Sanjiv Ridge
BWT Groundwater Dependent Vegetation Assessment

Report to Atlas Iron Pty Ltd

12 February 2025

Document Status				
Revision No.	Author	Review / Approved for Issue	Approved for Issue to Name	Date
1	Rylan Cunnane, Emma Marsh, Clare Whyte, Carmel Winton	Carmel Winton	Larissa Byrne	11/12/2024
2	Rylan Cunnane	Carmel Winton	Larissa Byrne	13/02/2025
3				

"IMPORTANT NOTE"

Biologic Environmental Survey Pty Ltd ("Biologic") has prepared this report for Atlas Iron Pty Ltd ("Client"), in accordance with the Client's specific instructions and solely for the purposes for which it is required by the Client ("Purpose"). This report and its content are only pertinent to the Purpose and any matters, facts or results contained in this report are not to be used for any purpose other than the Purpose.

The information contained in this report is not financial advice and Biologic is not licenced to provide financial advice. The report does not take into account the investment objectives, financial situation or specific investment needs of the Client and should not form the basis of an investment decision by the Client.

In preparing this report Biologic has assumed the accuracy and completeness of all the information and documents received or obtained from the Client and all information and documents received or obtained as a result of any request or enquiry made to a government department, authority, government register or database. Biologic has not independently verified any such assumptions.

This report is presented without the assumption of a duty of care to any other person (other than the Client) ("Third Party"). The report may not contain sufficient information for the purposes of a Third Party or for other uses and may not be relied on by a Third Party without Biologic's prior written consent.

Biologic will not be liable to a Third Party for any loss, damage, liability, or claim arising out of or incidental to a Third-Party publishing, using or relying on the facts, content, opinions or subject matter contained in this report.

If a Third Party uses or relies on the facts, content, opinions, or subject matter contained in this report with or without the consent of Biologic, Biologic disclaims all risk, and the Third Party assumes all risk and releases and indemnifies and agrees to keep Biologic indemnified from any Loss, Damage, claim or liability arising directly or indirectly from the use of or reliance on this report.

For the purpose of this document, a reference to "Loss" and "Damage" includes past and prospective economic loss, loss of profits, damage to property, injury to any person (including death) costs and expenses incurred in taking measures to prevent, mitigate or rectify any harm, loss of opportunity, legal costs, compensation, interest and any other direct, indirect, consequential, or financial or other loss.

Glossary

BWT	Below the Water Table.
Drawdown	The process of lowering the water level in a body of water or aquifer.
EPA	Environmental Protection Authority.
Ephemeral	Lasting for a season or short time; water body that is present only occasionally, most likely in the wet season.
EWR	Ecological Water Requirement; minimum water that is needed to sustain the ecosystem and/or species.
Facultative phreatophyte	Plant species that requires groundwater at some stage of their life cycle; may still thrive with seasonal inundation and little groundwater contribution.
GDE	Ground Water Dependant Ecosystems; ecosystems that need groundwater to sustain the species therein.
GDV	Groundwater Dependant Vegetation; (as above).
Hydrophyte/Hydrophytic	A large aquatic plant, living entirely in water, that grows either submerged, emerging or floating on the water, root system is completely inundated (syn macrophyte).
IDE	Inflow Dependant Ecosystem; a community of plants that requires flow of water across land that is not related to defined drainage lines
Macrophyte/Macrophytic	See Hydrophyte
Mesophytic	Plants that thrive in moderate moisture conditions, where soil moisture is readily available but the root system is not inundated.
NVIS	Native Vegetation Information System; used to define vegetation communities in Western Australia
Obligative phreatophyte	A plant species that relies primarily on groundwater.
Perennial/Permanent	Present at all seasons of the year.
Phreatophytes	Plants that access groundwater directly.
Riparian Flora	Individual plant taxa that grow alongside rivers, streams, and other bodies of water.
Riparian Vegetation	Community of plant taxa that grow alongside rivers, streams, and other bodies of water.
Semi-Permanent water	A body of water that retains water for most of the year but may dry out during certain seasons or periods of drought.
Soil moisture	The total amount of water, including the water vapor, in an unsaturated soil.
Surface Water	Body of water above ground.

Executive Summary

Atlas Iron Pty Ltd is currently in the process of developing the Sanjiv Ridge Project, located approximately 33 kilometres south of Marble Bar in the Pilbara region of Western Australia. Project development plans involve extending below the water table. Atlas Iron commissioned Biologic Environmental Survey Pty Ltd to undertake a desktop assessment and targeted riparian vegetation survey. The survey concentrated specifically on perennial and ephemeral pools, and areas of riparian vegetation previously categorised at High risk from groundwater drawdown impacts.

The field survey was conducted from the 10th to the 14th of June 2024, by Senior Botanist Kelby Jennings and Botanist Emma Marsh over 10 person days.

One hundred and thirty-one sites were assessed within the Survey Area to identify the presence of GDV; 51 relevés and 80 vegetation mapping notes. Fifteen perennial or potentially permanent pools were ground-truthed. Where possible, ephemeral and likely ephemeral pools were ground-truthed; 14 of the 33 ephemeral pools were assessed.

One-hundred and forty confirmed vascular flora taxa were recorded during the survey. Eighty of these species can be classified as riparian flora, or taxa that are mostly associated with drainage lines, floodplains and watercourses. Thirty-six taxa were identified as groundwater indicator species; nine phreatophytic flora, 15 hydrophytes and 12 mesophytes. These taxa informed the GDV assessment.

Ten riparian vegetation types were described from the Survey Area. Two vegetation types were determined to have a High dependence on the groundwater (D1 and D3), and two vegetation types had a Moderate to High rating (D2 and D5). Vegetation type D3 occurs in one small area associated with previously known perennial pool, CO-WS-16 and includes taxa consistent with the Pilbara Pools PEC, including *Imperata cylindrica.* This taxon is almost exclusively restricted to riparian zones of permanent wetlands with high soil moisture maintained by groundwater flows and is an indicator species for the PEC. Two vegetation types, D1 and D2, are particularly worth noting as they have High GDV rating and occur within the high and/or moderate risk areas for impact from drawdown.

A total of 29 water features were observed from the Study Area; all 15 of the permanent or potentially permanent pools and 14 of the ephemeral or likely ephemeral pools. Three pools were assessed at a High GDV rating; they were permanent pools CO-WS-14 and CO-WS-16, and ephemeral pool CO-WS-26. One perennial pool (CO-WS-10) was located in an area at moderate risk of impact from drawdown.

Table of Contents

Tables

Figures

Appendices

1 Introduction

1.1 Background

Atlas Iron Pty Ltd (Atlas Iron) is currently in the process of developing the Sanjiv Ridge Project (formerly the Corunna Downs Project), located approximately 33 kilometres (km) south of Marble Bar in the Pilbara region of Western Australia (Figure 1.1). Project development plans involve extending below the water table (BWT) within the Sanjiv Ridge project area (hereafter referred to as the Survey Area). The Coongan River flows adjacent to the Project, various pools are known to occur within and surrounding the Project area, with several known to support groundwater dependent vegetation (GDV) (Woodman Environmental, 2019). As such, drawdown resulting from the BWT development may impact GDV in the surrounding systems.

Atlas Iron commissioned Biologic Environmental Survey Pty Ltd (Biologic) to undertake a desktop assessment and targeted riparian vegetation survey within select priority areas (identified by Biologic prior to mobilisation) where there is potential for drawdown impacts to vegetation and/or where GDV was already known to occur (hereafter the Survey). The survey concentrated specifically on the pools that are considered to be permanent or semi-permanent, and the area of riparian vegetation that has been categorised at High risk from groundwater drawdown impacts (based on GDV risk mapping by Woodman Environmental (2019). The SMR Mine Development Envelope has been added to all figures to provide context to the GDV locations. However, this was not a focus of the survey, targeted searches were not conducted therein.

1.2 Scope and Objectives

The overarching objective of the Survey was to better define and map GDV within priority areas of the Sanjiv Ridge Project, by building on existing riparian vegetation and GDV risk mapping (Woodman, 2016; Woodman Environmental, 2019). This information will give fine-scale information on the pools and riparian vegetation that are at risk of groundwater drawdown impacts. The objective was achieved through:

- A desktop assessment to further understand riparian vegetation and key phreatophytic flora taxa previously recorded within the Project, including:
  - a review of historical surveys within/surrounding the Survey Area
  - a review of relevant hydrological and groundwater information for the Project
- Completion of a targeted riparian vegetation survey to characterise GDV present, its significance and risk to drawdown impacts, Ground-truth and refine the existing riparian vegetation mapping by Woodman (2016);
- Review of the survey results and discussion of the significant GDV values in a regional and local context.

770000
777000
784000
7644000
7637000
7630000
7623000

E 4503717
E 4505984
E 4504843
E 4504060
E 4503940
M 4500679
E 4506211
E 4505879
L 4500410
L 4500609
E 4503655
L 4500564
M 4500521
G 4500348
E 4504666
Hillside - Marble Bar Rd
E 4504622
E 4504934
L 4500406
M 4500678
E 4506069
E 4505847
P 4502966
E 4506055
L 4500408
L 4500407
G 4500339
M 4500591
P 4502965
L 4500685
L 4500418
E 4504856
L 4500527
P 4502964
P 4503002
M 4501257
M 4500589
E 4
E 4506468
Sanjiv Ridge
P 4502976
E 4503321
P 4502977
E 450

IBRA Region
Pilbara
IBRA Subregion
Chichester
Fortescue
Hamersley
Roebourne
Port Hedland
Karratha
Marble Bar
Newman

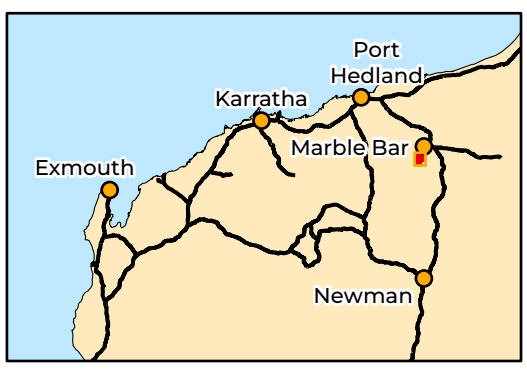
LEGEND

Study Area
Development Envelope
Mining Tenements
Operating Mine
Local Road

Focus Pools
Ephemeral Pool
Potentially Ephemeral
Perennial Pool
Potentially Permanent

Scale 1:75,000
0 1 2 3 Km
Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator
Created: 30/01/2025

Biologic



ATLAS IRON PTY LTD
Sanjiv Ridge BWT Groundwater Dependent Vegetation Assessment

Figure 1.1: Survey Area and regional context

2 Existing Environment

2.1 Biogeography

The Survey Area is located within the Chichester (PIL01) subregion of the Pilbara bioregion as defined by the interim Biogeographic Regionalisation of Australia (IBRA) (Figure 1.1) (Thackway & Cresswell, 1995). The Chichester subregion is characterised by undulating Archaean granite and basalt plains and include significant areas of basaltic ranges (Kendrick & McKenzie, 2003). Vegetation in this subregion is characterised by a shrub steppe containing *Acacia inequilatara* over *Triodia wiseana* on the plains, while *Eucalyptus leucophloia* tree steppes occur on the ranges (Kendrick & McKenzie, 2003). Drainage throughout the Chichester occurs to the North through numerous rivers (e.g. Shaw, Nullagine, Sherlock etc) (Kendrick & McKenzie, 2003).

A characteristic feature of the Chichester is the Chichester range that extends 400 km west of the Millstream-Chichester National park to Balfour Downs station in the east (McKenzie et al., 2009). This region also contains the Marble Bar – Nullagine mineral province with is geological complexity (Kendrick & McKenzie, 2003).

2.2 Climate

The Pilbara is a semi-desert to tropical climate that relies on irregular rainfall throughout the year, occurring mostly during summer (DoW, 2010). Summer rain in the Pilbara is generally the result of tropical storms or cyclones typically from December to March, while winter rainfall in the Pilbara is usually the result of cold fronts moving north easterly across the state (Leighton, 2004). Rainfall in the Pilbara on average is 290 mm a year, with rainfall occasionally exceeding 700 mm in particular localities (George et al., 2011-2015).

2.3 Hydrology

The surface and groundwater hydrology of the Pilbara is highly variable and dependent on climactic conditions, severe drought can be followed by major flooding (DoW, 2010). Stream flows in the Pilbara are dependent on rainfall resulting in high seasonality and variability. Most runoff and recharge occurs as a result of episodic cyclonic activities occurring mostly from January to March (DoW, 2010).

Through the Chichester ranges water drains via the Harding Dam and river northward towards Roebourne and the coast. There are no wetlands or within the Survey Area however the Coongan River passes through some of the areas of interest in the Survey Area. Throughout the areas of interest in the Survey Area there are several permanent and semi-permanent pools and ephemeral creek lines. Some of the more minor creeklines would only flow after major rainfall events (Figure 2.1).

770000
777000
784000
7644000
7637000
7630000
7623000
Hillside - Marble Bar Rd
Glen Herring Creek
Camel Creek
Camel Creek
Coongan River
Coongan River
Emu Creek
Sanjiv Ridge

LEGEND

- Study Area
- Development Envelope
- Operating Mine
- Local Road

Surface Hydrology

- Minor
- Major

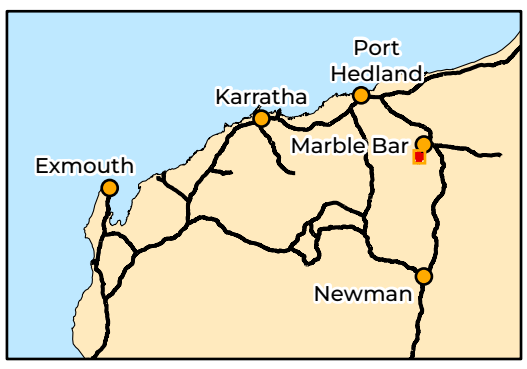
Terrestrial

- Moderate potential GDE - from national assessment
- Low potential GDE - from national assessment

Aquatic

- High potential GDE - from national assessment
- Moderate potential GDE - from national assessment
- Unclassified potential GDE - from regional studies

Scale 1:75,000
0 1 2 3 Km
Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 30/01/2025



Biologic

ATLAS IRON PTY LTD
Sanjiv Ridge BWT Groundwater Dependent Vegetation Assessment

Figure 2.1: Hydrology of the Survey Area

2.4 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDEs) are complex dynamic ecosystems that require access to groundwater to meet all of some of their water requirements (Doody et al., 2017). Changes to groundwater exceeding the natural bounds of variation can heavily impact these ecosystems. Insufficient supply of groundwater to these ecosystems can affect the ecosystem services they supply (Doody et al., 2017). GDEs can be represented by many different assemblages of biota which rely on groundwater, and as a result come in several forms. The three key GDEs include (BoM, 2024b):

1. Aquatic ecosystems: those reliant on surface expression of groundwater – including inundated environments that use groundwater after it has been discharged to the surface, such as rivers, wetlands, lakes and springs (excludes fringing vegetation);

2. Terrestrial ecosystems: those reliant on the presence of subsurface groundwater to meet all or some of its water requirements – this includes terrestrial vegetation ecosystems, subsurface fauna communities, and some vegetation associated with a surface water body; and

3. Subterranean ecosystems: water-dependent ecosystems occurring below the ground surface, including cave and aquifer systems.

Of interest for this survey is the Terrestrial ecosystems, which are typically characterised by the presence of flora species that rely on groundwater namely those classified as phreatophytes and collectively termed Groundwater Dependent Vegetation (GDV). Phreatophytes may be classified as either obligate or facultative phreatophytes depending on their reliance of groundwater (Eamus et al., 2016).

- Obligate phreatophytes – flora species for which are confined to habitats where access to groundwater is critically important to their presence in the landscape.
- Facultative phreatophytes – flora species that can use groundwater to utilise groundwater to satisfy a proportion of their ecological water requirement (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.

The BoM has developed The Groundwater Dependent Ecosystems Atlas (GDE Atlas) as a national dataset to inform groundwater planning and management. The GDE Atlas includes the national inflow dependent ecosystem (IDE) layer. The IDE layer indicates the likelihood of the presence of landscapes that are wetter that surrounding areas, either seasonally or permanently, as a result of receiving or using water from inflows in addition to rainfall (i.e., they are likely to be accessing an additional source of water rather than relying solely on rainfall and are therefore inflow dependent). IDEs include GDEs and ecosystems that utilise surface water

and soil moisture (BoM, 2024b). IDEs are not considered within the context of this flora and vegetation survey, but their presence may be a precursor to the presence of GDE.

The GDE Atlas shows that the Survey Area overlaps with areas with low and moderate potential terrestrial GDEs, but also with areas with no potential to support a terrestrial GDE. There are seven potential aquatic GDEs as identified from regional studies occurring within the Survey Area. The Coongan River running through parts of the Survey Area has a high potential of supporting aquatic GDEs.

2.4.1 Groundwater indicator species

GDV communities or groundwater dependent ecosystems (GDEs) are typically characterised by the presence of flora species that rely on groundwater (i.e., phreatophytes). These species can be used to indicate presence of groundwater as they 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 a fair 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 et al., 2006). Examples of recognised obligate phreatophytes include trees species, *Melaleuca argentea* (silver cadjeput) and *Eucalyptus camaldulensis* (river gum).

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 (Eamus et al., 2006). Facultative phreatophytes are 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. Examples of recognised facultative phreatophytes include tree species such as *Eucalyptus victrix* (coolibah), and shrub species *Atalaya hemiglauca* and *Sesbania formosa*.

In general, the structure and composition of creek line vegetation in the Pilbara tends to be driven by the inter and intra-annual availability of moisture. As such, the structure and composition of vegetation present is often the most reliable indicator of the longer term inter/intra-annual availability of moisture, often providing valuable insight into groundwater proximity (and consistency of access), surface water permanence and therefore the potential sensitivity of a riparian ecosystem to fluctuations in water availability.

3 Desktop Assessment

3.1 Methods

A desktop assessment, comprising of a literature review, was undertaken prior to the field survey. The purpose of the desktop assessment was to identify groundwater dependent vegetation species and their probability of occurring in the Survey Area.

3.1.1 Review of other reports

A review of available literature relevant to the Sanjiv Ridge Project was completed to compile a list of groundwater dependent vegetation species and their potential to occur within the Survey Area. A total of 14 assessments were reviewed, comprising detailed, reconnaissance and targeted riparian surveys with a focus on the groundwater dependent vegetation found in these reports (Table 3.1, Appendix A, Appendix B).

Table 3.1 Summary of other reports informing the desktop assessment

Project area	Reference	Survey type
Intersecting Survey Area		
Corunna Downs Project	Woodman (2016)	Detailed
Corunna Downs Project Assessment of Groundwater Drawdown Impacts to Vegetation	Woodman Environmental (2019)	Drawdown impact assessment
< 50km from Survey Area		
Mt Webber Bore WEB0121 Groundwater Dependent Vegetation Assessment	Biologic (2019)	Targeted riparian
Marble Bar Project	Botanica (2022)	Reconnaissance and targeted
Flora and Vertebrate Fauna Assessment of the Moolyella Pipeline Corridor	Rapallo (2021)	Reconnaissance
Miralga Creek Iron Ore Project Desktop Review of Potential Groundwater Dependent Vegetation	Woodman (2019a)	Desktop
Miralga Creek Iron Ore Project 2019	Woodman (2019b)	Detailed
> 50km from Survey Area		
Bakers Syncline 19	Astron (2019)	Detailed
McPhee Creek	Ecoscape (2020)	Detailed
Woodie Woodie Minesite Expansion Groundwater Dependent Ecosystem Survey	Mattiske (2019)	Targeted riparian
Nullagine Iron Ore Joint Venture Project Extension	Plantecology (2013)	Detailed
Roy Hill Consolidated Vegetation Report	Strategen-JBS&G (2020)	Consolidation of 4 previous flora and vegetation surveys

Project area	Reference	Survey type
Millennium Minerals Limited Nullagine Gold Project Vegetation of the MML Nullagine Tenements	Waters (2017)	Detailed vegetation
Flora and Vegetation of Beatons Creek	Woodgis (2020)	Detailed

3.2 Results

3.2.1 Riparian taxa from the desktop assessment

A list of key riparian flora taxa was derived from the review of other survey reports within and surrounding the Sanjiv Ridge project area. During the desktop assessment 32 riparian flora species were identified as possible indicator species for GDV due to their presence across multiple riparian vegetation units and/or as their status as obligate/facultative phreatophytes, mesophytic (terrestrial plants with affinities towards water supply) or hydrophytic (aquatic) taxa. These species are listed in below Table 3.2 and Appendix A outlines which reports they were from. Flora species recorded by existing surveys provided context for the field survey conducted within the Sanjiv Ridge Survey Area. It is important to note that when considering these species for GDV, density is also taken into account, not only presence.

Table 3.2: Key riparian flora species outlined by the desktop assessment

Stratum Level	Riparian Taxa	
Upper stratum (Trees)	• *Acacia coriacea* subsp. *pendens* • *Acacia sclerosperma* • *Atalaya hemiglauca* • *Eucalyptus camaldulensis*	• *Eucalyptus victrix* • *Ficus aculeata* • *Melaleuca argentea*
Upper-mid stratum (Shrubs)	• *Acacia ampliceps* • *Adriana tomentosa* • *Melaleuca bracteata*	• *Melaleuca glomerata* • *Melaleuca linophylla* • *Terminalia circumalata*
Mid-lower stratum (Shrubs)	• *Cullen leucanthum* • *Sesbania cannabina*	
Lower stratum (Herbs)	• *Lobelia arnhemiaca* • *Ludwigia perennis* • *Marsilea exarata* • *Marsilea hirsuta*	• *Stemodia grossa* • *Stylidium fluminense* • *Wahlenbergia tumidifructa*
Lower stratum (Sedges)	• *Cyperus difformis* • *Cyperus iria* • *Cyperus ixiocarpus* • *Cyperus pulchellus*	• *Cyperus vaginatus* • *Fimbristylis microcarya* • *Schoenoplectus subulatus* • *Typha domingensis*
Lower stratum (Grasses)	• *Eulalia aurea*	
Lower Stratum (Vines)	• *Tinospora smilacina*	

3.2.2 GDV from the desktop assessment

The fourteen reports that formed the desktop assessment were reviewed for the presence of key phreatophytes forming strata dominance in mapped vegetation types and thus the potential GDV vegetation units occurring (Appendix B). While a variety of potential GDV were identified, actual groundwater usage is dependent on contextual factors including depth to groundwater, geology, and presence of permanent water bodies.

Vegetation mapping and assessment of GDV have been previously completed for the Project (Woodman, 2016; Woodman Environmental, 2019). Woodman (2016) identified five potential GDV vegetation units within the Survey Area (VT 3, 4, 8, 14 and 15) listed in Table 3.3. These vegetation units were further broken down into obligate or facultative GDV types based on the presence of obligate phreatophytes (*Melaleuca argentea*, *Eucalyptus camaldulensis*, *Sesbania formosa*) and facultative phreatophytes/ presumed facultative phreatophytes (*Eucalyptus victrix*, *Melaleuca glomerata*, *Melaleuca linophylla*, *Corymbia flavescens*, *Atalaya hemiglauca*, *Acacia ampliceps*) (Woodman Environmental, 2019). It was noted that key phreatophytes within VT 3, VT 4 and VT 8 were only present as isolated occurrences and as such, their full extent is likely not to be dependent on groundwater. Vegetation units VT 14 and 15 were considered to represent GDV across their full extents, but VT 14 was only considered obligate GDV in locations containing *Melaleuca argentea* and/ or *Eucalyptus camaldulensis*.

In the Woodman Environmental (2019) report areas that were likely to be at risk from drawdown were identified. VT15 occurring along the Coongan River, with potential GDV, was classified as being at high and moderate risk from drawdown (Figure 3.1).

Pools throughout the Survey Area were identified to contain water from both ephemeral and perennial sources (Figure 3.1). Perennial pools have a high association with GDV as they are usually ground-water fed. The majority of ephemeral and perennial pools were located in areas at low risk of impact from drawdown. One perennial pool (CO-WS-10) was located in an area at moderate risk of impact from drawdown.

