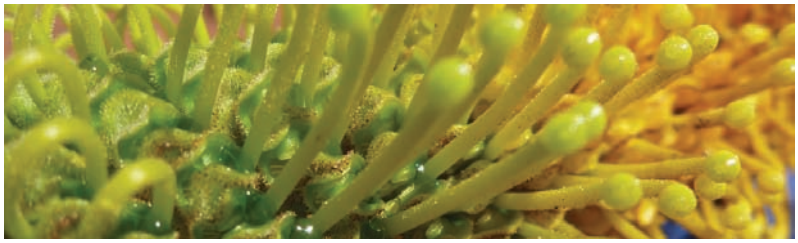
Biota Environmental Sciences

Winu Project Detailed Flora and Vegetation Survey



Prepared for Rio Tinto Winu Pty Limited

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Contents

Tables

Figures

Plates

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1.0 Executive Summary

1.1 Project Background

Rio Tinto Winu Pty Limited is evaluating the potential development of mineralised deposits within the Winu Project Area (WPA), and undertaking an upgrade to the existing access to the area in the form of a corridor named the Winu Road Access Corridor (WRAC).

The WPA is 13,361.8 ha in size, and is located approximately 320 km east of Port Hedland in the northwest of Western Australia.

The WRAC is 178.2 km in length, extending from the Great Northern Highway to the western end of the WPA. The WRAC largely involves the widening of existing road infrastructure known as the Nyangumarta Highway and Old Dump Road (Patterson Road), with the addition of potential borrow source areas along its length. Two sections of the WRAC are not an upgrade to the existing road, but rather new optimised routes to avoid sensitive areas or to improve road safety. The largest of these ("the Diversion', which is 22.8 km long), cuts through sand plains; the smaller section ("the Hairpin", which is 1.5 km long), cuts across a sand dune.

1.2 Methodology

Biota Environmental Sciences (Biota) was commissioned to conduct a desktop review for the WPA and WRAC, followed by a detailed terrestrial flora and vegetation survey of the WPA, and a reconnaissance level flora and vegetation survey of the WRAC.

The greater locality of the Great Sandy Desert has been poorly sampled from a botanical perspective and there are few floristic records from the region, however two previous surveys overlap the WRAC footprint. Biota (2018a) completed a detailed flora and fauna survey of the Asian Renewable Energy Hub (AREH) for NW Interconnected Power: this study area was located to the west of the WPA, and overlapped a major portion of the WRAC. A data sharing agreement was reached for the results of that report to be utilised for this study. Astron Environmental Services (Astron) also conducted three reconnaissance level flora and vegetation surveys in the area; two entirely within the WPA, and one within the WRAC. The two surveys conducted within the WPA were conducted to facilitate clearing for road, drill pad, and airport construction. The Patterson Road Corridor survey (Astron 2019a) overlaps a large portion of the WRAC, which was also assessed during the AREH survey. The data from these surveys are amalgamated within this document to provide an overview of the region.

The first phase of the current field survey was carried out between the 12th and 17th of May 2019 (wet season), and the second phase was carried out between the 18th and 24th of September 2019 (dry season). Very little rainfall reached the WPA prior to the wet season, and neither of the survey phases was optimal for the collection of annual and cryptic perennial flora species. The WRAC was surveyed in a single visit between the 22nd and 27th of August 2019, when conditions were similarly dry.

Vegetation types were described and mapped, with replicated sampling using standard floristic survey quadrats (50 x 50 m) and relevés (unbounded floristic survey sites of a similar area to the quadrats). The WPA was sampled over two phases, with 32 quadrats and two relevés established in Phase 1 and resampled in Phase 2. One additional quadrat was established in Phase 2. Within the WRAC, eight quadrats and five relevés were established in August 2019; these data were combined with 23 quadrats and one relevé established during the AREH survey, and 28 relevés established by Astron during the Patterson Road Corridor survey. The combined results allowed for a more comprehensive flora list and floristic analysis of the WRAC.

As far as practicable, the surveys were completed in accordance with relevant Environmental Protection Authority (EPA) policy.

1.3 Vegetation

Eleven vegetation types were identified and mapped within the WPA, and an additional nine types were mapped within the WRAC. These were associated with three broad landforms:

- Longitudinal sand dunes and associated swales;
- Inter-dunal sand plains; and
- Stony rises and outcroppings.

Both the WPA and WRAC were dominated by sand plain habitat, with sand dunes becoming more prevalent in the WPA, while stony rises and outcroppings were more abundant in the WRAC. The vegetation throughout both the WPA and WRAC was in Excellent condition, barring small areas of cleared tracks and an airstrip in the east of the WPA. The Great Sandy Desert is subject to numerous fire events, and as such much of the vegetation in both the WPA and WRAC was heavily and recently burnt (May 2018).

None of the vegetation types are Threatened Ecological Communities, Priority Ecological Communities, or Groundwater Dependent Vegetation. Two units on dunes (D1 and D2) were considered to be of elevated conservation significance, as they supported high numbers of three Priority 3 flora species: *Corynotheca asperata*, *Indigofera ammobia* and *Sauropus arenosus*. In addition, areas of sand plain vegetation that had been recently burnt contained very large numbers of the Priority 2 species *Goodenia hartiana*. In some areas this species formed a low herbland, which often contained populations of many thousands of individuals.

1.4 Flora

A combined total of 278 native vascular flora species from 115 genera and 45 families have been recorded from the WPA and WRAC based on all sampling to date. Due to the limited botanical sampling in the area, many of these species represent range extensions.

No Threatened flora species were recorded from the WPA and WRAC, however nine Priority flora species have been recorded to date, as shown in Table 1.1. *Goodenia hartiana*, *Tribulopis marliesiae* and *Dasymalla chorisepala* were present in inter-dunal sand plain habitat, while the remaining species were present on the crests, sides and swales of dune habitats.

Table 1.1. Numbers of individuals of Priority flora species recorded within the WPA and WRAC.

Species	WPA		WRAC		
	Biota (current study)	Astron (2018)	Biota (current study)	Astron (2019a)	AREH (Biota 2018a)
Priority 2					
Goodenia hartiana	81,413	4,829	61,652	2,782	
Priority 3					
Bonamia oblongifolia					2
Comesperma sabulosum	10				
Corynotheca asperata	255				
Dasymalla chorisepala	21		4		
Indigofera ammobia	788	18		2	1
Sauropus arenosus	233				
Seringia katatona					150
Tribulopis marliesiae	30		7		15

No weed species have been recorded in the WPA or WRAC during any of the surveys to date.

2.0 Introduction

2.1 Project Background

Rio Tinto Winu Pty Limited (RTW) is evaluating the potential development of mineralised deposits within the Winu Project Area (WPA). The WPA is 13,361.8 ha in size, and is located approximately 320 km east of Port Hedland in the Pilbara region of Western Australia (Figure 2.1).

To provide better access to the WPA, an infrastructure corridor is also proposed. This consists of upgrades to the existing road access (including the Nyangumarta Highway), as well as two small road realignments, and the inclusion of satellite potential borrow source areas across the extent of the corridor. This infrastructure corridor is referred to as the Winu Road Access Corridor (WRAC).

To support the design of the potential development and to inform the environmental impact assessment of the project, vegetation and flora surveys of both the WPA and the WRAC were required.

2.2 Report Structure and Survey Objectives

For ease of use, this document has been structured to address the two components that comprise the project; the WPA and the WRAC.

For both components, the approach and methodology for the botanical surveys were developed with consideration of the following:

- EPA "*Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment*" (EPA 2016a);
- EPA "*Environmental Factor Guideline: Flora and Vegetation*" (EPA 2016b); and
- Rio Tinto Data Standards Guidance 2018.

More specific information for each component is provided in the sections below.

2.2.1 Winu Project Area

The WPA encompasses the mineralised deposit and the surrounding Mine Survey Area (Figure 2.1). A detailed flora and vegetation survey was undertaken within the entire WPA, building on two more targeted flora surveys. The specific details and objectives of this portion of the work are described in Table 2.1. Sections 3.0 and 6.0 of this report document the methods, results and discussion for the WPA.

2.2.2 Winu Road Access Corridor

The WRAC generally follows existing access roads from the Great Northern Highway to the WPA, with numerous potential borrow source areas identified along its extent. These borrow source areas have not been ground-truthed at the time of writing.

The majority of the WRAC intersects the development area for an unrelated project: the Asian Renewable Energy Hub (AREH), for which NW Interconnected Power is the proponent. Results of a previous detailed flora and vegetation survey undertaken for the AREH project (Biota 2018a) have been made available for use in this study, to amalgamate and align vegetation with both the WPA and WRAC in an over-arching document. In addition, a survey by Astron (2019a) was undertaken for RTW along 'Old Dump Road', which has also been included in the results. A reconnaissance level flora and vegetation survey was undertaken to assess all sections of the WRAC not previously surveyed. This included a newly planned 22.8 km shortcut between existing roads within Section 2

(The Diversion), as this constituted an area not surveyed by foot during the AREH survey (Biota 2018a). A smaller shortcut known as 'the Hairpin' was not surveyed due to its short length (1.5 km) and proximity to previously surveyed areas; vegetation types in this area were instead extrapolated based on surrounding data and aerial imagery.

The specific details and objectives of this portion of the work are described in Table 2.1. Sections 4.0 and 7.0 describe the methods, results and discussions for the WRAC. Due to the continuous nature of the vegetation through the WRAC, the various sections are generally reported on as a single entity.

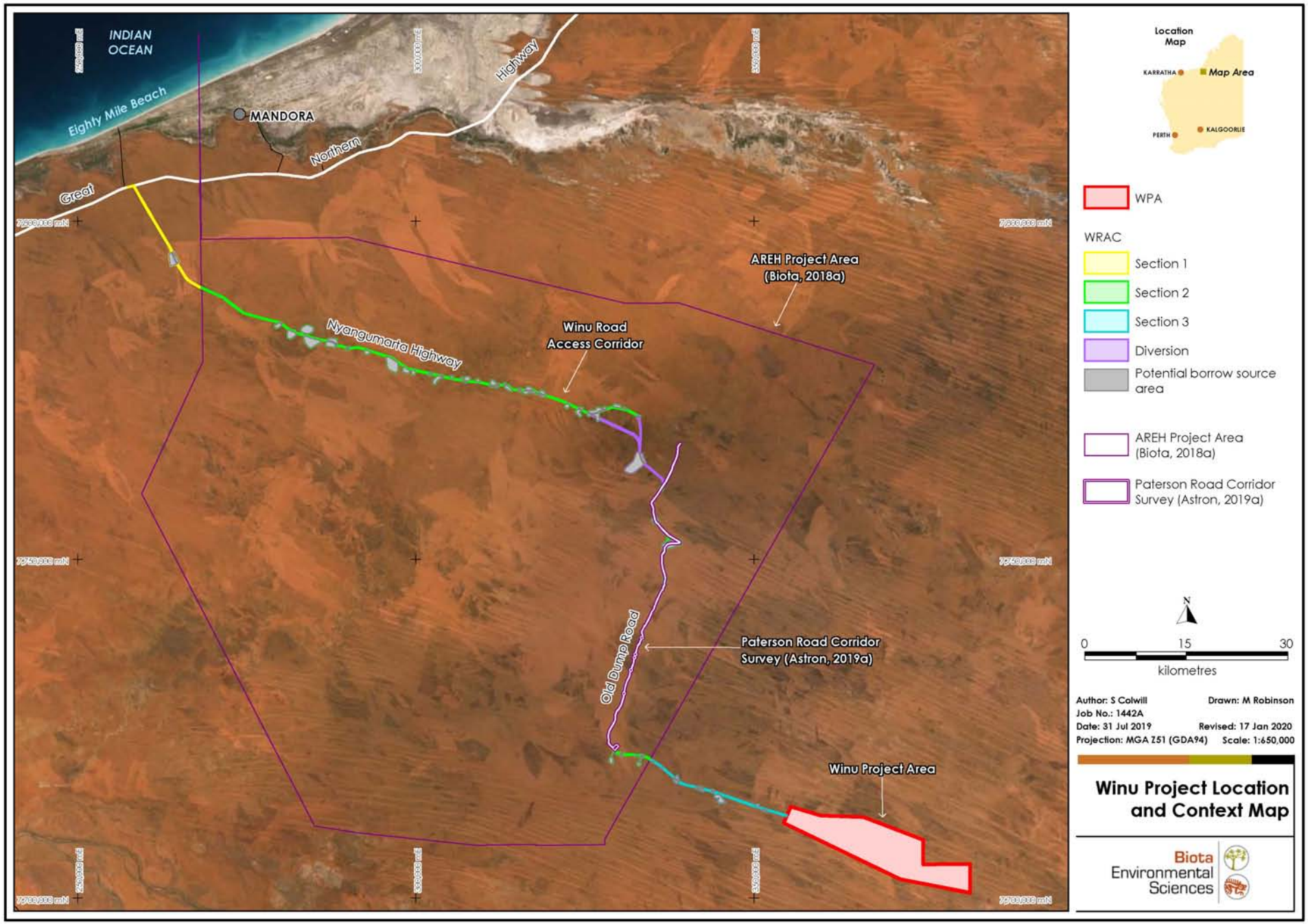

Figure 2.1: Location of the WPA and WRAC.

Table 2.1: Objectives and scope of the vegetation and flora surveys undertaken for the Winu Project.

