subsp. ochroleuca* were the most frequently recorded introduced taxa across the study area. **Flaveria trinervia* was recorded in 73 locations (Figure 4.6). In quadrats, the cover of **Flaveria trinervia* was generally low, but where recorded opportunistically, estimates of up to 1,000 individuals were recorded (Table 4.5), with heights extending beyond 2 m in some situations. **Flaveria trinervia* individuals and counts were relatively low in 2019, but increased substantially following the wet season with counts in excess of several thousand individuals present.

**Cenchrus ciliaris* was recorded in 66 locations (Figure 4.6 and Table 4.5) with up to 50 % quadrat cover. Densities were more prevalent amongst the alluvials and on creek banks and floodplains. The areas of the creek subject to high fluvial energies and the skeletal creek beds (i.e., bedrock present or minimal soil cover on bedrock) had little to no presence of **Cenchrus ciliaris*.

**Argemone ochroleuca subsp. ochroleuca* was present throughout the study area (Figure 4.6), with high prevalence in the west, as opposed to the east. Estimated number of individuals across the two phases was in excess of 17,000 individuals (Table 4.5). A high proportion of individuals were recorded during phase one with increased numbers within the dry creek bed. The number of individuals was less during phase two, however, this is mainly due to the presence of extensive surface water and pools. It is likely that the number of individuals would increase following drying of these pools.

Table 4.5: Introduced taxa recorded from the study area

Introduced taxon	Point locations	Estimated number of individuals recorded	Phase 1	Phase 2
<i>*Aerva javanica</i>	21	60	•	•
<i>*Argemone ochroleuca subsp. ochroleuca</i>	60	17,223	•	•
<i>*Bidens bipinnata</i>	13	<50	•	•
<i>*Bidens pilosa var. pilosa</i>	2	<20		•
<i>*Cenchrus ciliaris</i>	66	>15,000	•	•
<i>*Cenchrus clandestinus</i>	2	<100	•	•

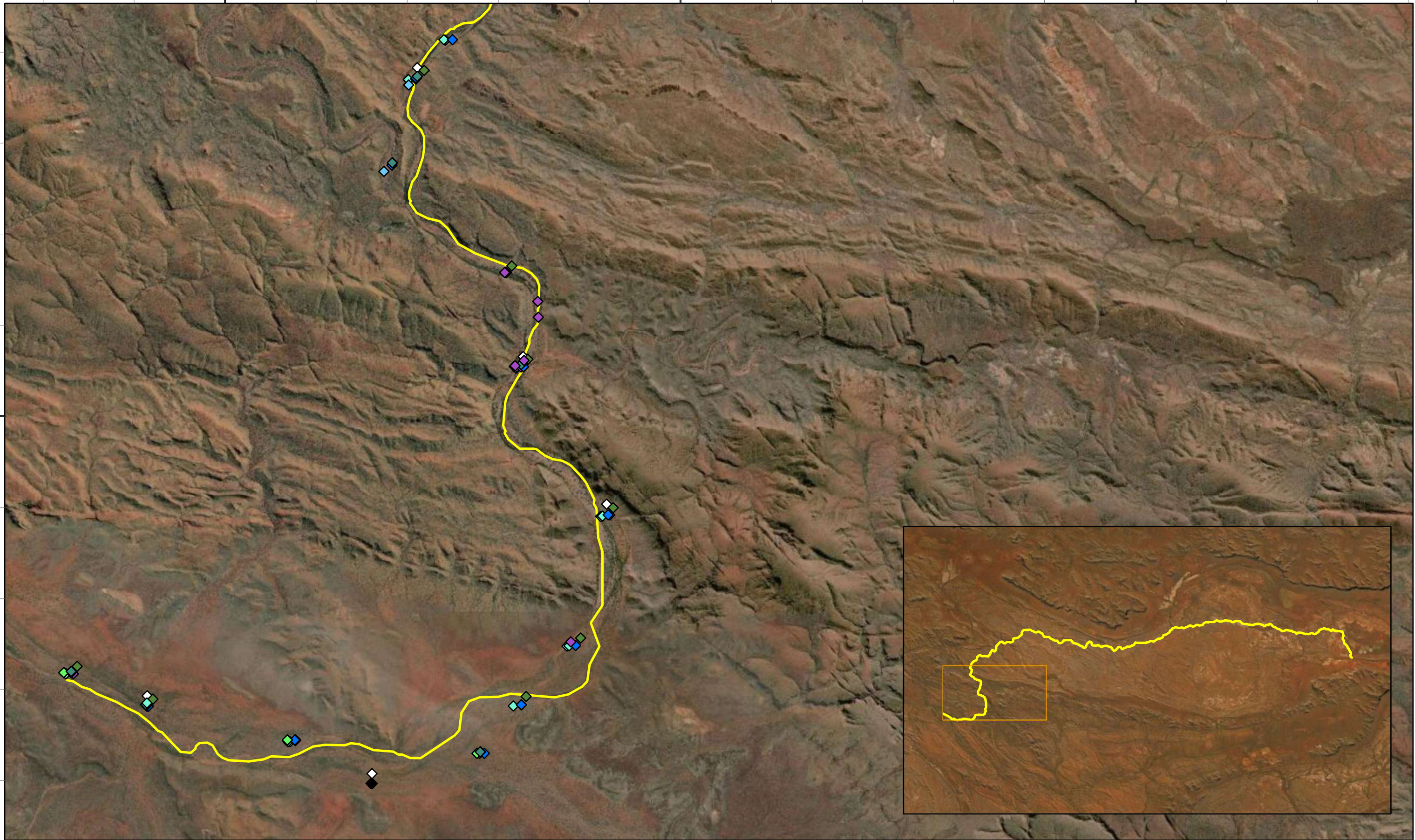
Introduced taxon	Point locations	Estimated number of individuals recorded	Phase 1	Phase 2
* <i>Cenchrus echinatus</i>	2	<50		•
* <i>Cenchrus setiger</i>	12	<50	•	•
* <i>Cyclosporum leptophyllum</i>	2	<20	•	•
* <i>Cynodon dactylon</i>	12	<100	•	•
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>	39	94		•
* <i>Echinochloa colona</i>	8	<100	•	•
* <i>Erigeron bonariensis</i>	4	<50	•	•
* <i>Euphorbia hirta</i>	19	<50	•	•
* <i>Flaveria trinervia</i>	73	>2200	•	•
* <i>Heliotropium europaeum</i>	2	<10		•
* <i>Malvastrum americanum</i>	26	<50	•	•
* <i>Rumex vesicarius</i>	1	<10	•	
* <i>Setaria verticillata</i>	43	<200	•	•
* <i>Sigesbeckia orientalis</i>	1	<10		•
* <i>Solanum nigrum</i>	5	<100	•	•
* <i>Sonchus oleraceus</i>	28	<100	•	•
* <i>Symphotrichum squamatum</i>	1	<10		•
* <i>Tribulus terrestris</i>	1	<10		•
* <i>Vachellia farnesiana</i>	39	102	•	•

457500

465000

472500

7515000



Legend

- Duck Creek
- Taxa**
- ◆ **Aerva javanica*
- ◆ **Argemone ochroleuca* subsp. *ochroleuca*
- ◆ **Cenchrus ciliaris*
- ◆ **Cenchrus setiger*
- ◆ **Datura leichhardtii* subsp. *leichhardtii*
- ◆ **Echinochloa colona*
- ◆ **Flaveria trinervia*
- ◆ **Heliotropium europaeum*
- ◆ **Malvastrum americanum*
- ◆ **Setaria verticillata*
- ◆ **Vachellia famesiana*

biologic
Environmental Survey

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1:58,000
0 1 2 4 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.6a: Introduced flora taxa recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020

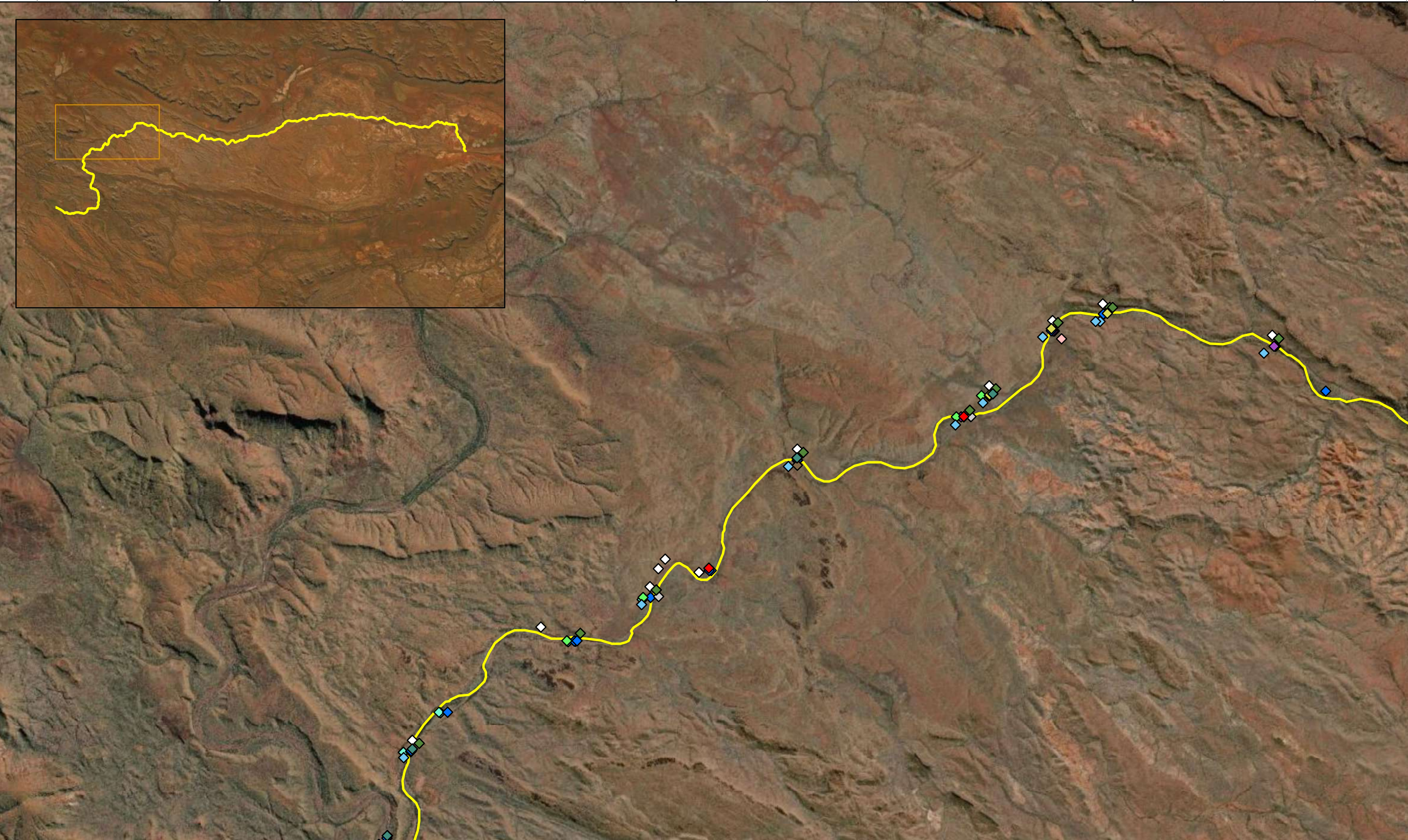
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Legend

- Duck Creek
- Taxa**
- ◆ **Aerva javanica*
- ◆ **Argemone ochroleuca* subsp. *ochroleuca*
- ◆ **Cenchrus ciliaris*
- ◆ **Cenchrus setiger*
- ◆ **Cynodon dactylon*
- ◆ **Datura leichhardtii* subsp. *leichhardtii*
- ◆ **Echinochloa colona*
- ◆ **Euphorbia hirta*
- ◆ **Flaveria trinervia*
- ◆ **Malvastrum americanum*
- ◆ **Setaria verticillata*
- ◆ **Sonchus oleraceus*
- ◆ **Vachellia farnesiana*

biologic
Environmental Survey

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1:58,000
0 1 2 4 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.6b: Introduced flora taxa
recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020

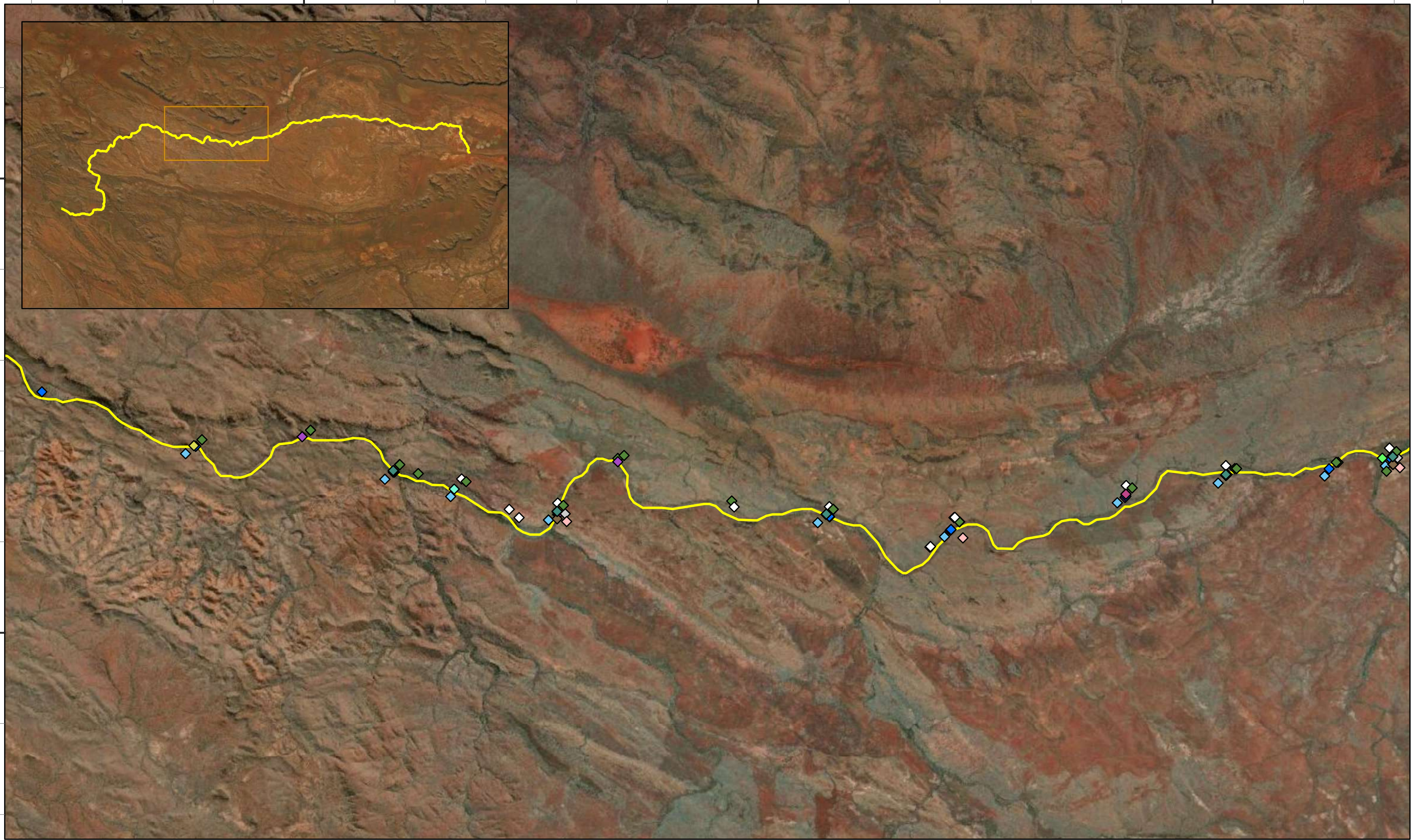
480000

487500

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Legend

- Duck Creek
- Taxa**
- ◆ **Aerva javanica*
- ◆ **Argemone ochroleuca* subsp. *ochroleuca*
- ◆ **Cenchrus ciliaris*
- ◆ **Cenchrus setiger*
- ◆ **Cynodon dactylon*
- ◆ **Datura leichhardtii* subsp. *leichhardtii*
- ◆ **Euphorbia hirta*
- ◆ **Flaveria trinervia*
- ◆ **Malvastrum americanum*
- ◆ **Setaria verticillata*
- ◆ **Sigesbeckia orientalis*
- ◆ **Sonchus oleraceus*
- ◆ **Vachellia farnesiana*

biologic
Environmental Survey

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1:58,000
0 1 2 4 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.6c: Introduced flora taxa recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020

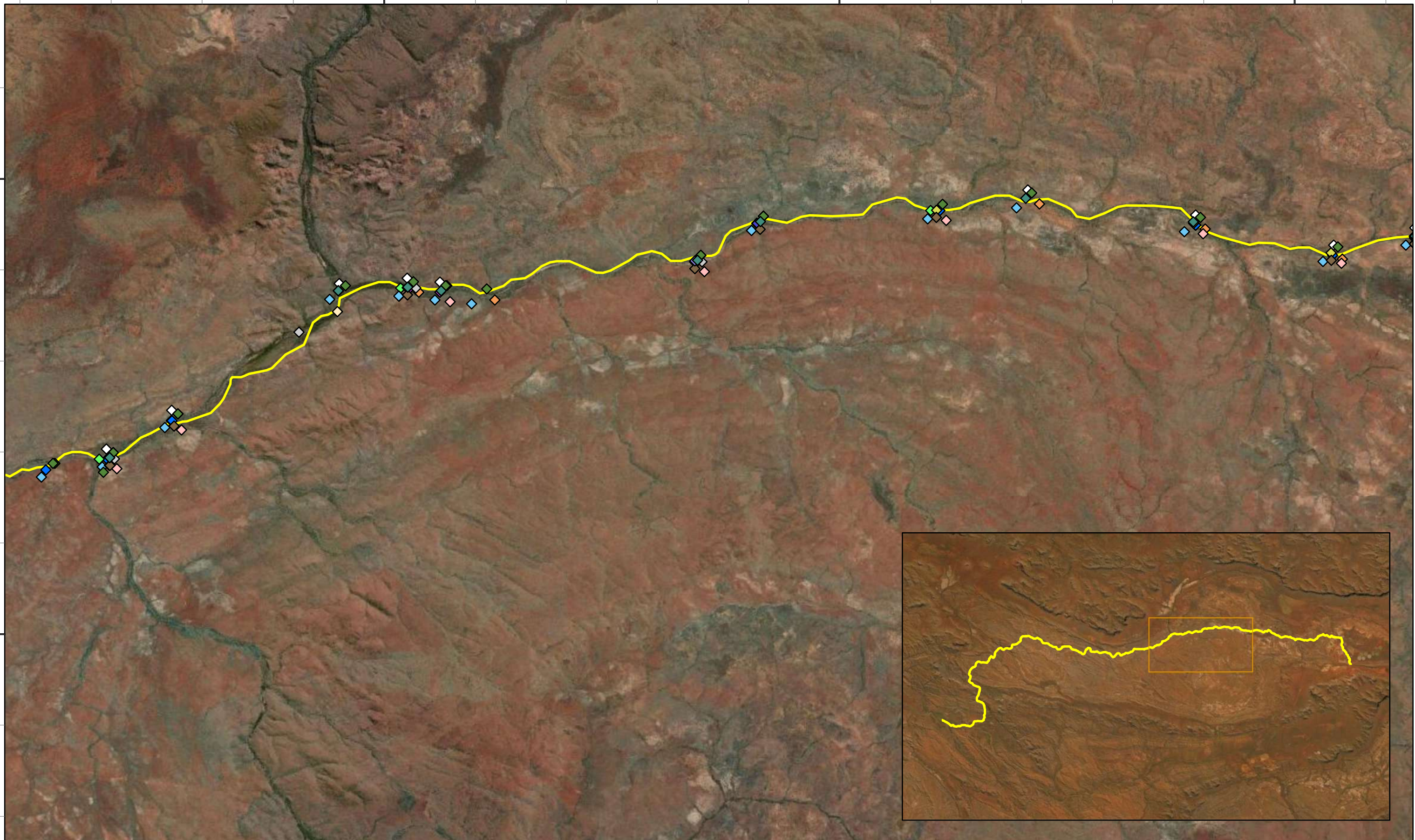
502500

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Legend

- Duck Creek
- Taxa**
- ◆ **Argemone ochroleuca* subsp. *ochroleuca*
- ◆ **Bidens bipinnata*
- ◆ **Bidens pilosa* var. *pilosa*
- ◆ **Cenchrus ciliaris*
- ◆ **Cenchrus echinatus*
- ◆ **Cenchrus setiger*
- ◆ **Cynodon dactylon*
- ◆ **Datura leichhardtii* subsp. *leichhardtii*
- ◆ **Echinochloa colona*
- ◆ **Euphorbia hirta*
- ◆ **Flaveria trinervia*
- ◆ **Malvastrum americanum*
- ◆ **Rumex vesicarius*
- ◆ **Setaria verticillata*
- ◆ **Sonchus oleraceus*
- ◆ **Tribulus terrestris*
- ◆ **Vachellia famesiana*

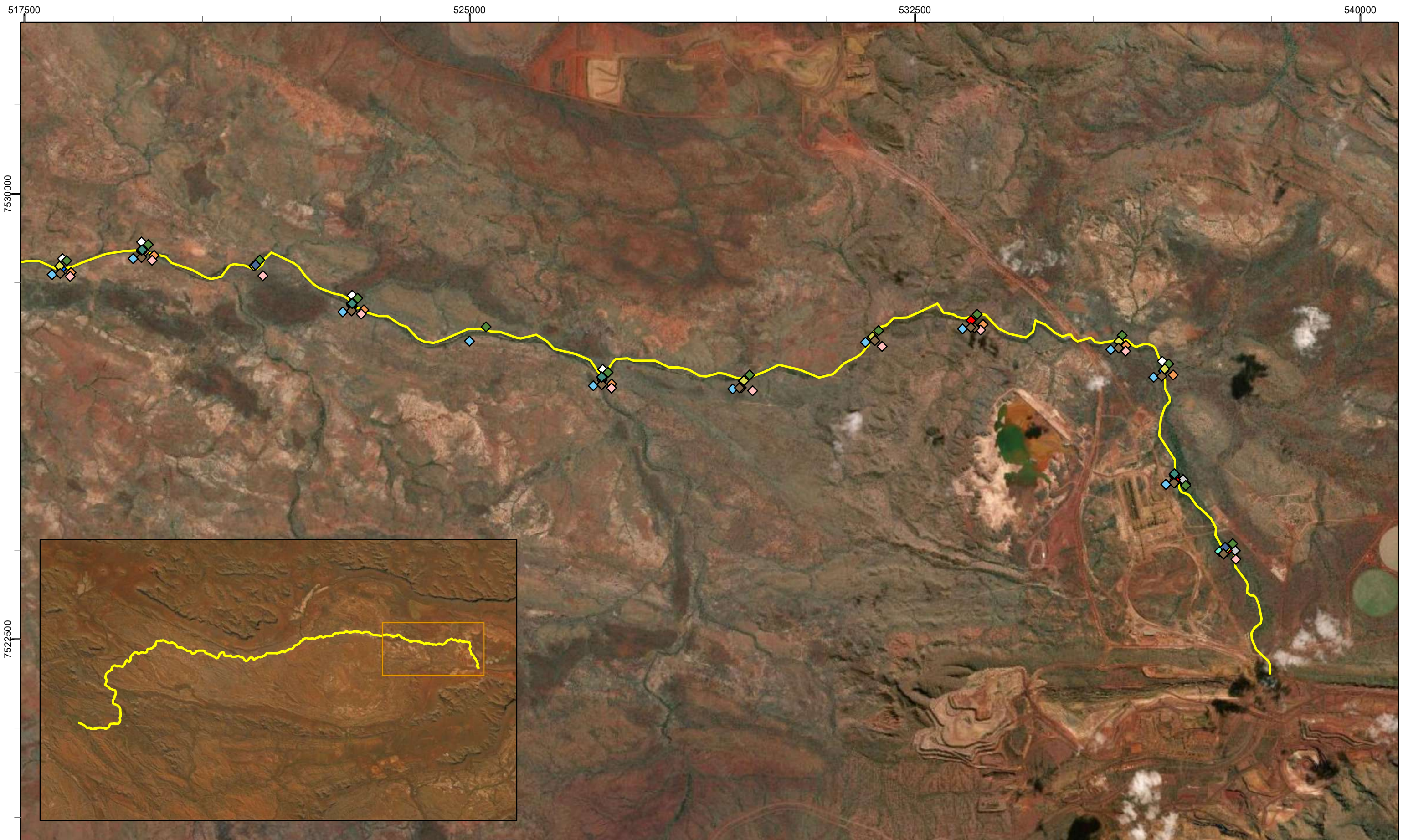
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0 1 2 4 km

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.6d: Introduced flora taxa recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020



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Legend		
Duck Creek	<i>*Conyza bonariensis</i>	<i>*Solanum nigrum</i>
Taxa	<i>*Cynodon dactylon</i>	<i>*Sonchus oleraceus</i>
<i>*Aerva javanica</i>	<i>*Datura leichhardtii</i> subsp. <i>leichhardtii</i>	<i>*Symphyotrichum squamatum</i>
<i>*Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	<i>*Echinochloa colona</i>	<i>*Vachellia farnesiana</i>
<i>*Bidens bipinnata</i>	<i>*Euphorbia hirta</i>	
<i>*Bidens pilosa</i> var. <i>pilosa</i>	<i>*Flaveria trinervia</i>	
<i>*Cenchrus ciliaris</i>	<i>*Malvastrum americanum</i>	
<i>*Cenchrus echinatus</i>	<i>*Setaria verticillata</i>	

1:58,000

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.6e: Introduced flora taxa recorded during the survey

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 08/01/2020

4.7 Vegetation Units

4.7.1 Broad Floristic Formations

Nine broad floristic formations were described from the Study Area, based on the dominant growth form and the dominant land cover genus for the dominant stratum. The broad floristic formations were:

- *Acacia* low open woodland;
- *Acacia* low woodland;
- *Acacia* tall open shrubland;
- *Eucalyptus* mid open woodland;
- *Eucalyptus* mid to low open woodland;
- *Eucalyptus* mid to low woodland;
- *Eucalyptus* mid woodland;
- *Melaleuca* mid to low open woodland; and
- *Melaleuca* tall shrubland.

The dominant broad floristic formation based on extent across the study area are *Acacia* low open woodland and *Eucalyptus* mid to low open woodland, both covering approximately 32 % of the mapped study area. *Eucalyptus* mid open woodland and *Eucalyptus* mid to low woodland were the second most dominant broad floristic formations (each covered 12 % of the mapped study area). The remaining five broad floristic formations covered in total 8 % of the study area, while the remainder (4 %) were mapped as cleared or were not sampled.

4.7.2 Vegetation Types

Fifteen vegetation types were described and delineated from the study area (Table 4.6 and Figure 4.7) based on the dominant genera within the upper, middle, and lower strata. The hierarchical clustering (Appendix O) presented appropriate grouping or vegetation types based on the dominant upper stratum and position along the study area.

The *Acacia citrinoviridis* low open woodland unit (AcLOW CcMOTG TwMSHG) was the most dominant, comprising 21.1 % of the mapped study area. The vegetation types were described from two landform types, drainage line and floodplain/drainage area.

Vegetation not considered to be riparian was not sampled or mapped. This consisted of hummock grasslands on stony rises, stony slopes, terraces, and mining areas. Mining and pastoral tracks were mapped as “cleared”, with only the regularly maintained tracks crossing the study area mapped. Additional tracks occur across the study area, especially in the west; however, several of the tracks were overgrown and relatively informal, or occurred in the creek channel which is subject to scouring and change from flooding events. As such, these tracks were not mapped within the study area.

Table 4.6: Vegetation association descriptions



Code	Description	Sample Sites	Condition	Extent (ha / %)	Significance	Key Riparian Features	Photo
Acacia low open woodland							
AcAcpGplLOW TwTeLOHG EmLOTG	<p><i>Acacia citrinoviridis</i>, <i>Acacia coriacea</i> subsp. <i>pendens</i> and <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i> low open woodland with occasional <i>Eucalyptus victrix</i> and/ or <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> mid trees over <i>Triodia wiseana</i> and <i>Triodia epactia</i> low open hummock grassland with <i>Eriachne mucronata</i> low open tussock grassland</p> <p>Species Richness: 27.6 ± 4.9</p>	DUCR-10; DUCR-13; DUCR-15; DUCR-27; DUCR-28	Very Good	120.8 / 4.9	<p><i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)</p> <p><i>Rhynchosia bungarensis</i> (P4)</p>	<p><i>Acacia coriacea</i> subsp. <i>pendens</i></p> <p><i>Cullen leucanthum</i></p> <p><i>Cyperus vaginatus</i></p>	
AcAcpMOW GplAbGrTSS TeTaMOHG	<p><i>Acacia citrinoviridis</i>, <i>Acacia coriacea</i> subsp. <i>pendens</i> and occasional <i>Eucalyptus victrix</i> and/ or <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> mid to low open woodland over <i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>, <i>Acacia bivenosa</i> and <i>Gossypium robinsonii</i> tall to mid sparse shrubland over <i>Triodia epactia</i> and <i>Triodia angusta</i> mid to low open hummock grassland</p> <p>Species Richness: 56.1 ± 12</p>	DUCR-21; DUCR-25; DUCR-31; DUCR-38; DUCR-42; DUCR-44; DUCR-46; DUCR-48	Poor to Very Good	140.1 / 5.6	<p><i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)</p> <p><i>Ipomoea racemigera</i> (P2)</p>	<p><i>Acacia coriacea</i> subsp. <i>pendens</i></p> <p><i>Dodonaea lanceolata</i></p> <p><i>Gossypium sturtianum</i></p> <p><i>Melaleuca glomerata</i></p> <p><i>Phyllanthus baccatus</i></p> <p><i>Potamogeton tricarinatus</i></p>	
AcLOW CcMOTG TwMSHG	<p><i>Acacia citrinoviridis</i> low open woodland with <i>Eucalyptus victrix</i> and <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> mid scattered trees over <i>Cenchrus ciliaris</i> mid open tussock grassland with <i>Triodia wiseana</i> mid scattered hummock grasses</p> <p>Species Richness: 31.1 ± 9</p>	DUCR-02; DUCR-03; DUCR-04; DUCR-05; DUCR-06; DUCR-58; DUCR-59	Poor to Good	524.8 / 21.1	<p><i>Rhynchosia bungarensis</i> (P4)</p>	<p><i>Acacia coriacea</i> subsp. <i>pendens</i></p> <p><i>Cyperus vaginatus</i></p> <p><i>Melaleuca glomerata</i></p> <p><i>Melaleuca linophylla</i></p>	

Code	Description	Sample Sites	Condition	Extent (ha / %)	Significance	Key Riparian Features	Photo
Acacia low woodland							
AcExLW AppSsGrMSS CcCdEcMOTG	<p><i>Acacia citrinoviridis</i> and <i>Eucalyptus xerothermica</i> low woodland over <i>Acacia pyrifolia</i> var. <i>pyrifolia</i>, <i>Stylobasium spathulatum</i> and <i>Gossypium robinsonii</i> mid sparse shrubland over <i>Cenchrus ciliaris</i>, <i>Cynodon dactylon</i> and <i>Echinochloa colona</i> mid to low open tussock grassland</p> <p>Species Richness: 41.5 ± 10.6</p>	DUCR-56; DUCR-57	Poor	65.5 / 2.6	<i>Ipomoea racemigera</i> (P2)	<i>Ammannia baccifera</i> <i>Typha domingensis</i>	
Acacia tall open shrubland							
EvExMOW AcAcpAbTOS EaCcTtMSTG	<p><i>Eucalyptus victrix</i>, <i>Eucalyptus xerothermica</i> and occasional <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> (in wetter zones) mid to low scattered to open woodland over <i>Acacia citrinoviridis</i>, <i>Acacia coriacea</i> subsp. <i>pendens</i> and <i>Acacia bivenosa</i> tall open shrubland over <i>Eulalia aurea</i>, <i>Cenchrus ciliaris</i> and <i>Themeda triandra</i> mid sparse tussock grassland</p> <p>Species Richness: 51.6 ± 12.7</p>	DUCR-50; DUCR-52; DUCR-53; DUCR-54; DUCR-55	Very Good to Excellent	41.8 / 1.7	<i>Ipomoea racemigera</i> (P2)	<i>Abutilon amplum</i> <i>Acacia coriacea</i> subsp. <i>pendens</i> <i>Cyperus vaginatus</i> <i>Dodonaea lanceolata</i> <i>Gossypium sturtianum</i> <i>Gossypium sturtianum</i> var. <i>sturtianum</i> <i>Melaleuca argentea</i> <i>Melaleuca glomerata</i> <i>Typha domingensis</i>	
Eucalyptus mid open woodland							
EcrMaMOW MIACpAaTOS CvMSS	<p><i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> and occasional <i>Melaleuca argentea</i> mid open woodland over <i>Melaleuca linophylla</i>, <i>Acacia coriacea</i> subsp. <i>pendens</i> and <i>Acacia ampliceps</i> tall open shrubland over <i>Cyperus vaginatus</i> mid scattered sedges</p> <p>Species Richness: 57.2 ± 13.1</p>	DUCR-07; DUCR-09; DUCR-11; DUCR-12; DUCR-14	Good to Very Good	292.2 / 11.8	<i>Ipomoea racemigera</i> (P2)	<i>Abutilon amplum</i> <i>Acacia ampliceps</i> <i>Acacia coriacea</i> subsp. <i>pendens</i> <i>Ammannia baccifera</i> <i>Cyperus vaginatus</i> <i>Gossypium sturtianum</i> <i>Gossypium sturtianum</i> var. <i>sturtianum</i> <i>Melaleuca argentea</i> <i>Melaleuca glomerata</i> <i>Melaleuca linophylla</i> <i>Phyllanthus baccatus</i>	

Code	Description	Sample Sites	Condition	Extent (ha / %)	Significance	Key Riparian Features	Photo
<i>Eucalyptus</i> mid to low open woodland							
EcrEvMOW AcAcpGrTSS EaCcTtMSTG	<p><i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> and occasional <i>Eucalyptus victrix</i> mid to low open woodland over <i>Acacia citrinoviridis</i>, <i>Acacia coriacea</i> subsp. <i>pendens</i> and <i>Gossypium robinsonii</i> tall sparse to open shrubland over <i>Eulalia aurea</i>, <i>Cenchrus ciliaris</i> and <i>Themeda triandra</i> mid sparse tussock grassland with occasional <i>Triodia epactia</i> low hummock grasses</p> <p>Species Richness: 73.5 ± 5</p>	DUCR-41; DUCR-45; DUCR-47; DUCR-49	Good to Excellent	118.5 / 4.8	<p><i>Aristida lazaridis</i> (P2)</p> <p><i>Indigofera</i> sp.</p> <p>Bungaroo Creek (S. van Leeuwen 4301) (P3)</p> <p><i>Ipomoea racemigera</i> (P2)</p>	<p><i>Acacia coriacea</i> subsp. <i>pendens</i></p> <p><i>Adriana tomentosa</i> var. <i>tomentosa</i></p> <p><i>Ammannia baccifera</i></p> <p><i>Cyperus vaginatus</i></p> <p><i>Dodonaea lanceolata</i></p> <p><i>Eleocharis geniculata</i></p> <p><i>Gossypium sturtianum</i></p> <p><i>Melaleuca glomerata</i></p> <p><i>Stylidium fluminense</i></p>	
EcrEvMOW AcAcpMgGrTS	<p><i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> and <i>Eucalyptus victrix</i> mid to low open woodland over <i>Acacia citrinoviridis</i>, <i>Acacia coriacea</i> subsp. <i>pendens</i>, <i>Melaleuca glomerata</i> and <i>Gossypium robinsonii</i> tall shrubland over scattered tussock grassland dominated by <i>Cenchrus ciliaris</i> and a scattered herbland dominated by <i>Stemodia grossa</i> and <i>Flaveria trinervia</i></p> <p>Species Richness: 59.2 ± 9</p>	DUCR-17; DUCR-33; DUCR-36; DUCR-39; DUCR-43	Poor to Very Good	137.9 / 5.6	<p><i>Gymnanthera cunninghamii</i> (P3)</p> <p><i>Indigofera</i> sp.</p> <p>Bungaroo Creek (S. van Leeuwen 4301) (P3)</p> <p><i>Ipomoea racemigera</i> (P2)</p> <p><i>Livistona alfredii</i> (P4)</p> <p><i>Rhynchosia bungarensis</i> (P4)</p>	<p><i>Acacia ampliceps</i></p> <p><i>Acacia coriacea</i> subsp. <i>pendens</i></p> <p><i>Ammannia baccifera</i></p> <p><i>Cyperus vaginatus</i></p> <p><i>Gossypium sturtianum</i></p> <p><i>Gymnanthera cunninghamii</i> (P3)</p> <p><i>Livistona alfredii</i> (P4)</p> <p><i>Melaleuca bracteata</i></p> <p><i>Melaleuca glomerata</i></p> <p><i>Melaleuca linophylla</i></p> <p><i>Potamogeton drummondii</i></p> <p><i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)</p> <p><i>Schoenoplectiella laevis</i></p> <p><i>Schoenoplectus subulatus</i></p> <p><i>Stylidium fluminense</i></p> <p><i>Typha domingensis</i></p>	
EcrEvMOW MgAppGrMSS CaEaMSTG	<p><i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> and <i>Eucalyptus victrix</i> mid to low open woodland over <i>Melaleuca glomerata</i>, <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and occasional <i>Gossypium robinsonii</i> mid to tall scattered to sparse shrubland over <i>Cymbopogon ambiguus</i> and <i>Eulalia aurea</i> mid scattered tussock grasses</p> <p>Species Richness: 21.2 ± 4.0</p>	Boolgeeda Creek only	Good to Excellent	412.7 / 16.6	<p><i>Rhynchosia bungarensis</i> (P4)</p>	<p><i>Acacia coriacea</i> subsp. <i>pendens</i></p> <p><i>Acacia ampliceps</i></p>	

Code	Description	Sample Sites	Condition	Extent (ha / %)	Significance	Key Riparian Features	Photo
EcrMaMOW MgAaAcTSS CvMSS	<p><i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> and <i>Melaleuca argentea</i> mid to low open woodland over <i>Melaleuca glomerata</i>, <i>Acacia ampliceps</i> and <i>Acacia citrinoviridis</i> tall sparse to open shrubland over <i>Cyperus vaginatus</i> mid sparse sedgeland</p> <p>Species Richness: 60.6 ± 9</p>	DUCR-26; DUCR-32; DUCR-34; DUCR-40; DUCR-64	Very Good	106.7 / 4.3	<p><i>Gymnanthera cunninghamii</i> (P3) <i>Indigofera</i> sp. <i>Bungaroo Creek</i> (S. van Leeuwen 4301) (P3) <i>Ipomoea racemigera</i> (P2) <i>Livistona alfredii</i> (P4)</p>	<p><i>Acacia ampliceps</i> <i>Acacia coriacea</i> subsp. <i>pendens</i> <i>Ammannia baccifera</i> <i>Chara</i> sp. <i>Cyperus vaginatus</i> <i>Eleocharis geniculata</i> <i>Gossypium sturtianum</i> <i>Gymnanthera cunninghamii</i> (P3) <i>Livistona alfredii</i> (P4) <i>Melaleuca argentea</i> <i>Melaleuca bracteata</i> <i>Melaleuca glomerata</i> <i>Potamogeton</i> sp. <i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076) <i>Schoenoplectus subulatus</i> <i>Stylidium fluminense</i> <i>Typha domingensis</i></p>	
EvCcdChMOW AcAppAssTOS CcEuTtMOTG	<p><i>Eucalyptus victrix</i> with occasional <i>Corymbia candida</i> subsp. <i>dipsodes</i> and <i>Corymbia hamersleyana</i> mid to low open woodland over <i>Acacia citrinoviridis</i>, <i>Acacia pyrifolia</i> var. <i>pyrifolia</i> and <i>Acacia sclerosperma</i> subsp. <i>sclerosperma</i> tall to mid open to sparse shrubland over <i>Cenchrus ciliaris</i>, <i>Eulalia aurea</i> and <i>Themeda triandra</i> mid open to sparse tussock grassland</p> <p>Species Richness: 14.6 ± 5.1</p>	Boolgeeda Creek Only	Poor to Very Good	13.3 / 0.5	<p><i>Goodenia nuda</i> (P4), <i>Indigofera</i> sp. <i>Bungaroo Creek</i> (S. van Leeuwen 4301) (P3)</p>	<p><i>Acacia coriacea</i> subsp. <i>pendens</i></p>	

Code	Description	Sample Sites	Condition	Extent (ha / %)	Significance	Key Riparian Features	Photo
<i>Eucalyptus</i> mid to low woodland							
MaEcrMW AcpMIAaTOS CvMSS	<p><i>Melaleuca argentea</i> and <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> mid to low woodland over <i>Acacia coriacea</i> subsp. <i>pendens</i>, <i>Melaleuca linophylla</i> and <i>Acacia ampliceps</i> tall open to sparse shrubland over <i>Cyperus vaginatus</i> mid sparse sedgeland</p> <p>Species Richness: 53.4 ± 9.1</p>	DUCR-08; DUCR-16; DUCR-18; DUCR-19; DUCR-20; DUCR-24; DUCR-37; DUCR-60; DUCR-62	Good to Excellent	307.3 / 12.4	<p><i>Gymnanthera cunninghamii</i> (P3)</p> <p><i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)</p> <p><i>Ipomoea racemigera</i> (P2)</p> <p><i>Livistona alfredii</i> (P3)</p> <p><i>Rhynchosia bungarensis</i> (P4)</p>	<p><i>Acacia ampliceps</i></p> <p><i>Acacia coriacea</i> subsp. <i>pendens</i></p> <p><i>Adriana tomentosa</i> var. <i>tomentosa</i></p> <p><i>Ammannia baccifera</i></p> <p><i>Cyperus vaginatus</i></p> <p><i>Dodonaea lanceolata</i></p> <p><i>Eleocharis geniculata</i></p> <p><i>Gossypium sturtianum</i></p> <p><i>Gymnanthera cunninghamii</i> (P3)</p> <p><i>Livistona alfredii</i> (P4)</p> <p><i>Melaleuca argentea</i></p> <p><i>Melaleuca glomerata</i></p> <p><i>Melaleuca linophylla</i></p> <p><i>Phyllanthus baccatus</i></p> <p><i>Potamageton</i> sp.</p> <p><i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)</p> <p><i>Schoenoplectus subulatus</i></p> <p><i>Sesbania formosa</i></p> <p><i>Stylidium fluminense</i></p> <p><i>Typha domingensis</i></p>	
<i>Eucalyptus</i> mid woodland							
EcrMW CcOTG	<p><i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> mid woodland over <i>Cenchrus ciliaris</i> open tussock grassland</p> <p>Species Richness: 27</p>	DUCR-01	Poor	3.2 / 0.1	NA	NA	

Code	Description	Sample Sites	Condition	Extent (ha / %)	Significance	Key Riparian Features	Photo
Melaleuca mid to low open woodland							
MaEcrMOW MgAaAcpTOS CvMSS	<p><i>Melaleuca argentea</i> and <i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> low to mid open woodland over <i>Melaleuca glomerata</i>, <i>Acacia ampliceps</i> and <i>Acacia coriacea</i> subsp. <i>pendens</i> tall to mid open shrubland over <i>Cyperus vaginatus</i> mid sparse sedgeland</p> <p>Species Richness: 20 ± 11.6</p>	DUCR-22; DUCR-23; DUCR-61; DUCR-63	Good to Excellent	53.5 / 2.2	<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	<p><i>Acacia ampliceps</i> <i>Acacia coriacea</i> subsp. <i>pendens</i> <i>Ammannia baccifera</i> <i>Cyperus vaginatus</i> <i>Eleocharis geniculata</i> <i>Melaleuca argentea</i> <i>Melaleuca bracteata</i> <i>Melaleuca glomerata</i> <i>Schoenoplectus subulatus</i> <i>Stylidium fluminense</i></p>	
Melaleuca tall shrubland							
EcrMaMST MgAcpAaTS CvMSS	<p><i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i> and <i>Melaleuca argentea</i> mid to low scattered trees over <i>Melaleuca glomerata</i>, <i>Acacia coriacea</i> subsp. <i>pendens</i> and <i>Acacia ampliceps</i> tall shrubland over <i>Cyperus vaginatus</i> mid scattered sedges</p> <p>Species Richness: 41 ± 9.9</p>	DUCR-29; DUCR-30	Excellent	42.3 / 1.7	NA	<p><i>Acacia ampliceps</i> <i>Acacia coriacea</i> subsp. <i>pendens</i> <i>Ammannia baccifera</i> <i>Cyperus vaginatus</i> <i>Gossypium sturtianum</i> <i>Melaleuca argentea</i> <i>Melaleuca glomerata</i></p>	

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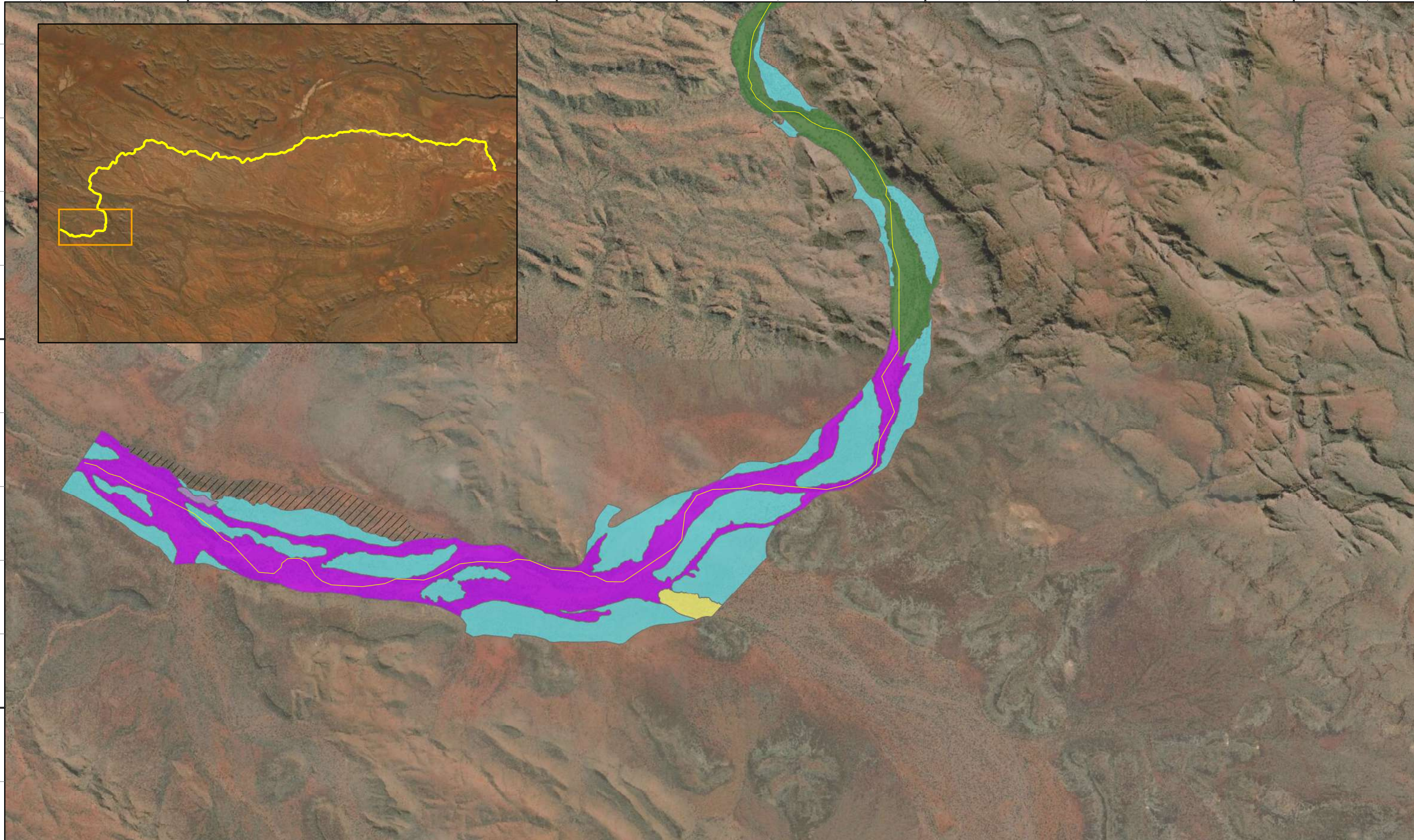
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Legend	
Duck Creek	EcrMaMOW MIAcpAaTOS CvMSS
VegetationType	EvCcdChMOW AcAppAssTOS CcEuTtMOTG
AcLOW CcMOTG TwMSHG	Not Sampled
EcrEvMOW MgAppGrMSS CaEaMSTG	
EcrMW CcOTG	

1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.7a: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 02/09/2020

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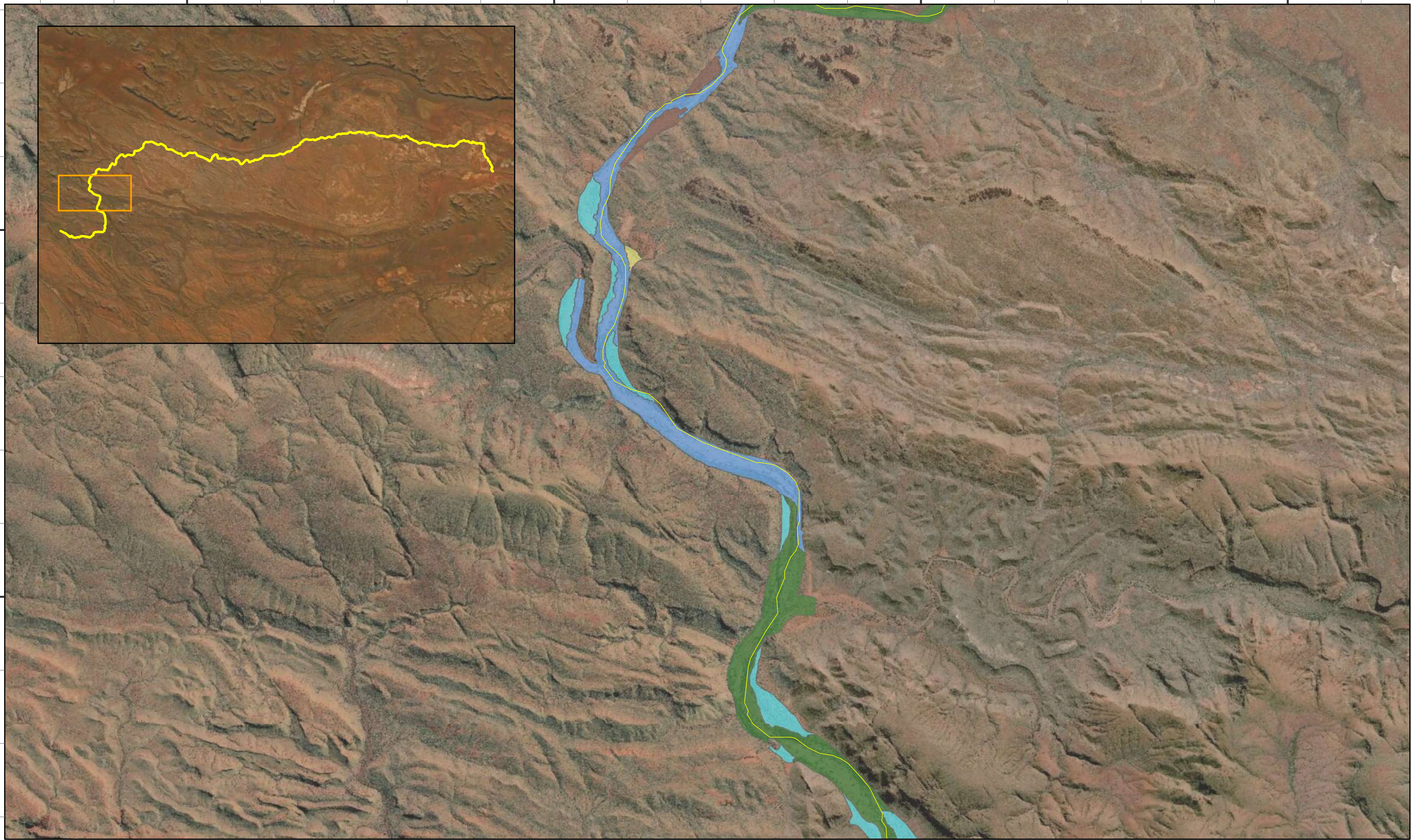
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Legend

— Duck Creek

VegetationType

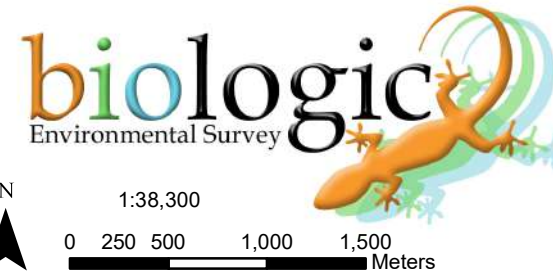
AcAcpGpLOW TwTeLOHG EmLOTG

AcLOW CcMOTG TwMSHG

EcrEvMOW AcAcpMgGrTS

EcrMaMOW MIAcpAaTOS CvMSS

MaEcrMW AcpMIAaTOS CvMSS



1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore

Brockman Syncline Riparian Vegetation

Figure 4.7b: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50

Projection: Transverse Mercator

Datum: GDA 1994

Size A3. Created 02/09/2020

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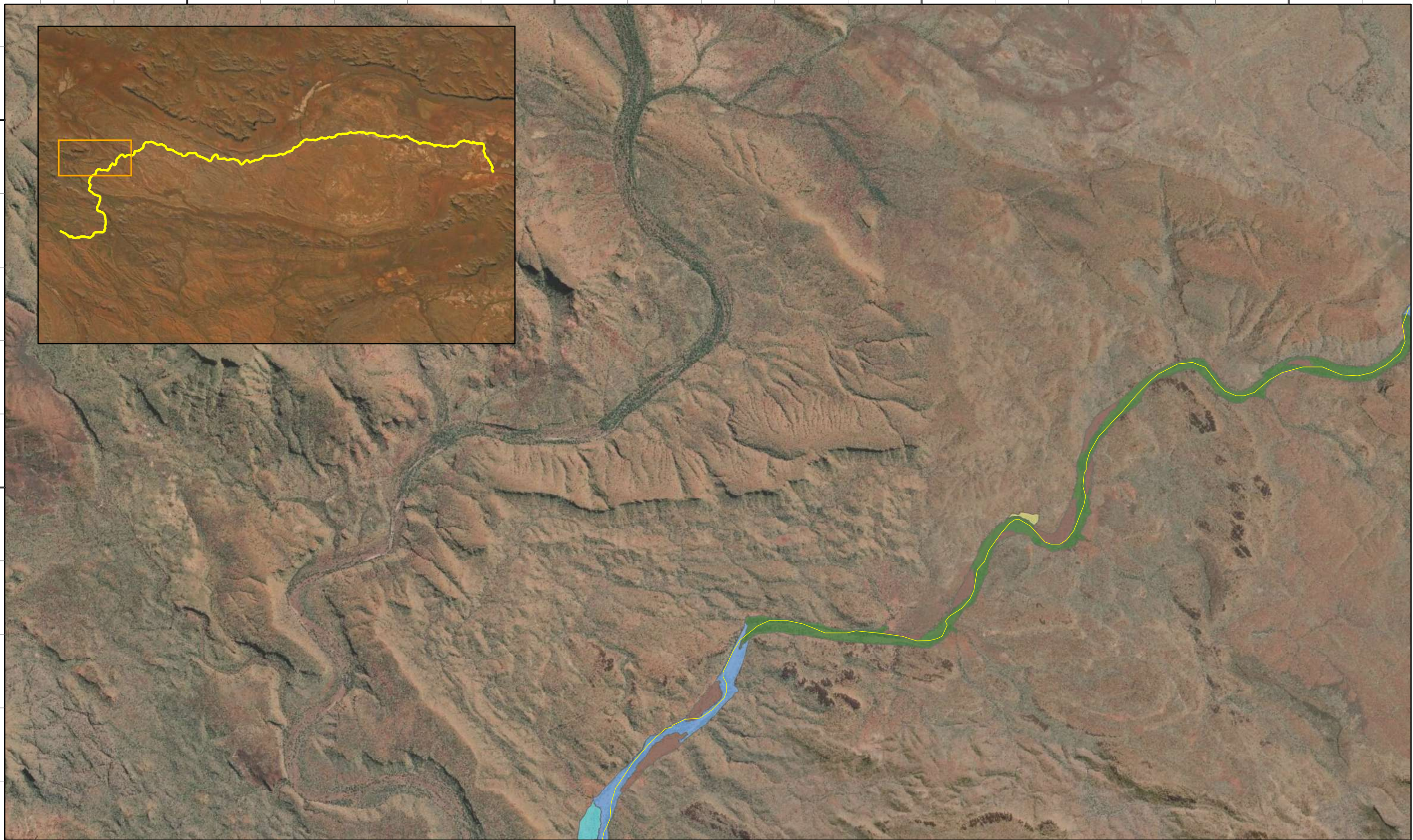
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Legend

— Duck Creek

VegetationType

■ AcAcpGpLOW TwTeLOHG EmLOTG

■ AcLOW CcMOTG TwMSHG

■ EcrEvMOW AcAcpMgGrTS

■ EcrMaMOW MI AcpAaTOS CvMSS

■ MaEcrMW AcpMIAaTOS CvMSS



1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore

Brockman Syncline Riparian Vegetation

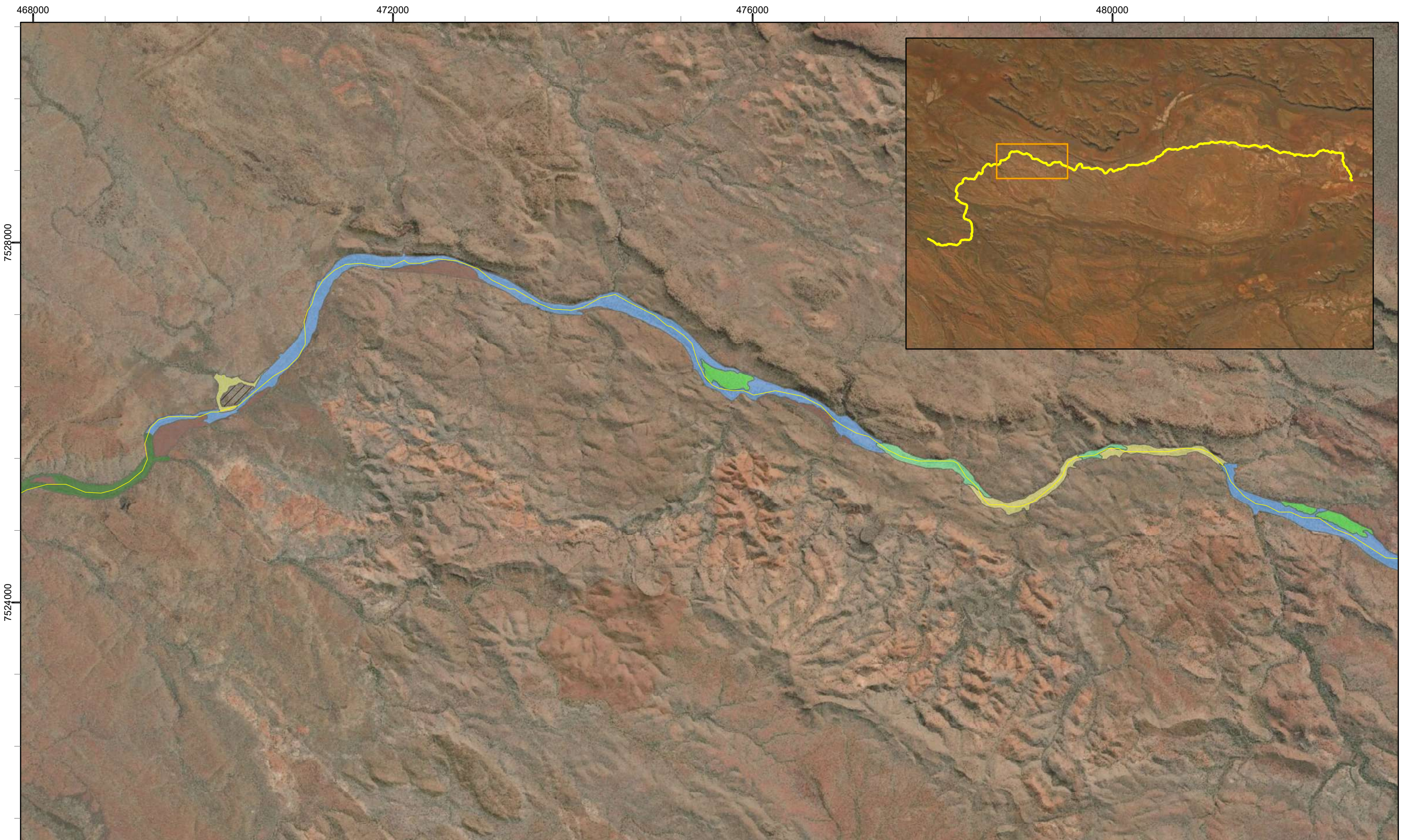
Figure 4.7c: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50