3.2.2.1 Significant GDV

The desktop did not identify any vegetation units that are consistent with ecological communities listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) or the Biodiversity Conservation Act 2016 (BC Act). Throughout the Pilbara there are a range of priority ecological communities (PECs) that contain GDV. Some areas associated with VT15 may be representative of the Priority 2 PEC: Riparian flora and plant communities of springs and river pools with high water permanence of the Pilbara Region (hereafter referred to as the Pilbara Pools PEC).

Table 3.3: GDV vegetation units identified by Woodman Environmental (2019)

Vegetation type	Occurrence
Obligate GDV	
VT 3 Low open woodland of mixed species dominated by species including *Corymbia ferriticola*, *Ficus brachypoda*, *Terminalia canescens* over tall sparse shrubland usually dominated by *Acacia pruinocarpa* and *Acacia tumida* var. *pilbarensis* over low open mixed grassland dominated by *Triodia epactia*, *Cymbopogon ambiguus* and *Eriachne mucronata*, on red to brown sand to clay loam on ironstone or metamorphosed granite outcropping, in steep gorges, often with semi-permanent water	Occurred along minor drainage lines and steep gorges throughout the Survey Area
VT 15 Mid open forest to woodland dominated by *Eucalyptus camaldulensis* subsp. *refulgens* and occasionally *Eucalyptus victrix* over tall open shrubland dominated by species including *Acacia ampliceps*, *Melaleuca glomerata* and *Acacia pyrifolia* var. *pyrifolia* over mixed mid open grassland and sedgeland dominated by **Cenchrus ciliaris*, *Cyperus vaginatus* and *Triodia longiceps* on red to brown sandy to clay loam with riverstone in major drainage lines	Occurred primarily along the Coongan River and along a minor drainage line in the west of the Survey Area
Facultative GDV	
VT 4 Low open woodland usually dominated by *Corymbia hamersleyana* over tall sparse shrubland dominated by mixed *Acacia* species including *A. trachycarpa* and *A. ancistrocarpa* with *Dichrostachys spicata* over low hummock grassland dominated by species including *Triodia wiseana* and *T. epactia* with *Eragrostis eriopoda* on brown sandy loams on plains and drainage lines	Broad floodplains of the Coongan River
VT 8 Low isolated shrubs dominated by *Melaleuca glomerata* over mid hummock grassland dominated by *Triodia longiceps* over low mixed sedgeland, grassland and forbland of mixed species including *Schoenus falcatus*, *Trianthema cusackianum* and *Stemodia grossa* on white to brown clay to clayey sand with occasional calcrete and dolerite stones, at the head of drainage lines	Spatial data of this unit was incongruent with description and landforms of aerial imagery (sometimes this unit was on undulating hills. Two conflicting descriptions recorded in the spatial data; the second description was for claypan and low lying areas.
VT 14 Mid open woodland of mixed species including *Eucalyptus victrix* and *Corymbia hamersleyana* over tall open to sparse shrubland of mixed species including *Acacia coriacea* subsp. *pendens*, *Acacia trachycarpa*, *Acacia pyrifolia* var. *pyrifolia*, *Acacia tumida* var. *pilbarensis* and *Melaleuca glomerata* over low sparse shrubland of mixed species including *Pluchea ferdinandi-muelleri*, *Cajanus pubescens* and *Stemodia grossa* over mid open grassland and sedgeland of mixed species dominated by **Cenchrus ciliaris*, *Triodia longiceps*, *Triodia epactia*, *Chrysopogon fallax* and *Cyperus vaginatus* on red to brown sand to sandy loam with riverstones in minor to medium drainage lines	Minor drainage and riparian flowlines of the broader area, somewhat intersecting with the Survey Area at the edges

770000
784000
798000
7644000
7630000
7616000
Glen Herring Creek
Callina Creek
Coongan River
Brockman Hay Cutting Creek
Camel Creek
Sandy Creek
Coolyia Creek
Hillside - Marble Bar Rd
Emu Creek
Ram Creek
Sanjiv Ridge
Sanjiv Ridge

LEGEND

Study Area
Development Envelope
Operating Mine
Local Road

Surface Hydrology
Minor
Major

Water Feature
Spring
Perennial
Waterhole
Ephemeral
Likely Ephemeral
Perennial
Likely Permanent

Potential GDV - Risk From Drawdown
Risk
High
Moderate
Low

Scale 1:140,000
0 2 4 6 Km
Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator
Created: 30/01/2025

Biologic

Port Hedland
Karratha
Marble Bar
Exmouth
Newman

ATLAS IRON PTY LTD
Sanjiv Ridge BWT Groundwater Dependent Vegetation Assessment

Figure 3.1: Groundwater Dependent Vegetation Risk

4 Field Assessment

4.1 Methods

4.1.1 Survey personnel timing

The field survey was conducted from the 10th to the 14th of June 2024, by Senior Botanist Kelby Jennings and Botanist Emma Marsh (with support from Michael Pezzaniti – Sanjiv Ridge Environment Advisor) over 10 person days. All personnel held the current and relevant licensing and had adequate experience for the bioregion. Project roles and licenses are provided in Table 4.1.

Table 4.1: Project team & licenses

Biologic personnel	Project Involvement	Licencing	Experience
Principal Botanists			
Clinton van den Bergh	• Project management support • survey design • QA/QC	FB62000453 TFL 2223-0030	18 yrs
Carmel Winton	• Project manager • Data analysis • Reporting lead • QA/QC	FB62000593 TFL 134B-2021	14 yrs
Senior Botanist			
Kelby Jennings	• Field survey	FB62000160	10 yrs
Clare Whyte	• Riparian vegetation mapping • Reporting	-	6.5 years
Rachel Meissner	• Taxonomic identifications	-	26 yrs
Botanist			
Emma Marsh	• Field survey • Reporting	FB62000233-4 TFL 2324-0178	4+ yrs
Rylan Cunnane	• Desktop assessment • Data management • Reporting	-	1 yr
Advisor Environment – Atlas Iron Sanjiv Ridge			
Michael Pezzaniti	• Field survey (on-site support)	-	*(Unknown)*

4.1.2 Weather and climate

The average annual rainfall in the Pilbara bioregion ranges from 200–350 mm, although there are significant fluctuations between years, with some locations receiving up to

1,200 mm in some years (BoM, 2024a; McKenzie et al., 2009).The wet season extends from October to April, when maximum daily temperatures can exceed 35°C. The dry season extends from June to August, with temperatures ranging from approximately 22°C to 30°C (BoM, 2024a).

Long-term climatic data is not available for the Survey Area itself; however, long term climatic data (from 2000 for rainfall and temperature data) is available from the nearby Marble Bar weather station (station #004106), located approximately 14 km North of the Survey Area (BoM, 2024a). This weather station is therefore expected to provide the most accurate data for historical and current climatic conditions. The long-term mean annual rainfall is 383.5 mm, with the majority of rainfall received between January and March each year (Figure 4.1). The highest maximum temperatures occur between November and January, with highest mean maximum recorded in December (42.1°C).

In the 12 months prior to the survey, mean temperatures and rainfall were comparable to long term averages (2000-2024), with February 2024 experiencing increased maximum and minimum temperatures (44.1°C and 28.2 C respectively) and significant rainfall recorded in March or 2024 (171 mm, 93.1 mm greater than the LTA for the same month). During the field survey weather was fine with temperatures between 28.8 C and 31.9 C, no rainfall was experienced over the course of the survey period.

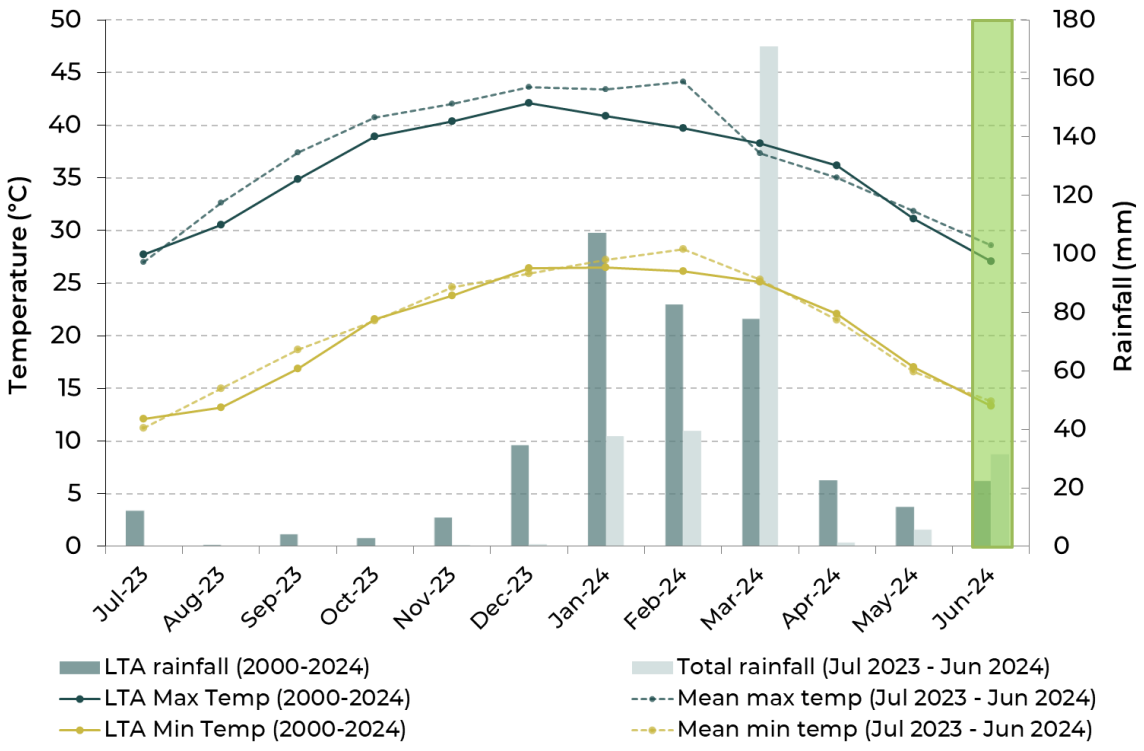


Figure 4.1: Long-term climatic data for Marble Bar weather station (station #004106, (BoM, 2024a)), with approximate survey timing shown in shaded box.

4.1.3 Targeted riparian vegetation survey

Fifteen perennial or potentially permanent pools, as well as 33 ephemeral or likely ephemeral pools formed part of the focus of the survey. These locations were provided to Biologic by Atlas prior to mobilisation. The 15 perennial or potentially permanent pools form the priority of the survey and all were ground-truthed. Where possible, ephemeral and likely ephemeral pools were ground-truthed; 14 of the 33 ephemeral pools were assessed. Priority was given to those pools occurring within or adjacent to the maximum pumping case end of mine drawdown contour (which is 0.5 m) and those that were in proximity to the more permanent features.

In addition to the pools, the riparian vegetation categorised as having a high risk of drawdown impacts (as classified by Atlas and provided prior to mobilisation) was ground-truthed to better define the GDV present. These areas occur along the Coongan River and a tributary of Glen Herring Creek. There are also several smaller drainage systems located high in the landscape that may be impacted by the drawdown and were ground-truthed.

One hundred and thirty-one sites were assessed within the Survey Area to identify the presence of GDV (Figure 4.2). Sampling techniques included relevés (51 sites Appendix C) and vegetation mapping notes (80 sites; Table 4.2). At each site broad information was collected to assist in the mapping of the GDV units, including a description of the vegetation, the presence or absence of any key phreatophytic, or indictive mesophytic and hydrophytic flora species. Particular emphasis was given to species that require groundwater to be at or just below the surface (obligate phreatophytes and high level mesophytes/ hydrophytes, for example *Sesbania formosa*, *Acacia ampliceps*) (Appendix D).

770000
777000
784000
7644000
7637000
7630000
7623000

SRGR-025
SRGR-014
SRGR-020
SRGR-024
SRGR-030
SRGR-031
SRGR-021
SRGR-025
SRGR-024
SRGR-031
SRGR-033
SRGR-132
SRGR-117
SRGR-130
SRGR-115
Hillside - Marble Bar Rd
SRGR-128
SRGR-111
SRGR-077
SRGR-064
SRGR-007
SRGR-001
SRGR-005
SRGR-006
SRGR-081
SRGR-085
SRGR-092
SRGR-078
SRGR-072
SRGR-107
SRGR-105
SRGR-120
SRGR-071
SRGR-065
SRGR-061
SRGR-067
SRGR-062
SRGR-054
SRGR-052
SRGR-034
SRGR-045
SRGR-013
SRGR-010
SRGR-019
SRGR-110
SRGR-015
SRGR-068
SRGR-048
SRGR-108
SRGR-036
SRGR-034
SRGR-045
SRGR-055
SRGR-009
Sanjiv Ridge
SRGR-086
SRGR-078
SRGR-072
SRGR-107
SRGR-105
SRGR-097
SRGR-120

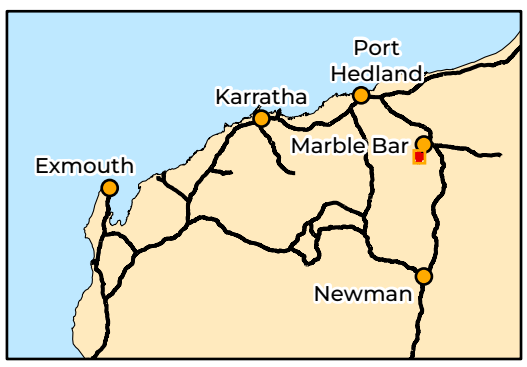
LEGEND

- Study Area
- Development Envelope
- Operating Mine
- Local Road

Sampling Type

- Relevé
- Vegetation Mapping Note
- Traverse

Scale 1:75,000
0 1 2 3 Km
Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator
Created: 30/01/2025



Biologic

ATLAS IRON PTY LTD
Sanjiv Ridge BWT Groundwater Dependent Vegetation Assessment

Figure 4.2: Flora sample site and traverses

Table 4.2: Field survey techniques

Relevé	Relevé sites are a lower intensity unbounded survey technique used in reconnaissance level flora and vegetation surveys (EPA, 2016). Information collected at each relevé includes: • Site code, date, location, botanist; • One photograph (as a minimum); • Vegetation condition and disturbances (including fire); • Landform including: slope, soil, rock type, aspect; • Flora and vegetation information; dominant cover, structure and species count where necessary; and • Recording of the majority of flora present.
Vegetation mapping note	Vegetation mapping notes are used to ground-truth existing vegetation mapping and significant flora locations. They are a lower intensity, unbounded, survey technique. Information collected at each mapping note may vary in detail depending upon what is present and needed for that site. The following was recorded as a minimum: location co-ordinates, representative photograph and brief description of the vegetation mapping note focus.
Traverse/Meandering Traverse	A traverse is an unmarked route along which data is collected. Traverses are useful for identifying the boundaries and characteristics of vegetation types and targeting significant flora or vegetation. Information recorded along traverses is the same as a vegetation mapping note, with the addition of noting vegetation changes and relationships between vegetation and substrate.
Opportunistic (Supplementary) Sampling	Flora and vegetation not recorded through other sampling methods were opportunistically sampled as encountered in the survey. Opportunistic sampling also included recording locations of significant, introduced (weed) and unknown species.

4.1.4 Classification of GDV

The classification of GDV in Western Australia is broad and lacks a clear definition or repeatable framework between scientists. Loosely, GDV is interpreted as the presence of obligate phreatophytes such as *Eucalyptus camaldulensis*, *Eucalyptus victrix* and *Melaleuca argentea*. While this broadly outlines the potential for GDV, it is too broad, and lacks application that would highlight areas of higher GDV importance. When additional hydrophytic and mesophytic species are considered it can give a more detailed picture of the nuances that is GDV.

To create a streamlined approach to GDV classification, Biologic has defined an assessment framework to apply to their projects. This assessment is a combination of botanical expertise based on years of field experience in riparian environments, papers and presentations on GDV and conversations with other botanical and ecohydrological experts. This assessment framework is provided as Appendix D.

Generally speaking, this framework defines the presence of GDV and then rates the dependence on groundwater through species composition and density cover. This dependence rating is based on a five-point scale; High, Moderate, Low, Negligible and None. The classification of 'High' indicates high soil moisture availability, very likely to be from a perennial source, as confirmed by the taxa present. Classification of 'Low' indicates soil moisture availability is more likely to be ephemeral. And classification of Negligible to None, refers more to the riparian systems that would rely on surface flow to support that habitat. The GDV assessment framework considers the following factors:

- The presence, density and maturity of four key indicative phreatophytes; *Melaleuca argentea* (obligate phreatophyte), *Eucalyptus camaldulensis* (facultative phreatophyte), *Eucalyptus victrix* (facultative phreatophyte to vadophyte) and *Sesbania formosa* (obligate to facultative phreatophyte);
- The presence, diversity and density of indicative hydrophytes and mesophytes and their relative reliance on groundwater (Appendix D);
- The structure of the vegetation with respect to obligate phreatophytes, facultative phreatophytes, hydrophytes and mesophytes. For example, a woodland of *Eucalyptus camaldulensis* is more dependent on groundwater presence (the woodland structure requires more groundwater for persistence) compared to scattered trees;
- The presence of water bodies and an assessment of their permanence; and
- Broad understanding on the geology and creek morphology (i.e., presence of calcrete which may be slowly leaking groundwater into the creek).

It should be noted that a GDV unit may be assigned an overlapping rating (e.g., Moderate to Low) due to the presence of semi-mature obligate phreatophytes, increased diversity or varying densities of mesophytes and hydrophytes across the GDV unit.

4.1.5 Riparian vegetation mapping

The aim of the field survey was to further refine riparian vegetation types as previously mapped by Woodman (2016). These existing vegetation assemblages were ground-truthed during the survey with photographs and full vegetation descriptions taken at each sampling site to support the vegetation mapping. The portion of the Survey Area which fell outside of Woodman (2016) was mapped by interpretation of aerial imagery, botanical expertise of Pilbara vegetation composition, and the floristic and vegetation data collected from sample sites.

The current nationally adopted classification system for vegetation descriptions is Native Vegetation Information System (NVIS) (NVIS Technical Working Group, 2017). NVIS seeks to manage national vegetation data to help improve vegetation planning and management within Australia including standardising scale and technical wording for vegetation

associations. Vegetation types and condition is mapped in accordance with the scale for NVIS level V (Appendix E). The vegetation type mapping was digitised using GIS software.

4.2 Results and discussion

4.2.1 Flora

One-hundred and forty confirmed vascular flora taxa were recorded during the survey with an additional four indeterminable taxa (Appendix F). Indeterminable taxa are unable to be conclusively confirmed to species level and are confirmed to family or genus or may have a tentative identification of species indicated with a query. Combined, 144 vascular flora taxa from 39 families and 95 genera were recorded from the Survey Area (Appendix F). One-hundred and thirty-three were native taxa and eleven were introduced or non-native taxa. Eighty of these species can be classified as riparian flora, or taxa that are mostly associated with drainage lines, floodplains and watercourses.

4.2.1.1 Groundwater indicator species

Thirty-six taxa were identified as groundwater indicator species from the GDV assessment framework. These taxa are a combination of nine phreatophytic flora, 15 hydrophytes and 12 mesophytes (Appendix H). Depending upon the presence, density and combination these taxa informed the GDV assessment.

4.2.2 Riparian vegetation

Ten riparian vegetation types from five broad GDV ratings were described from the Survey Area (Figure 4.3, Table 4.3). Vegetation types were primarily differentiated based upon the key phreatophytic tree species presence/ absence and density. Middle and understorey were similar between several vegetation types e.g. *Melaleuca glomerata*, *.M. linophylla*, and *Atalaya hemiglauca* were common mid-level taxa across seven vegetation types. *Cyperus vaginatus* and *Schoenoplectus subulatus* were common sedges across seven vegetation types. Mapping has been more finely defined from the mapping provided prior to mobilisation (Woodman, 2016), creating new sub-types of riparian vegetation based on locations and density of key indicator species as per the internal Biologic GDV assessment framework (Appendix D).

4.2.2.1 Groundwater dependence

All sites, pools and vegetation types were assigned a GDV rating (framework in Appendix D); GDV rating per site is provided in the data submission, pools is provided at Appendix H, and vegetation types are rated in Table 4.3 and Figure 4.4. Two vegetation types were determined to have a High dependence on the groundwater (D1 and D3), and two vegetation types had a Moderate to High rating (D2 and D5). The remaining six vegetation types had a rating of Low to Moderate, Low, Negligible or no dependence on groundwater.

770000
777000
784000
7644000
7637000
7630000
7623000
Hillside - Marble Bar Rd
Sanjiv Ridge

LEGEND

- Study Area
- Development Envelope
- Operating Mine
- Local Road

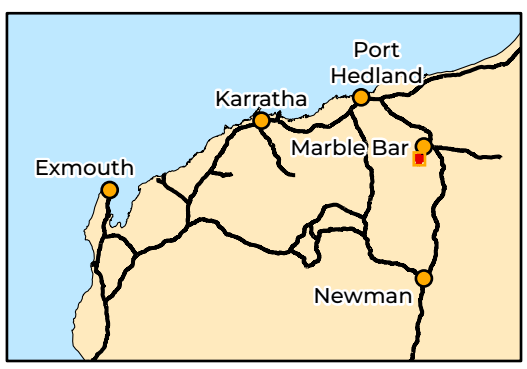
MapCode

- D1
- D2
- D3
- D4
- D5
- D6
- D7
- D8
- D9
- D10

Mapping Unit

- Cleared
- Upland

Scale 1:75,000
0 1 2 3 Km
Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator Created: 13/02/2025

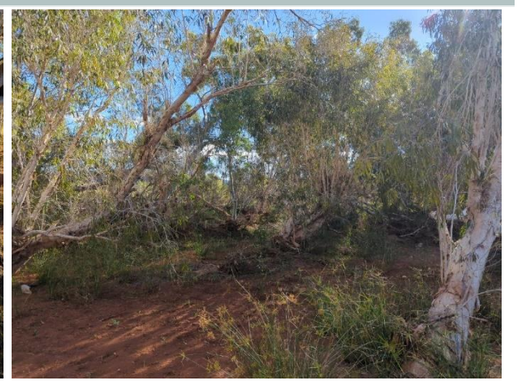


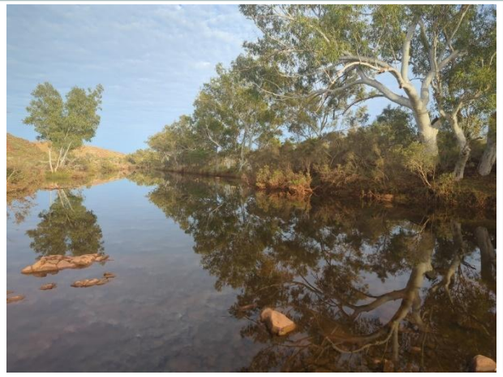
Biologic

ATLAS IRON PTY LTD
Sanjiv Ridge BWT Groundwater Dependent Vegetation Assessment

Figure 4.3: Riparian vegetation types in the Survey Area

Table 4.3: Riparian vegetation types within the Survey Area

Vegetation Code & Description	Key GDV species	Representative Photo (s)
GDV Rating: High		
D1 Ma Ml Cv *Melaleuca argentea* low woodland over *Melaleuca linophylla* tall sparse shrubland over *Cyperus vaginatus* mid sparse sedgeland	• *Melaleuca argentea* (High) • *Melaleuca linophylla* (Moderate) • *Cyperus vaginatus* (Low)	 
D3 MaEc(±Fb) AciAtp(±AtFv) Ic TdEg *Melaleuca argentea*, *Eucalyptus camaldulensis* (±*Ficus brachypoda*) low-mid open woodland over *Acacia colei* var. *ileocarpa*, *Acacia tumida* var *pilbarensis* (±*Adriana tomentosa*, *Flueggea virosa*) tall shrubland over *Imperata cylindrica* mid tussock grassland over *Typha domingensis*, *Eleocharis geniculata* low-mid isolated sedges	• *Imperata cylindrica* (High) • *Adriana tomentosa* (Moderate) • *Eleocharis geniculata* (Moderate) • *Eucalyptus camaldulensis* (Moderate) • *Flueggea virosa* (Moderate) • *Melaleuca argentea* (Moderate) • *Typha domingensis* (Low)	 
GDV Rating: Moderate to High		
D2 EcMa(±Ev) MlMgAcpAh CvSs(±Td) *Eucalyptus camaldulensis*, *Melaleuca argentea* (±*Eucalyptus victrix*) mid open woodland to open forest over *Melaleuca linophylla*, *Melaleuca glomerata*, *Acacia coriacea* subsp. *pendens*, *Atalaya hemiglauca* tall open shrubland over *Cyperus vaginatus*, *Schoenoplectus subulatus* (±*Typha domingensis*) mid sparse sedgeland	• *Eucalyptus camaldulensis* (Moderate to High) • *Melaleuca argentea* (Moderate to High) • *Atalaya hemiglauca* (Moderate) • *Eucalyptus victrix* (Low to Moderate) • *Melaleuca linophylla* (Moderate) • *Schoenoplectus subulatus* (Moderate) • *Acacia coriacea* subsp. *pendens* (Low) • *Cyperus vaginatus* (Low) • *Melaleuca glomerata* (Low) • *Typha domingensis* (Low)	 