Project Component	Report Terminology	Location	Area (ha)	Survey Description	Objective
WPA	Winu Project Area	320 km east of Port Hedland.	13,362	Two-phase detailed flora and vegetation survey (completed over the entire Mine Survey Area). NB. Two reconnaissance level flora and vegetation surveys were completed previously within the WPA (for Native Vegetation Clearing Permits) by Astron (2018, 2019b)	• Review and discuss the results of relevant database searches to determine flora and vegetation communities of conservation significance that may occur in the WPA; specifically Threatened or Priority listed flora species, Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs), and other Environmentally Sensitive Areas (ESAs); • Undertake a detailed two-phase flora and vegetation survey of the WPA; • Facilitate the involvement of Traditional Owners during the completion of the field surveys; • Describe, photograph and map the dominant vegetation units occurring within the WPA (including a description of dominant species, structure and vegetation condition, and discussion of their representation in a regional context); • Identify any vegetation units of particular conservation significance within the WPA; • Compile a list of vascular flora species recorded in the WPA; • Record and photograph flora of particular conservation significance, including Threatened and Priority species and any other species of interest; • Record any introduced flora species (weeds) occurring in the WPA; • Provide interim and final detailed reports for both surveys; and • Supply high quality spatial data from both surveys in accordance with current Rio Tinto data standards.
	Mine Development Envelope	Subset of WPA	9,988		

Project Component	Report Terminology	Location	Area (ha)	Survey Description	Objective
WRAC	Section 1	18.6 km section of the existing Nyangumarta Highway, from the Great Northern Highway to the western edge of the AREH boundary.	458	Single phase reconnaissance flora and vegetation survey	• Review and discuss the results of relevant database searches to determine fauna, flora and vegetation communities of conservation significance that may occur in the WRAC; specifically Threatened or Priority listed flora species, and TECs, PECs or other ESAs; • Undertake a single-phase reconnaissance flora and vegetation survey of the WRAC in the sections not previously surveyed (Section 1, Section 3, Diversion and Hairpin), in accordance with the requirements of relevant State and Federal guidance; • Amalgamate vegetation units from previous surveys within the area; • Describe, photograph and map the dominant vegetation units occurring within the WRAC (including a description of dominant species, structure and vegetation condition, and discussion of their representation in a regional context); • Identify any vegetation units of particular conservation significance within the WRAC; • Compile a list of vascular flora species recorded in the WRAC; • Record and photograph flora of particular conservation significance, including Threatened and Priority species and any other species of interest; • Record any introduced flora species (weeds) occurring in the WRAC; and • Supply high quality spatial data from the field survey in accordance with current Rio Tinto data standards.
	Section 2	~137 km along the existing Nyangumarta Highway and Old Dump Road, within the AREH boundary; ~220 km east of Port Hedland.	4,309 (out of the 660,686 ha AREH survey area)	Two-phase detailed flora and vegetation survey previously completed for the AREH Project (Biota 2018a), with part also surveyed as a single phase reconnaissance level flora and vegetation survey by Astron (2019a)	
	Section 3	22.6 km section of the existing Old Dump Road, from the eastern edge of the AREH boundary to the WPA.	561	Single phase reconnaissance flora and vegetation survey	
	The Diversion, the Hairpin	~22 km and 1.5 km of proposed diversion to the existing Nyangumarta Highway, within Section 2.	831	Single phase reconnaissance flora and vegetation survey	

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3.0 Methodology – Winu Project Area

3.1 Desktop Assessment

The aim of the desktop review was to identify all relevant available information in order to accurately describe the existing environment within the WPA. In particular, it sought to identify flora species and vegetation communities of conservation significance that had already been recorded from the WPA, or those that were known from the broader locality and could potentially occur. Appendix 1 contains more information regarding the framework for conservation significance ranking of communities (DEC 2010) and species in WA.

3.1.1 Database Searches

The following databases were searched to identify flora species and vegetation communities of conservation significance that had already been recorded from the WPA, or were known from the broader locality. Each of these searches was conducted using a 40 km buffer around a central point (-20.72°S, 121.74°E). The databases comprised:

1. The DBCA NatureMap database[1]. This database is the most comprehensive source of information on the distribution of WA's flora, and includes location records from the WA Herbarium Specimen Database (derived from lodgement of voucher specimens), as well as records from Threatened and Priority Flora Report Forms submitted to the DBCA.
2. The Australasian Virtual Herbarium (AVH) database[2]. This database incorporates records of both voucher and DNA specimens held at all major Australian and New Zealand herbaria.
3. The Commonwealth Department of the Environment and Energy's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters database[3]. This database includes species and communities considered to be Matters of National Environmental Significance (MNES).
4. Biota's internal database of conservation significant flora records obtained from surveys in the locality. This included the large-scale AREH survey completed in similar habitats within 20 km (to the nearest boundary) of the WPA by Biota (2018a) (see Section 5.6).

The vegetation community and flora species search results are summarised in Section 5.7.

3.1.2 Review of Historical Data from the WPA

Two reconnaissance level flora and vegetation surveys were undertaken entirely within the WPA in October 2018 (Astron 2018) and March 2019 (Astron 2019b), to address proposed clearing areas for drilling activities and airstrip construction, respectively. Results from these surveys were reviewed, and incorporated into this report where relevant.

3.1.3 Literature Review

The study completed for the AREH Project by Biota (2018a) included considerable data relevant to the broader locality, as well as a literature review of various general published references, such as those relating to bioregions and subregions (Graham 2003a, 2003b, Kendrick 2003), land systems (van Vreeswyk et al. 2004), Beard's vegetation system associations (Beard 1968, 1975), and the Eighty-mile Beach Ramsar site (Hale and Butcher 2009).

1 https://naturemap.dbca.wa.gov.au

2 http://avh.chah.org.au
2 http://avh.chah.org.au

3 http://www.environment.gov.au/epbc/protected-matters-search-tool
3 http://www.environment.gov.au/epbc/protected-matters-search-tool

The following surveys completed in the broader locality were also reviewed by Biota (2018a):

- A rare flora survey completed by Biota (2018b) on Mandora Station, approximately 9 km north of the northernmost extent of Section 1 of the WRAC. This survey sampled an area of pindan habitat immediately north of the Great Northern Highway, which comprised coastal habitat not present in the WPA or WRAC.
- Vegetation and flora surveys completed by the DBCA in the Mandora Marsh / Walyarta area, approximately 35 km north of the WRAC (English et al. 2016, Markey 2017). This survey sampled the marsh habitat, which does not extend to the WPA or WRAC.
- A vegetation and flora survey on Pardoo Station, approximately 100 km southwest of the WRAC (EnviroWorks 2017a). This survey sampled areas of near-coastal pindan habitat, as well as *Melaleuca* thickets and tidal mudflats, none of which are present in the WPA or WRAC.
- A rare flora survey on Anna Plains Station, approximately 105 km north of the WRAC (EnviroWorks 2017b). This survey sampled areas of pindan habitat similar to those within the WRAC.
- A rare flora survey completed by Biota (2017) on Nita Downs Station, approximately 125 km northeast of the WRAC. This survey sampled areas of pindan habitat similar to those within the WRAC.

Additionally, ethnobotanic surveys of the Nyangumarta Warrarn Indigenous Protected Area (see Section 5.2) have documented numerous species occurring in the area, principally those with traditional uses (see Nyangumarta Warrarn Aboriginal Corporation 2016).

In addition to the AREH study, a reconnaissance level flora and vegetation survey was conducted by Astron (2019a) in May 2019. This survey area was a corridor entirely within the AREH survey area, to the west of the WPA. Astron also completed a small targeted survey to map additional locations of *Goodenia hartiana* (P2), which was not referenced in a report, and provided to Biota as location data only.

3.2 Field Survey

3.2.1 Survey Timing and Survey Effort

The Phase 1 (wet season) component of the field survey was conducted over six days (12–17 May 2019), by a team of three botanists from Biota (Simon Colwill, Pierre-Louis de Kock and Rebecca Mason). The Phase 2 (dry season) survey was conducted over seven days (18–24 September 2019), by Simon Colwill and Rebecca Mason. All team members have a minimum of seven years of experience conducting flora and vegetation surveys.

During Phase 1 of the survey, 32 quadrats and two relevés were established, all of which were resampled in Phase 2. An additional quadrat (WIN41) was established in Phase 2. Numerous mapping notes were completed within the WPA, along with targeted searches on foot through all habitats to locate conservation significant flora and weeds (Figure 3.1). Where appropriate, mapping notes were placed from a short distance away, when visibility was high (e.g. standing on a raised sand dune) to assist with the desktop vegetation mapping.

Figure 3.1: Quadrat, relevé and mapping note locations, and foot traverses within the WPA.

3.2.2 Survey Conditions

Historical weather data (1974–2019) were obtained from the Bureau of Meteorology Telfer Aero weather station (no. 013030). Figure 3.2 charts the average monthly minimum and maximum temperatures and total rainfall for the year preceding the survey, in comparison with long-term averages.

Maximum and minimum temperatures in the six months prior to the Phase 1 survey were higher than the long-term averages (Figure 3.2). In the lead up to Phase 2, between June and September 2019, both maximum and minimum temperatures were significantly higher than long-term averages; maximum temperatures were between 5-8°C higher than average, and minimum temperatures were between 6-10°C higher than average (Figure 3.2).

Rainfall data indicate a dry period between May and October 2018, with little to no rainfall received (Figure 3.2). Between November and April 2019, some rainfall was received, however this was significantly below the long-term average (Figure 3.2). This was especially noticeable for February, which typically has the highest rainfall; only 4 mm of rainfall was received in February 2019, compared to the long-term average of 98 mm. A second dry period followed between May and September 2019.

This combination of low rainfall and high temperatures resulted in poor conditions for sampling during both of the survey phases.

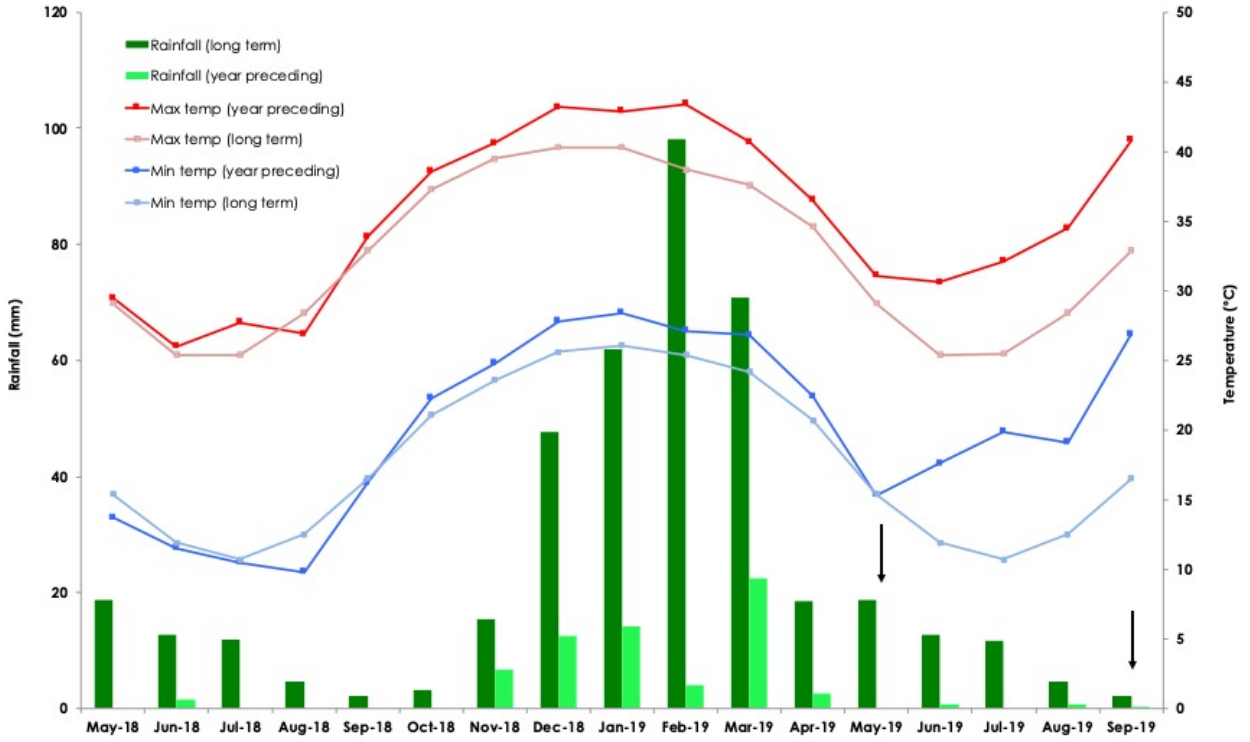

Figure 3.2: Monthly climate data for the year preceding the survey and long-term climate averages. Arrows indicate survey timing.

In addition, over half (~53%) of the vegetation in the WPA was burnt in May 2018 (Figure 3.3; fire scar digitised by Biota using imagery supplied by RTW). Additional areas were also burnt 3-5 years prior, resulting in a mosaic of fire ages across the WPA (not illustrated in Figure 3.3).

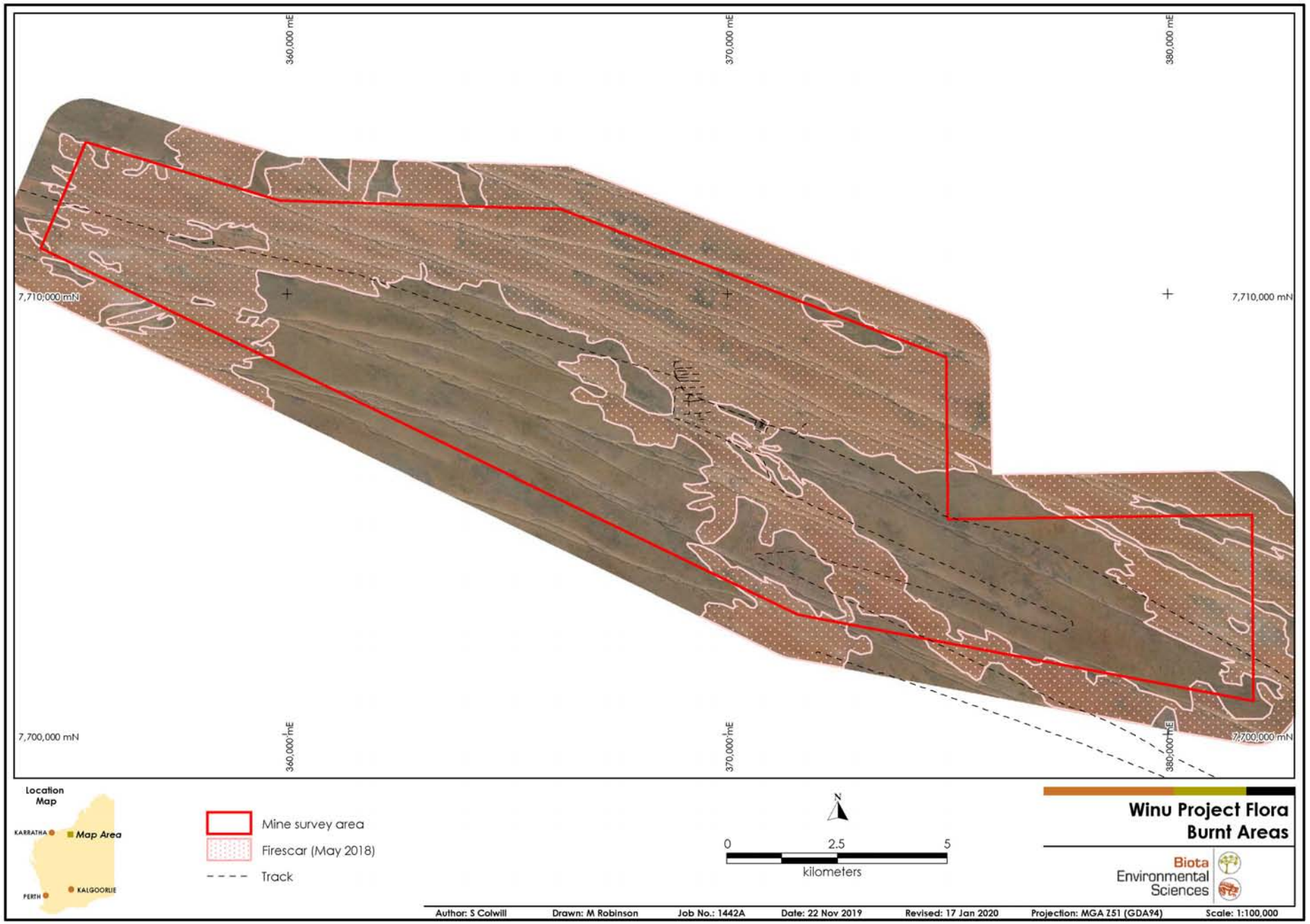

Figure 3.3 Recent fire history of the WPA.