Projection: Transverse Mercator

Datum: GDA 1994

Size A3. Created 02/09/2020



- Legend**
- Duck Creek
 - VegetationType**
 - AcrMaMOW MIACPAAOTOS CvMSS
 - MaEcrMOW MgAaACPOTOS CvMSS
 - AcAcpGpLOW TwTeLOHG EmLOTG
 - MaEcrMW AcpMIAaTOS CvMSS
 - AcAcpMOW GpIAbGrTSS TeTaMOHG
 - Not Sampled
 - EcrEvMOW AcAcpMgGrTS

1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.7d: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 02/09/2020

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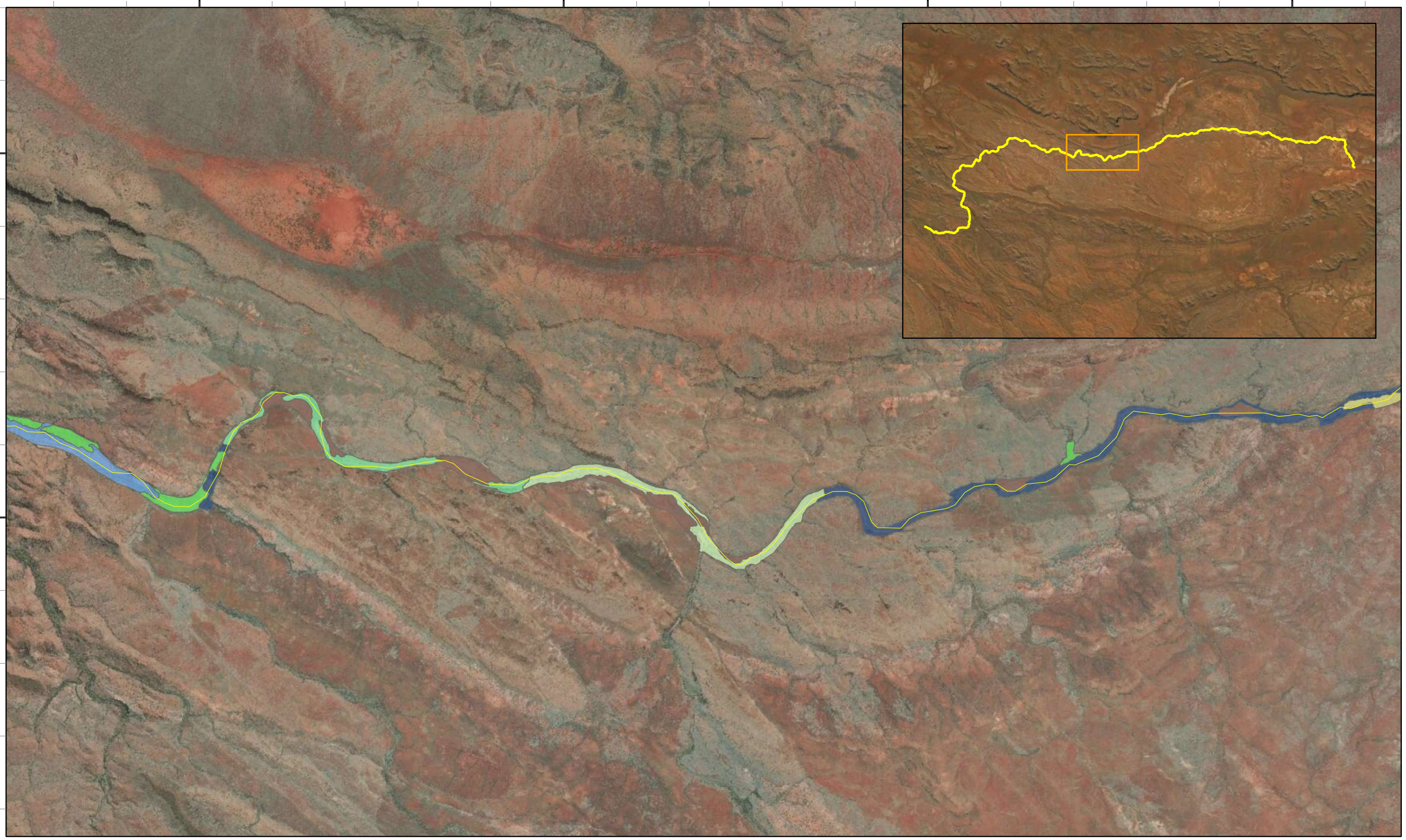
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7528000

7524000



Legend	
Duck Creek	EcrMaMOW MgAaAcTSS CvMSS
VegetationType	EcrMaMST MgAcpAaTS CvMSS
AcAcpGpLOW TwTeLOHG EmLOTG	MaEcrMOW MgAaAcpTOS CvMSS
AcAcpMOW GpIAbGrTSS TeTaMOHG	MaEcrMW AcpMIAaTOS CvMSS
EcrEvMOW AcAcpMgGrTS	

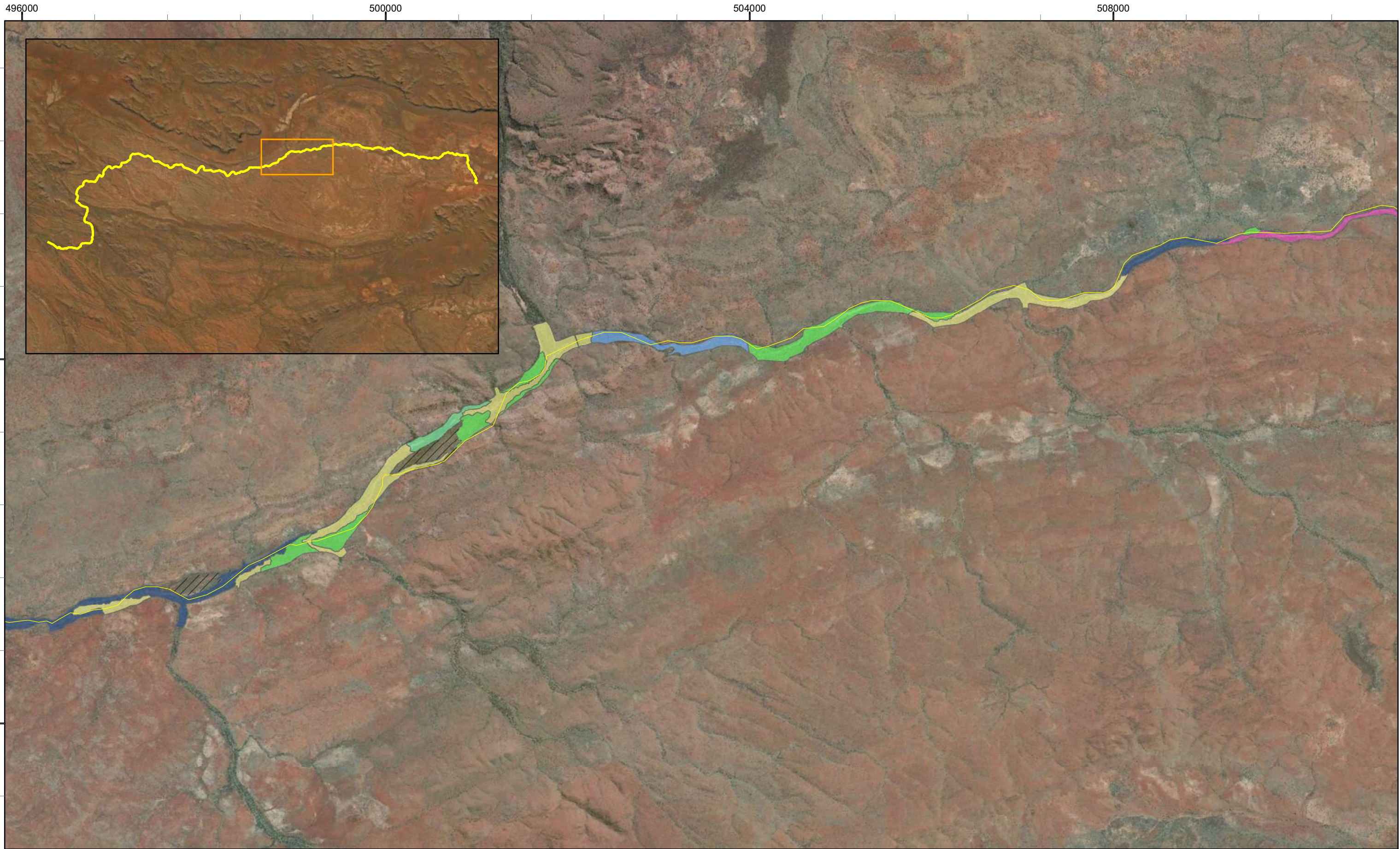
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Environmental Survey

N
1:38,300
0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.7e: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 02/09/2020



Legend	
	Duck Creek
VegetationType	
	AcAcpMOW GplAbGrTSS TeTaMOHG
	Cleared
	EcrEvMOW AcAcpGrTSS EaCcTtMSTG
	EcrEvMOW AcAcpMgGrTS
	EcrMaMOW MgAaAcTSS CvMSS
	MaEcrMOW MgAaAcpTOS CvMSS
	MaEcrMW AcpMIAaTOS CvMSS
	Not Sampled

1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.7f: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 02/09/2020

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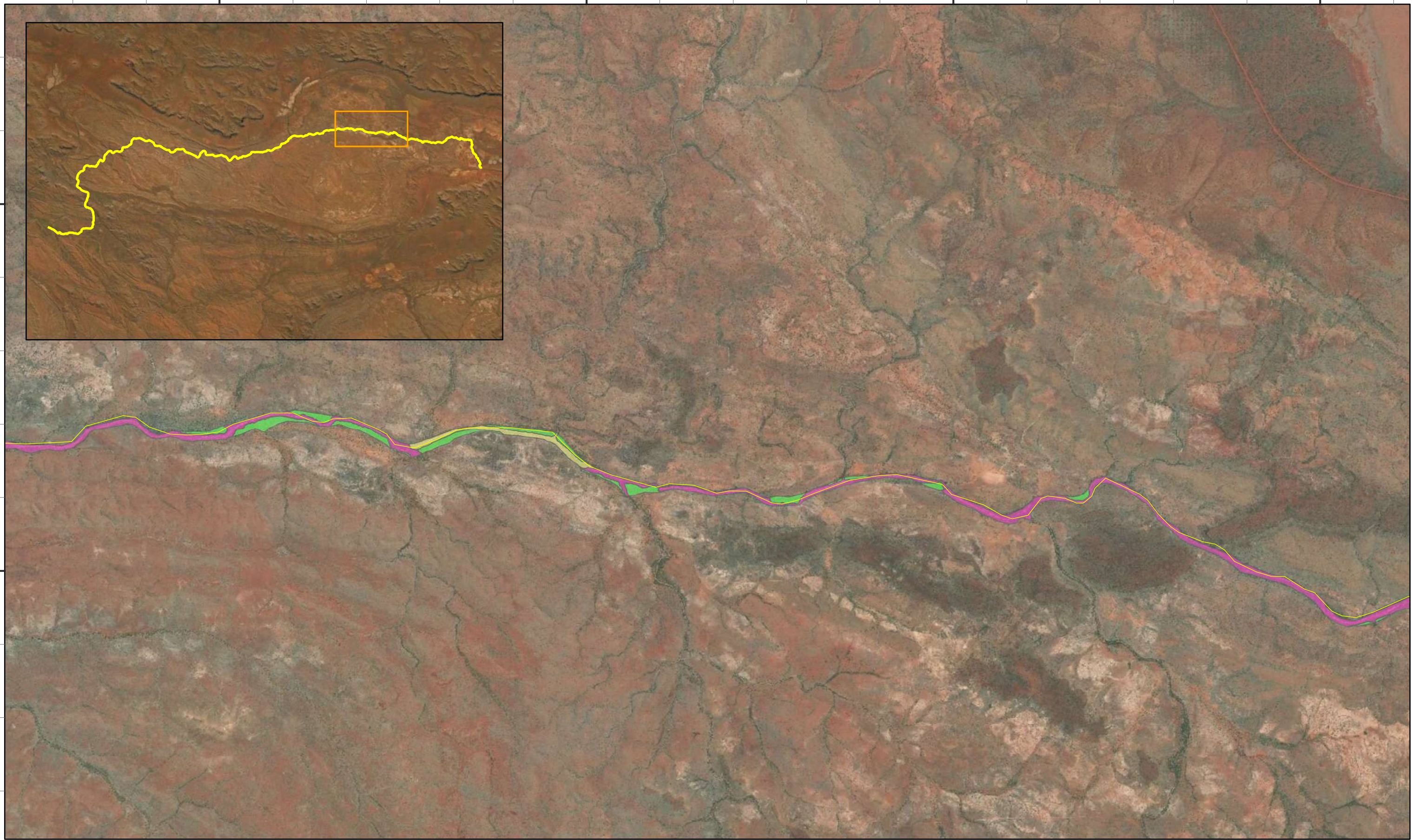
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7528000



Legend

- Duck Creek
- EcrEvMOW AcAcpMgGrTS
- VegetationType**
- AcAcpMOW GplAbGrTSS TeTaMOHG
- Cleared
- EcrEvMOW AcAcpGrTSS EaCcTtMSTG

1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.7g: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 02/09/2020

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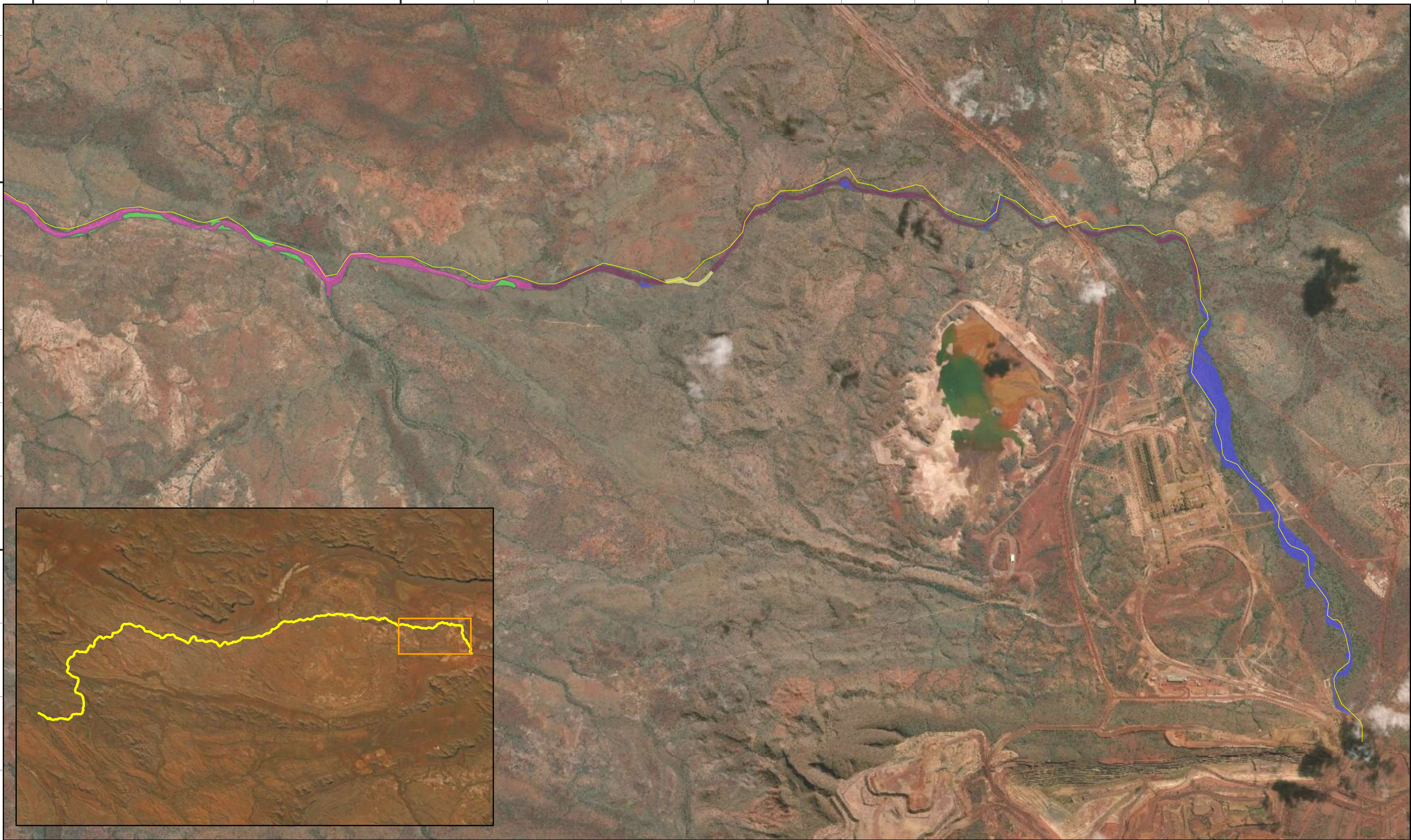
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Legend

- Duck Creek
- VegetationType**
- AcAcpMOW GplAbGrTSS TeTaMOHG
- AcExLW AppSsGrMSS CcCdEcMOTG
- Cleared
- EcrEvMOW AcAcpGrTSS EaCcTtMSTG
- EcrEvMOW AcAcpMgGrTS
- EvExMOW AcAcpAbTOS EaCcTtMSTG

1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.7h: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994
 Size A3. Created 02/09/2020

4.8 Vegetation of Conservation Significance

4.8.1 Federal and State Listing

Sections of the study area crossed through known locations of the *Triodia pisolitica* (previously *Triodia* sp. Robe River) assemblages of mesas of the West Pilbara PEC. However, as the study area is restricted to the riparian zone of a creekline, this PEC was not expressed in the study area. The PEC occurs in upland landforms on Robe Pisolite geology, with *Triodia pisolitica* a key species in the hummock grassland layer. The vegetation types described and delineated in the study area are not considered to be analogous with any TECs and PECs known to occur in the surrounding Pilbara region.

4.8.2 Vegetation of Other Significance

The vegetation types described from the study area do not support unique floristic assemblages or threatened flora species, and are not analogous with any known TECs or PECs. However, the majority of the vegetation types supported populations of conservation significant taxa, with only two vegetation types (EcrMW CcOTG and EcrMaMST MgAcpAaTS CvMSS) not supporting any populations.

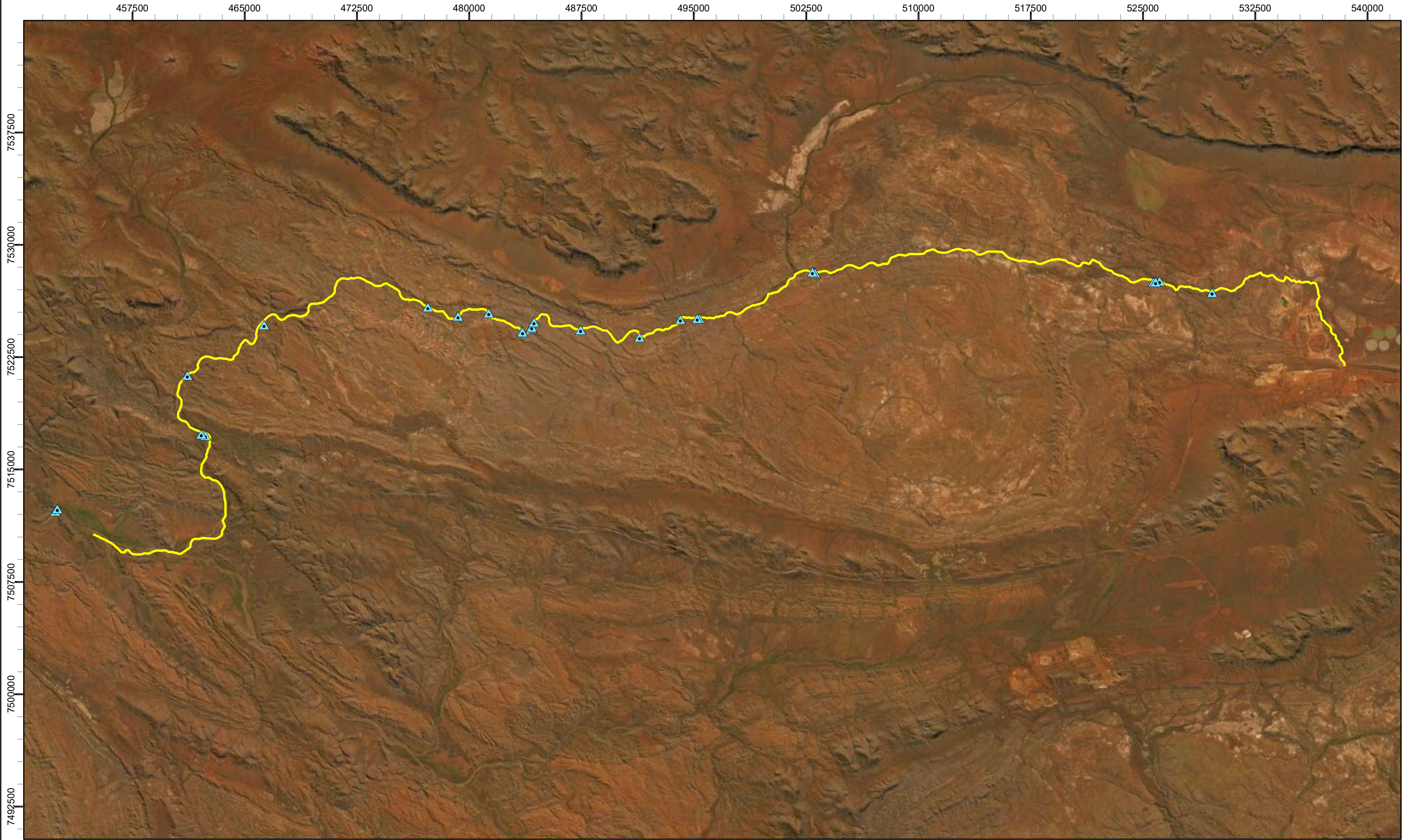
A total of 81 semi-permanent or permanent waterbodies were recorded in the study area over both survey phases (Figure 4.8). The longevity of the temporary waterbodies would be determined by the amount, intensity and frequency of the rainfall in the immediate region and within the catchment of the creeks.

Given the extent of water bodies and presence of taxa which indicate soil moisture, the vegetation of Duck Creek has potential local significance. In particular, vegetation types EcrMaMOW MgAaAcTSS CvMSS, EcrMaMOW MIAcpAaTOS CvMSS, EcrMaMST MgAcpAaTS CvMSS, MaEcrMOW MgAaAcpTOS CvMSS, MaEcrMW AcpMIAaTOS CvMSS and EcrEvMOW AcAcpMgGrTS were associated with indicators of consistent moisture, including *Melaleuca argentea*.



4.9 Vegetation Condition


The condition of the vegetation in the study area ranged from completely degraded to excellent (Table 4.7 and Figure 4.9). Some relatively extensive sections of vegetation along the creek were observed to be in excellent condition, with minimal signs of disturbance from weeds and grazing/ trampling. These sections generally coincided with rocky terrain either side of the creek, resulting in less cattle movement. The lower cattle movement has also resulted in lower weed presence and densities.

The main disturbances observed in the study area were associated with pastoralism (i.e., cattle grazing and weed disturbance). The sections of the creekline mapped as degraded were heavily impacted by weeds, as well as trampling and grazing. Overall, most of the study area (47%) was mapped as good condition, due to weeds and cattle disturbance. Cattle and donkeys were observed throughout the study area, which are known to move weed species through creeks systems.



Legend

-  Duck Creek
-  Water Feature Phase 1

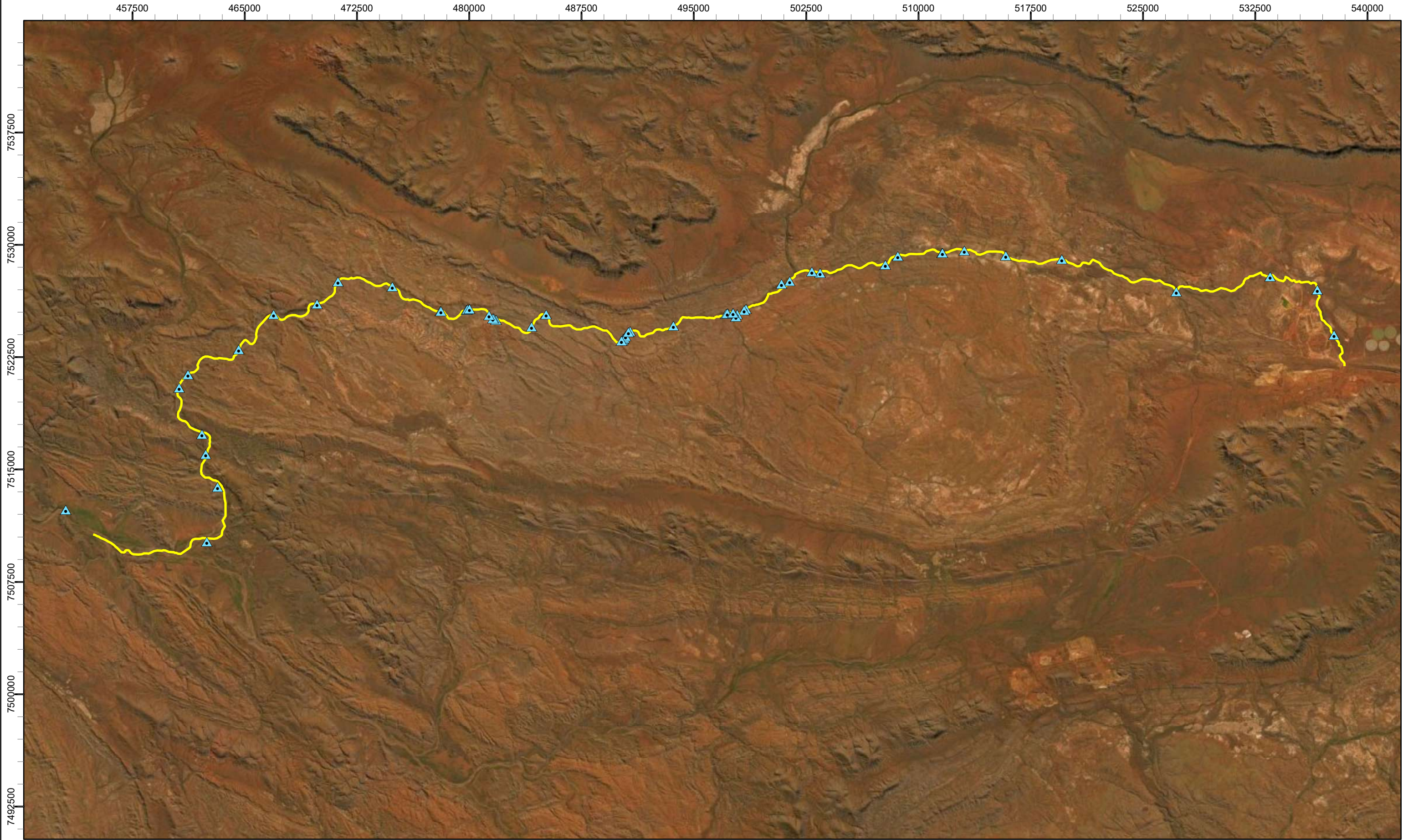


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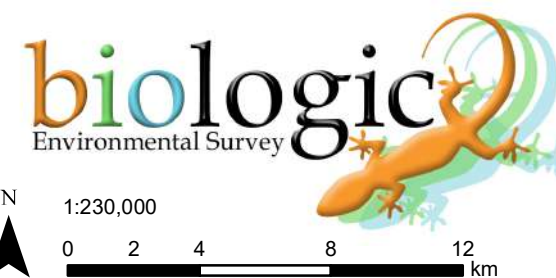
Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.8a: Observed water features
of the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994
 Size A3. Created 08/01/2020



Legend

- Duck Creek
- ▲ Water Feature Phase 2



**Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.8b: Observed water features
of the Study Area**

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994
Size A3. Created 08/01/2020

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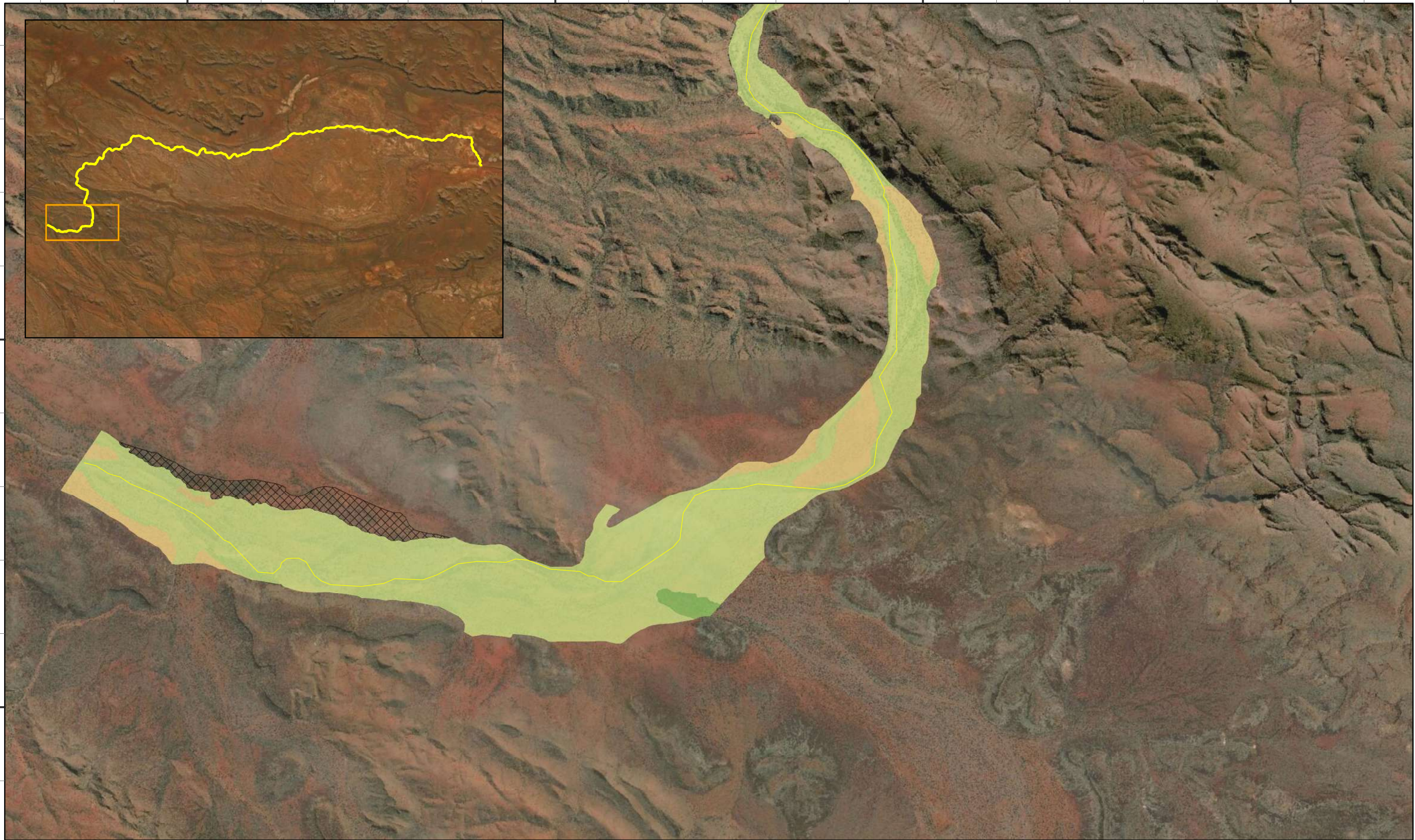
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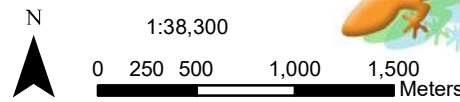
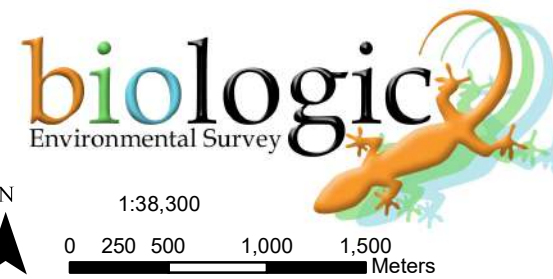


Legend

— Duck Creek Not Sampled

Vegetation Condition

- Very Good
- Good
- Poor



Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.9a: Vegetation types
occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 02/09/2020

456000

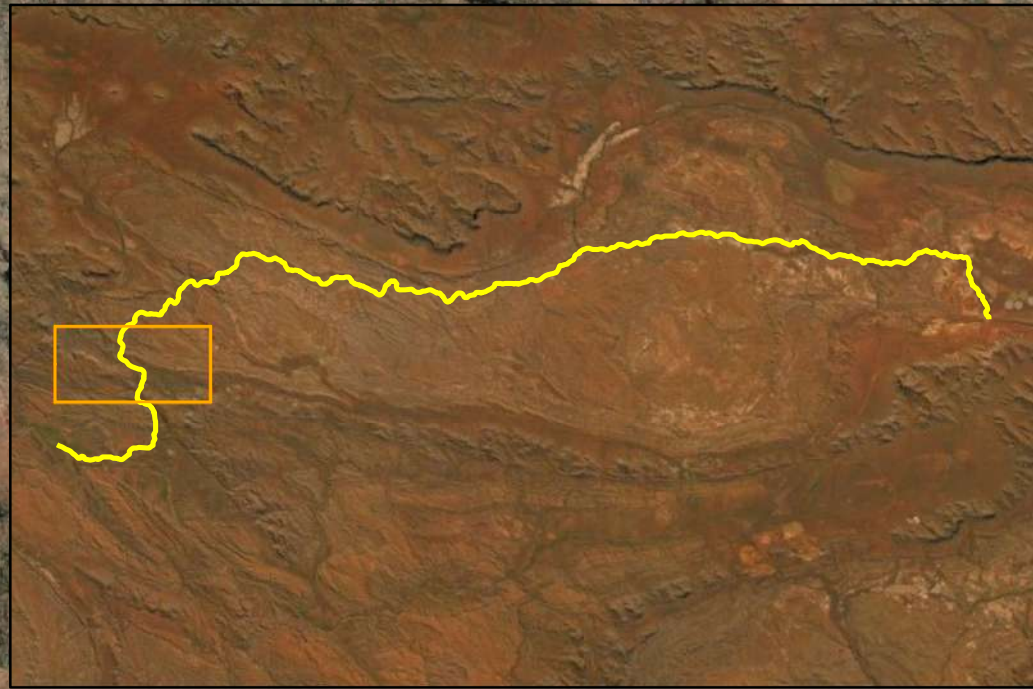
460000

464000

468000

7520000

7516000



Legend

- Duck Creek
- Vegetation Condition**
- Very Good
- Good
- Poor

1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.9b: Vegetation types
occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 02/09/2020

456000

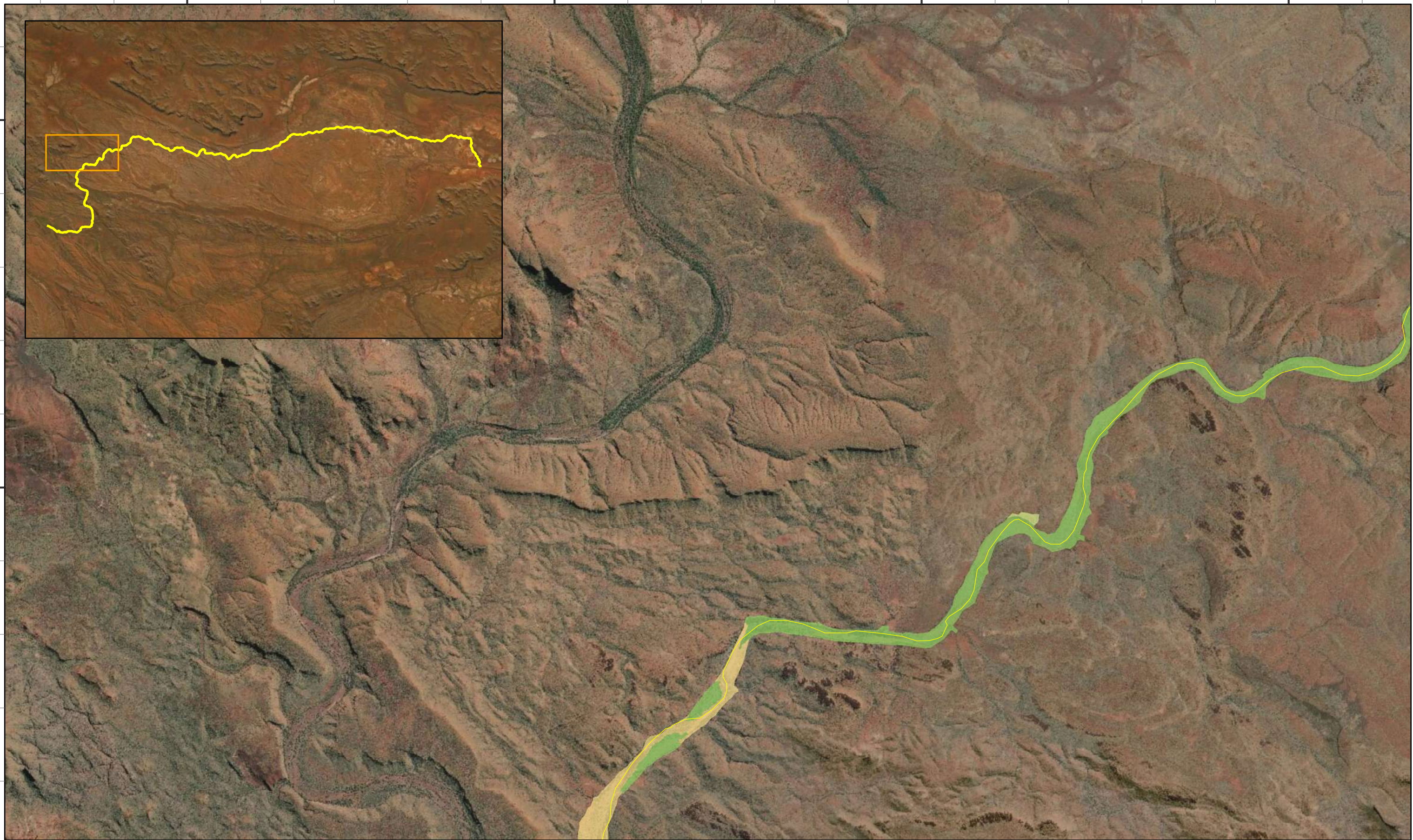
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

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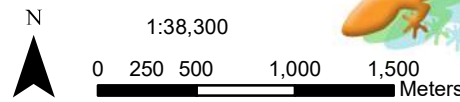
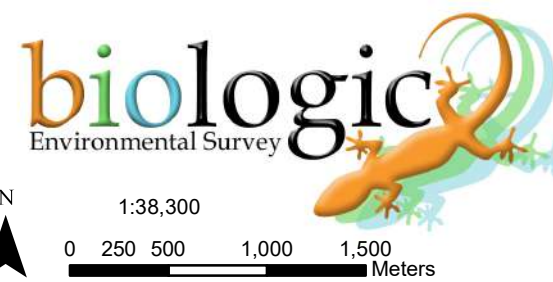
7528000

7524000



Legend

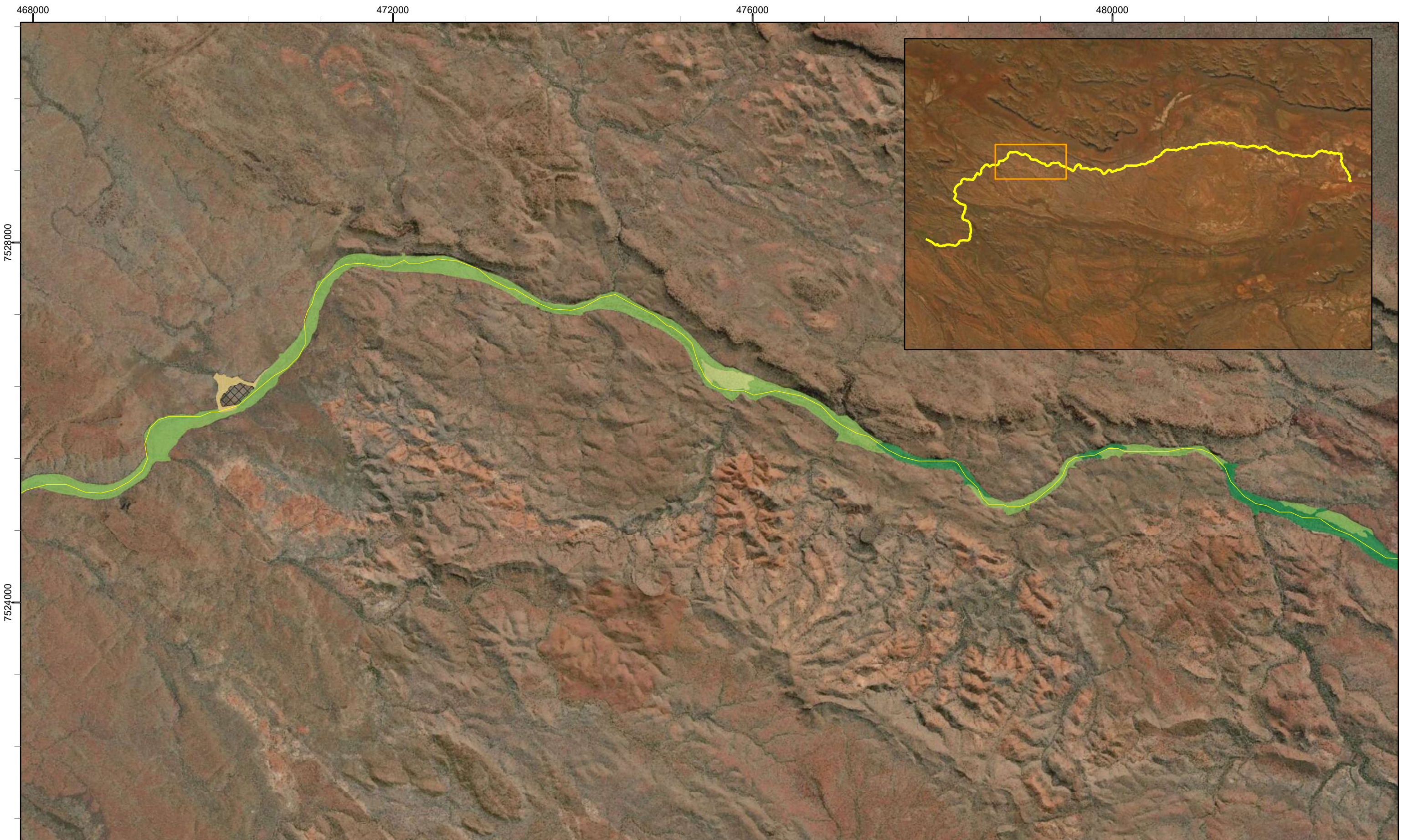
-  Duck Creek
- Vegetation Condition**
-  Very Good
-  Good
-  Poor



Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.9c: Vegetation types
occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 02/09/2020



- Legend**
- Duck Creek
 - Poor
 - Vegetation Condition**
 - Excellent
 - Very Good
 - Good
 - Not Sampled

biologic
Environmental Survey

N
1:38,300
0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.9d: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 02/09/2020

484000

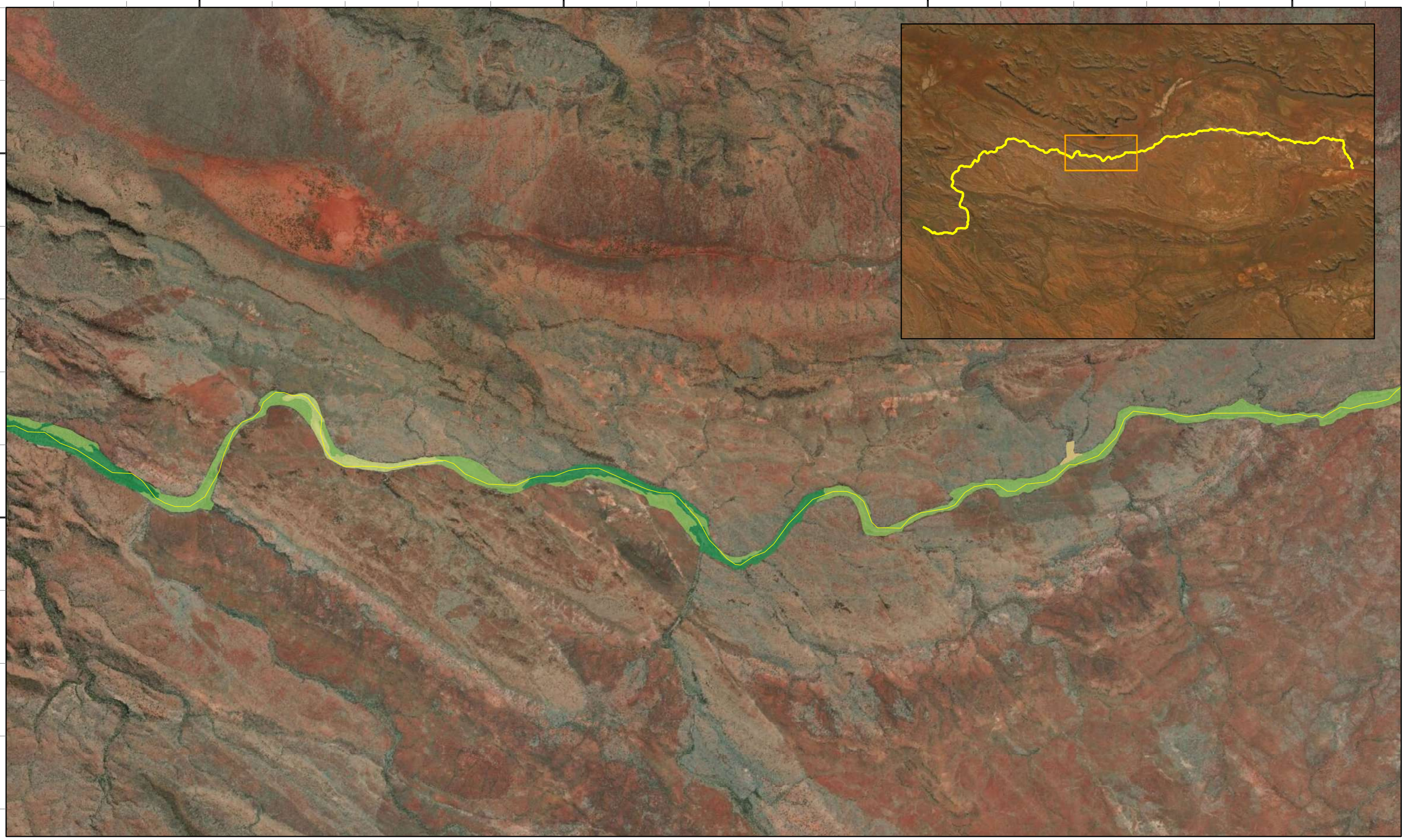
488000

492000

496000

7528000

7524000



Legend

— Duck Creek ■ Poor

Vegetation Condition

■ Excellent

■ Very Good

■ Good

biologic
Environmental Survey

N

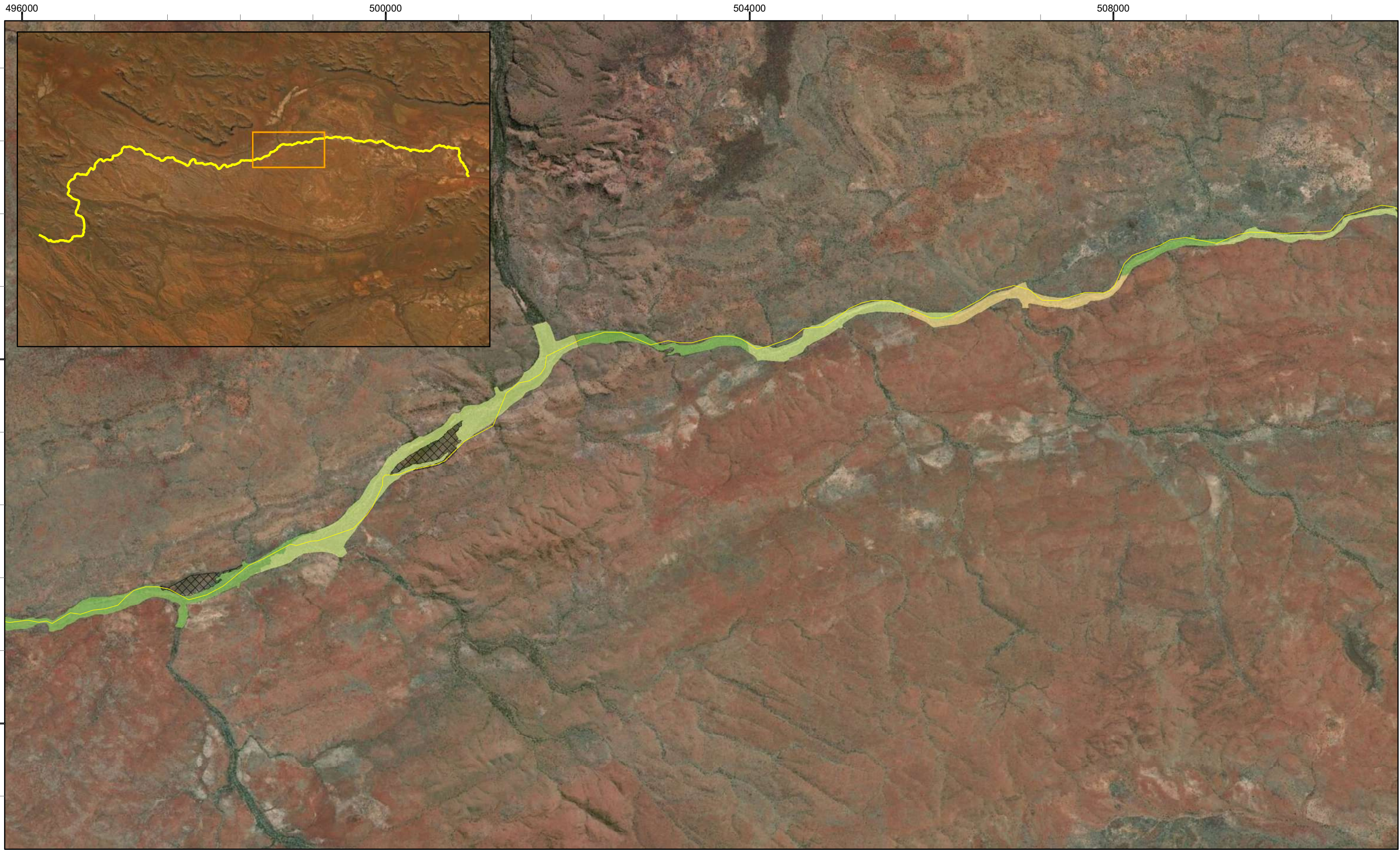
1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.9e: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 02/09/2020



Legend

Duck Creek	Completely degraded
Vegetation Condition	Not Sampled
Very Good	
Good	
Poor	

1:38,300

0 250 500 1,000 1,500 Meters

N

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.9f: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994

Size A3. Created 02/09/2020

512000

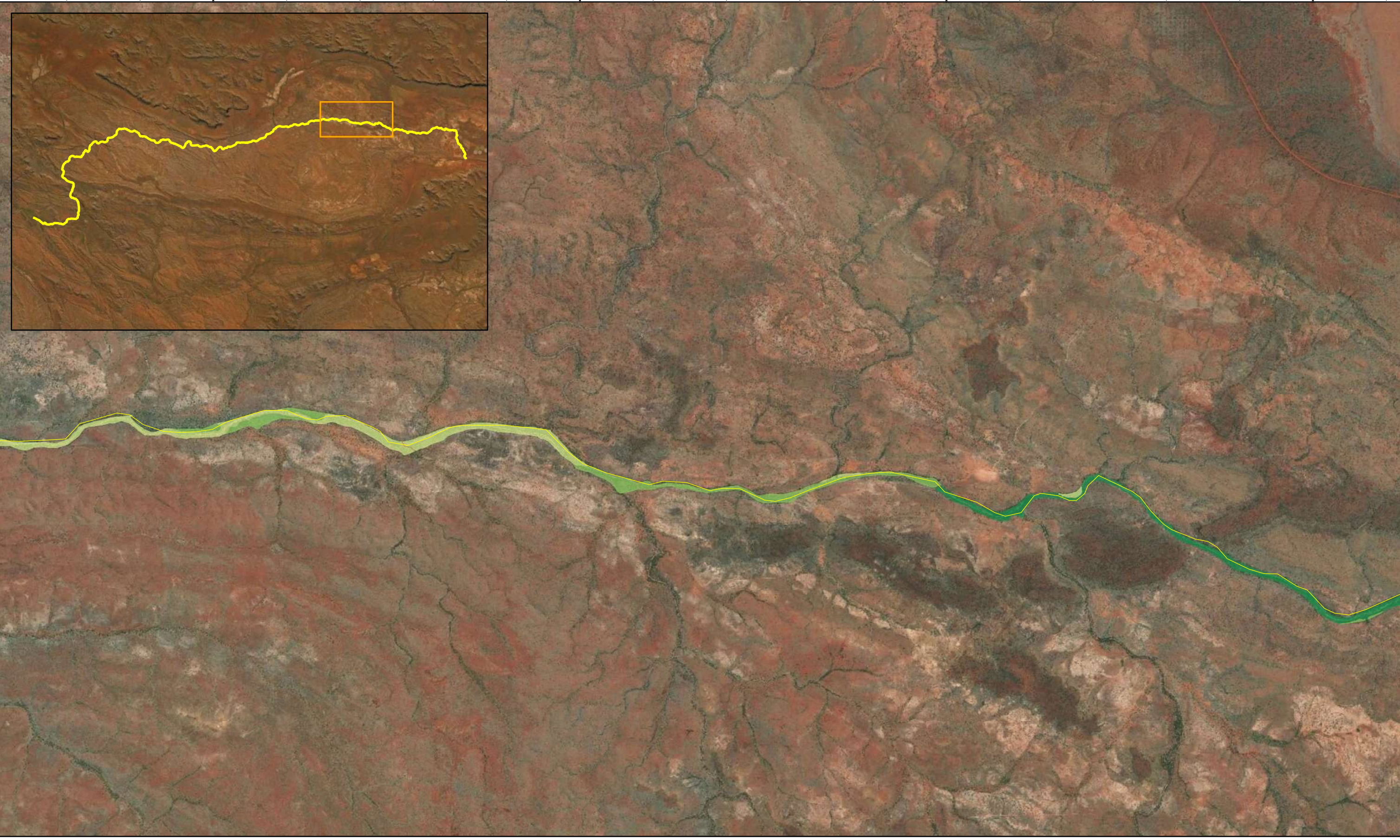
516000

520000

524000

7532000

7528000



Legend

— Duck Creek ■ Completely degraded

Vegetation Condition

■ Excellent

■ Very Good

■ Good

biologic
Environmental Survey

N

1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.9g: Vegetation types occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 02/09/2020

524000

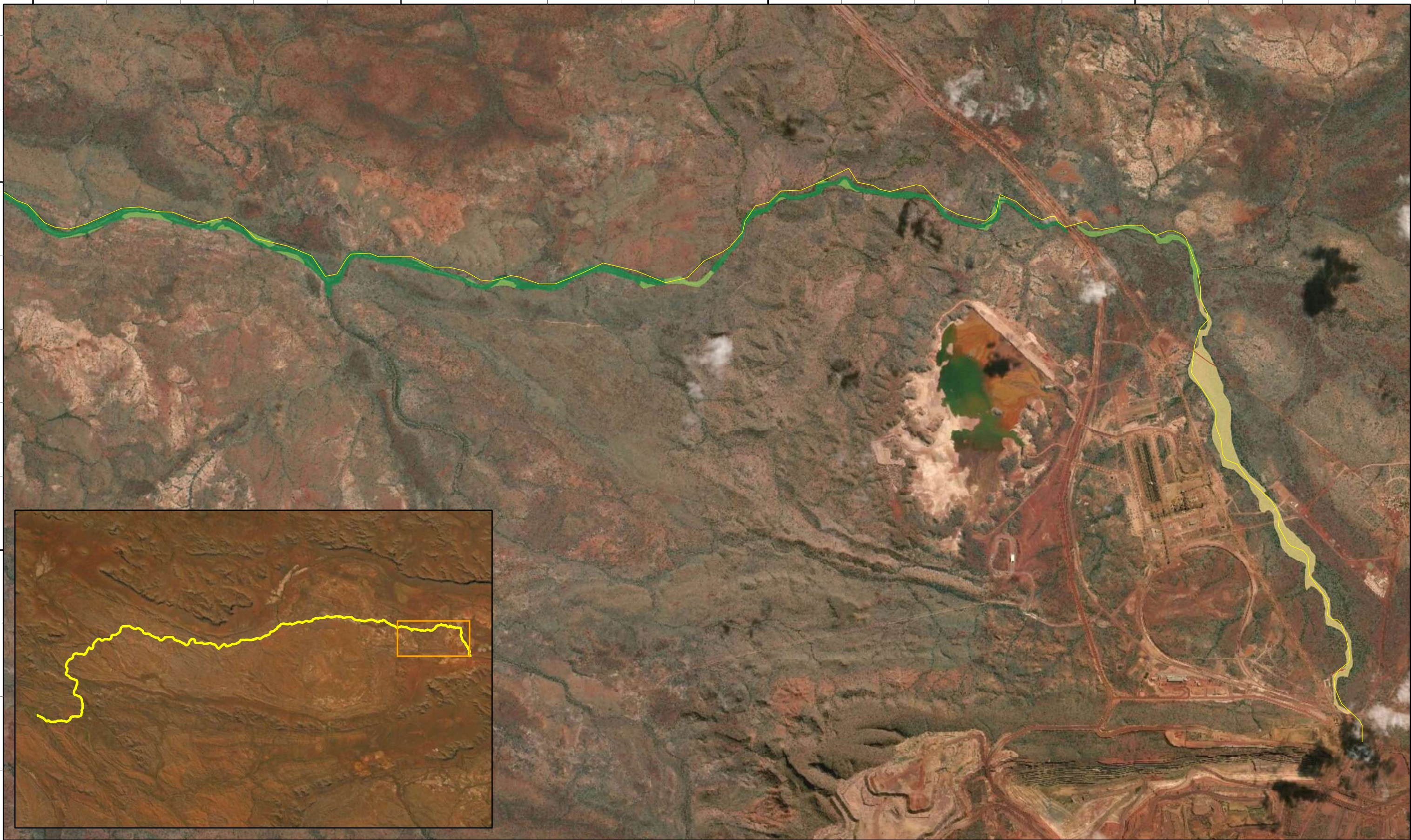
528000

532000

536000

7528000

7524000



Legend

- Duck Creek
- Completely degraded
- Vegetation Condition**
- Excellent
- Very Good
- Poor

1:38,300

0 250 500 1,000 1,500 Meters

Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation
Figure 4.9h: Vegetation types
occurring in the Study Area

Coordinate System: GDA 1994 MGA Zone 50
 Projection: Transverse Mercator
 Datum: GDA 1994
 Size A3. Created 02/09/2020

Table 4.7: Vegetation condition extent in the Study Area

Condition	Extent (ha / %)	Comment
Excellent	199 / 8	Negligible signs of disturbance.
Very Good	637 / 26	Minimal signs of disturbances associated with cattle grazing and trampling. Only minor weeds disturbance evident.
Good	1,175 / 47	Cattle grazing and trampling more evident.
Poor	370 / 15	The understorey contained substantial * <i>Cenchrus ciliaris</i> cover (or other weeds), while cattle grazing and trampling was evident.
Completely Degraded	1 / <1	* <i>Cenchrus ciliaris</i> dominated the understorey, while cattle grazing and trampling was evident. The understorey lacked native taxa and structure.
Not sampled	100 / 4	Not sampled as it was non-riparian vegetation.

Rounded to the nearest whole number

4.10 Review of Likelihood of Occurrence for Conservation Significant Flora

Prior to the survey, six conservation significant flora taxa were known to occur in the study area. One taxon was considered likely, and 27 were considered to possibly occur within the study area. Reviewed likelihoods of occurrence for these conservation significant taxa are provided in Table 4.8.