Vegetation Code & Description	Key GDV species	Representative Photo (s)
D5 Ec MgAhMl(±Aa) CvSs EbCc *Eucalyptus camaldulensis* mid open woodland to open forest over *Melaleuca glomerata*, *Atalaya hemiglauca*, *Melaleuca linophylla* (±*Acacia ampliceps*) mid open shrubland over *Cyperus vaginatus*, *Schoenoplectus subulatus* mid sparse sedgeland over *Eriachne benthamii*, **Cenchrus ciliaris* low open tussock grassland	• *Acacia ampliceps* (High) • *Eucalyptus camaldulensis* (Moderate to High) • *Atalaya hemiglauca* (Moderate) • *Melaleuca glomerata* (Moderate) • *Melaleuca linophylla* (Moderate) • *Schoenoplectus subulatus* (Moderate) • *Cyperus vaginatus* (Low)	 
GDV Rating: Low to Moderate		
D4 MaEc MgMl Cv(±Ss) *Melaleuca argentea*, *Eucalyptus camaldulensis* low isolated trees to clumps of trees over *Melaleuca glomerata*, *Melaleuca linophylla* mid isolated shrubs over *Cyperus vaginatus* (±*Schoenoplectus subulatus*) low isolated clumps of sedges	• *Melaleuca linophylla* (Moderate) • *Schoenoplectus subulatus* (Moderate) • *Cyperus vaginatus* (Low) • *Eucalyptus camaldulensis* (Low) • *Melaleuca argentea* (Low) • *Melaleuca glomerata* (Low)	 
D6 EcEv MgMlAh(±At) CvSs CcEbEm *Eucalyptus camaldulensis*, *Eucalyptus victrix* mid open woodland to forest over *Melaleuca glomerata*, *Melaleuca linophylla*, *Atalaya hemiglauca* (±*Acacia trachycarpa*) tall open shrubland over *Cyperus vaginatus*, *Schoenoplectus subulatus* mid isolated sedges over **Cenchrus ciliaris*, *Eriachne benthamii*, *Eriachne mucronata* low sparse tussock grassland	• *Eucalyptus camaldulensis* (High) • *Atalaya hemiglauca* (Moderate) • *Eucalyptus victrix* (Moderate) • *Melaleuca glomerata* (Moderate) • *Melaleuca linophylla* (Moderate) • *Schoenoplectus subulatus* (Moderate) • *Cyperus vaginatus* (Low)	 

Vegetation Code & Description	Key GDV species	Representative Photo (s)
D8 Ev MgMl(AcpAa) Cv Cc *Eucalyptus victrix* low open woodland to isolated trees over *Melaleuca glomerata*, *Melaleuca linophylla*, (±*Acacia coriacea* subsp. *pendens*, *Acacia ampliceps*) tall shrubland over *Cyperus vaginatus* mid sparse sedgeland over **Cenchrus ciliaris* low sparse tussock grassland	• *Acacia ampliceps* (High) • *Melaleuca glomerata* (Moderate) • *Melaleuca linophylla* (Moderate) • *Acacia coriacea* subsp. *pendens* (Low) • *Eucalyptus victrix* (Low) • *Cyperus vaginatus* (Low)	 
GDV Rating: Low		
D7 TcEv(±Ec) MgAhFb Cv EmTspCa Te *Terminalia circumalata*, *Eucalyptus victrix* (±*Eucalyptus camaldulensis*) low open woodland over *Melaleuca glomerata*, *Atalaya hemiglauca*, *Ficus brachypoda* tall open shrubland over *Cyperus vaginatus* mid isolated sedges over *Eriachne mucronata*, *Themeda* sp. indet, *Cymbopogon ambiguus* low sparse tussock grassland over *Triodia epactia* low isolated hummock grasses	• *Atalaya hemiglauca* (Moderate) • *Eucalyptus camaldulensis*(Moderate) • *Cyperus vaginatus* (Low) • *Eucalyptus victrix* (Low) • *Melaleuca glomerata* (Low) • *Terminalia circumalata* (Low)	 
GDV Rating: Negligible		
D9 AtAhPl Te Cc *Acacia trachycarpa*, *Atalaya hemiglauca*, *Petalostylis labicheoides* tall sparse shrubland over *Triodia epactia* mid sparse hummock grassland over **Cenchrus ciliaris* low isolated clumps of tussock grasses	• *Atalaya hemiglauca* (Low)	 

Vegetation Code & Description	Key GDV species	Representative Photo (s)
D10 El AtpAcEs Em Te *Eucalyptus leucophloia* low isolated trees over *Acacia tumida* var. *pilbarensis*, *Acacia citrinoviridis*, *Ehretia saligna* tall sparse shrubland over *Eriachne mucronata* low isolated tussock grasses over *Triodia epactia* low isolated hummock grasses	• *Acacia citrinoviridis* (Negligible to Low)	 

770000
777000
784000
7644000
7637000
7630000
7623000
Hillside - Marble Bar Rd
Sanjiv Ridge

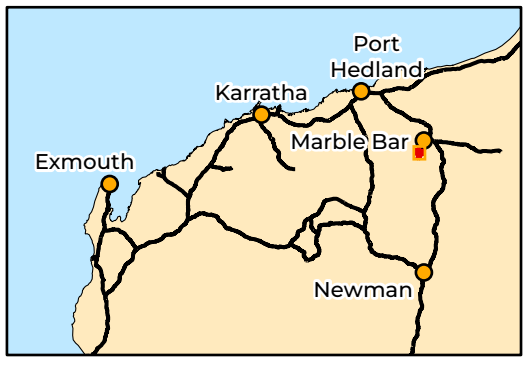
LEGEND

Study Area
Development Envelope
Operating Mine
Local Road

GDV Rating

High
Moderate to High
Moderate
Low to Moderate
Low
Negligible to Low
Negligible
None
Cleared

Scale 1:75,000
0 1 2 3 Km
Coordinate System: GDA 1994 MGA Zone 50 Transverse Mercator
Created: 30/01/2025



Biologic

ATLAS IRON PTY LTD
Sanjiv Ridge BWT Groundwater Dependent Vegetation Assessment

Figure 4.4: GDV rating of vegetation types in the Survey Area

The vegetation types in Table 4.3 are rated on the overall GDV of the sites therein, thus some are across two ratings (i.e.; Low to Moderate). The GDV rating provided in Figure 4.4 is derived from the site data and is more specific to the location. Some vegetation types will have ratings of High at some locations and Moderate to High in others (for example, D2 and D5). The majority of the mapped vegetation is returned as Moderate GDV rating. The two vegetation types considered to have High groundwater dependence, D1 and D3 are found in two locations and all have a rating of High. The two vegetation types with a rating of Moderate to High are D2 and D5. Both of these vegetation types are found throughout the Survey Area with locations of High, Moderate to High and Moderate GDV rating.

Vegetation type D1 occurs in three small patches in the main tributary of the Coongan River (south). It is primarily rated as High for the abundance of *Melaleuca argentea*, and presence of *Eucalyptus camaldulensis*, *Melaleuca linophylla*, *Sesbania formosa*, and mesophyte *Acacia ampliceps*. This, combined with the diversity of several other hydrophytic taxa suggesting high soil moisture content in line with groundwater availability. Two locations intersect with the area of moderate risk for groundwater drawdown impacts. The location furthest south intersects the area of low risk.

D3 occurs in one small area associated with previously known perennial pool, CO-WS-16 and is in an area at low risk of groundwater drawdown impacts. This vegetation type has affinities with the Pilbara Pools PEC. The Pilbara Pools PEC is listed as Priority 2 and occurs sporadically throughout the Pilbara, with several occurrences in Karijini National Park and other springs and river pools with high water permanence of the Pilbara. The presence of phreatophytic flora, permanent to semi-permanent pools, as well as several of the key relictual/ indicator understorey species suggests that portions of the Survey Area may represent the PEC, but particularly this vegetation type. Additionally, many pools occurring in the Survey Area are in a gorge, gully or valley wetland landform that is coupled with significant shading, in line with the description of this PEC.

The flora species recorded from D3 includes taxa consistent with the Pilbara Pools PEC, including *Imperata cylindrica*. This taxon is almost exclusively restricted to riparian zones of permanent wetlands with high soil moisture maintained by groundwater flows and is an indicator species for the PEC. The vegetation type D3, supports species composition consistent with persistently high soil moisture. Including an upper strata of obligate and facultative phreatophytes, including *Melaleuca argentea* and *Eucalyptus camaldulensis* with lower strata of *Imperata cylindrica* and diverse hydrophytic/ mesophytic flora taxa (Figure 4.3, Appendix G, Appendix H).

In the vegetation types D2 and D5 there are respectively three and one location(s) of High GDV rating from the survey. D2 forms the largest vegetation type associated within the main

tributary of the Coongan River; this intersects with the high, moderate and low risk areas of drawdown impacts. D5 is a smaller vegetation type of the Coongan River and intersects with the areas of moderate and low risk areas of drawdown impacts. The areas of High GDV rating of vegetation type D2 all occur within the area at highest risk of impacts from drawdown.

Seventeen sites were recorded from the in area at high risk of drawdown impacts, with eleven of these forming the vegetation type D2. Eight of the D2 sites show features of consistent with high soil moisture content, indicating High GDV rating. The remaining three are considered High to Moderate GDV rating (two sites) and Moderate GDV rating (one site).

4.2.2.2 Permanent and Ephemeral Pools

Prior to mobilisation, spatial data for 15 perennial or potentially permanent pools, as well as 33 other ephemeral pools were provided to Biologic (Figure 1.1). The 15 perennial or potentially permanent pools formed a focus of the survey and where possible, ephemeral and likely ephemeral pools were ground-truthed. The field team started with those ephemeral pools occurring in proximity to the more permanent features and those pools occurring within or adjacent to the maximum pumping case end of mine drawdown contour.

A total of 29 water features were observed from the Study Area; all 15 of the permanent or potentially permanent pools and 14 of the ephemeral or likely ephemeral pools. The pools of highest GDV rating are provided as a summary in Table 4.4 and information collected from the water features is presented in full at Appendix H.

Three pools were assessed at a High GDV rating; they were permanent pools CO-WS-14 and CO-WS-16, and ephemeral pool CO-WS-26. All of these pools were at low risk of impact from drawdown or less. Six pools were assessed as Moderate to High GDV rating, also all with a low risk of impact from drawdown or less.

The majority of ephemeral and perennial pools were located in areas at low risk of impact from drawdown or less. One perennial pool (CO-WS-10) was located in an area at moderate risk of impact from drawdown. This pool was assessed by two adjacent sites (SRGM-011 and SRGR-010). These sites commented on the pool as being a perched perennial pool with heavily incised sides to the gorge and evidence of deep scouring from flooding. The vegetation present was assessed as having a low and low to moderate rating for dependence on groundwater. Combined with the landform, in this area this vegetation was assessed to have a moderate GDV rating.

Table 4.4: High and Moderate to High GDV Pools of the Survey Area

Pool feature ID	Assessment Sites	Vegetation Type and Notable Features	Biologic GDV Rating
Perennial or Potentially Permanent Pools			
CO-WS-14	SRGR-009	D2 Perched wetland above pool; Deeply incised gully; Flowing water	High
CO-WS-16	SRGR-036 SRGR-108 SRGM-035	D3 Confirm High GDV; Rockface seepage; Permanent pool; Flowing water; Deeply incised gully	High
CO-WS-05	SRGR-055	D8 Surface water present; Mature *Melaleuca* and sedges	Moderate to High
CO-WS-12	SRGR-015	D2 Deeply incised gully; Mature *Melaleuca argentea*	Moderate to High
CO-WS-27	SRGR-005	D8 Non-porous substrate; Potentially permanent pool; Steep gully sides	Moderate to High
CO-WS-28	SRGR-006	D5 Pool quite deep, 2-4m; Mature *Melaleuca argentea* though infrequent	Moderate to High
Ephemeral or Likely Ephemeral Pools			
CO-WS-26	SRGR-064 SRGR-077	D5 Pool quite deep, < 5m; water flowing with seepage present; Suggests perennial groundwater fed (though classed Ephemeral from Atlas data)	High
CO-WS-25	SRGM-068	D6 Water flowing with seepage present; Becoming incised.	Moderate to High
CO-WS-34	SRGR-110 SRGM-066	D5 Surface water present in perched pools, ephemeral; Species composition suggests good soil moisture availability.	Moderate to High

4.2.2.3 Vegetation at High Risk of Drawdown Impact

Prior to mobilisation, spatial data was provided to Biologic to define the areas at high risk of drawdown impact (0.5m contour mapping). These were ground-truthed as a priority to better define the GDV present. There are eight vegetation types and 36 sites within the areas of high and moderate risk of drawdown impacts (Table 4.5). Five vegetation types intersect with the high risk area and six vegetation types intersect with the moderate risk area; three vegetation types are found in both risk areas (D2, D4 and D6).

Two vegetation types, D1 and D2, are particularly worth noting as they have High GDV rating and occur within the high and/or moderate risk areas. As discussed in the previous section, D2 is a main vegetation type for the Coongan River. The majority of species in these two vegetation types are dependent on groundwater to sustain the ecosystem and will very likely decline in health with groundwater drawdown. Specifically, the following species recorded from vegetation types D1 and D2, will not persist without high soil moisture availability, as seen with high groundwater availability:

- Hydrophyic taxa:
    - *Ammannia baccifera, Ammannia multiflora, Eleocharis geniculate, Lobelia arnhemiaca, Marsilea exarata, Marsilea hirsuta, Potamogeton tepperi* (aquatic), *Schoenoplectus subulatus, Typha domingensis, Wahlenbergia tumidifructa*
- Mesphytic taxa:
    - *Acacia ampliceps, Cyperus vaginatus, Fleuggea virosa, Melaleuca glomerata, Melaleuca linophylla, Stemodia grossa*; and
- Phreatophytic taxa
    - *Melaleuca argentea, Sesbania cannabina, Sesbania formosa*

One pool, CO-WS-10, is within an area at moderate risk of drawdown. This pool was mapped as D7 and is assessed by sites adjacent sites SRGR-010 and SRGM-011 (adjacent). The vegetation found here was rated as Low to Moderate GDV; the sites returned Low to Moderate and Low GDV ratings respectively.

Vegetation type D4 and D6 both intersect the moderate risk of and have a Moderate and/or Low to Moderate rating of GDV. These vegetation types each have one representative site rated at a High indication of GDV (SRGM-093 and SRGM-084 respectively).

Table 4.5: Vegetation and sites at high and moderate risk of drawdown impacts.

Vegetation intersecting	Vegetation GDV rating	Representative Site(s) intersecting	Site GDV rating
High risk of drawdown impact			
D2	High	SRGR-014	High
		SRGR-021	High
		SRGR-030	High
		SRGM-023	High
		SRGM-024	High
		SRGM-027	High
		SRGM-029	High
		SRGM-032	High
		SRGR-024	Moderate to High
		SRGR-025	Moderate to High
		SRGM-026	Moderate
D8	Moderate	SRGM-028	Moderate to High
D4	Moderate	SRGR-020	Moderate
		SRGM-022	Moderate
D6	Moderate	None	n/a
D9	Negligible to Low	SRGM-014	Negligible to Low
		SRGM-016	Negligible to Low
		SRGM-018	Negligible
Moderate risk of drawdown impact			
D1	High	SRGM-091	High
D2	Moderate to High and Moderate	SRGR-092	High
		SRGR-072	High
		SRGM-074	High
		SRGM-090	High
		SRGR-078	Moderate
		SRGM-080	Moderate
		SRGM-082	Moderate
		SRGM-094	Moderate
		SRGM-096	Low to Moderate
		SRGM-076	Low
D5	Moderate	SRGM-095 (adjacent)	Moderate
D6	Moderate	SRGM-084	High
		SRGR-086	Moderate
		SRGM-088	Moderate

Vegetation intersecting	Vegetation GDV rating	Representative Site(s) intersecting	Site GDV rating
D4	Moderate and	SRGM-093	High
	Low to Moderate	SRGM-089b	Low
D7	Low to Moderate	SRGR-010 (adjacent)	Low to Moderate
		SRGM-011 (adjacent)	Low

4.3 Limitations and constraints

The EPA (2016) outlines several potential limitations to flora surveys. These aspects are assessed and discussed in Table 4.6. No major limitations or constraints were identified for the survey.

Table 4.6: Survey limitations and constraints

Potential limitation or constraint	Constraint	Applicability to this survey
Availability of data and information	No	A sufficient amount of survey work has been undertaken in the wider local area and the surrounding region, and most of these previous survey results were available for review at the time of reporting.
Competency/ experience of the survey team, including experience in the bioregion surveyed	No	The field personnel involved in the survey are experienced in undertaking flora surveys of similar nature, including with GDV and riparian flora. The flora field lead, Kelby Jennings, has over 10 years' experience conducting flora surveys in WA including sufficient experience in the Pilbara bioregion.
Proportion of flora recorded/collected and any identification issues	No	As this survey was a targeted riparian vegetation assessment, sampling was focused on key riparian and phreatophytic taxa. It was thus not necessary to record all flora species within the Survey Area. Unknown flora encountered within relevés and vegetation mapping notes, as well as opportunistic locations were collected by field staff, where it was relevant to riparian taxa and vegetation. Of all specimens collected, 16% of total taxa were unable to be confirmed due to insufficient/poor identifying material. None of these are analogous with significant flora; this did not impede the ability to define GDV.
Timing, weather, and season	No	Ground conditions were generally good for the purposes of a groundwater dependent vegetation (GDV) survey. This did not present a limitation to the survey.
Disturbance that may have affected results, e.g. fire, flood	No	No disturbances were recorded during the survey that would present any constraints to the results. This does not present a limitation for the survey.

Potential limitation or constraint	Constraint	Applicability to this survey
Appropriate area fully surveyed (effort & extent)	No	The sampling methods and survey intensity was appropriate to achieve the scope of the survey. The Survey Area was traversed to determine presence and density of key riparian and phreatophytic flora taxa, allowing GDV to be assessed. Existing vegetation types were ground-truthed with relevés and vegetation mapping notes. The scope for a targeted riparian vegetation survey, was adequately ground-truthed using relevés and vegetation mapping notes and does not present a limitation to the survey. Some of the ephemeral pools were not ground-truthed. The field team and Atlas project manager knew that there was not enough time allocated to get to all the pools. All permanent or potentially permanent pools were made the priority and al were ground-truthed; this does not present a limitation for the survey.
Access restrictions within the Survey Area	No	There were no access restrictions on the survey. The areas of interest were accessed by vehicle. Some areas required an escort (via vehicle and on foot) through both Operations and within known Heritage locations. This was provided by the Atlas Sanjiv Ridge Environmental Advisor and does not pose a limitation on the survey.
Problems with data and analysis, including sampling bias	No	There were no issues with data collection, analysis or sampling during the survey. Biologic uses an assessment framework to assess presence of GDV. This framework looks at the features of the site as well as species composition and relationship of each species with water and soil moisture requirements. This framework helps to prevent any bias and interpret each site in a like-manner. This does not pose a limitation to the survey.

5 References

Astron. (2019). *Bakers Syncline 19: Vegetation, flora and fauna survey September 2019* [Unpublished report prepared for Rio Tinto Iron Ore]. Astron Environmental Services.

Biologic. (2019). *Mt Webber Bore WEB0121 groundwater dependent vegetation assessment* (Unpublished report prepared for Atlas Iron Pty Ltd).

BoM, Bureau of Meteorology. (2024a). *Climate Data Online* http://www.bom.gov.au./climate/data/index.shtml

BoM, Bureau of Meteorology. (2024b). *Groundwater dependent ecosystems atlas*. Bureau of Meterology.

Botanica. (2022). *Marble Bar Project: Reconnaissance and targeted flora assessment* [Unpublished report prepared for Lithium 1 Pty Ltd]. Botanica Consulting.

Doody, T. M., Barron, O. V., Dowsley, K., Emelyanova, I., Fawcett, J., Overton, I. C., Pritchard, J. L., Van Dijk, A. I. J. M., & Warren, G. (2017). Continental mapping of groundwater dependent ecosystems: A methodological framework to integrate diverse data and expert opinion. *Journal of Hydrology: Regional Studies*, *10*, 61-81.

DoW, Department of Water. (2010). *Pilbara Regional Water Plan 2010-2030*. Department of Water

Eamus, D., Froend, R., Loomes, R., Hose, G., & Murray, B. (2006). A functional methodology for determining the groundwater regime needed to maintain the health of groundwater-dependent vegetation. *Australian Journal of Botany*, *54*(2), Page 97-Page 114. https://doi.org/https://doi.org/10.1071/BT05031

Eamus, D., Fu, B., Springer, A. E., & Stevens, L. E. (2016). Groundwater dependent ecosystems: Classification, identification techniques and threats. In A. J. Jakeman, O. Barreteau, R. J. Hunt, J. D. Rinaudo, & A. Ross (Eds.), *Integrated Groundwater Management: Concepts, Approaches and Challenges* (pp. 313-346). Springer International Publishing. https://doi.org/10.1007/978-3-319-23576-9_13

Ecoscape. (2020). *McPhee Creek flora and vegetation survey* [Unpublished report prepared for Atlas Iron]. Ecoscape (Australia) Pty Ltd.

EPA, Environmental Protection Authority. (2016). *Technical guidance: Flora and vegetation surveys for environmental impact assessment*. Perth, Western Australia: Environmental Protection Authority

George, A. S., McKenzie, N. L., & Doughty, P. (2011-2015). *A Biodiversity Survey of the Pilbara Region of Western Australia 2002-2007* (Vol. 78). Western Australian Museum.

Hnatiuk, R. J., Thackway, R., & Walker, J. (2009). Vegetation. In The National Committee on Soil and Terrain (Ed.), *Australian Soil and Land Survey* (3rd ed.). CSIRO Publishing.

Kendrick, P., & McKenzie, N. L. (2003). Pilbara 1 (PIL1 - Chichester subregion). In J. E. May & N. L. McKenzie (Eds.), *A biodiversity audit of Western Australia's 53 biogeographic subregions in 2002* (pp. 547-558). Department of Conservation and Land Management.

Leighton, K. A. (2004). Climate. In A. M. E. van Vreeswyk, A. L. Payne, K. A. Leighton, & P. Hennig (Eds.), *An inventory and condition survey of the Pilbara region, Western Australia. Technical Bulletin No. 92*. Western Australian Department of Agriculture.

Mattiske. (2019). *Flora and vegetation assessment Woodie Woodie Minesite Expansion: Groundwater dependent ecosystems survey* (Unpublished report prepared for MBS Environmental, Issue.

McKenzie, N. L., van Leeuwen, S., & Pinder, A. M. (2009). Introduction to the Pilbara biodiversity survey, 2002-2007. *Records of the Western Australian Museum Supplement*, *78*, 3-89.

NVIS Technical Working Group. (2017). *Australian vegetation attribute manual: National vegetation information system, Version 7.0* (Department of the Environment and Energy, Ed.). Department of the Environment and Energy.

Plantecology. (2013). *Nullagine Iron Ore Joint Venture Project extension: Level 2 flora and vegetation survey* [Unpublished report prepared for BC Iron Ltd (BCI)]. Plantecology Consulting.

Rapallo. (2021). *Flora and vertebrate fauna assessment of the Moolyella Pipeline Corridor* [Unpublished report prepared for Calidus Resources Ltd]. Rapallo Environmental.

Specht, R. L., & Specht, A. (1999). *Australian plant communities: Dynamics of structure, growth and biodiversity*. Oxford University Press.