3.2.3 Floristic Data Collection: Assessment of Quadrats and Relevés

Indicative sites were selected prior to the field survey, based on the broad habitats and vegetation types apparent. Once in the field, the actual locations of the sites were adjusted as necessary (e.g. to be placed in an area more representative of the broader vegetation type, to avoid recently burnt areas, etc.).

Sampling sites were established as either:

1. Quadrats: bounded floristic sampling sites. The standard for the Great Sandy Desert bioregion comprises a 50 m x 50 m square (or a modified shape with an equivalent area). Quadrats were measured out using optical squares and measuring tapes, and permanently marked with a steel fence dropper at each corner; or
2. Relevés: unbounded floristic sampling sites with a similar search area to a quadrat. Relevés were typically used where the target vegetation was too small or too narrow to effectively establish a quadrat. The relevés during the current survey were thoroughly surveyed for flora, but were not permanently marked.

The following parameters were recorded for all quadrats and relevés:

1. Location coordinates[4] (±5 m) were recorded using a hand-held Global Positioning System (GPS) unit; coordinates were recorded for all four corners of a quadrat. A central point was recorded as a minimum for the relevés, with a start and end point recorded for relevés that were undertaken in linear habitats such as swales;
2. Habitat: A description of the landform and habitat;
3. Soil: A broad description of the soil and any stony surface mantle or rocky outcropping;
4. Fire History: An estimate of time since last fire;
5. Disturbance Details: Vegetation condition was ranked according to the scale from EPA (2016a), which was based on that developed by Trudgen (1988); this considered evidence of grazing, physical disturbance, weed invasion etc. (see Appendix 2);
6. Vegetation Description: A broad description based on the height and estimated cover of dominant species after Aplin's (1979) modification of the vegetation classification system of Specht (1970) (see Appendix 2);
7. Flora Species: The estimated percentage foliar cover of each flora species present within the quadrat, or in the vicinity of the relevé (within a ~30 m radius of the centre point); and
8. Photograph: A representative digital photograph of the vegetation was taken, typically from the north or northwest corner of the quadrat or the central point of a relevé.

A minimum of three sampling sites was established within each vegetation type where possible, consistent with the EPA (2016a) requirements for a detailed flora and vegetation survey. The single exception to this was unit P7, which was restricted to a small geographical area, and was largely burnt; only two sample sites were installed in this unit. A summary of the raw data from the sites is provided in Appendix 3, with locations of the sampling sites shown in Figure 3.1.

3.2.4 Vegetation Description and Mapping

The scale of vegetation mapping is influenced by a range of factors including spatial characteristics of the survey area (e.g. the size and variety of habitats present), and other factors such as the scope of the survey and the availability of current, high-resolution aerial photography. The vegetation types for this study were described at the association level (level V as per the National Vegetation Information System; NVIS)[5]. This level of detail would be considered fine-scale (intra-locality) delineation of vegetation types as per EPA (2016a). In general, minor

[4] All coordinates presented in this report are in GDA94 datum and MGA51 projection.

[5] http://www.environment.gov.au/land/publications/nvis-taxonomic-review/introduction#del

variations in the vegetation were not clearly defined on aerial photography or were not practical to accurately map in the field (e.g. minor swale patches). These minor variations were incorporated into the surrounding 'parent' vegetation type.

Mapping notes were utilised to mark the boundaries of vegetation types in the field to allow for more accurate delineation of these boundaries following the survey. Mapping notes were also used as an additional way to define vegetation types when it was not practical to establish quadrats or relevés in the area.

Vegetation types and boundaries were subsequently verified using both the data collected in the field and digital imagery. Each vegetation type mapped for this assessment was given a unique alphanumeric code, comprising a character representing the broad landform group (i.e. 'D' for sand dune areas, 'P' for sand plains, and 'R' for stony rises and outcroppings), followed by a number sequence. The codes and a full description of each vegetation type are presented in Section 6.2.

Vegetation maps were created and consolidated using Geographical Information System (GIS) software (QGIS and MapInfo Professional). All maps in this report were produced by Biota's GIS team of Melissa Robinson (Senior GIS Cartographer) and Paul Sawers (GIS Manager).

3.2.5 Searches for Conservation Significant Flora and Weeds

Targeted, non-systematic searches were conducted in areas considered to be potential habitat for conservation significant flora (i.e. Threatened and Priority listed species). The routes of the foot traverses intersected all major habitats and vegetation types in the WPA (see Figure 3.1), and survey effort was increased in areas that were recognised as having a greater potential to support conservation significant or restricted species (e.g. along sand dunes). The distance between botanists during traverses varied depending on the terrain.

Locations of species of conservation significance or unknown taxa were recorded using a hand-held GPS unit. The number of individuals and extent of the population were also recorded for each location, together with the habitat and associated species. Records of conservation significant flora are provided in Appendix 4. Locations of introduced flora species (weeds) were also recorded during the foot traverses, along with an estimate of their population size.

3.3 Specimen Identification, Nomenclature and Data Entry

Common taxa that were well known to the survey botanists were confirmed in the field. A voucher specimen was collected if the taxon was either difficult to determine without closer examination, belonged to a recognised species complex, was poorly collected or otherwise unusual, or was in very good condition (healthy specimens with flowers and/or fruits are often useful to submit to the WA Herbarium). Each voucher specimen was assigned a unique internal code to facilitate tracking of data. Specimens were pressed in the field and then returned to Perth for further examination and confirmation.

Voucher specimens were identified using all available flora keys, including a draft of a new Kimberley flora kindly provided by Dr Russell Barrett (CSIRO), and comparison with reference collections of specimens at the WA Herbarium and in-house at Biota. Most specimens were identified by Pierre-Louis de Kock (Senior Botanist / Specialist Taxonomist with Biota) and Michi Maier (Principal Botanist / Director with Biota). Assistance was also sought from a number of specialist taxonomists to further resolve specimen identifications during the study, but could only be obtained from the following:

- Dr Carol Wilkins (The University of WA) confirmed the identifications of flowering specimens of *Seringia 'exastia'* and *S. katatona*.
- Ryonen Butcher (WA Herbarium) assisted with confirmation of some *Tephrosia* specimens from the WPA.

- Mike Hislop (WA Herbarium) assisted with identification and advice regarding the potential new entity related to *Acacia 'platycarpa'*, as well as confirmation of a number of Priority species.
- Steve Dillon (WA Herbarium, Rio Tinto sponsored Taxonomist) assisted with confirmation of a number of Priority species.

A full flora species list is provided in Appendix 5. Nomenclature and conservation significance rankings used in this report are consistent with the current listing of WA flora recognised by the WA Herbarium on FloraBase[6] at the time of preparation of this report.

All data were entered into a Microsoft Access database maintained at Biota, which was developed by Ted Griffin at the request of Malcolm Trudgen (M.E. Trudgen & Associates).

3.4 Analysis

3.4.1 Floristic Analysis

Hierarchical clustering analyses were conducted in PRIMER v6 (Clarke and Gorley 2006) to investigate the similarity of sampling sites based on their floristic composition. Analyses were conducted using only those sites within the WPA in order to identify the floristic groups present, with a regional analysis also completed using the small amount of relevant data that could be sourced from the broader locality.

A total of 31 quadrats and two relevés sampled within the WPA were included in the input data set. These comprised all those sampled during the current surveys, with the exception of WIN32 and WINREL02, which represented ecotonal swale vegetation.

For sites that had been sampled twice, data from the two phases were merged; where cover values differed between phases, the highest cover value was retained.

For the analysis that utilised only the sites in the WPA, the percent cover data were used (transformed using a single square root transformation). The Bray-Curtis measure of similarity was used to produce a similarity matrix. The cluster analysis (group average method) was used to determine floristic groups, with statistically different groups identified through similarity profile analysis (SIMPROF). The similarity percentage test (SIMPER) was used to determine which species contributed most to the similarities between groups. Analyses were run using all species (perennial and annual).

Only two studies contained quadrat data suitable for inclusion in a regional analysis:

1. Biota (2018a). Asian Renewable Energy Hub Detailed Vegetation and Flora Survey.
2. Astron (2019a). Paterson Road Corridor Reconnaissance Flora and Vegetation and Level 1 Fauna Survey May 2019.

For the regional analysis, all weeds were removed, along with species present at only single sites. The combined species list from the surveys was reviewed for errors and inconsistencies in nomenclature. Where there were multiple taxa that could potentially represent the same species, these were all referred to a single taxon identification code, and thus treated as a single entity in the analysis. Where a taxon name could potentially refer to more than one entity across different projects (e.g. *Euphorbia* sp.), it was excluded from the analysis. The analysis was then run on both percent cover and presence absence data. The Bray-Curtis measure of similarity was again used to produce a similarity matrix and the group average method cluster analysis was used to determine floristic groups.

6 http://florabase.dpaw.wa.gov.au

Results of all analyses were investigated through outputs including dendrograms (tree diagrams) of site similarity, and Non-metric Multi-Dimensional Scaling plots (NMDS plots). Selected inputs and outputs from the analyses are provided in Appendix 6. Due to the size of the analyses, the raw data and outputs from the larger tests are not presented in this document, however they are available on request.

3.4.2 Species Accumulation Analysis

Plots of species accumulation curves can be used to assess sampling adequacy: when a survey has sampled an adequate proportion of the floristic assemblage, the curve should plateau and approach an asymptote. EstimateS (Colwell 2013) was used to calculate smoothed species accumulation curves based on 100 random permutations of the species data; only quadrat and relevé data were used (opportunistic records were excluded), and the sampling sites were randomly assigned an order. Seasonally sampled quadrats were treated as separate samples.

Species accumulation curves alone cannot be reliably used to extrapolate predicted species richness for future biological sampling. In order to estimate asymptotic richness (i.e. an extrapolation of species richness) for the incidence data (i.e. presence, rather than abundance data), the Chao 2 Mean and ICE Mean estimators were calculated using EstimateS.

3.5 Limitations of the Study

In accordance with the EPA *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a), potential constraints and limitations of the botanical survey of the WPA are addressed in Table 3.1. Limitations of the WRAC survey are discussed in Section 4.5.

Table 3.1: Potential constraints and limitations of the WPA surveys.

Potential Constraint	Statement of Limitations
1. Availability of contextual information at a regional and local scale	A small section (3%) of the WPA has been surveyed previously by Astron (2018, 2019b) in advancement of activities associated with exploration programs for the Winu Project. The WRAC also overlaps with a large portion of the AREH survey area (Biota 2018a). The latter study and the Patterson Road survey by Astron (2019a) provided some contextual information for the current study. The current survey has added significant new data to the WPA however broader contextual data is somewhat lacking, and is considered to be a limiting factor for this study.
2. Competency/ experience of the team carrying out the survey, including experience in the bioregion surveyed	Sufficient time was allocated to the current field survey component (18 person days for Phase 1, and 14 for Phase 2). The field personnel were also suitably qualified to identify flora, with all botanists having a minimum of seven years experience in the adjacent Pilbara bioregion. External specialist taxonomists were contacted for assistance with specimen identifications as required. Resourcing and experience were therefore not considered to be limitations.
3. Proportion of flora recorded and/or collected, any identification issues	All vascular flora encountered in the WPA during the current surveys were recorded, comprising 170 native taxa. Almost all of the flora specimens collected during the current field surveys (>95%) were of sufficient quality to be fully determined to the lowest relevant taxonomic level. Identification of flora was not considered to be a limitation.
4. Appropriate area fully surveyed (effort and extent)	A detailed survey as described by EPA (2016a) was considered appropriate to address the requirements for an environmental impact assessment of the WPA. The 13,362 ha footprint was sampled with 33 quadrats, two relevés, and 206 map notes, with additional rare flora searches also completed. All but one vegetation type (P7) described for the WPA included at least three replicated sampling sites. Unit P7 was restricted to a small area and heavily burnt; only two sites could be established. Survey effort and extent for the WPA were not considered to be a limitation for the study.

Potential Constraint	Statement of Limitations
5. Access restrictions within the WPA	All tracks were in good condition and suitable survey sites could be located nearby. Some sections of the WPA were a large distance from any tracks and required considerable time to ground-truth on foot. These areas could not be visited easily due to personnel constraints and safety concerns. Interpretation of aerial imagery during the vegetation mapping process was used to verify that the habitats that were systematically sampled were likely to be representative of the inaccessible areas. Access to the current WPA was therefore considered to be only a minor limitation.
6. Survey timing, rainfall, season of survey	Despite the timing of the Phase 1 survey following the typical 'wet season' for the area, the conditions at the time of this survey were relatively dry. The Phase 2 'dry season' survey was also very dry, and temperatures were higher than average during both phases. Rainfall was considered a limitation for this study.
7. Disturbance that may have affected the results of survey such as fire, flood or clearing	Clearing in the area for drill lines, tracks and an airstrip was minimal and was not limiting to the results of the assessment. However, over half (53%) of the WPA had been affected by recent fires, which led to altered species composition of large portions of the WPA. This made accurate assessment of the vegetation types difficult in some areas, although in most cases small patches of remnant vegetation and minor regrowth were considered sufficient to determine vegetation boundaries, when used in conjunction with examination of historical aerial imagery. Disturbance from fire is considered to be a limitation for the study, as it may have impacted the flora species list recorded and delineation of some vegetation boundaries.

4.0 Methodology – Winu Road Access Corridor

Several aspects of the methodology for the WRAC component of this study were the same as those conducted for the WPA, as documented in Section 3.0. Only aspects that differ or are specific to the WRAC have been described in the following sections.

4.1 Desktop Assessment

The aim of the desktop review was to identify all relevant available information in order to accurately describe the existing environment within the length of the WRAC.

4.1.1 Database Searches

Searches of the DBCA NatureMap database, the AVH database and the EPBC Act Protected Matters database (see Section 3.1.1) were completed by Biota (2018a). The areas for the NatureMap and AVH searches comprised the AREH study area boundary, while the EPBC Act Protected Matters search was completed using a 100 km buffer around an approximate central point for the AREH study area (-20.28699°S, 121.10484°E). Biota's internal database of conservation significant flora records was also searched for surveys completed in similar habitats within 50 km of the AREH study area. As the boundary of these searches encompassed the WRAC Sections 1, 2, 3 and the Diversion, no further searches were considered to be required for the WRAC.