Table 4.8: Post-survey likelihood of occurrence for conservation significant flora

Taxon	Post-survey likelihood	Reason for change in likelihood
Pre-survey likelihood: Confirmed		
<i>Ipomoea racemigera</i> (P2)	Confirmed	No Change. Confirmed within the study area.
<i>Oxalis</i> sp. Pilbara (M.E. Trudgen 12725) (P2)	Confirmed	No Change. Previous records (Astron, 2017) were confirmed by a WA Herbarium taxonomist, thus taxon is presumed to occur, but was not observed during the current survey.
<i>Euphorbia australis</i> var. <i>glabra</i> (P3)	Confirmed	
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	Confirmed	No Change. Confirmed within the study area.
<i>Livistona alfredii</i> (P4)	Confirmed	
<i>Rhynchosia bungarensis</i> (P4)	Confirmed	
Pre-survey likelihood: Likely		
<i>Gymnanthera cunninghamii</i> (P3)	Confirmed	Confirmed to occur within the study area.
Pre-survey likelihood: Possible		
<i>Helichrysum oligochaetum</i>	Possible	No change. Taxa could occur in creeklines and on flood plains which were present within the study area.
<i>Dicladantha glabra</i>	Possible	
<i>Gompholobium karjini</i>	Possible	
<i>Teucrium pilbaranum</i>	Possible	
<i>Iotasperma sessilifolium</i>	Possible	
<i>Ptilotus subspinescens</i>	Possible	
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	Possible	

Taxon	Post-survey likelihood	Reason for change in likelihood
<i>Sida</i> sp. Hamersley Range (K. Newbey 10692)	Possible	
<i>Terminalia supranitifolia</i>	Possible	
<i>Triodia basitricha</i>	Possible	
<i>Acacia bromilowiana</i>	Possible	
<i>Goodenia nuda</i>	Possible	
<i>Hibiscus campanulatus</i>	Unlikely	<p>Most generally occur on clay plains, slopes, or hills. The study area was restricted to the riparian zone of Duck Creek, so the habitat is likely unsuitable to support these taxa.</p>
<i>Triodia</i> sp. Karijini (S. van Leeuwen 4111)	Unlikely	
<i>Triodia</i> sp. Silvergrass (P.-L. de Kock BES 00808)	Unlikely	
<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	Unlikely	
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	Unlikely	
<i>Cyanthillium gracile</i>	Unlikely	
<i>Dampiera anonyma</i>	Unlikely	
<i>Eremophila magnifica</i> subsp. <i>velutina</i>	Unlikely	
<i>Glycine falcata</i>	Unlikely	
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	Unlikely	
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	Unlikely	
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)	Unlikely	
<i>Lepidium catapycnon</i>	Unlikely	
<i>Ptilotus mollis</i>	Unlikely	
<i>Astrebla lappacea</i>	Unlikely	

5 DISCUSSION

The following section discusses the results of the survey and places the significant results in a regional and local context, consistent with the requirements of EPA (2016b). During the present survey (i.e., October 2019 and June 2020), Biologic also completed a two-phase riparian vegetation survey of Boolgeeda Creek. Duck Creek and Boolgeeda Creek join at their western ends and as such, the results of the Boolgeeda Creek survey have also been considered here where relevant.

The survey did not identify any threatened flora taxa listed under the EPBC Act or the BC Act. Six priority-listed flora taxa were recorded in the study area during the survey: *Aristida lazaridis* (P2), *Ipomoea racemigera* (P2), *Gymnanthera cunninghamii* (P3), *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3), *Livistona alfredii* (P4) and *Rhynchosia bungarensis* (P4). The small population of *Aristida lazaridis* is a substantial range extension; however, the remaining taxa are already known to the area and therefore do not represent range extensions or regional significance.

Aristida lazaridis has previously been recorded from the eastern Pilbara, with the majority of the records around West Angelas, Mining Area C and Yandicoogina (ALA, 2020; DBCA, 2020a). The record of *Aristida lazaridis* in the study area represents a range extension of approximately 130 km and is the first known record (vouchered with WAH) on the western side of Karijini National Park. The record also represents the most westerly known record in Australia and as a result, is locally important. Extensive records of *Aristida lazaridis* occur across Queensland (ALA, 2020), while the WAH has 21 specimens vouchered in the research collection (WAH, 1998-). The five individuals of *Aristida lazaridis* recorded potentially represent an under-representation of the population and further targeted surveys may locate additional individuals along the banks of Duck Creek.

During the survey, the number of vascular flora taxa recorded (277) was higher than nearby Boolgeeda Creek (206), likely due to the greater availability of water, and complexity of landforms along Duck Creek. All the vascular flora taxa recorded during the survey have previously been recorded in the Pilbara. The total number of vascular flora taxa recorded is consistent with what is expected in the region; however, the floristic diversity is greater than previous riparian surveys in the study area (e.g., 132, 148 and 117 taxa recorded by Biota, 2015, 2018a; Eco Logical, 2015 respectively), likely due to the rainfall preceding the phase two survey. Furthermore, the current survey assessed a longer stretch of watercourse compared to the previous riparian surveys, thus maximising the likelihood of recording additional taxa.

None of the mapped vegetation types contained vegetation that was consistent with known TECs or PECs; however, the flora and vegetation observed has some degree of groundwater dependence, and thus local significance.

Almost all of the mapped vegetation types encompass at least a few records of taxa which indicate a consistent or persistent soil moisture content. The vegetation types which have a perceived higher local significance are associated with water features that were observed in 2019 (i.e., more persistent moisture following successive years of below average rainfall compared to the water features only observed following above average summer rainfall in 2020), as well as numerous groundwater/ soil moisture dependent taxa.

Vegetation types EcrMaMOW MgAaAcTSS CvMSS, EcrMaMOW MIAcpAaTOS CvMSS, EcrMaMST MgAcpAaTS CvMSS, MaEcrMOW MgAaAcpTOS CvMSS, and MaEcrMW AcpMIAaTOS CvMSS all supported individuals of the obligate phreatophyte *Melaleuca argentea* as a dominant overstorey species. EcrEvMOW AcAcpMgGrTS (near the confluence of Caves Creek and Duck Creek) also supported mature *M. argentea* trees. Due to its groundwater dependence, *Melaleuca argentea* is often the best indicator of consistently shallow groundwater tables or permanent (perennial) surface water. It is therefore routinely used to indicate the presence of groundwater dependent vegetation.

As well as their association with *Melaleuca argentea*, the above units each contained key riparian species (i.e., indicators of consistent soil moisture), including *Acacia ampliceps*, *Ammannia baccifera*, and *Cyperus vaginatus* to name a few.

Of particular note are the vegetation types EcrEvMOW AcAcpMgGrTS, EcrMaMOW MgAaAcTSS, CvMSS, and MaEcrMW AcpMIAaTOS CvMSS, which were mapped near the confluence of Caves Creek and Duck Creek and generally continued downstream (west). These units contained *Gymnanthera cunninghamii* (P3), *Livistona alfredii* (P4), and *Stylidium fluminense*, which are thought to be good indicators of soil moisture, consistent with our observations of permanent to semi-permanent pools along this section of the creek. Similarly, the pools and vegetation types which contain groundwater dependent vegetation generally occur in sections of the creek that returned high persistence values from the Normalised Difference Vegetation Index (NDVI) persistence mapping (Appendix P).

NDVI persistence mapping allows the identification of ground pixels where vegetation is most consistently dense throughout wet and dry seasons, with high persistence indicated by a high percentage of aerial images (generally derived from satellites with remote sensing, producing a series of aerial imagery that can be further interrogated; for example Landsat) having exceeded the chosen threshold at any point on the ground (for the relevant temporal period). It is thus inferred that high persistence vegetation (in the order of 60 % persistent and greater) is likely to be accessing stored groundwater (many potential sources; or alternative water sources other than groundwater) in order to maintain growth and productivity throughout the year.

At the confluence with Caves Creek, the creek bed of Duck Creek is dominated by alluvium, while the surrounding geology is mapped as Marra Mamba Iron Formation and Fortescue Group (Figure 2.3). Both the Marra Mamba and Fortescue geologies are potentially more impervious, and result in the abundance of groundwater dependent vegetation where Duck Creek receives inflow from Caves Creek. The NDVI persistence mapping supports the presence of groundwater dependent vegetation, with a high proportion of NDVI persistence signatures returning values between 0.6 and 1 (which can be re-interpreted as 60-100 %). These high NDVI values (which ranges from -1 to +1, with higher values associated with greater density and greenness of the plant canopy; BoM, 2020c). NDVI persistence values in excess of 0.6 within the arid climate of the Pilbara suggests a relatively consistent to permanent access to groundwater or soil moisture year round.

Further riparian features with relatively high NDVI persistence values (0.6 to 1) occur further downstream, with most of these features isolated and associated with bends in the creek, confluence with minor tributaries flowing into Duck Creek or presence of bedrock that may be resulting in the pooling of

groundwater closer to the surface. There is then a higher proportion of high NDVI persistence values near the confluence of Duck Creek and Serpentine Creek. Serpentine Creek originates from a large area of colluvium and traverses through extensive calcrete, which potentially provides additional groundwater inflow into Duck Creek. This is reflected by the increase in the presence of *Melaleuca argentea* as well as numerous other hydric and mesic indicator species, including *Sesbania formosa* and *Acacia ampliceps* to name a few.

The presence of *Acacia ampliceps* and the other key mesic and hydric indicator species from the confluence with Caves Creek and downstream is potentially driven by the underlying geology. Duck Creek originates (in the east) from a large colluvium basin (and small areas of alluvium; geological codes Czc and Qa) which holds a large amount of groundwater. The creek then traverses across the Jeerinah Formation, and various metabasaltic flows and breccia and metadolerite sills (geological codes AFj, AFjl and AFd, respectively) (Government of Western Australia, 2020). Duck Creek also traverses across a relatively small patch of calcrete (Czk) before crossing into the Bunjinah Formation (AFu). At the confluence with Caves Creek, alluvium (Qa) dominates the creek bed, before Duck Creek then crosses back into the Jeerinah Formation (Fj) until the confluence of Serpentine Creek where alluvium (Qa) dominates the creek bed for the remainder of the study area (Government of Western Australia, 2020). The geology of the surrounding area consists of various pervious (alluviums and colluviums) and impervious layers (Marra Mamba Formation and Brockman Iron Formation).

The Archaean Jeerinah Formation potentially has an unconformable contact with the overlying Marra Mamba Formation, which may allow for groundwater pooling. There is also a major anticline with flat lying fault structures and the creek sits on the northern limb, while surrounding calcrete aquifers, with one occurring on Duck Creek, is potentially holding substantial amounts of water in the area.

The presence of *Melaleuca argentea* and other key mesic/ hydric indicator species upstream from the Caves Creek confluence diminishes compared to downstream. However, there are still several high to very high level indicator species (i.e., *Melaleuca bracteata*, *Gymnanthera cunninghamii*, *Stylidium fluminense*) present, while the number of moderate to low level indicator species is consistent with the downstream portion of Duck Creek. The creek upstream from Caves Creek is relatively narrow, with several riparian features showing a high NDVI persistence (values between 0.6 to 1). The majority of these features coincided with bends in the creek and at the confluence with minor tributaries flowing into Duck Creek. Furthermore, the eastern end of the study area currently receives mine water discharge, with the discharged water at times reaching the confluence of Caves Creek (Astron, 2017).

The eastern or upstream end of Duck Creek supports extensive communities of the facultative phreatophyte *Eucalyptus camaldulensis* subsp. *refulgens*, which indicates groundwater is within the reach of the root zone (Collof, 2014). *Eucalyptus victrix* (vadophyte/ facultative phreatophyte) was also present through much of the study area, with particularly extensive stands upstream. Work by Pfautsch *et al.* (2014) indicates that *E. victrix* can persist in areas of low depth to groundwater. With potential changes to the water regime of the creekline (i.e., increased water discharge), the composition of these overstorey species may change. *Eucalyptus camaldulensis* subsp. *refulgens* sapling density would likely increase in a wetter regime, while *Eucalyptus victrix* sapling density would likely decrease. The persistence of mature

trees from both species in a wetter regime would depend on the underlying geology and the degree of wetness ((Pfautsch *et al.*, 2014)).

The vegetation downstream of the Caves Creek confluence supports a high proportion of hydric and mesic indicator species, with numerous permanent and semi-permanent pools present. As the vegetation in these sections is already subjected to a higher degree of soil moisture and availability than the surrounding areas, this vegetation may be more resilient to increases in soil moisture.

The understorey structure and composition along the study area is likely to represent the greatest opportunity for change as a result of alterations to the hydrological regime. If the hydrological regime were to migrate to a wetter regime, then it is likely that the structure and composition will also migrate to a more mesic or hydric environment. This is particularly pertinent upstream of the Caves Creek confluence, where the presence of mesic and hydric species is lower compared to downstream of the confluence. Colonising species like *Typha domingensis* will most likely colonise permanent or semi-permanent pools and surface expressions of groundwater. The change in understorey structure and composition is likely to occur over an extended period, with only minor discernible changes noted from year to year.

The condition of the vegetation along the length of the study area was influenced by the presence of cattle and pastoral activities. Cattle grazing and trampling and the associated spread and proliferation of weeds from pastoral activities was observable along the banks and floodplains of Duck Creek. The disturbance associated with pastoralism was most notable in vegetation type EcrMW CcOTG, which had a tussock grassland dominated by *Cenchrus ciliaris*. The large alluvial riparian zone at the confluence of Duck Creek and Boolgeeda Creek and further downstream also showed signs of increased cattle activity.

6 CONCLUSION

A two-season detailed flora and vegetation survey was completed in the study area during October and November 2019 and June 2020, which also incorporated targeted flora searches and the establishment of monitoring transects (during phase one). The survey involved two-phase sampling of quadrats along the extent of the creekline.

There were no significant limitations to the survey and the scope and objectives were addressed in full. Work was completed to a level sufficient to meet EPA requirements. Key findings of the current survey were:

- Six conservation significant listed taxa were recorded from the study area;
 - *Aristida lazaridis* (P2), a ~130 km range extension;
 - *Ipomoea racemigera* (P2);
 - *Gymnanthera cunninghamii* (P3);
 - *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3);
 - *Livistona alfredii* (P4); and
 - *Rhynchosia bungarensis* (P4).
- Several mesophytic taxa were recorded from the study area, with the key species being:
 - *Melaleuca argentea*;
 - *Acacia ampliceps*;
 - *Melaleuca bracteata*;
 - *Cullen leucanthum*;
 - *Eucalyptus camaldulensis* subsp. *refulgens*;
 - *Stylidium fluminense*;
 - *Sesbania formosa*;
 - *Livistona alfredii* (P4);
 - *Gymnanthera cunninghamii* (P3);
- No TECs or PECs were mapped within the study area; and
- Six vegetation types were noted as being of higher local importance due to the presence of mature individuals of *Melaleuca argentea* as well as a high proportion of mesophytic and hydrophytic taxa:
 - EcrMaMOW MgAaAcTSS CvMSS;
 - EcrMaMOW MIAcpAaTOS CvMSS;
 - EcrMaMST MgAcpAaTS CvMSS;
 - MaEcrMOW MgAaAcpTOS CvMSS;
 - MaEcrMW AcpMIAaTOS CvMSS; and
 - EcrEvMOW AcAcpMgGrTS.

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8 APPENDICES

Appendix A: State and Federal Conservation Codes

International Union for Conservation of Nature

Category	Definition
Extinct (EX)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered (CR)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern (LTC)	A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.
Not Evaluated (NE)	A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

Environment Protection and Biodiversity Conservation Act 1999

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

Category	Definition
Threatened Ecological Communities	
Critically Endangered	An ecological community is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered	An ecological community is eligible to be included in the endangered category at a particular time if, at that time: <ul style="list-style-type: none"> (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable	An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time: <ul style="list-style-type: none"> (a) it is not critically endangered nor endangered; and (b) it is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

Biodiversity Conservation Act 2016

Category	Definition
Threatened Flora Species	
Critically Endangered (CR)	Threatened species considered to be “facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines”. Published under schedule 1 of the <i>Wildlife Conservation (Rare Flora) Notice 2018</i> for critically endangered flora.
Endangered (EN)	Threatened species considered to be “facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines”. Published under schedule 2 of the <i>Wildlife Conservation (Rare Flora) Notice 2018</i> for endangered flora.
Vulnerable (VU)	Threatened species considered to be “facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines”. Published under schedule 3 of the <i>Wildlife Conservation (Rare Flora) Notice 2018</i> for vulnerable flora.
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). Published as presumed extinct under schedule 4 of the <i>Wildlife Conservation (Rare Flora) Notice 2018</i> for extinct flora.
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). Currently there are no threatened flora species listed as extinct in the wild.

Category	Definition
Threatened Ecological Communities	
Critically Endangered (CR)	<p>An ecological community is eligible for listing in the category of critically endangered ecological community at a particular time if, at that time —</p> <p>(a) it is facing an extremely high risk of becoming eligible for listing as a collapsed ecological community in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines; and</p> <p>(b) listing in that category is otherwise in accordance with the ministerial guidelines.</p>
Endangered (EN)	<p>An ecological community is eligible for listing in the category of endangered ecological community at a particular time if, at that time —</p> <p>(a) it is not a critically endangered ecological community; and</p> <p>(b) it is facing a very high risk of becoming eligible for listing as a collapsed ecological community in the near future, as determined in accordance with criteria set out in the ministerial guidelines; and</p> <p>(c) listing in that category is otherwise in accordance with the ministerial guidelines.</p>
Vulnerable (VU)	<p>An ecological community is eligible for listing in the category of vulnerable ecological community at a particular time if, at that time —</p> <p>(a) it is not a critically endangered ecological community or an endangered ecological community; and</p> <p>(b) it is facing a high risk of becoming eligible for listing as a collapsed ecological community in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines; and</p> <p>(c) listing in that category is otherwise in accordance with the ministerial guidelines.</p>
Collapsed	<p>An ecological community is eligible for listing as a collapsed ecological community at a particular time if, at that time —</p> <p>(a) there is no reasonable doubt that the last occurrence of the ecological community has collapsed; or</p> <p>(b) the ecological community has been so extensively modified throughout its range that no occurrence of it is likely to recover —</p> <p style="padding-left: 40px;">(i) its species composition or structure; or</p> <p style="padding-left: 40px;">(ii) its species composition and structure.</p>

Department of Biodiversity, Conservation and Attractions Priority Definitions

Category	Definition
Threatened Flora Species	
Priority 1 (P1)	<p>Poorly-known Species</p> <p>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.</p>
Priority 2 (P2)	<p>Poorly-known Species</p> <p>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.</p>
Priority 3 (P3)	<p>Poorly-known Species</p> <p>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.</p>
Priority 4 (P4)	<p>Rare, Near Threatened and other species in need of monitoring</p> <p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

Category	Definition
Priority Ecological Communities	
Priority 1 (P1)	<p>Poorly-known ecological communities</p> <p>Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤ 5 occurrences or a total area of ≤ 100ha). 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.</p>
Priority 2 (P2)	<p>Poorly-known Ecological Communities</p> <p>Communities that are known from few occurrences with a restricted distribution (generally ≤ 10 occurrences or a total area of ≤ 200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) 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.</p>
Priority 3 (P3)	<p>Poorly-known Ecological Communities</p> <p>(i) 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:</p> <p>(ii) 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 (within approximately 10 years), or;</p> <p>(iii) 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, inappropriate fire regimes, clearing, hydrological change etc.</p> <p>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.</p>

Category	Definition
<p>Priority 4 (P4)</p>	<p>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.</p> <p>(i) 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.</p> <p>(ii) 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 a higher threat category.</p> <p>(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.</p>
<p>Priority 5 (P5)</p>	<p>Conservation Dependent ecological communities.</p> <p>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.</p>

Appendix B: Conservation Significant Flora Likelihood of Occurrence

Taxon	DBCA Status	Habit and Habitat	Habitat within Study Area	Study Area Within Current Known Distribution	Distance to Nearest Record	Likelihood of Occurrence	Likelihood Post-Survey
<i>Ipomoea racemigera</i>	P2	Creeping annual, herb or climber. Fl. white.	Yes	Yes	Within	Confirmed	Confirmed
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	P3	Perennial, upright shrub, to 2 m high. Fl. red/pink/purple. Red/brown sandy clay loam. Drainage lines, floodplains, gullies.	Yes	Yes	Within	Confirmed	Confirmed
<i>Livistona alfredii</i>	P4	Tree-like monocot (palm), to 10 m high. Fl. cream, Jul to Sep. Edges of permanent pools.	Yes	Yes	Within	Confirmed	Confirmed
<i>Rhynchosia bungarensis</i>	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. Granite	Yes	Yes	Within	Confirmed	Confirmed
<i>Oxalis</i> sp. Pilbara (M.E. Trudgen 12725)	P2	Annual herb, 0.1-0.3 m high. Fl. Yellow. Brown sandy loam or clay. Gorge, ironstone outcrops, gully, shaded areas, creeklines.	Yes	Yes	Within	Confirmed	Confirmed
<i>Euphorbia australis</i> var. <i>glabra</i>	P3	Annual prostrate herb, leaves green with a red tinged margins. Drainage lines on clay loam and river sand	Yes	Yes	Within	Confirmed	Confirmed
<i>Gymnanthera cunninghamii</i>	P3	Erect shrub, 1-2 m high. Fl. cream-yellow-green, Jan to Dec. Sandy soils.	Yes	Yes	10.1 km N	Likely	Confirmed
<i>Helichrysum oligochaetum</i>	P1	Erect annual, herb, to ca 0.25 m high. Fl. yellow, Aug to Nov. Red clay. Alluvial plains.	Possible	Yes	13 km ENE	Possible	Possible
<i>Dicladantha glabra</i>	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.	Possible	Yes	3.6 km ENE	Possible	Possible
<i>Gompholobium karijini</i>	P2	Shrub, to 1 m high. Fl. yellow/green. Red/brown gravelly loam or clay. Undulating hills, hilltops, drainage lines.	Possible	Yes	12.2 km NNE	Possible	Possible
<i>Teucrium pilbaranum</i>	P2	Upright shrub, 0.2 m high. Fl. white, May or Sep. Clay. Crab hole plain in a river floodplain, margin of calcrete table	Possible	Adjacent	5.5 km NNE	Possible	Possible
<i>Iotasperma sessilifolium</i>	P3	Erect herb. Fl. pink. Cracking clay, black loam. Edges of waterholes, plains	Possible	Yes	7.1 km NNE	Possible	Possible
<i>Ptilotus subspinescens</i>	P3	Compact shrub, to 0.8 m high. Gentle rocky slopes, screes and the bases of screes.	Possible	Yes	0.1 km SSW	Possible	Possible

Taxon	DBCA Status	Habit and Habitat	Habitat within Study Area	Study Area Within Current Known Distribution	Distance to Nearest Record	Likelihood of Occurrence	Likelihood Post-Survey
<i>Rostellularia adscendens</i> var. <i>latifolia</i>	P3	Herb or shrub, 0.1-0.3 m high. Fl. blue-purple-violet, Apr to May. Ironstone soils. Near creeks, rocky hills.	Possible	Yes	9.9 km NNW	Possible	Possible
<i>Sida</i> sp. Hamersley Range (K. Newbey 10692)	P3	Low, spreading shrub, to 0.5 m high. Fl. yellow. Brown loamy soil. Base of breakaways, gullies, hill summits.	Possible	Yes	0.3 km NNE	Possible	Possible
<i>Terminalia supranitifolia</i>	P3	Spreading, tangled shrub or tree, 1.5-3 m high. Fl. green-yellow, May or Jul or Dec. Sand. Among basalt rocks.	Possible	Yes	0.8 km ESE	Possible	Possible
<i>Triodia basitricha</i>	P3	Hummock grass to 0.8 m high, non-resinous. Red/brown clay loam over ironstone. Floodplains, flat hill crest, lower slopes.	Possible	Yes	3.4 km NNE	Possible	Possible
<i>Acacia bromilowiana</i>	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.	No	Yes	3.3 km S	Possible	Possible
<i>Goodenia nuda</i>	P4	Erect to ascending herb, to 0.5 m high. Fl. yellow, Apr to Aug.	Possible	Yes	4.1 km ENE	Possible	Possible
<i>Hibiscus campanulatus</i>	P1	Erect bushy shrub, 1-3.5 m high. Fl. White/pale pink. Brown loamy to skeletal soils. Rocky gullies, ironstone range.	Possible	Yes	6 km NNE	Possible	Unlikely
<i>Triodia</i> sp. <i>Karijini</i> (S. van Leeuwen 4111)	P1	Hummock grass to 0.9 m high. Steep hillslopes, hillcrests, ironstone outcrops on grey-brown silty loam	Possible	Yes	1.4 km N	Possible	Unlikely
<i>Triodia</i> sp. Silvergrass (P.-L. de Kock BES 00808)	P1	Hummock grass to 0.6 m high, copiously resinous. Red/brown silty loam, shale. Slope of low shale hills, shale gullies, rocky shale ridge.	No	Yes	3.4 km SE	Possible	Unlikely
<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	P2	Prostrate annual herb, to 0.1 m high. Red brown clay loam. Flat plain, cracking clay floodplain, gentle slopes.	Possible	Yes	7.1 km SSE	Possible	Unlikely
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	P3	Compactly tufted perennial, grass-like or herb, 0.3-0.8 m high, lemma groove muricate. Hardpan plains.	Possible	Adjacent	6.6 km E	Possible	Unlikely

Taxon	DBCA Status	Habit and Habitat	Habitat within Study Area	Study Area Within Current Known Distribution	Distance to Nearest Record	Likelihood of Occurrence	Likelihood Post-Survey
<i>Cyanthillium gracile</i>	P3	Spreading or rounded shrub, to 0.5 m high. Fl. purple. Skeletal red soil, rocky ironstone outcropping. Steep slopes, mesas, gullies.	No	Yes	0.1 km E	Possible	Unlikely
<i>Dampiera anonyma</i>	P3	Multi-stemmed 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).	No	Adjacent	4.2 km S	Possible	Unlikely
<i>Eremophila magnifica</i> subsp. <i>velutina</i>	P3	Shrub, 0.5-1.5 m high. Fl. blue-purple, Aug to Sep. Skeletal soils over ironstone. Summits.	No	Yes	3.8 km NNE	Possible	Unlikely
<i>Glycine falcata</i>	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.	Possible	Yes	6.4 km S	Possible	Unlikely
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	P3	Tall spindly shrub, 1.5-4 m high. Fl. yellow. Red brown sandy loam or clay, ironstone plain. Undulating plains, floodplain.	Possible	Adjacent	6.7 km E	Possible	Unlikely
<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	P3	Spreading shrub, to 0.5 m high. Fl. yellow, Aug. Skeletal red soils pockets. Steep slope.	No	Yes	2.7 km S	Possible	Unlikely
<i>Themeda</i> 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.	Possible	Yes	5.8 km NNE	Possible	Unlikely
<i>Lepidium catapycnon</i>	P4	Open, woody perennial, herb or shrub, 0.2-0.3 m high, stems zigzag. Fl. white, Oct. Skeletal soils. Hillsides.	Possible	Adjacent	13.8 km SSE	Possible	Unlikely
<i>Ptilotus mollis</i>	P4	Compact, perennial shrub, to 0.5 m high, soft grey foliage. Fl. white/pink, May or Sep. Stony hills and screes.	Possible	Yes	5.3 km SSE	Possible	Unlikely
<i>Astrebla lappacea</i>	P3	Tufted perennial, grass-like or herb, 0.3-0.8 m high. Fl. green/purple, Jun to Jul. Clay, loam.	Possible	Yes	7.3 km NNE	Possible	Unlikely
<i>Euphorbia inappendiculata</i> var. <i>queenslandica</i>	P1	Spreading, procumbent herb, to 0.4 m high. Fl. pink, Aug. Clay soils. Among broken rocky screes	No	Adjacent	5.3 km N	Unlikely	Unlikely
<i>Hibiscus</i> sp. Mt Brockman (E. Thoma ET 1354)	P1	Spindly, erect shrub, to 3.5 m high. Fl. mauve. Steep, deeply incised drainage gullies, base of breakaways.	No	Adjacent	5.1 km N	Unlikely	Unlikely

Taxon	DBCA Status	Habit and Habitat	Habitat within Study Area	Study Area Within Current Known Distribution	Distance to Nearest Record	Likelihood of Occurrence	Likelihood Post-Survey
<i>Tetradlea butcheriana</i>	P1	Small sub-shrub, 0.2-0.6 m high. Fl. pink. Cliff faces and breakaways.	No	Adjacent	11.9 km SSE	Unlikely	Unlikely
<i>Vittadinia</i> sp. Coondewanna Flats (S. van Leeuwen 4684)	P1	Erect annual herb, 0.3-1 m high. Fl. cream. Red-brown sandy loam. Drainage areas, floodplains, flat and/or stony plains.	Possible	Adjacent	20.2 km ENE	Unlikely	Unlikely
<i>Paspalidium retiglume</i>	P2	Tufted annual, grass-like or herb, 0.1-0.5 m high. Fl. Apr. Clay.	No	No	28.4 km NW	Unlikely	Unlikely
<i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i>	P2	Upright, perennial shrub, to 1.3 m high. Fl. yellow. Red/brown clay loam. Undulating hills and crests, ridge summits, slopes of low hills.	No	Adjacent	16.5 km ESE	Unlikely	Unlikely
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3	Open, erect annual or biennial, herb, to 0.2 m high. Fl. yellow. Red-brown clay soil, calcrete pebbles. Low undulating plain, swampy plains.	Possible	Adjacent	25.8 km ENE	Unlikely	Unlikely
<i>Grevillea saxicola</i>	P3	Tree or shrub, to 8 m high, rough bark on trunks and stems; leaves terete, pinnately lobed and grey coloured. Fl. creamy white. Skeletal red brown sandy loam with ironstone pebble cover. Rocky gully, drainage lines, steep cliff, low rocky hills.	Yes	No	32 km S	Unlikely	Unlikely
<i>Oldenlandia</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)	P3	Spreading annual, herb, 0.05-0.1 m high. Fl. blue, Mar. Cracking clay, basalt. Gently undulating plain with large surface rocks, flat crab holed plain	No	Yes	25.4 km NNW	Unlikely	Unlikely
<i>Solanum kentrocaule</i>	P3	Spiny, erect perennial shrub, to 0.7 m high. Fl. purple. Steep rocky gullies, gorges, outcrops, cliffs.	No	Yes	5.6 km N	Unlikely	Unlikely
<i>Swainsona thompsoniana</i>	P3	Prostrate annual herb, to 0.2m high, Fl. blue. higher altitude floodplains, top of hilltops and cracking clays on red-brown clay	No	Yes	5.7 km N	Unlikely	Unlikely
<i>Triodia pisoliticola</i>	P3	Hummock grass to 1 m high, non-resinous. Red sandy clay loam over ironstone. Flat hill crest, rocky creek lines, hillsides.	No	Yes	11.4 km S	Unlikely	Unlikely
<i>Eremophila magnifica</i> subsp. <i>magnifica</i>	P4	Shrub, 0.5-1.5 m high. Fl. blue, Aug to Nov. Skeletal soils over ironstone. Rocky screes.	No	Yes	13.4 km SW	Unlikely	Unlikely

Taxon	DBCA Status	Habit and Habitat	Habitat within Study Area	Study Area Within Current Known Distribution	Distance to Nearest Record	Likelihood of Occurrence	Likelihood Post-Survey
<i>Ptilotus trichocephalus</i>	P4	Prostrate, spreading perennial, herb. Fl. white, Sep. Sandy soils. Colluvial plains.	No	No	38.6 km S	Unlikely	Unlikely
<i>Goodenia pedicellata</i>	P1	Single-stemmed perennial, herb (with dense, cottony and strigose hairs), to 0.25 m high. Rocky clayey soils. Rocky slopes and crests of small hills.	Possible	Adjacent	25.4 km S	Unlikely	Unlikely

Appendix C: Quadrat and Relevé Data

Brockman Syncline Riparian Site DUCR-01

Date 1/11/2019 15/06/2020
Described by CvdB EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 456194 mE; 7510248 mN
 116.5740 E -22.513710 S
Veg Condition Poor
Soil Silty Clay Loam
Rock Type none
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid woodland over **Cenchrus ciliaris* open tussock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	0.1	4	0.1	4		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>	15	0.2	50	0.1		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.2		
<i>Cucumis variabilis</i>			0.1	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.7		
<i>Duperreya commixta</i>			0.1	0.1		
* <i>Echinochloa colona</i>			0.1	0.1	DUCR01-02	Echinochloa branched
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	50	20	50	20		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>			0.1	0.5		
<i>Gossypium robinsonii</i>			0.1	1		
* <i>Heliotropium europaeum</i>			0.1	0.2	DUCR01-01	Heliotropium Boerhavia leaf
Indeterminant sp.			0.1	0.2	DUCR01-04	Heart leaf
<i>Ipomoea muelleri</i>			0.1	0.3		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.5	0.1	0.5		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Phyllanthus erwinii</i>			0.1	0.1		
<i>Pluchea dentex</i>			0.1	0.1		
<i>Psydrax suaveolens</i>			0.1	0.4	DUCR01-03	
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Solanum diversiflorum</i>			0.1	1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Sporobolus australasicus</i>			0.1	0.1		
* <i>Vachellia farnesiana</i>	0.1	1.3	0.1	1.3		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-02

Date 1/11/2019 15/06/2020
Described by CvdB KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 458648 mE; 7509668 mN
 116.5979 E -22.519013 S
Veg Condition Good
Soil Clayey Sand
Rock Type alluvial stone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis* tall sparse shrubland over *Triodia wiseana* mid scattered hummock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)			0.1	0.2		
<i>Acacia citrinoviridis</i>	9	6.5	9	6.5		
* <i>Aerva javanica</i>	0.1	0.4	2	0.6		
<i>Amyema hilliana</i>			0.1			
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1		0.1			
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3	0.1	0.1		
<i>Boerhavia coccinea</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>	1	0.2	1	0.4		
* <i>Cenchrus setiger</i>	0.1	0.2	0.1	0.4		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>			1	2		
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	0.1	0.4	0.1	0.4		
<i>Eremophila cuneifolia</i>	0.1	0.7	0.1	0.7		
<i>Eriachne mucronata</i>			0.1	0.3		
<i>Eriachne pulchella</i>	0.1	0.2	0.1	0.1		
<i>Gossypium australe</i>			0.1	0.2		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	2		
<i>Senna notabilis</i>			0.1	0.1		
<i>Triodia angusta</i>			0.1	0.5		
<i>Triodia wiseana</i>	1	0.7	1	1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-03

Date 1/11/2019 15/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 459910 mE; 7508952 mN
 116.6101 E -22.525511 S
Veg Condition Good
Soil Silty Loam
Rock Type riverstone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation Isolated *Eucalyptus victrix* over tall sparse *Acacia citrinoviridis* shrubland over open tussock grassland of *Triodia wiseana* and **Cenchrus ciliaris*.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	10	9	10	9		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	1.5				
<i>Acacia synchronicia</i>	2	3	2			
<i>Acacia xiphophylla</i>	0.2	2				
<i>Amyema hilliana</i>	0.1					
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Bonamia pilbarensis</i>			0.1	0.1	DUCR03-01	Sprawling alternate
<i>*Cenchrus ciliaris</i>	10	0.2	4	0.2		
<i>Arivela viscosa</i>			0.1	0.3		
<i>Corchorus crozophorifolius</i>	0.1	1	0.1	1		
<i>Corchorus tridens</i>			0.1	0.1	DUCR03-04	Pod stem sprawler
<i>*Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.3		
<i>Eragrostis dielsii</i>			0.1	0.3	DUCR03-02	Claw grass
<i>Eremophila cuneifolia</i>	0.1	0.4	0.1	0.4		
<i>Eucalyptus victrix</i>	1	10	1	10		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
<i>Fimbristylis dichotoma</i>			0.1	0.1		
<i>Goodenia forrestii</i>			0.1	0.1		
<i>Goodenia</i> sp. Indet			0.1	0.1	DUCR03-05	<i>Goodenia</i> sp.
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.2	1.5	0.2	1.5		
<i>*Heliotropium europaeum</i>			0.1	0.3		Heliotropium Boerhavia leaf
<i>Indigofera colutea</i>			0.1	0.1		Indigofera sticky pinnate
<i>Ipomoea muelleri</i>			0.1	0.1		
Malvaceae sp. Indet			0.1	0.1	DUCR03-06	
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Portulaca oleracea</i>			0.1	0.1		
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	0.2		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>Solanum lasiophyllum</i>	0.1	0.7	0.1	0.7		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Tribulus hirsutus</i>			0.1	0.2		
<i>Triodia wiseana</i>	10	0.8				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-04

Date 1/11/2019 15/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 462364 mE; 7510273 mN
 116.6340 E -22.513639 S
Veg Condition Good
Soil Loam
Rock Type riverstone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus victrix* sparse woodland over *Acacia citrinoviridis* shrubland over *Triodia wiseana* sparse hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon lepidum</i>			0.1	0.5		Abutilon yellow flower
<i>Acacia citrinoviridis</i>	25	5	25	5		
<i>Acacia synchronicia</i>			0.1	1.2		
* <i>Aerva javanica</i>	0.2	0.5				
<i>Boerhavia coccinea</i>			0.1	0.2		
* <i>Cenchrus ciliaris</i>	0.1	0.1	0.1	0.4		
<i>Arivela viscosa</i>			0.1	0.1		
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	0.1	2	0.1	2	DUCR04-01	
<i>Corchorus crozophorifolius</i>	2	1.2				
<i>Cucumis variabilis</i>			0.1	0.3		
<i>Eriachne mucronata</i>			0.1	0.1		
<i>Eriachne pulchella</i>	0.1	0.1	0.1	0.1		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	5	10	5	10		Subsp. obtusa
<i>Eucalyptus victrix</i>	1	10	1	10		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>			0.1	0.1		
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Solanum lasiophyllum</i>			0.1	0.1		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Triodia wiseana</i>	1	0.5	1	0.5		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-05

Date 31/10/2019 15/06/2020
Described by KJ & SC KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 463256 mE; 7511242 mN
 116.6427 E -22.504901 S
Veg Condition Poor
Soil Sand
Rock Type river
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis* low open woodland over *Corchorus lasiocarpus* subsp. *parvus* mid scattered shrubs over scattered *Triodia wiseana* hummock grasses and scattered **Cenchrus ciliaris* tussock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	15	8	15	8		
<i>Acacia synchronicia</i>	0.1	1.8	0.1	1.8		
* <i>Aerva javanica</i>	1	0.5	1	1		
<i>Amyema hilliana</i>	0.1	0	0.1	0		
<i>Boerhavia coccinea</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>	5	0.2	5	0.5		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>	5	1.7	5	1.7		
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>			0.1	0.2		
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Duperreya commixta</i>	0.1	0	0.1	0		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Goodenia forrestii</i>			0.1	0.1		Goodenia hairy wide
<i>Heliotropium crispatum</i>	0.1	0.1	0.1	0.2		
<i>Heliotropium tenuifolium</i>			0.1	0.1	DUCR05-01	Helio inexplicitum
<i>Indigofera colutea</i>			0.1	0.1		
<i>Ipomoea muelleri</i>			0.1	0.1		?Ipomoea muel
<i>Ixiochlamys cuneifolia</i>	0.1	0.1				
<i>Jasminum didymum</i> subsp. <i>lineare</i>			0.1	0.2		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Ptilotus exaltatus</i>			0.1	0.1		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	1		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.2		
<i>Triodia wiseana</i>	10	0.7	10	0.7		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-06

Date 31/10/2019 15/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 463796 mE; 7513388 mN
 116.6480 E -22.485525 S
Veg Condition Poor
Soil Sandy Clay Loam
Rock Type river
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Acacia citrinoviridis* tall open shrubland over *Melaleuca linophylla* sparse shrubs over **Cenchrus ciliaris* open tussock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	20	8	20	8		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	5	0.1	5		
* <i>Aerva javanica</i>	0.1	0.4	0.2	0.4		
<i>Amyema hilliana</i>	0.1	0	0.1	0.1		A. fitzgeraldii
<i>Boerhavia coccinea</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>	5	0.5	5	0.8		
<i>Arivela viscosa</i>			0.1			
<i>Corchorus crozophorifolius</i>	1	1	1	1		Was lasiocarpus
<i>Cucumis variabilis</i>			0.1	0.1		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1			
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	10	12	10	12		Euc camal subsp. obtusa
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Goodenia forrestii</i>	0.1	0.1	0.1	0.1	DUCR06-01	
<i>Gossypium robinsonii</i>	0.1	2	0.1	2		
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Ipomoea muelleri</i>			0.1	0.1		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0	0.1	0.1		
<i>Melaleuca linophylla</i>	2	2	2	2		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Portulaca oleracea</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Solanum diversiflorum</i>	0.1	0.2				
<i>Triodia wiseana</i>	1	0.5	1	0.5		
<i>Triumfetta maconochieana</i>	0.1	0.1				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-07

Date 31/10/2019 15/06/2020
Described by KJ & SC KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 462382 mE; 7515842 mN
 116.6343 E -22.463325 S
Veg Condition Good
Soil Silty Clay Loam
Rock Type river
Fire Age >10 yrs
Habitat Medium Drainage Line

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid woodland over *Melaleuca argentea* scattered low trees over *Acacia coriacea* subsp. *pendens* and *Melaleuca linophylla* tall scattered shrubland over scattered hummocks, tussocks, and sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	1	4	1	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	5	4	5	4		
* <i>Aerva javanica</i>	0.1	0.2	0.1	0.1		
<i>Alternanthera nana</i>	0.1	0.1	0.1	0.1		
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Ammannia baccifera</i>			0.1	0.2		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1	0	0.1			
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.2	0.1	0.1		
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.3		
* <i>Cenchrus ciliaris</i>	1	0.3	1	0.3		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.4		
<i>Corchorus crozophorifolius</i>			0.5	1.2		
<i>Corchorus</i> sp. Indet			0.1	0.3	DUCR07-01	<i>Corchorus</i> <i>sidoides</i>
<i>Cucumis variabilis</i>			0.1			
<i>Cyperus difformis</i>			0.1	0.1		<i>Cyperus</i> <i>cunninghamii</i>
<i>Cyperus vaginatus</i>	0.5	0.5	0.5	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.1		
<i>Duperreya commixta</i>	0.1	0				
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.1		
<i>Eragrostis tenellula</i>			0.1	0.2		
<i>Eriachne benthamii</i>	1	0.3				
<i>Eriachne mucronata</i>			0.5	0.5		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	20	15	20	15		
<i>Eucalyptus victrix</i>			2			

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.3		
* <i>Flaveria trinervia</i>			1	0.3		
<i>Gossypium australe</i>			0.1	0.4		
<i>Gossypium robinsonii</i>	0.5	2	0.5	2		
<i>Heliotropium ovalifolium</i>			0.1	0.2		
<i>Hybanthus aurantiacus</i>			0.1	0.2		
<i>Indigofera colutea</i>			0.1	0.1		
<i>Ipomoea muelleri</i>			0.1			?Ipomoea muel
<i>Ixiochlamys cuneifolia</i>	0.1	0.1				
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0	0.1	2		
<i>Melaleuca argentea</i>	5	10	5	10		
<i>Melaleuca glomerata</i>	1	2	1	2		
<i>Melaleuca linophylla</i>	10	4	10	4		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.1		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>	0.1	0.1	0.1	0.1		
<i>Pluchea dentex</i>			0.1	0.3		
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Portulaca oleracea</i>			0.1	0.1		
<i>Pterocaulon sphacelatum</i>	0.1	0.2	0.1	0.2		
<i>Ptilotus auriculifolius</i>			0.1	0.4		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.4		
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	1.5	0.1	1.5		
<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>			0.1	0.1		
<i>Triodia epactia</i>	0.1	0.3				
<i>Triodia wiseana</i>	1	0.3	1	0.3		
<i>Triumfetta maconochieana</i>	0.1	0.3	0.1	0.4	DUCR07-01	
* <i>Vachellia farnesiana</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-08

Date 31/10/2019 15/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 462111 mE; 7517377 mN
 116.6317 E -22.449457 S
Veg Condition Good
Soil Sand
Rock Type river
Fire Age >10 yrs
Habitat Medium Drainage Line

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca argentea* low woodland over *Melaleuca linophylla*, *Acacia coriacea* subsp. *pendens* and *Acacia ampliceps* over *Cyperus vaginatus* sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	1.5	10	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	5	1	5		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1				
<i>Alternanthera nana</i>			0.1	0.1		
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.1		
<i>Ammannia baccifera</i>			0.1	0.1		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1	0				
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	1	0.3	0.1	0.1		
<i>Boerhavia schomburgkiana</i>	0.1	0.1			DUCR08-02	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.1		
<i>Corchorus crozophorifolius</i>	0.1	0.4				
<i>Cyperus difformis</i>			0.1	0.5		Cyper triangle
<i>Cyperus vaginatus</i>	5	0.7	0.7	3		
<i>Dysphania plantaginella</i>			0.1	0.1		Dysphania long
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Eragrostis cumingii</i>			0.1	0.1		Open wet Eragrostis
<i>Eragrostis tenellula</i>			0.1	0.1		
<i>Eriachne flaccida</i>			0.1	0.4		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	5	16	5	16		Euc camal subsp. obtusa
<i>Eulalia aurea</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Gossypium robinsonii</i>	1	2	1	2		
<i>Heliotropium ovalifolium</i>	0.1	0.1	0.1	0.2	DUCR08-01	Heliotropium chrysocarpum
<i>Ipomoea muelleri</i>			0.1	0.1		
<i>Lobelia arnhemiaca</i>	0.1	0.1			DUCR08-01	

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Melaleuca argentea</i>	50	10	50	10		
<i>Melaleuca linophylla</i>	8	3	8	3		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.3		Nicotiana sticky flesh
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>	0.1	0.1	0.1	0.1		
<i>Pluchea dentex</i>	0.1	0.3	0.1	0.1		
<i>Pterocaulon sphacelatum</i>	0.1	0.2	0.1	0.2		
<i>Schoenoplectus subulatus</i>			0.1	1		
<i>Sesbania formosa</i>	1	6	1	6		
<i>Stemodia grossa</i>	0.1	0.1	0.1	0.1		
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Typha domingensis</i>			0.1	0.1		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>	0.1	0	0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-09

Date 31/10/2019 15/06/2020
Described by CvdB EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 460255 mE; 7519174 mN
 116.6137 E -22.433179 S
Veg Condition Very Good
Soil Sand
Rock Type riverstones
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus victrix* low open woodland over *Melaleuca glomerata* and *Acacia citrinoviridis* tall scattered shrubs over *Corchorus crozophorifolius* mid to low sparse shrubland over *Cyperus vaginatus* low scattered sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)	0.1	1.2	0.1	1.2	DUCR09-02	
<i>Acacia bivenosa</i>	0.1	1.4				
<i>Acacia citrinoviridis</i>	0.1	4	0.1	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>			0.1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.5	0.1	1.5		
<i>Amyema hilliana</i>	0.1		0.1			Amyema fitz
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	0.1	0.3	0.1	0.3		
* <i>Cenchrus ciliaris</i>			0.1	0.5		
<i>Arivela viscosa</i>			0.1	0.1		
<i>Corchorus crozophorifolius</i>	2	1.2	2	1.2		Changed from lasiocarpus
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Cymbopogon</i> sp. Indet	0.1	0.4	0.1	0.4		Cymbopogon sp.
<i>Cyperus vaginatus</i>	1	0.4	0.1	0.4		
<i>Dodonaea lanceolata</i>	0.1	1.5				
<i>Duperreya commixta</i>			0.1	0.1		
<i>Eriachne mucronata</i>	0.1	0.2	0.1	0.1		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	1	9	1	9		
<i>Eucalyptus victrix</i>	20	9	20	9		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		Euphorbia golden
<i>Euphorbia careyi</i>	0.1	0.1			DUCR09-01	
<i>Gossypium australe</i>			0.1	1.5		
<i>Gossypium robinsonii</i>	0.1	2	0.1	2		
<i>Hibiscus</i> sp. Indet	0.1	0.3	0.1	0.1		Hibiscus sp.
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	0.2	0.1	0.2		Changed from monophylla
<i>Ipomoea muelleri</i>			0.1	0.1		
* <i>Malvastrum americanum</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Melaleuca glomerata</i>	0.1	3	0.1	3		
<i>Melaleuca linophylla</i>	0.1	1.5				
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	0.2		
<i>Rhynchosia bungarensis</i>	0.1	0.2				
<i>Rhynchosia minima</i>			0.1	0.1		
* <i>Setaria verticillata</i>			0.1	0.1		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	0.6	0.1	0.1		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.1		
<i>Triodia wiseana</i>	0.1	0.4	0.1	0.4		
* <i>Vachellia farnesiana</i>	0.1	1				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-10

Date 31/10/2019 15/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 461201 mE; 7521217 mN
 116.6230 E -22.414743 S
Veg Condition Very Good
Soil Sand
Rock Type river rocks
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus victrix* low scattered trees over *Acacia coriacea* subsp. *pendens*, *Acacia citrinoviridis* and *Grevillea pyramidalis* scattered tall shrubs of over scattered hummock and tussock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	2	3.5	2	3.5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2	4	2	4		
* <i>Aerva javanica</i>	0.1	0.1	0.1	0.7		
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.4		
* <i>Cenchrus ciliaris</i>	0.1	0.1				
<i>Arivela viscosa</i>			0.1	0.5		
<i>Corchorus crozophorifolius</i>	0.1	0.8	0.1	0.8		Was lasiocarpus
<i>Corchorus sidoides</i>	0.1	0.4				
<i>Eriachne mucronata</i>	1	0.2	3		DUCR27-01	Rocky
<i>Eriachne pulchella</i>	0.1	0.1				
<i>Eucalyptus victrix</i>	2	7	2	7		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	0.1	0.1	0.1		
<i>Euphorbia coghlanii</i>	0.1	0.2				
<i>Goodenia microptera</i>			0.1	0.3		Goodenia hairy linear
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	1	3.5	1	3.5		
<i>Hybanthus aurantiacus</i>	0.1	0.1	0.1	0.1		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)	0.1	0.1				
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Polycarpaea longiflora</i>	0.1	0.1	0.1	0.1		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.1	0.1	0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Tribulus ? hirsutus</i>			0.1	0.2		Tribulus hirsutus
<i>Triodia wiseana</i>	2	0.5				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-11

Date 31/10/2019 15/06/2020
Described by CvdB KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 463325 mE; 7522398 mN
 116.6436 E -22.404121 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Basalt, Ironstone
Fire Age >10 yrs
Habitat Major Drainage Line

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid to low scattered trees over *Melaleuca linophylla*, *Acacia coriacea* subsp. *pendens* and *Gossypium robinsonii* tall open shrubland over **Cenchrus ciliaris* low scattered tussock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon amplum</i>			0.1	1	DUCR11-01	Abutilon macrum
<i>Abutilon</i> sp. Indet	0.1	0.9				
<i>Acacia ampliceps</i>	0.1	3	1	1.2		
<i>Acacia arida</i>	0.1	1.5			DUCR11-04	
<i>Acacia bivenosa</i>	0.1	2	0.1	2		
<i>Acacia citrinoviridis</i>	0.1	0.6	0.1	1		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	5	1	5		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2	0.1	2		
* <i>Aerva javanica</i>			0.1	0.4		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Alternanthera nodiflora</i>			0.1	0.2		
<i>Amaranthus undulatus</i>	0.1	0.2	0.1	0.4		Amaranthus sp.
<i>Ammannia baccifera</i>			0.1	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3	0.1	0.1		
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	0.1	0.5	0.1	0.3		
* <i>Cenchrus ciliaris</i>	1	0.3	1	0.3		
* <i>Cenchrus setiger</i>	0.1	0.3				
<i>Arivela viscosa</i>			0.1	0.4		
<i>Corchorus crozophorifolius</i>			0.1	0.4		
<i>Corchorus</i> sp. Indet	0.1	0.5	0.1	0.1		Corchorus sp.
<i>Cucumis variabilis</i>	0.1		0.1			
<i>Cyperus difformis</i>			0.1	0.2		<i>Cyperus cunninghamii</i>
<i>Cyperus vaginatus</i>	0.1	0.3	0.1	0.3		
<i>Duperreya commixta</i>	0.1		0.1			
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.1		
<i>Enneapogon lindleyanus</i>	0.1	0.3				
<i>Enteropogon ramosus</i>			0.1	0.7		<i>Dichanthium sericeum</i>

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Eragrostis elongata</i>			0.1	0.3		
<i>Eragrostis</i> sp. Indet			0.1	0.6		Eriachne festucacea
<i>Eragrostis tenellula</i>	0.1	0.2	0.1	0.2		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	2	12	2	12		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>	0.1	0.4	0.1	0.4		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.1	0.1	0.1	0.1	DUCR11-02	
* <i>Flaveria trinervia</i>			0.1	0.3		
<i>Glinus lotoides</i>	0.1	0.1			DUCR20-02	
<i>Gossypium australe</i>	0.1	0.3	0.1	0.7		
<i>Gossypium robinsonii</i>	0.1	2.5	0.1	2.5		
<i>Heliotropium tenuifolium</i>			0.1	0.3		
<i>Hybanthus aurantiacus</i>	0.1	0.2	0.1	0.2		
<i>Indigofera monophylla</i>			0.1	0.1		
<i>Ipomoea muelleri</i>	0.1		0.1	0.1	DUCR18-01	Operculina
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	1	0.1	1		
<i>Melaleuca glomerata</i>	0.1	3	0.1	3		
<i>Melaleuca linophylla</i>	25	3.5	25	3.5		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus baccatus</i>	0.1	2	0.1	2	DUCR11-03	Senna like
<i>Phyllanthus maderaspatensis</i>	0.1	0.2	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.3	DUCR53-03	Pluchea long dentex
<i>Polycarpaea longiflora</i>	0.1	0.2				
<i>Polymeria ambigua</i>	0.1	0.2	0.1	0.1	DUCR11-01	Nicotiana sp.
<i>Pterocaulon sphacelatum</i>	0.1	0.2	0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.2		
<i>Ptilotus exaltatus</i>			0.1	0.1		
<i>Rhynchosia minima</i>	0.1	0.1	0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>	0.1	0.2	0.1	1		
<i>Solanum diversiflorum</i>			0.1	0.3		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)	0.1	0.3	0.1	0.3		
<i>Triodia wiseana</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-12

Date 30/10/2019 16/06/2020
Described by KJ & SC KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 464577 mE; 7523110 mN
 116.6558 E -22.397713 S
Veg Condition Very Good
Soil Sandy Loam
Rock Type river
Fire Age >10 yrs
Habitat Medium Drainage Line
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca linophylla* tall shrubland over mixed sedges, grasses, and herbs.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	1	3	0.1	1		
<i>Acacia citrinoviridis</i>	1	3	1	3		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	4	1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	1	2	1	2		
<i>Acacia trachycarpa</i>	0.1	1	0.1	1		
* <i>Aerva javanica</i>	0.1	0.4	0.1	0.1		
<i>Alternanthera nana</i>			0.1	0.2		
<i>Amaranthus undulatus</i>			0.1	0.3		
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.1		
* <i>Cenchrus ciliaris</i>	1	0.3	1	0.3		
* <i>Cenchrus setiger</i>			0.1	0.2		
<i>Arivela viscosa</i>	0.1	0.1	0.1	0.4		
<i>Corchorus crozophorifolius</i>	0.1	0.5	0.1	0.3		
<i>Corchorus sidoides</i>	0.1	1	0.1	1		
<i>Cucumis variabilis</i>	0.1	0	0.1	0		
<i>Cymbopogon ambiguus</i>	0.1	0.5	0.1	0.5		
* <i>Cynodon dactylon</i>	0.1	0.1				
<i>Cyperus vaginatus</i>	1	0.6	1	0.6		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.2		
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.2		
<i>Enneapogon lindleyanus</i>			0.1	0.1		
<i>Eriachne mucronata</i>			1	0.4		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	5	12	5	12		
<i>Euphorbia biconvexa</i>	0.1	0.1	0.1	0.1		
* <i>Flaveria trinervia</i>	0.1	0.3	0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	2	0.1	2		
<i>Hybanthus aurantiacus</i>	0.1	0.1	0.1	0.2		
<i>Ipomoea ? costata</i>	0.1	0	0.1	0		Ipomoea heart
<i>Melaleuca argentea</i>	0.1		0.1			

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Melaleuca linophylla</i>	30	3	30	3		
<i>Oldenlandia crouchiana</i>			0.1	0.2		Oldenlandia lanky
<i>Phyllanthus maderaspatensis</i>	0.1	0.2	0.1	0.3		
<i>Pluchea dentex</i>			0.1	0.4		
<i>Polycarpaea longiflora</i>	0.1	0.1	0.1	0.1		
<i>Polymeria ambigua</i>	0.1	0.1	0.1	0.1		
<i>Pterocaulon sphacelatum</i>	0.1	0.4				
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	0.2		
<i>Rhynchosia minima</i>	0.1	0.1	0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.6		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>	0.1	0.4	0.1	0.2		
<i>Stylobasium spathulatum</i>	0.2	1	0.1	0.3		
<i>Triodia epactia</i>	0.1	0.3				
<i>Triodia wiseana</i>	0.1	0.3	0.1	0.3		
<i>Waltheria indica</i>	0.1	0.2				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-13

Date 30/10/2019 16/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 465548 mE; 7523569 mN
 116.6653 E -22.393588 S
Veg Condition Very Good
Soil Sand
Rock Type river
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* tall shrubland over *Triodia wiseana* and *Triodia epactia* open hummock grassland over *Eriachne mucronata* sparse tussock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.1	2.5	0.1	2.5		
<i>Acacia citrinoviridis</i>	25	4	18	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>			0.1	2		
<i>Acacia inaequilatera</i>	0.5	4	0.5	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2	0.1			
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Bonamia erecta</i>			0.1	0.2		
* <i>Cenchrus ciliaris</i>	0.1	0.3	0.1	0.3		
<i>Arivela viscosa</i>	0.1	0.2	0.1	0.4		
<i>Corchorus crozophorifolius</i>	1	1	1	1		Was lasiocarpus
<i>Corchorus sidoides</i>	0.1	0.5				
<i>Cymbopogon ambiguus</i>	0.1	0.5				
* <i>Echinochloa colona</i>			0.1	0.1		Echino branched
<i>Eriachne mucronata</i>	5	0.3	5	0.3		
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	1	3	0.1	3		
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	1	0.1	0.5		Indigo mono big
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.5	0.1	0.5		
<i>Lysiana casuarinae</i>	0.1	0				
<i>Petalostylis labicheoides</i>	1	4	1	0.5		
<i>Phyllanthus maderaspatensis</i>			0.1	0.3		
<i>Polymeria ambigua</i>			0.1	0.1	DUCR13-01	Boerhavia schom
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Rhynchosia bungarensis</i>	0.1	0.1	0.1	0.2		
<i>Senna artemisioides</i> subsp. <i>helmsii</i>			0.1	0.9		
<i>Stylobasium spathulatum</i>	0.5	2.5				
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Triodia epactia</i>	5	0.5	2	0.5		
<i>Triodia wiseana</i>	10	0.5	9	0.6		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-14

Date 30/10/2019 16/06/2020
Described by CvdB EEB, JE, KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 466984 mE; 7525380 mN
 116.6792 E -22.377257 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type riverstone
Fire Age >10 yrs
Habitat Major Drainage Line

Vegetation *Eucalyptus camaldulensis* and *Melaleuca argentea* mid to low open woodland over *Melaleuca linophylla*, *Acacia coriacea* subsp. *pendens* and *Acacia ampliceps* tall open shrubland over *Cyperus vaginatus* mid scattered sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon amplum</i>			0.1	0.4		Abutilon macrum
<i>Acacia ampliceps</i>	0.1	3	1	0.1		
<i>Acacia bivenosa</i>	0.1	2.5				
<i>Acacia citrinoviridis</i>	0.1	3.5	0.1	3.5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	4	1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.8	0.1	1.8		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Alysicarpus muelleri</i>			0.1	0.2		? Alysicarpus muel
<i>Amaranthus undulatus</i>	0.1	0.2	0.1	0.2		Amaranthus sp.
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3	0.1	0.2		
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.1		
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	0.1	0.2	0.1	0.2		
* <i>Cenchrus ciliaris</i>	0.1	0.3	0.1	0.3		
<i>Arivela viscosa</i>	0.1	0.3	0.1	0.3		
<i>Corchorus crozophorifolius</i>	0.1	0.8	0.1	0.8		
<i>Corchorus</i> sp. Indet			0.1	0.3		<i>Corchorus sidoides</i>
<i>Corchorus tridens</i>			0.1	0.2		
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.2		
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Cyperus vaginatus</i>	0.1	0.5	0.1	0.7		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	1		
<i>Duperreya commixta</i>			0.1	0.1		
<i>Dysphania melanocarpa</i>			0.1	0.1		Alternate prostrate
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.2		
<i>Enneapogon lindleyanus</i>			0.1	0.2		
<i>Eragrostis tenellula</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	7	13	7	13		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	0.1	0.1	0.1	DUCR62-02	Euphorbia hairy
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.4		
<i>Glycine canescens</i>			0.1	0.1		
<i>Gossypium australe</i>			0.1	0.2		
<i>Gossypium robinsonii</i>	0.1	2	0.1	2		
<i>Gossypium sturtianum</i>	0.1	0.3	0.1	0.3		
<i>Gossypium sturtianum</i> var. <i>sturtianum</i>			0.1	0.2		
<i>Heliotropium crispatum</i>			0.1	0.2		
<i>Heliotropium ovalifolium</i>			0.1	0.1		Helio europaeum
<i>Hybanthus aurantiacus</i>	0.1	0.1				
<i>Indigofera colutea</i>			0.1	0.1		
<i>Ipomoea muelleri</i>			0.1	0.1		
<i>Ipomoea racemigera</i>			0.1	0.1		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	2.2	0.1	2.2		
* <i>Malvastrum americanum</i>			0.1	0.2		
<i>Melaleuca argentea</i>	5	10	5	10		
<i>Melaleuca glomerata</i>	0.1	3.2	0.1	3.2		
<i>Melaleuca linophylla</i>	18	4	18	4		
<i>Nicotiana benthamiana</i>			0.1	0.1		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Petalostylis labicheoides</i>	0.1	2.4				
<i>Phyllanthus maderaspatensis</i>	0.1	0.3	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	Pluchea dentex long
<i>Polycarpaea longiflora</i>			0.1	0.2		
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Pterocaulon sphacelatum</i>			0.1	0.2		
<i>Rhynchosia minima</i>	0.1		0.1	0.3		Rhynchosia aus
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Salsola australis</i>			0.1	0.2		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.5		
* <i>Setaria verticillata</i>			0.1	0.3		
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			0.1	0.2		Sida rohlenae
<i>Solanum diversiflorum</i>			0.1	0.2		
* <i>Sonchus oleraceus</i>	0.1	0.3				
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	2.5	0.1	2.5		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)	0.1	0.3	0.1	0.1		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.2		
<i>Tribulus hirsutus</i>			0.1	0.2		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.2		
<i>Triodia wiseana</i>	0.1	0.5				
* <i>Vachellia farnesiana</i>	0.1	0.6	0.1	3		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-15