Strategen-JBS&G. (2020). *Roy Hill Consolidated Vegetation Report* (Unpublished report prepared for Roy Hill).

Thackway, R., & Cresswell, I. D. (1995). *An interim biogeographical regionalisation for Australia: A framework for setting priorities in the National Reserves System Cooperation Plan*. Australian Nature Conservation Agency.

Waters, A. (2017). *Vegetation of the MML Nullagine tenements* [Unpublished report prepared for Millennium Minerals Ltd]. Woodgis Environmental Assessment & Management, and Plantecology Consulting.

Woodgis. (2020). *Flora and vegetation of Beaton's Creek* [Unpublished report prepared for Novo Resources Corp.]. Woodgis Environmental Assessment & Management.

Woodman. (2016). *Corunna Downs project level 2 flora and vegetation assessment* (Unpublished report prepared for Atlas Iron Limited, Issue.

Woodman. (2019a). *Miralga Creek Iron Ore Project Desktop Review of Potential Groundwater Dependent Vegetation* (Unpublished report prepared for Atlas Iron, Issue.

Woodman. (2019b). *Miralga Creek Iron Ore Project detailed flora and vegetation survey* [Unpublished report prepared for Atlas Iron]. Woodman Environmental Consulting.

Woodman Environmental. (2019). *Corunna Downs Project: Assessment of Groundwater Drawdown Impacts to Vegetation* (Unpublished report prepared for Atlas Iron, Issue.

Appendix A: Riparian flora from the desktop assessment

		Reports used within the desktop assessment						
		Astron (2019)	Biologic (2019)	Botanica (2022)	Ecoscape (2020)	Mattiske (2019)	Novo - Woodgis (2020)	Plantecology (2013)
Stratum Level	**Taxa**							
Upper stratum (Trees)	*Acacia coriaceae* subsp. *pendens*		•		•	•	•	•
	Acacia sclerosperma						•	
	Atalaya hemiglauca		•		•	•	•	•
	Eucalyptus camaldulensis		•	•	•		•	•
	Eucalyptus victrix	•	•		•			•
	Ficus aculeata							
	Melaleuca argentea		•				•	
Upper-mid stratum (Shrubs)	*Acacia ampliceps*		•				•	•
	Adriana tomentosa							
	Melaleuca bracteata				•		•	
	Melaleuca glomerata		•	•	•		•	•
	Melaleuca linophylla		•					•
	Terminalia circumalata							
Mid-Lower stratum (Shrubs)	*Cullen leucanthum*		•		•	•		•
	Sesbania cannabina				•	•	•	•
Lower stratum (Herbs)	*Lobelia arnhemiaca*							
	Ludwigia perennis							
	Marselia exarata							
	Marselia hirsuta				•	•	•	•
	Stemodia grossa				•	•	•	•
	Stylidium fluminense					•		
	Wahlenbergia tumidifructa							•
Lower stratum (Sedges)	*Cyperus difformis*							•
	Cyperus iria						•	
	Cyperus ixiocarpus						•	
	Cyperus pulchellus							
	Cyperus vaginatus		•		•	•	•	•
	Fimbristylis microcarya							
	Schoenoplectus subulatus							
	Typha domingensis				•	•	•	
Lower stratum (Grasses)	*Eulalia aurea*							•
Lower stratum (Vine)	*Tinospora smilacina*					•	•	

		Reports used within the desktop assessment						
		Plantecology - Woodgis (2017)	Rapallo (2021)	Strategen-JBS&G (2020)	Woodman (2016)	Woodman (2018)	Woodman (2019a)	Woodman (2019b)
Stratum Level	**Taxa**							
Upper stratum (Trees)	*Acacia coriaceae* subsp. *pendens*	•		•	•			•
	Acacia sclerosperma			•				•
	Atalaya hemiglauca	•		•		•	•	•
	Eucalyptus camaldulensis	•	•	•	•	•	•	•
	Eucalyptus victrix	•		•	•	•	•	
	Ficus aculeata							•
	Melaleuca argentea		•				•	•
Upper-mid stratum (Shrubs)	*Acacia ampliceps*			•		•	•	•
	Adriana tomentosa			•				•
	Melaleuca bracteata	•						
	Melaleuca glomerata					•		•
	Melaleuca linophylla			•		•	•	•
	Terminalia circumalata							•
Mid-Lower stratum (Shrubs)	*Cullen leucanthum*							•
	Sesbania cannabina			•			•	•
Lower stratum (Herbs)	*Lobelia arnhemiaca*				•			•
	Ludwigia perennis							•
	Marselia exarata							
	Marselia hirsuta			•				•
	Stemodia grossa			•	•			•
	Stylidium fluminense							
	Wahlenbergia tumidifructa			•	•			
Lower stratum (Sedges)	*Cyperus difformis*				•			•
	Cyperus iria			•	•			•
	Cyperus ixiocarpus			•				•
	Cyperus pulchellus							•
	Cyperus vaginatus		•	•	•			•
	Fimbristylis microcarya			•				•
	Schoenoplectus subulatus					•		
	Typha domingensis			•		•		
Lower stratum (Grasses)	*Eulalia aurea*	•						•
Lower stratum (Vine)	*Tinospora smilacina*			•				•

Appendix B: Riparian vegetation and GDV identified through review of other reports

Report	Distance from Survey Area	Riparian/ GDV
Corunna Downs Project Level 2 Flora and Vegetation Assessment (Woodman, 2016)	Within	Five vegetation units considered to potentially be GDV based on presence of *Melaleuca argentea*, *Eucalyptus camaldulensis*, *Eucalyptus victrix*, *Melaleuca glomerata* and *Atalaya hemiglauca* (VT 3, 4, 8, 14 and 15).
Flora and Vertebrate Fauna Assessment of the Moolyella Pipeline Corridor Rapallo (2021)	17 km northeast	Four vegetation units which recorded GDV tree and shrub indicator taxa. Two of these are potentially GDV: • *Eucalyptus camaldulensis* and *Melaleuca argentea* open woodland with occasional *E. victrix* or *M. glomerata*; over mixed tall to medium shrubland dominated by *Acacia trachycarpa* and **Calotropis procera*; over mixed medium to low shrubs; over *Triodia longiceps* sparse hummock grassland; over *Cyperus vaginatus* sedges and **Cenchrus ciliaris* and/or **Chloris barbata* grasses (high groundwater dependency) • Mixed open woodland dominated by *Corymbia hamersleyana*, with *Eucalyptus victrix*, *E. camaldulensis*, *C. ferriticola* and *Atalaya hemiglauca*; over mixed open to sparse medium shrubland dominated by *Acacia eriopoda* with *Petalostylis labicheoides*, *A. pyrifolia*, *Cymbopogon ambiguus* and *Grevillea pyramidalis*; over *Triodia wiseana* sparse hummock grassland (low groundwater dependency)
Marble Bar Project Reconnaissance and Targeted Flora Assessment (Botanica, 2022)	~20 km northeast	One potential GDV vegetation unit: • *Eucalyptus camaldulensis* open woodland over *Grevillea pyramidalis*, *Melaleuca glomerata* and *Androcalva luteiflora* open shrubland over *Pluchea rubelliflora*, *Stemodia grossa* and *Polycarpaea longiflora* sparse herbland
Mt Webber Bore WEB0121 GDV Assessment Biologic (2019)	28.0 km west	Three GDV vegetation units: • Low *Melaleuca argentea* woodland (ranges from scattered to open to woodland) • Mid *Eucalyptus camaldulensis* subsp. *obtusa* dominated woodland (ranges from open to woodland) • Mid to low *Eucalyptus camaldulensis* subsp. *obtusa* and *Eucalyptus victrix* codominated woodland Two riparian vegetation units with lower reliance on groundwater: • Mid to low *Eucalyptus victrix* dominated woodland • Tall open *Acacia trachycarpa* shrubland

Report	Distance from Survey Area	Riparian/ GDV
Miralga Creek Iron Ore Project Detailed Flora and Vegetation Survey (Woodman, 2019b)	~35 km northwest	Three vegetation units occurring on drainage lines, with one likely to be GDV either fully or in part: • Mid to low woodland dominated by *Eucalyptus camaldulensis*, *Eucalyptus victrix*, *Melaleuca glomerata* and/or *Melaleuca argentea* over tall open shrubland of *Atalaya hemiglauca*, *Flueggea virosa* subsp. *melanthesoides* and *Acacia trachycarpa* over sparse low shrubland and grassland of mixed species, occasionally dominated by **Cenchrus ciliaris* on major drainage lines or rivers on brown sandy to clay loam with alluvial river stones
McPhee Creek Flora and Vegetation Survey (Ecoscape, 2020)	~45 km east-southeast	Four vegetation units described from drainage lines with one likely GDV vegetation unit: • *Eucalyptus camaldulensis* and *Eucalyptus victrix* mid woodland over *Acacia pyrifolia*, *Atalaya hemiglauca* and *Acacia trachycarpa* tall open shrubland over **Cenchrus ciliaris* and *Cyperus vaginata* low tussock grassland/sedgeland
Flora and Vegetation of Beatons Creek (Woodgis, 2020)	~60 km southeast	One vegetation type which may represent GDV was recorded: • *Eucalyptus camaldulensis*, *Melaleuca glomerata*, *Acacia coriacea* woodland over *Cyperus vaginatus*, *Typha domingensis* sedgeland
Nullagine Iron Ore Joint Venture Project Extension Level 2 Flora and Vegetation Survey (Plantecology, 2013)	~68 km south-southeast	Seven vegetation units occurring on drainage lines, of which the following two may be considered GDV: • *Eucalyptus camaldulensis* woodland over mixed shrubland over mixed **Cynodon dactylon* grassland/ *Typha domingensis* sedgeland • *Eucalyptus victrix* woodland over *Melaleuca* spp. high shrubland over mixed *Triodia epactia* hummock grassland/ **Cenchrus* spp. tussock grassland/ *Cyperus vaginatus* sedgeland
Millennium Minerals Limited Nullagine Gold Project – Vegetation of the MML Nullagine Tenements (Waters, 2017)	~72 km southeast	Ten drainage line vegetation units described, with one of these occurring on major creeklines. This unit likely has low groundwater dependence but may be considered GDV in some areas: • *Triodia angusta – Eucalyptus victrix* woodland with scattered *Eucalyptus camaldulensis*, *Acacia coriacea* subsp. *pendens*, *Melaleuca bracteata*, *Atalaya hemiglauca*, *Flueggea virosa* subsp. *melanthesoides*, *Gossypium robinsonii*

Report	Distance from Survey Area	Riparian/ GDV
Roy Hill Consolidated Vegetation Report (Strategen-JBS&G, 2020)	~105 km south	Nine vegetation units which recorded key phreatophytic flora. Four of these only contained scattered *Eucalyptus victrix* and would have low-negligible reliance on groundwater. The remaining five contained either *E. camaldulensis* or *E. victrix* in higher densities, and may potentially be GDV: • *Eucalyptus camaldulensis* subsp. *obtusa* mid-low isolated trees with *Eucalyptus victrix* and *Corymbia hamersleyana*, *Atalaya hemiglauca* and *Acacia coriacea* subsp. *pendens* over disturbed hummock grassland with *Triodia wiseana* and *T.* sp. Warrawagine (A.L. Payne PRP 1859) over understorey dominated by **Vachellia farnesiana* and **Cenchrus ciliaris* • Open forest to woodland of *Eucalyptus victrix* and *Acacia aptaneura* over mid to tall isolated shrubs of *A. tetragonophylla*, *A. sclerosperma* subsp. *sclerosperma* and *Eremophila youngii* subsp. *lepidota* over isolated mid hummock grasses of *Triodia angusta* over sparse mixed tussock grasses • *Eucalyptus victrix* and occasional patches of *Acacia aptaneura* low isolated trees over *Acacia sclerosperma* subsp. *sclerosperma*, **Vachellia farnesiana* and *Acacia tetragonophylla* mid to tall isolated shrubs over disturbed understorey dominated by **Malvastrum americanum* and **Cenchrus ciliaris*. • *Eucalyptus camaldulensis* subsp. *obtusa* and/or *E. victrix/Corymbia hamersleyana* open low forest to woodland over *Atalaya hemiglauca/Acacia pyrifolia* tall open shrubland over low open shrubs over **Cenchrus ciliaris* tussock grassland • *Eucalyptus victrix* open forest to woodland over *Acacia tetragonophylla*, *A. sclerosperma* subsp. *sclerosperma* and **Vachellia farnesiana* mid open shrubland over sparse mixed tussock grasses and herbs
Woodie Woodie Minesite Expansion Groundwater Dependent Ecosystem Survey Mattiske (2019)	~160 km southeast	This project did not involve vegetation mapping, but instead involved sampling 12 creekline transects to monitor GDV. These transects all contained a mixture of key phreatophytic flora, including *Melaleuca argentea*, *Eucalyptus camaldulensis*, *Eucalyptus victrix*, *Acacia coriacea* and *Atalaya hemiglauca*.
Bakers Syncline 19 Vegetation, Flora and Fauna Survey (Astron, 2019)	190 km south	Six vegetation units described from drainage lines, of which three contained woodland or open woodland of *Eucalyptus victrix*. These vegetation units did not contain any other key riparian flora taxa, and so likely have a negligible reliance on groundwater.

Appendix C: Sample site data

Atlas Sanjiv Ridge GDV **Site SRGR-001**

Date	10/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771132 mE;	7636515 mN
	119.6143 E	-21.353137 S
Veg Condition	Poor	
Soil	Clayey Sand	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca glomerata*, *Atalaya hemiglauca*, *Acacia ampliceps* tall open shrubland over **Cenchrus ciliaris* closed tussock grassland (on banks) with *Cyperus vaginatus* isolated clumps of sedges	
Notes	Water feature present, likely ephemeral	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	3	3.3	
Acacia coriacea subsp. *pendens*	0.1	2.5	
Acacia pyrifolia var. *pyrifolia*	0.1	1.5	
Ammannia baccifera	0.1	0.3	
Atalaya hemiglauca	2	4	
**Cenchrus ciliaris*	75	1	
Cyperus vaginatus	0.5	0.7	
Dactyloctenium radulans	0.1	0.2	
Ehretia saligna var. *saligna*	0.1	4.5	
Eucalyptus camaldulensis subsp. *refulgens*	8	14	
Melaleuca glomerata	3	3.5	
Pluchea dentex	0.1	0.1	
Sesbania cannabina	0.1	0.2	
Stemodia grossa	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-005**

Date	10/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771302 mE;	7636832 mN
	119.6159 E	-21.350259 S
Veg Condition	Very Good	
Soil	Sand	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Melaleuca glomerata, Acacia ampliceps, Acacia trachycarpa* tall sparse shrubland over *Schoenoplectus subulatus* (in pool) mid sparse sedgeland	
Notes	Perennial pool	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	1	4	
Acacia trachycarpa	0.5	3.5	
Cyperus vaginatus	0.1	0.3	
Eucalyptus camaldulensis subsp. *refulgens*	0.1	7	
Ficus brachypoda	0.1	3.5	
Flueggea virosa subsp. *melanthesoides*	0.1	1	SRG005.02
Heliotropium crispatum	0.1	0.3	SRGR005.06
Melaleuca glomerata	3	3	
Melaleuca linophylla	0.1	1.6	
**Physalis angulata*	0.1	0.3	SRGR005.05
Schoenoplectus subulatus	1	0.7	SRGR005.03
Sesbania cannabina	0.1	0.3	SRGR005.01
Stemodia grossa	0.1	0.1	
Terminalia circumalata	0.1	2.5	SRGR005.04

Atlas Sanjiv Ridge GDV **Site SRGR-006**

Date	10/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771053 mE;	7635492 mN
	119.6137 E	-21.362388 S
Veg Condition	Very Good	
Soil	Clayey Sand	
Rock Type	Dolerite	
Fire Age	>10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland (with isolated *Melaleuca argentea* trees) over *Melaleuca glomerata, Acacia ampliceps, Acacia coriacea* subsp. *pendens, Atalaya hemiglauca* tall shrubland over *Cyperus vaginatus* mid sedgeland (on banks) over **Cenchrus ciliaris* isolated clumps of tussock grasses (on banks/islands)	
Notes	Due to presence of mature *Melaleuca argentea* (although infrequent) pool is likely to be perennial /somewhat permanent. Appears to be about 2-3/4m deep at the moment	

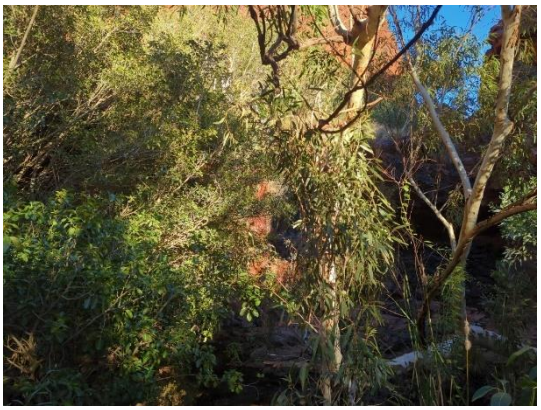
Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	5	6	
Acacia coriacea subsp. *pendens*	0.5	5	
Acacia pyrifolia var. *pyrifolia*	0.1		
Afrohybanthus aurantiacus	0.1		
Ammannia multiflora	0.1		
Atalaya hemiglauca	0.2	4.5	
**Cenchrus ciliaris*	2	0.6	
Cullen leucanthum	0.1	0.5	15
Cyperus vaginatus	12	0.8	
Duperreya commixta	0.1		
Eragrostis tenellula	0.1		
Eriachne benthamii	0.1	SRGR007.01	
Eucalyptus camaldulensis subsp. *refulgens*	25	12	
Eucalyptus victrix	0.2	14	
Euphorbia biconvexa	0.1		
Euphorbia careyi	0.1		
Flueggea virosa subsp. *melanthesoides*	0.1		
Melaleuca argentea	0.4	12	
Melaleuca glomerata	15	5.5	
Melaleuca linophylla	0.2	3	
Nellica maderaspatensis	0.1		
Pluchea rubelliflora	0.1		
Polymeria ambigua	0.1		
Potamogeton tepperi	0.1	0	
Rhynchosia minima	0.1		
Sesbania cannabina	0.1		
Stemodia grossa	0.1		

Atlas Sanjiv Ridge GDV **Site SRGR-007**

Date	10/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771190 mE;	7637030 mN
	119.6148 E	-21.348488 S
Veg Condition	Good	
Soil	Sandy Clay Loam	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca glomerata* tall sparse to open shrubland over **Cenchrus ciliaris* tussock grassland (on banks) with *Schoenoplectus subulatus* (in pools), *Cyperus vaginatus* isolated clumps of sedges	
Notes	Permanent pool, up to approx. 1m	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	1.5	
Acacia pyrifolia var. *pyrifolia*	0.1	1.7	
Arivela viscosa	0.1	0.2	
Atalaya hemiglauca	0.1	5	
**Calotropis procera*	0.1	1.6	5
Cyperus vaginatus	0.1	0.5	
Eriachne benthamii	0.1	0.5	SRGR007.01
Eucalyptus camaldulensis subsp. *refulgens*	1	8	
Melaleuca glomerata	6	2.5	
Potamogeton tepperi	0.1	0.1	
Schoenoplectus subulatus	1	0.5	SRGR005.03
Sesbania cannabina	0.1	0.1	
Stemodia grossa	0.1	0.2	
Terminalia circumalata	0.1	3.5	SRGR005.04

Atlas Sanjiv Ridge GDV **Site SRGR-009**



Date 11/06/2024
Described by Kelby Jennings, Emma Marsh
Type Releve
Location MGA Zone 50
776817 mE; 7623724 mN
119.6712 E -21.467725 S
Veg Condition Very Good
Soil Sandy Clay Loam
Rock Type Ironstone
Fire Age 5-10 yrs
Habitat Medium Drainage Line
Vegetation *Eucalyptus camaldulensis* subsp. *refulgens*, *Melaleuca argentea*, *Ficus brachypoda* open woodland over *Acacia colei* var. *ileocarpa*, *Acacia tumida* var. *pilbarensis* tall open shrubland over *Triodia epactia* isolated hummock grasses with *Themeda* sp. indet isolated tussock grasses with **Passiflora foetida* open vineland
Notes Permanent pool, flowing water. Perched wetland above pool, contains short but mature *Melaleuca argentea*.

Site Taxa	Cover (%)	Height (m)	Specimen #
Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)	0.1	1.3	
Acacia citrinoviridis	0.1	4	
Acacia colei var. *ileocarpa*	3	4	
Acacia pyrifolia var. *pyrifolia*	0.1	2	
Acacia tumida var. *pilbarensis*	0.5	2.5	
Adriana tomentosa var. *tomentosa*	0.1	1.1	
Atalaya hemiglauca	0.1	2.2	
**Cenchrus ciliaris*	0.1	0.3	3
Cucumis variabilis	0.1	0.1	
Cyperus hesperius	0.1	0.3	
Cyperus vaginatus	0.1	0.9	
Dodonaea lanceolata var. *lanceolata*	0.1	1.4	
Eleocharis geniculata	0.1	0.2	
Eriachne mucronata	0.1	0.2	
Eucalyptus camaldulensis subsp. *refulgens*	7	12	
Ficus brachypoda	0.5	6.5	
Lobelia arnhemiaca	0.5	0.1	
Melaleuca argentea	1	10	
**Passiflora foetida* var. *hispida*	8	0.1	
**Physalis angulata*	0.1	0.7	SRGR005.05
Pluchea rubelliflora	0.1	0.4	
Rhynchosia minima	0.1	0.1	
Stemodia grossa	0.1	0.8	
Themeda sp.	1	0.7	SRGR009.01
Tinospora smilacina	0.1	0.1	
Triodia epactia	0.5	0.4	
Typha domingensis	0.1	1.2	

Atlas Sanjiv Ridge GDV **Site SRGR-010**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	777469 mE;	7629438 mN
	119.6765 E	-21.416055 S
Veg Condition	Excellent	
Soil	Silty Clay Loam	
Rock Type	Ironstone	
Fire Age	>10 yrs	
Habitat	Gully	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus leucophloia* subsp. *leucophloia* low isolated trees over *Terminalia circumalata, Acacia tumida* var. *pilbarense* tall open shrubland over *Themeda* sp. indet, *Cymbopogon ambiguus*, *Eriachne mucronata* low isolated tussock grasses	

Site Taxa	Cover (%)	Height (m)	Specimen #
Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)	0.1	0.9	
Acacia pruinocarpa	0.1	2.5	
Acacia pyrifolia var. *pyrifolia*	0.1	1.5	
Acacia tumida var. *pilbarensis*	0.2	3.5	
Atalaya hemiglauca	0.2	2.5	
Cymbopogon ambiguus	0.1	0.5	
Cyperus hesperius	0.1	0.3	
Eriachne mucronata	1	0.2	
Eucalyptus camaldulensis subsp. *refulgens*	0.2	10	
Eucalyptus leucophloia subsp. *leucophloia*	0.2	8	
Euphorbia trigonosperma	0.1	0.2	
Ficus brachypoda	0.5	4.5	
Stemodia grossa	0.1	0.3	
Terminalia circumalata	12	8	
Themeda sp.	0.5	1	
Tinospora smilacina	0.1	0	
Trachymene oleracea subsp. *oleracea*	0.1	0.23	
Triodia epactia	0.1	0.4	

Atlas Sanjiv Ridge GDV **Site SRGR-013**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	778590 mE;	7630042 mN
	119.6872 E	-21.410423 S
Veg Condition	Very Good	
Soil	Sandy Clay Loam	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Gully	
Vegetation	*Terminalia circumalata* low open woodland over *Acacia colei* var. *ileocarpa*, *Atalaya hemiglauca* tall shrubland over *Typha domingensis, Cyperus vaginatus* tall to mid sedgeland with **Passiflora foetida* open vineland	
Notes	Small permanent pool with impermeable rocky bed.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia colei var. *ileocarpa*	10	4.5	
Acacia monticola	0.1	2.5	
Atalaya hemiglauca	0.5	4	
Cyperus vaginatus	10	1	
Eleocharis geniculata	0.1	0.2	
Eriachne benthamii	0.1	0.2	SRGR007.01
Grevillea wickhamii	0.1	4.5	
**Passiflora foetida* var. *hispida*	3	0.1	
Schoenoplectus subulatus	0.1	1.6	SRGR005.03
Stemodia grossa	0.1	0.7	
Terminalia circumalata	15	6	SRGM003.01
Typha domingensis	12	1.8	