The vegetation community and flora species search results are summarised in Section 5.7.

4.1.2 Review of Historical Data from the WRAC

Sampling effort, methodology and results for Section 2 of the WRAC were partially sourced from the recently completed surveys for the AREH (Biota 2018a), which included broad survey of Section 2 of the WRAC. These data are re-presented in this report where relevant to the WRAC, under the terms of a mutual data sharing arrangement agreed to by RTW and NW Interconnected Power (the proponent for the AREH).

In addition, Astron (2019a) surveyed the southern part of Section 2 of the WRAC (Old Dump Road) for RTW in May 2019. These data have also been combined in this report with the AREH data to form a more complete picture of the flora and vegetation along the WRAC. Most of the data were taken from the AREH report, given its more encompassing area and two-phase detailed survey.

4.1.3 Literature Review

The literature review conducted for the WPA was broad scale and also encompassed the WRAC (see Section 3.1.3).

4.2 Field Survey

4.2.1 Survey Timing and Survey Effort

Section 1, Section 3 and the Diversion of the WRAC were surveyed as a single phase reconnaissance level flora and vegetation survey over 10 person days between the 22nd and 27th of August 2019, by botanists Simon Colwill and Rebecca Mason. The remaining areas (the Hairpin, and proposed borrow source areas) are scheduled for field works in early 2020.

Eight quadrats and five relevés were established in August 2019 along the surveyed areas of the WRAC, with targeted searches for Priority flora also completed. The Diversion was searched on

foot in its entirety, as there was no existing road access to the area. Vegetation in the eastern arm of the Diversion was mapped by Senior Zoologist Penny Brooshooft and Zoologist Joshua Keen on the 26th of September 2019, with units subsequently confirmed by Simon Colwill (Botanist).

Section 2 of the WRAC (Nyangumarta Highway and Old Dump Road) is within the boundary of the AREH study area (Biota 2018a), and was surveyed during a two-phase detailed flora and vegetation survey, conducted over 72 person days between the 24th of August and 5th of September 2017 and the 13th to 21st of March 2018, led by Michi Maier (Biota's Principal Botanist). Old Dump Road has also been surveyed and mapped by Astron (2019a), in a single phase survey by Ecologist Lucy Dadour and Botanist Dr Markus Mikli over 22 person days in May 2019.

The final locations of the potential borrow source areas have not yet been identified by RTW. Vegetation types in these areas, and in the short 'Hairpin', have been mapped based on extrapolation of surrounding data, but the areas have not been ground truthed for validity of mapping, nor searched for conservation significant flora. An additional survey of these areas is planned for early 2020.

4.2.2 Survey Conditions

The WRAC survey in 2019 was completed between the Phase 1 and Phase 2 surveys of the WPA. The weather leading up to this period was hot and dry, resulting in sub-optimal conditions for collecting annual or cryptic perennial flora (see Section 3.2.2).

4.2.3 Floristic Data Collection: Assessment of Quadrats and Relevés

The establishment of sites within the WRAC followed the same methodology as within the WPA (see Section 3.2.3); this was also true of the AREH survey (2018a) and the survey by Astron (2019a).

A total of eight quadrats, five relevés, and numerous map notes were established during the WRAC survey. During the AREH survey, Biota (2018b) established 23 quadrats and 1 relevé within or in close proximity to the WRAC, while Astron (2019a) established 25 relevés within the WRAC. A summary of the raw data from the sites is provided in Appendix 3, with locations of the sampling sites shown in Figure 4.1 to Figure 4.3.

4.2.4 Vegetation Description and Mapping

Vegetation description and mapping for the WRAC followed the same methodology as utilised in the WPA (see Section 3.2.4); this was also true of the AREH survey (Biota 2018a), and the survey by Astron (2019a). Vegetation mapping for this report represents a combined list from all proponents, amalgamating site data and vegetation descriptions to present a complete and continuous list of vegetation types across the extent of the WRAC. The same alphanumeric coding from the WPA vegetation list (Section 6.2) was built upon for the WRAC to avoid confusion.

The potential borrow source areas along the WRAC and the 'Hairpin' were not yet surveyed at the time of writing, but have been mapped via aerial imagery and sites of close proximity. This mapping may change once ground truthing has been completed.

4.2.5 Searches for Conservation Significant Flora and Weeds

Searches within the WRAC were conducted using the same methodology as described in Section 3.2.5, as for the AREH survey (Biota 2018a), and the survey by Astron (2019a). Track logs from foot traverses within the WRAC are presented in Figure 4.1 to Figure 4.3.

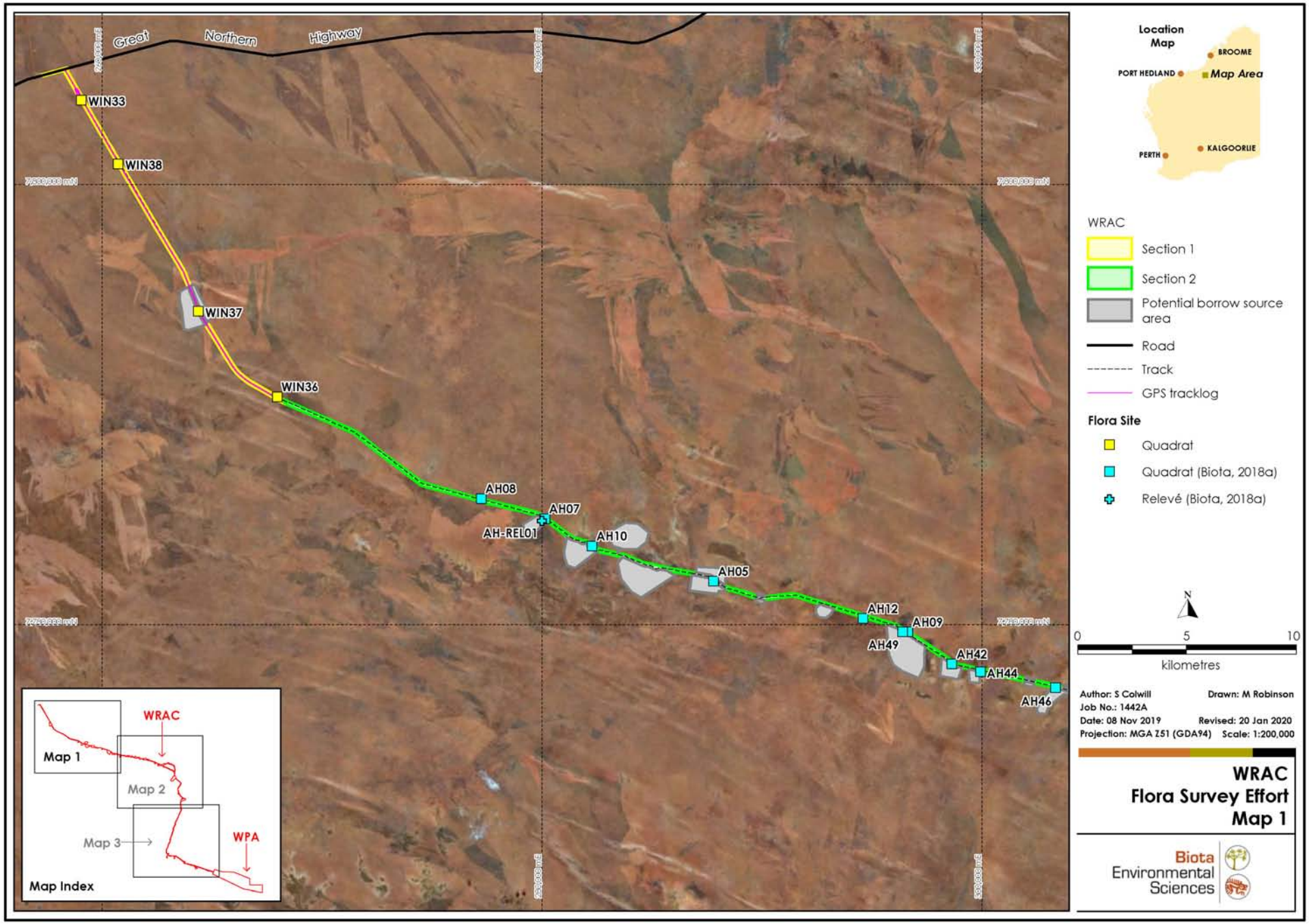

Figure 4.1 **Survey effort for WRAC Section 1 and western part of Section 2.**

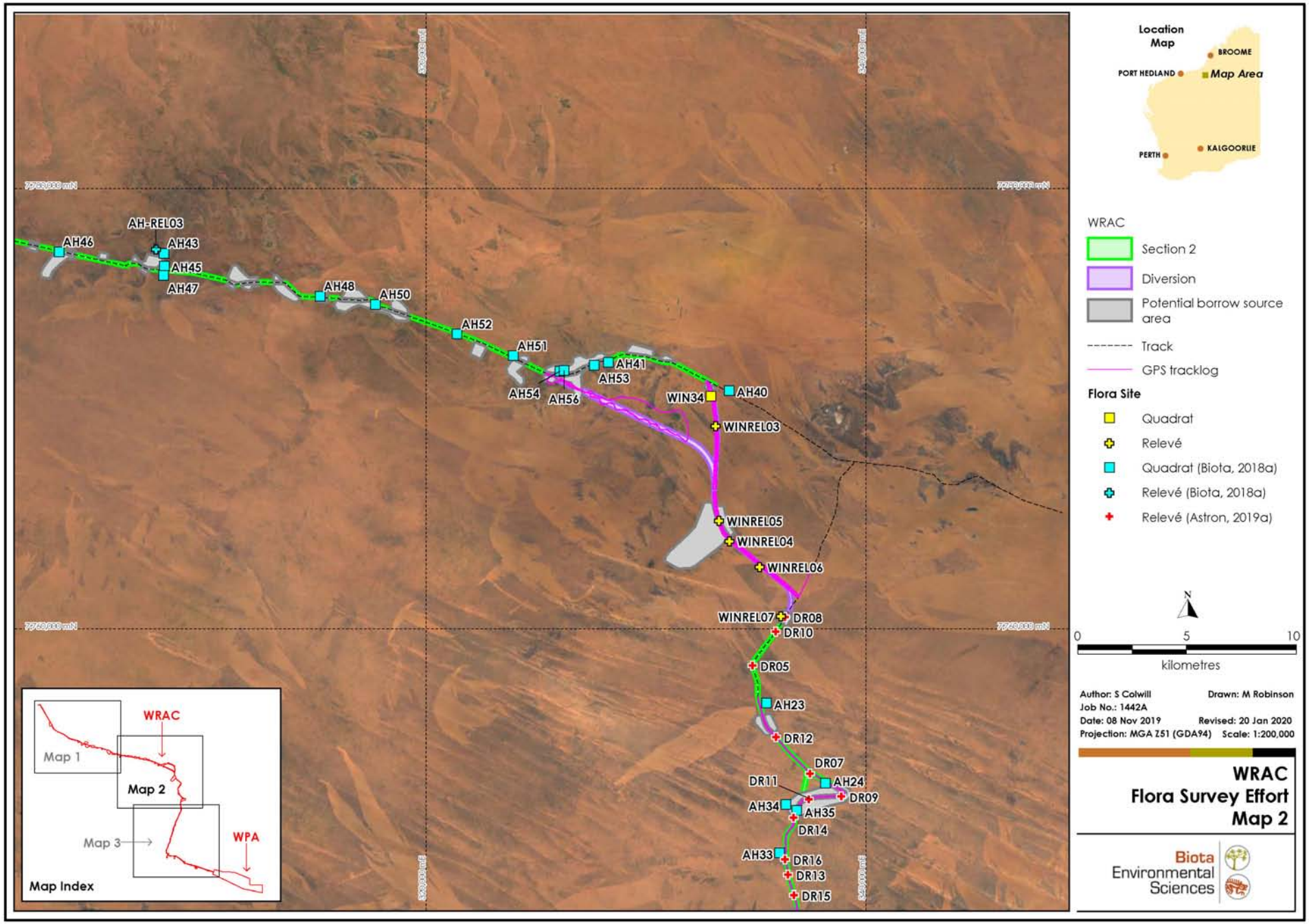

Figure 4.2 Survey effort for central part of WRAC Section 2 and the Diversion.

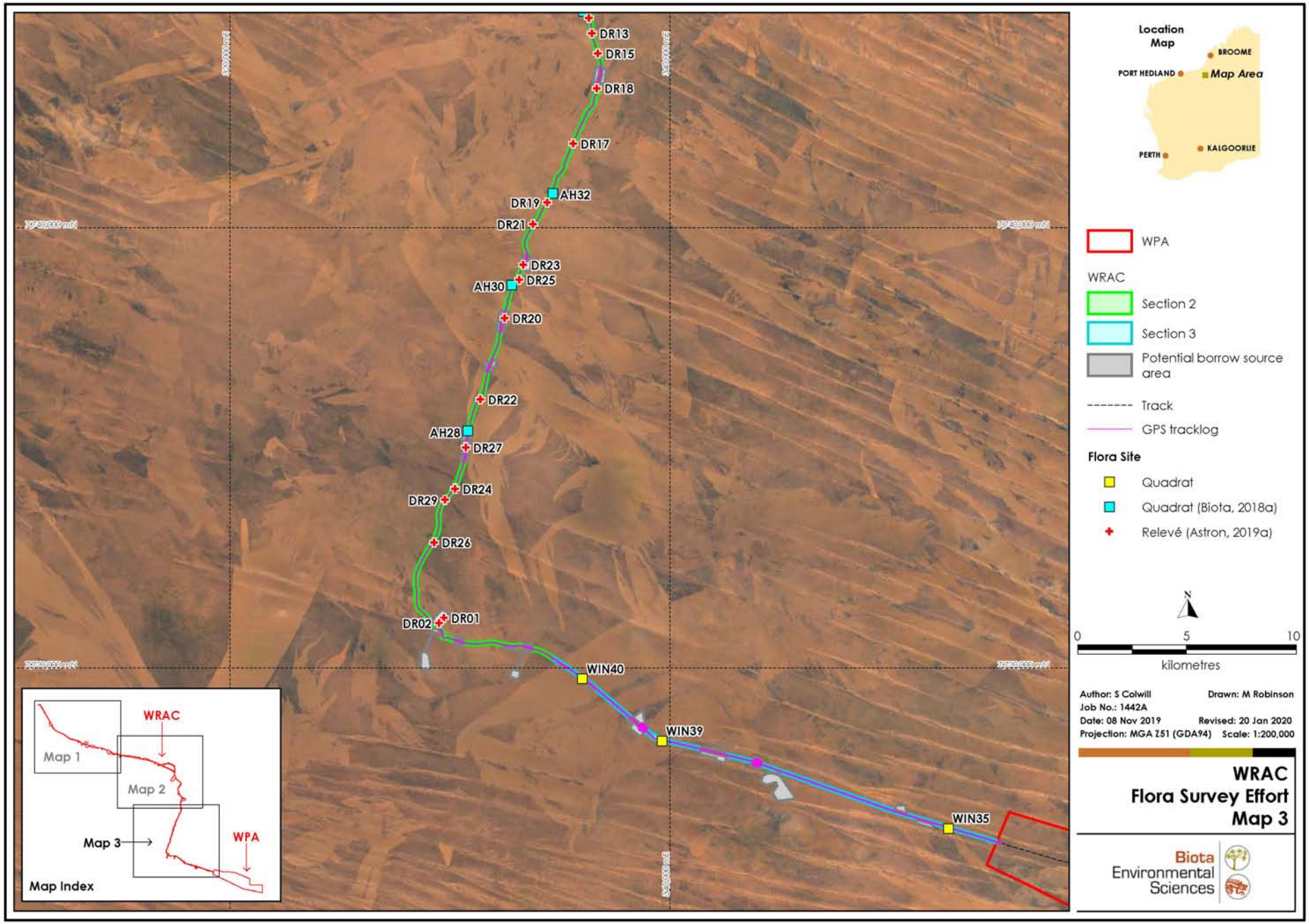

Figure 4.3 **Survey effort for eastern part of WRAC Section 2 and Section 3.**

4.3 Specimen Identification, Nomenclature and Data Entry

These components were completed as for the WPA (see Section 3.3).