Date 30/10/2019 14/06/2020
Described by CvdB KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 468122 mE; 7525388 mN
 116.6903 E -22.377200 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Basalt, Shale, Slate
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid scattered trees over *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* tall sparse shrubland over *Triodia wiseana* mid sparse hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	8	4	8	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	3	0.1	3		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.5	0.1	1.5		
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1		0.1			
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Arivela viscosa</i>	0.1	0.2	0.1	0.4		
<i>Corchorus crozophorifolius</i>	0.1	0.6	1	1		
<i>Cyperus vaginatus</i>	0.1	0.4	0.1	0.6		
<i>Duperreya commixta</i>	0.1		0.1			
<i>Eriachne mucronata</i>	0.1	0.3	5	0.4		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	1	12	1	12		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	0.1	0.1	0.1	DUCR62-02	Euphorbia hairy
<i>Gossypium australe</i>	0.1	0.6	0.1	1		
<i>Gossypium robinsonii</i>	0.1	1.5	0.1	1.6		
<i>Grevillea wickhamii</i>	0.1	4.5	0.1	4.5	DUCR15-01	
<i>Indigofera monophylla</i>			0.1	0.2		
<i>Ipomoea muelleri</i>	0.1		0.1		DUCR18-01	Operculina
<i>Lysiana casuarinae</i>	0.1		0.1			Lysiana
<i>Petalostylis labicheoides</i>	0.1	3	0.1	3		
<i>Polycarpaea longiflora</i>	0.1	0.2				
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.2		
<i>Stylobasium spathulatum</i>	0.1	0.7	0.1	0.7		
<i>Themeda triandra</i>			0.1	0.3		
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Triodia angusta</i>	0.1	0.4	0.1	0.4	DUCR44-01	
<i>Triodia epactia</i>	0.1	0.4	0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Triodia wiseana</i>	3	0.6	1	0.4		
<i>Triumfetta clementii</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-16

Date 29/10/2019 14/06/2020
Described by KJ & SC CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 469731 mE; 7526059 mN
 116.7059 E -22.371173 S
Veg Condition Very Good
Soil Sandy Loam
Rock Type Basalt
Fire Age >10 yrs
Habitat Medium Drainage Line
Vegetation *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* mid to low woodland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	2	0.5	1		
<i>Acacia citrinoviridis</i>	0.1	2.5				
<i>Acacia coriacea</i> subsp. <i>pendens</i>	5	6	5	6		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Ammannia baccifera</i>			0.1	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.1				
<i>Bothriochloa ewartiana</i>			0.1	0.5		Chloris purple tree
* <i>Cenchrus ciliaris</i>			0.1	0.3		
* <i>Cenchrus setiger</i>			0.1			
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>	0.1	0.1	0.1	0.1		
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.1		
<i>Cucumis variabilis</i>	0.1	0	0.1	0.1		
* <i>Cynodon dactylon</i>	4	0.1	0.1	0.2		
<i>Cyperus difformis</i>			0.1	0.1		Cyper triangle
<i>Cyperus vaginatus</i>	7	0.8	5	0.8		
<i>Duperreya commixta</i>	0.1	0				
<i>Dysphania plantaginella</i>			0.1	0.1		Dysphania long
* <i>Echinochloa colona</i>			0.1	0.1		
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Eragrostis tenellula</i>	0.1	0.2	0.1	0.2		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	12	16	12	16		Subsp. obtusa
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	0.1				
* <i>Flaveria trinervia</i>	0.1	0.1	1	0.8		
<i>Glinus lotoides</i>	0.1	0.1				
<i>Glycine canescens</i>	0.1	0				
<i>Gossypium australe</i>	0.1	0.8				
<i>Gossypium robinsonii</i>	0.1	1.7	0.1	1.7		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Gossypium sturtianum</i>	0.1	1.5				
<i>Hybanthus aurantiacus</i>	0.1	0.1	0.1	0.1		
Indeterminant sp.			0.1	0.1		Sparaxis
<i>Ipomoea muelleri</i>			0.1	0.2		
<i>Ipomoea racemigera</i>			0.1	0.1		Ipomoea racemigera recoll
<i>Lobelia arnhemiaca</i>			0.1	0.1		
<i>Lysiana casuarinae</i>	0.1	0				
<i>Melaleuca argentea</i>	15	10	15	10		
<i>Melaleuca glomerata</i>	12	4	12	4		
<i>Melaleuca linophylla</i>	10	3	10	3	DUCR16-01	
<i>Nicotiana benthamiana</i>			0.1	0.2		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.1	0.1	0.2		
Poaceae sp. Indet	0.1	0.2			DUCR16-02	
<i>Pseudognaphalium luteoalbum</i>	0.1	0.1				
<i>Rhynchosia minima</i>			0.1	0.2		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Schoenoplectus subulatus</i>			0.1	0.3		
<i>Sesbania cannabina</i>			0.1	0.2		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1			
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.2		
<i>Triglochin nana</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-17

Date 29/10/2019 14/06/2020
Described by KJ & SC CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 470156 mE; 7526412 mN
 116.7101 E -22.367991 S
Veg Condition Good
Soil Sandy Clay Loam
Rock Type river
Fire Age >10 yrs
Habitat Minor Drainage Line
Vegetation Low to mid *Eucalyptus camaldulensis* subsp. *refulgens* and *Eucalyptus victrix* woodland over tall open shrubland of *Acacia citrinoviridis* over low to mid mixed shrubs.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	1.5	0.1	0.8		
<i>Acacia bivenosa</i>	0.1	1.8				
<i>Acacia citrinoviridis</i>	5	3	5	3		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	1				
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2				
<i>Alternanthera nana</i>			0.1	0.1		
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.2		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>			0.1	0.1		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	0.1	0.3				
* <i>Cenchrus ciliaris</i>	5	0.5	0.1	0.5		
* <i>Cenchrus setiger</i>			0.1	0.2		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>	0.1	1				
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.1		
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Cyperus vaginatus</i>	0.1	0.5	0.1	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.3		
<i>Duperreya commixta</i>	0.1	0				
<i>Dysphania melanocarpa</i>			0.1	0.1		Dysphania rhad
<i>Dysphania rhadinostachya</i> subsp. ?			0.1	0.1		
* <i>Echinochloa colona</i>			0.1	0.1		
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eragrostis tenellula</i>			0.1	0.2		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	20	15	20	15		Euc camal subsp. obtusa

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Eucalyptus victrix</i>	15	11	15	11		
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.2		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>			0.1	2.5		
<i>Glinus lotoides</i>			0.1	0.2		
<i>Gossypium australe</i>			0.1	0.1		
<i>Gossypium robinsonii</i>	1	1.8	1	1.8		
<i>Gossypium sturtianum</i>	0.1	1				
<i>Heliotropium tanythrix</i>			0.1	0.1		Heliotropium grey
<i>Ipomoea racemigera</i>			0.13	0.1		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.5				
* <i>Malvastrum americanum</i>			0.1	0.2		
<i>Marsilea hirsuta</i>			0.1	0.2		
<i>Melaleuca glomerata</i>	0.5	1	0.5	1.5		
<i>Melaleuca linophylla</i>	0.1	1				
<i>Nicotiana benthamiana</i>			0.1	0.2		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.2		
<i>Pluchea dentex</i>			0.1	0.1		
<i>Pterocaulon sphacelatum</i>			0.1	0.2		
<i>Rhynchosia minima</i>			0.1	0.2		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Senna notabilis</i>	0.1	0.1	0.1	0.1		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.2		
* <i>Vachellia farnesiana</i>	0.1	1	0.1	1		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>			0.1	0.2		
<i>Wahlenbergia tumidifructa</i>			0.1	0.3		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-18

Date 29/10/2019 14/06/2020
Described by CvdB KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 471170 mE; 7527506 mN
 116.7199 E -22.358121 S
Veg Condition Very Good
Soil Clay Loam
Rock Type Basalt
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Melaleuca argentea* over *Melaleuca linophylla*, *Acacia coriacea* subsp. *pendens* and *Acacia ampliceps* tall open shrubland over *Cyperus vaginatus* mid sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.5	3	1	1.8		
<i>Acacia bivenosa</i>	0.1	2				
<i>Acacia citrinoviridis</i>	0.1	2	0.1	2		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	2	1	2		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.6	0.1	0.2		
<i>Adriana tomentosa</i> var. <i>tomentosa</i>			0.1	0.2		
<i>Alysicarpus muelleri</i>			0.1	0.2		
<i>Ammannia baccifera</i>			0.1	0.2		
<i>Amyema hilliana</i>	0.1					
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3	0.1	0.3		
<i>Bergia</i> sp. Indet			0.1	0.1	DUCR18-02	Bergia like
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Boerhavia schomburgkiana</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>	0.1	0.4				
<i>Arivela viscosa</i>	0.1	0.1	0.1	0.6		
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.2		
<i>Cucumis variabilis</i>	0.1		0.1			
<i>Cymbopogon</i> sp. Indet	0.1	0.3				
<i>Cyperus difformis</i>			0.1	0.2	DUCR18-03	<i>Cyperus cunninghamii</i>
<i>Cyperus vaginatus</i>	3	0.5	3	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.2		
<i>Duperreya commixta</i>	0.1	0.3				
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.1		
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.1	0.5		<i>Dichanthium sericeum</i>
<i>Eragrostis</i> sp. Indet			0.1	0.6		<i>Eriachne festucacea</i>

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Eragrostis tenellula</i>	0.1	0.1	0.1	0.1		
<i>Eriachne mucronata</i>			0.1	0.7		
<i>Eriochloa pseudoacrotricha</i>			0.1	0.6		Digitaria brownii
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	8	15	8	15		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	0.1	0.1	0.1	DUCR62-02	Euphorbia hairy
<i>Euphorbia biconvexa</i>	0.1	0.2	0.1	0.2		
* <i>Euphorbia hirta</i>			0.1	0.1		
* <i>Flaveria trinervia</i>	0.1	0.1	0.5	0.4		
<i>Glinus lotoides</i>	0.1	0.1			DUCR20-02	
<i>Glycine canescens</i>			0.1			
<i>Gossypium robinsonii</i>	0.1	2.5	0.1	2.5		
<i>Heliotropium ovalifolium</i>			0.1	0.1	DUCR18-04	Helio ?europaeum
<i>Hybanthus aurantiacus</i>	0.1	0.1	0.1	0.1		
<i>Indigofera linifolia</i>			0.1	0.1		
<i>Ipomoea muelleri</i>	0.1				DUCR18-01	Ipomoea small 2
<i>Ipomoea racemigera</i>			0.1			
<i>Jasminum didymum</i> subsp. <i>lineare</i>			0.1	1.2		
<i>Lobelia arnhemiaca</i>			0.1	0.1		
<i>Lysiana casuarinae</i>			0.1		DUCR18-01	Amyema preissii
* <i>Malvastrum americanum</i>	0.1	0.3	0.1	0.4		
<i>Melaleuca argentea</i>	8	11	8	11		
<i>Melaleuca glomerata</i>	0.1	3	0.1	3		
<i>Melaleuca linophylla</i>	18	4	18	4	DUCR18-02	
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Petalostylis labicheoides</i>	0.1	0.2	0.1	1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	Pluchea dentex long
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Pseudognaphalium luteoalbum</i>	0.1	0.1			DUCR29-01	
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Rhynchosia minima</i>	0.1		0.1			
<i>Schenkia australis</i>			0.1		DUCR18-03	? Stylidium
<i>Schoenoplectus subulatus</i>			0.1	0.5		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.5		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Stemodia grossa</i>			0.5	0.3		
<i>Streptoglossa</i> sp. Indet.	0.1	0.1				
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>			0.1	0.1		
<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)	0.1	0.3	0.1	0.4		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Tinospora smilacina</i>			0.1			
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.2		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	0.1	0.1				
<i>Triodia epactia</i>	0.1	0.3	0.1	0.1		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>	0.1		0.1			



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-19

Date 29/10/2019 14/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 472013 mE; 7527749 mN
 116.7281 E -22.355940 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Basalt
Fire Age >10 yrs
Habitat Major Drainage Line

Vegetation *Eucalyptus camaldulensis* and occasional *Melaleuca argentea* mid to low open woodland over *Acacia coriacea* subsp. *pendens*, *Acacia citrinoviridis* and *Gossypium robinsonii* tall sparse shrubland over *Cyperus vaginatus* mid to low sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	4	0.1	0.2		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	3	4	3	4		
<i>Alternanthera nana</i>	0.1	0.3	0.1	0.3		
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.1		
<i>Ammannia baccifera</i>			0.1	0.2		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.4	0.1	0.1		
* <i>Cenchrus ciliaris</i>			0.1	0.3		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>	0.1	0.2	0.1	0.2		
<i>Cucumis variabilis</i>	0.1		0.1			
<i>Cyperus vaginatus</i>	2	0.5	2	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.3		
<i>Duperreya commixta</i>	0.1		0.1			
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	0.1	0.1	0.1	0.1		
<i>Enteropogon ramosus</i>	0.1	0.4	0.1	0.4		
<i>Eragrostis tenellula</i>	0.1	0.1	0.1	0.3		
<i>Eriochloa pseudoacrotricha</i>			0.1	0.6		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	12	14	12	14		
<i>Eulalia aurea</i>	0.1	0.3				
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Flaveria trinervia</i>	0.1	0.2	5	0.6		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	0.1	3	0.1	3		Fruit tree
<i>Glinus lotoides</i>	0.1	0.1	0.1	0.1	DUCR20-02	Pink green woolly
<i>Glycine canescens</i>			0.1	0.1		
<i>Goodenia lamprosperma</i>	0.1	0.1	0.1	0.2		
<i>Gossypium robinsonii</i>	0.1	3	0.1	3.5		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Gossypium sturtianum</i>			0.1	0.5		
<i>Ipomoea muelleri</i>			0.1			?Ipomoea muell
<i>Ipomoea racemigera</i>			0.1			Ipomoea small 2
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	1.2	0.1	1.2		
<i>Lepidium muelleri-ferdinandii</i>	0.1	0.1	0.1	0.1		
<i>Lobelia arnhemiaca</i>			0.1	0.1		
* <i>Malvastrum americanum</i>			0.1	0.2		
<i>Melaleuca argentea</i>	1	8	1	8		
<i>Melaleuca glomerata</i>	0.1	0.4	0.1	0.4		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1			Nicotiana sticky flesh
<i>Phyllanthus baccatus</i>	0.1	2	0.1	2	DUCR19-01	Senna like
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	Pluchea dentex long
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1			
<i>Schoenoplectus subulatus</i>			0.1	0.3		
<i>Sesbania cannabina</i>			0.1	1		
* <i>Setaria verticillata</i>	0.1	0.1	10	0.2		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>Sporobolus</i> aff. <i>virginicus</i>	1	0.2				
<i>Stemodia grossa</i>	0.1	0.2	0.1	0.1		
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>			0.1	1		
<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)			0.1	0.4		
<i>Tinospora smilacina</i>			0.1			
<i>Typha domingensis</i>			0.1	0.2		
<i>Wahlenbergia tumidifruca</i>	0.1	0.1	0.1	0.1		Wahlenbergia gracilentia



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-20

Date 27/10/2019 14/06/2020
Described by CvdB CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 474798 mE; 7527237 mN
 116.7552 E -22.360610 S
Veg Condition Very Good
Soil Silty Clay Loam
Rock Type Basalt
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Cyperus vaginatus* mid sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)			0.1	0.4		
<i>Acacia ampliceps</i>	0.1	4	0.1	4		
<i>Acacia bivenosa</i>	0.1					
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	4	1	4		
<i>Alternanthera nodiflora</i>			0.1	0.2		
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Ammannia baccifera</i>			0.1	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.5	0.1	0.1		
<i>Bergia pedicellaris</i>			0.1	0.1	DUCR20-01	Dicladanthera
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>	0.1	0.1	0.1	0.1		
<i>Corchorus</i> ? <i>sidoides</i>	0.1	0.4			DUCR20-01	
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.2		
<i>Cucumis variabilis</i>	0.1		0.1	0.1		
<i>Cymbopogon</i> sp. Indet	0.1	0.5				
<i>Cyperus difformis</i>			0.1	0.2		Cyper triangle
<i>Cyperus vaginatus</i>	2	0.6	1	0.6		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.3		
<i>Duperreya commixta</i>	0.1					
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Eragrostis tenellula</i>			0.1	0.2		
<i>Eriachne benthamii</i>			0.1	0.5		Eriachne recollect
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	4	16	4	16		
<i>Eulalia aurea</i>	0.1	0.5	0.1	0.5		
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Flaveria trinervia</i>	0.1	0.2	0.1	0.8		
<i>Glinus lotoides</i>	0.1	0.1			Ducr20.02	

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Goodenia lamprosperma</i>			0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	3	0.1	3		
<i>Gossypium sturtianum</i>	0.1	1.4				
Indeterminant sp.			0.1	0.2		Sparaxis
<i>Lobelia arnhemiaca</i>			0.1	0.1		
<i>Melaleuca argentea</i>	8	12	8	12		
<i>Melaleuca glomerata</i>	0.1	1.6				
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	0.1	0.2	0.1	0.2	Ducr20.03	Sticky herb
<i>Oldenlandia crouchiana</i>			0.1	0.2		
<i>Phyllanthus maderaspatensis</i>	0.1	0.2	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2		Pluchea long dentex
<i>Pseudognaphalium luteoalbum</i>	0.1	0.1			Ducr29.01	
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)	0.1	0.6	0.1	0.4	Ducr32.01	Stalk flower
<i>Schoenoplectus subulatus</i>			0.1	0.5		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>	0.3	1	0.3	1.2		
* <i>Setaria verticillata</i>			0.1	0.3		
<i>Stemodia grossa</i>	0.1	0.2				
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.2		
<i>Triglochin nana</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-21

Date 27/10/2019 1406/2020
Described by CvdB CvdB,EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 475669 mE; 7526494 mN
 116.7636 E -22.367336 S
Veg Condition Good
Soil Sandy Loam
Rock Type Basalt
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* tall sparse shrubland over *Triodia epactia* and *Triodia wiseana* sparse hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.1	1.5	0.1	1.5		
<i>Acacia citrinoviridis</i>	15	6	15	6		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	4	0.1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.6	0.1	1.6		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1		0.1			
<i>Boerhavia coccinea</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>			0.1	0.4		
<i>Corchorus</i> sp. Indet	0.1	0.4				
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Cymbopogon ambiguus</i>	0.1	0.3	0.1	0.3		
<i>Enneapogon lindleyanus</i>	0.1		0.1	0.3	Ducr21-01	Enneapogon flood
<i>Eriachne mucronata</i>	0.1	0.2	0.1	0.2		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.2		
<i>Goodenia forrestii</i>			0.1	0.2		
<i>Goodenia stobbsiana</i>			0.1	0.1		
<i>Gossypium australe</i>			0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	1.6	0.1	1.6		
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	0.1	4	0.1	4		
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Indigofera colutea</i>			0.1	0.1		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	1	0.1	1		
<i>Jasminum didymum</i> subsp. <i>lineare</i>			0.1	1		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Paraneurachne muelleri</i>			0.1	0.1		
<i>Paspalidium clementii</i>			0.1	0.1		Paspalidium tab

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Petalostylis labicheoides</i>	0.1	3	0.1	3		
<i>Phyllanthus maderaspatensis</i>			0.1	0.2		
<i>Salsola australis</i>			0.1	0.1		
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.1	0.8	0.1	0.4		
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.1	1.6				
<i>Senna notabilis</i>			0.1			
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Triodia epactia</i>	3	0.7	3	0.7		
<i>Triodia wiseana</i>	0.1	0.4	0.1	0.4		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-22

Date 27/10/2019 14/06/2020
Described by CvdB KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 478183 mE; 7525599 mN
 116.7880 E -22.375460 S
Veg Condition Excellent
Soil Clay Loam
Rock Type Basalt, Dolerite
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Melaleuca argentea* low open woodland over *Melaleuca glomerata* and *Acacia ampliceps* tall shrubland over *Cyperus vaginatus* low sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	4	0.1	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	3	0.1	3		
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.2		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>			0.1	0.4		
<i>Corchorus crozophorifolius</i>	0.1	0.2	0.1	0.2		
<i>Cyperus vaginatus</i>	3	0.6	3	0.6		
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eragrostis</i> sp. Indet			0.5	0.6		Eriachne fest
<i>Eragrostis tenellula</i>			0.1	0.1		
<i>Eriachne mucronata</i>	0.1	0.3	0.1	0.3		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	5	8	5	8		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Gossypium robinsonii</i>	0.1	0.5	0.1	0.5		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.6	0.1	0.6		
* <i>Malvastrum americanum</i>			0.1	0.2		
<i>Marsilea hirsuta</i>			0.1	0.1		
<i>Melaleuca argentea</i>	10	9	10	9		
<i>Melaleuca glomerata</i>	25	5	25	5		
<i>Phyllanthus maderaspatensis</i>	1	0.2	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.3	0.1	0.3	DUCR53-03	P. dentex long
<i>Rhynchosia minima</i>	0.1		0.1			
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Schoenoplectus subulatus</i>			0.1	1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.8		
* <i>Setaria verticillata</i>			0.1	0.3		
<i>Stemodia grossa</i>	0.1	0.5	0.1	0.5		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)			0.1	0.2		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-23

Date 30/10/2019 14/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 479969 mE; 7525734 mN
 116.8054 E -22.374261 S
Veg Condition Excellent
Soil Clayey Sand
Rock Type Basalt
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Melaleuca argentea* low open woodland over *Melaleuca glomerata*, *Acacia coriacea* subsp. *pendens* and *Acacia ampliceps* tall open shrubland over *Cyperus vaginatus* low scattered sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	3	1	5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	4	3.5	4	3.5		
<i>Amaranthus undulatus</i>			0.1	0.3		
<i>Ammannia baccifera</i>			0.1	0.2		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>			0.1	0.1		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.3		
<i>Cyperus vaginatus</i>	2	0.5	2	0.7		
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Eragrostis</i> sp. <i>Indet</i>			0.1	0.6	DUCR23-01	Eriachne fest
<i>Eragrostis tenellula</i>	0.1	0.1	0.1	0.1		
<i>Eriachne mucronata</i>			0.1	0.4		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	2	10	2	10	DUCR23-01	
<i>Eulalia aurea</i>	0.1	0.3				
<i>Euphorbia biconvexa</i>			0.1	0.2		
* <i>Flaveria trinervia</i>	0.1	0.1	0.1	0.4		
<i>Gossypium robinsonii</i>			0.1	0.3		
<i>Melaleuca argentea</i>	10	8	10	8		
<i>Melaleuca glomerata</i>	12	4	12	4		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>	0.1	0.3	0.1	0.3	DUCR53-03	P. dentex long
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.2		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.2		
<i>Schoenoplectus subulatus</i>			0.1	0.5		
<i>Senna notabilis</i>			0.1	0.3		
<i>Sesbania cannabina</i>	0.1	0.2	0.1	2		
<i>Stemodia grossa</i>	0.1	0.1	1	0.3		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Triodia wiseana</i>			0.1	0.4		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-24

Date 30/10/2019
Described by CvdB
Type Quadrat 50m x 50m
Location MGA Zone 50
 481470 mE; 7525171 mN
 116.8200 E -22.379362 S
Veg Condition Excellent
Soil Sandy Clay Loam
Rock Type Basalt
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Melaleuca glomerata*, *Acacia coriacea* subsp. *pendens* and *Acacia ampliceps* tall open shrubland over *Cyperus vaginatus* mid sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon</i> sp. Indet	0.1	1.2				
<i>Acacia ampliceps</i>	0.1	3	0.1	0.5		
<i>Acacia citrinoviridis</i>	0.1	4	0.1	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2	4	2	4		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Alysicarpus muelleri</i>			0.1	0.3		
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Ammannia baccifera</i>			0.1	0.3		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3	0.1	0.3		
<i>Bergia pedicellaris</i>			0.1	0.1	DUCR24-01	Long peduncles
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.1		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus</i> sp. Indet	0.1	0.5	0.1	0.5		Corchorus sp.
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Cyperus difformis</i>			0.1	0.2		Cyperus triangle
<i>Cyperus vaginatus</i>	3	0.5	3	0.8		
<i>Duperreya commixta</i>			0.1	0.1		
<i>Eleocharis geniculata</i>			0.1	0.2		
<i>Eragrostis tenellula</i>			0.1	0.4		
<i>Eriachne flaccida</i>			0.1	0.3		Eriachne fest
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	8	15	8	15		
<i>Eulalia aurea</i>	0.1	0.3				
<i>Euphorbia biconvexa</i>	0.1	0.3	0.1	0.3		
<i>Euphorbia vaccaria</i> var. <i>erucoides</i>			0.1	0.1		Euphorb tight aus
* <i>Flaveria trinervia</i>	0.1	0.2	0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	1.5	0.1	1.5		
<i>Hibiscus</i> sp. Indet			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	1.2				
<i>Lobelia arnhemiaca</i>			0.1	0.1		
<i>Melaleuca argentea</i>	12	12	12	12		
<i>Melaleuca glomerata</i>	7	4	7	4		
<i>Melaleuca linophylla</i>			0.1	1.4		
<i>Oldenlandia crouchiana</i>			0.1			
<i>Phyllanthus erwinii</i>			0.1	0.2		
<i>Phyllanthus maderaspatensis</i>	0.1	0.2	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	P. dentex long
<i>Rhynchosia minima</i>	0.1	0.1				
<i>Schenkia australis</i>	0.1	0.1				
<i>Schoenoplectus subulatus</i>			0.1	0.5		
<i>Sesbania cannabina</i>	0.1	0.2	0.1	0.7		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>Stemodia grossa</i>	0.1	0.2				
<i>Stemodia</i> sp. Indet			0.1	0.2		
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)	0.1	0.5	0.1	0.5		Tephrosia rosea
<i>Tinospora smilacina</i>			0.1	0.1		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.2		
<i>Triumfetta chaetocarpa</i>			0.1	0.3		Triumfetta m
* <i>Vachellia farnesiana</i>	0.1	0.6	0.1	0.6		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-25

Date 30/10/2019 14/06/2020
Described by CvdB CvdB, EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 482565 mE; 7524891 mN
 116.8306 E -22.381903 S
Veg Condition Very Good
Soil Loamy Sand
Rock Type Basalt, Ironstone, Slate
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis*, *Grevillea pyramidalis* subsp. *leucadendron* and *Acacia coriacea* subsp. *pendens* tall open shrubland over *Acacia pyrifolia* var. *pyrifolia* scattered mid shrubs over *Triodia epactia* and *Triodia angusta* mid sparse hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	12	4	12	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	4	0.1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.6	0.1	1.6		
<i>Acacia synchronicia</i>	0.1	1.5				
* <i>Aerva javanica</i>			0.1	0.1		
<i>Amyema hilliania</i>			0.1		DUCR 25-01	Amyema hill 2
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1		0.1			
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.6		
<i>Corchorus crozophorifolius</i>	0.1	0.4	0.1	0.6		Corchorus sp.
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.1		
<i>Cucumis variabilis</i>			0.1			
<i>Cymbopogon</i> sp. Indet	0.1	0.2	0	0		<i>Cymbopogon</i> sp.
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.1		
<i>Duperreya commixta</i>	0.1		0.1			
<i>Enneapogon caeruleus</i>			0.1	0.1		
<i>Eriachne mucronata</i>	0.1	0.2				
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Gossypium australe</i>			0.1	0.1		
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	0.1	3.5	0.1	3.5		
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.1	4	0.1	4		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	1.2	0.5	1.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Ipomoea racemigera</i>			0.1			Ipomoea small 2
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	1	0.1	1		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Paraneurachne muelleri</i>			0.1	0.2		
<i>Paspalidium constrictum</i>			0.1	0.1		
<i>Petalostylis labicheoides</i>	0.1	1.6	0.1	1.6		
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Ptilotus exaltatus</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.1		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	1.2	0.1	2.5		
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Triodia angusta</i>	0.1	0.6	1	0.6		
<i>Triodia epactia</i>	8	0.5	8	0.5		
<i>Triodia wiseana</i>	0.1	0.6	0.1	0.6		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-26

Date 27/10/2019 14/06/2020
Described by CvdB CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 484185 mE; 7524501 mN
 116.8463 E -22.385441 S
Veg Condition Very Good
Soil Clay Loam
Rock Type none
Fire Age >10 yrs
Habitat Major Drainage Line

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Melaleuca argentea* mid open woodland over *Acacia ampliceps*, *Acacia coriacea* subsp. *pendens* and *Acacia citrinoviridis* tall sparse shrubland over *Cyperus vaginatus* mid sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	1	4	1	4		
<i>Acacia bivenosa</i>	0.1	1.4				
<i>Acacia citrinoviridis</i>	0.1	3.5	0.1	3.5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	4	0.1	4		
<i>Alternanthera nana</i>	0.1	0.1				
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Ammannia baccifera</i>			0.1	0.1		
<i>Ammannia multiflora</i>			0.1	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.4	0.1	0.1		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Arivela viscosa</i>	0.1	0.1				
<i>Cucumis variabilis</i>	0.1		0.1	0.1		
* <i>Cynodon dactylon</i>			0.1	0.1		
<i>Cyperus difformis</i>			0.1	0.1	DUCR26-05	Cyper triangle
<i>Cyperus hesperius</i>	0.1	0.7			Ducr37-03	
<i>Cyperus vaginatus</i>	8	0.6	8	0.9		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.5		
<i>Dysphania rhadinostachya</i> subsp. ?			0.1	0.2		Dysphania mint
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.1	0.8		
<i>Eragrostis cumingii</i>			0.1	0.2	DUCR26-01	
<i>Eragrostis tenellula</i>	0.1	0.2	0.1	0.1		
<i>Eriochloa pseudoacrotricha</i>			0.1	0.4	DUCR26-03	Diplachne
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	25	16	45	16		
<i>Eulalia aurea</i>	0.1	0.2				
<i>Euphorbia biconvexa</i>			0.1	0.1		
<i>Euphorbia coghlanii</i>			0.1	0.1	DUCR26-04	Euphorbia open

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
* <i>Euphorbia hirta</i>			0.1	0.1		Alternanthera big balls
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.2		
<i>Euphorbia vaccaria</i> var. <i>erucoides</i>			0.1	0.1		Euphorb tight aus
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	0.1				
<i>Fimbristylis littoralis</i>			0.1	0.1		Fimbristylis sib
* <i>Flaveria trinervia</i>	0.1	0.2	0.1	0.3		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	0.1	1.5				
<i>Gossypium robinsonii</i>	0.1	2.5	0.1	2.5		
<i>Gossypium sturtianum</i>			0.1	1		
<i>Hybanthus aurantiacus</i>	0.1	0.2				
<i>Ipomoea plebeia</i>			0.1	0.1		
<i>Ipomoea racemigera</i>			0.1	0.2		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.3	0.1	0.3		
<i>Livistona alfredii</i>			0.1	0.1		
* <i>Malvastrum americanum</i>			0.1	0.1		
<i>Melaleuca argentea</i>	4	11	3	9		
<i>Myriophyllum verrucosum</i>	0.1					
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Paspalidium basicladum</i>			0.1	0.2	DUCR26.02	Paspalidium open spike
<i>Phyllanthus maderaspatensis</i>			0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	P. dentex long
<i>Polycarpha longiflora</i>			0.1	0.2		
<i>Ptilotus exaltatus</i>	0.1	0.1				
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Sesbania cannabina</i>	0.1	0.2	0.1	0.4		
* <i>Setaria verticillata</i>	0.1	0.1	0.1	0.3	DUCR26-01	Flat head grass
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			0.1	0.4		Corchorus sidoides
* <i>Sonchus oleraceus</i>			0.1	0.1		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia</i> sp. Indet			0.1	0.1		
<i>Tinospora smilacina</i>			0.1	0.2		
* <i>Vachellia farnesiana</i>	0.1	0.4	0.1	0.4		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-27

Date 29/10/2019 14/06/2020
Described by KJ & SC CvdB, EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 485086 mE; 7525270 mN
 116.8551 E -22.378501 S
Veg Condition Very Good
Soil Sand
Rock Type river rocks
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation Tall shrubland of *Acacia citrinoviridis*, *Acacia coriacea* subsp. *pendens* and *Grevillea pyramidalis* subsp. *leucadendron* with occasional scattered low *Eucalyptus victrix* trees over open tussock grassland of *Eriachne mucronata* with occasional scattered hummock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	30	5	23	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2	4	0.1	4		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>	1	1	0.1	0.7		
<i>Cymbopogon ambiguus</i>	0.1	0.5	0.1	0.5		
<i>Eriachne mucronata</i>	20	0.3	15	0.3	DUCR27-01	Rocky
<i>Eriachne pulchella</i>			0.1	0.1		
<i>Eucalyptus victrix</i>	2	8	0	8		
<i>Eulalia aurea</i>	0.5	0.5				
<i>Euphorbia biconvexa</i>			0.1	0.1		
<i>Euphorbia careyi</i>	0.1	0.3	0.1	0.1	DUCR27-02	Euphorbia cog
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Gossypium robinsonii</i>	0.1	0.5	0.1	0.3		
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	1	2	1	1.5		
<i>Hybanthus aurantiacus</i>			0.1	0.2		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	1	1	1	1.5		Indigofera mono big
<i>Jasminum didymum</i> subsp. <i>lineare</i>			0.1	0.2		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Phyllanthus maderaspatensis</i>			0.1	0.3		
<i>Portulaca oleracea</i>			0.1	0.1		
<i>Triodia wiseana</i>	4	0.6	2	0.6		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-28

Date 27/10/2019 14/06/2020
Described by CvdB KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 486947 mE; 7524581 mN
 116.8731 E -22.384746 S
Veg Condition Very Good
Soil Sand
Rock Type Basalt, Dolerite
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis* mid to tall sparse shrubland over *Triodia wiseana* mid scattered hummock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	3	3				
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	3	0.1	3		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.6				
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Cassutha capillaris</i>	0.1		0.1			
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>	0.1	0.5	0.1	0.5		
<i>Corymbia hamersleyana</i>	0.1	4	0.1	4		
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Eriachne mucronata</i>	0.1	0.2				
<i>Euphorbia biconvexa</i>			0.1	0.1		
<i>Euphorbia careyi</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.5	0.3		
<i>Gomphrena cunninghamii</i>			0.1	0.1		
<i>Gossypium australe</i>			0.1	0.5		
<i>Gossypium robinsonii</i>	0.1	0.3	0.1	0.3		
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	0.1	2	0	0		
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)			0.1	1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Polycarpaea longiflora</i>	0.1	0.3				
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.3		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	0.1	0.5				
<i>Senna notabilis</i>			0.1	0.1		
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)			0.1	0.1		
<i>Tribulus hirsutus</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Triodia angusta</i>	0.1	0.4				
<i>Triodia epactia</i>	0.1	0.5				
<i>Triodia wiseana</i>	2	0.6				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-29

Date 27/10/2019 13/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 488615 mE; 7524455 mN
 116.8893 E -22.385893 S
Veg Condition Excellent
Soil Loamy Sand
Rock Type Basalt, Dolerite, Ironstone
Fire Age >10 yrs
Habitat Major Drainage Line

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Melaleuca argentea* mid to low sparse woodland over *Melaleuca glomerata* and *Acacia coriacea* subsp. *pendens* tall shrubland over *Cyperus vaginatus* low scattered sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	3	0.1	3		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	5	0.1	5		
<i>Alternanthera nana</i>	0.1	0.2	0.1	0.2		
<i>Alysicarpus muelleri</i>			0.1	0.3	DUCR29-02	? <i>Alysicarpus muelleri</i>
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Ammannia baccifera</i>			0.1	0.3		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3	0.1	0.3		
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.2		
* <i>Cenchrus ciliaris</i>	0.1	0.2	0.1	0.3		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>	0.1	0.2	0.1	0.3		
<i>Cucumis variabilis</i>	0.1		0.1			
<i>Cymbopogon ambiguus</i>	0.1	0.4	0.1	0.4		
<i>Cyperus vaginatus</i>	0.1	0.5	0.1	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.1		
<i>Duperreya commixta</i>	0.1					
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.1		
<i>Dysphania</i> sp. Indet	0.1	0.1				
<i>Eragrostis tenellula</i>			0.1	0.1		
<i>Eriachne mucronata</i>			0.1	0.2		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	2	12	2	12		
<i>Eulalia aurea</i>	0.1	0.4	0.1	0.4		
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>	0.1	0.1	1	0.5		
<i>Gossypium robinsonii</i>	0.1	2.2	0.1	2.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Gossypium sturtianum</i>	0.1	0.6	0.1	0.6		
<i>Ipomoea muelleri</i>			0.1		DUCR29-01	?Ipomoea muel
<i>Lepidium muelleri-ferdinandii</i>			0.1	0.1		
* <i>Malvastrum americanum</i>	0.1	0.3	0.1	0.3		
<i>Melaleuca argentea</i>	4	5	4	5		
<i>Melaleuca glomerata</i>	25	4	25	4		
<i>Nicotiana benthamiana</i>			0.1	0.3		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>	0.1	0.3	0.1	0.3	DUCR53-03	P. dentex long
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Pseudognaphalium luteoalbum</i>	0.1	0.1	0.1	0.1	DUCR29-01	Woolly daisy
<i>Pterocaulon sphacelatum</i>	0.1	0.2				
<i>Rhynchosia minima</i>	0.1		0.1			
<i>Sesbania cannabina</i>	0.1	0.1	0.1	0.5		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)	0.1	0.3	0.1	0.3		
<i>Triodia epactia</i>	0.1	0.1	0.1	0.3		
<i>Triodia wiseana</i>	0.1	0.4	0.1	0		
* <i>Vachellia farnesiana</i>	0.1	1.6	0.1	2		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>	0.1		0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-30

Date 30/10/2019 13/06/2020
Described by CvdB CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 490721 mE; 7524226 mN
 116.9098 E -22.387978 S
Veg Condition Excellent
Soil Clayey Sand
Rock Type Basalt
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Melaleuca glomerata* and *Acacia coriacea* subsp. *pendens* tall shrubland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	0.1	0.6				
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	3.5	0.1	3.5		
<i>Acacia maitlandii</i>	0.1	0.5				
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.2				
<i>Amaranthus undulatus</i>	0.1	0.2	0.1	1		Amaranthus sp.
<i>Ammannia baccifera</i>			0.1	0.2		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.2				
* <i>Cenchrus ciliaris</i>	0.1	0.2	0.1	0.2		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus</i> sp. Indet			0.1	0.2		
<i>Cucumis variabilis</i>	0.1		0.1	0.1		
<i>Cyperus vaginatus</i>	0.1	0.4	0.1	0.4		
<i>Enneapogon lindleyanus</i>	0.1	0.3				
<i>Eriachne mucronata</i>	0.1	0.4	0.1	0.4		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	0.1	6				
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Euphorbia coghlanii</i>	0.1	0.2				
* <i>Euphorbia hirta</i>			0.1	0.1		Alternanthera big balls
* <i>Flaveria trinervia</i>	0.1	0.2	0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	1.8	0.1	1		
<i>Hybanthus aurantiacus</i>			0.1	0.2		
<i>Melaleuca argentea</i>	0.1	4	0.1	4		
<i>Melaleuca glomerata</i>	35	4	35	4		
<i>Oldenlandia crouchiana</i>			0.1	0.2		
<i>Phyllanthus maderaspatensis</i>	0.1	0.2	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	P. dentex long
<i>Polymeria</i> sp. Indet			0.1	0.1		
<i>Sesbania cannabina</i>	0.1	0.2	0.1	0.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>*Setaria verticillata</i>			0.1	0.1		
<i>Stemodia grossa</i>	0.1	0.2	0.1	0.2		
<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)	0.1	0.3				
<i>Triodia angusta</i>	0.1	0.4			DUCR44-01	
<i>Triodia epactia</i>	0.1	0.5				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-31

Date 26/10/2019 13/06/2020
Described by CvdB CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 493567 mE; 7524785 mN
 116.9375 E -22.382933 S
Veg Condition Poor
Soil Sand
Rock Type Dolerite
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis*, *Acacia coriacea* subsp. *pendens* and *Melaleuca glomerata* tall shrubland over *Triodia wiseana* and *Triodia epactia* low scattered hummock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.1	1.8				
<i>Acacia citrinoviridis</i>	12	5.5	12	5.5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	3	6	3	6		
<i>Amaranthus undulatus</i>			0.1	0.1		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1		0	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>			0.1	0.3		
<i>Boerhavia coccinea</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>			0.1	0.3		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>			0.1	0.5		
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.1		
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Cymbopogon</i> sp. Indet	0.1	0.2				
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.2		
<i>Dodonaea</i> sp. Indet	0.1	0.6				
<i>Duperreya commixta</i>			0.1	0.1		
<i>Enneapogon lindleyanus</i>			0.1	0.1	DUCR31-02	Enneapogon small
<i>Eucalyptus victrix</i>			0.1	4		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.4		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.3		
<i>Euphorbia vaccaria</i> var. <i>erucoides</i>			0.1	0.1	DUCR31-01	Euphorbia tight aus
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			2	0.3		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>			0.1	0.2		
<i>Gomphrena cunninghamii</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Gossypium robinsonii</i>	0.1	1.2	0	1.2		
<i>Hybanthus aurantiacus</i>			0.1	0.2		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)			0.1	1.5		
<i>Indigofera</i> sp. Indet	0.1	0.9				
* <i>Malvastrum americanum</i>			0.1	0.2		
<i>Melaleuca glomerata</i>	8	4	8	4		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.3		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Paraneurachne muelleri</i>			0.1	0.2		
<i>Paspalidium clementii</i>			0.1	0.1		Paspalidium tab
<i>Petalostylis labicheoides</i>	0.1	2				
<i>Phyllanthus maderaspatensis</i>			0.1	0.3		
<i>Ptilotus auriculifolius</i>			0.1	0.3		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	0.4		
<i>Ptilotus</i> sp. Indet			0.1	0.2		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>			0.1	0.4		
<i>Senna notabilis</i>			0.1	0.2		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			0.1	0.2	DUCR31-03	Corchorus sidoides
<i>Sida</i> sp. Indet	0.1	1.2	0	0.3		Sida sp.
* <i>Sigesbeckia orientalis</i>			0.1	0.2		
<i>Solanum cleistogamum</i>			0.1	0.1		
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia</i> sp. Indet			0.1	0.1		
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)			0.1	0.2		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.2		
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.2		
<i>Triodia epactia</i>	0.1	0.4				
<i>Triodia wiseana</i>	0.1	0.4	0	0.4		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-32

Date 26/10/2019 13/06/2020
Described by CvdB CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 495219 mE; 7525098 mN
 116.9535 E -22.380116 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Dolerite, Granite
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca glomerata* and *Melaleuca argentea* tall open shrubland over *Cyperus vaginatus* mid sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	3	0.1	3		
<i>Acacia citrinoviridis</i>	0.1	0.3	0.1	1		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	4	0.1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.6	0.1	1.6		
<i>Alteranthera nana</i>	0.1	0.2	0.1	0.2		
<i>Amaranthus undulatus</i>			0.1	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.1	0.1	0.1		
<i>Bothriochloa ewartiana</i>			0.1	0.6	DUCR32-02	
* <i>Cenchrus ciliaris</i>			0.1	0.4		
<i>Arivela viscosa</i>			0.1	0.1		
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.1		
<i>Cucumis variabilis</i>	0.1		0.1			
<i>Cymbopogon ambiguus</i>			0.1	0.6		
<i>Cyperus vaginatus</i>	2	0.5	2	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.4		
<i>Duperreya commixta</i>			0.1	0.1		
<i>Enneapogon caeruleascens</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.1	0.4	DUCR32-01	<i>Dichanthium sericeum</i>
<i>Eriachne mucronata</i>			0.1	0.3		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	8	16	8	16		
<i>Eulalia aurea</i>	0.1	0.4	0.1	0.4		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia careyi</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.5		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
* <i>Flaveria trinervia</i>	0.1	0.2	4	0.6		
<i>Glycine canescens</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Gossypium robinsonii</i>	0.1	2	0.1	2		
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Indigofera linifolia</i>			0.1	0.1		
<i>Ipomoea racemigera</i>			0.1			Ipomoea small 2
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.6	0.1	0.6		
* <i>Malvastrum americanum</i>			0.1	0.3		
<i>Melaleuca argentea</i>	0.1	4	0.1	4		
<i>Melaleuca bracteata</i>	0.1	1	0.1			
<i>Melaleuca glomerata</i>	11	4	11	4		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.1	0.1	0.1	DUCR53-03	P. dentex long
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)	0.1	0.1	0.1	0.1	DUCR32-01	Stalk flower
<i>Schoenoplectus subulatus</i>			0.1	1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.3		
* <i>Setaria verticillata</i>			1	0.3		
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			0.1	0.3		Sida rohlenae
<i>Solanum diversiflorum</i>			0.1	0.3		
<i>Solanum lasiophyllum</i>			0.1	1		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Tinospora smilacina</i>			0.1	0.1		
* <i>Vachellia farnesiana</i>			0.1	0.2		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-33

Date 29/10/2019 13/06/2020
Described by KJ & SC CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 496932 mE; 7525206 mN
 116.9702 E -22.379144 S
Veg Condition Very Good
Soil Sandy Loam
Rock Type river rocks
Fire Age >10 yrs
Habitat Medium Drainage Line

Vegetation Low *Eucalyptus victrix* open woodland over tall *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* shrubland over mid sparse shrubland of *Petalostylis labicheoides* and *Gossypium robinsonii* over mixed grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>		1.81	0.1	0.1		
<i>Acacia bivenosa</i>			0.1	0.4		
<i>Acacia citrinoviridis</i>	2	5	2	5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	5	5	5	5		
<i>Acacia maitlandii</i>			0.1	0.2		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2	0.1	1		
<i>Alternanthera nana</i>			0.1			
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Amyema hilliana</i>			0.1	0.1	DUCR33-03	Amyema sang ssp. sang
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.1		
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	0.1	0.2	0.1	0.2		
* <i>Cenchrus ciliaris</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.3		
<i>Corchorus crozophorifolius</i>	0.1	0.8	0.1	0.5		Corchorus las
<i>Corchorus sidoides</i>	0.1	0.4	0.1	0.4		
<i>Cymbopogon ambiguus</i>			0.1	0.2		
<i>Cyperus vaginatus</i>	0.1	0.5	0.1	0.5		
<i>Duperreya commixta</i>	0.1	0				
<i>Dysphania melanocarpa</i>			0.1	0.2	DUCR33-02	Dysphania rhad
<i>Eragrostis tenellula</i>			0.1	0.2	DUCR33-05	
<i>Eriachne mucronata</i>			0.1	0.1		
<i>Eriachne pulchella</i>			0.1	0.1		
<i>Eucalyptus victrix</i>	10	12	10	12		
<i>Eulalia aurea</i>			0.1	0.1		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1			
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>*Flaveria trinervia</i>	0.1	0.1	0.1	0.5		
<i>Gossypium australe</i>			0.1	0.4		
<i>Gossypium robinsonii</i>	1	2	1	2		
<i>Gossypium sturtianum</i>	0.1	1	0.1	1		
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	0.1	2	0.1	2		
<i>Hybanthus aurantiacus</i>			0.1	0.3		
<i>Indigofera monophylla</i>	1	1.2				
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	0.3	1	1.2		
<i>Ipomoea racemigera</i>			0.1	0.1	DUCR33-07	Polymeria large
<i>Lysiana casuarinae</i>			0.1		DUCR33-06	Other mistletoe
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Paspalidium clementii</i>			0.1	0.1	DUCR33-04	Paspalidium tab
<i>Petalostylis labicheoides</i>	2	2	2	2		
<i>Phyllanthus maderaspatensis</i>	0.1	0.3	0.1	0.3		
<i>Pluchea dentex</i>			0.1	0.1		
<i>Polymeria ambigua</i>	0.1	0.1	0.1	0.1		
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1	DUCR33-01	Rostellularia adscendens
<i>Senna notabilis</i>	0.1	0.3	0.1	0.3		
<i>Sesbania cannabina</i>			0.1	0.7		
<i>*Setaria verticillata</i>			0.1	0.2		
<i>Solanum diversiflorum</i>	0.1		0.1	0.2		
<i>Sporobolus australasicus</i>			0.1	0.2		
<i>Stemodia</i> sp. Indet			0.1	0.3		
<i>Stylobasium spatulatum</i>	0.1	1	0.1	1		
<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)			0.1	0.4		
<i>Tribulus hirsutus</i>			0.1	0.2		
<i>Triodia wiseana</i>	0.1	0.3	0.1	0.3		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-34

Date 29/10/2019 13/06/2020
Described by CvdB CvdB, EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 497930 mE; 7525382 mN
 116.9798 E -22.377557 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Basalt
Fire Age >10 yrs
Habitat Major Drainage Line

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Melaleuca argentea* mid to low open woodland over *Melaleuca glomerata*, *Acacia ampliceps* and *Acacia coriacea* subsp. *pendens* tall shrubland over *Cyperus vaginatus* low sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	1	3	0.1	0.6		
<i>Acacia citrinoviridis</i>	0.1	2	0.1	2		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	4	1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	0.5	0.1	0.5		
<i>Ammannia baccifera</i>			0.1	0.2		
<i>Amyema hilliana</i>	0.1					
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.2				
* <i>Cenchrus ciliaris</i>			0.1	0.2		
* <i>Cenchrus setiger</i>			0.1	0.2		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Corchorus</i> ? <i>sidooides</i>	0.1	0.3			DUCR62-01	
<i>Corchorus</i> sp. Indet			0.1	0.3		
<i>Cucumis variabilis</i>	0.1					
<i>Cymbopogon</i> sp. Indet	0.1	0.2				
* <i>Cynodon dactylon</i>			0.1	0.2		
<i>Cyperus vaginatus</i>	3	0.4	3	0.6		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.3		
<i>Duperreya commixta</i>	0.1		0.1			
<i>Dysphania plantaginella</i>			0.1		DUCR34-01	Dysphania long
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.1	0.4		
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eragrostis tenellula</i>			0.1	0.2		
<i>Eriachne mucronata</i>	0.1	0.3	0.1	0.3		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	8	13	8	13		
<i>Eulalia aurea</i>	0.1	0.4	0.1	0.4		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Euphorbia biconvexa</i>			0.1	0.3		
* <i>Euphorbia hirta</i>			0.1	0.1	DUCR34-03	Alternanthera big balls
<i>Euphorbia</i> sp. Indet	0.1	0.1				
* <i>Flaveria trinervia</i>	0.1	0.3	0.1	0.7		
<i>Glycine canescens</i>			0.1	0.1		Glycine falcata
<i>Gossypium australe</i>	0.1	0.3	0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	2.5				
<i>Gossypium sturtianum</i>	0.1	1.8	0.1			
<i>Gymnanthera cunninghamii</i>	0.1	1.3	0.1	1.3		
<i>Hybanthus aurantiacus</i>			0.1	0.3		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	0.8				
<i>Ipomoea racemigera</i>			0.1		DUCR-34.02	Ipomoea race recoll
<i>Livistona alfredii</i>	0.1	0.6	0.1	0.6		
<i>Melaleuca argentea</i>	7	10	7	10		
<i>Melaleuca glomerata</i>	4	3.5	4	3.5		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	1	DUCR34-05	Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	Pluchea dentex long
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.2		Rostellularia adscendens
<i>Schoenoplectus subulatus</i>			0.1	0.2		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.5		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Solanum diversiflorum</i>			0.1	0.2		
* <i>Sonchus oleraceus</i>	0.1	0.1	0.1	0.1		Sonchus hydro
<i>Stemodia</i> sp. Indet			0.1			
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		
* <i>Vachellia farnesiana</i>	0.1	1	0.1	1		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-36

Date 26/10/2019 16/06/2020
Described by CvdB KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 501742 mE; 7528155 mN
 117.0169 E -22.352503 S
Veg Condition Good
Soil Clay Loam
Rock Type none
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid to low sparse woodland over *Melaleuca glomerata*, *Acacia coriacea* subsp. *pendens* and *Acacia citrinoviridis* tall shrubland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	3	0.1	3		
<i>Acacia bivenosa</i>	0.1	2.8			DUCR48-01	
<i>Acacia citrinoviridis</i>	1	4	1	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	3.5	1	3.5		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.6	0.1	1.6		
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.5		
<i>Ammannia baccifera</i>			0.1	0.1		
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	0.1	0.8	0.1	0.8		
<i>Arivela viscosa</i>			0.1	0.4		
<i>Corchorus crozophorifolius</i>	0.1	0.3	0.1	0.8		
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Cyperus vaginatus</i>	0.1	0.7	0.1	0.7		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.3		
<i>Duperreya commixta</i>	0.1		0.1			
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eragrostis</i> sp. Indet			0.1	0.6		Eriachne festucacea
<i>Eragrostis tenellula</i>			0.1	0.3		
<i>Eriachne mucronata</i>	0.1	0.2	0.5	0.4		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	8	15	8	15		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.1	0.2	0.1	0.2		
* <i>Flaveria trinervia</i>			8	0.5		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>			0.1	2		
<i>Gossypium robinsonii</i>	0.1	1.5	0.1	1.5		
<i>Gossypium sturtianum</i>	0.1	0.3	0.1	0.3		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Hybanthus aurantiacus</i>	0.1	0.2	0.1	0.2		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)			0.1	0.6		
<i>Ipomoea muelleri</i>			0.1	0.1		?Ipomoea muell
<i>Livistona alfredii</i>	0.1	0.8	0.1	0.8		
<i>Melaleuca glomerata</i>	20	5	20	5		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.2		Nicotiana sticky flesh
<i>Phyllanthus maderaspatensis</i>			0.1	0.3		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	Pluchea dentex long
<i>Pterocaulon sphacelatum</i>	0.1	0.2	0.1	0.2	DUCR36-01	
<i>Rhynchosia minima</i>			0.1	0.2		
<i>Rhynchosia</i> sp. Indet	0.1	0.2				
<i>Rostellularia adscendens</i> var. <i>clementii</i>	0.1	0.1	0.1	0.2		
<i>Sesbania cannabina</i>			0.1	1		
* <i>Setaria verticillata</i>			1	0.2		
<i>Sida</i> sp. Indet	0.1	0.3			DUCR37-02	
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.3		
<i>Stylobasium spathulatum</i>	0.1	1.5	0.1	1.5		
<i>Triodia wiseana</i>	0.1	0.4	0.1	0.4		
* <i>Vachellia farnesiana</i>	0.1	2	0.1	2.5		
<i>Waltheria indica</i>			0.1	0.3		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-37

Date 26/10/2019 16/06/2020
Described by CvdB EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 503419 mE; 7528135 mN
 117.0332 E -22.352680 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Dolerite, Granite
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Cyperus vaginatus* low scattered sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	2	0.1	2		
<i>Acacia citrinoviridis</i>	0.1	2	0.1	2		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	2.5	0.1	2.5		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	0.8				
<i>Altermanthera nana</i>	0.1	0.1	0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.1		
<i>Ammannia baccifera</i>			0.1	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.8	0.1	0.3		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.2		
<i>Convolvulus clementii</i>			0.1			Creeper variable
<i>Corchorus sidoides</i>			0.1	0.3		
<i>Cyperus difformis</i>			0.1	0.2		Cyper triangle
<i>Cyperus hesperius</i>	0.1	0.5			DUCR37-03	
<i>Cyperus vaginatus</i>	1	0.5	1	0.6		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.4		
<i>Duperreya commixta</i>	0.1					
<i>Dysphania rhadinostachya</i> subsp. <i>inflata</i>			0.1		DUCR37-02	Dysphania radical gnarly
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Enneapogon lindleyanus</i>			0.1	0.3		
<i>Eragrostis tenellula</i>			0.1	0.2		
<i>Eriachne mucronata</i>	0.1	0.2	0.1	0.2		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	8	12	8	12		
<i>Eulalia aurea</i>	0.1	0.3	0.1	0.3		Eulalia sp.
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	0.1	0.1	0.1	DUCR37-01	Euphorbia blue
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Fimbristylis microcarya</i>			0.1	0.1	DUCR37-01	Fimbristylis
* <i>Flaveria trinervia</i>	0.1	0.3	1	0.5		
<i>Gossypium australe</i>			0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	2	0.1	0.3		
<i>Gossypium sturtianum</i>	0.1	0.8	0.1	0.8		
<i>Hybanthus aurantiacus</i>			0.1			
Indeterminant sp.			0.1	0.1		Circular sprawler mud
<i>Melaleuca argentea</i>	20	14	20	14		
<i>Melaleuca glomerata</i>	0.1	2.8				
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.1		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.13		
<i>Phyllanthus maderaspatensis</i>	0.1	0.1	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.1	0.1	0.2	DUCR53-03	Pluchea dentex long
<i>Polymeria ambigua</i>	0.1	0.1			DUCR37-05	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	0.1	0.1	0.1	0.1	DUCR37-04	Rostellularia adscen var lat
* <i>Setaria verticillata</i>			0.1	0.3		
<i>Sida</i> sp. Indet	0.1	0.2			DUCR37-02	
<i>Solanum diversiflorum</i>			0.1			
<i>Stackhousia</i> sp. Indet			0.1	0.2	DUCR37-03	Yellow toobs
<i>Stemodia grossa</i>	0.1	0.3	0.1	0.3		
<i>Stylidium fluminense</i>			0.1			
<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)	0.1	0.4				
* <i>Vachellia farnesiana</i>			0.1	0.2		
<i>Wahlenbergia tumidifruca</i>	0.1	0.3				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-38

Date 26/10/2019 16/06/2020
Described by CvdB EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 504077 mE; 7528084 mN
 117.0395 E -22.353137 S
Veg Condition Good
Soil Clayey Sand
Rock Type none
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* tall shrubland with scattered *Eucalyptus camaldulensis* subsp. *refulgens* mid trees over *Gossypium robinsonii* mid scattered shrubs over *Triodia epactia* and *Triodia wiseana* low scattered hummock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	20	5	20	5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	3	5	3	5		
<i>Acacia monticola</i>	0.1	1.5				
<i>Amaranthus undulatus</i>			0.1	0.2		
* <i>Bidens bipinnata</i>			0.1	0.1		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Arivela viscosa</i>			0.1	0.1		
<i>Cucumis variabilis</i>			0.1			
<i>Cymbopogon ambiguus</i>	0.1	0.2	0.1	0.4		
<i>Dicladantha forrestii</i>			0.1	0.2		Schenkia 38
<i>Duperreya commixta</i>	0.1		0.1			
<i>Erneapogon lindleyanus</i>	0.1	0.4	0.1	0.4		
<i>Enteropogon ramosus</i>			0.1	0.6		Dichanthium sericeum
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eriachne mucronata</i>	0.1	0.3	1	0.4		
<i>Eriachne tenuiculmis</i>			0.1	0.3		Eriachne fest recoll
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	1	11	1	11		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1	DUCR38-02	
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			1	0.3		
<i>Glycine canescens</i>			0.1			
<i>Goodenia microptera</i>			0.1	0.2		
<i>Gossypium australe</i>			0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	1.8	0.1	0.5		
<i>Gossypium sturtianum</i>	0.1	1.5	0.1	0.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Heliotropium tenuifolium</i>			0.1	0.1		
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	0.8	0.1	1		
<i>Ipomoea muelleri</i>			0.1			?Ipomoea muell
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Paraneurachne muelleri</i>			0.1	0.1		
<i>Paspalidium constrictum</i>			0.1	0.2		
<i>Petalostylis labicheoides</i>	0.1	2	0.1	0.2		
<i>Pluchea dentex</i>			0.1	0.2		
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.1	0.8	0.1	1		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Sida fibulifera</i>	0.1	0.4	0.1	0.1	DUCR37-02	
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			0.1	0.3		Corchorus sidoides
<i>Solanum diversiflorum</i>			0.1	0.3		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	1.4	0.1	1.6		
<i>Themeda triandra</i>			0.1	0.6		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.3		
<i>Triodia epactia</i>	1	0.5	0.1	0.2		
<i>Triodia wiseana</i>	0.1	0.5	0.1	0.4		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>	0.1					



Phase 1

No Photo Available

Phase 2

Brockman Syncline Riparian Site DUCR-39

Date 28/10/2019 16/06/2020
Described by KJ & SC KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 507620 mE; 7528635 mN
 117.0740 E -22.348150 S
Veg Condition Poor
Soil Silty Clay Loam
Rock Type river rocks
Fire Age >10 yrs
Habitat Medium Drainage Line
Vegetation Mid open *Eucalyptus camaldulensis* subsp. *refulgens* woodland over low sparse trees of *Acacia coriacea* subsp. *pendens* and *Acacia citrinoviridis* over scattered grasses, sedges, and herbs.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	1	2				
<i>Acacia citrinoviridis</i>	1	5	1	5		
<i>Acacia colei</i>	0.1	2				
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2	6	2	6		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2	0.1	2		
<i>Acacia tumida</i> var. <i>pilbarensis</i>	0.5	2.8	0.5	1.2		
<i>Alternanthera nana</i>	0.1	0.1	0.1	0.1		
<i>Amaranthus undulatus</i>	0.1	0.1	0.1	0.3		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	1	0.2	0.1	0.1		
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.1		
* <i>Cenchrus ciliaris</i>			0.1	0.2		
<i>Arivela viscosa</i>			0.1	0.3		
<i>Corchorus sidoides</i>	0.1	0.5			DUCR39-04	
<i>Cucumis variabilis</i>	0.1	0.1	0.1			
<i>Cymbopogon ambiguus</i>	0.1	0.6				
* <i>Cynodon dactylon</i>	0.1	0.1				
<i>Cyperus squarrosus</i>			0.1	0.2	DUCR39-01	Cyperus hesperius
<i>Cyperus vaginatus</i>	0.5	0.6	0.1	0.6		
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	0.1	1				
<i>Duperreya commixta</i>			0.1			
<i>Enteropogon ramosus</i>			0.1			Dichanthium sericeum
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eragrostis tenellula</i>			0.1	2		
<i>Eriachne pulchella</i>	0.1	0.1				
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	15	14	15	14		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.2		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Euphorbia</i> sp. Indet	0.1	0.1				