Atlas Sanjiv Ridge GDV **Site SRGR-014**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	781121 mE;	7642159 mN
	119.7096 E	-21.300674 S
Veg Condition	Very Good	
Soil	Silty Clay Loam	
Rock Type	Ironstone	
Fire Age	>10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Melaleuca argentea*, *Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Acacia coriacea* subsp. *pendens* tall isolated shrubs over *Cyperus vaginatus* mid isolated clumps of sedges	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.5	4.5	
Alternanthera nana	0.1	0.1	
Ammannia multiflora	0.1	0.1	
Atalaya hemiglauca	0.1	1.5	
**Cenchrus ciliaris*	0.2	0.2	
Cyperus blakeanus	0.1	0.1	
Cyperus vaginatus	1.5	1.2	
Eragrostis tenellula	0.1	0.2	
Eucalyptus camaldulensis subsp. *refulgens*	2	14	
Melaleuca argentea	11	12	
Potamogeton tepperi	0.1	0	

Atlas Sanjiv Ridge GDV **Site SRGR-015**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	777077 mE;	7629027 mN
	119.6728 E	-21.419823 S
Veg Condition	Excellent	
Soil	Sandy Clay Loam	
Rock Type	Ironstone	
Fire Age	1-2 yrs	
Habitat	Gully	
Vegetation	*Melaleuca argentea, Eucalyptus camaldulensis* subsp. refulgens low open woodland over *Acacia colei* var. *ileocarpa*, *Acacia tumida* var. *pilbarensis* tall open shrubland over *Eleocharis geniculata*, *Cyperus vaginatus* low to mid open sedgeland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia colei var. *ileocarpa*	6	4	
Acacia tumida var. *pilbarensis*	2	4	
Ammannia multiflora	0.1	0.2	
Atalaya hemiglauca	0.1	1	
Cajanus pubescens	0.1	1	SRGR015.01
Cyperus blakeanus	0.1	0.2	
Cyperus cunninghamii subsp. *cunninghamii*	0.1	0.2	
Cyperus hesperius	0.1	0.3	
Cyperus vaginatus	0.5	0.5	
Eleocharis geniculata	3	0.2	
Eragrostis speciosa	0.5	0.7	SRGR015.02
Eriachne mucronata	0.1	0.3	
Eucalyptus camaldulensis subsp. *refulgens*	1	10	
Eucalyptus leucophloia subsp. *leucophloia*	0.1	0.6	
Ficus brachypoda	0.1	2	
Grevillea wickhamii	0.1	1	
Lobelia arnhemiaca	0.1	0.1	
Melaleuca argentea	7	10	
Solanum horridum	0	0.2	SRGR015.03
Stemodia grossa	0.1	0.6	
Themeda sp.	0.1	0.5	SRGR009.01
Themeda triandra	0.1	0.4	
Tinospora smilacina	0.1	0.1	
Typha domingensis	0.1	1.1	

Atlas Sanjiv Ridge GDV **Site SRGR-019**

Date	11/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Releve
Location	MGA Zone 50
	776567 mE; 7629097 mN
	119.6679 E -21.419270 S
Veg Condition	Excellent
Soil	Sandy Clay Loam
Rock Type	Basalt
Fire Age	5-10 yrs
Habitat	Gully
Vegetation	*Acacia monticola* tall isolated shrubs over *Eriachne mucronata* low isolated tussock grasses with *Triodia epactia* isolated hummock grasses
Notes	Water present but standing still, very low inflow

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia monticola	0.1	4.5	
Acacia tumida var. *pilbarensis*	0.1	2.5	
Arivela viscosa	0.1	0.2	
Cymbopogon ambiguus	0.1	0.7	
Cyperus cunninghamii subsp. *cunninghamii*	0.1	0.2	
Cyperus hesperius	0.1	0.2	
Eragrostis cumingii	0.1	0.3	
Eragrostis tenellula	0.1	0.4	
Eriachne lanata	0.1	0.1	
Eriachne mucronata	1	0.3	
Eucalyptus leucophloia subsp. *leucophloia*	0.1	1.3	
Fimbristylis dichotoma	0.1	0.2	
Pluchea dentex	0.1	0.3	
Stemodia grossa	0.1	0.7	
Tephrosia densa	0.1	0.3	
Trachymene oleracea subsp. *oleracea*	0.1	0.1	
Trichodesma zeylanicum var. *zeylanicum*	0.1	0.7	
Triodia epactia	1	0.5	

Atlas Sanjiv Ridge GDV **Site SRGR-020**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	781067 mE;	7641939 mN
	119.7091 E	-21.302674 S
Veg Condition	Very Good	
Soil	Clayey Sand	
Rock Type		
Fire Age	>10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* (+/- *Melaleuca argentea*) mid isolated trees over *Melaleuca glomerata, Acacia pyrifolia* var. *pyrifolia*, *Acacia trachycarpa* mid-tall open shrubland over **Cenchrus ciliaris* low isolated clumps of tussock	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia pyrifolia var. *pyrifolia*	0.5	2.5	
Acacia trachycarpa	0.3	3.2	
Arivela viscosa	0.1	0.2	
Atalaya hemiglauca	0.1	1.5	
**Cenchrus ciliaris*	1	0.4	
Corchorus parviflorus	0.1	0.8	
Eucalyptus camaldulensis subsp. *refulgens*	0.5	12	
Melaleuca argentea	0.1	10	
Melaleuca glomerata	16	3	
Petalostylis labicheoides	0.1	1.6	

Atlas Sanjiv Ridge GDV **Site SRGR-021**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	781098 mE;	7642284 mN
	119.7094 E	-21.299552 S
Veg Condition	Good	
Soil	Silty Loam	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Melaleuca argentea* woodland over *Cyperus vaginatus, Schoenoplectus subulatus* mid open sedgeland	
Notes	Large pool, approx. 500m X 50m at location. Silty bed, approx. 1.5m deep at location. Many aquatic plants.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	0.3	
Alternanthera nodiflora	0.1	0.1	SRGR021.01
Ammannia multiflora	0.1	0.1	
Atalaya hemiglauca	0.1	3.1	
**Cenchrus ciliaris*	0.1	0.1	
**Cynodon dactylon*	1	0.1	
Cyperus blakeanus	0.1	0.2	
Cyperus vaginatus	8	0.8	
Eragrostis tenellula	0.1	0.1	
Eucalyptus camaldulensis subsp. *refulgens*	20	11	
Marsilea hirsuta	0.1	0.1	
Melaleuca argentea	1	7	
Melaleuca glomerata	0.1	4.5	
Melaleuca linophylla	0.1	2.2	
Pluchea rubelliflora	0.1	0.1	
Potamogeton tepperi	2	0.1	
Schoenoplectus subulatus	2	1.6	SRGR005.03
Wahlenbergia tumidifructa	0.1	0.1	SRGR021.02

Atlas Sanjiv Ridge GDV **Site SRGR-024**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	780977 mE;	7641828 mN
	119.7083 E	-21.303687 S
Veg Condition	Very Good	
Soil	Clayey Sand	
Rock Type		
Fire Age	>10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Melaleuca argentea, Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca glomerata, Melaleuca linophylla* tall open shrubland over *Schoenoplectus subulatus*, *Cyperus vaginatus* mid isolated sedges	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	1.5	
Acacia coriacea subsp. *pendens*	0.1	1.8	
Ammannia baccifera	0.1	0.2	
Atalaya hemiglauca	0.1	2	
**Cenchrus ciliaris*	0.1	0.4	
Cyperus blakeanus	0.1	0.3	
Cyperus vaginatus	3	0.5	
Eleocharis geniculata	0.1	0.3	
Eragrostis tenellula	0.1	0.4	
Eriachne helmsii	0.1	0.4	
Eucalyptus camaldulensis subsp. *refulgens*	14	11	
Marsilea exarata	0.1	0.1	SRGR024.01
Melaleuca argentea	17	12	
Melaleuca glomerata	18	2.1	
Melaleuca linophylla	12	2.3	
Pluchea dentex	0.1	0.2	
Schoenoplectus subulatus	2.5	0.5	
Sesbania cannabina	0.1	0.8	

Atlas Sanjiv Ridge GDV **Site SRGR-025**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	781047 mE;	7642201 mN
	119.7089 E	-21.300311 S
Veg Condition	Poor	
Soil	Sandy Clay Loam	
Rock Type	None Discernible	
Fire Age	5-10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* mid woodland over *Melaleuca glomerata, Atalaya hemiglauca* tall open shrubland over **Cenchrus ciliaris* mid open tussock grassland over **Cynodon dactylon* low open grassland	
Notes	Island in river channel, between pool and floodplain.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Atalaya hemiglauca	1	3.5	
**Cenchrus ciliaris*	14	0.6	
**Cenchrus setiger*	0.1	0.1	
**Cynodon dactylon*	5	0.1	
Cyperus vaginatus	0.1	0.4	
Dichrostachys spicata	0.1	1.3	
Eucalyptus camaldulensis subsp. *refulgens*	20	12	
Eucalyptus victrix	2	8	
Gossypium australe	0.1	0.6	SRGR025.01
Melaleuca glomerata	10	2.5	
Nellica maderaspatensis	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-030**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	780935 mE;	7641484 mN
	119.7079 E	-21.306794 S
Veg Condition	Very Good	
Soil	Clayey Sand	
Rock Type		
Fire Age	>10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Melaleuca argentea, Eucalyptus victrix* (occasional *Eucalyptus camaldulensis* subsp. *refulgens*) mid open woodland over *Melaleuca linophylla*, *Acacia coriacea*, *Melaleuca glomerata* tall shrubland over *Cyperus vaginatus* mid sparse sedgeland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	1	3	
Cyperus vaginatus	2	0.9	
Eucalyptus camaldulensis subsp. *refulgens*	0.2	12	
Eucalyptus victrix	2	12	
Melaleuca argentea	15	11	
Melaleuca glomerata	0.5	3	
Sesbania cannabina	0.1	0.5	

Atlas Sanjiv Ridge GDV **Site SRGR-031**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	781264 mE;	7641458 mN
	119.7111 E	-21.306982 S
Veg Condition	Poor	
Soil	Sand	
Rock Type	None Discernible	
Fire Age	5-10 yrs	
Habitat	Major Drainage Line	

Vegetation *Eucalyptus victrix* low open woodland over *Acacia trachycarpa, Petalostylis labicheoides, Atalaya hemiglauca* tall open shrubland over **Cenchrus ciliaris*, open tussock grassland with *Cyperus vaginatus* isolated sedges with *Triodia longiceps* tall isolated clumps of hummock grasses

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.1	1.7	
Acacia pyrifolia var. *pyrifolia*	0.1	2.1	
Acacia trachycarpa	2.5	3.5	
**Aerva javanica*	0.1	0.6	
Afrohybanthus aurantiacus	0.1	0.2	
Arivela viscosa	0.1	0.2	
Atalaya hemiglauca	0.5	3.5	
**Calotropis procera*	0.1	1.6	
**Cenchrus ciliaris*	25	0.6	
Corchorus crozophorifolius	0.1	0.5	
Crotalaria novae-hollandiae	0.1	1.3	SRGM003.02
Cyperus vaginatus	0.5	0.6	
Eucalyptus victrix	5	10	
Euphorbia coghlanii	0.5	0.1	
Euphorbia sp. Indet	0.1	0.1	
Petalostylis labicheoides	*1*	*3.2*	
Triodia longiceps	*5*	*1.5*	

Atlas Sanjiv Ridge GDV **Site SRGR-033**

Date	11/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	781192 mE;	7641376 mN
	119.7104 E	-21.307736 S
Veg Condition	Very Good	
Soil	Sand	
Rock Type		
Fire Age	5-10 yrs	
Habitat	Major Drainage Line	
Vegetation	Eucalyptus camaldulensis, Eucalyptus victrix isolated trees over Melaleuca glomerata, Acacia trachycarpa tall open shrubland over Triodia longiceps tall isolated hummock grasses over *Cenchrus ciliaris mid sparse tussock grassland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia pyrifolia var. *pyrifolia*	0.1	1.8	
Acacia trachycarpa	1	3	
Arivela viscosa	0.1	0.8	
Atalaya hemiglauca	0.1	1.6	
**Cenchrus ciliaris*	1	0.4	
Eucalyptus camaldulensis subsp. *refulgens*	0.5	11	
Eucalyptus victrix	0.5	7	
Euphorbia coghlanii	0.1	0.1	
Melaleuca glomerata	15	2.5	
Triodia longiceps	1	0.6	

Atlas Sanjiv Ridge GDV **Site SRGR-034**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	775036 mE;	7632604 mN
	119.6526 E	-21.387854 S
Veg Condition	Excellent	
Soil		
Rock Type	Banded ironstone	
Fire Age	>10 yrs	
Habitat	Gully	
Vegetation	*Eucalyptus leucophloia* subsp. *leucophloia* low isolated trees over *Eriachne mucronata* low isolated grasses with *Cyperus cunninghamii* subsp. *cunninghamii* low isolated sedges	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia tumida var. *pilbarensis*	0.1	1	
Atalaya hemiglauca	0.1	1.6	
Cymbopogon ambiguus	0.1	0.5	
Cyperus cunninghamii subsp. *cunninghamii*	0.1	0.3	
Eriachne mucronata	0.1	0.3	
Eucalyptus leucophloia subsp. *leucophloia*	0.5	6	

Atlas Sanjiv Ridge GDV **Site SRGR-036**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	775159 mE;	7632642 mN
	119.6537 E	-21.387493 S
Veg Condition	Excellent	
Soil	Clay Loam	
Rock Type	Basalt,Banded ironstone	
Fire Age	>10 yrs	
Habitat	Gully	
Vegetation	*Melaleuca argentea*, *Eucalyptus camaldulensis* subsp. *refulgens* low-mid open woodland over *Acacia colei* var. *ileocarpa*, *Adriana tomentosa*, *Flueggea virosa* tall shrubland over *Imperata cylindrica* mid tussock grassland with *Typha domingensis* tall isolated sedges	
Notes	Permanent pool. Flowing water in a deeply incised gully with cliff/very steep faces	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia colei var. *ileocarpa*	6	5	
Acacia pyrifolia var. *pyrifolia*	0.1	1.2	
Adriana tomentosa var. *tomentosa*	20	3.5	
Atalaya hemiglauca	0.1	4	
Cajanus pubescens	0.1	1	SRGR015.01
Cucumis variabilis	0.1	0	
Eleocharis geniculata	0.1	0.2	
Eriachne mucronata	0.1	0.3	
Eucalyptus camaldulensis subsp. *refulgens*	2	13	
Ficus brachypoda	0.1	0.5	
Flueggea virosa subsp. *melanthesoides*	2	3.5	
Imperata cylindrica	32	1	
Melaleuca argentea	8	12	
Senna venusta	0.1	1	
Typha domingensis	1	1.5	

Atlas Sanjiv Ridge GDV **Site SRGR-037**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	77525 mE;	7632670 mN
	119.6547 E	-21.387221 S
Veg Condition	Excellent	
Soil	Sandy Clay Loam	
Rock Type	Ironstone	
Fire Age	3-5 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Melaleuca argentea, Eucalyptus camaldulensis* subsp. *refulgens* woodland over *Acacia colei* var. *ileocarpa* tall isolated shrubs over *Adriana tomentosa* var. *tomentosa* mid clumps of shrubs over *Themeda* sp. indet mid open tussock grassland with *Typha domingensis*, *Eleocharis geniculata* low to mid open sedgeland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia colei var. *ileocarpa*	0.5	4	
Acacia pyrifolia var. *pyrifolia*	0.1	1	
Adriana tomentosa var. *tomentosa*	3	1.7	
Atalaya hemiglauca	0.1	0.5	
Cajanus pubescens	1	1.6	SRGR015.01
Cyperus hesperius	0.1	0.3	
Eleocharis geniculata	4	0.3	
Eucalyptus camaldulensis subsp. *refulgens*	15	14	
Ficus brachypoda	0.1	1.2	
Melaleuca argentea	22	11	
Themeda sp.	20	0.6	SRGR009.01
Typha domingensis	20	1.7	

Atlas Sanjiv Ridge GDV **Site SRGR-045**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	776052 mE;	7632422 mN
	119.6624 E	-21.389338 S
Veg Condition	Excellent	
Soil	Sandy Clay Loam	
Rock Type	Ironstone	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Terminalia circumalata, Eucalyptus victrix* low woodland over *Atalaya hemiglauca* tall isolated shrubs over *Eriachne mucronata*, *Themeda* sp. indet, *Cymbopogon ambiguus* low sparse tussock grassland with *Triodia epactia* low isolated hummock grasses	
Notes	Deep pool but likely ephemeral due to impermeable bed.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.1	2.5	
Atalaya hemiglauca	1	4	
Cymbopogon ambiguus	0.5	0.4	
Eriachne mucronata	1	0.3	
Eucalyptus victrix	0.5	8	
Terminalia circumalata	30	9	SRGM003.01
Themeda sp.	1	0.5	SRGR009.01
Triodia epactia	0.5	0.4	

Atlas Sanjiv Ridge GDV **Site SRGR-048**

Date	12/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Releve
Location	MGA Zone 50
	775735 mE; 7632980 mN
	119.6592 E -21.384346 S
Veg Condition	Excellent
Soil	Silty Clay Loam
Rock Type	Ironstone,Basalt
Fire Age	>10 yrs
Habitat	Medium Drainage Line
Vegetation	*Eucalyptus victrix* mid open woodland to isolated trees over *Terminalia circumalata*, *Melaleuca glomerata* tall open shrubland over *Cyperus vaginatus* mid isolated sedges
Notes	Pool appears to be perennial

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.1	4	
Acacia pyrifolia var. *pyrifolia*	0.3	2.2	
Ammannia multiflora	0.1	0.3	
Atalaya hemiglauca	0.1	8	
Cymbopogon ambiguus	0.1	0.4	
Cyperus vaginatus	0.5	1	
Ehretia saligna var. *saligna*	0.1	5.5	
Eragrostis speciosa	0.1	0.6	SRGR015.02
Eriachne mucronata	0.1	0.2	
Eucalyptus victrix	2.5	12	
Flueggea virosa subsp. *melanthesoides*	0.1	1.3	
Melaleuca glomerata	4.5	5	
Pluchea dentex	0.1	0.3	
Schoenoplectus subulatus	0.1	0.8	
Sesbania cannabina	0.1	1.8	
Terminalia circumalata	10	8	
Themeda sp.	0.1	0.8	SRGR009.01
Triodia epactia	0.1	0.4	

Atlas Sanjiv Ridge GDV **Site SRGR-052**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	772753 mE;	7631759 mN
	119.6307 E	-21.395819 S
Veg Condition	Very Good	
Soil	Silty Clay Loam	
Rock Type	Ironstone	
Fire Age	>10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus victrix*, *Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca linophylla, Melaleuca glomerata* tall open shrubland over **Cenchrus ciliaris* mid isolated clumps of tussock grasses	
Notes	Pool wide, approximately 1m deep, likely perennial pool.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	2	
Atalaya hemiglauca	0.1	5	
**Cenchrus ciliaris*	1.5	0.5	
Cyperus vaginatus	0.2	0.5	
Ehretia saligna var. *saligna*	0.1	1.4	
Eragrostis tenellula	0.1	0.2	
Eriachne mucronata	0.1	0.3	
Eucalyptus camaldulensis subsp. *refulgens*	2	14	
Eucalyptus victrix	3	12	
Ficus brachypoda	0.1	1.2	
Flueggea virosa subsp. *melanthesoides*	0.1	1.8	
Marsilea exarata	0.1	0.2	SRGR024.01
Melaleuca glomerata	10	4	
Melaleuca linophylla	15	3	
Stemodia grossa	0.1	0.2	
Themeda sp.	0.1	0.8	SRGR009.01

Atlas Sanjiv Ridge GDV **Site** **SRGR-054**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	772482 mE;	7631829 mN
	119.6281 E	-21.395229 S
Veg Condition	Good	
Soil	Sandy Clay Loam	
Rock Type		
Fire Age	>10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* mid open woodland over *Melaleuca glomerata, Atalaya hemiglauca, Melaleuca linophylla* tall open shrubland over **Cenchrus ciliaris* mid tussock grassland (on banks) with *Cyperus vaginatus* mid sparse sedgeland (on banks)	
Notes	Pool is likely perennial, large (250m long by 50m wide), no movement, murky - possibly up to 2m in depth.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	2	
Acacia colei var. *ileocarpa*	0.1	1.5	
Acacia coriacea subsp. *pendens*	0.1	6	
Acacia pyrifolia var. *pyrifolia*	0.1	2	
Atalaya hemiglauca	5	5.5	
**Cenchrus ciliaris*	18	0.5	
Cyperus vaginatus	1	0.8	
Eucalyptus camaldulensis subsp. *refulgens*	5.5	15	
Eucalyptus victrix	1.5	13	
Flueggea virosa subsp. *melanthesoides*	0.1	1.5	
Melaleuca glomerata	8	5	
Melaleuca linophylla	2	2.2	
Stemodia grossa	0.1	0.2	
Themeda sp. indet	0.1	0.9	SRGR009.01

Atlas Sanjiv Ridge GDV **Site SRGR-055**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	773511 mE;	7623885 mN
	119.6393 E	-21.466776 S
Veg Condition	Good	
Soil	Sandy Loam	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus victrix* low open woodland over *Melaleuca glomerata, Melaleuca linophylla* tall shrubland over *Cyperus vaginatus* mid open sedgeland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	2.3	
Acacia coriacea subsp. *pendens*	0.1	9	
Acacia pyrifolia var. *pyrifolia*	0.1	1.8	
**Cenchrus ciliaris*	0.1	0.3	
Cyperus vaginatus	12	0.8	
Eucalyptus victrix	15	8	
**Flaveria trinervia*	0.1	0.1	
Melaleuca glomerata	35	4.5	
Melaleuca linophylla	0.5	4	
Schoenoplectus subulatus	0.1	0.3	SRGR005.03
**Vachellia farnesiana* var. *farnesiana*	0.1	0.8	

Atlas Sanjiv Ridge GDV **Site SRGR-061**

Date	12/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Releve
Location	MGA Zone 50
	771503 mE; 7633028 mN
	119.6184 E -21.384562 S
Veg Condition	Good
Soil	Sandy Clay Loam
Rock Type	Basalt
Fire Age	5-10 yrs
Habitat	Medium Drainage Line
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* open woodland over *Atalaya hemiglauca, Acacia trachycarpa* tall sparse shrubland over *Cyperus vaginatus* open sedgeland with **Cenchrus ciliaris* open tussock grassland
Notes	Large pool, likely permanent

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	2	
Acacia pyrifolia var. *pyrifolia*	0.1	0.6	
Acacia trachycarpa	5	2.5	
Atalaya hemiglauca	4	3	
**Cenchrus ciliaris*	25	0.1	
Chrysopogon fallax	0.1	0.4	
Cyperus vaginatus	10	0.8	
Eucalyptus camaldulensis subsp. *refulgens*	15	14	
Eucalyptus victrix	5	12	
Melaleuca glomerata	0.1	5	
Triodia epactia	0.1	0.4	
**Vachellia farnesiana* var. *farnesiana*	0.1	1.9	

Atlas Sanjiv Ridge GDV **Site SRGR-062**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771602 mE;	7632367 mN
	119.6195 E	-21.390510 S
Veg Condition	Very Good	
Soil	Silty Clay Loam	
Rock Type		
Fire Age	>10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca glomerata*, *Atalaya hemiglauca, Acacia coriacea* subsp. *pendens* tall open shrubland (on banks) over *Cyperus vaginatus, Schoenoplectus subulatus* isolated clumps of sedges	
Notes	Long narrow pool, approximately 3m deep, some water seepage and movement. Appears to be perennial.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.5	5	
Ammannia multiflora	0.1	0.1	
Atalaya hemiglauca	2	4	
**Cenchrus ciliaris*	1	0.2	
Cyperus vaginatus	1	0.9	
Eragrostis cumingii	0.1	0.2	
Eragrostis tenellula	0.1	0.3	
Eucalyptus camaldulensis subsp. *refulgens*	8	15	
Fimbristylis microcarya	0.1	0.2	
Melaleuca glomerata	9	4.5	
Melaleuca linophylla	2	3	
Pluchea rubelliflora	0.1	0.2	
Schoenoplectus subulatus	0.5	1.2	
Stemodia grossa	0.1	0.3	