4.4 Analysis

The species accumulation analysis and floristic analysis were completed in the same manner as for the WPA (see Section 3.4). A regional analysis was conducted including a total of 94 quadrats and four relevés assessed by Biota (2018b) from across the AREH Project Area, 28 relevés assessed by Astron (2019a) from within the WRAC, the 33 quadrats and two relevés from within the WPA, together with the eight quadrats and five relevés assessed during the field survey in August 2019. A further analysis was conducted using a dataset of only the sites within the WRAC. Two sites from the WPA (WIN32 and WINREL02), which were located in ecotones and excluded from the smaller dataset used in the WPA analysis, were included in the larger scale regional WRAC analysis, as increased data allowed for better regional separation.

4.5 Limitations of the Study

In accordance with the EPA *Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a), potential constraints and limitations of the botanical survey of the WRAC are addressed in Table 4.1.

Table 4.1: Potential constraints and limitations of the WRAC survey.

Potential Constraint	Statement of Limitations
1. Availability of contextual information at a regional and local scale	This report includes compilation of information from three separate surveys. The WRAC overlaps with a large portion of the AREH survey area (Biota 2018a), as well as the Paterson Road survey by Astron (2019a). These surveys provide specific information relevant to some sections of the WRAC, as well as contextual information, with two additional surveys also contributing to the latter (Astron 2018, 2019b). The current survey has added significant new data to the WRAC and contextual surrounds. Contextual information was therefore considered to be a minor limiting factor for this study.
2. Competency/ experience of the team carrying out the survey, including experience in the bioregion surveyed	Sufficient time was allocated to the current field survey component (10 person days). The field personnel were also suitably qualified to identify flora, with all botanists having a minimum of seven years' experience in the adjacent Pilbara bioregion. External specialist taxonomists were contacted for assistance with specimen identifications as required. Resourcing and experience were therefore not considered to be limitations.
3. Proportion of flora recorded and/or collected, any identification issues	All vascular flora encountered in the WRAC in 2019 were recorded, totalling 201 native taxa as detailed in Section 7.6. Almost all of the flora specimens collected during the current field surveys (>95%) were of sufficient quality to be fully determined to the lowest relevant taxonomic level. Identification of flora was not considered to be a limitation.
4. Appropriate area fully surveyed (effort and extent)	A single phase reconnaissance level survey as described by the EPA (2016a) was considered appropriate to address the requirements for an environmental impact assessment of the WRAC, given that the vast majority lies within the AREH study area, and some of the WRAC has also been directly surveyed by Astron (2019a). These previous surveys allow a compilation of information to form a broad picture of the flora in the area. The WRAC was surveyed with a minimum of two sites per vegetation type, with additional sites drawn on from the previous surveys in the area. Where the WRAC could not be confidently mapped to existing vegetation units, the area was ground truthed with sites and Priority flora searches. Due to the project planning, the WRAC

Potential Constraint	Statement of Limitations
	could not be surveyed over two phases, and the species list may therefore be limited because of this. Eight quadrats and five relevés were established in the WRAC by Biota during the Winu survey; 23 quadrats and one relevé were previously assessed by Biota (2018b), and 25 relevés were assessed by Astron (2019a). When data from the three projects was integrated, the majority of vegetation types were replicated with at least three sampling sites. Vegetation types D3, P12, and R4 were each represented by only two sample sites, from the AREH study area. These vegetation types had a very limited spatial distribution within the WRAC, however more sites were established in these vegetation types in the broader AREH study area. Vegetation type P7 was also limited spatially, and not assessed by Biota during the WRAC survey. Only a small section of this vegetation type was present; this was mapped from aerial imagery and matched to its likely counterpart from the WPA, in which two sites were established. This vegetation type appears to have a limited distribution in the locality. Survey effort and extent for the survey were not considered to be a limitation for the study.
5. Access restrictions within the WRAC	All of the existing tracks were in good condition and representative sites could be established nearby. One section (the Diversion) was a considerable distance from existing tracks, however this area was surveyed on foot from existing tracks or via access with a helicopter. Interpretation of aerial imagery during the vegetation mapping process was used to verify that the habitats that were systematically sampled were likely to be representative of the inaccessible areas. Access to the current WRAC was therefore considered to be only a minor limitation.
6. Survey timing, rainfall, season of survey	The WRAC survey was conducted in between the Phase 1 and Phase 2 surveys of the WPA, and would be considered a 'dry season' survey. The condition of the vegetation reflected this, with rainfall poor leading up to the survey. No 'wet season' survey was conducted. Seasonal conditions are therefore considered a limiting factor for the study.
7. Disturbance that may have affected the results of survey such as fire, flood or clearing	The WRAC had been affected by recent and extensive fires, which led to altered species composition of large portions of the area, making accurate assessment of the vegetation types difficult in some areas. However in most cases small patches of remnant vegetation and minor regrowth were considered sufficient to determine vegetation boundaries, when used in conjunction with examination of historical aerial imagery, and data from the previous surveys in the area. Clearing in the area for existing roads and tracks was minimal and was not limiting to the results of the assessment. Disturbance was therefore considered to be a minor limitation for the study.

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5.0 Existing Environment

5.1 IBRA Bioregion and Subregion

The Interim Biogeographic Regionalisation of Australia (IBRA) identifies 89 bioregions across Australia (Environment Australia 2000).

The WPA and WRAC are located predominantly within the Great Sandy Desert IBRA bioregion. This is divided into six subregions, of which only the Mackay and McLarty subregions are relevant to the current project (Figure 5.1). The WPA is located entirely within the Mackay subregion. The WRAC extends from the Mackay subregion in the southern extent, through the McLarty subregion, with a small portion of the northern extent within the Pindanland subregion of the Dampierland bioregion (Figure 5.1).

The three subregions are summarised below:

- The Mackay subregion (18,636,695 ha) comprises the "tropical inland 'red-centre' desert, and includes the 'Percival' and 'Auld' palaeoriver systems. Mainly tree steppe grading to shrub steppe in south; comprising open hummock grassland of *Triodia pungens* and *Triodia schinzii* with scattered trees of *Owenia reticulata* and bloodwood (*Corymbia* spp.), and shrubs of *Acacia* spp., *Grevillea wickhamii* and *G. refracta*, on Quaternary red longitudinal sand dune fields. The climate is arid tropical with summer rainfall, and monsoonal influences are apparent in the northwestern sector of this region" (Kendrick 2003). The vegetation is similar to the McLarty subregion.
- The McLarty subregion (13,173,266 ha) "includes the Mandora palaeoriver system and red-brown dune fields with finer texture than further south. It also includes gravelly surfaces of Anketell Ridge along its northern margin. The subregion is arid tropical with summer rain and is influenced by monsoonal activity. Morning fogs are recorded during the dry season. The vegetation is mainly tree steppe grading to shrub steppe in the south; comprising open hummock grassland of *Triodia pungens* and *Triodia schinzii* with scattered trees of *Owenia reticulata* and Bloodwoods (*Corymbia* spp.), and shrubs of *Acacia* spp., *Grevillea wickhamii* and *G. refracta*, on Quaternary red longitudinal sand dune fields overlying Jurassic and Cretaceous sandstones of the Canning and Amadeus Basins. Gently undulating lateritised uplands support shrub steppe" (Graham 2003a). Wetland features in the subregion include isolated mound springs supporting *Melaleuca leucadendra* closed forests, and *Melaleuca glomerata - M. lasiandra* shrublands around salt lakes (Graham 2003a).
- The Pindanland subregion (5,198,904 ha) "comprises sandplains of the Dampier Peninsula and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. This is the coastal, semi-arid, northwestern margin of the Canning Basin. The climate is described as dry hot tropical and semi-arid with summer rainfall. The average annual rainfall is between 450 – 700 mm, slightly lower than the Fitzroy Trough subregion" (Graham 2003b). The vegetation is described primarily as pindan, but includes *Melaleuca alsophila* low forests on coastal plains, and *Spinifex* spp. – *Crotalaria* spp. strand communities (Graham 2003b).

5.2 Native Title

The WPA encompasses two Native Title determination areas, comprising the Nyangumarta Native Title determination in the north (overlapping 70% of the Mine Survey Area), and the Martu Native Title determination in the south (Figure 5.1). The WRAC is entirely included in the Nyangumarta Native Title determination (Figure 5.1).

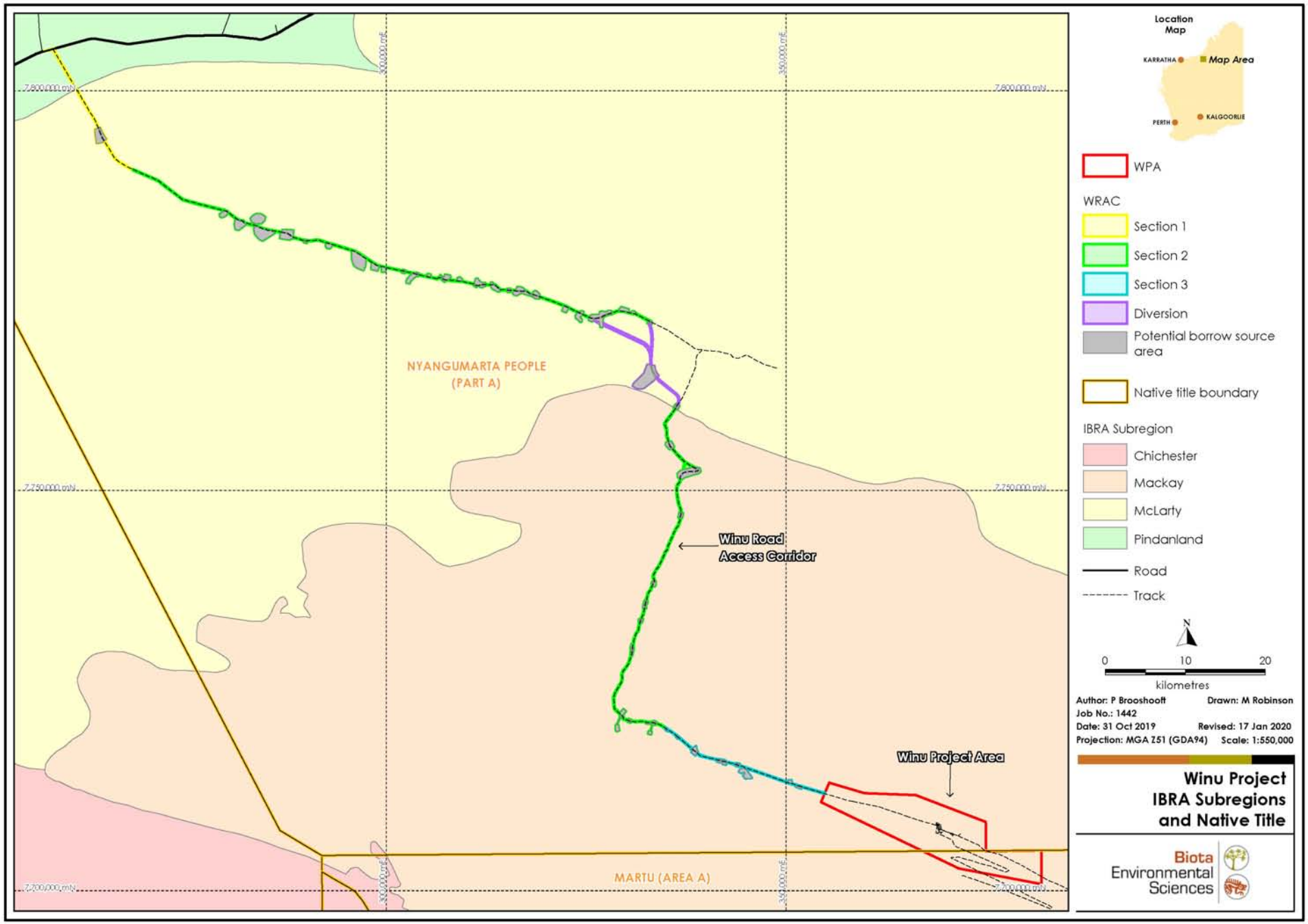

Figure 5.1: IBRA subregions and Native Title boundaries in the locality of the WPA and WRAC.

5.3 Surface Geology and Soils

Mapping of the surface geological units in the locality was prepared based on data from Stewart et al. (2008). The majority of the WPA (98%) is dominated by dune geology (Qd), with two smaller areas of sandstone and siltstone with interbedded conglomerate (Ksak) (Table 5.1, Figure 5.2). The northern extent (Nyangumarta highway) of the WRAC is a mosaic of the broadly dominant sand plains (Czs), intersected with numerous small sections of ferruginous duricrust laterite (Czl), and fluviatile sandstone conglomerate (JKsc). The southern section (old dump road) consists of both sand plains (Czs), and sand dunes (Qd), with dune geology dominating more towards the southern end (Table 5.1, Figure 5.2).

Four broad soil types have been mapped in the WPA and WRAC (Agriculture Western Australia 1967) (see Table 5.2 and Figure 5.3). Unit AB39 represents the majority (92%) of the WPA, with small outer pockets of AB40 (8%) Table 5.2. These two units are both described as gently undulating plains with longitudinal dunes, however AB40 is more elevated in the landscape than AB39. The WRAC is represented by three broad soil types, mostly dominated by AB22 (58%), and AB21 (27%), with the southern end featuring more AB39 (15%). Both AB21 and AB22 are similarly described as gently undulating sand plains, however AB22 features many rocky sandstone residuals.