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	0.1				
* <i>Flaveria trinervia</i>	0.1	0.2	0.1	0.2		
<i>Goodenia microptera</i>	0.1		0.1	0.3	DUCR39-01	Goodenia woolly
<i>Gossypium australe</i>	0.1	0.4				
<i>Gossypium robinsonii</i>	1	1.5	1	1.5		
<i>Gossypium sturtianum</i>	1	1				
<i>Hybanthus aurantiacus</i>	0.1	0.3	0.1	0.3		
* <i>Malvastrum americanum</i>	0.1	0.1				
<i>Melaleuca glomerata</i>	0.5	3	0.5	3		
<i>Melhania oblongifolia</i>	0.1	0.3				
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.3		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Petalostylis labicheoides</i>	0.5	2.5				
<i>Phyllanthus maderaspatensis</i>	0.1	0.1	0.1	0.4		
<i>Pluchea dentex</i>	0.1	0.1	0.1	0.3		
<i>Polycarpaea longiflora</i>	0.1	0.1				
<i>Polymeria ambigua</i>	0.1	0.1				
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Sesbania cannabina</i>	0.1	0.5	0.1	0.5		
<i>Sida</i> sp. Indet	0.1	0.1				
<i>Solanum diversiflorum</i>			0.1	0.3		
* <i>Sonchus oleraceus</i>	0.1	0.1				
<i>Stemodia grossa</i>	0.1	0.1	0.1	0.2		
<i>Stylobasium spathulatum</i>	0.1	3	0.1			
<i>Tribulus hirsutus</i>			0.1	0.1		
* <i>Tribulus terrestris</i>			0.1	0.1		
<i>Triodia epactia</i>	0.1	0.2				
<i>Triodia wiseana</i>	1	0.3				
* <i>Vachellia farnesiana</i>	0.1	2				
<i>Waltheria indica</i>	0.1	0.1				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-40

Date 28/10/2019 16/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 508642 mE; 7529279 mN
 117.0839 E -22.342327 S
Veg Condition Very Good
Soil Medium Clay
Rock Type river stones
Fire Age 1-3 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Acacia citrinoviridis* *Acacia coriacea* subsp. *pendens* and *Melaleuca glomerata* tall sparse shrubland over *Cyperus vaginatus* mid scattered sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ancistrocarpa</i>			0.1	0.6		
<i>Acacia bivenosa</i>	0.1	1.2	0.1	1.2		
<i>Acacia citrinoviridis</i>	4	5	4	5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	4	0.1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	0.3	0.1	1		
<i>Acacia tumida</i> var. <i>pilbarensis</i>	0.1	1.8	0.1	2		
<i>Alternanthera nana</i>	0.1	0.1	0.1	0.1	DUCR40-04	Alternanthera ground
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.4				
<i>Aristida inaequiglumis</i>			0.1	0.5		
<i>Boerhavia coccinea</i>			0.1			
<i>Boerhavia schomburgkiana</i>	0.1	0.1			DUCR40-03	
<i>Bothriochloa decipiens</i> var. <i>cloncurrrens</i>			0.1		DUCR40-05	? Dichanthium tall
<i>Capparis lasiantha</i>	0.1	0.8				
* <i>Cenchrus ciliaris</i>	0.1	0.2	0.1	0.5		
* <i>Cenchrus echinatus</i>			0.1	0.2	DUCR40-04	Bur grass
<i>Corchorus</i> sp. Indet			0.1	0.3		<i>Corchorus sidoides</i>
<i>Crotalaria novae-hollandiae</i> subsp. <i>novae-hollandiae</i>			0.1	0.2		
<i>Cymbopogon ambiguus</i>			0.1	0.5		
<i>Cyperus vaginatus</i>	2	0.6	2	0.6		
<i>Duperreya commixta</i>	0.1	0.2	0.1	0.2		
<i>Enneapogon lindleyanus</i>	0.1	0.3				
<i>Enteropogon ramosus</i>	0.1	0.3	0.1	1		
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eriachne mucronata</i>			0.1	0.3		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	14	14	14	14		
<i>Eulalia aurea</i>	0.1	0.3	0.1	0.7		
<i>Euphorbia biconvexa</i>	0.1	0.1			DUCR40-01	

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	0.1	0.3			DUCR40-06	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>	0.1	0.1	1	0.3		
<i>Glycine canescens</i>			0.1			
<i>Gomphrena</i> ? <i>kanasii</i>	0.1	0.1			DUCR40-05	
<i>Goodenia forrestii</i>			0.1			Goodenia wide hairy
<i>Gossypium australe</i>			0.1	0.4		
<i>Gossypium robinsonii</i>	0.1	1.2	0.1	1.2		
<i>Gossypium sturtianum</i>	0.1	0.5	0.1	0.7		
<i>Heteropogon contortus</i>			0.1	0.8	DUCR40-02	Sorghum plumosum
<i>Hybanthus aurantiacus</i>	0.1	0.1	0.1	0.1		
<i>Indigofera monophylla</i>			0.1	0.3		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)			0.1	1		
<i>Ipomoea racemigera</i>			0.1			Ipomoea small 2
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.6	0.1	0.6		
<i>Melaleuca bracteata</i>			0.1	2		
<i>Melaleuca glomerata</i>	0.1	3.5	0.1	3.5		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Oldenlandia crouchiana</i>			0.1	0.2		
<i>Petalostylis labicheoides</i>	0.1	2	0.1	0.7		
<i>Phyllanthus maderaspatensis</i>	0.1	0.2	0.1	0.3		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.3		Pluchea long dentex
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Salsola australis</i>			0.1	0.1		
<i>Schoenoplectus subulatus</i>			0.1	1		
<i>Senna notabilis</i>	0.1	0.4	0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.5		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Sida echinocarpa</i>	0.1	0.4			DUCR40-01	
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			0.1	0.4		Sida rohlenae
<i>Sida</i> sp. Indet	0.1	0.3			DUCR37-02	
<i>Solanum diversiflorum</i>			0.1	0.2		
* <i>Sonchus oleraceus</i>	0.1	0.1				
<i>Stemodia grossa</i>			0.1	0.2		
<i>Stylobasium spathulatum</i>	0.1	1.6				
<i>Themeda triandra</i>	0.1	0.3	0.1	0.6		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		
<i>Triodia angusta</i>	0.1	0.3	0.1	0.2		
* <i>Vachellia farnesiana</i>	0.1	0.6				
<i>Wahlenbergia tumidiflora</i>	0.1	0.1			DUCR40-02	



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-41

Date 28/10/2019 16/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 511596 mE; 7529482 mN
 117.1126 E -22.340480 S
Veg Condition Good
Soil Silty Clay Loam
Rock Type river rocks
Fire Age >10 yrs
Habitat Medium Drainage Line
Vegetation Mid open woodland of *Eucalyptus camaldulensis* subsp. *refulgens* over low woodland of *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* over hummock and tussock grasses of *Triodia pungens*, **Cenchrus ciliaris* and *Eulalia aurea*.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
? <i>Lysimachia arvensis</i>			0.1	0.3	DUCR41-03	Opposite straight
<i>Acacia citrinoviridis</i>	30	7	25	7		
<i>Acacia colei</i>	0.1	2.5			DUCR41-01	
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2	10	2	8		
<i>Alternanthera nana</i>	0.1	0.1	0.1	0.2		
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.3		
<i>Ammannia baccifera</i>			0.1	0.3		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1	0				
<i>Androcalva luteiflora</i>	0.1	2				
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>			0.1	0.1		
<i>Calandrinia</i> sp. Indet			0.1	0.1	DUCR41-06	Green succulent
* <i>Cenchrus ciliaris</i>	2	0.6	0.1	0.6		
* <i>Cenchrus setiger</i>			0.1	0.2		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			0.1	0.1	DUCR41-01	Fern
<i>Chrysopogon fallax</i>			0.1	0.7	DUCR41-05	Avena?
<i>Corchorus crozophorifolius</i>	0.1	1				
<i>Corchorus sidoides</i>			0.1	0.1		
<i>Cymbopogon ambiguus</i>	0.1	0.6	0.1	0.6		
<i>Cyperus difformis</i>			0.1	0.33		Cyper triangle
<i>Cyperus hesperius</i>			0.1	0.5		Cyperaceae robust
<i>Cyperus vaginatus</i>	0.1	0.5	0.1	0.5		
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	0.1	2	0.1	2		
<i>Duperreya commixta</i>	0.1	0	0.1			
<i>Eleocharis geniculata</i>			0.1	0.2		
<i>Enteropogon ramosus</i>			0.1	0.4		
<i>Eragrostis cumingii</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Eragrostis tenellula</i>			0.1	0.1		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	20	16	20	16		
<i>Eulalia aurea</i>	2	0.6	2	0.6		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.2		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
<i>Fimbristylis microcarya</i>			0.1	0.2		Fimbristylis sp 1
* <i>uFlaveria trinervia</i>			0.1	0.2		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>			0.1	1		
<i>Glycine canescens</i>	0.1	0.1	0.1			Trileaf creeper
<i>Goodenia microptera</i>			0.1	0.2		Goodenia linear
<i>Gossypium robinsonii</i>	0.1	2	0.1	2		
<i>Gossypium sturtianum</i>	0.5	1	0.5	0.5		
<i>Hybanthus aurantiacus</i>	0.1	0.1				
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.6				
* <i>Malvastrum americanum</i>			0.1	0.2		
<i>Marsilea hirsuta</i>			0.1	0.1		
<i>Melaleuca glomerata</i>	1	2	1	2		
<i>Nicotiana benthamiana</i>			0.1	0.3		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.2		
<i>Oldenlandia galioides</i>			0.1	0.1	DUCR41-02	Boerhavia teeny tiny
<i>Paraneurachne muelleri</i>			0.1	0.2		
<i>Paspalidium clementii</i>			0.1	0.1		Paspalidium tab
<i>Phyllanthus erwinii</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>	0.1	0.3	0.1	0.3		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2		
<i>Pseudognaphalium luteoalbum</i>			0.1	0.3	DUCR41-04	?Chrysocephalum
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
* <i>Setaria verticillata</i>			0.1	0.3		
* <i>Sonchus oleraceus</i>			0.1	0.2		
<i>Stackhousia</i> sp. Indet			0.1	0.1		Yellow toobs
<i>Stemodia grossa</i>			0.1	0.2		
<i>Stylobasium spathulatum</i>	0.1	2				
<i>Triodia angusta</i>	15	0.4				
<i>Triodia epactia</i>	0.1	0.4				
<i>Wahlenbergia tumidifruca</i>			0.1	0.3	DUCR41-09	Wahlenbergia



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-42

Date 28/10/2019 16/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 513061 mE; 7529662 mN
 117.1268 E -22.338843 S
Veg Condition Very Good
Soil Loamy Sand
Rock Type Basalt, Calcrete, Ironstone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus victrix* and *Eucalyptus camaldulensis* subsp. *refulgens* scattered mid to low trees over *Acacia citrinoviridis* tall shrubland over *Triodia angusta* low open hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.1	2	0.1	2		
<i>Acacia citrinoviridis</i>	40	6	40	6		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	1.5	0.1	1.7		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	3	0.1	2.5		
<i>Acacia tumida</i> var. <i>pilbarensis</i>	0.1	3	0.1	3		
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>			0.1			
* <i>Bidens bipinnata</i>			0.1	0.1		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Capparis lasiantha</i>	0.1	0.9	0.1	1		
<i>Arivela viscosa</i>			0.1	0.1		
<i>Cucumis variabilis</i>			0.1			
<i>Cymbopogon ambiguus</i>			0.1	0.4		
<i>Dactyloctenium radulans</i>			0.1	0.1		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.3		
<i>Dicladantha forrestii</i>			0.1	0.1		
<i>Dodonaea lanceolata</i>	0.1	1.2	0.1	1.2		
<i>Duperreya commixta</i>	0.1		0.5			
<i>Erneapogon lindleyanus</i>	0.1	0.4	0.1	0.4		
<i>Enteropogon ramosus</i>			0.1	0.6		Dichanthium sericeum
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eriachne mucronata</i>	0.1	0.3	1	0.4		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	2	12	2	12		
<i>Eucalyptus victrix</i>	2	10	2	10		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	0.1	0.2	0.1	0.2		
* <i>Flaveria trinervia</i>			1	0.4		
<i>Glycine canescens</i>			0.1			
<i>Goodenia forrestii</i>			0.1	0.2		Goodenia wide hairy
<i>Goodenia microptera</i>			0.1	0.2		
<i>Gossypium australe</i>			0.1	0.3		
<i>Gossypium robinsonii</i>	0.1	1.9	0.1	2		
<i>Gossypium sturtianum</i>			0.1	0.2		
<i>Heliotropium tenuifolium</i>			0.1	0.1		
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Indigofera monophylla</i>	0.1	0.7				
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)			0.1	1		
<i>Ipomoea muelleri</i>			0.1			?Ipomoea muell
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Paraneurachne muelleri</i>			0.1	0.1		
<i>Paspalidium constrictum</i>			0.1	0.2		
<i>Petalostylis labicheoides</i>	0.1	2.5	0.1	0.2		
<i>Phyllanthus baccatus</i>			0.1	1.2		
<i>Pluchea dentex</i>			0.1	0.2		
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Ptilotus exaltatus</i>			0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Salsola australis</i>			0.1	0.1		
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.1	1.7				
<i>Senna notabilis</i>			0.1	0.1		
<i>Senna venusta</i>			0.1	0.1		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Sida fibulifera</i>			0.1	0.1		
<i>Sida</i> sp. Indet	0.1	0.8				
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	1.6	0.1	2		
<i>Themeda triandra</i>			0.1	0.6		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.3		
<i>Triodia angusta</i>	10	0.4	5	0.4	DUCR44-01	
<i>Triodia epactia</i>	1	0.4	0.1	0.2		
<i>Waltheria indica</i>	0.1	0.3			DUCR42-01	



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-43

Date 28/10/2019 16/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 515828 mE; 7529272 mN
 117.1537 E -22.342339 S
Veg Condition Good
Soil Sandy Loam
Rock Type river rock
Fire Age >10 yrs
Habitat Medium Drainage Line

Vegetation Mid to low woodland of *Eucalyptus camaldulensis*, *Eucalyptus victrix* and *Acacia coriacea* subsp. *pendens* over tall shrubland of *Melaleuca glomerata*, *Melaleuca bracteata* and *Gossypium robinsonii* over mixed herbs, grasses, and sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon</i> sp. Pilbara (W.R. Barker 2025)			0.1	0.5		<i>Abutilon</i> sp. dioc collection
<i>Acacia ampliceps</i>			0.1	0.3		
<i>Acacia bivenosa</i>	0.1	3				
<i>Acacia citrinoviridis</i>	0.2	3				
<i>Acacia coriacea</i> subsp. <i>pendens</i>	5	10	5	10		
<i>Acacia inaequilatera</i>			0.1	0.2		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2	0.1	2		
<i>Acacia tumida</i> var. <i>pilbarensis</i>	0.1	2				
<i>Alternanthera nana</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1	0				
<i>Androcalva luteiflora</i>			0.1	0.2		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>			0.1	0.3		
* <i>Bidens bipinnata</i>			0.1	0.8		
<i>Boerhavia coccinea</i>			0.1	0.1		
* <i>Cenchrus ciliaris</i>	0.1	0.6	0.1	0.5		
<i>Arivela viscosa</i>			0.1	0.3		
<i>Corchorus crozophorifolius</i>			0.1	0.2		
<i>Corchorus sidoides</i>			0.1	0.2		
<i>Cyperus difformis</i>			0.1	0.4		Cyper triangle
<i>Cyperus vaginatus</i>	0.5	0.6	0.1	0.6		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	1		
<i>Duperreya commixta</i>			0.1			
<i>Dysphania plantaginella</i>			0.1	0.2		Dysphania long
<i>Dysphania rhadinostachya</i> subsp. <i>inflata</i>			0.1	0.2		Dysphania radical gnarly
<i>Enteropogon ramosus</i>			0.1	0.5		
<i>Eragrostis cumingii</i>	0.1	0.1	0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Eragrostis tenellula</i>			0.1	0.3		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	25	15	25	15		Subsp. obtusa
<i>Eucalyptus victrix</i>	10	12	10	12		
<i>Eulalia aurea</i>	0.1	0.6				
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.2		
* <i>Euphorbia hirta</i>	0.5	0.2			DUCR43-01	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.1	0.1				
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.2		
* <i>Flaveria trinervia</i>			2	0.7		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	0.1	1.5	0.1	1.1		
<i>Glycine canescens</i>			0.1			
<i>Goodenia microptera</i>			0.1	0.3		Goodenia linear
<i>Gossypium australe</i>	0.1	0.5				
<i>Gossypium robinsonii</i>	1.5	2				
<i>Gossypium sturtianum</i>	1	1	1	0.6		
<i>Gymnanthera cunninghamii</i>	0.1	3	0.1	1	DUCR43-02	
<i>Hybanthus aurantiacus</i>			0.1	0.2		
<i>Ipomoea muelleri</i>	0.1	0.1	0.1	0.1		
<i>Ipomoea racemigera</i>			0.1	0.1		
<i>Jasminum didymum</i> subsp. <i>lineare</i>			0.1	0.5		
* <i>Malvastrum americanum</i>			0.1	0.2		
<i>Melaleuca bracteata</i>	15	4	1	0.5		
<i>Melaleuca glomerata</i>	30	5	0.1	0.4		
<i>Mimulus gracilis</i>			0.1	0.1	DUCR43-03	
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.2		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Oldenlandia crouchiana</i>			0.1			
<i>Petalostylis labicheoides</i>	0.1	2				
<i>Phyllanthus erwinii</i>			0.1	0.2		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2		
<i>Polycarpaea corymbosa</i>			0.1	0.2	DUCR43-01	Polycarpaea
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Senna notabilis</i>	0.1	0.1	0.1	0.8		
<i>Sesbania cannabina</i>			0.1	0.2		
* <i>Setaria verticillata</i>			0.1	0.3		
<i>Sida</i> sp. L (A.M.Ashby 4202)			0.1	0.1	DUCR43-02	Malvaceae two tone
<i>Solanum diversiflorum</i>			0.1	0.3		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stackhousia</i> sp. Indet			0.1	0.1		Yellow toobs

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Stemodia grossa</i>	0.1	0.2	2	0.2		
<i>Stylobasium spathulatum</i>			0.1	0.2		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.3		
<i>Triodia epactia</i>	0.1	0.3				
* <i>Vachellia farnesiana</i>	0.1	0.2				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-44

Date 26/10/2019 17/06/2020
Described by CvdB EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 518107 mE; 7528784 mN
 117.1758 E -22.346728 S
Veg Condition Very Good
Soil Sandy Clay Loam
Rock Type Dolerite, Granite
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus victrix* low scattered trees over *Acacia citrinoviridis*, *Acacia bivenosa* and *Gossypium robinsonii* tall to mid open shrubland over *Triodia angusta* mid open hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.1	2.5	0.1	2.5	DUCR48-01	Acacia bivenosa cross
<i>Acacia citrinoviridis</i>	8	5.5	8	7		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	3	0.1	1		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2	0.1			
<i>Acacia tumida</i> var. <i>pilbarensis</i>	0.1	3	0.1	3		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Alternanthera nodiflora</i>			0.1			
<i>Amaranthus undulatus</i>			0.1	0.3		
* <i>Bidens bipinnata</i>			0.1	0.1		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Bothriochloa ewartiana</i>			0.1	0.4		Maybe Chloris 3 purple
* <i>Cenchrus ciliaris</i>			0.1	0.1		
<i>Arivela viscosa</i>	0.1	0.1	0.1	0.3		
<i>Corchorus crozophorifolius</i>	0.1	0.1	0.1	0.1		Corchorus sp.
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.1		
<i>Cucumis variabilis</i>			0.1			
<i>Cymbopogon ambiguus</i>	0.1	0.5	0.1	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.1		
<i>Dicladantha forrestii</i>			0.1	0.3		Schenkia 38
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	0.1	1				
<i>Duperreya commixta</i>	0.1		0.1			
<i>Dysphania melanocarpa</i>			0.1	0.1		Dysphania rad
<i>Enneapogon lindleyanus</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.1	0.4		
<i>Eragrostis tenellula</i>			0.1	0.1		
<i>Eriachne mucronata</i>			0.1	0.3		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	0.1		0.1			Overhang
<i>Eucalyptus victrix</i>	2	9	2	9		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.4		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.1	0.1	0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
<i>Fimbristylis dichotoma</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.5		
<i>Glycine canescens</i>			0.1	0.1		
<i>Goodenia microptera</i>			0.1	0.1		Goodenia linear
<i>Goodenia muelleriana</i>			0.1			Goodenia leathery
<i>Gossypium robinsonii</i>	0.1	3	0.1	3		
<i>Hakea chordophylla</i>	0.1	0.4				
<i>Heliotropium tenuifolium</i>			0.1	0.2	DUCR44-01	Goodenia ptilotusy
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	0.6	0.1	0.6		Was monophylla
<i>Ipomoea racemigera</i>			0.1	0.1		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.5				
* <i>Malvastrum americanum</i>			0.1	0.1		
<i>Melaleuca glomerata</i>	0.1	2	0.1	2		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Paspalidium clementii</i>			0.1	0.1		Paspalidium tab
<i>Petalostylis labicheoides</i>	0.1	3	0.1	1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>			0.1	0.1		
<i>Polymeria ambigua</i>			0.1			Boerhavia schom
<i>Pterocaulon sphacelatum</i>			0.1			
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Ptilotus fusiformis</i>			0.1	0.3		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.2		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Solanum diversiflorum</i>			0.1	0.1		
* <i>Sonchus oleraceus</i>			0.1			
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	1.5	0.1	1		
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)			0.1	0.1		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.2		
<i>Triodia angusta</i>	18	0.5	18	0.5	DUCR44-01	Triodia blue island
<i>Triodia epactia</i>	2	0.5	2	0.5	DUCR44-02	



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-45

Date 28/10/2019 17/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 519469 mE; 7529032 mN
 117.1890 E -22.344474 S
Veg Condition Very Good
Soil Light Clay
Rock Type Ironstone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Acacia citrinoviridis*, *Acacia coriacea* subsp. *pendens* and *Gossypium robinsonii* tall sparse shrubland over *Eulalia aurea* low scattered tussock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.1	2	0.1	2.5		
<i>Acacia citrinoviridis</i>	3	4	3	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	4	1	4		
<i>Alternanthera nana</i>	0.1	0.2				
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Ammannia baccifera</i>			0.1	0.2		
<i>Amyema hilliana</i>	0.1					
<i>Amyema sanguinea</i> var. <i>sanguinea</i>			0.1			
<i>Androcalva luteiflora</i>			0.1	1		
<i>Aristida lazarensis</i>			0.1	1.2	DUCR45-02	
* <i>Bidens bipinnata</i>			0.1	0.3		
* <i>Bidens pilosa</i> var. <i>pilosa</i>			0.1	0.2		
<i>Blumea tenella</i>			0.1	0.1	DUCR45-04	Sonchus hairy
<i>Bothriochloa decipiens</i> var. <i>cloncurrrensensis</i>			1	1.2		Dichanthium tall
* <i>Cenchrus ciliaris</i>			0.1	0.3		
* <i>Cenchrus echinatus</i>			0.1	0.2		Burr-grass
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			0.1	0.1		Cheilanthes sp.
<i>Chrysopogon fallax</i>			0.1	1.2		
<i>Arivela viscosa</i>			0.1	0.1		
<i>Corchorus crozophorifolius</i>			0.1	0.4		
<i>Cyperus difformis</i>			0.1	0.3		Cyperus cunninghamii
<i>Cyperus vaginatus</i>	0.1	0.4	0.1	0.4		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.5	0.5		
<i>Dichanthium sericeum</i>	2	1				
<i>Dicladantha forrestii</i>			0.1	0.2		Samolus sp. Millstream
<i>Dodonaea lanceolata</i>	0.1	1.5	0.1	1.5		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Duperreya commixta</i>	0.1		0.1			
* <i>Echinochloa colona</i>	0.1	0.1			DUCR45-02	
<i>Eragrostis cumingii</i>			0.1	0.1		
<i>Eragrostis tenellula</i>	0.1	0.1	0.1	0.2		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	8	13	8	13		
<i>Eucalyptus victrix</i>	4	12	4	12		
<i>Eulalia aurea</i>	1	0.4	1	0.4		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.2		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.4		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.2		
<i>Fimbristylis microcarya</i>			0.1	0.3	DUCR45-05	Fimbristylis Duck
* <i>Flaveria trinervia</i>			1	0.5		
<i>Glycine canescens</i>			0.1			
<i>Gossypium robinsonii</i>	0.1	3	5	3		
<i>Gossypium sturtianum</i>	0.1	1.7	0.1	1.7		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)			0.1	0.7		
<i>Ipomoea racemigera</i>			0.1			Ipomoea small 2
<i>Jasminum didymum</i> subsp. <i>lineare</i>			0.1			
* <i>Malvastrum americanum</i>			0.1	0.5		
<i>Marsilea hirsuta</i>	0.1	0.1			DUCR45-01	
<i>Melaleuca glomerata</i>	0.1	2.2			DUCR45-03	
<i>Melhania oblongifolia</i>			0.1	0.4	DUCR45-01	Sida creek
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.2		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Paraneurachne muelleri</i>			0.1	0.2		
<i>Peripleura arida</i>			0.1	0.2	DUCR45-03	Daisy rough
<i>Phyllanthus maderaspatensis</i>	0.1	0.2	0.1	0.3		
<i>Pluchea dentex</i>			0.1	0.2		
<i>Pterocaulon sphacelatum</i>			0.1	0.2		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>	0.1	0.1				
* <i>Setaria verticillata</i>			2	0.2		
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			0.1	0.3		Sida rohlenae
<i>Solanum diversiflorum</i>			0.1	0.2		
* <i>Sonchus oleraceus</i>	0.1	0.1	0.1	0.1		
<i>Sporobolus australasicus</i>			0.1	0.2		
<i>Stemodia grossa</i>			2	0.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Stylidium fluminense</i>			0.1	0.2		
<i>Stylobasium spatulatum</i>			0.1	0.5		
<i>Themeda triandra</i>	0.1	0.6	0.1	0.6		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.2		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	1.5		
* <i>Vachellia farnesiana</i>	0.1	0.1	0.1	0.4		



Brockman Syncline Riparian Site DUCR-46

Date 28/10/2019 17/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 521359 mE; 7528782 mN
 117.2074 E -22.346709 S
Veg Condition Good
Soil Sandy Loam
Rock Type Dolerite
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation Low woodland of *Acacia citrinoviridis* with occasional scattered *Eucalyptus camaldulensis* subsp. *refulgens* over tall scattered shrubs of *Gossypium robinsonii* and *Stylobasium spathulatum* over open hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	3	2.5	3	2.5		
<i>Acacia citrinoviridis</i>	30	4	12	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	3	0.1	1		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	1	1.5	0.1	0.5		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1		0.1			
<i>Androcalva luteiflora</i>			0.1	0.1		
<i>Aristida contorta</i>			0.1	0.1	Ducr46-03	Aristida hola ?
<i>Boerhavia coccinea</i>			0.1	0.1		
* <i>Bothriochloa pertusa</i>			0.1	0.1	DUCR46-02	Grass wispy 8
<i>Capparis lasiantha</i>			0.1	0.1		
<i>Chrysopogon fallax</i>			0.1	0.5		Avena?
<i>Arivela viscosa</i>			0.1	0.1		
<i>Corchorus crozophorifolius</i>			0.1	0.5		
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	0.1	1	0.1	1		
<i>Corchorus tridens</i>			0.1	0.1		
<i>Cymbopogon ambiguus</i>	0.1	0.2	0.1	0.4		
<i>Dicladanthera forrestii</i>			0.1	0.1		Schenkia 38
<i>Duperreya commixta</i>			0.1			
<i>Enneapogon lindleyanus</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.1	0.1		
<i>Eriachne mucronata</i>			1	0.5		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	3	14	3	14		
<i>Eucalyptus victrix</i>	2	11	2	11		
<i>Eucalyptus xerothermica</i>	0.5	4	0.1	4		
<i>Eulalia aurea</i>	0.5	0.5	0.1	0.5		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>*Euphorbia hirta</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
<i>*Flaveria trinervia</i>			0.1	0.1		
<i>Goodenia microptera</i>			0.1	0.1		Goodenia linear
<i>Goodenia muelleriana</i>			0.1	0.1	DUCR46-01	Goodenia leathery
<i>Gossypium australe</i>			0.1	0.1		
<i>Gossypium robinsonii</i>	0.2	1.7	0.2	1.7		
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	2	2	0.1	1.5		
<i>Heliotropium tenuifolium</i>			0.1	0.1		Goodenia ptilotusy
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.5	1	0.5	1		
<i>Ipomoea racemigera</i>			0.1	0.1		Ipomoea race
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	1.7	0.1	0.1		
<i>*Malvastrum americanum</i>			0.1	0.1		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Paraneurachne muelleri</i>			0.1	0.1		
<i>Paspalidium clementii</i>			0.1	0.1		Paspalidium tab
<i>Petalostylis labicheoides</i>	0.5	1.8	0.1	1.8		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>			0.1	0.1		
<i>Polymeria ambigua</i>			0.1	0.1		Boerhavia schom
<i>Portulaca oleracea</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Salsola australis</i>			0.1	0.2	DUCR46-04	Salsola aus
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.1		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>*Solanum nigrum</i>			0.1	0.1		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Styobasium spathulatum</i>	1	1.7	1	1.7		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Triodia angusta</i>	0.5	0.4	0.5	0.4		
<i>Triodia epactia</i>	20	0.8	12	0.8		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-47

Date 28/10/2019 17/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 523011 mE; 7528133 mN
 117.2234 E -22.352549 S
Veg Condition Very Good
Soil Sand
Rock Type Basalt, Dolerite, Ironstone
Fire Age >10 yrs
Habitat Major Drainage Line

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Eucalyptus victrix* mid to low open woodland over *Acacia citrinoviridis*, *Acacia coriacea* subsp. *pendens* and *Melaleuca glomerata* tall sparse shrubland over *Eulalia aurea* low sparse tussock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	3	6	4	1.5	DUCR47-01	Acacia citrin long
<i>Acacia coleii</i>			0.1	0.3		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	4				
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.6	0.1	0.5		
<i>Acacia tumida</i> var. <i>pilbarensis</i>	0.1	3	0.1	0.5		
<i>Alternanthera nana</i>	0.1	0.1				
<i>Ammannia baccifera</i>			0.1	0.2		
<i>Androcalva luteiflora</i>			0.1	0.3		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.1	0.1	0.2		
<i>Aristida inaequiglumis</i>	0.1	0.4	0.1	0.5	DUCR53-08	Aristida point
* <i>Bidens bipinnata</i>			0.1	0.5		
<i>Boerhavia coccinea</i>			0.1			
<i>Bothriochloa decipiens</i> var. <i>cloncurrrens</i>			0.1	0.8		Dichanthium tall
<i>Bulbostylis barbata</i>			0.1	0.2		
* <i>Cenchrus ciliaris</i>			0.5	0.3		
<i>Chrysopogon fallax</i>			0.1	1		
<i>Arivela viscosa</i>			0.1	0.4		
<i>Corchorus tridens</i>			0.1	0.1		
<i>Cyperus difformis</i>			0.1	0.3		Cyperus cunning
<i>Cyperus squarrosus</i>			0.1	0.1		Cyperus hesp
<i>Cyperus vaginatus</i>	0.1	0.5	0.1	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.4		
<i>Duperreya commixta</i>	0.1		0.1			
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.1	0.8		Dichanthium sericeum
<i>Eragrostis cumingii</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Eragrostis tenellula</i>			0.1	0.2		
<i>Eriachne mucronata</i>	0.1	0.1				
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	12	15	8	15		
<i>Eucalyptus victrix</i>	5	10	2	10		
<i>Eulalia aurea</i>	1	0.5	1	0.5		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.3		
* <i>Euphorbia hirta</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	0.1	0.1	0.1	0.1		
<i>Fimbristylis microcarya</i>			0.1	0.3		Fimbristylis duck
* <i>Flaveria trinervia</i>	0.1	0.1	2	0.4		
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	0.1	3				
<i>Glycine canescens</i>			0.1			
<i>Goodenia lamprosperma</i>	0.1	0.2				
<i>Gossypium robinsonii</i>	0.1	2.2	1	1.5		
<i>Gossypium sturtianum</i>	0.1	1.5	0.1	1.5		
<i>Hybanthus aurantiacus</i>	0.1	0.2	0.1	0.1		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	0.1	1.6	0.1	0.6		
<i>Ipomoea racemigera</i>			0.1			Ipomoea small 2
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.3	0.1	0.3		
* <i>Malvastrum americanum</i>			0.1	0.3		
<i>Marsilea hirsuta</i>			0.1	0.1		
<i>Melaleuca glomerata</i>	0.1	4				
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.3		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Paspalidium constrictum</i>			0.1	0.2		
<i>Petalostylis labicheoides</i>			0.1	0.3		
<i>Phyllanthus maderaspatensis</i>	0.1	0.2	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.2	DUCR53-03	P. dentex long
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>			0.1	0.2		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Sida echinocarpa</i>			0.1	0.5		Sida sp. spic pan
<i>Solanum diversiflorum</i>			0.1	0.3		
* <i>Solanum nigrum</i>			0.1	0.3		
* <i>Sonchus oleraceus</i>	0.1	0.1	0.1	0.3		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>	0.1	0.5	4	0.4		
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	1	0.1	0.4		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Themeda triandra</i>			0.1	1.2		
<i>Triodia epactia</i>	0.1	0.4				
* <i>Vachellia farnesiana</i>	0.1	0.7				
<i>Vigna lanceolata</i> var. <i>lanceolata</i>	0.1					



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-48

Date 25/10/2019 17/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 525135 mE; 7527660 mN
 117.2441 E -22.356787 S
Veg Condition Very Good
Soil Sandy Clay Loam
Rock Type none
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia bivenosa*, *Acacia pyrifolia* var. *pyrifolia* and *Acacia citrinoviridis* tall to mid shrubland over *Triodia pungens* mid to low open hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	20	3	8	0.5	Ducr48.01	Acacia bivenosa cross
<i>Acacia citrinoviridis</i>	3	2	1	0.5		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2	0.1	0.8		
<i>Aristida inaequiglumis</i>			0.1	0.6		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Bonamia erecta</i>	0.1	0.4	0.1	0.2		
<i>Arivela viscosa</i>			0.1	0.3		
<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>			0.1	0.1		
<i>Enneapogon lindleyanus</i>			0.1	0.4		
<i>Enneapogon polyphyllus</i>			0.1	0.1		
<i>Eriachne mucronata</i>			0.1	0.3		
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>						Supplementary records
<i>Eucalyptus xerothermica</i>						Supplementary records
<i>Eulalia aurea</i>	0.1	0.3	0.1	0.5		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.5		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.2		
<i>Goodenia forrestii</i>			0.1	0.2		Goodenia wide hairy
<i>Goodenia microptera</i>			0.1	0.2		
<i>Goodenia muelleriana</i>			0.1	0.2	DUCR48-01	
<i>Gossypium robinsonii</i>	0.1	2	4	1.5		
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	0.1	3	0.1	0.3		
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.1	1.5	0.1	1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Heliotropium tenuifolium</i>			0.1	0.2		
<i>Hybanthus aurantiacus</i>			0.1	0.2		
<i>Indigofera rugosa</i>			0.1	0.3		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)			0.1	0.8		
<i>Indigofera</i> sp. Indet	0.1	0.4				
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	1.5	0.1	0.1		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Petalostylis labicheoides</i>	0.1	3	5	1.2		
<i>Phyllanthus erwinii</i>			0.1	0.2		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.2		
<i>Rhynchosia minima</i>			0.1	0.2		
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.1	0.4	0.1	0.4		
<i>Senna notabilis</i>			0.1	0.2		
* <i>Setaria verticillata</i>			0.1	0.1		
<i>Sida fibulifera</i>			0.1	0.1		
<i>Solanum diversiflorum</i>			0.1	0.2		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	1.5	0.1	0.8		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Triodia angusta</i>	0.1	0.5				
<i>Triodia epactia</i>	12	0.5	0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-49

Date 25/10/2019 17/06/2020
Described by CvdB EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 527223 mE; 7526909 mN
 117.2644 E -22.363546 S
Veg Condition Excellent
Soil Clayey Sand
Rock Type Dolerite, Ironstone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Eucalyptus victrix* mid to low open woodland over *Acacia citrinoviridis* and *Gossypium robinsonii* tall shrubland over *Eulalia aurea* low sparse tussock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
? Cyperaceae sp. Indet			0.1	0.3	DUCR49-06	Wet little friend
<i>Abutilon macrum</i>			0.1	0.1		
<i>Acacia citrinoviridis</i>	5	4	5	4		
<i>Acacia colei</i>	0.1		0.1	2		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1					
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>			0.1	0.3		
<i>Acacia tumida</i> var. <i>pilbarensis</i>	0.1					
<i>Adriana tomentosa</i> var. <i>tomentosa</i>			0.1	0.3		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Amaranthus undulatus</i>			0.1	0.5		
<i>Ammannia baccifera</i>			0.1	0.23		
<i>Androcalva luteiflora</i>	0.1		0.1	0.1		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>			0.1	0.1		
* <i>Bidens bipinnata</i>			0.1	0.1		
<i>Bothriochloa ewartiana</i>			0.1	0.5		Chloris 3 purple
<i>Capparis lasiantha</i>	0.1		0.1			
<i>Capparis umbonata</i>	0.1				DUCR49-06	
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			0.1	0.2		Cheilanthes fern recoll
<i>Corchorus sidoides</i>			0.1	0.1		
<i>Corchorus tridens</i>			0.1	0.1		
<i>Cucumis variabilis</i>			0.1			
<i>Cyperus difformis</i>			0.1	0.4		Cyperus triangle
<i>Cyperus vaginatus</i>	0.1	0.6	0.1	0.6		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.1		
<i>Dicladantha forrestii</i>	0.1				KJopp01	
<i>Duperreya commixta</i>			0.1			
<i>Dysphania melanocarpa</i>			0.1	0.1		Dysphania rad
<i>Dysphania plantaginella</i>			0.1	0.1		Dysphania long

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Enneapogon lindleyanus</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.5	1		
<i>Eragrostis cumingii</i>			0.1	0.1		Eragrostis collected
<i>Eragrostis tenellula</i>			0.1	0.4		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	20	11	20	11		
<i>Eucalyptus victrix</i>	5	8	5	8		
<i>Eulalia aurea</i>	1		1			
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.5		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.2		
* <i>Flaveria trinervia</i>			0.1	1		
<i>Glycine canescens</i>			0.1	0.1		
<i>Gossypium robinsonii</i>	0.1	2.8	1	1		
<i>Gossypium sturtianum</i>	0.1	2.1	2	1	DUCR49-01	
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	0.1					
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.8				
<i>Petalostylis labicheoides</i>	0.1	3				
<i>Pluchea dentex</i>	0.1	0.1				
<i>Roepera</i> ? <i>eichleri</i>			0.1	0.1	DUCR49-03	Two leaf ovate succulent
<i>Santalum lanceolatum</i>	0.1	2				
<i>Senna notabilis</i>			0.1	0.3		
* <i>Setaria verticillata</i>			0.1	0.5		
<i>Solanum diversiflorum</i>			0.1	0.2		
* <i>Sonchus oleraceus</i>	0.1	0.2	0.1	0.4		was Sonchus hydrophilus
<i>Stackhousia</i> sp. Indet			0.1	0.1		Yellow toobs
<i>Stemodia grossa</i>			0.1	0.2		
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>			0.1	0.1		
<i>Themeda triandra</i>	0.1		0.1	0.5		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		
<i>Triodia longiceps</i>	0.1	0.8				
* <i>Vachellia farnesiana</i>	0.1	0.3	0.1	0.3		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>			0.1	0.1		
<i>Wahlenbergia tumidifruca</i>			0.1	0.1	DUCR49-01	Purple toobs



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-50

Date 28/10/2019 17/06/2020
Described by KJ & SC KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 529614 mE; 7526848 mN
 117.2876 E -22.364052 S
Veg Condition Very Good
Soil Sandy Loam
Rock Type river rock
Fire Age >10 yrs
Habitat Medium Drainage Line
Vegetation Mid open woodland of *Eucalyptus camaldulensis* subsp. *refulgens* over low woodland of *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* over tall sparse shrubland of *Melaleuca glomerata* and *Stylobasium spathulatum* over scattered *Triodia pungens* hummock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>	25	4	25	4		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	2	6	2	6		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1	0.1	1		
<i>Acacia tetragonophylla</i>	0.1		0.1			
<i>Amyema preissii</i>	0.1	0	0.1		DUCR50-03	Amyema preissii
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	0.1		0.1			
<i>Androcalva luteiflora</i>	0.1	1	0.1	1.5		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Capparis lasiantha</i>	0.1	0.4	0.1	0.5		
* <i>Cenchrus ciliaris</i>	1	0.5	1	0.5		
<i>Chrysopogon fallax</i>			0.1	1.2		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Cyperus vaginatus</i>	0.1		0.1	0.5		
<i>Diplachne fusca</i> subsp. <i>fusca</i>	0.1		0.1	1.2	DUCR50-04	Leptochloa fusca
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	0.1	1	0.1	1		
<i>Duperreya commixta</i>	0.1	0	0.1			
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.1		
<i>Enteropogon ramosus</i>			0.1	0.6		Dichanthium sericeum
<i>Eriachne mucronata</i>			0.1	0.5		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	5	15	5	15		
<i>Eulalia aurea</i>	0.5	0.7	0.5	0.7		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.5		
<i>Glycine canescens</i>			0.1	0.1		
<i>Goodenia muelleriana</i>			0.1	0.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Gossypium robinsonii</i>	0.1	1	0.1	1		
<i>Gossypium sturtianum</i>	3	1	3	1		
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.1	1	0.1	1		
<i>Haloragis gossei</i>			0.1	0.2		
<i>Heliotropium tenuifolium</i>			0.1	0.2		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.5	0.1	1.5		
* <i>Malvastrum americanum</i>			0.1	0.3		
<i>Melaleuca glomerata</i>	1	4	1	4		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.3		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.2		
<i>Paraneurachne muelleri</i>			0.1	0.2		
<i>Paspalidium constrictum</i>			0.1	0.2		
<i>Petalostylis labicheoides</i>	0.5	3	0.5	3		
<i>Pluchea dentex</i>			0.1	0.2		
<i>Ptilotus auriculifolius</i>			0.1	0.3		
<i>Rhynchosia minima</i>			0.1	0.2		
<i>Schenkia clementii</i>	0.1	0.1	0.1	0.1	DUCR50-02	Five petal pink
<i>Senna notabilis</i>			0.1	0.1		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Sida</i> sp. L (A.M.Ashby 4202)			0.1	0.2		Sida fib long
<i>Solanum diversiflorum</i>			0.1	0.2		
* <i>Sonchus oleraceus</i>	0.1	0.1	0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.2		
<i>Stylobasium spathulatum</i>	3	2	3	2		
<i>Themeda triandra</i>			0.1	1		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.3		
<i>Triodia angusta</i>	0.1	0.6	0.1	0.4		
<i>Triodia epactia</i>	2	0.5	2	0.5		Triodia pungens
<i>Waltheria indica</i>			0.1	0.2		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-52

Date 28/10/2019 17/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 531781 mE; 7527594 mN
 117.3086 E -22.357279 S
Veg Condition Excellent
Soil Sandy Clay Loam
Rock Type none
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus xerothermica* and *Eucalyptus camaldulensis* subsp. *refulgens* mid to low sparse woodland over *Acacia citrinoviridis* and *Petalostylis labicheoides* and *Acacia pyrifolia* var *pyrifolia*.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon amplum</i>			0.1	1		Abutilon macrum
<i>Acacia bivenosa</i>	0.1	2			DUCR48-01	
<i>Acacia citrinoviridis</i>	45	5	1	1		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	4	0.1	0.5		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	2.2	0.1	0.6		
<i>Amaranthus undulatus</i>			0.1	0.2		
<i>Androcalva luteiflora</i>	0.1	1.5	0.1	1		
<i>Aristida inaequiglumis</i>	0.1	0.2	0.1	0.6	DUCR53-08	Aristida point
<i>Capparis lasiantha</i>	0.1	0.7	0.1	0.3		
<i>Chrysopogon fallax</i>			0.5	1.4		
<i>Arivela viscosa</i>			0.1	0.4		
<i>Corchorus tridens</i>			0.1	0.3		
<i>Dodonaea lanceolata</i>	0.1	2	0.1	0.5	DUCR52-01	
<i>Duperreya commixta</i>	0.1		0.1			
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.2		
<i>Enteropogon ramosus</i>			0.1	0.8		Dichanthium sericeum
<i>Eragrostis tenellula</i>			0.1	0.3		
<i>Eriachne mucronata</i>			0.1	0.3		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	1	10	1	10		
<i>Eucalyptus xerothermica</i>	1	7	1	7		
<i>Eulalia aurea</i>	0.1	0.3	0.1	0.5		
<i>Euphorbia biconvexa</i>			0.1	0.2		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.5		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.4		
<i>Glycine canescens</i>			0.1			

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Goodenia muelleriana</i>			0.1	0.2		
<i>Gossypium robinsonii</i>	0.1	1.8	18	2		
<i>Gossypium sturtianum</i>			5	1.2		
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.1	0.6	0.1	0.4		
<i>Haloragis gossei</i>			0.1	0.2		
<i>Ipomoea coptica</i>			0.1			
<i>Ipomoea racemigera</i>			0.1			Ipomoea small 2
* <i>Malvastrum americanum</i>			0.1	0.3		
<i>Melhania oblongifolia</i>			0.1	0.3		Sida creek
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.3		Nicotiana sticky flesh
<i>Oldenlandia crouchiana</i>			0.1	0.2		
<i>Paraneurachne muelleri</i>			0.1	0.2		
<i>Paspalidium constrictum</i>			0.1	0.2		
<i>Perotis rara</i>			0.1	0.2		
<i>Petalostylis labicheoides</i>	0.1	3	4	2		
<i>Phyllanthus erwinii</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.3		
<i>Pluchea dentex</i>			0.1	0.2		
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.2		
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.1	2				DUCR52-02
<i>Senna notabilis</i>			0.1	0.5		
* <i>Setaria verticillata</i>			0.1	0.3		
<i>Sida</i> sp. L (A.M.Ashby 4202)			0.1	0.1		Sida fib long
<i>Solanum diversiflorum</i>			0.1	0.3		
* <i>Sonchus oleraceus</i>			0.1	0.1		
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.2		
<i>Stylobasium spathulatum</i>	0.1	1.4	0.1	0.8		
<i>Themeda triandra</i>			0.1	0.6		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.3		
<i>Triodia wiseana</i>	0.1	0.3				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-53

Date 26/10/2019 17/06/2020
Described by CvdB EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 533487 mE; 7527873 mN
 117.3252 E -22.354723 S
Veg Condition Excellent
Soil Clay Loam
Rock Type Granite
Fire Age >10 yrs
Habitat Medium Drainage Line

Vegetation *Eucalyptus victrix* and *Eucalyptus xerothermica* low scattered trees over *Acacia citrinoviridis* and *Acacia bivenosa* tall open shrubland over *Themeda triandra* low sparse tussock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	1	3	1	3	DUCR48-01	Acacia bivenosa cross
<i>Acacia citrinoviridis</i>	6	5.5	6	5.5		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.5	0.1	1.5		
<i>Androcalva luteiflora</i>	0.1	2	0.1	2	DUCR53-01	
<i>Aristida inaequiglumis</i>	0.1	0.5	0.1	0.5	DUCR53-08	Aristida point
* <i>Bidens bipinnata</i>			0.1	0.3		
* <i>Bothriochloa pertusa</i>			0.1	0.5		Grass wispy 8
* <i>Cenchrus ciliaris</i>			0.1	0.1		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>			0.1	0.1		Fern
<i>Dichanthium fecundum</i>	2	0.8	3	0.8	DUCR53-02	Eulalia fresh
<i>Duperreya commixta</i>	0.1		0.1			
* <i>Echinochloa colona</i>	0.1	0.4			DUCR53-07	
<i>Eragrostis tenellula</i>			0.1	0.1		
<i>Eucalyptus victrix</i>	2	9	2	9		
<i>Eucalyptus xerothermica</i>	0.1	6	0.1	6		
<i>Euphorbia</i> ? <i>hirta</i>	0.1	0.1			DUCR53-05	
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.2		
<i>Glycine canescens</i>			0.1			
<i>Gossypium robinsonii</i>	0.1	1.8	0.1	1.8		
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.6	0.1	0.6		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.2		Nicotiana sticky flesh
<i>Paspalidium constrictum</i>			0.1	0.4	DUCR53-01	
<i>Petalostylis labicheoides</i>	0.1	2.8	0.1	2.8		
<i>Phyllanthus erwinii</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1			

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Pluchea dentex</i>	0.1	0.1	0.1	0.2	DUCR53-03	Pluchea dentex long
<i>Pseudognaphalium luteoalbum</i>	0.1	0.1			DUCR53-04	
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>	0.1	0.1			DUCR53-06	
<i>Santalum lanceolatum</i>	0.1	1.8	0.1	1.8		
* <i>Setaria verticillata</i>			0.1	0.1		Sonchus hydro
* <i>Sonchus oleraceus</i>	0.1	0.1	0.1	1		
<i>Stemodia</i> sp. Indet	0.1	0.1	0.1	0.2		Stemodia sp.
<i>Stylobasium spathulatum</i>	0.1	1.5	0.1	1.6		
<i>Themeda triandra</i>	0.1	0.4	0.1	0.5		
<i>Wahlenbergia tumidifruca</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-54

Date 1/11/2019 17/06/2020
Described by CvdB & EEB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 535883 mE; 7527510 mN
 117.3485 E -22.357960 S
Veg Condition Excellent
Soil Sandy Clay Loam
Rock Type Basalt, Calcrete
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Eucalyptus victrix* and *Eucalyptus xerothermica* low scattered trees over *Acacia citrinoviridis* tall sparse shrubland over *Eulalia aurea* and **Cenchrus ciliaris* low scattered tussock grasses.

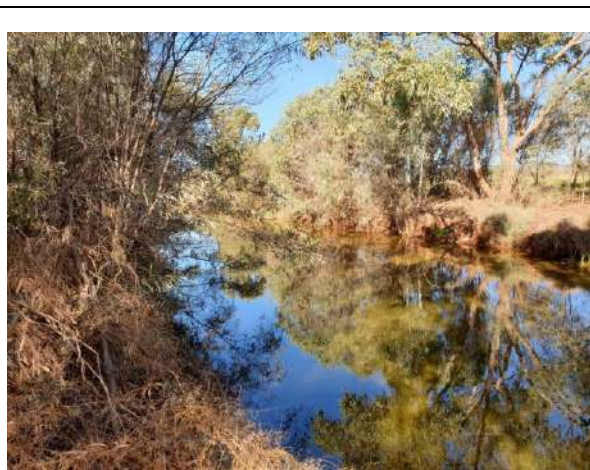
SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.1	2	0.1	2		
<i>Acacia citrinoviridis</i>	8	5	8	5		
<i>Androcalva luteiflora</i>	0.1	1.5	0.1	1.5		
* <i>Bidens bipinnata</i>			0.1	0.3		
<i>Bothriochloa decipiens</i> var. <i>cloncurrrens</i>			0.1	1.2		Dichanthium tall
<i>Capparis lasiantha</i>			0.1	0.3		
<i>Chrysopogon fallax</i>			0.1	1		
<i>Cymbopogon</i> sp. Indet	0.1	0.3				
<i>Dichanthium fecundum</i>	0.1	0.4			DUCR54-01	
<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>			0.1	0.1		
<i>Duperreya commixta</i>	0.1		0.1			
<i>Enteropogon ramosus</i>			0.1	0.8		Dichanthium sericeum
<i>Eragrostis tenellula</i>	0.1	0.2	0.1	0.2		
<i>Eremophila longifolia</i>	0.1	0.5	0.1	1		
<i>Eucalyptus xerothermica</i>	1	6	1	6		
<i>Eulalia aurea</i>	1	0.4	4	0.4		
<i>Euphorbia biconvexa</i>			0.1	0.1		
* <i>Euphorbia hirta</i>			0.1	0.2		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.3		
* <i>Flaveria trinervia</i>			1	0.5		
<i>Gossypium sturtianum</i>	0.1	1.4	0.1	1.6		
<i>Haloragis gossei</i>			0.1	0.2		
* <i>Malvastrum americanum</i>			0.1	0.3		
<i>Petalostylis labicheoides</i>	0.1	2.5	0.1	3		
<i>Phyllanthus maderaspatensis</i>	0.1	0.1	0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.1	0.1	0.2	DUCR53-03	P. dentex long
<i>Pseudognaphalium luteoalbum</i>			0.1	0.3		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	0.3		
* <i>Setaria verticillata</i>			0.1	0.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>*Sonchus oleraceus</i>	0.1	0.3	0.1	0.3		
<i>Sporobolus australasicus</i>			0.1	0.6		
<i>Stemodia grossa</i>	0.1	0.1	0.1	0.2		
<i>Stylobasium spathulatum</i>	0.1	2	0.1	2.5		
<i>Themeda triandra</i>			0.1	0.8		
<i>Triodia angusta</i>	0.1	0.4	0.1	0.6		
<i>Typha domingensis</i>	0.1	0.7	0.1	1.5		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-55

Date 1/11/2019 17/06/2020
Described by CvdB & EEB EEB & JE
Type Quadrat 50m x 50m
Location MGA Zone 50
 536655 mE; 7527053 mN
 117.3560 E -22.362064 S
Veg Condition Excellent
Soil Clay Loam Sandy
Rock Type Basalt, Calcrete
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus victrix* and *Eucalyptus xerothermica* low sparse woodland over *Acacia citrinoviridis* tall shrubland over *Eulalia aurea* and **Cenchrus ciliaris* low scattered tussock grasses.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.1	1.8	0.1	2		
<i>Acacia citrinoviridis</i>	60	5	60	5		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.6	0.1	1.6		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Androcalva luteiflora</i>	0.1	1.5	0.1	1.5		
<i>Aristida inaequiglumis</i>			0.1	0.6		
* <i>Bidens bipinnata</i>			0.1	0.1		
* <i>Bidens pilosa</i> var. <i>pilosa</i>			0.1	0.5		
<i>Capparis lasiantha</i>	0.1	0.5	0.1	0.5		
* <i>Cenchrus ciliaris</i>	1	0.2	1	0.2		
<i>Arivela viscosa</i>			0.1	0.4		
<i>Convolvulus clementii</i>			0.1	0.1		Ipomoea variable leaf
<i>Corchorus tridens</i>			0.1	0.1		
<i>Cymbopogon ambiguus</i>	0.1	0.2				
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.1		
<i>Duperreya commixta</i>	0.1		0.5			
<i>Dysphania</i> sp. Indet	0.1	0.1	0.1	0.1		Dysphania sp.
<i>Enneapogon robustissimus</i>			0.1	1	DUCR55-02	Enneapogon caerulescens
<i>Enteropogon ramosus</i>			0.5	0.6	DUCR55-03	Dichotoma?
<i>Eragrostis tenellula</i>			0.1	0.3		
<i>Eremophila longifolia</i>	0.1	2				
<i>Eriachne pulchella</i>	0.1	0.1				
<i>Eucalyptus victrix</i>	1	9	1	9		
<i>Eucalyptus xerothermica</i>	0.1	6	0.1	6		
<i>Euphorbia biconvexa</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>			0.1	0.2		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Glycine canescens</i>			0.1			
<i>Goodenia muelleriana</i>	0.1	0.2	0.1	0.1		
<i>Gossypium robinsonii</i>	0.1	2	0.1	2		
<i>Gossypium sturtianum</i>	0.1	2	0.5	2		
<i>Gossypium sturtianum</i> var. <i>sturtianum</i>			0.1	0.7		
<i>Hakea lorea</i> subsp. <i>lorea</i>	0.1	4	0.1	4		
<i>Hybanthus aurantiacus</i>	0.1	0.1	0.1	0.1		
Indeterminant sp.			0.1	0.1		Sparaxis
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.5				
<i>Lysiana casuarinae</i>			0.1			
<i>Maireana villosa</i>			0.1	0.1		Maireana succulent hairy
* <i>Malvastrum americanum</i>			0.1	0.1		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.3		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Petalostylis labicheoides</i>	0.1	3	0.1	3		
<i>Phyllanthus erwinii</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>	0.1	0.1	0.1	0.1		
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	0.2		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Santalum lanceolatum</i>	0.1	2	0.1	2		
<i>Scaevola spinescens</i>	0.1	0.6				
* <i>Setaria verticillata</i>			0.1	0.1		
<i>Solanum diversiflorum</i>			0.1	0.1		
<i>Solanum lasiophyllum</i>			0.1	0.2		Solanum orb
* <i>Sonchus oleraceus</i>	0.1	0.2				
<i>Stemodia grossa</i>	0.1	0.1	0.1	0.3		
<i>Stylobasium spathulatum</i>	0.1	2.1	3	2.1		
<i>Themeda triandra</i>	0.1	0.5	0.1	0.1		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	0.1	0.1	0.1	0.1	DUCR55-01	Trachymene ?
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.1		
<i>Triodia angusta</i>	0.1	0.7				
<i>Triodia epactia</i>	0.1	0.4	0.1	0.4		
<i>Wahlenbergia tumidifruca</i>			0.1	0.1		Wahlen grac



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-56

Date 1/11/2019 17/06/2020
Described by KJ & SC KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 536889 mE; 7525183 mN
 117.3583 E -22.378954 S
Veg Condition Good
Soil Clay Loam
Rock Type none
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis* tall shrubland over isolated grass and herbs.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia aptaneura</i>	0.2	6	0.2	6	DUCR56-03	Mulga duck
<i>Acacia citrinoviridis</i>	70	6	70	6		
<i>Alternanthera nana</i>			0.1	0.2		
<i>Alternanthera nodiflora</i>	0.1	0.1	0.1	0.2	DUCR56-04	
<i>Ammannia baccifera</i>			0.1	0.4		
* <i>Bidens bipinnata</i>	0.1	0.1	0.1	0.1		
<i>Capparis lasiantha</i>			0.1	0.2		
* <i>Cenchrus ciliaris</i>	0.1	0.3	0.1	0.3		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	0.1	0.1	0.1	0.1		
* <i>Erigeron bonariensis</i>	0.1	0.1	0.1	0.3		
* <i>Cyclosporum leptophyllum</i>	0.1		0.1		DUCR57-02	
* <i>Cynodon dactylon</i>	0.1	0.1	0.1	0.1		
<i>Cyperus difformis</i>	0.1	0.5	0.1	0.3	DUCR56-02	Cyperus cunninghamii
<i>Duperreya commixta</i>	0.1	0	0.1			
* <i>Echinochloa colona</i>			0.5	0.5		
<i>Eragrostis tenellula</i>	0.1	0.1	0.1	0.4		
<i>Eucalyptus xerothermica</i>	10	6	10	6		
<i>Eulalia aurea</i>			0.1	0.5		
<i>Euphorbia biconvexa</i>			0.1	0.2		
<i>Glycine canescens</i>	0.1	0.1			DUCR56-07	
<i>Ipomoea plebeia</i>	0.1	0	0.1		DUCR56-05	Ipomoea fuzzy
<i>Ipomoea racemigera</i>			0.1			Ipomoea small 2
<i>Lepidium muelleri-ferdinandii</i>	0.1	0.1			DUCR56-08	
<i>Pseudognaphalium luteoalbum</i>	0.1	0.1	0.1	0.4	DUCR56-01	Daisy woolly green
<i>Rhynchosia minima</i>	0.1	0.5			DUCR56-06	
<i>Rostellularia adscendens</i> var. <i>clementii</i>	0.1	0.1			DUCR56-09	
* <i>Setaria verticillata</i>	0.1	0.1	0.1	0.3		
* <i>Solanum nigrum</i>	0.1	0.1	0.1	0.6		
* <i>Sonchus oleraceus</i>	0.1	0.1	0.1	0.3		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Stemodia grossa</i>	0.1	0.1	0.1	0.3		
<i>Stylobasium spatulatum</i>	0.2	2	0.1	2		
<i>Symphotrichum squamatum</i>			0.1	0.3	DUCR56-01	Daisy skinny
<i>Typha domingensis</i>	0.1	0.1	0.1	1		
* <i>Vachellia farnesiana</i>	0.1	1.2	0.1	1.2		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-57

Date 1/11/2019 17/06/2020
Described by KJ & SC EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 537754 mE; 7524004 mN
 117.3667 E -22.389591 S
Veg Condition Good
Soil Clay Loam
Rock Type riverstone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Acacia citrinoviridis* tall shrubland over *Acacia pyrifolia* var. *pyrifolia* and *Stylobasium spathulatum* sparse shrubland over sparse grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia bivenosa</i>	0.5	1.5	0.1	1.5		
<i>Acacia citrinoviridis</i>	70	6	60	6		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	1	1.8	1	1.8		
<i>Acacia tumida</i> var. <i>pilbarensis</i>	0.2	1.8				
* <i>Aerva javanica</i>	0.1	0.4				
<i>Alternanthera nana</i>			0.1	0.2		
<i>Ammannia baccifera</i>			0.1			
<i>Anthobolus leptomerioides</i>			0.1	2		
<i>Aristida inaequiglumis</i>			0.1	0.2		
<i>Capparis lasiantha</i>			0.1			
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	0.1	1				
* <i>Cenchrus ciliaris</i>	10	0.6	0.1	0.1		
* <i>Cenchrus clandestinus</i>	1	0.1	0.1	0.2		Kikuyu
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1			
* <i>Erigeron bonariensis</i>	0.1	0.1	0.1	0.1		
<i>Corchorus tridens</i>			0.1	0.7		
* <i>CyclospERMUM leptophyllum</i>	0.1	0.1			DUCR57-02	
* <i>Cynodon dactylon</i>	2	0.1	2	0.1	DUCR57-01	
<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>	0.1	0.1				
<i>Duperreya commixta</i>	0.1	0	0.1	0		
* <i>Echinochloa colona</i>			0.1	0.4		Paspalidium / echinochloa
<i>Eragrostis tenellula</i>	0.1	0.1	0.1	0.1		
<i>Eriachne mucronata</i>	0.1	0.1	0.1	0.2		
<i>Eucalyptus xerothermica</i>	5	6	5	6		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	0.1	0.1	0.1		
<i>Euphorbia coghlanii</i>	0.1	0.2				
* <i>Euphorbia hirta</i>			0.1	0.2		
<i>Euphorbia</i> sp. Indet	0.1	0.1				

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>*Flaveria trinervia</i>			0.1	0.2		
<i>Glycine canescens</i>			0.1			
<i>Gossypium australe</i>	0.1	0.4				
<i>Gossypium robinsonii</i>	1	2.5	1	2.5		
<i>Hybanthus aurantiacus</i>	0.1	0.1				
<i>Ipomoea muelleri</i>			0.1			
<i>*Malvastrum americanum</i>			0.1	0.2		
<i>Marsilea hirsuta</i>			0.1	0.1		
<i>Paspalidium constrictum</i>	0.1	0.2			DUCR57-03	
<i>Petalostylis labicheoides</i>	1	2.5	1	2.5		
<i>Phyllanthus maderaspatensis</i>			0.1	0.3		
<i>Pluchea dentex</i>			0.1			
<i>Rhynchosia minima</i>			0.1			
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	0.2	1.2				
<i>*Solanum nigrum</i>			0.1			
<i>*Sonchus oleraceus</i>	0.1	0.1	0.1	0.1		
<i>Stemodia grossa</i>	0.1	0.2	0.1	0.3		
<i>Stylobasium spathulatum</i>	1	1.8	1	1.5		
<i>Themeda triandra</i>			0.1			
<i>Triodia epactia</i>	5	0.8	0.1	0.8		Triodia pungens
<i>Uvedalia linearis</i>			0.1	0.3		Wahlenbergia?