Atlas Sanjiv Ridge GDV **Site SRGR-064**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771046 mE;	7637690 mN
	119.6133 E	-21.342549 S
Veg Condition	Excellent	
Soil	Sandy Clay Loam	
Rock Type	Basalt	
Fire Age	>10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca glomerata, Acacia ampliceps, Ehretia saligna* var. *saligna* tall open shrubland over *Schoenoplectus subulatus*, *Cyperus vaginatus* mid-tall open sedgeland	
Notes	Clear pool (3-5m) definitely at least perennial, water flowing	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	2	3	
Ammannia multiflora	0.1	0.3	
Atalaya hemiglauca	0.2	4.5	
Cyperus vaginatus	4	1	
Ehretia saligna var. *saligna*	2	1.3	
Eucalyptus camaldulensis subsp. *refulgens*	7	12	
Melaleuca glomerata	6	3	
Potamogeton tepperi	0.1	0	
Schoenoplectus subulatus	6	1.2	
Stemodia grossa	0.1	0.2	

Atlas Sanjiv Ridge GDV **Site SRGR-065**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771788 mE;	7633452 mN
	119.6211 E	-21.380693 S
Veg Condition	Good	
Soil	Sand	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Melaleuca glomerata, Melaleuca linophylla* tall open shrubland over **Cenchrus ciliaris, Eriachne benthamii* low open tussock grassland with *Cyperus vaginatus* low isolated sedges	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	2.3	
Arivela viscosa	0.1	0.3	
Boerhavia coccinea	0.1	0.1	
**Cenchrus ciliaris*	2	0.6	
Cyperus vaginatus	0.5	0.7	
Eriachne benthamii	0.5	0.5	SRGR007.01
Euphorbia australis var. *subtomentosa*	0.1	0.1	SRGR065.01
Melaleuca glomerata	15	4.5	
Melaleuca linophylla	2	4	
Nellica maderaspatensis	0.1	0.1	
Sesbania cannabina	0.1	0.7	SRGR005.01

Atlas Sanjiv Ridge GDV **Site SRGR-067**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771606 mE;	7633247 mN
	119.6194 E	-21.382568 S
Veg Condition	Very Good	
Soil	Sandy Clay Loam	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* open woodland over *Acacia trachycarpa, Atalaya hemiglauca, Acacia ampliceps* tall open shrubland over *Cyperus vaginatus* open sedgeland with *Eriachne benthamii* open tussock grassland	
Notes	Large pool, likely permanent.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	2	2.5	
Acacia pyrifolia var. *pyrifolia*	0.1	2	
Acacia trachycarpa	7	3.5	
Arivela viscosa	0.1	0.1	
Atalaya hemiglauca	4	3.5	
Cajanus pubescens	0.1	1.6	SRGR015.01
**Cenchrus ciliaris*	0.5	0.1	
Cyperus vaginatus	8	0.8	
Eriachne benthamii	20	0.5	SRGR007.01
Eucalyptus camaldulensis subsp. *refulgens*	10	14	
Eucalyptus victrix	3	12	
Euphorbia sp. Indet	0.1	0.1	
Melaleuca glomerata	1	3.5	
Melaleuca linophylla	0.1	2.5	
Sesbania cannabina	0.1	1.7	SRGR005.01
Triodia epactia	0.1	0.4	

Atlas Sanjiv Ridge GDV **Site SRGR-068**

Date	13/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	775159 mE;	7628548 mN
	119.6544 E	-21.424436 S
Veg Condition	Excellent	
Soil	Sand	
Rock Type	Granite	
Fire Age	5-10 yrs	
Habitat	Gully	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* low isolated trees over *Melaleuca glomerata* tall isolated shrubs over *Cyperus vaginatus, Schoenoplectus subulatus, Typha domingensis* mid to low isolated sedges	

Site Taxa	Cover (%)	Height (m)	Specimen #
Amaranthus cuspidifolius	0.1	0.1	
Arivela viscosa	0.1	0.3	
Corchorus parviflorus	0.1	0.1	
Cymbopogon ambiguus	0.1	0.2	
Cyperus vaginatus	0.5	0.7	
Dolichocarpa crouchiana	0.1	0.1	
Enneapogon caerulescens	0.1	0.2	
Eragrostis tenellula	0.1	0.2	
Eriachne mucronata	0.1	0.2	
Eucalyptus camaldulensis subsp. *refulgens*	0.1	7	
Euphorbia careyi	0.1	0.1	SRGR068.01
Flueggea virosa subsp. *melanthesoides*	0.1	1.7	
Gomphrena cunninghamii	0.1	0.2	
Melaleuca glomerata	0.5	4	
Nellica maderaspatensis	0.1	0.3	
Pluchea rubelliflora	0.1	0.1	
Polycarpaea longiflora	0.1	0.2	
Schoenoplectus subulatus	0.5	1.5	SRGR005.03
Sesbania cannabina	0.1	0.4	
Stemodia grossa	0.5	0.1	
Swainsona formosa	0.1	0.2	
Trachymene oleracea subsp. *oleracea*	0.1	0.3	
Typha domingensis	0.5	1.2	

Atlas Sanjiv Ridge GDV **Site SRGR-071**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771309 mE;	7633816 mN
	119.6164 E	-21.377480 S
Veg Condition	Good	
Soil	Sandy Clay Loam	
Rock Type		
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* woodland over *Melaleuca glomerata, Atalaya hemiglauca, Melaleuca linophylla* tall open shrubland	
Notes	Large, likely permanent pool.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.1	6.5	
Acacia pyrifolia var. *pyrifolia*	1	2.5	
Acacia trachycarpa	0.1	4.5	
**Argemone ochroleuca* subsp. *ochroleuca*	0.1	0.1	
Arivela viscosa	0.1	0.1	
Atalaya hemiglauca	4	4	
**Cenchrus ciliaris*	1	0.4	
Cyperus vaginatus	0.1	0.7	
Eriachne benthamii	1	0.5	SRGR007.01
Eucalyptus camaldulensis subsp. *refulgens*	31	16	
Euphorbia australis var. *subtomentosa*	0.1	0.1	SRGR065.01
Euphorbia sp. Indet	0.1	0.1	
Flueggea virosa subsp. *melanthesoides*	0.1	1	
Gossypium australe	0.1	1.1	
Marsilea exarata	0.1	0.1	SRGR024.01
Melaleuca glomerata	1	5.5	
Melaleuca linophylla	1	4.5	
Petalostylis labicheoides	0.1	2.3	
Rhynchosia minima	0.1	0.1	
Stemodia grossa	0.1	0.1	
**Vachellia farnesiana* var. *farnesiana*	0.1	3	

Atlas Sanjiv Ridge GDV **Site SRGR-072**

Date	13/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Releve
Location	MGA Zone 50
	780446 mE; 7633215 mN
	119.7046 E -21.381507 S
Veg Condition	Very Good
Soil	Silty Clay Loam
Rock Type	
Fire Age	>10 yrs
Habitat	Major Drainage Line
Vegetation	*Eucalyptus camaldulensis, Melaleuca argentea* mid open woodland over *Melaleuca glomerata, Melaleuca linophylla, Acacia coriacea* subsp. *pendens* tall shrubland over **Cenchrus ciliaris* low sparse tussock grassland with *Cyperus vaginatus* mid sparse sedgeland
Notes	Some surface water present, small pools

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	2.3	
Acacia coriacea subsp. *pendens*	1	12	
Ammannia multiflora	0.1	0.1	
Atalaya hemiglauca	0.1	4	
**Cenchrus ciliaris*	3	0.5	
Centipeda minima	0.1	0.1	
Cyperus vaginatus	4	0.8	
Eragrostis tenellula	0.1		
Eriachne helmsii	0.1	0.6	
Eucalyptus camaldulensis subsp. *refulgens*	8	15	
Flueggea virosa subsp. *melanthesoides*	0.1	3.5	
Ipomoea muelleri	0.1	0	
Lobelia arnhemiaca	0.1	0.1	
Melaleuca argentea	5	14	
Melaleuca glomerata	5.5	5.5	
Melaleuca linophylla	30	3.2	
Pluchea rubelliflora	0.1	0.2	
Sesbania cannabina	0.1	0.4	
Stemodia grossa	0.1	0.3	

Atlas Sanjiv Ridge GDV **Site SRGR-077**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	770983 mE;	7637654 mN
	119.6127 E	-21.342880 S
Veg Condition	Excellent	
Soil	Sandy Clay Loam	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* low isolated trees over *Melaleuca glomerata* tall sparse shrubland over *Cyperus vaginatus*, *Schoenoplectus subulatus* open sedgeland with *Eriachne benthamii* sparse tussock grassland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	2.5	
Acacia pyrifolia var. *pyrifolia*	0.1	1.5	
Acacia trachycarpa	0.1	3.5	
Atalaya hemiglauca	0.1	3.8	
Cymbopogon ambiguus	0.1	0.3	
Cyperus vaginatus	5	0.7	
Eriachne benthamii	5	0.5	SRGR007.01
Eucalyptus camaldulensis subsp. *refulgens*	1	9	
Flueggea virosa subsp. *melanthesoides*	0.1	1.7	
Melaleuca glomerata	10	2.5	
Schoenoplectus subulatus	1	0.8	SRGR005.03
Stemodia grossa	0.1	0.2	
Terminalia circumalata	0.1	5	SRGM003.01
Themeda triandra	0.1	0.3	

Atlas Sanjiv Ridge GDV **Site SRGR-078**

Date 13/06/2024
Described by Kelby Jennings, Emma Marsh
Type Releve
Location MGA Zone 50
780404 mE; 7633566 mN
119.7041 E -21.378340 S
Veg Condition Very Good
Soil Sandy Clay Loam
Rock Type
Fire Age >10 yrs
Habitat Major Drainage Line
Vegetation *Melaleuca argentea*, *Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca linophylla, Melaleuca glomerata* tall sparse shrubland over *Cyperus vaginatus, Typha domingensis, Schoenoplectus subulatus* mid isolated clumps of sedges

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.1	4	
Ammannia multiflora	0.1	0.2	
Atalaya hemiglauca	0.1	2.5	
**Cenchrus ciliaris*	0.5	0.4	
Cyperus vaginatus	2	0.8	
Eragrostis tenellula	0.1	0.1	
Eucalyptus camaldulensis subsp. *refulgens*	3	12	
Eulalia aurea	0.3	0.6	
Marsilea exarata	0.1	0.1	SRGR024.01
Melaleuca argentea	6	10	
Melaleuca glomerata	1.5	5	
Melaleuca linophylla	4	3.5	
Schoenoplectus subulatus	0.5	1.2	
Stemodia grossa	0.1	0.2	
Typha domingensis	0.4	1.4	

Atlas Sanjiv Ridge GDV **Site SRGR-081**

Date	13/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	780712 mE;	7635917 mN
	119.7067 E	-21.357078 S
Veg Condition	Good	
Soil	Sandy Loam	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* open forest over *Atalaya hemiglauca* tall open shrubland over *Leptochloa digitata* sparse tussock grassland over **Cenchrus ciliaris* low sparse tussock grassland with *Triodia epactia* isolated hummock grasses with *Schoenoplectus subulatus, Cyperus vaginatus* mid sparse sedgeland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.1	5	
Acacia pyrifolia var. *pyrifolia*	0.1	1.6	
Acacia trachycarpa	0.1	1.7	
Afrohybanthus aurantiacus	0.1	0.4	
Ammannia baccifera	0.1	0.1	
Arivela viscosa	0.1	0.1	
Atalaya hemiglauca	8	5	
Corchorus parviflorus	0.1	1.4	
Crotalaria medicaginea var. *neglecta*	0.1	0.3	
Cyperus vaginatus	0.1	0.7	
Eragrostis tenellula	0.1	0.2	
Eriachne benthamii	0.1	0.2	SRGR007.01
Eucalyptus camaldulensis subsp. *refulgens*	35	16	
Eucalyptus victrix	0.1	10	
Euphorbia careyi	0.1	0.1	SRGR068.01
Euphorbia sp. Indet	0.1	0.2	
Euploca tenuifolia	0.1	0.2	
Leptochloa digitata	1	1.4	SRGR081.01
Melaleuca argentea	0.1	7	
Melaleuca glomerata	0.1	3	
Nellica maderaspatensis	0.1	0.2	
Potamogeton tepperi	0.1	0.1	
Schoenoplectus subulatus	2	1.4	SRGR005.03
Sesbania cannabina	0.1	0.3	
Stemodia grossa	0.1	0.8	
Vigna lanceolata var. *lanceolata*	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-085**

Date	13/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	780637 mE;	7635629 mN
	119.7060 E	-21.359682 S
Veg Condition	Good	
Soil	Sandy Loam	
Rock Type	Basalt	
Fire Age	5-10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Melaleuca argentea* open woodland over *Melaleuca glomerata* tall open shrubland over **Cenchrus ciliaris* open tussock grassland with *Schoenoplectus subulatus* open sedgeland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.1	4	
Ammannia multiflora	0.1	0.1	
**Cenchrus ciliaris*	3	0.6	
Cyperus hesperius	0.1	0.2	
Cyperus vaginatus	2	0.7	
Eragrostis tenellula	0.1	0.2	
Eucalyptus camaldulensis subsp. *refulgens*	5	12	
Marsilea exarata	0.1	0.1	SRGR024.01
Melaleuca argentea	6	9	
Melaleuca glomerata	5	3.5	
Nellica maderaspatensis	0.1	0.1	
Potamogeton tepperi	0.1	0.1	
Schoenoplectus subulatus	1	1.3	SRGR005.03

Atlas Sanjiv Ridge GDV **Site SRGR-086**

Date	13/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Releve
Location	MGA Zone 50
	780253 mE; 7634106 mN
	119.7026 E -21.373488 S
Veg Condition	Good
Soil	Sand
Rock Type	
Fire Age	>10 yrs
Habitat	Major Drainage Line
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* mid open woodland over *Melaleuca linophylla*, *Acacia coriacea* subsp. *pendens* tall sparse shrubland over *Triodia longiceps* tall open hummock grassland (on banks)

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.1	3.5	
Arivela viscosa	0.1	0.3	
Atalaya hemiglauca	0.5	5	
**Cenchrus ciliaris*	1	0.3	
Cyperus vaginatus	0.1	0.5	
Eucalyptus camaldulensis subsp. *refulgens*	6.5	14	
Eucalyptus victrix	1.5	12	
Melaleuca linophylla	2.5	3.2	

Atlas Sanjiv Ridge GDV **Site SRGR-092**

Date	13/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Relevé
Location	MGA Zone 50
780175 mE;	7634604 mN
119.7017 E	-21.369007 S
Veg Condition	Good
Soil	Sandy Clay Loam
Rock Type	
Fire Age	>10 yrs
Habitat	Major Drainage Line
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix*, *Melaleuca argentea* mid woodland over *Melaleuca linophylla, Melaleuca glomerata* tall open shrubland over **Cenchrus ciliaris mid isolated clumps of tussock grasses with Triodia longiceps* mid isolated clumps of hummock grasses

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	2.2	
Acacia coriacea subsp. *pendens*	0.1	4	
Acacia trachycarpa	0.1	2.8	
Atalaya hemiglauca	0.1	3.5	
**Calotropis procera*	0.1	1.7	
**Cenchrus ciliaris*	4	0.3	
Eucalyptus camaldulensis subsp. *refulgens*	12	-2	
Eucalyptus victrix	10	11	
Melaleuca argentea	0.5	4	
Melaleuca glomerata	2.5	4	
Melaleuca linophylla	18	3	
Triodia longiceps	0.5	0.7	

Atlas Sanjiv Ridge GDV **Site SRGR-097**

Date	13/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Releve
Location	MGA Zone 50
	780955 mE; 7632381 mN
	119.7096 E -21.388947 S
Veg Condition	Poor
Soil	Sandy Clay Loam
Rock Type	None Discernible
Fire Age	5-10 yrs
Habitat	Major Drainage Line
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* open woodland over *Melaleuca argentea*, *Melaleuca glomerata* tall open shrubland over *Cyperus vaginatus, Schoenoplectus subulatus* open sedgeland over **Cynodon dactylon* low open grassland

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	1	
Ammannia baccifera	0.1	0.1	
Atalaya hemiglauca	1	4.5	
Centipeda minima	0.1	0.1	
**Cynodon dactylon*	20	0.1	
Cyperus vaginatus	2	0.7	
Eucalyptus camaldulensis subsp. *refulgens*	15	12	
Marsilea exarata	0.1	0.1	SRGR024.01
Melaleuca argentea	7	4	
Melaleuca glomerata	2	5.5	
Potamogeton tepperi	0.1	0.1	
Schoenoplectus subulatus	1.5	0.7	SRGR005.03
Stemodia grossa	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-105**

Date	13/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	780775 mE;	7632556 mN
	119.7079 E	-21.387396 S
Veg Condition	Poor	
Soil	Silty Loam	
Rock Type	None Discernible	
Fire Age	5-10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Melaleuca argentea* woodland over *Atalaya hemiglauca*, *Melaleuca glomerata* tall isolated shrubs over *Cyperus vaginatus* sparse sedgeland over **Cynodon dactylon* low grassland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Atalaya hemiglauca	1	5.5	
**Cynodon dactylon*	31	0.1	
Cyperus vaginatus	3	0.7	
Eucalyptus camaldulensis subsp. *refulgens*	18	14	
Marsilea exarata	0.1	0.1	SRGR024.01
Melaleuca argentea	10	12	
Melaleuca glomerata	1.5	2.5	
Stemodia grossa	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-107**

Date	13/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	780744 mE;	7632658 mN
	119.7075 E	-21.386481 S
Veg Condition	Very Good	
Soil	Sand	
Rock Type	None Discernible	
Fire Age	5-10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Melaleuca argentea, Eucalyptus camaldulensis* subsp. *refulgens* low open forest over *Cyperus vaginatus* open sedgeland	

Site Taxa	Cover (%)	Height (m)	Specimen #
**Argemone ochroleuca* subsp. *ochroleuca*	0.1	0.1	
Arivela viscosa	0.1	0.1	
Atalaya hemiglauca	0.1	4.5	
Blumea tenella	0.1	0.1	SRGR103.01
Centipeda minima subsp. *minima*	0.1	0.1	
Cyperus vaginatus	12	0.8	
Eragrostis tenellula	0.1	0.1	
Eucalyptus camaldulensis subsp. *refulgens*	5	16	
Ipomoea muelleri	0.1	0.1	SRGR103.02
Marsilea exarata	0.1	0.1	SRGR024.01
Melaleuca argentea	30	13	
Melaleuca glomerata	1	3	
Nellica maderaspatensis	0.1	0.2	
Pluchea rubelliflora	0.1	0.1	
Stemodia grossa	0.1	0.1	
Stemodia viscosa	0.1	0.1	SRGR103.03
Vigna lanceolata var. *lanceolata*	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-108**

Date	12/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	775125 mE;	7632628 mN
	119.6534 E	-21.387617 S
Veg Condition	Excellent	
Soil	Sandy Clay Loam	
Rock Type	Ironstone	
Fire Age	5-10 yrs	
Habitat	Gully	
Vegetation	*Melaleuca argentea, Ficus brachypoda, Eucalyptus leucophloia* subsp. *leucophloia* low open woodland over *Acacia colei* var. *ileocarpa*, *Acacia tumida* var *pilbarensis* tall sparse shrubland over *Eleocharis geniculata* low isolated clumps of sedges	

Site Taxa	Cover (%)	Height (m)	Specimen #
Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)	0.1	1.6	
Acacia colei var. *ileocarpa*	1	5.5	
Acacia coriacea subsp. *pendens*	0.1	5	
Acacia pruinocarpa	0.1	1	
Acacia tumida var. *pilbarensis*	5	5.5	
Alternanthera nana	0.1	0.1	
Atalaya hemiglauca	0.5	6	
Clerodendrum floribundum var. *angustifolium*	0.1	0.6	
Cymbopogon ambiguus	0.1	0.1	
Cyperus cunninghamii subsp. *cunninghamii*	0.1	0.2	
Cyperus hesperius	0.1	0.2	
Eleocharis geniculata	0.5	0.3	
Eriachne mucronata	0.1	0.3	
Eucalyptus leucophloia subsp. *leucophloia*	5	6	
Ficus brachypoda	2	3.5	
Flueggea virosa subsp. *melanthesoides*	0.1	2.2	
Hibiscus goldsworthii	0.1	0.3	
Melaleuca argentea	15	7	
Nicotiana benthamiana	0.1	0.1	
Paspalidium tabulatum	0.1	0.2	

Atlas Sanjiv Ridge GDV **Site SRGR-110**

Date	13/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	775343 mE;	7628556 mN
	119.6562 E	-21.424342 S
Veg Condition	Very Good	
Soil	Sandy Loam	
Rock Type	Basalt,Banded ironstone	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* mid woodland over *Flueggea virosa* tall isolated shrubs over *Stemodia grossa* low sparse shrubland over *Cyperus vaginatus* mid sedgeland with *Themeda* sp. indet mid tussock grassland over **Passiflora foetida* sparse vineland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)	0.1	2	
Acacia ampliceps	0.3	1.6	
Acacia coriacea subsp. *pendens*	0.1	1.6	
Acacia pyrifolia var. *pyrifolia*	0.1	0.5	
Acacia tumida var. *pilbarensis*	0.1	1	
Afrohybanthus aurantiacus	0.1	0.2	
Ammannia baccifera	0.1	0.1	
Arivela viscosa	0.1	0.3	
Atalaya hemiglauca	0.1	1.5	
Cajanus pubescens	0.1	1.7	SRGR015.01
Corchorus parviflorus	0.1	0.6	SRGR064.01
Crotalaria medicaginea var. *neglecta*	0.1	0.3	
Cymbopogon ambiguus	0.2	0.4	
Cyperus vaginatus	25	0.9	
Eriachne benthamii	0.1	0.3	SRGR007.01
Eucalyptus camaldulensis subsp. *refulgens*	20	15	
Flueggea virosa subsp. *melanthesoides*	1.5	2	
Gossypium australe	0.1	0.2	
**Passiflora foetida* var. *hispida*	1.5	0	
Rhynchosia minima	0.1	8	
Sesbania cannabina	0.1	1.3	
Stemodia grossa	7	0.9	
Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186)	0.1	0.6	
Themeda sp.	8	0.7	SRGR009.01
Tinospora smilacina	0.1	0	
Trachymene oleracea subsp. *oleracea*	0.1	0.1	
Trichodesma zeylanicum var. *zeylanicum*	0.1	0.6	

Atlas Sanjiv Ridge GDV **Site SRGR-111**

Date	14/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	771983 mE;	7638911 mN
	119.6221 E	-21.331392 S
Veg Condition	Poor	
Soil	Sandy Loam	
Rock Type	Dolerite	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* open woodland over *Melaleuca linophylla, Melaleuca glomerata* tall open shrubland over *Schoenoplectus subulatus* sparse sedgeland over **Cynodon dactylon*, **Cenchrus ciliaris* low open grassland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia pyrifolia var. *pyrifolia*	0.1	1.9	
Amaranthus cuspidifolius	0.1	0.3	
Ammannia baccifera	0.1	0.1	
Arivela viscosa	0.1	0.2	
Atalaya hemiglauca	0.1	3	
**Cenchrus ciliaris*	1	0.1	
**Cenchrus setiger*	0.5	0.2	
**Cynodon dactylon*	10	0.1	
Cyperus vaginatus	0.1	0.7	
Eucalyptus camaldulensis subsp. *refulgens*	12	11	
Eucalyptus victrix	0.1	9	
Gossypium australe	0.1	1.5	
Melaleuca glomerata	4	3	
Melaleuca linophylla	7	2.8	
Pluchea rubelliflora	0.1	0.1	
Potamogeton tepperi	0.5	0.1	
Schoenoplectus subulatus	2	1.2	SRGR005.03
Sesbania cannabina	0.1	0.1	SRGR005.01
Stemodia grossa	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-115**

Date	14/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Relevé
Location	MGA Zone 50
773641 mE;	7639289 mN
119.6380 E	-21.327726 S
Veg Condition	Poor
Soil	Sandy Clay Loam
Rock Type	Dolerite
Fire Age	5-10 yrs
Habitat	Medium Drainage Line
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* woodland over *Melaleuca glomerata, Atalaya hemiglauca* tall open shrubland over *Leptochloa digitata* isolated tussock grasses over **Cenchrus ciliaris* low tussock grassland
Notes	Large pool, rocky bed. Potentially permanent.