5.4 Land Systems

The then Department of Agriculture Western Australia mapped land systems for the Rangelands regions of WA, however the current land system dataset does not entirely cover the WPA (van Vreeswyk et al. 2004). Within the existing land system data set, there is a large polygon of the Little Sandy land system that is likely to represent the entirety of the WPA. The Little Sandy land system also occurs in the WRAC, and is described and mapped in Table 5.3 and Figure 5.4.

The WRAC intersects four land systems along its extent: Little Sandy, Nita, Callawa, and Buckshot (Table 5.3, Figure 5.4). The southern area (encompassing 'Old Dump Road') of the WRAC is dominated by the Little Sandy land system, while the northern section (encompassing 'Nyangumarta Highway') is a mosaic of the Nita and Callawa land systems. The Nita land system features sandplains supporting shrubs, spinifex grasslands, and occasional trees, while the Callawa land system features highly dissected low hills, mesas, and gravelly plains of sandstone and conglomerate. The Callawa land system is relatively restricted to small mosaic patches; the WRAC intersects numerous small occurrences of this land system, covering almost 3% (Table 5.3) of the system's total extent. The Buckshot land system is present in two small areas, and features gravelly sand plains and occasional sand dunes.

5.5 Beard's Regional Vegetation Mapping

Broad-scale vegetation mapping for the locality has been prepared at the 1:1,000,000 scale based on the work of J.S. Beard for the Pilbara (Beard 1975) and Great Sandy Desert (Beard 1968). The WPA includes only one of Beard's vegetation system associations: 'Great Sandy Desert 134' (Table 5.4 and Figure 5.5). The WRAC was mapped as a mosaic of 'Great Sandy Desert 134', along with the 'Mandora East 80, 101, 117' and 'Pindan 32' vegetation system associations, as described below:

- Great Sandy Desert 134 comprises a mosaic: Hummock grasslands, open low tree steppe; Desert Bloodwood and Feathertop Spinifex (*Triodia schinzii*) on sandhills / Hummock grasslands, shrub steppe; mixed shrubs over spinifex between sandhills;
- Mandora East 80 comprises hummock grasslands and low tree steppe with Desert Walnut over soft spinifex between sand ridges;
- Mandora East 101 comprises hummock grasslands and shrub steppe with *Acacia pachycarpa* over soft spinifex;
- Mandora East 117 comprises hummock grasslands and grass steppe with soft spinifex;
- Pindan 32 comprises pindan sand plain with *Acacia* shrubland with scattered low trees over *Triodia* spp.

The pre-European and current extents of Beard's vegetation system associations have been calculated using interpretation of imagery to determine areas that have been cleared (see Shepherd et al. 2002, and Government of Western Australia 2018). According to this, none of the system associations have had extensive clearing, and the WPA and WRAC contain very small proportions of the current extents. The largest of these is the Mandora East 117 association, with the WRAC containing 1.24% of its current extent (Table 5.4).

Table 5.1: Description and extent of surface geology units in the WPA and WRAC.
Data from Geoscience Australia (Stewart et al. 2008).

Geological Unit	Description	Area (ha) in WPA	% of WPA	Area (ha) in WRAC	% of WRAC
Czl	Ferruginous duricrust: Pisolitic, nodular or vuggy ferruginous laterite; some lateritic soils; ferricrete; magnesite; ferruginous and siliceous duricrusts and reworked products, calcrete, kaolinised rock, gossan; residual ferruginous saprolite.	–	–	3,317	21%
Czs	Sand plain: Sand or gravel plains; quartz sand sheets commonly with ferruginous pisoliths or pebbles, minor clay; local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium, aeolian sand.	–	–	9,757	61%
JKsc	Callawa Formation: Fluviatile cross-bedded very fine to coarse-grained sandstone, granule conglomerate and minor siltstone; plant and trace fossils.	–	–	236	1%
Ksak	Poorly sorted, cross-bedded and partly bioturbated, paralic fine sandstone and siltstone with interbedded coarse sandstone and conglomerate.	208	2%	–	–
Kspa	Parda Formation: Mudstone, claystone; minor fine-grained sandstone; macrofossils; shallow marine deposits.	–	–	17	<1%
Qd	Dunes: sandplain with dunes and swales; may include numerous interdune claypans; residual and aeolian sand with minor silt and clay; aeolian red quartz sand, clay and silt, in places gypsiferous; yellow hummocky sand.	13,154	98%	2,751	17%

Table 5.2: Description and extent of soil units in the WPA and WRAC.
Data from Agriculture Western Australia (1967).

Soil Unit	Description	Area (ha) in WPA	% of WPA	Area (ha) in WRAC	% of WRAC
AB21	Pindan country: gently undulating sand plain with a few small rocky sandstone residuals; no external drainage: chief soils are red earthy sands (Uc5.21), with associated (Uc5.11) and hummocks of siliceous sands (Uc1.23).	–	–	1,693	27%
AB22	Gently undulating sand plain as for unit AB21 but with many rocky sandstone residuals: chief soils are red earthy sands (Uc5.21), with (Uc5.11) and (Uc1.23) as for unit AB21. Associated are bare rock and shallow sands, probably (Uc1.4), of the sandstone residuals.	–	–	3,564	58%
AB39	Gently undulating plains dominated by longitudinal dunes of varying frequency; some exposures of ironstone gravels on low rises occur in the dune swales: chief soils are red earthy sands (Uc5.21) on dune slopes, and inter-dune plains with red siliceous sands (Uc1.23) on the dunes. Other soils include (KS-Uc5.21) on the gravelly rises where an ironstone (laterite) duricrust is present at about 45 cm depth; and (Um5.11) on small included areas of calcrete (kunkar).	12,291	92%	901	15%
AB40	Gently undulating plain slightly more elevated than unit AB39, and dominated by longitudinal dunes, many exposures of ironstone gravels and some breakaways capped by ironstone (laterite) duricrust: chief soils are red earthy sands (Uc5.21), with red siliceous sands (Uc1.23) on the dunes. There is an increased amount of (KS-Uc5.21) soil compared with unit AB39, and locally it may become dominant.	1,070	8%	–	–

Table 5.3: Description of land systems within the WRAC.
Data from Department of Agriculture WA (van Vreeswyk et al. 2004).

Land System	Area Within WRAC (ha)	% of WRAC	Extent within McLarty, Mackay and Pindanland Subregions (ha)	% of Subregional Extent Within WRAC	Description
Buckshot	96	<1%	7,944	1%	Gravelly sandplains and occasional sand dunes supporting hard spinifex grasslands.
Callawa	2,922	20%	97,793	3%	Highly dissected low hills, mesas and gravelly plains of sandstone and conglomerate supporting soft and hard spinifex grasslands.
Little Sandy	5,007	35%	676,257	<1%	Sandplains with linear and reticulate dunes supporting shrubby hard and soft spinifex grasslands.
Nita	6,386	44%	1,429,175	<1%	Sandplains supporting shrubby spinifex grasslands with occasional trees.

Table 5.4: Description and extent of Beard's broad vegetation units in the WPA and WRAC, together with pre-European and current extents.
Data from Government of Western Australia (2018).

Beard's Vegetation System Association	System Association Code	Total Extent in McLarty, Mackay and Pindanland Subregions		Area in WPA (ha)	% of WPA	% of Current Extent in WPA	Area in WRAC (ha)	% of WRAC	% of Current Extent in WRAC
		Pre-European Extent	Current Extent						
Great Sandy Desert 134	134	11,218,536	11,217,944	13,362	100%	<1%	1,847	30%	<1%
Mandora East 80	80	294,53	294,534	–	–	–	633	10%	<1%
Mandora East 101	101	570,039	569,993	–	–	–	657	11%	<1%
Mandora East 117	117	242,002	235,135	–	–	–	2,923	47%	1%
Pindan 32	32	244,906	244,875	–	–	–	97	2%	<1%

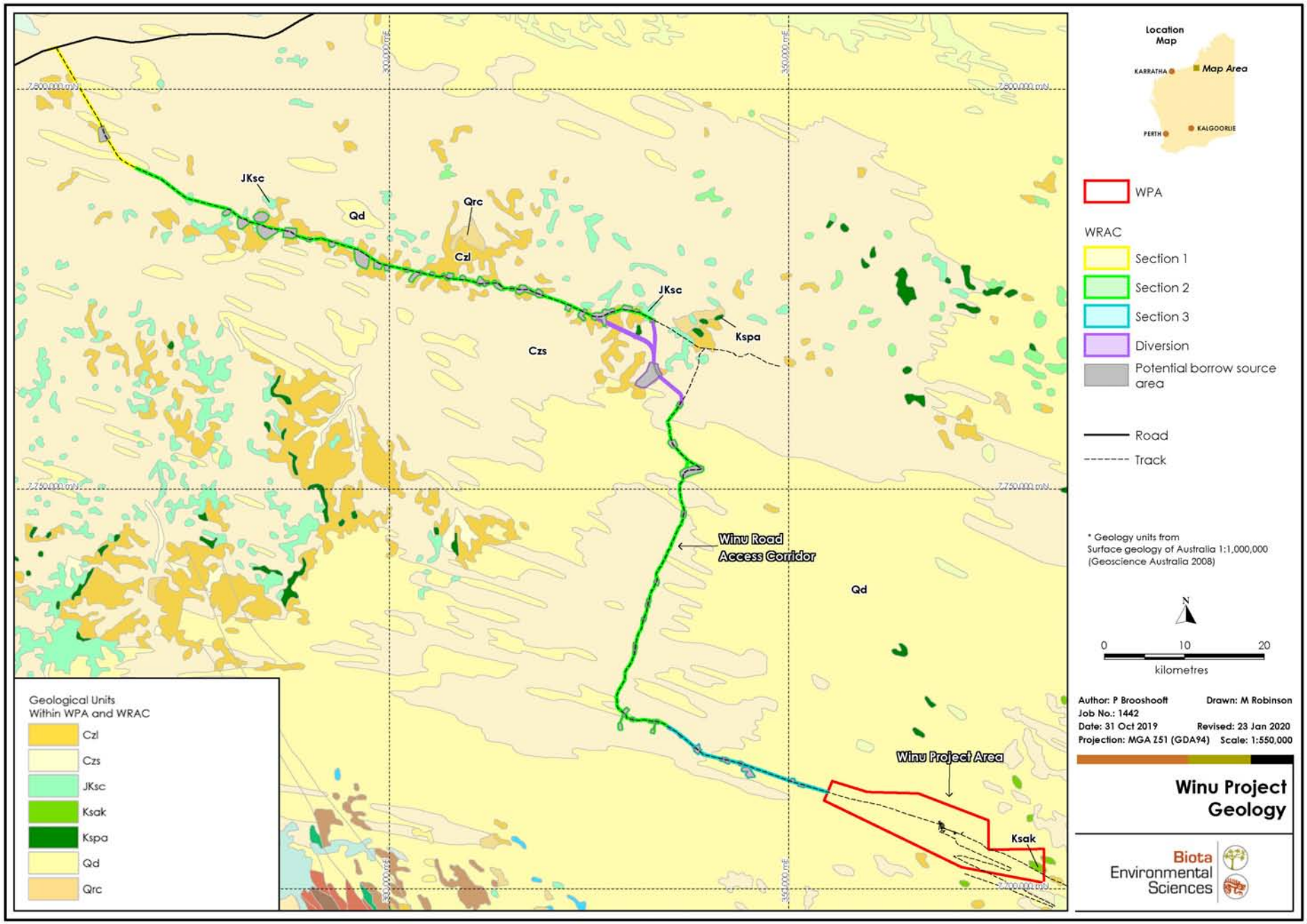

Figure 5.2: Geological units in the WPA and WRAC.

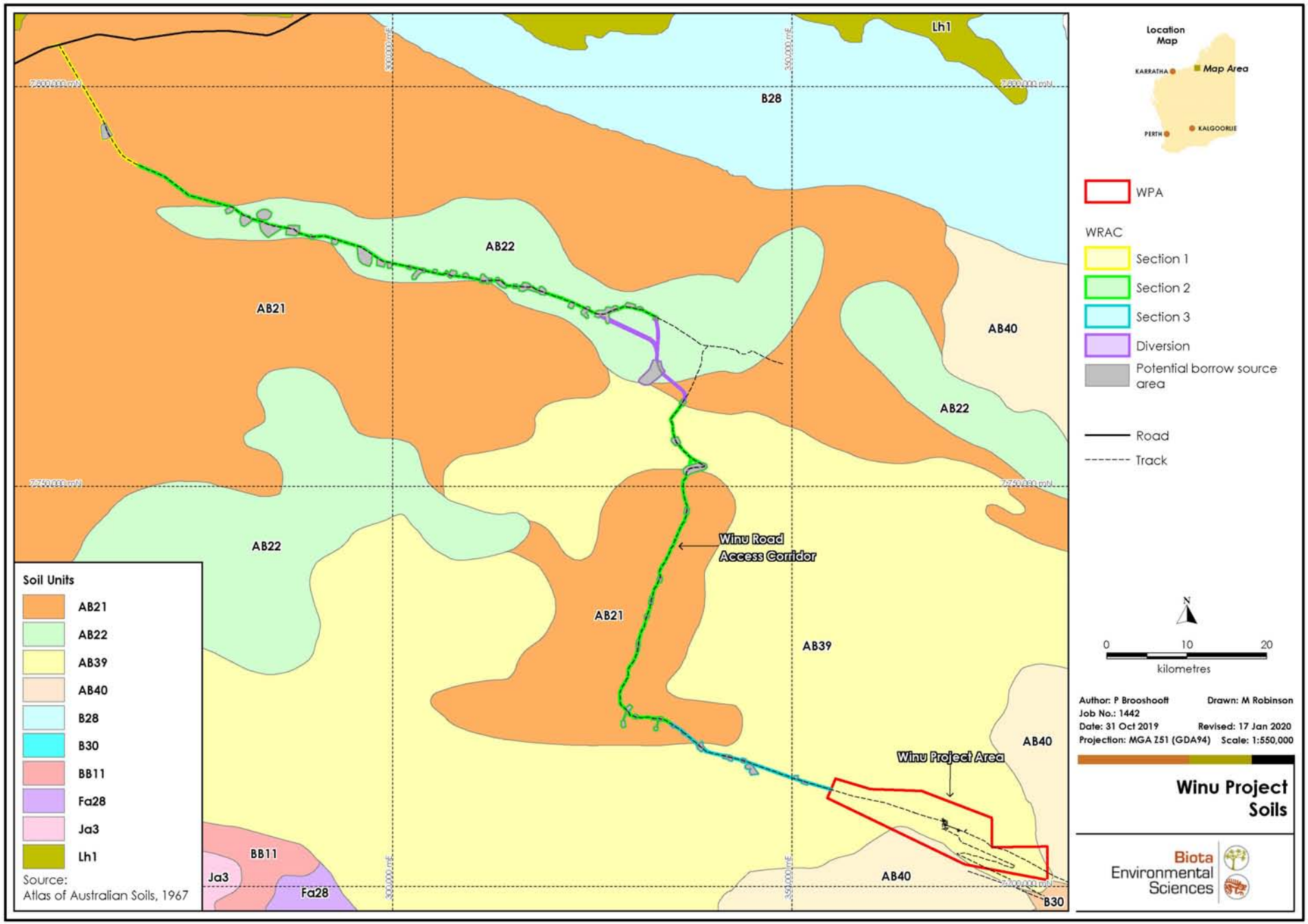

Figure 5.3: Soil units in the WPA and WRAC.