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-58

Date 1/11/2019 15/06/2020
Described by CvdB KG & SC
Type Quadrat 50m x 50m
Location MGA Zone 50
 454959 mE; 7510798 mN
 116.5620 E -22.508710 S
Veg Condition Good
Soil Loamy Sand
Rock Type alluvial stone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Acacia citrinoviridis* with occasional *Eucalyptus victrix* mid to low sparse woodland over *Acacia citrinoviridis* and **Vachellia farnesiana* mid to tall sparse shrubland over **Cenchrus ciliaris* low scattered tussock grasses

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)	0.1	1	0.1	1.5		
<i>Acacia citrinoviridis</i>	2	11	2	11		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	0.2	0.1	0.2		
<i>Acacia synchronicia</i>	0.1	1	0.1	1		
* <i>Aerva javanica</i>	0.1	0.3	0.1	0.5		
<i>Amaranthus undulatus</i>			0.1	0.2		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3	0.1	0.1		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Bonamia</i> ? <i>pilbarensis</i>	0.1	0.1	0.1	0.1	DUCR58-02	Bonamia ground
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	0.1	1.5	0.1	0.4		
* <i>Cenchrus ciliaris</i>	1	0.2	10	0.4		
* <i>Cenchrus setiger</i>	0.1	0.2	3	0.4		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>			1	1.2		
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	0.1	0.8	0.1	1		
<i>Cucumis variabilis</i>			0.1	0.1		
<i>Eriachne mucronata</i>			0.1	0.3		
<i>Eriachne pulchella</i>	0.1	0.2	0.1	0.2		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	2	12	2	12		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.1		
<i>Goodenia forrestii</i>			0.1	0.2	DUCR58-01	Goodenia wide-hairy
<i>Gossypium robinsonii</i>	0.1	1.8	0.1	1.8		
<i>Heliotropium ovalifolium</i>			0.1	0.2		
<i>Indigofera colutea</i>			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Ipomoea muelleri</i>			0.1	0.1		?Ipomoea muell
<i>Ixiochlamys cuneifolia</i>	0.1	0.1				
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>	0.1	0.1	0.1	0.1	DUCR58-01	
<i>Phyllanthus maderaspatensis</i>			0.1	0.2		
<i>Polycarpaea longiflora</i>	0.1	0.2	0.1	0.1		
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.2		
<i>Sesbania cannabina</i>			0.1	0.3		
<i>Triodia wiseana</i>	0.1	0.6	0.1	0.6		
* <i>Vachellia farnesiana</i>	0.1	2.1	0.1	2.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-59

Date 1/11/2019 15/06/2020
Described by KJ & SC KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 461770 mE; 7509457 mN
 116.6282 E -22.520990 S
Veg Condition Good
Soil Sandy Loam
Rock Type riverstone
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain
Vegetation *Eucalyptus victrix* sparse woodland over *Acacia citrinoviridis* sparse shrubland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)			0.1	0.3		
<i>Acacia citrinoviridis</i>	10	8	10	8		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.5	3	0.5	3		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.5	1	0.5	1		
<i>Acacia synchronicia</i>	0.2	0.7	0.1	0.7		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Boerhavia coccinea</i>			0.1	0.1		
<i>Bonamia pilbarensis</i>			0.1		DUCR59-03	Bonamia ground 2
<i>Bulbostylis barbata</i>	0.1	0.1	0.1	0.1		
* <i>Cenchrus ciliaris</i>	3	0.2	5	0.5		
* <i>Cenchrus setiger</i>			0.1	0.5		
<i>Arivela viscosa</i>			0.1	0.2		
<i>Corchorus crozophorifolius</i>	0.5	0.6	1	1		
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>			0.1	0.1		
<i>Cucumis variabilis</i>			0.1			
<i>Cyperus vaginatus</i>	2	0.5	2	0.5		
<i>Eriachne pulchella</i>			0.1	0.2		
<i>Eucalyptus victrix</i>	5	12	5	12		
<i>Euphorbia biconvexa</i>			0.1	0.1		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
<i>Goodenia forrestii</i>			0.1	0.2		Goodenia hairy wide
<i>Heliotropium ovalifolium</i>			0.1	0.1		
<i>Hibiscus</i> sp. Indet			0.1	0.3		
<i>Hybanthus aurantiacus</i>			0.1	0.2		
<i>Indigofera colutea</i>			0.1	0.1		
<i>Ipomoea muelleri</i>			0.1			? Ipomoea muell
<i>Melaleuca glomerata</i>	1	2.5	1	2.5		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Oldenlandia crouchiana</i>			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.2		
<i>Polycarpaea longiflora</i>			0.1	0.1		
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Portulaca oleracea</i>			0.1			
<i>Pterocaulon sphacelatum</i>			0.1	0.1		
<i>Ptilotus auriculifolius</i>			0.1	0.1		
<i>Ptilotus exaltatus</i>			0.1	0.1		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>			0.1	0.4		
<i>Sesbania cannabina</i>			0.1	0.2		
<i>Sida</i> sp. L (A.M.Ashby 4202)			0.1	0.1	DUCR59-01	Sida fib long
<i>Solanum lasiophyllum</i>			0.1	0.3	DUCR59-02	Solanum ?phlom
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Trianthema triquetrum</i>			0.1	0.1	DUCR59-04	Trianthema pilosum
<i>Tribulus hirsutus</i>			0.1	0.1		
<i>Triodia wiseana</i>	0.1	0.3				
<i>Triumfetta clementii</i>			0.1	0.2		
* <i>Vachellia farnesiana</i>	0.2	1.7	0.2	1.7		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-60

Date 31/10/2019 15/06/2020
Described by KJ & SC KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 460665 mE; 7520595 mN
 116.6177 E -22.420349 S
Veg Condition Good
Soil Sand
Rock Type river
Fire Age >10 yrs
Habitat Medium Drainage Line

Vegetation Mid woodland of *Eucalyptus camaldulensis* subsp. *refulgens* over low scattered trees of *Eucalyptus victrix* and *Melaleuca argentea* over tall open shrubland of *Melaleuca linophylla*, *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* over open sedgeland of *Cyperus vaginatus*.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	1	4	1	1		
<i>Acacia citrinoviridis</i>	2	3	2	3		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	3	6	3	6		
* <i>Aerva javanica</i>	0.1	0.1	0.1	0.1		
<i>Alternanthera nana</i>			0.1	0.1		
<i>Alternanthera nodiflora</i>			0.1	0.1		
<i>Amaranthus undulatus</i>	0.1	0.1	0.1	0.3		
<i>Ammannia baccifera</i>			0.1	0.3		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	1	0.3	0.1	0.1		
<i>Boerhavia burbridgeana</i>	0.1	0.1	0.1	0.1	DUCR60-04	Boerhavia schom
<i>Boerhavia coccinea</i>	0.1	0.1	0.1	0.1	DUCR60-03	
<i>Boerhavia schomburgkiana</i>	0.1	0.1			DUCR60-05	
<i>Capparis lasiantha</i>	0.1	0.1				
* <i>Cenchrus ciliaris</i>	0.1	0.1	0.1	0.4		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.1		
<i>Arivela viscosa</i>	0.1	0.1	0.1	0.3		
<i>Corchorus sidoides</i>	0.1	0.6				
<i>Cucumis variabilis</i>	0.1	0				
<i>Cyperus difformis</i>			0.1	0.3		<i>Cyperus cunninghamii</i>
<i>Cyperus vaginatus</i>	5	0.6	5	0.6		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.3		
<i>Dysphania melanocarpa</i>			0.1		DUCR60-02	Alternate prostrate
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>			0.1	0.1		
<i>Eragrostis tenellula</i>	0.1	0.3				
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	40	16	40	16		
<i>Eucalyptus victrix</i>	2	8	2	8		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>			0.1	0.1		
<i>Euphorbia biconvexa</i>	0.1	0.1	0.1	0.1		
* <i>Flaveria trinervia</i>			0.1	0.2		
<i>Glinus lotoides</i>	0.1	0.1				
<i>Glycine canescens</i>			0.1			
<i>Gossypium sturtianum</i>	0.1	1	0.1	1.5		
<i>Heliotropium crispatum</i>	0.1	0.1			DUCR60-01	
<i>Heliotropium ovalifolium</i>	0.1	0.1			DUCR60-02	
<i>Indigofera linifolia</i>			0.1	0.1		
<i>Ipomoea muelleri</i>			0.1	0.1		?Ipomoea muell
<i>Ixiochlamys cuneifolia</i>	0.1	0.1				
<i>Melaleuca argentea</i>	5	8	5	8		
<i>Melaleuca linophylla</i>	20	4	20	4		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.1		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Oldenlandia crouchiana</i>			0.1	0.2	DUCR60-01	Oldenlandia lanky
<i>Phyllanthus maderaspatensis</i>			0.1	0.2		
<i>Pluchea dentex</i>	0.1	0.1	0.1	0.2		
<i>Polycarpaea longiflora</i>	0.1	0.1				
<i>Potamogeton</i> sp. Indet			0.1	0.1		
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	0.1	0.1	0.1	0.1		
<i>Rhynchosia minima</i>			0.1	0.1		
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1	0.1		
<i>Schoenoplectus subulatus</i>			0.1	1.2		
<i>Senna notabilis</i>			0.1	0.1		
<i>Sesbania cannabina</i>	0.1	0.1	0.1	1.5		
* <i>Setaria verticillata</i>			0.1	0.2		
<i>Solanum cleistogamum</i>	0.1	0.1	0.1	0.3		
<i>Stemodia grossa</i>			0.1	0.2		
<i>Stylobasium spatulatum</i>	0.1	0.1				
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.1		
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>			0.1	0.7		
* <i>Vachellia farnesiana</i>	0.1	1	0.1	1		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>			0.1			



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-61

Date 29/10/2019 16/06/2020
Described by KJ & SC KG & SC
Type Relevé
Location MGA Zone 50
 500969 mE; 7527472 mN
 117.0094 E -22.358675 S
Veg Condition Good
Soil Silty Clay Loam
Rock Type river rocks
Fire Age >10 yrs
Habitat Medium Drainage Line
Vegetation Mid woodland of *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* over tall open shrubland of *Melaleuca glomerata* and *Acacia ampliceps* over mixed grasses and sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	3	4	0.5	0.3		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	6				
* <i>Cynodon dactylon</i>	0.1	0.1				
<i>Cyperus vaginatus</i>	1	1				
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	15	14				
<i>Eulalia aurea</i>	1	0.6				
<i>Gossypium robinsonii</i>	0.5	2				
<i>Melaleuca argentea</i>	25	12	25	12		
<i>Melaleuca glomerata</i>	5	5				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-62

Date 29/10/2019 16/06/2020
Described by CvdB EEB & JE
Type Quadrat 100m x 25m
Location MGA Zone 50
 502877 mE; 7528201 mN
 117.0279 E -22.352087 S
Veg Condition Very Good
Soil Sand
Rock Type Basalt
Fire Age >10 yrs
Habitat Drainage Area/ Floodplain

Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* and *Melaleuca argentea* mid to low open woodland over *Melaleuca glomerata*, *Acacia coriacea* subsp. *pendens* tall sparse shrubland over *Cyperus vaginatus* mid to low sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	2.5	30	0.4		
<i>Acacia bivenosa</i>	0.1	2				
<i>Acacia citrinoviridis</i>	0.1	2				
<i>Acacia coriacea</i> subsp. <i>pendens</i>	1	3	1	3		
<i>Achyranthes aspera</i>			0.1	0.4		
<i>Alternanthera nana</i>	0.1	0.1			DUCR40-04	
<i>Ammannia baccifera</i>			0.1	0.2		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.5	0.1	0.1		
* <i>Bidens bipinnata</i>			0.1			
<i>Boerhavia schomburgkiana</i>	0.1	0.1				
<i>Capparis spinosa</i> subsp. <i>nummularia</i>			0.1			
* <i>Cenchrus setiger</i>			0.1	0.1		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1	0.2		
<i>Corchorus</i> ? <i>sidoides</i>	0.1	0.2			DUCR62-01	
<i>Corchorus sidoides</i>			0.1	0.3		
<i>Cucumis variabilis</i>			0.1	0.1		
* <i>Cynodon dactylon</i>			0.1			
<i>Cyperus difformis</i>			0.1	0.2		
<i>Cyperus hesperius</i>	0.1	0.6			DUCR37-03	
<i>Cyperus vaginatus</i>	2	0.5	2	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1			
<i>Duperreya commixta</i>	0.1		0.1			
<i>Eragrostis tenellula</i>			0.1	0.1		
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	8	16	8	16		
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	0.1	0.1	0.1	0.1	DUCR62-02	Euphorbia hairy
<i>Euphorbia biconvexa</i>			0.1	0.2		

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>			0.1	0.1		
* <i>Flaveria trinervia</i>			0.5	1		
<i>Glycine canescens</i>			0.1			
<i>Gossypium robinsonii</i>	0.1	2	0.1	0.2		
<i>Gossypium sturtianum</i>	0.1	1.5	0.1	0.3		
<i>Hybanthus aurantiacus</i>	0.1	0.1				
<i>Ipomoea muelleri</i>			0.1	0.1		
<i>Ipomoea racemigera</i>			0.1			
<i>Lobelia arnhemiaca</i>			0.1	0.1		Lobelia like
* <i>Malvastrum americanum</i>			0.1	0.2		
<i>Melaleuca argentea</i>	6	10	6	10		
<i>Melaleuca glomerata</i>	1	3.5	1	3.5		
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>			0.1	0.2		Nicotiana sticky flesh
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1			
<i>Oldenlandia crouchiana</i>			0.1	0.2		
<i>Phyllanthus erwinii</i>	0.1	0.1	0.1	0.1		
<i>Pluchea dentex</i>			0.1	0.2		
<i>Sesbania cannabina</i>			0.1	0.4		
* <i>Setaria verticillata</i>	0.1	0.1	0.1	0.3		
<i>Solanum diversiflorum</i>			0.1	0.2		
* <i>Sonchus oleraceus</i>			0.1			
<i>Sporobolus australasicus</i>			0.1	0.1		
<i>Stemodia grossa</i>			0.1	0.1		
<i>Stylidium fluminense</i>			0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	2.2	0.1	2.2		
* <i>Vachellia farnesiana</i>	0.1	0.3	0.1	0.3		
<i>Wahlenbergia tumidiflora</i>	0.1	0.1				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-63

Date 29/10/2019 14/06/2020
Described by KJ & SC CvdB
Type Relevé
Location MGA Zone 50
 485183 mE; 7525323 mN
 116.8560 E -22.378023 S
Veg Condition Good
Soil Sandy Clay Loam
Rock Type Basalt
Fire Age >10 yrs
Habitat Medium Drainage Line
Vegetation ---

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	1	3	5	0.4		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3				
<i>Cyperus vaginatus</i>	5	0.5				
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	10	14				
* <i>Flaveria trinervia</i>			0.1			
<i>Melaleuca argentea</i>	20	10				
<i>Melaleuca glomerata</i>	10	4				
<i>Pluchea dentex</i>	0.1	0.3				
<i>Schoenoplectus subulatus</i>			0.1			
<i>Stemodia grossa</i>	0.5	0.4				
<i>Stylidium fluminense</i>			0.1			



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-64

Date 29/10/2019 13/06/2020
Described by CvdB KG & SC
Type Quadrat 100m x 25m
Location MGA Zone 50
 498987 mE; 7526021 mN
 116.9901 E -22.371785 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Basalt, Calcrete
Fire Age >10 yrs
Habitat Major Drainage Line

Vegetation *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Melaleuca glomerata*, *Acacia ampliceps* and *Acacia coriacea* subsp. *pendens* tall open shrubland over *Cyperus vaginatus* mid sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>	0.1	3	0.1	3		
<i>Acacia citrinoviridis</i>			0.1	0.5		
<i>Acacia coriacea</i> subsp. <i>pendens</i>	0.1	4	0.1	4		
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	0.1	1.5	0.1	1.5		
<i>Amaranthus undulatus</i>	0.1	0.2	0.1	0.5		
<i>Ammannia baccifera</i>			0.1	0.1		
<i>Ammannia multiflora</i>			0.1	0.3		
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	0.1	0.3	0.1	0.3		
* <i>Cenchrus ciliaris</i>			0.1	0.3		
<i>Centipeda minima</i> subsp. <i>macrocephala</i>			0.1			
<i>Chara</i> sp. Indet			0.1			
<i>Corchorus</i> ? <i>sidoides</i>	0.1	0.4	0.1	0.4	DUCR62-01	Corchorus green serrate
<i>Cucumis variabilis</i>	0.1		0.1			
<i>Cymbopogon</i> sp. Indet	0.1	0.2	0.1			Cymbopogon sp.
<i>Cyperus hesperius</i>	0.1	0.5	0.1		DUCR37-03	Cyperus robust
<i>Cyperus vaginatus</i>	2	0.5	2	0.5		
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>			0.1	0.5		
<i>Eleocharis geniculata</i>			0.1	0.1		
<i>Eragrostis tenellula</i>			0.1	0.5		
<i>Eriachne mucronata</i>	0.1	0.3	0.1	0.3		
<i>Eriochloa pseudoacrotricha</i>			0.1	0.7	DUCR64-03	Digitaria brownii
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	4	12	4	12		
* <i>Euphorbia hirta</i>			0.1	0.1		
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>			0.1	0.3		
<i>Euphorbia vaccaria</i> var. <i>erucoides</i>			0.1	0.1	DUCR64-02	Euphorbia robust

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
* <i>Flaveria trinervia</i>	0.1	0.3	10	0.7		
<i>Glycine canescens</i>			0.1	0.1		
<i>Gossypium australe</i>			0.1	0.5		
<i>Gossypium robinsonii</i>	0.1	2.5	0.1	2.5		
<i>Gossypium sturtianum</i>	0.1	1.5	0.1	1.5		
<i>Heliotropium crispatum</i>			0.1	0.1	DUCR64-01	
<i>Hybanthus aurantiacus</i>			0.1	0.1		
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)			0.1	1.5		
<i>Ipomoea racemigera</i>			0.1			Ipomoea small
<i>Jasminum didymum</i> subsp. <i>lineare</i>	0.1	0.8	0.1	0.8		
<i>Livistona alfredii</i>	0.1	0.4	0.1	0.4		
<i>Melaleuca argentea</i>	8	11	6	11		
<i>Melaleuca glomerata</i>	5	4	5	4		
<i>Nicotiana benthamiana</i>			0.1	0.5		
<i>Notoleptopus decaisnei</i> var. <i>orbicularis</i> (A.B. Craig 428)			0.1	0.1		
<i>Phyllanthus maderaspatensis</i>			0.1	0.1		
<i>Pluchea dentex</i>	0.1	0.2	0.1	0.1	DUCR53-03	
<i>Polymeria ambigua</i>			0.1	0.1		
<i>Potamogeton</i> sp. Indet			0.1			
<i>Rhynchosia minima</i>	0.1		0.1			
<i>Rostellularia adscendens</i> var. <i>clementii</i>			0.1			
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)	0.1	0.4			DUCR32-01	
<i>Schoenoplectus subulatus</i>			0.1	1		
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	0.1	2	0.1	2		
<i>Senna notabilis</i>			0.1	0.2		
<i>Sesbania cannabina</i>			0.1	0.7		
* <i>Setaria verticillata</i>			0.1	0.3		
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>			0.1	0.3	DUCR64-04	Sida rohlenae
<i>Sida</i> sp. Indet	0.1	0.3				
<i>Solanum diversiflorum</i>			0.1	0.3		
* <i>Sonchus oleraceus</i>			0.1	0.1		
<i>Stemodia grossa</i>	0.1	0.1	0.1	0.1		
<i>Stylobasium spathulatum</i>	0.1	1.2	0.1	1.2		
<i>Themeda triandra</i>			0.1	0.7		
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>			0.1	0.5		
<i>Typha domingensis</i>			0.1	0.6		
<i>Vigna lanceolata</i> var. <i>lanceolata</i>			0.1	0.1		



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-66

Date 29/10/2019
Described by CvdB
Type Relevé
Location MGA Zone 50
 498512 mE; 7525724 mN
 116.9855 E -22.374466 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Basalt
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Acacia coriacea* subsp. *pendens*, *Acacia citrinoviridis* and *Gossypium robinsonii* tall sparse shrubland over *Cyperus vaginatus* low sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia citrinoviridis</i>						
<i>Acacia coriacea</i> subsp. <i>pendens</i>						
<i>Cyperus vaginatus</i>						
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>						
<i>Gossypium robinsonii</i>						



Brockman Syncline Riparian Site DUCR-68

Date 29/10/2019 13/06/2020
Described by CvdB CvdB
Type Relevé
Location MGA Zone 50
 497790 mE; 7525097 mN
 116.9785 E -22.380125 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Basalt
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Acacia ampliceps*, *Melaleuca glomerata* and *Acacia coriacea* subsp. *pendens* tall sparse shrubland over *Cyperus vaginatus* mid sparse tussock grassland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>						
<i>Acacia coriacea</i> subsp. <i>pendens</i>						
<i>Cyperus vaginatus</i>						
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>						
<i>Melaleuca argentea</i>						
<i>Melaleuca glomerata</i>						



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-70

Date 30/10/2019 14/06/2020
Described by CvdB CvdB
Type Relevé
Location MGA Zone 50
 481802 mE; 7525007 mN
 116.8232 E -22.380845 S
Veg Condition Very Good
Soil Clay Loam
Rock Type Basalt
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Cyperus vaginatus* low scattered sedges.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Cyperus vaginatus</i>						Cyperus vaginatus
<i>Eleocharis geniculata</i>	0.1	0.1				
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>						
<i>Heliotropium crispatum</i>	0.1	0.1			DUCR70-01	Heliotropium spikey
<i>Melaleuca argentea</i>						
<i>Stylidium fluminense</i>	0.1	0.1				
<i>Typha domingensis</i>	0.1	0.5				



Phase 1



Phase 2

Brockman Syncline Riparian Site DUCR-72

Date 30/10/2019 14/06/2020
Described by CvdB KG & SC
Type Relevé
Location MGA Zone 50
 468169 mE; 7525301 mN
 116.6907 E -22.377988 S
Veg Condition Very Good
Soil Clayey Sand
Rock Type Basalt
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Melaleuca argentea* and *Eucalyptus camaldulensis* subsp. *refulgens* mid to low open woodland over *Melaleuca linophylla* and *Acacia ampliceps* tall sparse shrubland over *Cyperus vaginatus* mid sparse sedgeland.

SPECIES LIST

Name	Phase 1 2019		Phase 2 2020		Specimen ID	Notes
	Cover	Height	Cover	Height		
<i>Acacia ampliceps</i>						
<i>Cyperus vaginatus</i>						
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>						
<i>Melaleuca argentea</i>						
<i>Melaleuca linophylla</i>						





Appendix D: Vegetation Structure Definition

Vegetation classification for the Pilbara (based on Specht (1970) as modified by Aplin (1979) and Trudgen (2002))

Height Class	Canopy Cover				
	100-70%	70-30%	30-10%	10-2%	<2%
Trees > 30 m	High Closed Forest	High Open Forest	High Woodland	High Open Woodland	Scattered Tall Trees
Trees 10-30 m	Closed Forest	Open Forest	Woodland	Open Woodland	Scattered Trees
Trees < 10 m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland	Scattered Low Trees
Mallee	Closed Mallee	Mallee	Open Mallee	Very Open Mallee	Scattered Mallee
Shrubs > 2 m	Closed Scrub	Open Scrub	High Shrubland	High Open Shrubland	Scattered Tall Shrubs
Shrubs 1-2 m	Closed Heath	Open Heath	Shrubland	Open Shrubland	Scattered Shrubs
Shrubs < 1 m	Low Closed Heath	Low Open Heath	Low Shrubland	Low Open Shrubland	Scattered Low Shrubs
Hummock Grass	Closed Hummock Grassland	Hummock Grassland	Open Hummock Grassland	Very Open Hummock Grassland	Scattered Hummock Grasses
Tussock Grass	Closed Tussock Grassland	Tussock Grassland	Open Tussock Grassland	Very Open Tussock Grassland	Scattered Tussock Grasses
Bunch Grass	Closed Bunch Grassland	Bunch Grassland	Open Bunch Grassland	Very Open Bunch Grassland	Scattered Bunch Grasses
Sedges	Closed Sedges	Sedge	Open Sedges	Very Open Sedges	Scattered Sedges
Herbs	Closed Herbs	Herbs	Open Herbs	Very Open Herbs	Scattered Herbs

Appendix E: Vegetation Condition Definition

Vegetation Condition Scale (adapted from Keighery (1994) and Trudgen (2002))

Condition Scale	Description
Excellent (1)	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement
Very Good (2)	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 (3)	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor (4)	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.
Degraded (5)	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 (6)	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.

Appendix F: Riparian Vegetation Monitoring Methods

The riparian vegetation monitoring methods were developed to ensure consistency with existing riparian vegetation monitoring conducted at Duck Creek, Caves Creek and Boolgeeda Creek (Astron, 2018; Biota, 2018a).

The riparian vegetation monitoring method consisted of the sampling of a transect, associated quadrats and tree health assessments of ten trees. The following information presents the methods to site establishment and the parameters recorded for each method.

Transect and Quadrat Layout

The following methodology was used to establish transects and quadrats:

- Each transect was established perpendicular to the direction of streamflow. The start and end points of each transect were temporarily marked with fence droppers and were selected to encompass riparian vegetation of the creek bed and banks and exclude other vegetation types (e.g. surrounding spinifex slopes).
- A Trimble Catalyst Antenna was used to record the start and end points for each transect. As Boolgeeda Creek is to be listed as a heritage site under the *WA Aboriginal Heritage Act 1972* the transects were not permanently marked with posts so ground disturbance was avoided. The transect start and end points were recorded to an accuracy of 10 cm to 70 cm depending on cloud cover, canopy cover and location to the Brockman 4 operations.
- Along each transect, 10 m × 10 m quadrats (100 m²) were established in either a continuous belt approach or separated by a nominal distance depending on width of creek. Quadrats began on the left side of the creek looking downstream.
- For each quadrat, the four corners were numbered 1-4, with point 1 located on the transect line toward the left side of the creek (looking downstream), and each corner then labelled point 2, 3 and 4 in a clockwise direction.
- Ten trees of *Eucalyptus camaldulensis* and/ or *Eucalyptus victrix* were chosen from along the transect, within the quadrats or in close proximity to the site to assess tree health parameters. Trees were tagged loosely with aluminium wire.

Transect Assessment

The following parameters were recorded for each transect:

- The start and end of each transect using a Trimble Catalyst antenna with decimeter accuracy.
- Transect length and bearing (in degrees).
- The date and the start and end time for assessing the entire site.
- Photos from the start and end looking back down the transect.
- A broad description of the vegetation present along the transect (see Appendix D).
- Vegetation condition (see Appendix E).
- Dominant disturbance factors.
- Soil type.

- Line intercept of canopy cover along the length of the transect. Only tree cover was recorded along the length.

Quadrat Assessment

The following parameters were recorded for each quadrat:

- Species present – all vascular plant species present. Species that could not be identified in the field were collected for later identification in the herbarium.
- Percentage foliar cover: Projected foliar cover was estimated visually for each species. Estimates were made to the nearest percent where possible. Where occasional individuals were present, species were assigned a cover of 0.1%. Where a species was rooted outside, and provided cover of 1% or greater to a quadrat, it was recorded together with NI=0, to indicate it was not rooted within the quadrat.
- Number of individuals: The number of individuals (NI) of perennial trees and shrubs; this was only recorded for those species that would usually grow to >1 m in height. The number of individuals were also recorded for introduced species and conservation significant species.
- Tree height: Tree height was estimated visually.
- Habitat: Description of habitat; habitats recorded for the programme to date comprise creek bank, creek bed and island (referring to built up sections within the creek bed). If a quadrat contained more than one habitat, this was noted along with the approximate percentage of each.
- Vegetation condition: Condition was ranked according to the scale presented in Appendix E.
- Cattle and feral donkey activity – assessed as a rating of nil, low (few or no tracks, scats (< 3), no or low level grazing/damage impact) medium (tracks, scats (3-6), moderate level grazing/damage), or high (extensive tracks, scats >6, high degree of damage/impact). Scat counts were also recorded where applicable.
- Vegetation description: Broad description based on the height and estimated cover of dominant species as presented in Appendix D.
- Photographs: Photographs of the vegetation at each quadrat were taken from corners 1 and 4, facing corners 2 and 3 respectively, as well as a photograph at the 5 m point of each quadrat (i.e. a central photo)].

Tree Health Assessment

To provide a baseline indication of tree health, the following information was recorded for each tree:

- Transect and tree identification number.
- Date of survey.
- DGPS coordinates of each tree (GDA 94) using a Trimble Catalyst Antenna with decimeter subscription.
- Tree taxon: Either *Eucalyptus camaldulensis* or *Eucalyptus victrix*.
- Tree height: measured using a Nikon Forestry Pro laser rangefinder (utilising the inclinometer function).
- Diameter at breast height (DBH): measured using a Richter 10 m fibreglass diameter tape.
- Crown extent and density on a six-point scale (see table below).
- Presence or absence of crown tip die off.

- Presence or absence of epicormic growth.
- Presence or absence of dead branches.

Crown extent and density six-point scale.

Scale	Crown Extent	Crown Density
0	None – 0 %	None – 0 %
1	Minimal 1-10 %	Minimal 1-10 %
2	Sparse 11-25 %	Sparse 11-25 %
3	Medium 26-75 %	Medium 26-75 %
4	Major 76-90 %	Major 76-90 %
5	Maximum 91-100 %	Maximum 91-100 %

Appendix G: Rio Tinto Sponsored Botanist Chain of Custody Forms

Chain of Custody: Significant Specimens to Herbarium

Company	Biologic Environmental	Date Collections Submitted to Steve	22 / 01 / 2020
Consultant Contact Name	Sam Coultas	Consultant Contact Number	0400507407
Rio Tinto Contact Name	Bridget Watkins	Rio Tinto Contact Number	0436631417
Study Area	Brockman Syncline (Boolgeeda and Duck creeks)	RTIO AR Number	_____
Senders Internal Job Name / Number	RTIO 1903 Brockman Syncline Riparian	Number of Collections Submitted	19
Collections From (Named location and distance & direction to nearest town)	Brockman Mine and surrounding, 80 km WNW of Tom Price		
Datum & Zone of Study Area	UTM 50 k		
Central GPS Co-ords of study area	493325 E, 7511575 N	Dates of Field Survey	15/10 - 04/11/2019
RTIO Required Date (RTIO to inform)	/ /		

Chain of Custody: Significant Specimens to Herbarium

Collection Number	Collectors Field Name	Cons Status	Latitude	Longitude	Plant Habit	Habitat	Collectors Comment	Photos (if applic)	S. Dillon ID	S. Dillon Comment
Boor39.01	Goodenia ? nuda	P4	-22.564848	117.164977	Herb	Drainage line	Tentatively IDd as Goodenia nuda (P4)		<i>Goodenia nuda</i>	
Ducr43-02	Gymnanthera cunninghamii	P3	-22.342339	117.153715	Erect emergent shrub	Drainage line	IDd as Gymnanthera cunninghamii (P3)	Image 1 and 2	<i>Gymnanthera cunninghamii</i>	Worth lodging as few of the collections at the WA herbarium have flowers.
BOOR 22-02	Indigofera monophylla	P3	-22.612359	116.967053	Shrub	Drainage line	Submit. Could be sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) but difficult to tell		<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
DUCT06-10-01	Indigofera monophylla big	P3	-22.38680644	116.6669715	Shrub	Drainage line	Submit. Could be sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) but difficult to tell. Specimens very tall, over 1.5 m		<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
BOOR30.01	Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301)	P3	-22.588159	117.042314	Shrub	Drainage line	Submit. Could be sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) but difficult to tell. Specimens very tall to 1.8 m	Image 7 and 8	<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
CBEbOpp.03	Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301)	P3	-22.3532	117.2247	Shrub	Drainage line	Submit. Could be sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) but difficult to tell. Specimens very tall, to 2 m	Image 9	<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
BOOR 21-02	Indigofera monophylla	P3	-22.617855	116.954267	Shrub	Drainage line	Submit. Could be sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) but difficult to tell. Specimens very tall		<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
DUCT08-opp01	Indigofera tall	P3	-22.3879	116.8402	Shrub	Drainage line	Submit. Could be sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) but difficult to tell. Specimens very tall		<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	
-	Livistonia alfredii	P4			Palm	Drainage line	No collection, just want a confirmation on paper	Image 5 and 6	<i>Livistonia alfredii</i>	See caveat below table.
SckjOpp-21	Rhynchosia bungarensis	P4	-22.4635	116.6332	Prostrate	Drainage line, rocky bed	IDd as Rhynchosia bungarensis (P4)		<i>Rhynchosia bungarensis</i>	
BOOT07-07-01	Rhynchosia bungarensis	P4	-22.6371	116.7843	Prostrate	Drainage line, rocky bed	IDd as Rhynchosia bungarensis (P4)		<i>Rhynchosia bungarensis</i>	
BOOR17-01	Rhynchosia bungarensis	P4	-22.630539	116.887841	Prostrate	Drainage line, rocky bed	IDd as Rhynchosia bungarensis (P4)		<i>Rhynchosia bungarensis</i>	
BOOR05.Sup01	Rhynchosia bungarensis	P4	-22.581188	116.679598	Prostrate	Drainage line, rocky bed	IDd as Rhynchosia bungarensis (P4)	Image 3 and 4	<i>Rhynchosia bungarensis</i>	
Ducr37.04	Rostellularia adscendens var. latifolia		-22.352680	117.033208	Spreading herb	Drainage line	IDd as Rostellularia adscendens var. latifolia (P3)		<i>Rostellularia adscendens</i> var. <i>clementii</i>	See note for Boor2402.
DUCR56-09	Rostulleria duck		-22.378954	117.358335	Spreading herb	Drainage line	IDd as Rostellularia adscendens var. latifolia (P3)		<i>Rostellularia adscendens</i> var. <i>clementii</i>	See note for Boor2402.

Boor2402			-22.593014	116.986237	Spreading herb	Drainage line	IDd as <i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3)	<i>Rostellularia adscendens</i> var. <i>clementii</i>	Margins of bracts wider above halfway, green central portion with eglandular hairs only on the midrib, the rest of the central area has glandular hairs and the stem indumentum is short and recurved. Var. <i>latifolia</i> has bracts with margins that are wider at or below halfway, the central green portion is a mix of glandular and eglandular hairs and the stem indumentum is long and spreading.
Ducr53.06	Green herb		-22.354723	117.325235	Spreading herb	Drainage line	IDd as <i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3)	<i>Rostellularia adscendens</i> var. <i>clementii</i>	See note for Boor2402
Ducr32.01	Stalk flower		-22.380116,	116.953559	Stick-like clumping herb	Drainage line	IDd as <i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076) but difficult to ID	<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)	The taxonomy of <i>Samolus</i> is in need of review. Several of the species regarded as being widespread in WA are unlikely to occur in Australia, let alone the Pilbara.
Scopp10	Terete scuzzy		-22.3585	117.0102	Stick-like clumping herb	Drainage line	IDd as <i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076) but difficult to ID	<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)	See above note.
Ducr11.03	Senna like		-22.404121	116.643673	Erect shrub	Drainage line	IDd as <i>Phyllanthus baccatus</i> . Submit one for confirmation. Sterile	<i>Phyllanthus baccatus</i>	
Boor40.01	<i>Tephrosia rosea</i>		-22.571453	117.181776	Shrub	Drainage line	IDd as <i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186). Fits ID perfectly except for one character; the key description states "glabrescent pods" where this specimens clearly has short sparse hairs covering the pod surface	<i>Tephrosia rosea</i> var. <i>Fortescue</i> creeks (M.I.H. Brooker 2186)	Matches the WA collections of this taxon, including the pod indumentum. I'll ask RB what she meant by "glabrescent" next time I see her.
Ducr1602	<i>Triodia creeper</i>		-22.371173	116.705989	Sprawling grass	Drainage line	Stumped by this one. Eriachne-like. Showed R. Meissner and she didn't know either	<i>Sporobolus</i> aff. <i>virginicus</i>	Atypical in habit, habitat and that the florets appear to have only 1 anther (usually 3). Checked a number of taxa, tried both AusGrass and a DELTA key and asked any other botanists who happened to wander past – the only taxa this specimen is close to are <i>S. virginicus</i> and <i>S. mitchellii</i> . I have placed it as an aff. of <i>S. virginicus</i> as the spikelet dimensions are a good match except for the number of anthers (the anthers are 1.5 mm long –OK for this taxon but not <i>S. mitchellii</i>) and the leaves are convolute (flat and/or folded for <i>S. mitchellii</i>). Worth reading the note by Bryan Simon in Flora of Australia 44B (page 335) regarding variation and ploidy in <i>S. virginicus</i> . Worth lodging – further collections (preferably some with the base) and photos would be useful.

This is a caveat we are required to add for all image identifications:

The Western Australian Herbarium has made every effort to provide an accurate identification based on the image(s) provided. Please be aware, however, that identifications based on images are difficult, and may represent a “best guess”. Employees and agents of the Department of Parks and Wildlife will not be held responsible or liable for any loss or damage suffered by any person directly or indirectly through reliance on the identification(s) provided, or for any consequences of any error, inaccuracy in, or omission from the identification.

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Chain of Custody: Significant Specimens to Herbarium (Indicate Study Area Location - ★)





Image 1 and 2 - Ducr43-02 *Gymnanthera cunninghamii*



Image 3 and 4 – BOOR-05-supp01 *Rhynchosia bungalowensis* (P4)



Image 5 and 6 – *Livistonia alfredii* (P4)



Image 7 and 8 *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)



Image 9 *Indigofera* sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) (upper right corner of photo)

Chain of Custody Form – Significant Specimens

Consultant to fill in the information in the tables below, and to indicate approximate study area on Figure 1. All specimen co-ordinates are to be provided in MGA Z50.

Please refer to the Herbarium Specimen Submission Procedure ([RTIO-HSE-0336396](#)) for guidelines on what should be submitted to the RTIO Sponsored Taxonomist for identification.

Consultant Company:	Biologic Environmental Survey
Consultant Contact Name:	Kaylin Geelhoed
Consultant Contact Number:	0458 443 255
Consultant Job Reference:	1903 Brockman Syncline (Boolgeeda and Duck Creek) 1990 Western Range (Greater Paraburadoo)
Specimen Submission Date:	03/08/2020

Rio Tinto Project Manager / Botanist:	Jody Neiman, Joel McShane, Hayden Adjuk and Jeremy Naaykens
Rio Tinto Contact Number:	0436665752, 0408056872
Rio Tinto Study Area:	Brockman Mine and Surrounding Western Range
Rio Tinto AR Number (if applicable):	

Nearest Named Location to Study Area:	Tom Price Paraburadoo
Distance and Direction to Nearest Town:	80 km WNW of Tom Price 20 km W of Paraburadoo
Central Co-ordinate of Study Area:	22°22'41.35"S, 116°58'39.63"E (Duck Creek) 22°37'39.09"S, 116°54'14.30"E (Boolgeeda Creek) 23°11'5.96"S, 117°25'38.28"E (Western Range)
Field Survey Date/s:	12 th – 19 th June 2020 (1903 Brockman Syncline) 20 th – 25 th June 2020 (1990 Western Range)

CONSULTANT TO FILL OUT					RTIO SPONSORED TAXONOMIST TO FILL OUT	
Collection No.	Collection Name	Easting (mE)	Northing (mN)	Consultant Comments <small>Habit (e.g. shrub, tree, herb), habitat description, photos</small>	Identification	Comment
DUCR 26-03	Diplachne	484184.45	7524499.83	Other grass, Drainage Area/Floodplain	<i>Eriochloa pseudoacrotricha</i>	A distinct genus – the lower glume is reduced to a small cupuliform strip adherent to the thickened rachilla. The species, however, are not so distinct.
DUCR 64-03	Digitaria brownii	498994.90	7526017.14	Other grass, Major drainage line	<i>Eriochloa pseudoacrotricha</i>	See note above.
DUCR 40-05	?Dichanthium tall	508645.15	7529261.33	Tussock grass, Drainage Area/Floodplain	<i>Bothriochloa decipiens</i> var <i>cloncurrensis</i>	Worth lodging. Pedicelled spikelets reduced to a small glume, sessile spikelets to 5 mm long.
DUCR 26-04	Euphorbia open	484191.19	7524456.44	Herb/Forb, Major drainage line	<i>Euphorbia coghlanii</i>	Good match except leaves very narrow for this species (L:W ratio of 10.8) although it is very variable for this species (description has range from 2.2 to 9.0). Also an odd habitat, usually found on clay pans. Found a specimen det'd by Halford with leaves that have a L:W ratio of 11 and recorded as being near a waterhole.
DUCR 33-07	Polymeria large	496938.54	7525212.70	Climber/vine, Medium drainage line, IDd as Ipomoea racemigera (P2)	<i>Ipomoea racemigera</i>	P2.
CV20opp.01	Ipomoea racemigera	497222.94	7525417.65	Climber/vine, IDd as Ipomoea racemigera (P2)	<i>Ipomoea racemigera</i>	P2.
BOOR 17-01	Ipomoea small boolgeeda	488471.63	7497386.46	Climber/vine, Minor drainage line, IDd as Ipomoea racemigera (P2)	<i>Ipomoea racemigera</i>	P2.
DUCR 64-05	Ipomoea small 2	498990.58	7526011.94	Climber/vine, Major drainage line, IDd as Ipomoea racemigera (P2)	<i>Ipomoea racemigera</i>	P2.
DUCR 33-01	Rostellularia adscendens	496968.70	7525211.27	Herb/forb, Medium drainage line	<i>Rostellularia adscendens</i> var. <i>clementii</i>	There is no specimen with this code. This specimen has "no tag" written on the newspaper.

CONSULTANT TO FILL OUT

RTIO SPONSORED TAXONOMIST TO FILL OUT

Collection No.	Collection Name	Easting (mE)	Northing (mN)	Consultant Comments	Identification	Comment
				Habit (e.g. shrub, tree, herb), habitat description, photos		
SCKGOpp02	Rostellularia adscendens var. clementii	498446.11	7525712.48	Herb/forb, Tentatively IDd as Rostellularia adscendens var. ? clementii	<i>Rostellularia adscendens</i> var. <i>clementii</i>	
CEJOpp01	Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301)	497026.43	7525351.53	Small shrub, Drainage line.	<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	P3.
SCKGOpp03	Ipomoea small	498803.12	7525909.32	Climber/vine, IDd as Ipomoea racemigera	<i>Ipomoea racemigera</i>	P2.
SCKGOpp01	Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301)	498120.72	7525520.50	Shrub to 1.7 m tall, Drainage area/Floodplain, IDd as Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) (P3). Image 1 and 2	<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	P3.
BOOR 30.02	Goodenia nuda	504379.14	7502020.07	Herb/forb, Drainage area/Floodplain, IDd as Goodenia nuda	<i>Goodenia nuda</i>	P4.
DUCR 45-02	Aristida lazaridis	519511.46	7529042.49	Tussock grass to 1.2 m tall, Drainage area/Floodplain, IDd as Aristida Lazaridis (P2)	<i>Aristida lazaridis</i>	P2. c. 130 km range extension, worth lodging.

CONSULTANT TO FILL OUT

RTIO SPONSORED TAXONOMIST TO FILL OUT

Collection No.	Collection Name	Easting (mE)	Northing (mN)	Consultant Comments Habit (e.g. shrub, tree, herb), habitat description, photos	Identification	Comment
WRA 21-07	Eremophila low	544441.19	7434934.58	Small shrub, Hillcrest/Upper hillslope	<i>Eremophila</i> sp.	I can't match this specimen to any named <i>Eremophila</i> (I also asked another ID botanist and they couldn't get a name on it either). I even checked through all the <i>Eremophila</i> sp. collections and couldn't find a match either. The indumentum of glandular hairs with long, fine eglandular hairs is similar to <i>E. canaliculate</i> but that species has distinctly serrate leaf margins in the upper 1/2 to 1/3 (cf. entire for this specimen). Possibly a new taxon but could also be a hybrid. Worth lodging but flowering specimens will need to be collected before this can be advanced. Also would be good to know if you found any other <i>Eremophila</i> in the area (only 2 <i>Eremophila</i> records from this range- 1 <i>E. cryptothrix</i> and 1 <i>E. jucunda</i>).
KGOpp02	Goodenia sp. East Pilbara	539994.65	7436691.45	Herb/forb, on access track on calcrete rise. Image 3 and 4	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	P3. In the strict sense. The manuscript- name <i>Goodenia omerana</i> was changed to <i>G. sp.</i> East Pilbara (it's a CHAH guideline) and this specimen matches the original <i>G. omerana</i> concept. However, there are appears to be at least two entities under <i>G. sp.</i> East Pilbara and they are all part of the larger <i>G. pascua</i> complex (at least 4 taxa involved). Further work is required to resolve this complex. Worth lodging this material.

CONSULTANT TO FILL OUT

RTIO SPONSORED TAXONOMIST TO FILL OUT

Collection No.	Collection Name	Easting (mE)	Northing (mN)	Consultant Comments	Identification	Comment
				Habit (e.g. shrub, tree, herb), habitat description, photos		
No Tag	Goodenia sp. East Pilbara, Extra material for KGOpp02	539994.65	7436691.45	Herb/forb, on access track on calcrete rise Image 3 and 4	Goodenia sp. East Pilbara (A.A. Mitchell PRP 727)	See note above.
DUCR 34.02	Ipomoea racemigera recollect	497924.72	7525385.10	Climber/vine, Major drainage line		NO SPECIMEN
WRA 14-01	Aluta quadrata	542599.39	7435959.33	Shrub, Gully	<i>Aluta quadrata</i>	T. At least one of these specimens should be lodged. I recommend the use of secateurs for all collecting but it should be noted that it is <u>compulsory</u> for the collection of threatened flora as per the conditions stated on your permit.
WRA 17-02	Aluta quadrata				<i>Aluta quadrata</i>	T. Not on original CoC.
WRA 119.04					<i>Eriachne benthamii</i>	In the broad sense. Matches some specimens under <i>E. benthamii</i> and, less so, some under <i>E. flaccida</i> . A recent unfinished and unpublished study of <i>Eriachne</i> suggests that all the specimens in WA currently under <i>E. benthamii</i> are closer to <i>E. flaccida</i> resulting in 8 lineages in <i>E. flaccida</i> . However, there has been no work to determine what morphological characters separate these lineages. Neither the current treatment nor the unfinished study is satisfactory but the published work is the "fall-back" position for now.



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Chain of Custody Flora Specimens to WA Herbarium

Drawn: N. Murdock
Date: 26/03/2019
Proj: GDA94 Z50
Scale: 1:2,500,000

Legend

- Highway
- Major Road
- RTIO Mine
- Major Town
- Town
- Resource
- National Park

Map units in metres

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Image 1 and 2 – *Indigofera* sp. Bungaroo Creek



Image 3 and 4 – Goodenia sp. East Pilbara



Appendix H: Data Reconciliation

Taxon	Reconciled Taxon
* <i>Aerva javanica</i>	Remove
* <i>Argemone ochroleuca</i> subsp. <i>ochroleuca</i>	Remove
* <i>Bidens bipinnata</i>	Remove
* <i>Bidens pilosa</i> var. <i>pilosa</i>	Remove
* <i>Bothriochloa pertusa</i>	Remove
* <i>Cenchrus ciliaris</i>	Remove
* <i>Cenchrus clandestinus</i>	Remove
* <i>Cenchrus echinatus</i>	Remove
* <i>Cenchrus setiger</i>	Remove
* <i>Cyclosporum leptophyllum</i>	Remove
* <i>Cynodon dactylon</i>	Remove
* <i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>	Remove
* <i>Echinochloa colona</i>	Remove
* <i>Erigeron bonariensis</i>	Remove
* <i>Euphorbia hirta</i>	Remove
* <i>Flaveria trinervia</i>	Remove
* <i>Heliotropium europaeum</i>	Remove
* <i>Malvastrum americanum</i>	Remove
* <i>Rumex vesicarius</i>	Remove
* <i>Setaria verticillata</i>	Remove
* <i>Sigesbeckia orientalis</i>	Remove
* <i>Solanum nigrum</i>	Remove
* <i>Sonchus oleraceus</i>	Remove
* <i>Symphyotrichum squamatum</i>	Remove
* <i>Tribulus terrestris</i>	Remove
* <i>Vachellia farnesiana</i>	Remove
? <i>Boerhavia</i> sp.	Remove
?Cyperaceae sp.	Remove
? <i>Lysimachia arvensis</i>	Remove
<i>Abutilon amplum</i>	<i>Abutilon amplum</i>
<i>Abutilon lepidum</i>	<i>Abutilon lepidum</i>
<i>Abutilon macrum</i>	<i>Abutilon macrum</i>
<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)	<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)
<i>Abutilon</i> sp. <i>Indet</i>	Remove
<i>Abutilon</i> sp. Pilbara (W.R. Barker 2025)	<i>Abutilon</i> sp. Pilbara (W.R. Barker 2025)
<i>Acacia ampliceps</i>	<i>Acacia ampliceps</i>
<i>Acacia ancistrocarpa</i>	<i>Acacia ancistrocarpa</i>
<i>Acacia aptaneura</i>	<i>Acacia aptaneura</i>
<i>Acacia arida</i>	<i>Acacia arida</i>
<i>Acacia bivenosa</i>	<i>Acacia bivenosa</i>
<i>Acacia citrinoviridis</i>	<i>Acacia citrinoviridis</i>
<i>Acacia colei</i>	<i>Acacia colei</i>
<i>Acacia coriacea</i> subsp. <i>pendens</i>	<i>Acacia coriacea</i> subsp. <i>pendens</i>
<i>Acacia inaequilatera</i>	<i>Acacia inaequilatera</i>
<i>Acacia maitlandii</i>	<i>Acacia maitlandii</i>
<i>Acacia monticola</i>	<i>Acacia monticola</i>
<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>
<i>Acacia synchronicia</i>	<i>Acacia synchronicia</i>

Taxon	Reconciled Taxon
<i>Acacia tetragonophylla</i>	<i>Acacia tetragonophylla</i>
<i>Acacia trachycarpa</i>	<i>Acacia trachycarpa</i>
<i>Acacia tumida</i> var. <i>pilbarensis</i>	<i>Acacia tumida</i> var. <i>pilbarensis</i>
<i>Acacia xiphophylla</i>	<i>Acacia xiphophylla</i>
<i>Achyranthes aspera</i>	<i>Achyranthes aspera</i>
<i>Adriana tomentosa</i> var. <i>tomentosa</i>	<i>Adriana tomentosa</i> var. <i>tomentosa</i>
<i>Alternanthera nana</i>	<i>Alternanthera nana</i>
<i>Alternanthera nodiflora</i>	<i>Alternanthera nodiflora</i>
<i>Alysicarpus muelleri</i>	<i>Alysicarpus muelleri</i>
<i>Amaranthus undulatus</i>	<i>Amaranthus undulatus</i>
<i>Ammannia baccifera</i>	<i>Ammannia baccifera</i>
<i>Ammannia multiflora</i>	<i>Ammannia multiflora</i>
<i>Amyema hilliana</i>	<i>Amyema hilliana</i>
<i>Amyema preissii</i>	<i>Amyema preissii</i>
<i>Amyema sanguinea</i> var. <i>sanguinea</i>	<i>Amyema sanguinea</i> var. <i>sanguinea</i>
<i>Androcalva luteiflora</i>	<i>Androcalva luteiflora</i>
<i>Anthobolus leptomerioides</i>	<i>Anthobolus leptomerioides</i>
<i>Aristida contorta</i>	<i>Aristida contorta</i>
<i>Aristida inaequiglumis</i>	<i>Aristida inaequiglumis</i>
<i>Aristida lazaridis</i>	<i>Aristida lazaridis</i>
<i>Bergia pedicellaris</i>	<i>Bergia pedicellaris</i>
<i>Bergia</i> sp.	Remove
<i>Blumea tenella</i>	<i>Blumea tenella</i>
<i>Boerhavia burbridgeana</i>	<i>Boerhavia burbridgeana</i>
<i>Boerhavia coccinea</i>	<i>Boerhavia coccinea</i>
<i>Boerhavia schomburgkiana</i>	<i>Boerhavia schomburgkiana</i>
<i>Bonamia</i> ? <i>pilbarensis</i>	Remove
<i>Bonamia erecta</i>	<i>Bonamia erecta</i>
<i>Bonamia pilbarensis</i>	<i>Bonamia pilbarensis</i>
<i>Bothriochloa decipiens</i> var. <i>cloncurrrens</i>	<i>Bothriochloa decipiens</i> var. <i>cloncurrrens</i>
<i>Bothriochloa ewartiana</i>	<i>Bothriochloa ewartiana</i>
<i>Brachychiton gregorii</i>	<i>Brachychiton gregorii</i>
<i>Bulbostylis barbata</i>	<i>Bulbostylis barbata</i>
<i>Cajanus acutifolius</i>	<i>Cajanus acutifolius</i>
<i>Calandrinia</i> sp.	<i>Calandrinia</i> sp.
<i>Capparis lasiantha</i>	<i>Capparis lasiantha</i>
<i>Capparis spinosa</i> subsp. <i>nummularia</i>	<i>Capparis spinosa</i> subsp. <i>nummularia</i>
<i>Capparis umbonata</i>	<i>Capparis umbonata</i>
<i>Cassytha capillaris</i>	<i>Cassytha capillaris</i>
<i>Centipeda minima</i> subsp. <i>macrocephala</i>	<i>Centipeda minima</i> subsp. <i>macrocephala</i>
<i>Chara</i> sp.	Remove
<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>
<i>Chrysopogon fallax</i>	<i>Chrysopogon fallax</i>
<i>Cleome viscosa</i>	<i>Arivela viscosa</i>
<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>	<i>Clerodendrum floribundum</i> var. <i>angustifolium</i>
<i>Convolvulus clementii</i>	<i>Convolvulus clementii</i>
<i>Corchorus</i> ? <i>sidoides</i>	Remove
<i>Corchorus crozophorifolius</i>	<i>Corchorus crozophorifolius</i>

Taxon	Reconciled Taxon
<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>
<i>Corchorus sidoides</i>	<i>Corchorus sidoides</i>
<i>Corchorus</i> sp. indet	Remove
<i>Corchorus tridens</i>	<i>Corchorus tridens</i>
<i>Corymbia hamersleyana</i>	<i>Corymbia hamersleyana</i>
<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>
<i>Crotalaria novae-hollandiae</i> subsp. <i>novae-hollandiae</i>	<i>Crotalaria novae-hollandiae</i> subsp. <i>novae-hollandiae</i>
<i>Cucumis variabilis</i>	<i>Cucumis variabilis</i>
<i>Cullen leucanthum</i>	<i>Cullen leucanthum</i>
<i>Cymbopogon ambiguus</i>	<i>Cymbopogon ambiguus</i>
<i>Cymbopogon</i> sp.	Remove
<i>Cyperus difformis</i>	<i>Cyperus difformis</i>
<i>Cyperus hesperius</i>	<i>Cyperus hesperius</i>
<i>Cyperus squarrosus</i>	<i>Cyperus squarrosus</i>
<i>Cyperus vaginatus</i>	<i>Cyperus vaginatus</i>
<i>Dactyloctenium radulans</i>	<i>Dactyloctenium radulans</i>
<i>Dichanthium fecundum</i>	<i>Dichanthium fecundum</i>
<i>Dichanthium sericeum</i>	<i>Dichanthium sericeum</i>
<i>Dicladantha forrestii</i>	<i>Dicladantha forrestii</i>
<i>Diplachne fusca</i> subsp. <i>fusca</i>	<i>Diplachne fusca</i> subsp. <i>fusca</i>
<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>	<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>
<i>Dodonaea lanceolata</i>	<i>Dodonaea lanceolata</i>
<i>Dodonaea</i> sp.	Remove
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>	<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>
<i>Duperreya commixta</i>	<i>Duperreya commixta</i>
<i>Dysphania melanocarpa</i>	<i>Dysphania melanocarpa</i>
<i>Dysphania plantaginella</i>	<i>Dysphania plantaginella</i>
<i>Dysphania rhadinostachya</i> subsp. ?	<i>Dysphania rhadinostachya</i>
<i>Dysphania rhadinostachya</i> subsp. <i>inflata</i>	<i>Dysphania rhadinostachya</i>
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	<i>Dysphania rhadinostachya</i>
<i>Dysphania</i> sp.	Remove
<i>Eleocharis geniculata</i>	<i>Eleocharis geniculata</i>
<i>Enneapogon caeruleus</i>	<i>Enneapogon caeruleus</i>
<i>Enneapogon lindleyanus</i>	<i>Enneapogon lindleyanus</i>
<i>Enneapogon polyphyllus</i>	<i>Enneapogon polyphyllus</i>
<i>Enneapogon robustissimus</i>	<i>Enneapogon robustissimus</i>
<i>Enteropogon ramosus</i>	<i>Enteropogon ramosus</i>
<i>Eragrostis cumingii</i>	<i>Eragrostis cumingii</i>
<i>Eragrostis dielsii</i>	<i>Eragrostis dielsii</i>
<i>Eragrostis elongata</i>	<i>Eragrostis elongata</i>
<i>Eragrostis</i> sp.	Remove
<i>Eragrostis tenellula</i>	<i>Eragrostis tenellula</i>
<i>Eremophila cuneifolia</i>	<i>Eremophila cuneifolia</i>
<i>Eremophila longifolia</i>	<i>Eremophila longifolia</i>
<i>Eriachne benthamii</i>	<i>Eriachne benthamii</i>
<i>Eriachne flaccida</i>	<i>Eriachne flaccida</i>
<i>Eriachne mucronata</i>	<i>Eriachne mucronata</i>
<i>Eriachne pulchella</i>	<i>Eriachne pulchella</i>