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia ampliceps	0.1	0.6	
Acacia pyrifolia var. *pyrifolia*	0.1	0.1	
Acacia trachycarpa	0.1	2.8	
Ammannia baccifera	0.1	0.1	
**Argemone ochroleuca* subsp. *ochroleuca*	0.1	0.1	
Arivela viscosa	0.1	0.1	
Atalaya hemiglauca	3	4.5	
**Cenchrus ciliaris*	35	0.5	
Corchorus parviflorus	0.1	0.8	
Cyperus hesperius	0.1	0.1	
Cyperus vaginatus	0.5	0.6	
Euphorbia australis var. *subtomentosa*	0.1	0.1	SRGR065.01
Euphorbia sp. Indet	0.1	0.1	
Flueggea virosa subsp. *melanthesoides*	0.1	1.3	
Gossypium australe	0.1	0.8	
Grevillea berryana	0.1	1.8	
Leptochloa digitata	1	1.4	SRGR081.01
Marsilea exarata	0.1	0.1	SRGR024.01
Melaleuca glomerata	8	5	
Nellica maderaspatensis	0.1	0.1	
Schoenoplectus subulatus	0.1	0.7	SRGR005.03
Sesbania cannabina	0.1	0.2	SRGR005.01
Stemodia grossa	0.1	0.1	
Trachymene oleracea subsp. *oleracea*	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-117**

Date	14/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	774636 mE;	7639947 mN
	119.6475 E	-21.321639 S
Veg Condition	Good	
Soil	Sandy Loam	
Rock Type	Dolerite	
Fire Age	5-10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* woodland over *Atalaya hemiglauca*, *Melaleuca glomerata* tall isolated shrubs over *Eriachne benthamii*, *Leptochloa digitata* mid tussock grassland with *Cyperus vaginatus, Schoenoplectus subulatus* mid open sedgeland over **Cynodon dactylon*, **Cenchrus ciliaris* low grassland	

Site Taxa	Cover (%)	Height (m)	Specimen #
Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)	0.1	0.1	
Acacia ampliceps	0.1	1.5	
Acacia coriacea subsp. *pendens*	0.1	4	
Acacia pyrifolia var. *pyrifolia*	0.1	1	
Arivela viscosa	0.1	0.1	
Atalaya hemiglauca	3	6	
**Cenchrus ciliaris*	1	0.1	
**Cynodon dactylon*	20	0.1	
Cyperus vaginatus	8	0.7	
Eriachne benthamii	20	0.7	SRGR007.01
Eucalyptus camaldulensis subsp. *refulgens*	15	12	
Eucalyptus victrix	10	12	
Euphorbia australis var. *subtomentosa*	0.1	0.1	SRGR065.01
Leptochloa digitata	2	0.8	SRGR081.01
Melaleuca glomerata	0.5	4	
Melaleuca linophylla	0.5	2.8	
Schoenoplectus subulatus	1	0.7	SRGR005.03
Senna notabilis	0.1	0.4	

Atlas Sanjiv Ridge GDV **Site SRGR-120**

Date	13/06/2024	
Described by	Emma Marsh, Kelby Jennings	
Type	Releve	
Location	MGA Zone 50	
	781496 mE;	7631453 mN
	119.7150 E	-21.397243 S
Veg Condition	Poor	
Soil	Silty Clay Loam	
Rock Type	None Discernible	
Fire Age	>10 yrs	
Habitat	Major Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* mid open woodland over *Melaleuca linophylla*, *Melaleuca glomerata* tall isolated shrubs over *Schoenoplectus subulatus*, *Cyperus vaginatus* sparse sedgeland over *Marsilea exarata* low sparse herbland with **Cenchrus ciliaris* low sparse tussock grassland on banks	
Notes	Looking to be a perennial pool depth approximately 2-3m with inaccessible hydrophytes in the water	

Site Taxa	Cover (%)	Height (m)	Specimen #
Ammannia baccifera	0.1	0.1	
Ammannia multiflora	0.1	0.1	
**Cenchrus ciliaris*	3	0.2	
Cyperus blakeanus	0.1	0.1	
Cyperus vaginatus	3	1	
**Echinochloa colona*	1	0.1	
Eucalyptus camaldulensis subsp. *refulgens*	7.5	14	
Eucalyptus victrix	1.5	12	
Marsilea exarata	0.5	0.1	SRGR024.01
Melaleuca glomerata	4	4	
Melaleuca linophylla	2	3	
Pluchea rubelliflora	0.1	0.2	
Schoenoplectus subulatus	4	1.2	

Atlas Sanjiv Ridge GDV **Site SRGR-128**

Date	14/06/2024	
Described by	Emma Marsh, Kelby Jennings	
Type	Releve	
Location	MGA Zone 50	
	771909 mE;	7638916 mN
	119.6214 E	-21.331353 S
Veg Condition	Good	
Soil	Silty Clay Loam	
Rock Type	Ironstone	
Fire Age	>10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens* mid open woodland over *Melaleuca linophylla*, *Melaleuca glomerata* tall open shrubland over *Cyperus vaginatus* mid sparse-open sedgeland over **Cenchrus ciliaris* low sparse tussock grassland	
Notes	Some pooling water, very stagnant, no more than 60cm deep.	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia trachycarpa	0.1	2	
Ammannia multiflora	0.1	0.2	
Atalaya hemiglauca	0.1	2.8	
**Cenchrus ciliaris*	2.5	0.2	
Cyperus blakeanus	0.1	0.1	
Cyperus vaginatus	6	0.9	
Eucalyptus camaldulensis subsp. *refulgens*	4	14	
Melaleuca glomerata	2.5	4	
Melaleuca linophylla	7	3.5	
Pluchea rubelliflora	0.1	0.2	
Stemodia grossa	0.1	0.2	
Triodia epactia	0.1	0.4	
Triodia longiceps	0.1	0.6	

Atlas Sanjiv Ridge GDV **Site SRGR-130**

Date	14/06/2024	
Described by	Kelby Jennings, Emma Marsh	
Type	Releve	
Location	MGA Zone 50	
	773752 mE;	7639426 mN
	119.6391 E	-21.326473 S
Veg Condition	Poor	
Soil	Silty Clay Loam	
Rock Type		
Fire Age	>10 yrs	
Habitat	Medium Drainage Line	
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* mid open woodland over *Atalaya hemiglauca, Melaleuca glomerata, Acacia coriacea* subsp. *pendens* tall sparse shrubland over **Cenchrus ciliaris* low tussock grassland (on banks) with *Cyperus vaginatus* mid isolated sedges	
Notes	Pool present (ephemeral) 350m long by 40m wide (approximately 70cm deep)	

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	0.5	8	
Acacia pyrifolia var. *pyrifolia*	0.1	1.6	
Acacia trachycarpa	0.1	2	
Atalaya hemiglauca	2	5	
**Cenchrus ciliaris*	35	0.3	
Cyperus vaginatus	0.5	0.8	
Eucalyptus camaldulensis subsp. *refulgens*	8	15	
Eucalyptus victrix	1	12	
Melaleuca glomerata	1	4.5	
Melaleuca linophylla	0.1	1.6	
Stemodia grossa	0.1	0.1	

Atlas Sanjiv Ridge GDV **Site SRGR-132**

Date	14/06/2024
Described by	Kelby Jennings, Emma Marsh
Type	Releve
Location	MGA Zone 50
	774225 mE; 7639779 mN
	119.6436 E -21.323211 S
Veg Condition	Poor
Soil	Silty Clay Loam
Rock Type	
Fire Age	>10 yrs
Habitat	Medium Drainage Line
Vegetation	*Eucalyptus camaldulensis* subsp. *refulgens*, *Eucalyptus victrix* mid open woodland over *Acacia coriacea* subsp. *pendens*, *Acacia trachycarpa* tall isolated shrubs over **Cenchrus ciliaris* low open tussock grassland (on banks) with *Cyperus vaginatus* mid isolated sedges
Notes	Large pool (600m long x 50m wide and up to 2m deep).

Site Taxa	Cover (%)	Height (m)	Specimen #
Acacia coriacea subsp. *pendens*	1	10	
Acacia trachycarpa	0.3	4	
Ammannia multiflora	0.1	0.1	
Atalaya hemiglauca	0.1	2	
**Cenchrus ciliaris*	22	0.3	
Corchorus parviflorus	0.1	0.7	SRGR064.01
Cyperus blakeanus	0.1	0.2	
Cyperus vaginatus	0.5	0.8	
Eucalyptus camaldulensis subsp. *refulgens*	3	12	
Eucalyptus victrix	1	12	
Ficus brachypoda	0.1	0.6	
Marsilea exarata	0.1	0.2	SRGR024.01
Sesbania cannabina	0.1	0.3	
Stemodia grossa	0.1	0.2	

Appendix D: Biologic GDV Assessment Framework

Table 1: Site considerations for GDV rating assessment

Rating	General site features	Key/most common indicator species and density		
High	Presence of mature obligate phreatophytes (i.e., *Melaleuca argentea*) with permanent to semi-permanent water bodies present. A high diversity and density of mesophytic and hydrophytic taxa.	**Abundant:** • *Eucalyptus camaldulensis* • *Melaleuca argentea* **Present:** • *Sesbania formosa*	**Abundant to Common:** • *Melaleuca* species • *Ficus aculeata* **Present:** • *Acacia ampliceps* • *Cullen leucanthum* • *Ficus virens* • *Imperata cylindrica* • *Myoporum monatanum* • *Samolus* species	**Abundant to Common:** • *Potamogeton* species • *Sonchus hydrophyllus* **Present:** • *Juncus krausii* • *Livistona alfredii* • *Lobelia arnhemiaca* • *Samolus* sp. Millstream
Moderate	Presence of mature facultative phreatophytes (with potential for semi-mature to young obligate phreatophytes). Semi-permanent water bodies may be present. A moderate diversity and density of mesophytic and hydrophytic taxa.	**Abundant:** • *Eucalyptus victrix* • *Sesbania cannabina* **Common:** • *Eucalyptus camaldulensis* • *Melaleuca argentea*	**Abundant:** • *Melaleuca glomerata* **Common to Present:** • *Melaleuca* species • *Ficus aculeata* • *Plumbago zeylanica* • *Atalaya hemiglauca* • *Dodonaea lanceolata* • *Gymnanthera cunninghamii* • *Adriana tomentosa* • *Tinospora smilacina*	**Abundant:** • *Ammannia baccifera* • *Chara* species • *Najas* species • *Typha domingensis* **Present:** • *Cyperus* species • *Potamogeton* species • *Samolus repens* • *Schenkia* species • *Schoenoplectus subulatus* • *Sonchus hydrophyllus*

Rating	General site features	Key/most common indicator species and density		
Low	Scattered presence of facultative and/or presence of mature vadophytic (i.e., *Eucalyptus victrix*). Ephemeral to semi-permanent water bodies may be present. Low diversity and density of mesophytic and hydrophytic taxa.	**Abundant to Common:** • *Acacia citrinoviridis* • *Acacia coriacea* subsp. *pendens* • *Eucalyptus victrix* • *Stylobasium spathulatum* **Present:** • *Acacia sclerosperma* • *Eucalyptus camaldulensis* • *Eucalyptus xerothermica* • *Melaleuca argentea* • *Sesbania cannabina* • *Terminalia circumalata*	**Abundant to Common:** • *Cyprus vaginatus* • *Eulalia aurea* • *Stemodia grossa* **Present:** • *Abutlion amplum* • *Melaleuca glomerata* • *Plumbago zeylanica* • *Atalaya hemiglauca*	**Present:** • *Ammannia baccifera* • *Chara* species • *Fimbristylis microcarya* • *Marsilea exarata* • *Marsilea hirsuta* • *Myriophyllum* species • *Najas* species • *Schoenoplectiella laevis* • *Typha domingensis* • *Wahlenbergia tumidifructa*
Negligible	Minor to medium flowlines and drainage areas. Mostly inflow dependent species. Riparian species (i.e., *Acacia tumida* var. *pilbarensis*) are prevalent and dominant.	No groundwater indicator species present or not present at the density that would indicate presence of soil moisture. Mostly mature vadophytic taxa, with riparian tree species (i.e., *Eucalyptus xerothermica*, *Corymbia hamersleyana*). High diversity of Riparian species abundant and common.		
None	Minor flowlines. Occurs on upland habitats (i.e., hummock grassland on stony hills and slopes) that are highly unlikely to have to access to or be reliant on groundwater presence.	None present. Riparian species may be abundant, common and present.		

Please Note: 'Present' refers to any cover density, though is usually 0.1%; 'Common' is cover density from 0.2% to 10%; 'Abundant' is 11% cover density and higher.

Table 2: Comprehensive list of riparian taxa and their GDV rating for assessment

Family	*Taxon*	Classification	High	Moderate	Low	Negligible
Amarantaceae	*Alternanthera denticulata*	Riparian				Present
	Alternanthera nana	Riparian				Present
	Alternanthera nodiflora	Riparian				Present
	Amaranthus cuspidifolius	Riparian				Present
Apocynaceae	*Gymnanthera cunninghamii*	Mesophyte		Common/Present		
Arecaceae	*Livistona alfredii*	Hydrophyte	Present			
Asteraceae	*Centipeda minima*	Riparian				Present
	Centipeda minima subsp. *minima*	Riparian				Common
	Flaveria trinervia	Riparian				Present
	Pluchea dentex	Riparian				Present
	Pluchea rubelliflora	Riparian				Present
	Sonchus hydrophyllus	Hydrophyte	Common	Present		
Boraginaceae	*Ehretia saligna* var. *saligna*	Riparian				Present
Campanulaceae	*Lobelia arnhemiaca*	Hydrophyte	Present			
	Wahlenbergia tumidifructa	Hydrophyte			Present	
Caryophyllaceae	*Polycarpaea longiflora*	Riparian				Present
Characeae	*Chara* species	Hydrophyte		Abundant	Present	
Combretaceae	*Terminalia circumalata*	Phreatophyte			Present	Present
Convolvulaceae	*Ipomoea muelleri*	Riparian				Present
	Polymeria ambigua	Riparian				Present
Cyperaceae	*Cladium procerum*	Hydrophyte	Present			
	Cyperus leptocarpus	Hydrophyte			Present	
	Cyperus polystachyos	Hydrophyte		Present		
	Cyperus species	Hydrophyte		Present		

Family	*Taxon*	Classification	High	Moderate	Low	Negligible
	Cyperus vaginatus	Mesophyte		Abundant/Common	Common/Present	
	Eleocharis dulcis	Hydrophyte	Present			
	Eleocharis geniculata	Hydrophyte		Present		
	Eleocharis pallens	Hydrophyte		Present		
	Eleocharis sphacelata	Hydrophyte	Present			
	Eleocharis spiralis	Hydrophyte	Present			
	Fimbristylis cephalophora	Hydrophyte	Present			
	Fimbristylis feruginea	Hydrophyte	Present			
	Fimbristylis littoralis	Hydrophyte	Present			
	Fimbristylis microcarya	Hydrophyte			Present	
	Fimbristylis sieberiana	Hydrophyte	Present			
	Fuirena ciliaris	Hydrophyte		Present		
	Machaerina juncea	Hydrophyte	Present			
	Machaerina rubiginosa	Hydrophyte	Present			
	Schoenoplectiella laevis	Hydrophyte			Present	
	Schoenoplectus subulatus	Hydrophyte		Present		
	Schoenus falcatus	Hydrophyte	Abundant	Common		
	Schoenus punctatus	Hydrophyte	Present			
Elatinaceae	*Bergia ammannioides*	Riparian				Present
Eriocaulaceae	*Eriocaulon cinereum*	Hydrophyte	Present			
Euphorbiaceae	*Adriana tomentosa*	Mesophyte		Present		
Fabaceae	*Acacia ampliceps*	Mesophyte	Present			
	Acacia citrinoviridis	Phreatophyte			Abundant/Common	
	Acacia colei var. *ileocarpa*	Riparian				Common
	Acacia coriacea subsp. *pendens*	Phreatophyte			Common	

Family	*Taxon*	Classification	High	Moderate	Low	Negligible
	Acacia monticola	Riparian				Present
	Acacia monticola	Riparian				Common
	Acacia pyrifolia	Riparian				Common
	Acacia pyrifolia var. *pyrifolia*	Riparian				Common
	Acacia sclerosperma	Phreatophyte			Present	
	Acacia sericophylla	Phreatophyte			Present	
	Acacia tumida	Riparian				Present
	Acacia tumida var. *pilbarensis*	Riparian				Common
	Afrohybanthus aurantiacus	Riparian				Present
	Cajanus pubescens	Riparian				Present
	Crotalaria medicaginea var. *neglecta*	Riparian				Present
	Crotalaria novae-hollandiae	Riparian				Present
	Cullen leucanthum	Mesophyte	Present			
	Petalostylis labicheoides	Riparian				Common
	Rhynchosia bungarensis	Mesophyte			Present	
	Sesbania cannabina	Phreatophyte		Abundant	Present	
	Sesbania formosa	Phreatophyte	Present			
	Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186)	Riparian				Present
	Vigna lanceolata var. *lanceolata*	Riparian				Present
Gentianaceae	*Schenkia australis*	Hydrophyte		Present		
	Schenkia clementii	Hydrophyte		Present		
Haloragaceae	*Myriophyllum* species	Hydrophyte			Present	
Hydrocharitaceae	*Najas* species	Hydrophyte		Abundant	Present	
Juncaceae	*Juncus krausii*	Hydrophyte	Present			

Family	*Taxon*	Classification	High	Moderate	Low	Negligible
Lamiaceae	*Clerodendrum floribundum* var. *angustifolium*	Riparian				Present
Lythraceae	*Ammannia baccifera*	Hydrophyte		Abundant	Present	
	Ammannia multiflora	Hydrophyte			Present	
Malvaceae	*Abutilon amplum*	Mesophyte		Common	Present	
	Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)	Riparian				Common
	Gossypium sturtianum	Mesophyte		Present		
	Lawrencia glomerata	Mesophyte		Present		
Marsileaceae	*Marsilea exarata*	Hydrophyte			Present	
	Marsilea hirsuta	Hydrophyte			Present	
Menispermaceae	*Tinospora smilacina*	Mesophyte		Present		
Moracea	*Ficus aculeata*	Mesophyte	Common	Present		
	Ficus brachypoda	Riparian				Present
	Ficus geniculata	Mesophyte	Present			
	Ficus virens	Mesophyte	Present			
	Ficus virens var. *dasycarpa*	Mesophyte	Present			
Myrtaceae	*Eucalyptus camaldulensis*	Phreatophyte	Abundant	Common	Present	
	Eucalyptus camaldulensis subsp. *refulgens*	Phreatophyte	Abundant	Common	Present	
	Eucalyptus victrix	Phreatophyte		Abundant	Common	
	Eucalyptus xerothermica	Riparian			Present	Present
	Melaleuca alsophila	Mesophyte	Abundant	Present		
	Melaleuca argentea	Phreatophyte	Abundant	Common	Present	
	Melaleuca bracteata	Mesophyte		Present		
	Melaleuca glomerata	Mesophyte		Abundant	Present	

Family	*Taxon*	Classification	High	Moderate	Low	Negligible
	Melaleuca lasiandra	Mesophyte		Present		
	Melaleuca linophylla	Mesophyte		Abundant/present		
	Melaleuca nervosa	Mesophyte	Abundant			
	Melaleuca xerophila	Mesophyte		Common		
Nyctaginaceae	*Commicarpus australis*	Mesophyte		Present		
Nymphaea	*Nymphaea pubescens*	Hydrophyte	Present			
	Nymphaeaceae species.	Hydrophyte	Present			
	Nymphoides indica	Hydrophyte	Present			
Orobanchaceae	*Striga curviflora*	Hydrophyte		Present		
Papaveraceae	*Argemone ochroleuca* subsp. *ochroleuca*	Riparian				Present
Passifloraceae	*Passiflora foetida var. hispida*	Riparian				Present
Phyllanthaceae	*Fleuggea virosa* subsp. *melanthesoides*	Mesophyte		Present		
	Kirganelia baccata	Mesophyte		Common/Present		
	Nellica maderaspatensis	Riparian				Present
	Notoleptopus decaisnei var. *orbicularis* (A.B. Craig 428)	Riparian				Present
Plantaginaceae	*Stemodia grossa*	Mesophyte			Abundant	
Plumbaginaceae	*Muellerolimon salicorniaceum*	Mesophyte		Present		
	Plumbago zeylanica	Mesophyte		Common	Present	
Poaceae	*Cenchrus ciliaris*	Riparian				Common
	Cenchrus setiger	Riparian				Common
	Chrysopogon fallax	Riparian				Present
	Cymbopogon ambiguus	Riparian				Present
	Cymbopogon obtectus	Riparian				Present

Family	*Taxon*	Classification	High	Moderate	Low	Negligible
	Cynodon dactylon	Riparian				Present
	Eragrostis tenellula	Riparian				Present
	Eriachne mucronata	Riparian				Common
	Arundo donax	Hydrophyte	Present			
	Elytrophorus spicatus	Hydrophyte			Present	
	Eragrostis surreyana	Mesophyte		Present		
	Eulalia aurea	Mesophyte			Abundant	
	Imperata cylindrica	Mesophyte	Present			
	Leptochloa digitata	Riparian				Present
	Phragmites karka	Hydrophyte	Present			
	Pseudoraphis spinescens	Hydrophyte		Present		
	Sporobolis virginicus	Hydrophyte	Present			
	Themeda triandra	Riparian				Common
Polygonaceae	*Duma florulenta*	Mesophyte		Present		
Potamogetonaceae	*Potamogeton* species	Hydrophyte	Abundant	Present		
	Potamogeton tepperi	Hydrophyte	Abundant	Present		
Primulaceae	*Samolus repens*	Hydrophyte		Present		
	Samolus sp. Millstream	Hydrophyte	Present			
	Samolus species.	Mesophyte	Present			
Pteridaceae	*Acrostichum speciosum*	Hydrophyte	Present			
	Adiantum capillus-veneris	Hydrophyte	Present			
	Ceratopteris thalictroides	Hydrophyte	Present			
	Pteris vittata	Hydrophyte	Present			
Ruppiaceae	*Ruppia polycarpa*	Hydrophyte		Present		
Sapindaceae	*Atalaya hemiglauca*	Mesophyte		Common	Present	

Family	*Taxon*	Classification	High	Moderate	Low	Negligible
	Dodonaea lanceolata	Mesophyte		Common		
Scrophulariaceae	*Myoporum montanum*	Mesophyte	Present			
Solanaceae	*Physalis angulata*	Riparian				Present
Stylidiaceae	*Stylidium fluminense*	Hydrophyte		Present		
	Stylidium weeliwolli	Hydrophyte	Present			
Surianaceae	*Stylobasium spathulatum*	Phreatophyte			Common	Present
Thelypteridaceae	*Ampelopteris prolifera*	Hydrophyte	Present			
Typhaceae	*Typha domingensis*	Hydrophyte		Abundant	Present	

Please Note: 'Present' refers to any cover density, though is usually 0.1%; 'Common' is cover density from 0.2% to 10%; 'Abundant' is 11% cover density and higher.