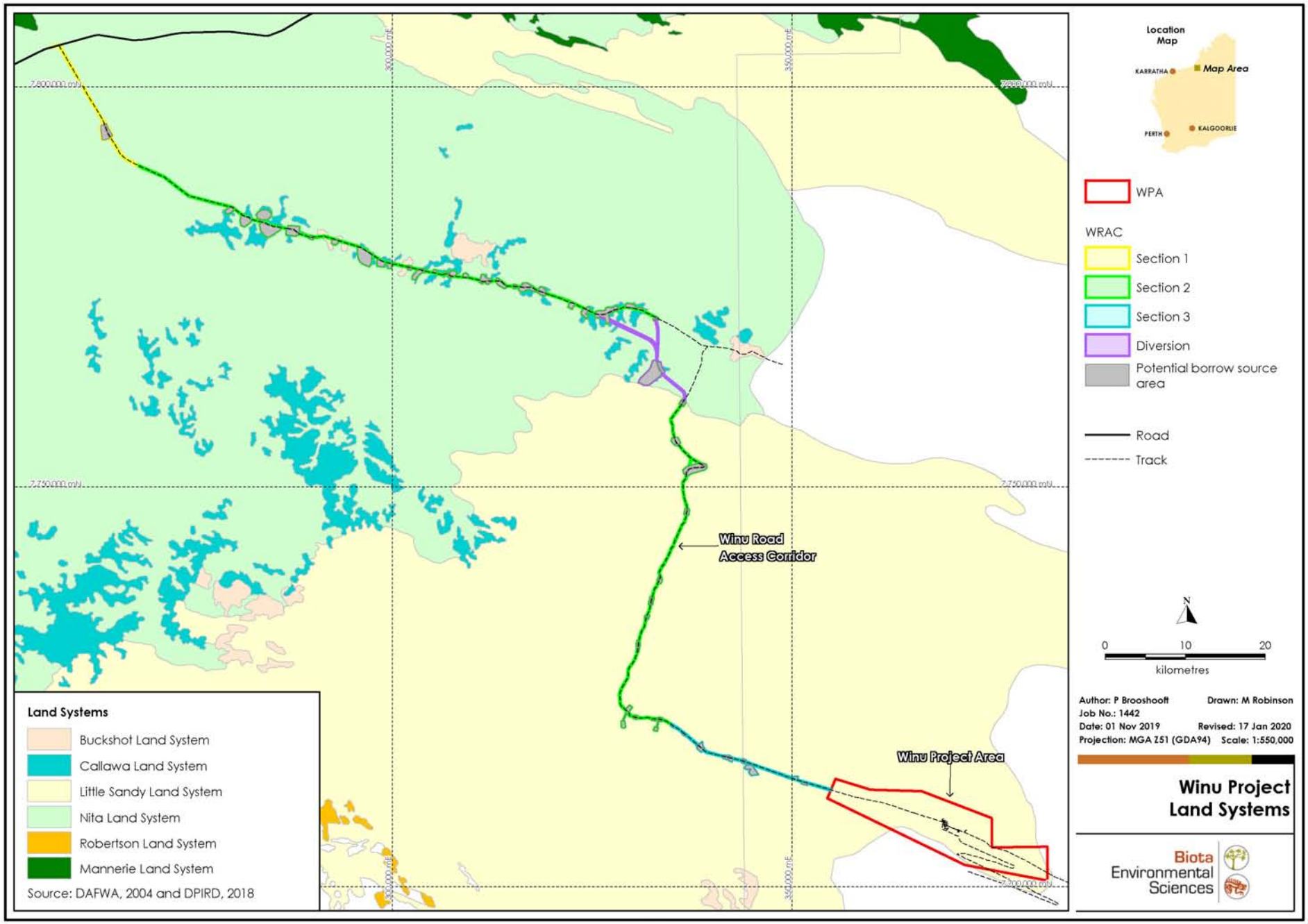

Figure 5.4: Land systems in the WPA and WRAC.

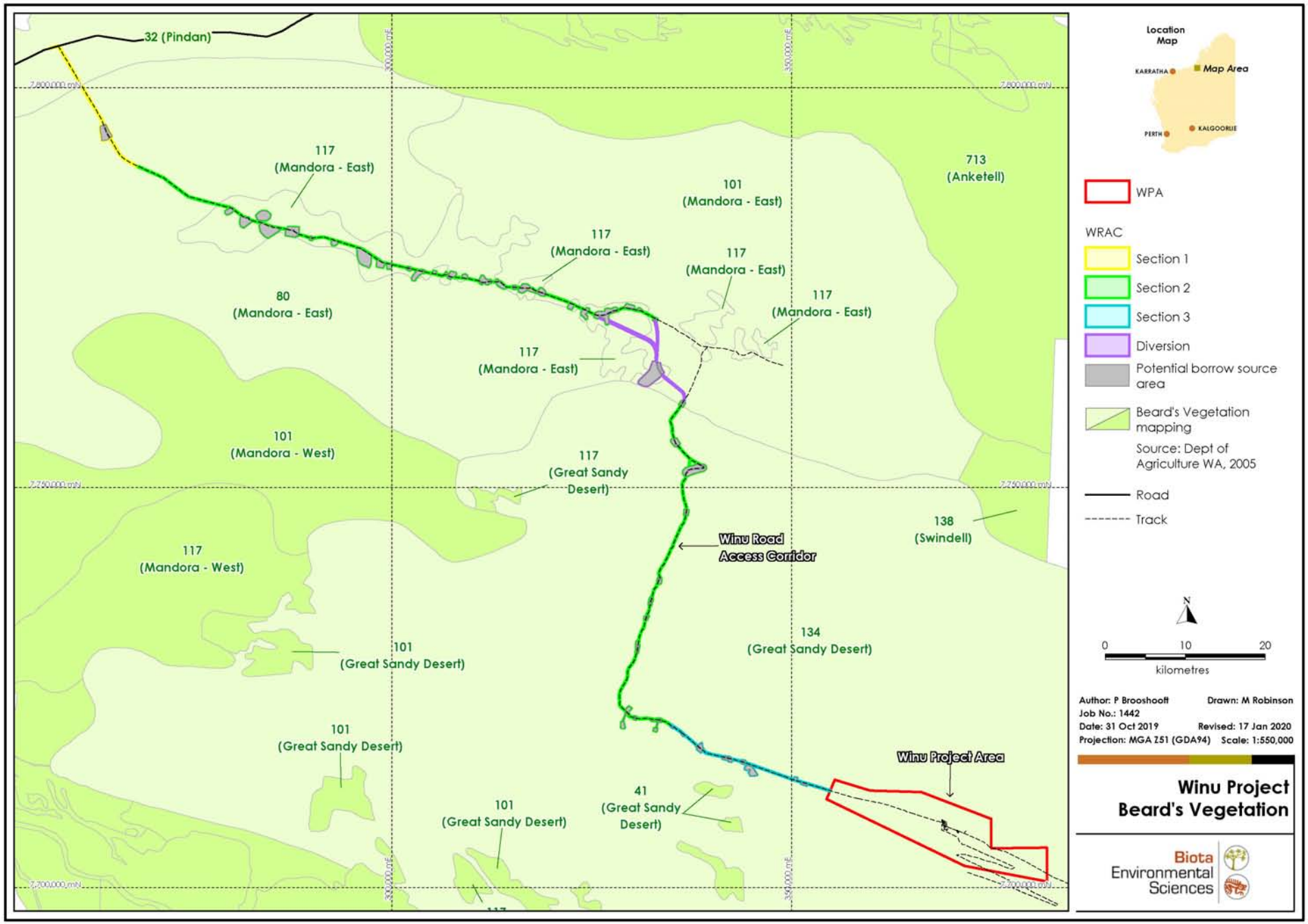

Figure 5.5: Beard's vegetation associations for the WPA and WRAC.

5.6 Previous Botanical Surveys in the Locality

In advancement of activities associated with exploration programs for the Winu Project, Rio Tinto Exploration had previously engaged Astron to conduct three reconnaissance level flora and vegetation surveys, comprising one in the WRAC (Astron 2019a), overlapping the southern end of Section 2; and nine smaller polygons within the current WPA (Astron 2018, 2019b). These latter surveys covered approximately 3% of the current WPA.

The three Astron surveys consisted of:

- one polygon (116 ha) surveyed in October 2018 (Astron 2018);
- eight polygons (292 ha) surveyed in March 2019 (Astron 2019b); and
- a road corridor (52 km) to the southern edge of Section 2 of the WRAC, surveyed in May 2019 (Astron 2019a).

The key findings of these surveys have been compiled and comprised identification of:

- 151 native vascular flora species;
- no weed species;
- no TECs or PECs;
- one Priority 2 flora species, *Goodenia hartiana;* and
- one Priority 3 flora species, *Indigofera ammobia*.

The Priority flora locations within the WPA and WRAC are detailed in Section 6.7.2, and Section 7.7.2 respectively.

The general locality surrounding the WPA and WRAC has been very poorly collected (see Figure 5.6). A search of previous botanical surveys in the locality identified one survey by Biota (2018a) completed for the AREH for NW Interconnected Power. The location of the AREH survey in relation to the current survey areas is shown in Figure 2.1; the nearest boundary is 20 km to the west of the WPA, while the WRAC traverses the centre of the AREH study area. The AREH survey was a two-phase detailed flora and vegetation survey of a 666,681 ha area, conducted in August 2017 and March 2018 (Biota 2018a). Key findings of that survey comprised identification of:

- 315 native vascular flora species in the AREH study area;
- 10 weed species, which were mostly located close to the coast;
- no TECs present in the AREH study area; although mound springs occur in the locality, these were all associated with the Mandora Marsh (Walyarta) to the north;
- a small area of the coastal grassland 'Vegetation Association 73' PEC near the northern end of the transmission cable corridor;
- a number of very small areas of beach at the northernmost end of the transmission cable corridor that would correspond to the 'Eighty Mile Land System' PEC;
- one Threatened flora species, *Seringia exastia;*
- one Priority 1 flora species, *Tephrosia rosea* var. Port Hedland (A.S. George 1114);
- one Priority 2 flora species, *Goodenia hartiana* (identified subsequent to issue of the report); and
- seven Priority 3 flora species: *Bonamia oblongifolia*, *Croton aridus, Indigofera ammobia*, *Polymeria* ? sp. Broome (K.F. Kenneally 9759), *Seringia katatona, Terminalia kumpaja* and *Tribulopis marliesiae*.

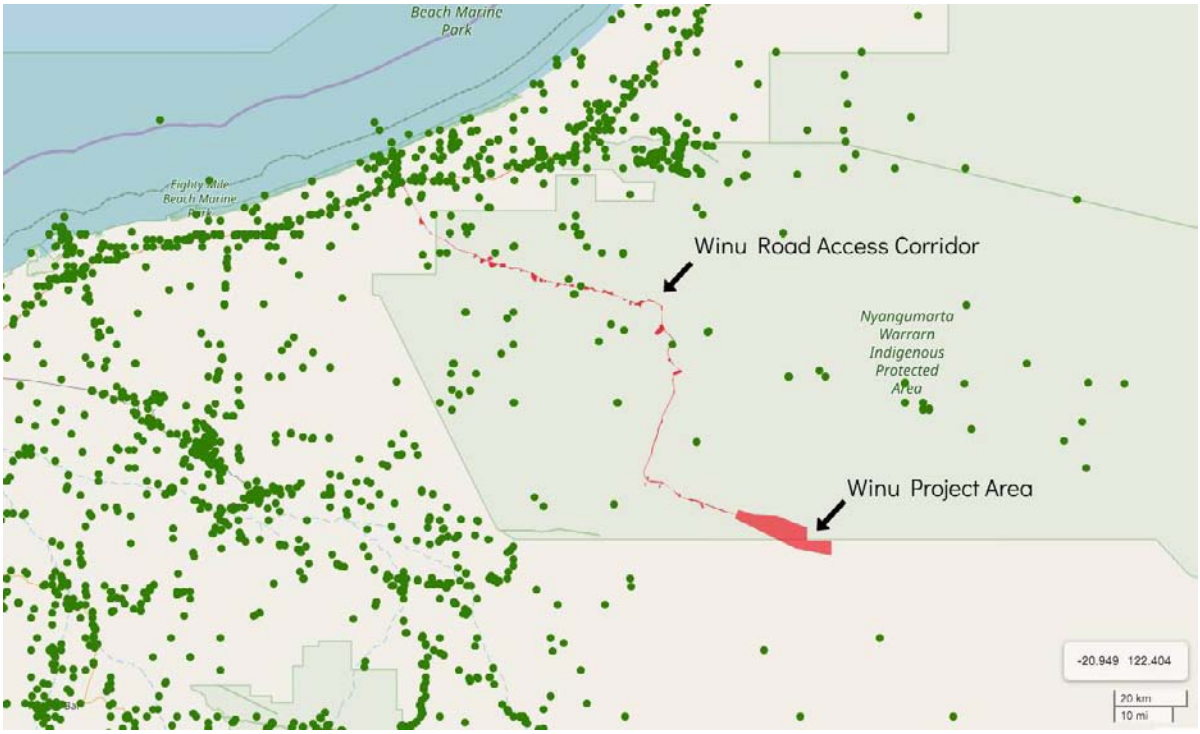

Figure 5.6: Flora records obtained for the locality from AVH, highlighting the limited botanical collections in the vicinity of the Winu Project.
Data obtained from CHAH (2019),

5.7 Conservation Significant Flora, Vegetation and Communities from the Localities

The EPBC Act Protected Matters Search did not identify any Threatened communities or Threatened flora species listed as MNES as having been recorded from or potentially occurring in the area.

With regards to the key findings from the AREH survey (Biota 2018a):

- The PECs identified through that study were located only on coastal landforms in the northern extent of the AREH study area, and are not relevant to the current study.
- Of the identified species of conservation significance, the following were recorded within a 40 km radius of the current WPA and WRAC:
  - *Seringia exastia* (Threatened): 334 records. (NB. This species is currently listed as Threatened, however it has been confirmed with Dr Carol Wilkins (the taxonomist who described *S. exastia*) that a scientific paper has been accepted for publication that synonymises this species with the widespread and common species *S. elliptica*; *S. exastia* will remain as the widespread species' name, as it was the first described (C. Wilkins, Department of Biodiversity, Conservation and Attractions (DBCA), pers. comm. 2019). Following the publication of the paper, *S. exastia* will no longer be a Threatened species, and is therefore not of conservation significance.)
  - *Bonamia oblongifolia* (Priority 3): 13 records;
  - *Croton aridus* (Priority 3): 4 individuals;
  - *Indigofera ammobia* (Priority 3): 6 records;
  - *Polymeria* ? sp. Broome (K.F. Kenneally 9759) (Priority 3): 2 records;
  - *Seringia katatona* (Priority 3): 150 records;
  - *Terminalia kumpaja* (Priority 3): 68 records; and
  - *Tribulopis marliesiae* (Priority 3): 148 records.