Taxon	Reconciled Taxon
<i>Eriachne tenuiculmis</i>	<i>Eriachne tenuiculmis</i>
<i>Eriochloa pseudoacrotricha</i>	<i>Eriochloa pseudoacrotricha</i>
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>
<i>Eucalyptus victrix</i>	<i>Eucalyptus victrix</i>
<i>Eucalyptus xerothermica</i>	<i>Eucalyptus xerothermica</i>
<i>Eulalia aurea</i>	<i>Eulalia aurea</i>
<i>Euphorbia</i> ? <i>hirta</i>	Remove
<i>Euphorbia australis</i> var. <i>subtomentosa</i>	<i>Euphorbia australis</i> var. <i>subtomentosa</i>
<i>Euphorbia biconvexa</i>	<i>Euphorbia biconvexa</i>
<i>Euphorbia careyi</i>	<i>Euphorbia careyi</i>
<i>Euphorbia coghlanii</i>	<i>Euphorbia coghlanii</i>
<i>Euphorbia hirta</i>	Remove
<i>Euphorbia</i> sp.	Remove
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>
<i>Euphorbia vaccaria</i> var. <i>erucoides</i>	<i>Euphorbia vaccaria</i> var. <i>erucoides</i>
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>	<i>Evolvulus alsinoides</i> var. <i>decumbens</i>
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>
<i>Fimbristylis dichotoma</i>	<i>Fimbristylis dichotoma</i>
<i>Fimbristylis littoralis</i>	<i>Fimbristylis littoralis</i>
<i>Fimbristylis microcarya</i>	<i>Fimbristylis microcarya</i>
<i>Flaveria trinervia</i>	Remove
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>	<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>
<i>Glinus lotoides</i>	<i>Glinus lotoides</i>
<i>Glycine canescens</i>	<i>Glycine canescens</i>
<i>Gomphrena</i> ? <i>kanasii</i>	Remove
<i>Gomphrena cunninghamii</i>	<i>Gomphrena cunninghamii</i>
<i>Goodenia forrestii</i>	<i>Goodenia forrestii</i>
<i>Goodenia lamprosperma</i>	<i>Goodenia lamprosperma</i>
<i>Goodenia microptera</i>	<i>Goodenia microptera</i>
<i>Goodenia muelleriana</i>	<i>Goodenia muelleriana</i>
<i>Goodenia</i> sp.	Remove
<i>Goodenia stobbsiana</i>	<i>Goodenia stobbsiana</i>
<i>Gossypium australe</i>	<i>Gossypium australe</i>
<i>Gossypium robinsonii</i>	<i>Gossypium robinsonii</i>
<i>Gossypium sturtianum</i>	<i>Gossypium sturtianum</i>
<i>Gossypium sturtianum</i> var. <i>sturtianum</i>	<i>Gossypium sturtianum</i> var. <i>sturtianum</i>
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>
<i>Grevillea wickhamii</i>	<i>Grevillea wickhamii</i>
<i>Gymnanthera cunninghamii</i>	<i>Gymnanthera cunninghamii</i>
<i>Hakea chordophylla</i>	<i>Hakea chordophylla</i>
<i>Hakea lorea</i> subsp. <i>lorea</i>	<i>Hakea lorea</i> subsp. <i>lorea</i>
<i>Haloragis gossei</i>	<i>Haloragis gossei</i>
<i>Heliotropium crispatum</i>	<i>Heliotropium crispatum</i>
<i>Heliotropium europaeum</i>	Remove
<i>Heliotropium ovalifolium</i>	<i>Heliotropium ovalifolium</i>
<i>Heliotropium tanythrix</i>	<i>Heliotropium tanythrix</i>
<i>Heliotropium tenuifolium</i>	<i>Heliotropium tenuifolium</i>

Taxon	Reconciled Taxon
Heteropogon contortus	<i>Heteropogon contortus</i>
<i>Hibiscus</i> sp.	Remove
<i>Hibiscus</i> sp. Indet	Remove
Hybanthus aurantiacus	<i>Hybanthus aurantiacus</i>
Indet sp.	Remove
Indigofera colutea	<i>Indigofera colutea</i>
Indigofera linifolia	<i>Indigofera linifolia</i>
Indigofera monophylla	<i>Indigofera monophylla</i>
Indigofera rugosa	<i>Indigofera rugosa</i>
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)
<i>Indigofera</i> sp. indet	Remove
<i>Ipomoea</i> ? <i>costata</i>	Remove
Ipomoea coptica	<i>Ipomoea coptica</i>
Ipomoea muelleri	<i>Ipomoea muelleri</i>
Ipomoea plebeia	<i>Ipomoea plebeia</i>
Ipomoea racemigera	<i>Ipomoea racemigera</i>
Ixiochlamys cuneifolia	<i>Ixiochlamys cuneifolia</i>
Jasminum didymum subsp. lineare	<i>Jasminum didymum</i> subsp. <i>lineare</i>
<i>Lepidium muelleri-ferdinandii</i>	<i>Lepidium muelleri-ferdinandii</i>
<i>Livistona alfredii</i>	<i>Livistona alfredii</i>
<i>Lobelia arnhemiaca</i>	<i>Lobelia arnhemiaca</i>
<i>Lysiana casuarinae</i>	<i>Lysiana casuarinae</i>
<i>Maireana villosa</i>	<i>Maireana villosa</i>
Malvaceae sp. indet	Remove
<i>Malvastrum americanum</i>	Remove
<i>Marsilea hirsuta</i>	<i>Marsilea hirsuta</i>
<i>Melaleuca argentea</i>	<i>Melaleuca argentea</i>
<i>Melaleuca bracteata</i>	<i>Melaleuca bracteata</i>
<i>Melaleuca glomerata</i>	<i>Melaleuca glomerata</i>
<i>Melaleuca linophylla</i>	<i>Melaleuca linophylla</i>
<i>Melhania oblongifolia</i>	<i>Melhania oblongifolia</i>
<i>Mimulus gracilis</i>	<i>Mimulus gracilis</i>
<i>Myriophyllum verrucosum</i>	<i>Myriophyllum verrucosum</i>
<i>Nicotiana benthamiana</i>	<i>Nicotiana benthamiana</i>
<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>
<i>Notoleptopus decaisnei</i> var. <i>Orbicularis</i> (A.B. Craig 428)	<i>Notoleptopus decaisnei</i> var. <i>Orbicularis</i> (A.B. Craig 428)
<i>Oldenlandia crouchiana</i>	<i>Oldenlandia crouchiana</i>
<i>Oldenlandia galioides</i>	<i>Oldenlandia galioides</i>
<i>Paraneurachne muelleri</i>	<i>Paraneurachne muelleri</i>
<i>Paspalidium basicladum</i>	<i>Paspalidium basicladum</i>
<i>Paspalidium clementii</i>	<i>Paspalidium clementii</i>
<i>Paspalidium constrictum</i>	<i>Paspalidium constrictum</i>
<i>Peripleura arida</i>	<i>Peripleura arida</i>
<i>Perotis rara</i>	<i>Perotis rara</i>
<i>Petalostylis labicheoides</i>	<i>Petalostylis labicheoides</i>
<i>Phyllanthus baccatus</i>	<i>Phyllanthus baccatus</i>
<i>Phyllanthus erwinii</i>	<i>Phyllanthus erwinii</i>

Taxon	Reconciled Taxon
<i>Phyllanthus maderaspatensis</i>	<i>Phyllanthus maderaspatensis</i>
<i>Pimelea ammocharis</i>	<i>Pimelea ammocharis</i>
<i>Pluchea dentex</i>	<i>Pluchea dentex</i>
Poaceae sp.	Remove
<i>Polycarpaea corymbosa</i>	<i>Polycarpaea corymbosa</i>
<i>Polycarpaea longiflora</i>	<i>Polycarpaea longiflora</i>
<i>Polymeria ambigua</i>	<i>Polymeria ambigua</i>
<i>Polymeria</i> sp.	Remove
<i>Portulaca oleracea</i>	<i>Portulaca oleracea</i>
<i>Potamogeton</i> sp.	Remove
<i>Potamogeton drummondii</i>	<i>Potamogeton drummondii</i>
<i>Potamogeton tricarinatus</i>	<i>Potamogeton tricarinatus</i>
<i>Pseudognaphalium luteoalbum</i>	<i>Pseudognaphalium luteoalbum</i>
<i>Psydrax suavolens</i>	<i>Psydrax suavolens</i>
<i>Pterocaulon sphacelatum</i>	<i>Pterocaulon sphacelatum</i>
<i>Ptilotus auriculifolius</i>	<i>Ptilotus auriculifolius</i>
<i>Ptilotus exaltatus</i>	<i>Ptilotus exaltatus</i>
<i>Ptilotus fusiformis</i>	<i>Ptilotus fusiformis</i>
<i>Ptilotus obovatus</i> var. <i>obovatus</i>	<i>Ptilotus obovatus</i> var. <i>obovatus</i>
<i>Ptilotus</i> sp.	Remove
<i>Rhynchosia bungarensis</i>	<i>Rhynchosia bungarensis</i>
<i>Rhynchosia minima</i>	<i>Rhynchosia minima</i>
<i>Roepera ? eichleri</i>	Remove
<i>Rostellularia adscendens</i> var. <i>clementii</i>	<i>Rostellularia adscendens</i> var. <i>clementii</i>
<i>Rumex vesicarius</i>	Remove
<i>Salsola australis</i>	<i>Salsola australis</i>
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)	<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)
<i>Santalum lanceolatum</i>	<i>Santalum lanceolatum</i>
<i>Scaevola spinescens</i>	<i>Scaevola spinescens</i>
<i>Schenkia australis</i>	<i>Schenkia australis</i>
<i>Schenkia clementii</i>	<i>Schenkia clementii</i>
<i>Schoenoplectiella laevis</i>	<i>Schoenoplectiella laevis</i>
<i>Schoenoplectus subulatus</i>	<i>Schoenoplectus subulatus</i>
<i>Senna artemisioides</i> subsp. <i>helmsii</i>	<i>Senna artemisioides</i> subsp. <i>helmsii</i>
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	<i>Senna glutinosa</i> subsp. <i>glutinosa</i>
<i>Senna notabilis</i>	<i>Senna notabilis</i>
<i>Senna venusta</i>	<i>Senna venusta</i>
<i>Sesbania cannabina</i>	<i>Sesbania cannabina</i>
<i>Sesbania formosa</i>	<i>Sesbania formosa</i>
<i>Setaria verticillata</i>	Remove
<i>Sida echinocarpa</i>	<i>Sida echinocarpa</i>
<i>Sida fibulifera</i>	<i>Sida fibulifera</i>
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>	<i>Sida rohlenae</i> subsp. <i>rohlenae</i>
<i>Sida</i> sp. indet	Remove
<i>Sida</i> sp. L (A.M. Ashby 4202)	<i>Sida</i> sp. L (A.M. Ashby 4202)
<i>Sigesbeckia orientalis</i>	Remove
<i>Solanum cleistogamum</i>	<i>Solanum cleistogamum</i>

Taxon	Reconciled Taxon
<i>Solanum diversiflorum</i>	<i>Solanum diversiflorum</i>
<i>Solanum lasiophyllum</i>	<i>Solanum lasiophyllum</i>
<i>Solanum nigrum</i>	Remove
<i>Sonchus oleraceus</i>	Remove
<i>Sporobolus</i> aff. <i>virginicus</i>	<i>Sporobolus</i> aff. <i>virginicus</i>
<i>Sporobolus australasicus</i>	<i>Sporobolus australasicus</i>
<i>Stackhousia</i> sp.	Remove
<i>Stemodia grossa</i>	<i>Stemodia grossa</i>
<i>Streptoglossa decurrens</i>	<i>Streptoglossa decurrens</i>
<i>Streptoglossa</i> sp.	Remove
<i>Stylidium fluminense</i>	<i>Stylidium fluminense</i>
<i>Stylobasium spathulatum</i>	<i>Stylobasium spathulatum</i>
<i>Symphotrichum squamatum</i>	Remove
<i>Synaptantha tilliaeacea</i> var. <i>tillaeacea</i>	<i>Synaptantha tilliaeacea</i> var. <i>tillaeacea</i>
<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)	<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)
<i>Themeda triandra</i>	<i>Themeda triandra</i>
<i>Tinospora smilacina</i>	<i>Tinospora smilacina</i>
<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	<i>Trachymene oleracea</i> subsp. <i>oleracea</i>
<i>Trianthema triquetrum</i>	<i>Trianthema triquetrum</i>
<i>Tribulus</i> ? <i>hirsutus</i>	Remove
<i>Tribulus hirsutus</i>	<i>Tribulus hirsutus</i>
<i>Tribulus terrestris</i>	Remove
<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>	<i>Trichodesma zeylanicum</i> var. <i>zeylanicum</i>
<i>Triglochin nana</i>	<i>Triglochin nana</i>
<i>Triodia angusta</i>	<i>Triodia angusta</i>
<i>Triodia epactia</i>	<i>Triodia epactia</i>
<i>Triodia longiceps</i>	<i>Triodia longiceps</i>
<i>Triodia wiseana</i>	<i>Triodia wiseana</i>
<i>Triumfetta chaetocarpa</i>	<i>Triumfetta chaetocarpa</i>
<i>Triumfetta clementii</i>	<i>Triumfetta clementii</i>
<i>Triumfetta maconochieana</i>	<i>Triumfetta maconochieana</i>
<i>Typha domingensis</i>	<i>Typha domingensis</i>
<i>Uvedalia linearis</i>	<i>Uvedalia linearis</i>
<i>Vigna lanceolata</i> var. <i>lanceolata</i>	<i>Vigna lanceolata</i> var. <i>lanceolata</i>
<i>Wahlenbergia tumidifructa</i>	<i>Wahlenbergia tumidifructa</i>
<i>Waltheria indica</i>	<i>Waltheria indica</i>

Appendix I: Key Findings from the Literature Review

Study Details	Methods	Results	Significant Findings	Limitations
Flora, Vegetation and Fauna Habitat Assessment at Bourne Highway Rio Tinto (2018d) Client: Hamersley Iron Pty Limited Type: Detailed flora and vegetation survey Location: Bourne Hwy (1.4 km east) Timing: June-July 2017	<ul style="list-style-type: none"> • 36 relevés • Targeted searching 	<ul style="list-style-type: none"> • 144 taxa from 42 families and 82 genera • Seven vegetation units • One introduced weed taxon 	<ul style="list-style-type: none"> • Six priority taxa recorded: <ul style="list-style-type: none"> ○ <i>Sida</i> sp. Hamersley Range (K. Newbey 10692) (P1)² ○ <i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) ○ <i>Triodia</i> sp. Robe River (M.E. Trudgen et al. MET 12367) (P3)³ ○ <i>Eremophila magnifica</i> subsp. <i>magnifica</i> (P4) ○ <i>Ptilotus mollis</i> (P4) ○ <i>Rhynchosia bungarensis</i> (P4) 	<ul style="list-style-type: none"> • Rainfall lower than average
Eliwana Consolidated Detailed Flora and Vegetation Phase 2 Biota (2018b) Client: Fortescue Metals Group Type: Detailed flora and vegetation survey (Consolidation report) Location: Eliwana Mine Study Area and Rail Study Area (adjacent S) Timing: April, July, August & September 2017	<ul style="list-style-type: none"> • 554 detailed floristic sites (quadrats) • 143 relevés • Targeted searching • Consolidation of 22 previous surveys 	<ul style="list-style-type: none"> • <u>Mine Study Area (MSA)</u> <ul style="list-style-type: none"> ○ 554 taxa from 57 families and 180 genera ○ 15 introduced weed taxa • <u>Rail Study Area (RSA)</u> <ul style="list-style-type: none"> ○ 651 taxa from 59 families and 204 genera ○ 23 introduced flora taxa • <u>Combined Study Areas</u> <ul style="list-style-type: none"> ○ 768 native taxa from 67 families and 223 genera ○ 27 introduced weed taxa ○ 99 vegetation units 	<ul style="list-style-type: none"> • <u>Mine Study Area (MSA)</u> <ul style="list-style-type: none"> ○ PEC '<i>Triodia</i> sp. Robe River assemblages of mesas of the West Pilbara' (P3)⁴ ○ 23 Priority flora taxa (four P1; four P2; ten P3; & five P4) ○ Several range extensions • <u>Rail Study Area (RSA)</u> <ul style="list-style-type: none"> ○ TEC '<i>Themeda</i> grasslands on cracking clays' ○ PEC 'Brockman Iron cracking clay communities of the Hamersley Range' (P1) ○ 35 Priority flora taxa (five P1; five P2; 21 P3; & four P4) ○ Several range extensions 	<ul style="list-style-type: none"> • Several undescribed or unresolved taxa or species with distinct forms recorded

² *Sida* sp. Hamersley Range (K. Newbey 10692) is no longer listed as Priority 1, it is now listed as Priority 3.

³ *Triodia* sp. Robe River (M.E. Trudgen et al. MET 12367) has recently been described as *Triodia pisolitica*, a Priority 3 taxon.

⁴ '*Triodia* sp. Robe River assemblages of mesas of the West Pilbara' is not current and is now known as '*Triodia pisolitica* assemblages of mesas of the West Pilbara'

Study Details	Methods	Results	Significant Findings	Limitations
<p>Hardey Rail Corridor Vegetation and Flora Survey (Phase 1) – Interim Report</p> <p>Astron (2011) Client: API Management Type: Detailed flora and vegetation survey Location: Hardey Rail Corridor (22.5 km W) Timing: March to July 2009 & March to May and August to October 2010</p>	<ul style="list-style-type: none"> • 129 detailed floristic sites (quadrats) • 93 relevés 	<ul style="list-style-type: none"> • 287 taxa from 43 families and 118 genera • 43 vegetation associations • Seven introduced weed taxa 	<ul style="list-style-type: none"> • One PEC recorded: <ul style="list-style-type: none"> ○ <i>Triodia</i> sp. Robe River assemblages of mesas of the Pilbara⁵ - Priority 3 PEC (~ 91 ha) • Three priority taxa recorded: <ul style="list-style-type: none"> ○ <i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) ○ <i>Triodia</i> sp. Robe River (M.E. Trudgen et al. MET 12367) (P3)⁶ ○ <i>Rhynchosia bungarensis</i> (P4) • Four range extensions: <ul style="list-style-type: none"> ○ <i>Alysicarpus muelleri</i> ○ <i>Flueggea virosa</i> subsp. <i>melanthesoides</i> ○ <i>Indigofera decipiens</i> ○ <i>Sporobolus caroli</i> 	<ul style="list-style-type: none"> • Rainfall lower than average, few annual or ephemeral species recorded. • Quality of some specimens' poor e.g. <i>Corchorus</i> • Disturbance inc. grazing, fire, weeds and clearing reduced the availability and condition of the flora
<p>Flora and Vegetation Survey at Metawandy and Duck Creek</p> <p>Rio Tinto (2014) Client: Rio Tinto Iron Ore Type: Detailed flora and vegetation survey Location: Metawandy and Duck Creek (9.5 km S) Timing: August & October 2013</p>	<ul style="list-style-type: none"> • 162 relevés • Targeted searching 	<ul style="list-style-type: none"> • 180 taxa from 37 families and 85 genera • 23 vegetation units • Two introduced weed taxa 	<ul style="list-style-type: none"> • Six priority taxa recorded: <ul style="list-style-type: none"> ○ <i>Sida</i> sp. Hamersley Range (K. Newbey 10692) (P1)⁷ ○ <i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) ○ <i>Nicotiana umbratica</i> (P3) ○ <i>Triodia</i> sp. Robe River (M.E. Trudgen et al. MET 12367) (P3) ○ <i>Eremophila magnifica</i> subsp. <i>magnifica</i> (P4) ○ <i>Ptilotus mollis</i> (P4) 	<ul style="list-style-type: none"> • No identified limitations

⁵ '*Triodia* sp. Robe River assemblages of mesas of the West Pilbara' is not current and is now known as '*Triodia pisolitica* assemblages of mesas of the West Pilbara'

⁶ *Triodia* sp. Robe River (M.E. Trudgen et al. MET 12367) is not current and is more recently known as *Triodia pisolitica*, a Priority 3 species.

⁷ *Sida* sp. Hamersley Range (K. Newbey 10692) is no longer listed as Priority 1. It is now a Priority 3.

Study Details	Methods	Results	Significant Findings	Limitations
Flora and Vegetation Survey at Metawandy and Duck Creek Biota (2010) Client: Rio Tinto Iron Ore Type: Riparian vegetation Monitoring Location: Greater Nammuldi Area (within survey area) Timing: April 2010	<ul style="list-style-type: none"> 22 creek sites (transects and quadrats) 	<ul style="list-style-type: none"> 132 taxa from 37 families and 81 genera Five vegetation groups correlated with dominant riverine species 	<ul style="list-style-type: none"> Three priority taxa recorded: <ul style="list-style-type: none"> <i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) <i>Rostellularia adscendens</i> var. <i>latifolia</i> (P3) <i>Livistona alfredii</i> (P4) 	<ul style="list-style-type: none"> No identified limitations
<i>Themeda</i> Grasslands Threatened Ecological Community – Phase 1 Botanical Survey Biota (2011) Client: Rio Tinto Iron Ore Type: Detailed flora and vegetation survey of the <i>Themeda</i> Grasslands TEC Location: <i>Themeda</i> grasslands Phase 1 (5 km SW) Timing: May and June 2011	<ul style="list-style-type: none"> 50 detailed floristic sites (quadrats) Targeted searching 	<ul style="list-style-type: none"> 192 taxa from 35 families and 102 genera Five vegetation units 11 introduced flora taxa 	<ul style="list-style-type: none"> Eight priority taxa recorded: <ul style="list-style-type: none"> <i>Astrebla lappacea</i> (P3) <i>Calotis latiuscula</i> (P3)⁸ <i>Glycine falcata</i> (P3) <i>Iotasperma sessilifolium</i> (P3) <i>Oldenlandia</i> sp. Hamersley Station (A.A. Mitchell PRP 1479) (P3)⁹ <i>Stackhousia clementii</i> (P3) <i>Swainsona</i> sp. Hamersley Station (A.A. Mitchell 196) (P3)¹⁰ <i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431) (P3) <i>Goodenia nuda</i> (P4) Three range extensions: <ul style="list-style-type: none"> <i>Spathia neurosa</i> <i>Eriochloa crebra</i> <i>Sida laevis</i> 	<ul style="list-style-type: none"> Some specimen identifications could not be resolved

⁸ *Calotis latiuscula* is no longer listed as a Priority flora taxon.

⁹ *Oldenlandia* sp. Hamersley Station (A.A. Mitchell PRP 1479) has recently been circumscribed as *Dolichocarpa* sp. Hamersley Station (A.A. Mitchell PRP 1479), a Priority 3 taxon.

¹⁰ *Swainsona* sp. Hamersley Station (A.A. Mitchell 196) has recently been described as *Swainsona thompsoniana*, a Priority 3 taxon.

Study Details	Methods	Results	Significant Findings	Limitations
<p>Homestead Exploration Lease Biological Survey Report</p> <p>Hamersley Iron (1996) Client: Hamersley Iron Type: Detailed flora and vegetation survey Location: Homestead exploration lease inc. Cave Creek (5.8 km N) Timing: November 1995</p>	<ul style="list-style-type: none"> • 10 detailed floristic sites (quadrats) • 29 relevés 	<ul style="list-style-type: none"> • 258 taxa from 54 families and 116 genera • 16 vegetation units 	<ul style="list-style-type: none"> • Three priority taxa recorded: <ul style="list-style-type: none"> ○ <i>Triumfetta leptacantha</i> (P3)¹¹ ○ <i>Brachychiton acuminatus</i> (P4) ○ <i>Livistona alfredii</i> (P4) 	<ul style="list-style-type: none"> • Two taxa could not be identified beyond genus level
<p>Nammuldi Trial Operation Vegetation and Flora Survey HGM (1998)</p> <p>Client: Hamersley Iron Type: Reconnaissance flora and vegetation survey Location: Nammuldi (1.7 km SW) Timing: June 1998</p>	<ul style="list-style-type: none"> • 17 relevés • Road alignments traversed on foot 	<ul style="list-style-type: none"> • 157 taxa from 42 families and 88 genera • Six vegetation associations • Two introduced weed taxa 	<ul style="list-style-type: none"> • Two priority taxa recorded <ul style="list-style-type: none"> ○ <i>Triumfetta leptacantha</i> (P3) ○ <i>Brachychiton acuminatus</i> (P4) 	<ul style="list-style-type: none"> • Nine taxa not identified beyond genus level; Seven taxa identified with a level of uncertainty (sterile specimens)

¹¹ *Triumfetta leptacantha* is no longer listed as a Priority flora taxon.

Study Details	Methods	Results	Significant Findings	Limitations
<p>Nammuldi / Silvergrass Soils, Vegetation and Flora Survey</p> <p>HGM (1999) Client: Hamersley Iron Type: Reconnaissance flora and vegetation survey Location: Nammuldi-Silvergrass (1.7 km SW, 5.8 km N) Timing: Aug-Sept 1998</p>	<ul style="list-style-type: none"> • 58 relevés • Targeted searching 	<ul style="list-style-type: none"> • 358 taxa from 56 families and 161 genera (includes results from HGM 1998) • 20 vegetation associations • Five introduced weed taxa 	<ul style="list-style-type: none"> • Six priority species recorded: <ul style="list-style-type: none"> ○ <i>Tephrosia</i> sp. Cathedral Gorge (F.H. Mollemans 2420) (P1)¹² ○ <i>Goodenia stellata</i> (P2)¹³ ○ <i>Bulbine pendula</i> (P3)¹⁴ ○ <i>Gymnanthera cunninghamii</i> (P3) ○ <i>Triumfetta leptacantha</i> (P3) ○ <i>Brachychiton acuminatus</i> (Priority species) 	<ul style="list-style-type: none"> • 13 taxa not identified beyond genus level; 15 taxa identified with a level of uncertainty (sterile specimens)
<p>Mattiske (2011)</p> <p>Client: Rio Tinto Iron Ore Type: Detailed flora and vegetation survey Location: Greater Nummuldi Irrigated Agriculture survey area (adjacent E) Timing: March 2011</p>	<ul style="list-style-type: none"> • 62 detailed floristic sites (quadrats) • Foot traverses 	<ul style="list-style-type: none"> • 189 taxa from 40 families and 99 genera • 13 vegetation units • Eight introduced weed taxa 	<ul style="list-style-type: none"> • One priority taxa recorded: <ul style="list-style-type: none"> ○ <i>Goodenia nuda</i> (P4) 	<ul style="list-style-type: none"> • No identified limitations
<p>Astron (2018)</p> <p>Client: Rio Tinto Iron Ore Type: Riparian Vegetation Monitoring Program Location: Nammuldi Creeks (within study area) Timing: May 2018</p>	<ul style="list-style-type: none"> • 185 detailed floristic sites (quadrats) • 25 transects 	<ul style="list-style-type: none"> • 248 taxa from 42 families and 123 genera • 14 introduced weed taxa 	<ul style="list-style-type: none"> • Four priority taxa recorded: <ul style="list-style-type: none"> ○ <i>Euphorbia australis</i> var. <i>glabra</i> (P2)¹⁵ ○ <i>Ipomoea racemigera</i> (P2) ○ <i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) ○ <i>Livistona alfredii</i> (P4) 	<ul style="list-style-type: none"> • Poor seasonal conditions leading up to monitoring • Some transects were completely inundated

¹² *Tephrosia* sp. Cathedral Gorge (F.H. Mollemans 2420) has recently been described as *Tephrosia oxalidea* which is not listed a Priority flora taxon.

¹³ *Goodenia stellata* is no longer listed as a Priority flora taxon.

¹⁴ *Bulbine pendula* is no longer listed as a Priority flora taxon.

¹⁵ *Euphorbia australis* var. *glabra* is no longer listed as Priority 2, it is now listed as Priority 3.

Study Details	Methods	Results	Significant Findings	Limitations
Astron (2017) Client: Rio Tinto Iron Ore Type: Riparian Vegetation Monitoring Program Location: Nammuldi Creeks (overlaps study area) Timing: May to June 2017	<ul style="list-style-type: none"> 186 detailed floristic sites (quadrats) 25 transects 	<ul style="list-style-type: none"> 234 taxa from 45 families and 132 genera 17 introduced weed taxa 	<ul style="list-style-type: none"> Four priority taxa recorded: <ul style="list-style-type: none"> <i>Ipomoea racemigera</i> (P2) <i>Oxalis</i> sp. Pilbara (M.E. Trudgen 12725) (P2) <i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) <i>Livistona alfredii</i> (P4) 	<ul style="list-style-type: none"> Some quadrats could not be adequately sampled due to inundation
Biota (2014) Client: Rio Tinto Iron Ore Type: Riparian Vegetation Monitoring Program Location: Nammuldi Creeks (within study area) Timing: April to May, & June 2014	<ul style="list-style-type: none"> 27 transects with 148 10x10 m monitoring quadrats 	<ul style="list-style-type: none"> 233 taxa from 49 families and 121 genera 16 introduced weed taxa 	<ul style="list-style-type: none"> Six priority taxa recorded: <ul style="list-style-type: none"> <i>Euphorbia australis</i> var. <i>glabra</i> (P2)¹⁶ <i>Ipomoea racemigera</i> (P2) <i>Oxalis</i> sp. Pilbara (M.E. Trudgen 12725) (P2) <i>Glycine falcata</i> (P3) <i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3) <i>Livistona alfredii</i> (P4) 	<ul style="list-style-type: none"> Some quadrats could not be adequately sampled due to inundation

¹⁶ *Euphorbia australis* var. *glabra* is no longer listed as Priority 2, it is now listed as Priority 3.

Appendix J: Database Search Results

Parks and Wildlife Service (DBCA, 2020c)
EPBC Act Protected Matters Search (DAWE, 2020)
NatureMap (DBCA, 2020a)
Atlas of Living Australia (ALA, 2020)
Western Australian Organism List (DPIRD, 2020)

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Acanthaceae	<i>Dicladantha forrestii</i>	•	•								
	<i>Dicladantha glabra</i>	•		•				P2			
	<i>Dipteracanthus australasicus</i>		•								
	<i>Rostellularia adscendens</i>	•	•								
	<i>Rostellularia adscendens</i> var. <i>clementii</i>	•									
	<i>Rostellularia adscendens</i> var. <i>latifolia</i>			•				P3			
Aizoaceae	<i>Trianthema oxycalyptum</i>		•								
	<i>Trianthema triquetrum</i>	•	•								
	<i>Zaleya galericulata</i>		•								
	<i>Zaleya galericulata</i> subsp. <i>galericulata</i>	•									
Alismataceae	<i>Sagittaria platyphylla</i>						•				Y
Amaranthaceae	<i>Achyranthes aspera</i>	•	•								
	<i>Alternanthera denticulata</i>	•	•								
	<i>Alternanthera nana</i>	•	•								
	<i>Alternanthera nodiflora</i>	•	•								
	<i>Amaranthus cuspidifolius</i>	•	•								
	<i>Amaranthus mitchellii</i>	•	•								
	<i>Amaranthus undulatus</i>	•	•								
	<i>Gomphrena canescens</i>	•	•								
	<i>Gomphrena canescens</i> subsp. <i>canescens</i>	•									
	<i>Gomphrena cunninghamii</i>	•	•								
	<i>Gomphrena kanisii</i>		•								
	<i>Ptilotus aevoides</i>	•	•								
	<i>Ptilotus appendiculatus</i>	•	•								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Amaranthaceae cont.	<i>Ptilotus astrolasius</i>	•	•								
	<i>Ptilotus auriculifolius</i>	•	•								
	<i>Ptilotus axillaris</i>	•	•								
	<i>Ptilotus carinatus</i>	•	•								
	<i>Ptilotus clementii</i>	•	•								
	<i>Ptilotus exaltatus</i>	•									
	<i>Ptilotus fusiformis</i>	•	•								
	<i>Ptilotus gomphrenoides</i>	•	•								
	<i>Ptilotus helipteroides</i>	•	•								
	<i>Ptilotus macrocephalus</i>		•								
	<i>Ptilotus mollis</i>	•	•	•				P4			
	<i>Ptilotus nobilis</i>	•	•								
	<i>Ptilotus obovatus</i>		•								
	<i>Ptilotus roei</i>		•								
	<i>Ptilotus rotundifolius</i>	•	•								
<i>Ptilotus subspinescens</i>	•	•	•	•			P3				
<i>Ptilotus trichocephalus</i>			•				P4				
Apiaceae	<i>Daucus glochidiatus</i>	•	•								
Apocynaceae	<i>Calotropis procera</i>						•				Y
	<i>Cynanchum floribundum</i>	•	•								
	<i>Gymnanthera cunninghamii</i>		•	•	•			P3			
Araceae	<i>Pistia stratiotes</i>						•				
	<i>Zantedeschia aethiopica</i>						•				Y
Araliaceae	<i>Hydrocotyle ranunculoides</i>						•				Y

Family	Taxon	Source						Conservation Code			Introduced	
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act		
Araliaceae cont.	<i>Trachymene oleracea</i>	•	•									
	<i>Trachymene oleracea</i> subsp. <i>oleracea</i>	•										
	<i>Trachymene pilbarensis</i>	•	•									
Arecaceae	<i>Livistona alfredii</i>		•	•					P4			
Asclepiadaceae	<i>Cryptostegia madagascariensis</i>						•				Y	
Asparagaceae	<i>Asparagus asparagoides</i>						•				Y	
Asphodelaceae	<i>Bulbine pendula</i>	•	•									
Asteraceae	<i>Apowollastonia hamersleyensis</i>	•	•									
	<i>Bidens bipinnata</i>	•	•								Y	
	<i>Bidens subalternans</i> var. <i>simulans</i>	•										
	<i>Blumea tenella</i>	•	•									
	<i>Calocephalus beardii</i>	•	•									
	<i>Calocephalus knappii</i>	•	•									
	<i>Calocephalus pilbarensis</i>		•									
	<i>Calotis hispidula</i>	•	•									
	<i>Calotis multicaulis</i>		•									
	<i>Calotis plumulifera</i>	•	•									
	<i>Centipeda minima</i>	•	•									
	<i>Centipeda minima</i> subsp. <i>macrocephala</i>	•										
	<i>Chondrilla juncea</i>							•				Y
	<i>Chrysocephalum apiculatum</i> subsp. <i>pilbarensis</i>	•										
	<i>Cyanthillium gracile</i>	•		•						P3		
	<i>Flaveria trinervia</i>	•	•									
<i>Helichrysum oligochaetum</i>			•						P1			

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Asteraceae cont.	<i>Iotasperma sessilifolium</i>		•	•				P3			
	<i>Ixiochlamys cuneifolia</i>	•	•								
	<i>Olearia xerophila</i>		•								
	<i>Onopordum acaulon</i>						•				Y
	<i>Pentalepis trichodesmoides</i>		•								
	<i>Pentalepis trichodesmoides</i> subsp. <i>hispida</i>			•				P2			
	<i>Pentalepis trichodesmoides</i> subsp. <i>trichodesmoides</i>	•									
	<i>Pleurocarpaea gracilis</i>		•								
	<i>Pluchea rubelliflora</i>	•	•								
	<i>Pseudognaphalium luteoalbum</i>	•									
	<i>Pterocaulon serrulatum</i> var. <i>velutinum</i>	•									
	<i>Pterocaulon sphacelatum</i>	•	•								
	<i>Rhodanthe floribunda</i>		•								
	<i>Rhodanthe humboldtiana</i>	•	•								
	<i>Rhodanthe margarethae</i>	•	•								
	<i>Roebuckiella similis</i>		•								
	<i>Sigesbeckia orientalis</i>	•	•								
	<i>Silybum marianum</i>						•				Y
	<i>Sonchus oleraceus</i>	•	•								Y
	<i>Streptoglossa adscendens</i>	•	•								
<i>Streptoglossa bubakii</i>	•	•									
<i>Streptoglossa cylindriceps</i>	•	•									
<i>Streptoglossa decurrens</i>	•	•									
<i>Streptoglossa liatroides</i>		•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Asteraceae cont.	<i>Vittadinia arida</i>		•								
	<i>Vittadinia eremaea</i>	•	•								
	<i>Vittadinia</i> sp. Coondewanna Flats (S. van Leeuwen 4684)			•				P1			
	<i>Xanthium spinosum</i>						•				Y
	<i>Xanthium strumarium</i>						•				Y
Boraginaceae	<i>Echium plantagineum</i>						•				Y
	<i>Heliotropium ammophilum</i>	•	•								
	<i>Heliotropium conocarpum</i>		•								
	<i>Heliotropium crispatum</i>	•	•								
	<i>Heliotropium cunninghamii</i>	•	•								
	<i>Heliotropium heteranthum</i>	•	•								
	<i>Heliotropium ovalifolium</i>	•	•								
	<i>Heliotropium tenuifolium</i>	•	•								
	<i>Trichodesma zeylanicum</i>	•	•								
Brassicaceae	<i>Lepidium catapycnon</i>				•			P4			
	<i>Lepidium muelleri-ferdinandi</i>	•	•								
	<i>Lepidium oxytrichum</i>	•	•								
	<i>Lepidium phlebopetalum</i>		•								
	<i>Lepidium pholidogynum</i>	•	•								
	<i>Stenopetalum anfractum</i>	•	•								
Cactaceae	<i>Austrocylindropuntia cylindrica</i>						•				Y
	<i>Austrocylindropuntia subulata</i>						•				Y
	<i>Cylindropuntia fulgida</i>						•				Y
	<i>Cylindropuntia imbricata</i>						•				Y

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Cactaceae cont.	<i>Cylindropuntia kleiniae</i>						•				Y
	<i>Cylindropuntia pallida</i>						•				Y
	<i>Cylindropuntia tunicata</i>						•				Y
	<i>Opuntia elata</i>						•				Y
	<i>Opuntia elatior</i>						•				Y
	<i>Opuntia engelmannii</i>						•				Y
	<i>Opuntia ficus-indica</i>						•				Y
	<i>Opuntia microdasys</i>						•				Y
	<i>Opuntia monacantha</i>						•				Y
	<i>Opuntia polyacantha</i>						•				Y
	<i>Opuntia puberula</i>						•				Y
	<i>Opuntia stricta</i>						•				Y
<i>Opuntia tomentosa</i>						•				Y	
Campanulaceae	<i>Lobelia arnhemiaca</i>	•	•								
	<i>Lobelia heterophylla</i>	•	•								
	<i>Lobelia heterophylla</i> subsp. <i>pilbarensis</i>	•									
	<i>Wahlenbergia</i> sp.	•									
	<i>Wahlenbergia tumidifruca</i>	•	•								
Capparaceae	<i>Capparis umbonata</i>	•	•								
Caryophyllaceae	<i>Polycarpaea holtzei</i>	•	•								
	<i>Polycarpaea longiflora</i>	•	•								
Celastraceae	<i>Denhamia cunninghamii</i>		•								
	<i>Stackhousia</i> sp. swollen gynophore (W.R. Barker 2041)	•									
Chenopodiaceae	<i>Dysphania glomulifera</i>		•								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Chenopodiaceae cont.	<i>Dysphania glomulifera</i> subsp. <i>eremaea</i>	•									
	<i>Dysphania kalpari</i>	•	•								
	<i>Dysphania melanocarpa</i>	•	•								
	<i>Dysphania rhadinostachya</i>		•								
	<i>Dysphania rhadinostachya</i> subsp. <i>inflata</i>	•									
	<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>	•									
	<i>Enchylaena tomentosa</i>		•								
	<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	•									
	<i>Maireana carnos</i>	•	•								
	<i>Maireana eriosphaera</i>	•	•								
	<i>Maireana georgei</i>	•	•								
	<i>Maireana melanocoma</i>	•	•								
	<i>Maireana planifolia</i>	•	•								
	<i>Maireana suaedifolia</i>	•	•								
	<i>Maireana tomentosa</i>		•								
	<i>Maireana tomentosa</i> subsp. <i>tomentosa</i>	•									
	<i>Rhagodia eremaea</i>	•	•								
	<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)		•	•					P3		
	<i>Salsola australis</i>	•	•								
	<i>Sclerolaena convexula</i>	•	•								
<i>Sclerolaena cornishiana</i>	•	•									
<i>Sclerolaena eriacantha</i>	•	•									
<i>Sclerolaena lanicuspis</i>	•	•									
<i>Tecticornia disarticulata</i>	•	•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Cleomaceae	<i>Arivela viscosa</i>	•	•								
Combretaceae	<i>Terminalia canescens</i>		•								
	<i>Terminalia circumalata</i>	•									
	<i>Terminalia supranitifolia</i>	•	•	•				P3			
Commelinaceae	<i>Commelina ensifolia</i>	•	•								
Convolvulaceae	<i>Bonamia erecta</i>		•								
	<i>Bonamia rosea</i>		•								
	<i>Convolvulus clementii</i>	•	•								
	<i>Duperreya commixta</i>	•	•								
	<i>Evolvulus alsinoides</i>	•									
	<i>Ipomoea muelleri</i>	•	•								
	<i>Ipomoea plebeia</i>	•	•								
	<i>Operculina aequisepala</i>	•									
	<i>Polymeria ambigua</i>	•	•								
	<i>Polymeria longifolia</i>		•								
	<i>Polymeria</i> sp.	•									
Cucurbitaceae	<i>Cucumis variabilis</i>	•	•								
Cyperaceae	<i>Baumea juncea</i>	•	•								
	<i>Bulbostylis barbata</i>	•	•								
	<i>Cyperus cunninghamii</i>		•								
	<i>Cyperus cunninghamii</i> subsp. <i>cunninghamii</i>	•									
	<i>Cyperus difformis</i>	•	•								
	<i>Cyperus hesperius</i>	•									
	<i>Cyperus pygmaeus</i>	•	•								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Cyperaceae cont.	<i>Cyperus squarrosus</i>	•	•								
	<i>Cyperus vaginatus</i>	•	•								
	<i>Eleocharis atropurpurea</i>	•	•								
	<i>Eleocharis geniculata</i>	•	•								
	<i>Eleocharis pallens</i>	•	•								
	<i>Eleocharis spiralis</i>	•	•								
	<i>Fimbristylis cephalophora</i>	•	•								
	<i>Fimbristylis dichotoma</i>	•									
	<i>Fimbristylis ferruginea</i>	•	•								
	<i>Fimbristylis microcarya</i>	•	•								
	<i>Fimbristylis rara</i>	•	•								
	<i>Fimbristylis simulans</i>	•	•								
	<i>Schoenoplectiella dissachantha</i>	•	•								
<i>Schoenoplectus subulatus</i>	•	•									
Dilleniaceae	<i>Hibbertia glaberrima</i>	•	•								
Elaeocarpaceae	<i>Tetratheca butcheriana</i>			•					P1		
Euphorbiaceae	<i>Adriana tomentosa</i>	•	•								
	<i>Euphorbia australis</i>		•								
	<i>Euphorbia australis</i> var. <i>glabra</i>	•		•					P3		
	<i>Euphorbia australis</i> var. <i>subtomentosa</i>	•									
	<i>Euphorbia biconvexa</i>	•	•								
	<i>Euphorbia boophthona</i>	•	•								
	<i>Euphorbia careyi</i>	•	•								
<i>Euphorbia coghlanii</i>	•	•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Euphorbiaceae cont.	<i>Euphorbia inappendiculata</i>		•								
	<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	•		•				P2			
	<i>Euphorbia inappendiculata</i> var. <i>queenslandica</i>	•		•				P1			
	<i>Euphorbia tannensis</i>		•								
	<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	•									
	<i>Euphorbia vaccaria</i>		•								
	<i>Euphorbia vaccaria</i> var. <i>erucooides</i>	•									
	<i>Jatropha gossypifolia</i>						•				Y
Fabaceae	<i>Acacia adoxa</i>		•								
	<i>Acacia adoxa</i> var. <i>adoxo</i>	•									
	<i>Acacia adsurgens</i>		•								
	<i>Acacia ancistrocarpa</i>	•	•								
	<i>Acacia aneura</i>		•								
	<i>Acacia aptaneura</i>	•	•								
	<i>Acacia arida</i>	•	•								
	<i>Acacia arrecta</i>		•								
	<i>Acacia atkinsiana</i>	•	•								
	<i>Acacia ayersiana</i>		•								
	<i>Acacia bivenosa</i>	•	•								
	<i>Acacia bromilowiana</i>	•	•	•					P4		
	<i>Acacia citrinoviridis</i>	•	•								
	<i>Acacia coriacea</i>		•								
	<i>Acacia coriacea</i> subsp. <i>pendens</i>	•									
<i>Acacia cowleana</i>	•	•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Fabaceae cont.	<i>Acacia elachantha</i>		•								
	<i>Acacia exigua</i>	•	•								
	<i>Acacia hamersleyensis</i>	•	•								
	<i>Acacia inaequilatera</i>	•	•								
	<i>Acacia kempeana</i>	•	•								
	<i>Acacia lysiphloia</i>		•								
	<i>Acacia maitlandii</i>	•									
	<i>Acacia marramamba</i>	•									
	<i>Acacia monticola</i>		•								
	<i>Acacia pachyacra</i>		•								
	<i>Acacia pruinocarpa</i>	•	•								
	<i>Acacia pteraneura</i>	•	•								
	<i>Acacia ptychophylla</i>		•								
	<i>Acacia pyrifolia</i>		•								
	<i>Acacia pyrifolia</i> var. <i>pyrifolia</i>	•									
	<i>Acacia retivenea</i>		•								
	<i>Acacia retivenea</i> subsp. <i>clandestina</i>	•									
	<i>Acacia sclerosperma</i>		•								
	<i>Acacia sclerosperma</i> subsp. <i>Sclerosperma</i>	•									
	<i>Acacia sibirica</i>		•								
<i>Acacia</i> sp.	•										
<i>Acacia synchronicia</i>	•	•									
<i>Acacia tenuissima</i>	•	•									
<i>Acacia tetragonophylla</i>		•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Fabaceae cont.	<i>Acacia trachycarpa</i>		•								
	<i>Acacia xiphophylla</i>	•									
	<i>Alhagi maurorum</i>						•				Y
	<i>Crotalaria dissitiflora</i>		•								
	<i>Crotalaria medicaginea</i>		•								
	<i>Crotalaria medicaginea</i> var. <i>neglecta</i>	•									
	<i>Crotalaria novae-hollandiae</i>	•	•								
	<i>Cullen cinereum</i>		•								
	<i>Cullen graveolens</i>		•								
	<i>Cullen lachnostachys</i>	•	•								
	<i>Cullen leucanthum</i>	•	•								
	<i>Cullen martinii</i>	•	•								
	<i>Cullen pogonocarpum</i>	•	•								
	<i>Gastrolobium grandiflorum</i>	•	•								
	<i>Glycine canescens</i>	•	•								
	<i>Glycine falcata</i>	•	•	•	•				P3		
	<i>Gompholobium karjini</i>			•					P2		
	<i>Gompholobium oreophilum</i>	•	•								
	<i>Indigofera colutea</i>	•	•								
	<i>Indigofera fractiflexa</i> subsp. <i>fractiflexa</i>	•									
<i>Indigofera linnaei</i>	•										
<i>Indigofera monophylla</i>		•									
<i>Indigofera rugosa</i>	•	•									
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301)	•	•	•					P3			

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Fabaceae cont.	<i>Isotropis atropurpurea</i>	•	•								
	<i>Lotus cruentus</i>	•	•								
	<i>Mirbelia viminalis</i>	•	•								
	<i>Neptunia dimorphantha</i>		•								
	<i>Parkinsonia aculeata</i>					•	•				Y
	<i>Petalostylis labicheoides</i>		•								
	<i>Prosopis glandulosa</i> x <i>Prosopis velutina</i>						•				Y
	<i>Rhynchosia australis</i>	•	•								
	<i>Rhynchosia bungarensis</i>	•	•	•					P4		
	<i>Rhynchosia minima</i>		•								
	<i>Senna alata</i>						•				Y
	<i>Senna artemisioides</i>		•								
	<i>Senna artemisioides</i> subsp. <i>oligophylla</i>	•									
	<i>Senna hamersleyensis</i>	•	•								
	<i>Senna notabilis</i>	•	•								
	<i>Senna obtusifolia</i>						•				Y
	<i>Senna stricta</i>	•	•								
	<i>Senna symonii</i>	•	•								
	<i>Senna venusta</i>		•								
	<i>Sesbania cannabina</i>	•	•								
<i>Swainsona leeana</i>	•	•									
<i>Swainsona maccullochiana</i>		•									
<i>Swainsona thompsoniana</i>	•	•	•					P3			
<i>Templetonia egena</i>	•	•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Fabaceae cont.	<i>Tephrosia densa</i>	•	•								
	<i>Tephrosia oxalidea</i>	•	•								
	<i>Tephrosia rosea</i>		•								
	<i>Tephrosia rosea</i> var. Fortescue creeks (M.I.H. Brooker 2186)	•									
	<i>Tephrosia</i> sp. NW Eremaean (S. van Leeuwen et al. PBS 0356)	•	•								
	<i>Tephrosia stipuligera</i>	•									
	<i>Tephrosia uniovulata</i>	•	•								
	<i>Ulex europaeus</i>						•				Y
	<i>Vachellia farnesiana</i>	•	•								Y
	<i>Vigna lanceolata</i> var. <i>lanceolata</i>	•									
	<i>Vigna</i> sp. Hamersley Clay (A.A.Mitchell PRP 113)		•								
Frankeniaceae	<i>Frankenia hispidula</i>	•	•								
Gentianaceae	<i>Schenkia australis</i>		•								
	<i>Schenkia clementii</i>	•	•								
Goodeniaceae	<i>Dampiera anonyma</i>	•	•	•					P3		
	<i>Dampiera candicans</i>		•								
	<i>Dampiera dentata</i>	•	•								
	<i>Goodenia cusackiana</i>	•									
	<i>Goodenia heterochila</i>	•	•								
	<i>Goodenia lamprosperma</i>	•	•								
	<i>Goodenia microptera</i>	•	•								
	<i>Goodenia muelleriana</i>	•	•								
	<i>Goodenia nuda</i>	•	•	•					P4		
<i>Goodenia pascua</i>	•	•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Goodeniaceae cont.	<i>Goodenia pedicellata</i>			•				P1			
	<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)				•			P3			
	<i>Goodenia stellata</i>	•	•								
	<i>Goodenia tenuiloba</i>	•	•								
	<i>Scaevola amblyanthera</i>		•								
	<i>Scaevola amblyanthera</i> var. <i>centralis</i>	•									
	<i>Scaevola parvifolia</i>		•								
	<i>Scaevola parvifolia</i> subsp. <i>pilbarae</i>	•									
Haloragaceae	<i>Haloragis gossei</i>	•	•								
	<i>Haloragis gossei</i> var. <i>inflata</i>	•									
	<i>Haloragis maierae</i>		•								
Iridaceae	<i>Moraea flaccida</i>						•				Y
	<i>Moraea miniata</i>						•				Y
Lamiaceae	<i>Clerodendrum floribundum</i>	•	•								
	<i>Clerodendrum tomentosum</i>		•								
	<i>Clerodendrum tomentosum</i> var. <i>lanceolatum</i>	•									
	<i>Dicrastylis cordifolia</i>		•								
	<i>Prostanthera albiflora</i>	•	•								
	<i>Teucrium disjunctum</i>	•	•								
	<i>Teucrium pilbaranum</i>	•	•	•				P2			
Lauraceae	<i>Cassytha capillaris</i>		•								
Linderniaceae	<i>Striga curviflora</i>	•	•								
Loranthaceae	<i>Amyema fitzgeraldii</i>	•	•								
	<i>Amyema hilliana</i>	•	•								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Loranthaceae cont.	<i>Amyema miquelii</i>	•	•								
	<i>Amyema preissii</i>	•	•								
	<i>Amyema sanguinea</i>		•								
	<i>Amyema sanguinea</i> var. <i>sanguinea</i>	•									
	<i>Digitaria ammophila</i>	•									
	<i>Diplatia grandibractea</i>	•	•								
	<i>Lysiana casuarinae</i>	•	•								
Lythraceae	<i>Ammannia baccifera</i>	•	•								
	<i>Ammannia multiflora</i>	•	•								
	<i>Rotala mexicana</i>		•								
Malvaceae	<i>Abutilon amplum</i>	•	•								
	<i>Abutilon cunninghamii</i>		•								
	<i>Abutilon fraseri</i>	•	•								
	<i>Abutilon macrum</i>	•	•								
	<i>Abutilon malvifolium</i>		•								
	<i>Abutilon otocarpum</i>		•								
	<i>Abutilon</i> sp. Dioicum (A.A. Mitchell PRP 1618)	•	•								
	<i>Abutilon</i> sp. Pilbara (W.R. Barker 2025)	•	•								
	<i>Androcalva luteiflora</i>	•									
	<i>Brachychiton acuminatus</i>	•	•								
	<i>Brachychiton gregorii</i>	•	•								
	<i>Corchorus crozophorifolius</i>	•	•								
	<i>Corchorus lasiocarpus</i>		•								
	<i>Corchorus lasiocarpus</i> subsp. <i>lasiocarpus</i>	•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Malvaceae cont.	<i>Corchorus lasiocarpus</i> subsp. <i>parvus</i>	•									
	<i>Corchorus walcottii</i>		•								
	<i>Gossypium australe</i>	•									
	<i>Gossypium robinsonii</i>	•	•								
	<i>Gossypium sturtianum</i>		•								
	<i>Gossypium sturtianum</i> var. <i>sturtianum</i>	•									
	<i>Hibiscus campanulatus</i>	•	•	•				P1			
	<i>Hibiscus coatesii</i>	•	•								
	<i>Hibiscus goldsworthii</i>	•	•								
	<i>Hibiscus leptocladus</i>	•	•								
	<i>Hibiscus</i> sp. Mt Brockman (E. Thoma ET 1354)	•		•				P1			
	<i>Hibiscus sturtii</i>		•								
	<i>Hibiscus sturtii</i> var. <i>campylochlamys</i>	•									
	<i>Hibiscus sturtii</i> var. <i>truncatus</i>	•									
	<i>Hibiscus verdcourtii</i>	•	•								
	<i>Malvastrum americanum</i>	•	•								Y
	<i>Seringia elliptica</i>	•	•								
	<i>Seringia nephrosperma</i>	•	•								
	<i>Sida arenicola</i>	•	•								
	<i>Sida arsinjata</i>	•	•								
<i>Sida cardiophylla</i>	•	•									
<i>Sida echinocarpa</i>	•	•									
<i>Sida fibulifera</i>	•	•									
<i>Sida laevis</i>	•	•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Malvaceae cont.	<i>Sida rohlenae</i>	•									
	<i>Sida</i> sp. Articulation below (A.A. Mitchell PRP 1605)	•	•								
	<i>Sida</i> sp. Barlee Range (S. van Leeuwen 1642)	•	•	•				P3			
	<i>Sida</i> sp. Hamersley Range (K. Newbey 10692)	•	•	•	•			P3			
	<i>Sida</i> sp. L (A.M. Ashby 4202)	•	•								
	<i>Sida</i> sp. Pilbara (A.A.Mitchell PRP1543)		•								
	<i>Sida</i> sp. Shovelanna Hill (S. van Leeuwen 3842)	•	•								
	<i>Sida</i> sp. spiciform panicles (E.Leyland s.n. 14/8/1990)	•	•								
	<i>Sida spinosa</i>		•								
	<i>Sida trichopoda</i>	•	•								
	<i>Triumfetta chaetocarpa</i>	•	•								
	<i>Triumfetta clementii</i>	•	•								
	<i>Triumfetta leptacantha</i>	•	•								
	<i>Triumfetta maconochieana</i>	•	•								
	<i>Waltheria indica</i>	•	•								
<i>Waltheria virgata</i>	•										
Marsileaceae	<i>Marsilea hirsuta</i>	•	•								
	<i>Marsilea mutica</i>	•	•								
Menispermaceae	<i>Tinospora smilacina</i>	•	•								
Molluginaceae	<i>Glinus lotoides</i>	•	•								
	<i>Mollugo molluginea</i>		•								
	<i>Trigastrotheca molluginea</i>	•									
Moraceae	<i>Ficus aculeata</i>		•								
	<i>Ficus aculeata</i> var. <i>indecora</i>	•									

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		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Moraceae cont.	<i>Ficus brachypoda</i>	•	•								
Myrtaceae	<i>Calytrix carinata</i>	•	•								
	<i>Corymbia ferritcola</i>	•	•								
	<i>Corymbia hamersleyana</i>		•								
	<i>Eucalyptus aridimontana</i>		•								
	<i>Eucalyptus camaldulensis</i>	•									
	<i>Eucalyptus gamophylla</i>		•								
	<i>Eucalyptus kingsmillii</i>	•	•								
	<i>Eucalyptus lucasii</i>	•	•								
	<i>Eucalyptus pilbarensis</i>	•	•								
	<i>Eucalyptus socialis</i>		•								
	<i>Eucalyptus trivalva</i>	•	•								
	<i>Eucalyptus victrix</i>	•	•								
	<i>Melaleuca argentea</i>	•	•								
	<i>Melaleuca bracteata</i>	•	•								
	<i>Melaleuca eleuterostachya</i>	•	•								
	<i>Melaleuca glomerata</i>	•	•								
<i>Melaleuca lasiandra</i>	•	•									
Nyctaginaceae	<i>Boerhavia coccinea</i>	•	•								
	<i>Boerhavia repleta</i>	•	•								
	<i>Boerhavia schomburgkiana</i>	•	•								
	<i>Commicarpus australis</i>	•	•								
Oleaceae	<i>Jasminum didymum</i>		•								
	<i>Jasminum didymum</i> subsp. <i>lineare</i>	•									

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		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Oxalidaceae	<i>Oxalis</i> sp. Pilbara (M.E. Trudgen 12725)		•	•				P2			
Papaveraceae	<i>Argemone ochroleuca</i>	•	•								Y
Phrymaceae	<i>Mimulus gracilis</i>	•	•								
	<i>Peplidium</i> sp. E Evol. Fl. Fauna Arid Aust. (A.S. Weston 12768)	•	•								
	<i>Uvedalia linearis</i>		•								
Phyllanthaceae	<i>Notoleptopus decaisnei</i>	•	•								
	<i>Phyllanthus baccatus</i>	•									
	<i>Phyllanthus ciccoides</i>		•								
	<i>Phyllanthus maderaspatensis</i>	•									
Plantaginaceae	<i>Plantago cunninghamii</i>	•	•								
	<i>Stemodia grossa</i>	•									
	<i>Stemodia kingii</i>	•	•								
Poaceae	<i>Amphipogon sericeus</i>	•	•								
	<i>Aristida burbridgeae</i>	•	•								
	<i>Aristida contorta</i>	•	•								
	<i>Aristida exserta</i>		•								
	<i>Aristida jerichoensis</i>		•								
	<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>			•				P3			
	<i>Aristida latifolia</i>		•								
	<i>Astrebla elymoides</i>	•	•								
	<i>Astrebla lappacea</i>		•	•	•			P3			
	<i>Bothriochloa ewartiana</i>	•	•								
	<i>Brachyachne convergens</i>		•								Y
	<i>Brachyachne prostrata</i>		•								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Poaceae cont.	<i>Cenchrus ciliaris</i>	•	•			•					Y
	<i>Cenchrus setiger</i>	•	•								Y
	<i>Chloris gayana</i>	•	•								Y
	<i>Chloris pectinata</i>	•	•								
	<i>Chrysopogon fallax</i>	•	•								
	<i>Cymbopogon ambiguus</i>	•	•								
	<i>Cymbopogon obtectus</i>	•	•								
	<i>Cynodon convergens</i>	•									
	<i>Cynodon prostratus</i>	•	•								
	<i>Dactyloctenium radulans</i>	•									
	<i>Dichanthium fecundum</i>	•	•								
	<i>Dichanthium sericeum</i>		•								
	<i>Elytrophorus spicatus</i>	•	•								
	<i>Enneapogon avenaceus</i>		•								
	<i>Enneapogon caerulescens</i>	•	•								
	<i>Enneapogon lindleyanus</i>	•	•								
	<i>Enneapogon polyphyllus</i>	•	•								
	<i>Enneapogon robustissimus</i>	•	•								
	<i>Enteropogon ramosus</i>		•								
	<i>Eragrostis cumingii</i>	•	•								
<i>Eragrostis dielsii</i>	•	•									
<i>Eragrostis eriopoda</i>		•									
<i>Eragrostis pergracilis</i>		•									
<i>Eragrostis setifolia</i>		•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Poaceae cont.	<i>Eragrostis tenellula</i>	•	•								
	<i>Eragrostis xerophila</i>	•	•								
	<i>Eriachne benthamii</i>	•	•								
	<i>Eriachne flaccida</i>		•								
	<i>Eriachne mucronata</i>	•	•								
	<i>Eriachne pulchella</i>	•									
	<i>Eriachne tenuiculmis</i>		•								
	<i>Eriochloa pseudoacrotricha</i>	•	•								
	<i>Iseilema dolichotrichum</i>		•								
	<i>Iseilema fragile</i>	•									
	<i>Iseilema macratherum</i>		•								
	<i>Iseilema membranaceum</i>	•	•								
	<i>Iseilema vaginiflorum</i>	•	•								
	<i>Paraneurachne muelleri</i>	•	•								
	<i>Paspalidium clementii</i>	•	•								
	<i>Paspalidium retiglume</i>			•					P2		
	<i>Perotis rara</i>	•	•								
	<i>Pseudoraphis spinescens</i>	•	•								
	<i>Setaria dielsii</i>	•	•								
	<i>Setaria verticillata</i>	•	•								Y
<i>Sporobolus australasicus</i>	•	•									
<i>Themeda</i> sp. Hamersley Station (M.E. Trudgen 11431)		•	•					P3			
<i>Tragus australianus</i>	•	•									
<i>Triodia angusta</i>	•	•									