Appendix E: Vegetation structural classification

NVIS Vegetation Structural Classifications

Cover Characteristics							
Foliage cover *	70-100	30-70	10-30	<10	≈0	0-5	unknown
Crown cover **	>80	50-80	20-50	0.25-20	<0.25	0-5	unknown
% Crown cover ***	>80	50-80	20-50	0.25-20	<0.25	0-5	unknown
Cover code	d	c	i	r	bi	bc	unknown

Growth Form	Height ranges (m)	Structural Formation Classes						
tree, palm	>30 Tall	closed forest	open forest	woodland	open woodland	isolated trees	isolated clumps of trees	trees
	10-30 Mid							
	<10 Low							
tree mallee	10-30 Tall	closed mallee forest	open mallee forest	mallee woodland	open mallee woodland	isolated mallee trees	isolated clumps of mallee trees	mallee trees
	<10 Mid							
	<3 Low							
shrub, cycad, grasstree, fern	>2 Tall	closed shrubland	shrubland	open shrubland	sparse shrubland	isolated shrubs	isolated clumps of shrubs	shrubs
	1-2 Mid							
	<1 Low							
mallee shrub	10-30 Tall	closed mallee shrubland	mallee shrubland	open mallee shrubland	sparse mallee shrubland	isolated mallee shrubs	isolated clumps of mallee shrubs	mallee shrubs
	<10 Mid							
	<3 Low							

Growth Form	Height ranges (m)	Structural Formation Classes						
heath shrub	>2 Tall	closed heathland	heathland	open heathland	sparse heathland	isolated heath shrubs	isolated clumps of heath shrubs	heath shrubs
	1-2 Mid							
	<1 Low							
chenopod shrub	>2 Tall	closed chenopod shrubland	chenopod shrubland	open chenopod shrubland	sparse chenopod shrubland	isolated chenopod shrubs	isolated clumps of chenopod shrubs	chenopod shrubs
	1-2 Mid							
	<1 Low							
samphire shrub	>0.5 Low	closed samphire shrubland	samphire shrubland	open samphire shrubland	sparse samphire shrubland	isolated samphire shrubs	isolated clumps of samphire shrubs	samphire shrubs
	<0.5 Low							
hummock grass	>2 Tall	closed hummock grassland	hummock grassland	open hummock grassland	sparse hummock grassland	isolated hummock grasses	isolated clumps of hummock grasses	hummock grasses
	<2 Tall							
tussock grass	>0.5 Mid	closed tussock grassland	tussock grassland	open tussock grassland	sparse tussock grassland	isolated tussock grasses	isolated clumps of tussock grasses	tussock grasses
	<0.5 Low							
other grass	>0.5 Mid	closed grassland	grassland	open grassland	sparse grassland	isolated grasses	isolated clumps of grasses	other grasses
	<0.5 Low							
sedge	>0.5 Mid	closed sedgeland	sedgeland	open sedgeland	sparse sedgeland	isolated sedges	isolated clumps of sedges	sedges
	<0.5 Low							
rush	>0.5 Mid	closed rushland	rushland	open rushland	sparse rushland	isolated rushes	isolated clumps of rushes	rushes
	<0.5 Low							
forb	>0.5 Mid	closed forbland	forbland	open forbland	sparse forbland	isolated forbs	isolated clumps of forbs	forbs
	<0.5 Low							

Growth Form	Height ranges (m)	Structural Formation Classes						
fern	>2 Tall	closed fernland	fernland	open fernland	sparse fernland	isolated ferns	isolated clumpsof ferns	ferns
	1-2 Tall							
	<1 Low							
bryophyte	<0.5	closed bryophyte land	bryophyte land	open bryophyte land	sparse bryophyte land	isolated bryophytes	isolated clumps of bryophytes	bryophytes
lichen	<0.5	closed lichenland	lichenland	open lichenland	sparse lichenland	isolated lichens	isolated clumps of lichens	lichens
vine	>30 Tall	closed vineland	vineland	open vineland	sparse vineland	isolated vines	isolated clumps of vines	vines
	10-30 Med							
	<10 Low							
aquatic	<1 Tall	closed aquatic bed	aquatic bed	open aquatic bed	sparse aquatics	isolated aquatics	isolated clumps of aquatics	aquatics
	0-0.5 Low							
seagrass	<1 Tall	closed seagrass bed	seagrass bed	open seagrass bed	sparse seagrass bed	isolated seagrasses	isolated clumps of seagrasses	seagrasses
	0-0.5 Low							

From: NVIS Structural Formation Terminology (Australian Vegetation Attribute Manual Version 7.0 November 2017 https://www.environment.gov.au/land/publications/australian-vegetation-attribute-manual-version-7)

* Foliage Cover is defined for each stratum as 'the proportion of the ground, which would be shaded if sunshine came from directly overhead'. It includes branches and leaves and is obtained by multiplying Crown Cover with Crown type (Hnatiuk et al., 2009). It is applied to a stratum in a plot, rather than an individual crown, with the NVIS measure for a vegetation type ideally being a summary of several plots. Foliage Projective Cover, which considers only the vertical projection of photosynthetic components (generally leaves), can be measured by line interception methods for tree, shrub and ground layer vegetation (Specht & Specht, 1999).

** Crown Cover (canopy cover) as per Hnatiuk et al. (2009) Although relationships between this attribute and Foliage Cover are dependent on season, species, species age etc., the crown cover category classes have been adopted as the defining measure.

*** The percentage cover is defined as the percentage of a strictly defined plot area, covered by vegetation. This can be an estimate and is a less precise measure than using, for example, a point intercept transect method on ground layer, or overstorey vegetative cover. That is, for precisely measured values (e.g., crown densitometer or point intercept transects) the value measured would be 'foliage' cover. Where less precise or qualitative measures are used these will most probably be recorded as 'percentage' cover.

Appendix F: Species list

Aizoaceae

Trianthema glossostigmum

Amaranthaceae

**Aerva javanica*
Alternanthera denticulata
Alternanthera nana
Alternanthera nodiflora
Amaranthus cuspidifolius
Gomphrena cunninghamii

Apocynaceae

**Calotropis procera*

Araliaceae

Trachymene oleracea subsp. *oleracea*

Asteraceae

Blumea tenella
Centipeda minima
Centipeda minima subsp. *minima*
*Flaveria trinervia
Pluchea dentex
Pluchea rubelliflora
Pterocaulon sphacelatum

Boraginaceae

Ehretia saligna var. *saligna*
Euploca tenuifolia
Heliotropium crispatum
Trichodesma zeylanicum var. *zeylanicum*

Campanulaceae

Lobelia arnhemiaca
Wahlenbergia tumidifructa

Caryophyllaceae

Polycarpaea longiflora

Cleomaceae

Arivela viscosa

Combretaceae

Terminalia circumalata

Convolvulaceae

?Bonamia pilbarensis
Duperreya commixta
Ipomoea muelleri
Polymeria ambigua

Cucurbitaceae

Cucumis variabilis

Cyperaceae

Cyperus blakeanus
Cyperus cunninghamii subsp. *cunninghamii*
Cyperus hesperius
Cyperus vaginatus
Eleocharis geniculata
Fimbristylis dichotoma
Fimbristylis microcarya
Schoenoplectus subulatus

Elatinaceae

Bergia ammannioides

Euphorbiaceae

Adriana tomentosa var. *tomentosa*
Euphorbia australis var. *subtomentosa*
Euphorbia biconvexa
Euphorbia careyi
Euphorbia coghlanii
Euphorbia sp. indet
Euphorbia tannensis subsp. eremophila
Euphorbia trigonosperma

Fabaceae

Acacia ampliceps
Acacia citrinoviridis
Acacia colei var. *ileocarpa*
Acacia coriacea subsp. *pendens*
Acacia monticola
Acacia pruinocarpa
Acacia pyrifolia
Acacia pyrifolia var. *pyrifolia*
Acacia trachycarpa
Acacia tumida var. *pilbarensis*
Cajanus pubescens
Crotalaria medicaginea var. *neglecta*
Crotalaria novae-hollandiae
Cullen leucanthum

Dichrostachys spicata
Indigofera monophylla
Petalostylis labicheoides
Rhynchosia minima
Senna glutinosa subsp. *glutinosa*
Senna notabilis
Senna venusta
Sesbania cannabina
Sesbania formosa
Swainsona formosa
Tephrosia densa
Tephrosia rosea var. Fortescue creeks (M.I.H. Brooker 2186)
**Vachellia farnesiana* var. *farnesiana*
Vigna lanceolata var. *lanceolata*

Lamiaceae

Clerodendrum floribundum var. *angustifolium*

Lythraceae

Ammannia baccifera
Ammannia multiflora

Malvaceae

Abutilon sp. Dioicum (A.A. Mitchell PRP 1618)
Corchorus crozophorifolius
Corchorus parviflorus
Gossypium australe
Hibiscus goldsworthii
Sida sp. spiciform panicles (E. Leyland s.n. 14/8/90)

Marsileaceae

Marsilea exarata
Marsilea hirsuta

Menispermaceae

Tinospora smilacina

Molluginaceae

Glinus lotoides

Moraceae

Ficus brachypoda

Myrtaceae

Eucalyptus camaldulensis
Eucalyptus camaldulensis subsp. *refulgens*
Eucalyptus leucophloia subsp. *leucophloia*
Eucalyptus victrix
Melaleuca argentea
Melaleuca glomerata
Melaleuca linophylla

Nyctaginaceae

Boerhavia burbidgeana
Boerhavia coccinea

Papaveraceae

**Argemone ochroleuca* subsp. *ochroleuca*

Passifloraceae

**Passiflora foetida* var. *hispida*

Phyllanthaceae

Flueggea virosa subsp. *melanthesoides*
Nellica maderaspatensis
Notoleptopus decaisnei var. *Orbicularis* (A.B. Craig 428)

Plantaginaceae

Stemodia grossa
Stemodia viscosa

Poaceae

**Cenchrus ciliaris*
**Cenchrus setiger*
Chrysopogon fallax
Cymbopogon ambiguus
Cymbopogon obtectus
**Cynodon dactylon*
Dactyloctenium radulans
**Echinochloa colona*
Enneapogon caerulescens
Eragrostis cumingii
Eragrostis speciosa
Eragrostis tenellula
Eriachne benthamii
Eriachne helmsii
Eriachne lanata
Eriachne mucronata
Eulalia aurea
Imperata cylindrica

Leptochloa digitata
Paspalidium tabulatum
Themeda sp. indet
Themeda triandra
Triodia epactia
Triodia longiceps
Urochloa sp. indet

Portulacaceae

Portulaca oleracea

Potamogetonaceae

Potamogeton tepperi

Proteaceae

Grevillea berryana
Grevillea wickhamii

Rubiaceae

Dolichocarpa crouchiana

Sapindaceae

Atalaya hemiglauca
Dodonaea lanceolata var. *lanceolata*

Solanaceae

Nicotiana benthamiana
**Physalis angulata*
Solanum horridum
Solanum phlomoides

Typhaceae

Typha domingensis

Violaceae

Afrohybanthus aurantiacus

Zygophyllaceae

Tribulus macrocarpus

Appendix G: GDV Indicator species of the Survey Area

Family	Taxon	GDV Indication
Hydrophytes		
Campanulaceae	*Lobelia arnhemiaca*	High
Campanulaceae	*Wahlenbergia tumudifructa*	Low
Cyperaceae	*Cyperus blakeanus*	Moderate
Cyperaceae	*Cyperus cunninghamii* subsp. *cunninghamii*	Moderate
Cyperaceae	*Cyperus hesperius*	Moderate
Cyperaceae	*Cyperus vaginatus*	Moderate
Cyperaceae	*Eleocharis geniculata*	Moderate
Cyperaceae	*Fimbristylis microcarya*	Low
Cyperaceae	*Schoenoplectus subulatus*	Moderate
Lythraceae	*Ammannia baccifera*	Moderate (if abundant); Low (if present)
Lythraceae	*Ammannia multiflora*	Low
Marsileaceae	*Marsilea exarata*	Low
Marsileaceae	*Marsilea hirsuta*	Low
Potamogetonaceae	*Potamogeton tepperi*	High (if abundant); Moderate (if present)
Typhaceae	*Typha domingensis*	Moderate (if abundant); Low (if present)
Mesophytes		
Euphorbiaceae	*Adriana tomentosa* var. *tomentosa*	Moderate
Fabaceae	*Acacia ampliceps*	High
Fabaceae	*Cullen leucanthum*	High
Menispermaceae	*Tinospora smilacina*	Moderate
Myrtaceae	*Melaleuca glomerata*	Moderate (if abundant); Low (if present)
Myrtaceae	*Melaleuca linophylla*	Moderate (if abundant/present)
Phyllanthaceae	*Flueggea virosa* subsp. *melanthesoides*	Moderate
Plantaginaceae	*Stemodia grossa*	Low (if abundant)

Poaceae	*Eulalia aurea*	Low (if abundant)
Poaceae	*Imperata cylindrica*	High
Sapindaceae	*Atalaya hemiglauca*	Moderate (if common); Low (if present)
Sapindaceae	*Dodonaea lanceolata* var. *lanceolata*	Moderate (if common)
Phreatophytes		
Combretaceae	*Terminalia circumalata*	Low
Fabaceae	*Acacia citrinoviridis*	Low (if abundant)
Fabaceae	*Acacia coriacea* subsp. *pendens*	Low (if dominant)
Fabaceae	*Sesbania cannabina*	Moderate (if abundant); Low (if present)
Fabaceae	*Sesbania formosa*	High
Myrtaceae	*Eucalyptus camaldulensis*	High (if abundant); Moderate (if common); Low (if present)
Myrtaceae	*Eucalyptus camaldulensis* subsp. *refulgens*	High (if abundant); Moderate (if common); Low (if present)
Myrtaceae	*Eucalyptus victrix*	Moderate (if abundant); Low (if common)
Myrtaceae	*Melaleuca argentea*	High (if abundant); Moderate (if common); Low (if present)

Appendix H: GDV Classification of the Pools

Pool feature ID	Atlas GDV Risk Rating	Assessment Sites	Vegetation Type and Notable Features	Indicator Species Present	Biologic GDV Rating
Perennial or Potentially Permanent Pools					
CO-WS-14	-	SRGR-009	D2 Perched wetland above pool; Deeply incised gully; Flowing water	• *Lobelia arnhemiaca* High • *Eucalyptus camaldulensis* Moderate • *Melaleuca argentea* Moderate • *Atalaya hemiglauca* Low • *Typha domingensis* Low • *Dodonaea lanceolata* Negligible • *Stemodia grossa* Negligible	High
CO-WS-16	Low	SRGR-036 SRGR-108 SRGM-035	D3 Confirm High GDV; Rockface seepage; Permanent pool; Flowing water; Deeply incised gully	• *Imperata cylindrica* High • *Melaleuca argentea* Moderate to High • *Eucalyptus camaldulensis* Moderate • *Atalaya hemiglauca* Low to Moderate • *Typha domingensis* Low • *Acacia coriacea* subsp. *pendens* Negligible	High
CO-WS-05	-	SRGR-055	D8 Surface water present; Mature *Melaleuca* and sedges	• *Acacia ampliceps* High • *Eucalyptus victrix* Moderate • *Melaleuca glomerata* Moderate • *Melaleuca linophylla* Moderate • *Acacia coriacea* subsp. *pendens* Negligible	Moderate to High
CO-WS-12	Low	SRGR-015	D2 Deeply incised gully; Mature *Melaleuca argentea*	• *Lobelia arnhemiaca* High • *Eucalyptus camaldulensis* Moderate • *Melaleuca argentea* Moderate • *Ammannia multiflora* Low • *Atalaya hemiglauca* Low • *Typha domingensis* Low • *Stemodia grossa* Negligible	Moderate to High

Pool feature ID	Atlas GDV Risk Rating	Assessment Sites	Vegetation Type and Notable Features	Indicator Species Present		Biologic GDV Rating
CO-WS-27	-	SRGR-005	D8 Non-porous substrate; Potentially permanent pool; Steep gully sides	• *Acacia ampliceps* • *Melaleuca linophylla* • *Eucalyptus camaldulensis* • *Melaleuca glomerata* • *Sesbania cannabina* • *Terminalia circumalata* • *Stemodia grossa*	High Moderate Low Low Low Low Negligible	Moderate to High
CO-WS-28	Low	SRGR-006	D5 Pool quite deep, 2-4m; Mature *Melaleuca argentea* though infrequent	• *Acacia ampliceps* • *Cullen leucanthum* • *Eucalyptus camaldulensis* • *Atalaya hemiglauca* • *Melaleuca argentea* • *Melaleuca glomerata* • *Melaleuca linophylla* • *Potamogeton tepperi* • *Ammannia multiflora* • *Eucalyptus victrix* • *Sesbania cannabina* • *Acacia coriacea* subsp. *pendens* • *Stemodia grossa*	High High High Moderate Moderate Moderate Moderate Moderate Low Low Low Negligible Negligible	Moderate to High
CO-WS-10	Moderate to High	SRGR-010 SRGM-008 SRGM-011	D7 Deeply inscised gorge; perched pool, heavily scoured in flood	• *Atalaya hemiglauca* • *Eucalyptus camaldulensis* • *Terminalia circumalata* • *Stemodia grossa*	Moderate Moderate Low Negligible	Moderate

Pool feature ID	Atlas GDV Risk Rating	Assessment Sites	Vegetation Type and Notable Features	Indicator Species Present		Biologic GDV Rating
CO-WS-20	Low	SRGR-062	D5 Non-porous pool substrate, 3m deep; Seepage noted; Permanent pool;	• *Atalaya hemiglauca* • *Eucalyptus camaldulensis* • *Melaleuca linophylla* • *Ammannia multiflora* • *Fimbristylis microcarya* • *Melaleuca glomerata* • *Acacia coriacea* subsp. *pendens* • *Stemodia grossa*	Moderate Moderate Moderate Low Low Low Negligible Negligible	Moderate
CO-WS-33	-	SRGR-068	D5	• *Eucalyptus camaldulensis* • *Melaleuca glomerata* • *Sesbania cannabina* • *Typha domingensis* • *Stemodia grossa*	Low Low Low Low Negligible	Moderate
CO-WS-01	-	SRGR-013	D7 Narrow gully; Surface water present	• *Atalaya hemiglauca* • *Typha domingensis* • *Terminalia circumalata* • *Stemodia grossa*	Moderate Moderate Low Negligible	Low to Moderate
CO-WS-19	-	SRGR-048	D7 Narrow gully; Surface water present, possibly perennial; Species composition not suggesting GDV	• *Ammannia multiflora* • *Atalaya hemiglauca* • *Eucalyptus victrix* • *Melaleuca glomerata* • *Sesbania cannabina* • *Terminalia circumalata* • *Acacia coriacea* subsp. *pendens*	Low Low Low Low Low Low Negligible	Low
CO-WS-38	-	SRGM-039	D7; Surface water present; Species composition not suggesting GDV	• *Terminalia circumalata*	Low	Low

Pool feature ID	Atlas GDV Risk Rating	Assessment Sites	Vegetation Type and Notable Features	Indicator Species Present		Biologic GDV Rating
CO-WS-40	-	SRGR-045 SRGM-047	D7 Surface water present, ephemeral; Species composition not suggesting GDV	• *Atalaya hemiglauca* • *Eucalyptus victrix* • *Melaleuca glomerata* • *Terminalia circumalata* • *Acacia coriacea* subsp. *pendens*	Moderate Low Low Low Negligible	Low
CO-WS-17 CO-WS-18	Low	SRGR-019	D10 Surface water present, low inflow, ephemeral;	• *Stemodia grossa*	Negligible	Negligible
Ephemeral or Likely Ephemeral Pools						
CO-WS-26	-	SRGR-064 SRGR-077	D5 Pool quite deep, < 5m; water flowing with seepage present; Suggests perennial groundwater fed (though classed Ephemeral from Atlas data)	• *Acacia ampliceps* • *Eucalyptus camaldulensis* • *Potamogeton tepperi* • *Atalaya hemiglauca* • *Ammannia multiflora* • *Melaleuca glomerata* • *Terminalia circumalata* • *Stemodia grossa*	High Moderate Moderate Low to Moderate Low Low Low Negligible	High
CO-WS-25	-	SRGM-068	D6 Water flowing with seepage present; Becoming incised.	• *Acacia ampliceps* • *Cyperus vaginatus* • *Eucalyptus camaldulensis* • *Eucalyptus victrix* • *Melaleuca glomerata*	High Moderate Moderate Low Low	Moderate to High

Pool feature ID	Atlas GDV Risk Rating	Assessment Sites	Vegetation Type and Notable Features	Indicator Species Present		Biologic GDV Rating
CO-WS-34	-	SRGR-110 SRGM-066	D5 Surface water present in perched pools, ephemeral; Species composition suggests good soil moisture availability.	• *Acacia ampliceps* • *Eucalyptus camaldulensis* • *Ammannia baccifera* • *Atalaya hemiglauca* • *Sesbania cannabina* • *Acacia coriacea* subsp. *pendens* • *Stemodia grossa*	High High Low Low Low Negligible Negligible	Moderate to High
CO-WS-22	-	SRGR-132	D6 Large and deep surface water pool; still, very little inflow if any	• *Eucalyptus camaldulensis* • *Ammannia multiflora* • *Atalaya hemiglauca* • *Eucalyptus victrix* • *Marsilea exarata* • *Sesbania cannabina* • *Acacia coriacea* subsp. *pendens* • *Stemodia grossa*	Moderate Low Low Low Low Low Negligible Negligible	Moderate
CO-WS-24	-	SRGR-128	D5 Some shallow pooling water; appears ephemeral	• *Eucalyptus camaldulensis* • *Melaleuca linophylla* • *Ammannia multiflora* • *Atalaya hemiglauca* • *Melaleuca glomerata* • *Stemodia grossa*	Moderate Moderate Low Low Low Negligible	Moderate
CO-WS-29	Low	SRGR-071	D5 Large surface water pool; Ducks; Likely perennial	• *Eucalyptus camaldulensis* • *Atalaya hemiglauca* • *Melaleuca linophylla* • *Marsilea exarata* • *Melaleuca glomerata* • *Acacia coriacea* subsp. *pendens* • *Stemodia grossa*	High Moderate Moderate Low Low Negligible Negligible	Moderate

Pool feature ID	Atlas GDV Risk Rating	Assessment Sites	Vegetation Type and Notable Features	Indicator Species Present		Biologic GDV Rating
CO-WS-30	Low	SRGM-058	D6 Large and deep surface water pool; Likely perennial; Macrophytes present	• *Cyperus vaginatus* • *Melaleuca linophylla* • *Potamogeton tepperi* • *Eucalyptus camaldulensis* • *Eucalyptus victrix* • *Melaleuca glomerata*	Moderate Moderate Moderate Low Low Low	Moderate
CO-WS-36	-	SRGM-042	D7 Minimal pooling not flowing	• *Eucalyptus victrix* • *Terminalia circumalata*	Low Low	Low
CO-WS-37	-	SRGM-041 SRGM-043	D7 Shallow pool, likely ephemeral; Species composition not suggesting GDV	• *Sesbania cannabina* • *Terminalia circumalata*	Low Low	Low
CO-WS-39	-	SRGM-040	D7 No pool; Species composition not suggesting GDV	• *Terminalia circumalata*	Low	Low
CO-WS-41	-	SRGM-046	D7 Some pooling water flowing; Rocky creekbed	• *Cyperus vaginatus* • *Atalaya hemiglauca* • *Melaleuca glomerata* • *Terminalia circumalata* • *Acacia coriacea* subsp. *pendens* • *Eucalyptus victrix* • *Stemodia grossa*	Low Low Low Low Negligible Negligible Negligible	Low
CO-WS-42	-	SRGM-044	D7 Some pooling not flowing	• *Terminalia circumalata*	Low	Low

Pool feature ID	Atlas GDV Risk Rating	Assessment Sites	Vegetation Type and Notable Features	Indicator Species Present		Biologic GDV Rating
CO-WS-43	-	SRGM-126	D7 Stagnant surface water present;	• *Atalaya hemiglauca* • *Melaleuca glomerata* • *Terminalia circumalata* • *Eucalyptus victrix* • *Stemodia grossa*	Low Low Low Negligible Negligible	Low
CO-WS-04	Low	SRGR-034	D10 Water pooling; No groundwater seep apparent	• *Atalaya hemiglauca*	Low	Negligible to Low
Not Assessed						
CO-WS-23	-	Ephemeral Pool; Assessed, adjacent				Moderate to High
CO-WS-02	Low	Not assessed				
CO-WS-03	-	Not assessed				
CO-WS-06	Low	Not assessed				
CO-WS-08	Low	Not assessed				
CO-WS-09	-	Not assessed				
CO-WS-11	Low	Not assessed				
CO-WS-13	-	Not assessed				
CO-WS-15	-	Not assessed				
CO-WS-21	-	Not assessed				
CO-WS-31	Low	Not assessed				
CO-WS-32	Low	Not assessed				
CO-WS-35	-	Not assessed				
CO-WS-44	Low	Not assessed				
CO-WS-45	Low	Not assessed				

Pool feature ID	Atlas GDV Risk Rating	Assessment Sites	Vegetation Type and Notable Features	Indicator Species Present	Biologic GDV Rating
CO-WS-46	-	Not assessed			
CO-WS-47	-	Not assessed			
CO-WS-48	-	Not assessed			
Waterpool (major-3)	Low	Not assessed			