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Poaceae cont.	<i>Triodia basitricha</i>	•	•	•				P3			
	<i>Triodia biflora</i>		•								
	<i>Triodia brizoides</i>	•	•								
	<i>Triodia pisolitica</i>	•		•				P3			
	<i>Triodia</i> sp. Karijini (S. van Leeuwen 4111)	•	•	•				P1			
	<i>Triodia</i> sp. Silvergrass (P.-L. de Kock BES 00808)	•		•				P1			
	<i>Triodia wiseana</i>	•	•								
	<i>Tripogonella loliiformis</i>		•								
	<i>Xerochloa barbata</i>	•	•								
Polygalaceae	<i>Polygala glaucifolia</i>	•	•								
Portulacaceae	<i>Calandrinia ptychosperma</i>	•	•								
	<i>Portulaca oleracea</i>	•	•								
Potamogetonaceae	<i>Potamogeton tepperi</i>	•	•								
Primulaceae	<i>Samolus repens</i>		•								
Proteaceae	<i>Grevillea pyramidalis</i>	•	•								
	<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	•									
	<i>Grevillea saxicola</i>			•				P3			
	<i>Grevillea striata</i>	•	•								
	<i>Grevillea wickhamii</i>		•								
	<i>Hakea lorea</i>		•								
	<i>Hakea lorea</i> subsp. <i>lorea</i>	•									
Pteridaceae	<i>Cheilanthes austrotenuifolia</i>	•									
	<i>Cheilanthes brownii</i>		•								
	<i>Cheilanthes contigua</i>	•	•								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Pteridaceae cont.	<i>Cheilanthes lasiophylla</i>	•	•								
	<i>Cheilanthes pumilio</i>		•								
	<i>Cheilanthes sieberi</i>		•								
	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	•									
Rhamnaceae	<i>Cryptandra monticola</i>	•	•								
	<i>Ziziphus mauritiana</i>						•				Y
Rosaceae	<i>Rubus anglocandicans</i>						•				Y
	<i>Rubus laudatus</i>						•				Y
	<i>Rubus rugosus</i>						•				Y
	<i>Rubus ulmifolius</i>						•				Y
Rubiaceae	<i>Oldenlandia crouchiana</i>	•	•								
	<i>Oldenlandia</i> sp. Hamersley Station (A.A. Mitchell PRP 1479)			•				P3			
	<i>Pomax rupestris</i>	•	•								
	<i>Synaptantha tillaeacea</i>	•	•								
	<i>Synaptantha tillaeacea</i> var. <i>tillaeacea</i>	•									
Santalaceae	<i>Santalum lanceolatum</i>		•								
	<i>Santalum spicatum</i>	•									
Sapindaceae	<i>Diplopeltis stuartii</i>		•								
	<i>Diplopeltis stuartii</i> var. <i>stuartii</i>	•									
	<i>Dodonaea coriacea</i>		•								
	<i>Dodonaea lanceolata</i>		•								
	<i>Dodonaea lanceolata</i> var. <i>lanceolata</i>	•									
	<i>Dodonaea pachyneura</i>	•	•								
	<i>Dodonaea petiolaris</i>	•	•								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Sapindaceae cont.	<i>Dodonaea viscosa</i>		•								
	<i>Dodonaea viscosa</i> subsp. <i>mucronata</i>	•									
Scrophulariaceae	<i>Eremophila cryptothrix</i>	•	•								
	<i>Eremophila cuneifolia</i>	•	•								
	<i>Eremophila exilifolia</i>		•								
	<i>Eremophila forrestii</i>	•	•								
	<i>Eremophila fraseri</i>		•								
	<i>Eremophila fraseri</i> subsp. <i>fraseri</i>	•									
	<i>Eremophila galeata</i>		•								
	<i>Eremophila lanceolata</i>		•								
	<i>Eremophila latrobei</i>		•								
	<i>Eremophila latrobei</i> subsp. <i>glabra</i>	•									
	<i>Eremophila latrobei</i> subsp. <i>latrobei</i>	•									
	<i>Eremophila maculata</i>		•								
	<i>Eremophila maculata</i> subsp. <i>brevifolia</i>	•									
	<i>Eremophila magnifica</i>		•								
	<i>Eremophila magnifica</i> subsp. <i>magnifica</i>	•		•					P4		
	<i>Eremophila magnifica</i> subsp. <i>velutina</i>	•		•	•				P3		
<i>Eremophila tietkensis</i>	•										
Solanaceae	<i>Datura leichhardtii</i>	•	•								Y
	<i>Nicotiana benthamiana</i>	•	•								
	<i>Nicotiana occidentalis</i>	•	•								
	<i>Nicotiana occidentalis</i> subsp. <i>occidentalis</i>	•									
	<i>Nicotiana rosulata</i>	•	•								

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Solanaceae cont.	<i>Solanum cleistogamum</i>	•	•								
	<i>Solanum diversiflorum</i>	•	•								
	<i>Solanum elaeagnifolium</i>						•				Y
	<i>Solanum elaeagnifolium</i>	•	•								
	<i>Solanum horridum</i>		•								
	<i>Solanum kentrocaule</i>	•	•	•				P3			
	<i>Solanum lasiophyllum</i>	•	•								
	<i>Solanum linnaeanum</i>						•				Y
	<i>Solanum phlomoides</i>	•	•								
	<i>Solanum sturtianum</i>		•								
Surianaceae	<i>Stylobasium spathulatum</i>	•	•								
Tamaricaceae	<i>Tamarix aphylla</i>						•				Y
Thymelaeaceae	<i>Pimelea ammocharis</i>		•								
	<i>Pimelea forrestiana</i>	•	•								
	<i>Pimelea holroydii</i>		•								
Urticaceae	<i>Parietaria cardiostegia</i>	•	•								
	<i>Pipturus argenteus</i>		•								Y
Verbenaceae	<i>Lantana camara</i>						•				Y
Zygophyllaceae	<i>Roepera eichleri</i>	•									
	<i>Tribulus astrocarpus</i>	•									
	<i>Tribulus hirsutus</i>	•	•								
	<i>Tribulus platypterus</i>		•								
	<i>Tribulus suberosus</i>		•								
	<i>Tribulus terrestris</i>	•	•								Y

Family	Taxon	Source						Conservation Code			Introduced
		NM	ALA	WA H	TPFL	EPBC	WAO L	DBCA	BC Act	EPBC Act	
Zygophyllaceae cont.	<i>Zygophyllum eichleri</i>		•								
	<i>Zygophyllum iodocarpum</i>		•								

Appendix K: Introduced Flora Database Results

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological Rating	Invasiveness Rating
		NM	ALA	EPBC	WAOL				
Alismataceae	<i>Sagittaria platyphylla</i>				•	Yes	Yes	Not Assessed	Not Assessed
Apocynaceae	<i>Calotropis procera</i>				•	Yes	No	Not Assessed	Not Assessed
Araceae	<i>Zantedeschia aethiopica</i>				•	Yes	No	Not Assessed	Not Assessed
Araliaceae	<i>Hydrocotyle ranunculoides</i>				•	Yes	No	Not Assessed	Not Assessed
Asclepiadaceae	<i>Cryptostegia madagascariensis</i>				•	Yes	No	Not Assessed	Not Assessed
Asparagaceae	<i>Asparagus asparagoides</i>				•	Yes	Yes	Not Assessed	Not Assessed
Asteraceae	<i>Bidens bipinnata</i>	•	•			No	No	Unknown	Rapid
	<i>Chondrilla juncea</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Onopordum acaulon</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Silybum marianum</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Sonchus oleraceus</i>	•	•			No	No	Low	Rapid
	<i>Xanthium spinosum</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Xanthium strumarium</i>				•	Yes	No	Not Assessed	Not Assessed
Boraginaceae	<i>Echium plantagineum</i>				•	Yes	No	Not Assessed	Not Assessed
Cactaceae	<i>Austrocylindropuntia cylindrica</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Austrocylindropuntia subulata</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Cylindropuntia fulgida</i>				•	Yes	Yes	High	Slow
	<i>Cylindropuntia imbricata</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Cylindropuntia kleiniae</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Cylindropuntia pallida</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Cylindropuntia tunicata</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Opuntia elata</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Opuntia elatior</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Opuntia engelmannii</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Opuntia ficus-indica</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Opuntia microdasys</i>				•	Yes	Yes	Not Assessed	Not Assessed

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological Rating	Invasiveness Rating
		NM	ALA	EPBC	WAOL				
Cactaceae cont.	<i>Opuntia monacantha</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Opuntia polyacantha</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Opuntia puberula</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Opuntia stricta</i>				•	Yes	Yes	High	Rapid
	<i>Opuntia tomentosa</i>				•	Yes	Yes	Not Assessed	Not Assessed
Euphorbiaceae	<i>Jatropha gossypifolia</i>				•	Yes	Yes	Not Assessed	Not Assessed
Fabaceae	<i>Alhagi maurorum</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Parkinsonia aculeata</i>			•	•	Yes	Yes	High	Rapid
	<i>Prosopis glandulosa</i> x <i>Prosopis velutina</i>				•	Yes	Yes	High	Rapid
	<i>Senna alata</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Senna obtusifolia</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Ulex europaeus</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Vachellia farnesiana</i>	•	•			No	No	High	Rapid
Iridaceae	<i>Moraea flaccida</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Moraea miniata</i>				•	Yes	No	Not Assessed	Not Assessed
Malvaceae	<i>Malvastrum americanum</i>	•	•			No	No	High	Rapid
Papaveraceae	<i>Argemone ochroleuca</i>	•	•			No	No	Unknown	Rapid
Poaceae	<i>Cenchrus ciliaris</i>	•	•	•		No	No	High	Rapid
	<i>Cenchrus setiger</i>	•	•			No	No	High	Rapid
	<i>Chloris gayana</i>	•	•			No	No	Not Assessed	Not Assessed
	<i>Setaria verticillata</i>	•	•			No	No	High	Rapid
Rhamnaceae	<i>Ziziphus mauritiana</i>				•	Yes	No	Not Assessed	Not Assessed
Rosaceae	<i>Rubus anglocandicans</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Rubus laudatus</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Rubus rugosus</i>				•	Yes	No	Not Assessed	Not Assessed
	<i>Rubus ulmifolius</i>				•	Yes	No	Not Assessed	Not Assessed

Family	Taxon	Source				Declared Plant Pest (DPP)	Weeds of National Significance (WoNS)	Ecological Rating	Invasiveness Rating
		NM	ALA	EPBC	WAOL				
Solanaceae	<i>Datura leichhardtii</i>	•	•			No	No	Unknown	Unknown
	<i>Solanum elaeagnifolium</i>				•	Yes	Yes	Not Assessed	Not Assessed
	<i>Solanum linnaeanum</i>				•	Yes	No	Not Assessed	Not Assessed
Tamaricaceae	<i>Tamarix aphylla</i>				•	Yes	Yes	High	Rapid
Verbenaceae	<i>Lantana camara</i>				•	Yes	Yes	Not Assessed	Not Assessed
Zygophyllaceae	<i>Tribulus terrestris</i>	•	•			No	No	Unknown	Moderate

Appendix L: Flora Composition

Montiaceae

Calandrinia sp. Indet

Characeae

Chara sp. Indet

16 Marsileaceae

Marsilea hirsuta

29 Pteridaceae

Cheilanthes sieberi subsp. *sieberi*

80 Lauraceae

Cassytha capillaris

89 Juncaginaceae

Triglochin nana

91 Potamogetonaceae

Potamogeton drummondii

Potamogeton sp. Indet

Potamogeton tricarinatus

133 Arecaceae

Livistona alfredii (P4)

148 Typhaceae

Typha domingensis

156 Cyperaceae

? Cyperaceae sp. Indet

Bulbostylis barbata

Cyperus difformis

Cyperus hesperius

Cyperus squarrosus

Cyperus vaginatus

Eleocharis geniculata

Fimbristylis dichotoma

Fimbristylis littoralis

Fimbristylis microcarya

Schoenoplectiella laevis

Schoenoplectus subulatus

163 Poaceae

Aristida contorta

Aristida inaequiglumis

Aristida lazaridis (P2)

Bothriochloa decipiens var. *cloncurrans*

Bothriochloa ewartiana

* *Bothriochloa pertusa*

* *Cenchrus ciliaris*

* *Cenchrus clandestinus*

* *Cenchrus echinatus*

* *Cenchrus setiger*

Chrysopogon fallax

Cymbopogon ambiguus

Cymbopogon sp. Indet

163 Poaceae (cont'd)

- * *Cynodon dactylon*
- Dactyloctenium radulans*
- Dichanthium fecundum*
- Dichanthium sericeum*
- Diplachne fusca* subsp. *fusca*
- * *Echinochloa colona*
- Enneapogon caeruleus*
- Enneapogon lindleyanus*
- Enneapogon polyphyllus*
- Enneapogon robustissimus*
- Enteropogon ramosus*
- Eragrostis cumingii*
- Eragrostis dielsii*
- Eragrostis elongata*
- Eragrostis* sp. Indet
- Eragrostis tenellula*
- Eriachne benthamii*
- Eriachne flaccida*
- Eriachne mucronata*
- Eriachne pulchella*
- Eriachne tenuiculmis*
- Eriochloa pseudoacrotricha*
- Eulalia aurea*
- Heteropogon contortus*
- Paraneurachne muelleri*
- Paspalidium basicladum*
- Paspalidium clementii*
- Paspalidium constrictum*
- Perotis rara*
- Poaceae* sp. Indet
- * *Setaria verticillata*
- Sporobolus* aff. *virginicus*
- Sporobolus australasicus*
- Themeda triandra*
- Triodia angusta*
- Triodia epactia*
- Triodia longiceps*
- Triodia wiseana*

166 Papaveraceae

- * *Argemone ochroleuca* subsp. *ochroleuca*

169 Menispermaceae

- Tinospora smilacina*

175 Proteaceae

- Grevillea pyramidalis* subsp. *leucadendron*
- Grevillea wickhamii*
- Hakea chordophylla*
- Hakea lorea* subsp. *lorea*

196 Haloragaceae

- Haloragis gossei*
- Myriophyllum verrucosum*

199 Zygophyllaceae

- Roepera* ? *eichleri*
- Tribulus* ? *hirsutus*

199 Zygomorphicaceae (cont'd)

Tribulus hirsutus

* *Tribulus terrestris*

201 Fabaceae

Acacia ampliceps

Acacia ancistrocarpa

Acacia aptaneura

Acacia arida

Acacia bivenosa

Acacia citrinoviridis

Acacia colei

Acacia coriacea subsp. *pendens*

Acacia inaequilatera

Acacia maitlandii

Acacia monticola

Acacia pyrifolia var. *pyrifolia*

Acacia synchronicia

Acacia tetragonophylla

Acacia trachycarpa

Acacia tumida var. *pilbarensis*

Acacia xiphophylla

Alysicarpus muelleri

Cajanus acutifolius

Crotalaria medicaginea var. *neglecta*

Crotalaria novae-hollandiae subsp. *novae-hollandiae*

Cullen leucanthum

Glycine canescens

Indigofera colutea

Indigofera linifolia

Indigofera monophylla

Indigofera rugosa

Indigofera sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)

Indigofera sp. Indet

Petalostylis labicheoides

Rhynchosia bungarensis (P4)

Rhynchosia minima

Rhynchosia sp. Indet

Senna artemisioides subsp. *helmsii*

Senna artemisioides subsp. *oligophylla*

Senna glutinosa subsp. *glutinosa*

Senna notabilis

Senna venusta

Sesbania cannabina

Sesbania formosa

Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186)

Vachellia farnesiana

Vigna lanceolata var. *lanceolata*

202 Surianaceae

Stylobasium spathulatum

224 Cucurbitaceae

Cucumis variabilis

229 Celastraceae

Stackhousia sp. Indet

242 Euphorbiaceae

Adriana tomentosa var. *tomentosa*
Euphorbia ? *hirta*
Euphorbia australis var. *subtomentosa*
Euphorbia biconvexa
Euphorbia careyi
Euphorbia coghlanii
 * *Euphorbia hirta*
Euphorbia sp. Indet
Euphorbia tannensis subsp. *eremophila*
Euphorbia vaccaria var. *erucoides*

247 Phyllanthaceae

Flueggea virosa subsp. *melanthesoides*
Notoleptopus decaisnei var. *orbicularis* (A.B. Craig 428)
Phyllanthus baccatus
Phyllanthus erwinii
Phyllanthus maderaspatensis

248 Elatinaceae

Bergia pedicellaris
Bergia sp. Indet

261 Violaceae

Hybanthus aurantiacus

278 Lythraceae

Ammannia baccifera
Ammannia multiflora

281 Myrtaceae

Corymbia hamersleyana
Eucalyptus camaldulensis
Eucalyptus camaldulensis subsp. *refulgens*
Eucalyptus leucophloia subsp. *leucophloia*
Eucalyptus victrix
Eucalyptus xerothermica
Melaleuca argentea
Melaleuca bracteata
Melaleuca glomerata
Melaleuca linophylla

299 Sapindaceae

Dodonaea lanceolata
Dodonaea sp. Indet
Dodonaea viscosa subsp. *spatulata*

309 Malvaceae

Abutilon amplum
Abutilon lepidum
Abutilon macrum
Abutilon sp. *Dioicum* (A.A. Mitchell PRP 1618)
Abutilon sp. Indet
Abutilon sp. *Pilbara* (W.R. Barker 2025)
Androcalva luteiflora
Brachychiton gregorii
Corchorus ? *sidoides*
Corchorus crozophorifolius

309 Malvaceae (cont'd)

- Corchorus lasiocarpus* subsp. *parvus*
- Corchorus sidoides*
- Corchorus* sp. Indet
- Corchorus tridens*
- Gossypium australe*
- Gossypium robinsonii*
- Gossypium sturtianum*
- Gossypium sturtianum* var. *sturtianum*
- Hibiscus* sp. Indet
- Malvaceae* sp. Indet
- * *Malvastrum americanum*
- Melhania oblongifolia*
- Sida echinocarpa*
- Sida fibulifera*
- Sida rohlenae* subsp. *rohlenae*
- Sida* sp. Indet
- Sida* sp. L (A.M.Ashby 4202)
- Triumfetta chaetocarpa*
- Triumfetta clementii*
- Triumfetta maconochieana*
- Waltheria indica*

311 Thymelaeaceae

- Pimelea ammocharis*

330 Capparaceae

- Capparis lasiantha*
- Capparis spinosa* subsp. *nummularia*
- Capparis umbonata*

331 Cleomaceae

- Arivela viscosa*

332 Brassicaceae

- Lepidium muelleri-ferdinandii*

338 Santalaceae

- Anthobolus leptomerioides*
- Santalum lanceolatum*

339 Loranthaceae

- Amyema hilliana*
- Amyema preissii*
- Amyema sanguinea* var. *sanguinea*
- Lysiana casuarinae*

345 Polygonaceae

- * *Rumex vesicarius*

355 Caryophyllaceae

- Polycarpaea corymbosa*
- Polycarpaea longiflora*

357 Amaranthaceae

- Achyranthes aspera*
- * *Aerva javanica*
- Alternanthera nana*

357 Amaranthaceae (cont'd)

Alternanthera nodiflora
Amaranthus undulatus
Gomphrena ? kanisii
Gomphrena cunninghamii
Ptilotus auriculifolius
Ptilotus exaltatus
Ptilotus fusiformis
Ptilotus obovatus var. *obovatus*
Ptilotus sp. Indet

358 Chenopodiaceae

Dysphania melanocarpa
Dysphania plantaginella
Dysphania rhadinostachya subsp. ?
Dysphania rhadinostachya subsp. *inflata*
Dysphania rhadinostachya subsp. *rhadinostachya*
Dysphania sp. Indet
Maireana villosa
Salsola australis

364 Aizoaceae

Trianthema triquetrum

367 Nyctaginaceae

? *Boerhavia* sp.
Boerhavia burbidgeana
Boerhavia coccinea
Boerhavia schomburgkiana

368 Molluginaceae

Glinus lotoides

374 Portulacaceae

* *Portulaca oleracea*

392 Primulaceae

? *Lysimachia arvensis*
Samolus sp. Millstream (M.I.H. Brooker 2076)

409 Rubiaceae

Oldenlandia crouchiana
Oldenlandia galioides
Psydrax suaveolens
Synaptantha tillaeacea var. *tillaeacea*

410 Gentianaceae

Schenkia australis
Schenkia clementii

413 Apocynaceae

Gymnanthera cunninghamii (P3)

415 Boraginaceae

Heliotropium crispatum
* *Heliotropium europaeum*
Heliotropium ovalifolium

415 Boraginaceae (cont'd)

Heliotropium tanythrix
Heliotropium tenuifolium
Trichodesma zeylanicum var. *zeylanicum*

416 Convolvulaceae

Bonamia ? pilbarensis
Bonamia erecta
Bonamia pilbarensis
Convolvulus clementii
Duperreya commixta
Evolvulus alsinoides var. *decumbens*
Evolvulus alsinoides var. *villosicalyx*
Ipomoea ? costata
Ipomoea coptica
Ipomoea muelleri
Ipomoea plebeia
Ipomoea racemigera (P1)
Polymeria ambigua
Polymeria sp. Indet

417 Solanaceae

Datura leichhardtii subsp. *leichhardtii*
Nicotiana benthamiana
Nicotiana occidentalis subsp. *occidentalis*
Solanum cleistogamum
Solanum diversiflorum
Solanum lasiophyllum
 * *Solanum nigrum*

423 Oleaceae

Jasminum didymum subsp. *lineare*

427 Plantaginaceae

Stemodia grossa
Stemodia sp. Indet

428 Scrophulariaceae

Eremophila cuneifolia
Eremophila longifolia

432 Lamiaceae

Clerodendrum floribundum var. *angustifolium*

433 Phrymaceae

Mimulus gracilis
Uvedalia linearis

437 Acanthaceae

Dicladanthera forrestii
Dipteracanthus australasicus subsp. *australasicus*
Rostellularia adscendens var. *clementii*

450 Campanulaceae

Lobelia arnhemiaca
Wahlenbergia tumidifructa

452 Styliaceae

Stylium fluminense

458 Goodeniaceae

Goodenia forrestii
Goodenia lamprosperma
Goodenia microptera
Goodenia muelleriana
Goodenia sp. Indet
Goodenia stobbsiana
Scaevola spinescens

460 Asteraceae

- * *Bidens bipinnata*
- Bidens pilosa* var. *pilosa*
- Blumea tenella*
- Centipeda minima* subsp. *macrocephala*
- * *Conyza bonariensis*
- * *Flaveria trinervia*
- Ixiochlamys cuneifolia*
- Peripleura arida*
- Pluchea dentex*
- * *Pseudognaphalium luteoalbum*
- Pterocaulon sphacelatum*
- * *Sigesbeckia orientalis*
- * *Sonchus oleraceus*
- Streptoglossa decurrens*
- Streptoglossa* sp. Indet.
- * *Symphyotrichum squamatum*

472 Araliaceae

Trachymene oleracea subsp. *oleracea*

474 Apiaceae

- * *Cyclospermum leptophyllum*



Appendix M: Flora Species by Site Matrix

Taxon	DUCR-49	DUCR-50	DUCR-52	DUCR-53	DUCR-54	DUCR-55	DUCR-56	DUCR-57	DUCR-58	DUCR-59	DUCR-60	DUCR-61	DUCR-62	DUCR-63	DUCR-64	DUCR-70
<i>Cyperus hesperius</i>									•	•						
<i>Cyperus squarrosus</i>																
<i>Cyperus vaginatus</i>		•														
<i>Dactyloctenium radulans</i>																
<i>Datura leichhardtii</i> subsp. <i>leichhardtii</i>											•					
<i>Dichanthium fecundum</i>	•		•			•			•	•			•			
<i>Dichanthium sericeum</i>																
<i>Dicladantha forrestii</i>	•															
<i>Diplachne fusca</i> subsp. <i>fusca</i>		•														
<i>Dipteracanthus australasicus</i> subsp. <i>australasicus</i>					•			•								
<i>Dodonaea lanceolata</i>															•	
<i>Dodonaea</i> sp. <i>indet</i>																
<i>Dodonaea viscosa</i> subsp. <i>spatulata</i>															•	
<i>Duperreya commixta</i>	•					•					•		•		•	
<i>Dysphania melanocarpa</i>	•										•					
<i>Dysphania plantaginella</i>	•															
<i>Dysphania rhadinostachya</i> subsp. ?																
<i>Dysphania rhadinostachya</i> subsp. <i>inflata</i>																
<i>Dysphania rhadinostachya</i> subsp. <i>rhadinostachya</i>																
<i>Dysphania</i> sp.																
<i>Echinochloa colona</i>											•					
<i>Eleocharis geniculata</i>															•	•
<i>Enneapogon caeruleus</i>																
<i>Enneapogon lindleyanus</i>																
<i>Enneapogon polyphyllus</i>																
<i>Enneapogon robustissimus</i>						•										
<i>Enteropogon ramosus</i>	•	•	•	•	•	•		•								
<i>Eragrostis cumingii</i>	•															
<i>Eragrostis dielsii</i>																
<i>Eragrostis elongata</i>																
<i>Eragrostis</i> sp. <i>indet</i>																
<i>Eragrostis tenellula</i>									•	•						
<i>Eremophila cuneifolia</i>	•	•	•	•	•			•			•		•	•	•	
<i>Eremophila longifolia</i>			•	•	•	•	•	•								
<i>Eriachne benthamii</i>									•	•			•			
<i>Eriachne flaccida</i>																
<i>Eriachne mucronata</i>	•	•								•	•	•	•	•	•	
<i>Eriachne pulchella</i>	•		•						•		•				•	
<i>Eriachne tenuiculmis</i>																
<i>Erigeron bonariensis</i>					•		•								•	•
<i>Eriochloa pseudoacrotricha</i>															•	
<i>Eucalyptus camaldulensis</i> subsp. <i>refulgens</i>	•	•	•						•		•	•	•	•	•	

Taxon	DUCR-49	DUCR-50	DUCR-52	DUCR-53	DUCR-54	DUCR-55	DUCR-56	DUCR-57	DUCR-58	DUCR-59	DUCR-60	DUCR-61	DUCR-62	DUCR-63	DUCR-64	DUCR-70
<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>																
<i>Eucalyptus victrix</i>	•	•	•	•	•	•		•	•		•		•	•	•	
<i>Eucalyptus xerothermica</i>																
<i>Eulalia aurea</i>							•	•				•	•			
<i>Euphorbia ? hirta</i>				•												
<i>Euphorbia australis</i> var. <i>subtomentosa</i>		•								•		•	•	•	•	
<i>Euphorbia biconvexa</i>	•	•	•	•		•		•	•	•					•	
<i>Euphorbia careyi</i>	•	•	•		•	•										
<i>Euphorbia coghlanii</i>								•								
<i>Euphorbia hirta</i>	•	•	•	•	•			•							•	
<i>Euphorbia</i> sp. <i>indet</i>								•								
<i>Euphorbia tannensis</i> subsp. <i>eremophila</i>	•		•		•	•									•	
<i>Euphorbia vaccaria</i> var. <i>erucoides</i>															•	
<i>Evolvulus alsinoides</i> var. <i>decumbens</i>								•	•				•			
<i>Evolvulus alsinoides</i> var. <i>villosicalyx</i>	•	•	•	•	•	•	•	•					•		•	
<i>Fimbristylis dichotoma</i>																
<i>Fimbristylis littoralis</i>																
<i>Fimbristylis microcarya</i>																
<i>Flaveria trinervia</i>	•		•	•	•	•	•	•			•		•		•	
<i>Flueggea virosa</i> subsp. <i>melanthesoides</i>																
<i>Glinus lotoides</i>		•				•		•								
<i>Glycine canescens</i>																
<i>Gomphrena ? kanasii</i>																
<i>Gomphrena cunninghamii</i>																
<i>Goodenia forrestii</i>	•	•				•			•	•	•		•		•	
<i>Goodenia lamprosperma</i>	•	•	•		•	•					•		•		•	
<i>Goodenia microptera</i>																
<i>Goodenia muelleriana</i>	•															
<i>Goodenia</i> sp. <i>indet</i>																
<i>Goodenia stobbsiana</i>																
<i>Gossypium australe</i>					•											
<i>Gossypium robinsonii</i>																
<i>Gossypium sturtianum</i>									•	•	•		•		•	
<i>Gossypium sturtianum</i> var. <i>sturtianum</i>						•										
<i>Grevillea pyramidalis</i> subsp. <i>leucadendron</i>	•		•	•	•	•		•	•	•	•				•	
<i>Grevillea wickhamii</i>																
<i>Gymnanthera cunninghamii</i>	•	•	•		•		•					•				
<i>Hakea chordophylla</i>																
<i>Hakea lorea</i> subsp. <i>lorea</i>	•															
<i>Haloragis gossei</i>		•	•		•											
<i>Heliotropium crispatum</i>				•			•	•								
<i>Heliotropium europaeum</i>													•		•	

Taxon	DUCR-49	DUCR-50	DUCR-52	DUCR-53	DUCR-54	DUCR-55	DUCR-56	DUCR-57	DUCR-58	DUCR-59	DUCR-60	DUCR-61	DUCR-62	DUCR-63	DUCR-64	DUCR-70
<i>Perotis rara</i>			•													
<i>Petalostylis labicheoides</i>								•							•	
<i>Phyllanthus baccatus</i>										•						
<i>Phyllanthus erwinii</i>							•									
<i>Phyllanthus maderaspatensis</i>						•			•	•						
<i>Pluchea dentex</i>						•				•						
Poaceae sp. indet																
<i>Polycarpaea corymbosa</i>																
<i>Polycarpaea longiflora</i>																
<i>Polymeria ambigua</i>															•	
<i>Polymeria</i> sp. indet																
<i>Portulaca oleracea</i>										•						
<i>Potamogeton</i> sp. indet											•				•	
<i>Pseudognaphalium luteoalbum</i>							•									
<i>Psyrax suaveolens</i>													•		•	
<i>Pterocaulon sphacelatum</i>			•						•	•						
<i>Ptilotus auriculifolius</i>	•	•				•			•	•						
<i>Ptilotus exaltatus</i>										•						
<i>Ptilotus fusiformis</i>																
<i>Ptilotus obovatus</i> var. <i>obovatus</i>											•	•	•	•	•	
<i>Ptilotus</i> sp. indet																
<i>Rhynchosia bungarensis</i>																
<i>Rhynchosia minima</i>		•						•	•		•		•			
<i>Roepera ? eichleri</i>	•															
<i>Rostellularia adscendens</i> var. <i>clementii</i>								•								
<i>Salsola australis</i>																
<i>Samolus</i> sp. Millstream (M.I.H. Brooker 2076)	•	•	•		•	•		•					•			
<i>Santalum lanceolatum</i>	•															
<i>Scaevola spinescens</i>						•										
<i>Schenkia australis</i>																
<i>Schenkia clementii</i>			•													
<i>Schoenoplectus subulatus</i>											•			•	•	
<i>Senna artemisioides</i> subsp. <i>helmsii</i>																
<i>Senna artemisioides</i> subsp. <i>oligophylla</i>		•	•								•					
<i>Senna glutinosa</i> subsp. <i>glutinosa</i>	•		•			•			•	•	•		•			
<i>Senna notabilis</i>						•										
<i>Senna venusta</i>																
<i>Sesbania cannabina</i>	•															
<i>Sesbania formosa</i>																
<i>Setaria verticillata</i>						•										
<i>Sida echinocarpa</i>																
<i>Sida fibulifera</i>																
<i>Sida rohlenae</i> subsp. <i>rohlenae</i>															•	
<i>Sida</i> sp. indet	•	•	•	•	•	•	•				•		•		•	
<i>Sida</i> sp. L (A. M. Ashby 4202)		•	•							•						

Appendix N: Conservation Significant Flora Locations

Taxon	Latitude	Longitude	Date	No. of Individuals
<i>Aristida lazaridis</i> (P2)	-22.3445156	117.1891353	17/06/2020	5
<i>Gymnanthera cunninghamii</i> (P3)	-22.3774996	116.9798584	29/10/2019	1
<i>Gymnanthera cunninghamii</i> (P3)	-22.37749928	116.9798493	13/06/2020	1
<i>Gymnanthera cunninghamii</i> (P3)	-22.3423745	117.153685	28/10/2019	4
<i>Gymnanthera cunninghamii</i> (P3)	-22.3423744	117.1537763	16/06/2020	4
<i>Gymnanthera cunninghamii</i> (P3)	-22.3800682	116.9785253	30/10/2019	6
<i>Gymnanthera cunninghamii</i> (P3)	-22.3800523	116.9785904	29/10/2019	1
<i>Gymnanthera cunninghamii</i> (P3)	-22.3800302	116.8229355	13/06/2020	2
<i>Gymnanthera cunninghamii</i> (P3)	-22.3799115	116.9785836	13/06/2020	3
<i>Gymnanthera cunninghamii</i> (P3)	-22.3797515	116.9786548	16/06/2020	2
<i>Gymnanthera cunninghamii</i> (P3)	-22.3797473	116.8202496	16/06/2020	3
<i>Gymnanthera cunninghamii</i> (P3)	-22.37926575	116.8199616	16/06/2020	1
<i>Gymnanthera cunninghamii</i> (P3)	-22.3791746	116.9786268	29/10/2019	3
<i>Gymnanthera cunninghamii</i> (P3)	-22.37857113	116.9715552	29/10/2019	6
<i>Gymnanthera cunninghamii</i> (P3)	-22.3785199	116.9709327	16/06/2020	1
<i>Gymnanthera cunninghamii</i> (P3)	-22.3785075	116.9784508	16/06/2020	5
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.433232	116.6138584	31/10/2019	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.4331754	116.6137876	15/06/2020	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.4331636	116.6137844	30/10/2019	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3935499	116.6652054	16/06/2020	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3935499	116.6652054	27/10/2019	25
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3935459	116.6652058	14/06/2020	25
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3935456	116.6652059	30/10/2019	2
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.377251	116.679292	30/10/2019	25
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3711296	116.705988	14/06/2020	25
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3679728	116.7100618	29/10/2019	15
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3581077	116.7199846	14/06/2020	15
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3559211	116.7283833	14/06/2020	4
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3672912	116.7636924	13/06/2020	15

Taxon	Latitude	Longitude	Date	No. of Individuals
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3672908	116.7636974	29/10/2019	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3793526	116.8200669	13/06/2020	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3819147	116.8306299	29/10/2019	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3819147	116.8306299	16/06/2020	2
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3819135	116.8308749	26/10/2019	6
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3854611	116.846286	16/06/2020	6
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3854586	116.8462857	16/06/2020	5
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3784812	116.855084	16/06/2020	6
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.378476	116.8550872	26/10/2019	15
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3848085	116.8732452	17/06/2020	15
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.38291976	116.9375489	17/06/2020	10
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3800143	116.9537495	28/10/2019	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3790593	116.9703697	17/06/2020	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3790593	116.9703697	28/10/2019	15
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3790592	116.9703488	17/06/2020	15
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3774974	116.979907	17/06/2020	2
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3774935	116.9799118	13/06/2020	20
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.37749079	116.9798267	15/06/2020	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3774898	116.9799083	15/06/2020	2
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3525079	117.0169208	27/10/2019	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3525073	117.016916	13/06/2020	5
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3525057	117.0169216	14/06/2020	5
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3531732	117.0396802	13/06/2020	5
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3531732	117.0396802	14/06/2020	5
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.34231	117.0839399	14/06/2020	5

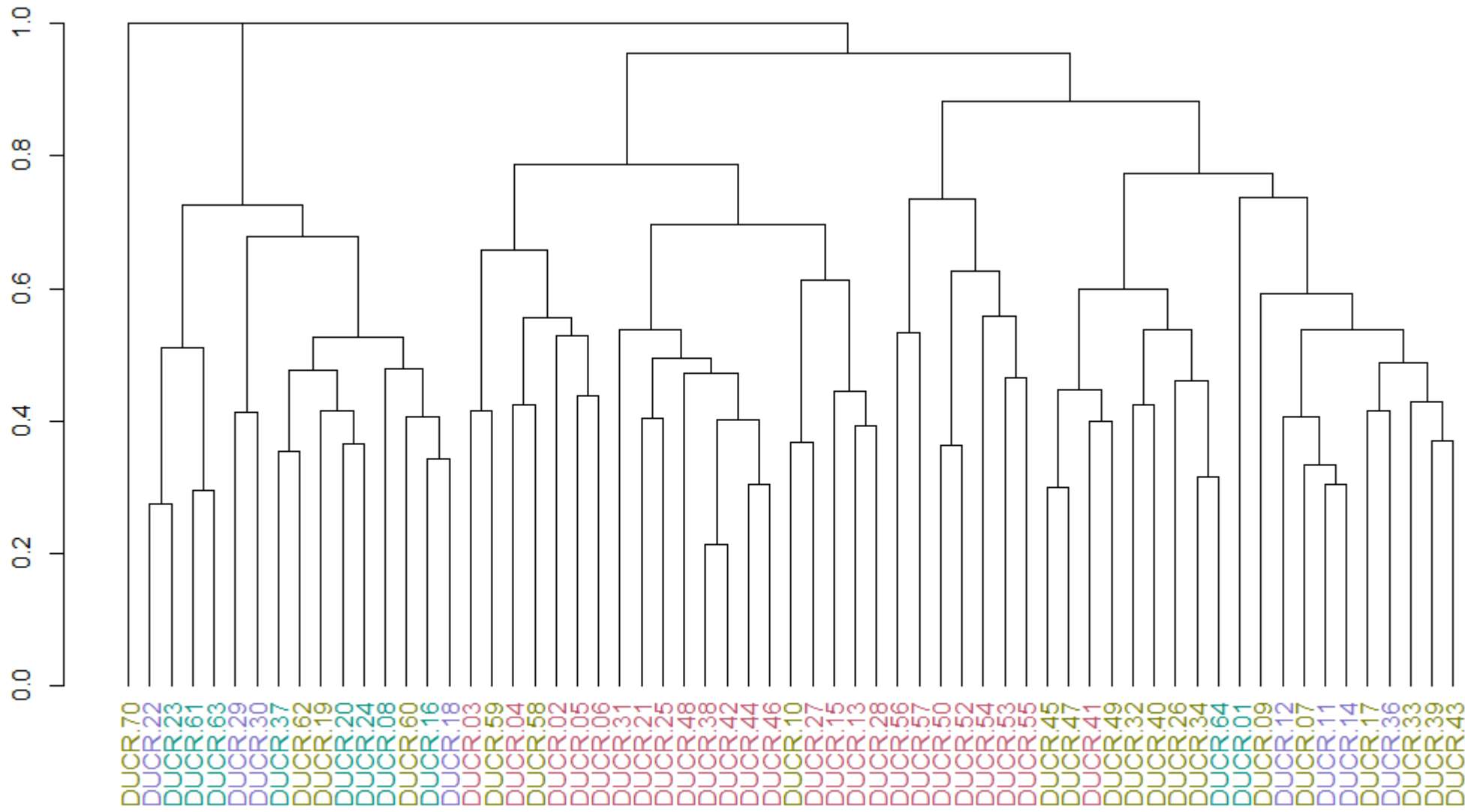
Taxon	Latitude	Longitude	Date	No. of Individuals
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3423077	117.0842053	13/06/2020	5
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3388273	117.1268613	13/06/2020	30
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.342371	117.1537663	13/06/2020	50
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.34677137	117.1758992	14/06/2020	20
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.34676587	117.1758832	13/06/2020	15
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.34676539	117.1758855	13/06/2020	30
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3443698	117.189155	13/06/2020	30
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3443698	117.189155	13/06/2020	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3466751	117.2074151	13/06/2020	2
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3466751	117.2074151	13/06/2020	15
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.34667458	117.2074731	13/06/2020	10
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3524857	117.2234883	13/06/2020	50
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3524857	117.2234883	13/06/2020	5
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3524477	117.2234256	13/06/2020	20
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3567975	117.2440748	13/06/2020	20
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.357273	117.3086756	13/06/2020	50
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3787167	117.3582425	13/06/2020	20
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.352064	117.0279284	14/06/2020	10
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3717277	116.9903403	16/06/2020	3
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3717253	116.9902774	25/10/2019	1
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3717237	116.9903184	16/06/2020	25
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3717237	116.9903184	28/10/2019	10
<i>Indigofera</i> sp. Bungaroo Creek (S. van Leeuwen 4301) (P3)	-22.3781098	116.972074	16/06/2020	2
<i>Ipomoea racemigera</i> (P2)	-22.37810681	116.9705353	16/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.37809921	116.9726039	14/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3780866	116.8541201	14/06/2020	1

Taxon	Latitude	Longitude	Date	No. of Individuals
<i>Ipomoea racemigera</i> (P2)	-22.3780722	116.8560141	14/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.37782799	116.9711153	14/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3778008	116.6906918	14/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.37775762	116.9733013	14/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3777004	116.971532	13/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.37767341	116.9717087	13/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3776068	116.9718127	13/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3773438	116.9739602	16/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3773095	116.9750905	16/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3772314	116.9730245	17/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.37714181	116.974906	17/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3769696	116.9768562	17/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3769276	116.9757198	17/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.376745	116.975078	17/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3763029	116.9817452	17/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3758742	116.982458	16/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3752221	116.9834278	13/06/2020	2
<i>Ipomoea racemigera</i> (P2)	-22.3751129	116.985206	14/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.375036	116.984073	13/06/2020	1
<i>Ipomoea racemigera</i> (P2)	-22.3749725	116.9841372	13/06/2020	2
<i>Livistona alfredii</i> (P4)	-22.3749464	116.9853908	14/06/2020	2
<i>Livistona alfredii</i> (P4)	-22.3747187	116.9850204	29/10/2019	1
<i>Livistona alfredii</i> (P4)	-22.3746242	116.9848501	13/06/2020	1
<i>Livistona alfredii</i> (P4)	-22.374619	116.8045272	26/10/2019	13
<i>Livistona alfredii</i> (P4)	-22.3745692	116.9849059	16/06/2020	13
<i>Livistona alfredii</i> (P4)	-22.3745504	116.9850265	29/10/2019	1
<i>Livistona alfredii</i> (P4)	-22.3741932	116.9847309	13/06/2020	1
<i>Livistona alfredii</i> (P4)	-22.3740499	116.9868605	30/10/2019	1
<i>Livistona alfredii</i> (P4)	-22.3734895	116.9875392	13/06/2020	1
<i>Livistona alfredii</i> (P4)	-22.3727914	116.9883737	13/06/2020	1
<i>Livistona alfredii</i> (P4)	-22.3727686	116.9883471	13/06/2020	1
<i>Livistona alfredii</i> (P4)	-22.3725993	116.9887752	13/06/2020	2

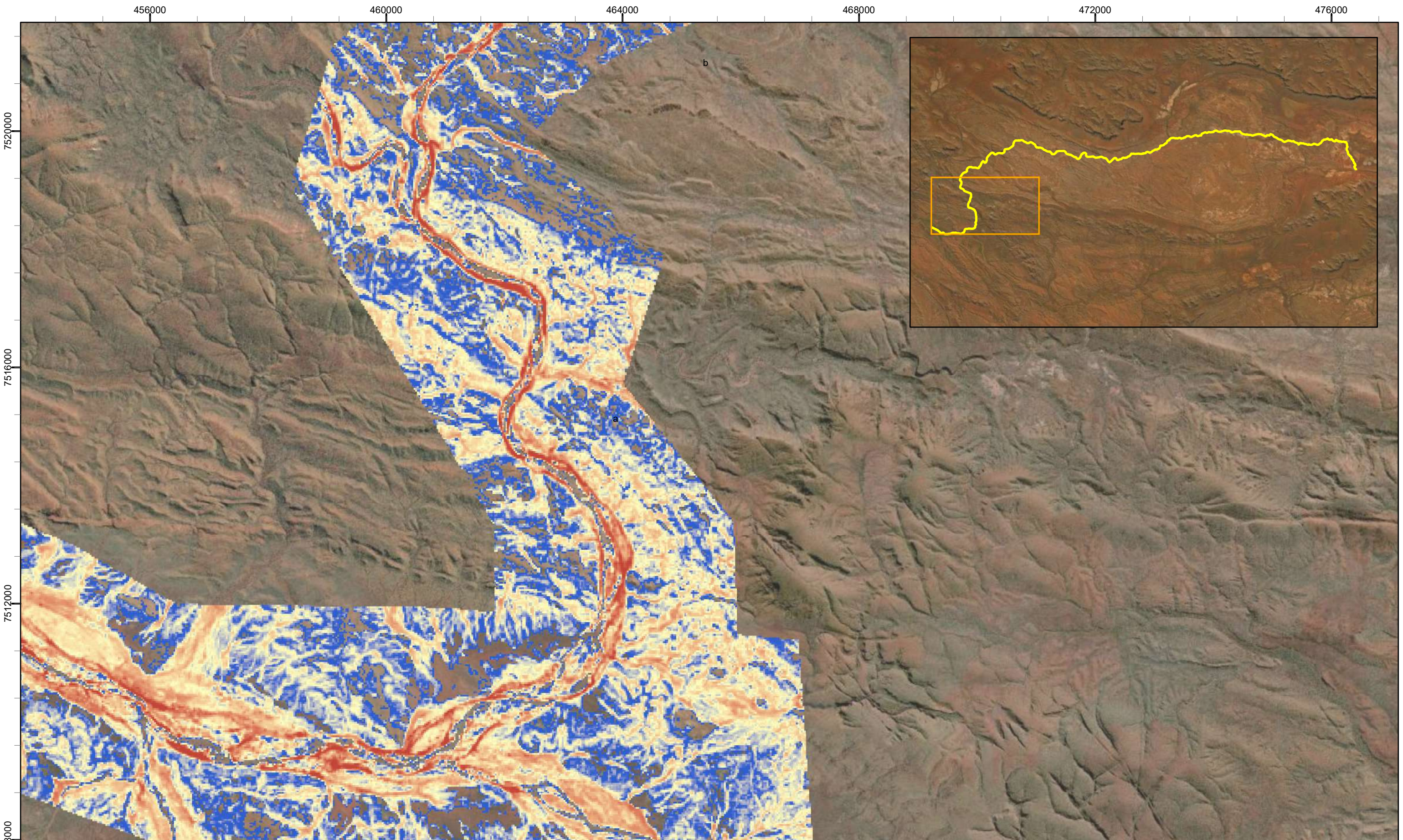
Taxon	Latitude	Longitude	Date	No. of Individuals
<i>Livistona alfredii</i> (P4)	-22.3724633	116.9888419	29/10/2019	1
<i>Livistona alfredii</i> (P4)	-22.3719718	116.9895549	29/10/2019	1
<i>Livistona alfredii</i> (P4)	-22.3712605	116.9911407	29/10/2019	3
<i>Livistona alfredii</i> (P4)	-22.3665181	116.7636095	29/10/2019	3
<i>Livistona alfredii</i> (P4)	-22.3647528	116.7165129	16/06/2020	1
<i>Livistona alfredii</i> (P4)	-22.3647336	116.7164831	26/10/2019	2
<i>Rhynchosia bungarensis</i> (P4)	-22.3647276	116.7164937	31/10/2019	1
<i>Rhynchosia bungarensis</i> (P4)	-22.3647256	116.7165069	30/10/2019	1
<i>Rhynchosia bungarensis</i> (P4)	-22.3646105	116.7165368	16/06/2020	1
<i>Rhynchosia bungarensis</i> (P4)	-22.357992	117.0111965	31/10/2019	5
<i>Rhynchosia bungarensis</i> (P4)	-22.3576424	117.0127904	31/10/2019	2



Appendix O: Hierarchical Clustering



Appendix P: NDVI Persistence Mapping Along Duck Creek



Legend

— Duck Creek

NDVI persistence value

Value

High : 100

Low : 0

N

1:58,300

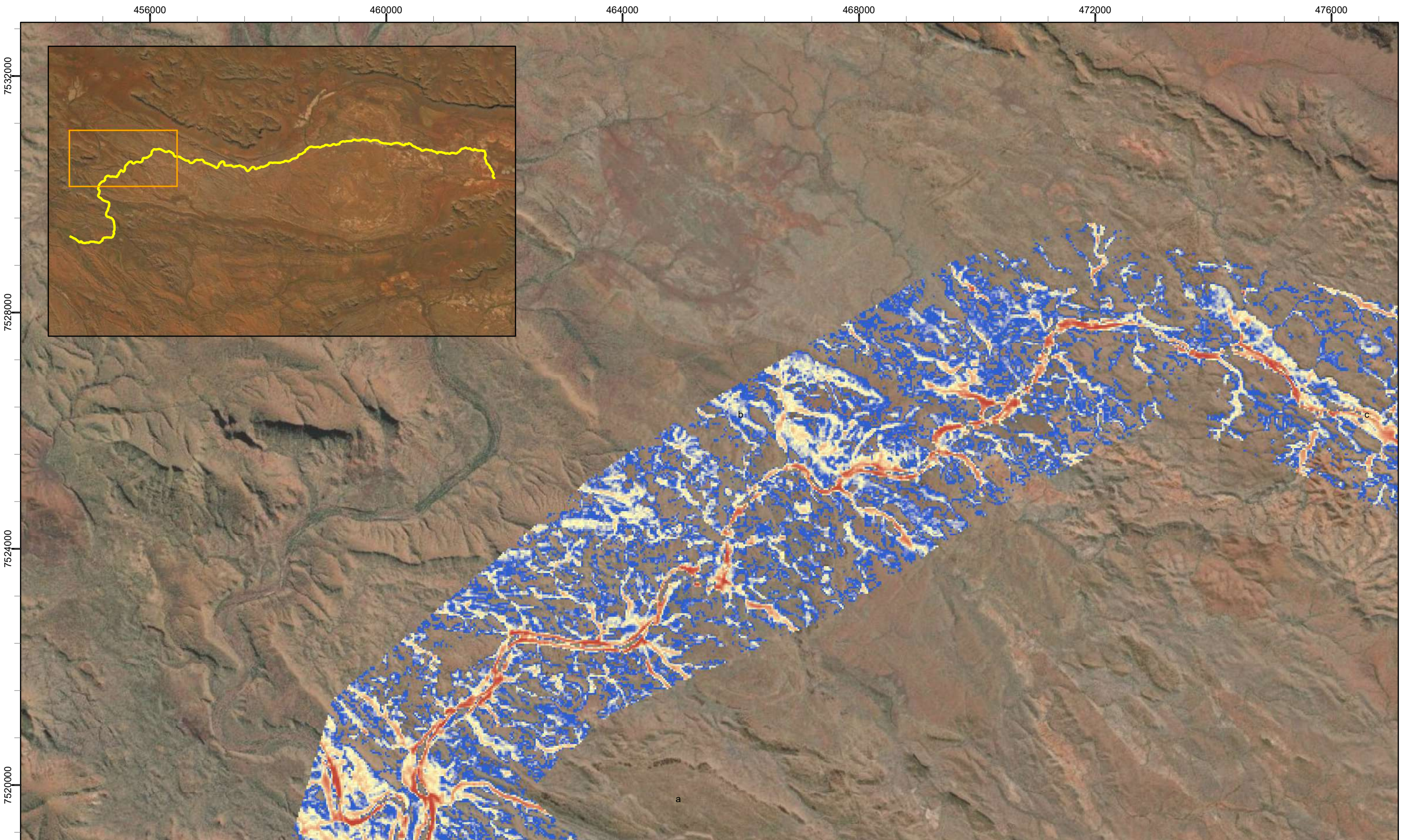
0 250500 1,000 1,500 Meters

**Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation**


Figure 4.10a: NDVI persistence mapping along Duck Creek (Landsat 30m imagery 1988-2019, NDVI threshold = 0.32)

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 08/01/2020




Legend


 Duck Creek

NDVI persistence value

Value

 High : 100

Low : 0



1:58,300

0 250500 1,000 1,500 Meters

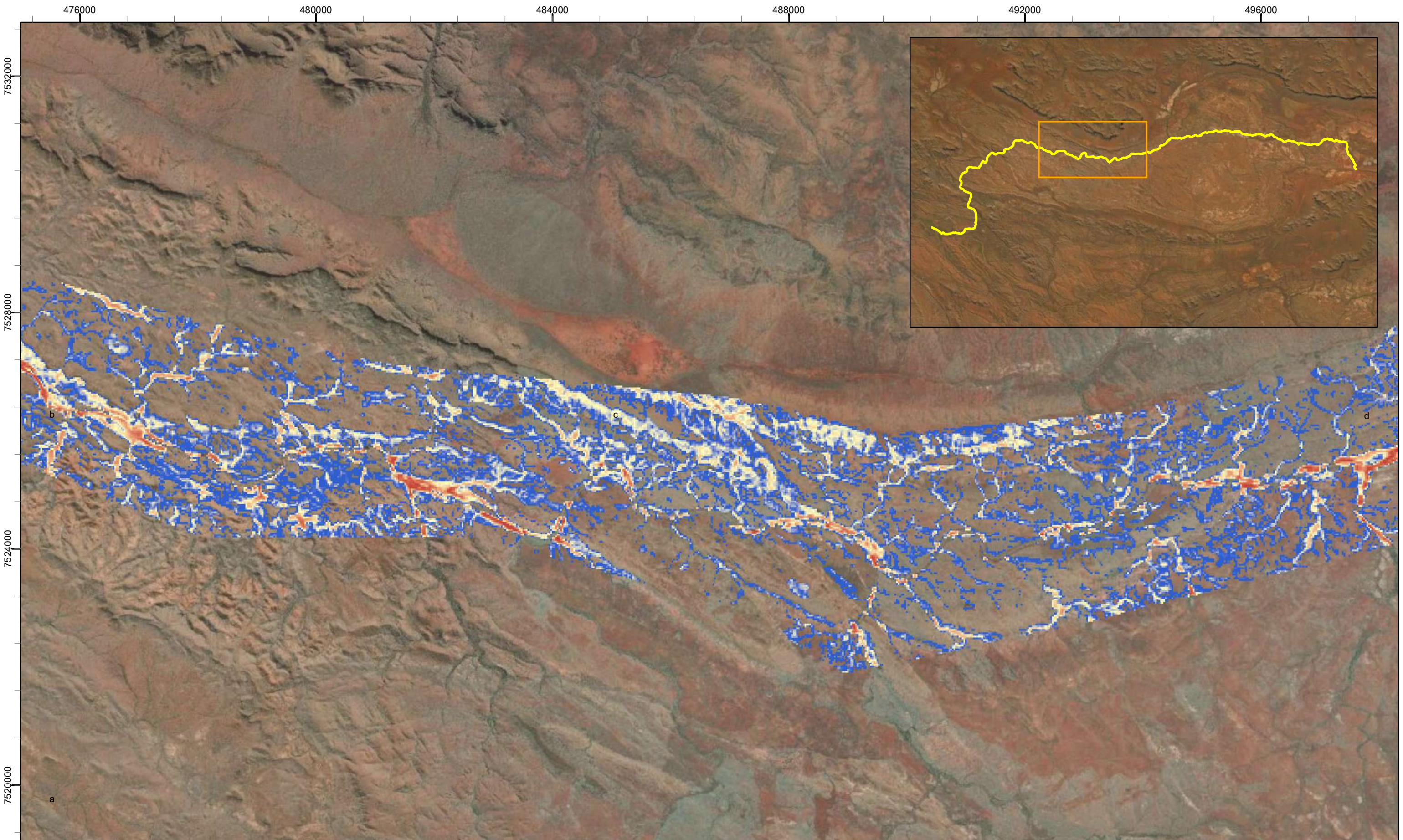
N

**Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation**

Figure 4.10b: NDVI persistence mapping along Duck Creek (Landsat 30m imagery 1988-2019, NDVI threshold = 0.32)

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 08/01/2020



Legend

— Duck Creek

NDVI persistence value

Value

High : 100

Low : 0

biologic
Environmental Survey

N

1:58,300

0 250500 1,000 1,500 Meters

**Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation**

**Figure 4.10c: NDVI persistence mapping along Duck
Creek (Landsat 30m imagery 1988-2019, NDVI
threshold = 0.32)**

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

Size A3. Created 08/01/2020

500000

504000

508000

512000

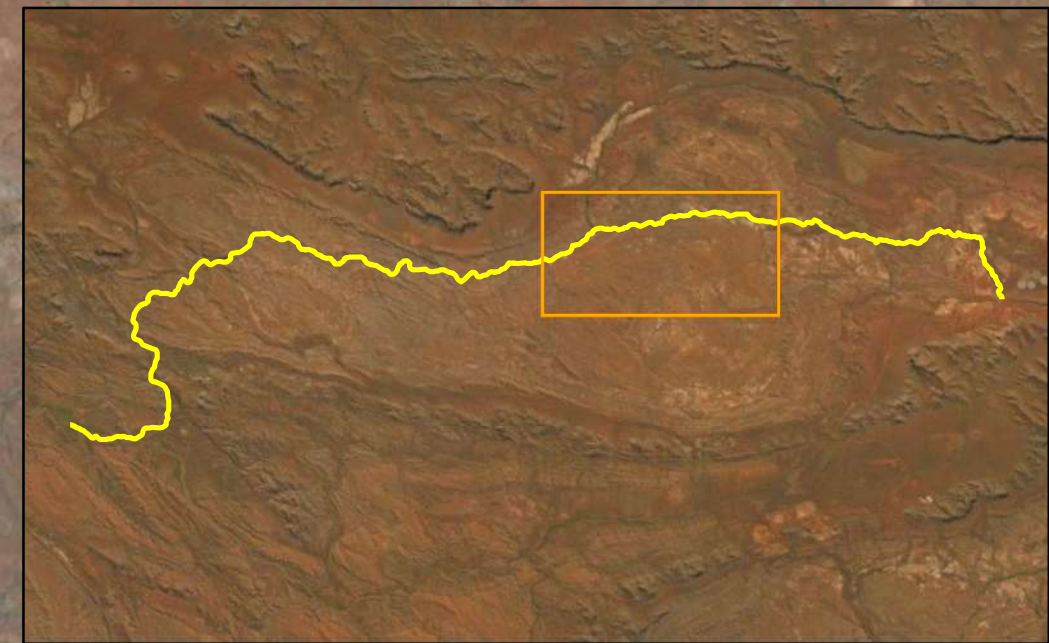
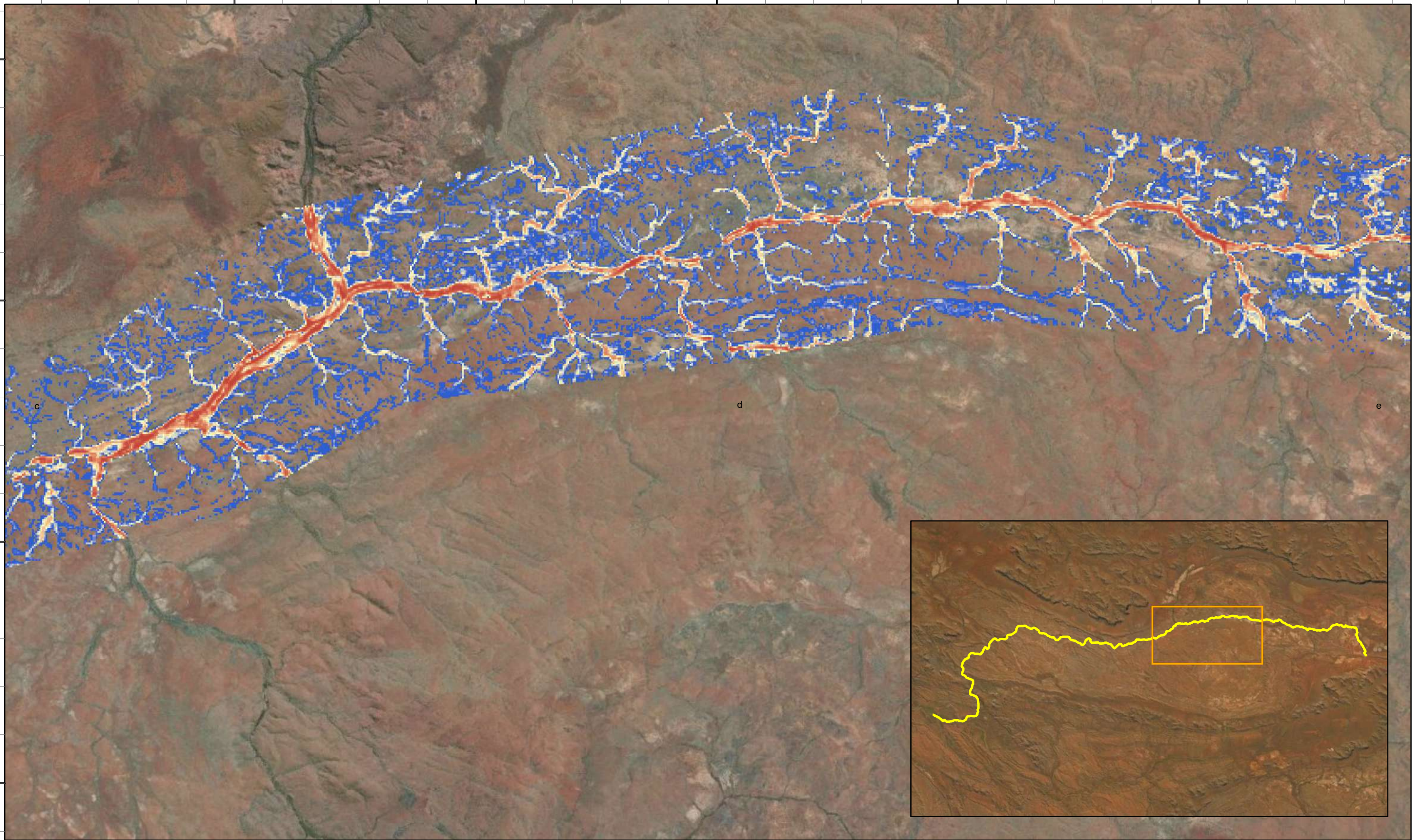
516000

7532000

7528000

7524000

7520000



Legend

— Duck Creek

NDVI persistence value

Value

High : 100

Low : 0



1:58,300

0 250500 1,000 1,500 Meters

**Rio Tinto Iron Ore
Brockman Syncline Riparian Vegetation**

Figure 4.10d: NDVI persistence mapping along Duck Creek (Landsat 30m imagery 1988-2019, NDVI threshold = 0.32)

Coordinate System: GDA 1994 MGA Zone 50

Projection: Transverse Mercator

Datum: GDA 1994

Size A3. Created 08/01/2020

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