The records of Priority flora were from similar landforms to those present in the WPA and WRAC, and these species would therefore be considered 'likely to occur'.

6.0 Results and Discussion – Winu Project Area

6.1 Vegetation

A total of 11 individual vegetation types were described and mapped for the WPA (summarised in Table 6.1 and described in Section 6.2), associated with three broad landforms:

- Sand dunes and associated swales;
- Inter-dunal sand plains; and
- Stony rises and gentle outcroppings.

Sand dune vegetation was restricted to the dune landforms, oriented in an east-west direction, which covered 25.0% of the total WPA. Vegetation of swales was included within the dune vegetation unit, as the boundaries were small and subtle. Within and across the sand plains, vegetation tended to follow sub-surface geological changes (Figure 6.1, Figure 6.2). There were no significant surface drainage features within the WPA.

The two units present on the stony rise and gentle outcropping landforms (R1 and R2) were restricted to the lateritic ironstone found in the eastern extent, covering only 2.5% of the total WPA.

Table 6.1: Vegetation units of the WPA.

Broad Landform	Vegetation Code	Description	Sampling Sites	Extent in the WPA	
				Hectares	%
Sand Dunes and Associated Swales	D1	*Corymbia chippendalei*, *Erythrophleum chlorostachys* low open woodland over *Acacia platycarpa, A. sabulosa,* (*A. tumida* var. *kulparn, Petalostylis cassioides*) open shrubland over *Dicrastylis doranii,* (*Dampiera cinerea, Gompholobium simplicifolium*) low open shrubland over *Triodia schinzii* open hummock grassland	WIN03, WIN10, WIN12, WIN32 (swale)	2,043.1	15.3
	D2	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa,* (*A. tumida* var. *kulparn, A. sabulosa, Petalostylis cassioides, Grevillea stenobotrya, Thinicola incana*) open shrubland over *Dampiera cinerea, Dicrastylis doranii, Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* open hummock grassland	WIN01, WIN14, WIN17, WIN-REL02 (swale)	1,294.5	9.7
Inter-dunal Sand Plains	P1	*Owenia reticulata*, *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Jacksonia aculeata,* (*Androcalva loxophylla, Dicrastylis cordifolia, Gompholobium simplicifolium, Seringia elliptica*) low shrubland over *Triodia schinzii* open hummock grassland	WIN02, WIN07, WIN08, WIN31	5,018.2	37.6
	P2	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa,* (*Hakea macrocarpa*) tall shrubland over *Sorghum plumosum* var. *plumosum, Aristida holathera* var. *holathera, Amphipogon sericeus* scattered tussock grasses to very open tussock grassland over *Triodia schinzii* open hummock grassland	WIN13, WIN29, WIN30	2,606.6	19.5
	P3	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia drepanocarpa* subsp. *latifolia,* (*A. platycarpa*) tall shrubland over *Jacksonia aculeata* low open shrubland over *Triodia schinzii* hummock grassland	WIN04, WIN09, WIN11	669.2	5.0
	P4	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia orthocarpa* open shrubland over *Dicrastylis cordifolia* low open shrubland over *Bonamia erecta,* (*Goodenia armitiana, Scaevola parvifolia* subsp. *parvifolia*) very open herbland over *Triodia schinzii* very open hummock grassland	WIN23, WIN24, WIN25	450.1	3.4
	P5	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia* spp. scattered shrubs over *Mirbelia viminalis,* (*Calytrix carinata*) low shrubland over *Eriachne lanata*, *Amphipogon sericeus* very open tussock grassland over *Triodia schinzii* open hummock grassland	WIN26, WIN27, WIN28	554.4	4.1
	P6	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Sorghum plumosum* var. *plumosum* very open tall tussock grassland over *Triodia schinzii,* (*T. epactia*) scattered hummock grasses	WIN06, WIN18, WIN-REL01	113.6	0.9
	P7	*Owenia reticulata*, *Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa* low open shrubland *over Eulalia aurea, (Eriachne lanata)* very open tussock grassland over *Triodia epactia* open hummock grassland	WIN05, WIN41	207.8	1.6

Broad Landform	Vegetation Code	Description	Sampling Sites	Extent in the WPA	
				Hectares	%
Stony Rises and Gentle Outcroppings	R1	*Acacia bivenosa,* (*A. ancistrocarpa*) open shrubland over *Triodia brizoides,* (*T. schinzii*) open hummock grassland	WIN20, WIN21, WIN22	136.4	1.0
	R2	*Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs over *Mirbelia viminalis,* (*Acacia hilliana*, *Calytrix carinata*) low shrubland over *Triodia brizoides,* (*T. schinzii*) open hummock grassland	WIN15, WIN16, WIN19	192.1	1.4

6.2 Description of Vegetation Types

6.2.1 Vegetation of Sand Dunes and Associated Swales

D1:	***Corymbia chippendalei*, *Erythrophleum chlorostachys* low open woodland over *Acacia platycarpa, A. sabulosa,* (*A. tumida* var. *kulparn, Petalostylis cassioides*) open shrubland over *Dicrastylis doranii,* (*Dampiera cinerea, Gompholobium simplicifolium*) low open shrubland over *Triodia schinzii* open hummock grassland**
Distribution and extent	This vegetation type was sampled on the sand dunes through the centre of the WPA, with the most defining feature being the dominance of the bloodwood *Corymbia chippendalei* in the overstorey (Plate 6.1). This vegetation type exhibited patches of swale in the same manner as vegetation D2, however *Owenia reticulata* replaced *C. chippendalei* as the dominant tree in the latter unit. This vegetation type covered 61.2% of the total dune vegetation within the WPA, and 15.3% of the WPA.
Other associated species	Shrubs: *Acacia anaticeps, Grevillea stenobotrya.* Low Shrubs: *Dampiera cinerea, Gompholobium simplicifolium*, *Gyrostemon tepperi, Indigofera ammobia* (P3), *Sida* sp. Western sand dunes (P.K. Latz 11980). Grasses: *Aristida holathera* var. *holathera, Eriachne aristidea, E. obtusa.* Herbs: *Spermacoce occidentalis*.
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN03, WIN10, WIN12, WIN32 (swale).
Notes	Much of this vegetation type was burnt, with *C. chippendalei* trees resprouting, and very little low shrub or grass cover (Plate 6.2). This unit contained large numbers of *Indigofera ammobia* (P3), *Sauropus arenosus* (P3), and *Corynotheca asperata* (P3). The three quadrats on top of the dunes grouped together in a distinct floristic group, with similarity to WIN01 from unit D2 (see Section 6.4). The swale quadrat (WIN32) grouped with a quadrat and swale relevé from D2 (WINREL02). This is not unexpected as the composition of these dunes was relatively similar, with recent fires affecting the species recorded.

Plate 6.1: Vegetation type D1.

Plate 6.2: Vegetation type D1 after fire.

D2:	***Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa*, (*A. tumida* var. *kulparn, A. sabulosa, Petalostylis cassioides, Grevillea stenobotrya, Thinicola incana*) open shrubland over *Dampiera cinerea, Dicrastylis doranii, Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* open hummock grassland**
Distribution and extent	This vegetation type was sampled on the sand dunes in the east and west of the WPA (Plate 6.3), and was floristically similar to unit D1 in the lower strata. Together with vegetation type D1, these units covered all of the dune systems throughout the WPA. This vegetation type covered 9.7% of the WPA.
Other associated species	Shrubs: *Acacia anaticeps, A. platycarpa, Grevillea wickhamii* subsp. *hispidula, Thinicola incana.* Low Shrubs: *Calytrix carinata, Cyanostegia cyanocalyx, Dampiera cinerea, Gompholobium simplicifolium, Gyrostemon tepperi, Indigofera ammobia* (P3), *Jacksonia aculeata, Sida* sp. Western sand dunes (P.K. Latz 11980). Grasses: *Aristida holathera* var. *holathera, Eragrostis eriopoda, Eriachne aristidea, E. helmsii.* Herbs: *Spermacoce occidentalis.*
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN01, WIN14, WIN17. Relevé WINREL02 (swale).
Notes	Much of this vegetation type on dunes was burnt at the time of the survey (Plate 6.3), with very little low shrub or grass cover, however many areas of swale were protected from the fire (Plate 6.4). This unit contained large numbers of *Indigofera ammobia* (P3), *Sauropus arenosus* (P3) and *Corynotheca asperata* (P3).

Plate 6.3: Recently burnt vegetation type D2.

Plate 6.4: Protected swale within vegetation type D2.

6.2.2 Vegetation of Inter-Dunal Sand Plains

P1:	***Owenia reticulata*, *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Jacksonia aculeata, (Androcalva loxophylla, Dicrastylis cordifolia, Gompholobium simplicifolium, Seringia elliptica*) low shrubland over *Triodia schinzii* open hummock grassland**
Distribution and extent	This vegetation unit was the most extensive of the WPA, covering 37.6%, and occurred mostly in the western extent.
Other associated species	Shrubs: *Dodonaea coriacea, Grevillea eriostachya, G. wickhamii* subsp. *hispidula*. Low Shrubs: *Calytrix carinata*, *Dicrastylis doranii*, *Indigofera boviperda* subsp. *eremaea*. Grasses: *Aristida holathera* var. *holathera*, *Eragrostis eriopoda*, *Eriachne lanata*. Herbs: *Bonamia erecta, Scaevola parvifolia* subsp. *parvifolia, Trigastrotheca molluginea*.
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN02, WIN07, WIN08, WIN31.
Notes	*Acacia platycarpa* was present in two forms throughout the WPA, referred to as "non-pruinose leaf variant" (Plate 6.5) and "pruinose leaf variant" (Plate 6.6), and tended to occur in patches. A recent fire had affected large portions of this vegetation unit. This unit contained the majority of *Goodenia hartiana* (P2) individuals recorded within the WPA.

Plate 6.5: Vegetation type P1 with *A. platycarpa* 'non-pruinose leaf variant'.

Plate 6.6: Vegetation type P1 with *A. platycarpa* 'pruinose leaf variant'.

P2:	***Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa*, (*Hakea macrocarpa*) tall shrubland over *Sorghum plumosum* var. *plumosum*, *Aristida holathera* var. *holathera*, *Amphipogon sericeus* scattered tussock grasses to very open tussock grassland over *Triodia schinzii* open hummock grassland**
Distribution and extent	This vegetation unit was the second most extensive of the WPA, covering 19.5%, and occurred mostly in the eastern extent.
Other associated species	Shrubs: *Acacia monticola*, *Dodonaea hispidula* var. *arida*, *Grevillea wickhamii* subsp. *hispidula*. Low Shrubs: *Calytrix carinata, Dampiera cinerea, Dicrastylis cordifolia, Dodonaea coriacea.* Grasses: *Eriachne aristidea, E. lanata.* Herbs: *Bonamia erecta, Goodenia armitiana, Halgania solanacea* var. *solanacea, Trigastrotheca molluginea.*
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN13, WIN29, WIN30.
Notes	This unit was present across the WPA, and included large unburnt and well established patches (Plate 6.7 and Plate 6.8).

Plate 6.7: Vegetation type P2.

Plate 6.8: Vegetation type P2.

P3:	***Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia drepanocarpa* subsp. *latifolia*, (*A. platycarpa*) tall shrubland over *Jacksonia aculeata* low open shrubland over *Triodia schinzii* hummock grassland**
Distribution and extent	This vegetation unit formed isolated patches scattered throughout the WPA, covering 5.0% of the total area.
Other associated species	Shrubs: *Grevillea eriostachya, G. wickhamii* subsp. *hispidula.* Low Shrubs: *Calytrix carinata, Dicrastylis cordifolia.* Grasses: *Amphipogon sericeus*, *Eriachne lanata.* Herbs: *Bonamia erecta, Halgania solanacea* var. *solanacea, Leptosema anomalum, Ptilotus arthrolasius.*
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN04, WIN09, WIN11.
Notes	This unit was characterised by a dense shrub cover of *A. drepanocarpa* subsp. *latifolia*, in some areas up to 80% (Plate 6.9, Plate 6.10). Recent fires may have affected the accuracy of the delineation of this unit through the WPA.

Plate 6.9: Vegetation type P3.

Plate 6.10: Vegetation type P3.

P4:	***Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia orthocarpa* open shrubland over *Dicrastylis cordifolia* low open shrubland over *Bonamia erecta*, (*Goodenia armitiana, Scaevola parvifolia* subsp. *parvifolia*) very open herbland over *Triodia schinzii* very open hummock grassland**
Distribution and extent	This vegetation unit was restricted to the eastern end of the WPA, covering 3.4% of the total area.
Other associated species	Shrubs: *Grevillea wickhamii* subsp. *hispidula*. Low Shrubs: *Calytrix carinata, Dampiera candicans, Hibiscus leptocladus, Sida arenicola, Solanum centrale, Tephrosia arenicola*. Grasses: *Amphipogon sericeus*, *Aristida holathera* var. *holathera*, *Eragrostis eriopoda*, *Eriachne aristidea, E. lanata, Yakirra australiensis* var. *australiensis*. Herbs: *Halgania solanacea* var. *solanacea, Trigastrotheca molluginea*.
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN23, WIN24, WIN25.
Notes	This vegetation type was almost entirely burnt within the WPA (Plate 6.11), with only small patches left intact (Plate 6.12). As such, the species and structure recorded are generally unlikely to reflect the vegetation's unburnt state.

Plate 6.11: Vegetation P4 after recent fire.

Plate 6.12: Unburnt vegetation type P4.

P5:	***Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia* spp. scattered shrubs over *Mirbelia viminalis,* (*Calytrix carinata*) low shrubland over *Eriachne lanata*, *Amphipogon sericeus* very open tussock grassland over *Triodia schinzii* open hummock grassland**
Distribution and extent	This vegetation unit was restricted to a single stand in the eastern extent of the WPA, covering 4.1% of the total area.
Other associated species	Shrubs: *Grevillea wickhamii* subsp. *hispidula.* Low Shrubs: *Dampiera candicans, Dicrastylis cordifolia, Dodonaea coriacea, Jacksonia aculeata, Tephrosia arenicola.* Grasses: *Amphipogon sericeus.* Herbs: *Bonamia erecta, Goodenia azurea* subsp. *hesperia, Halgania solanacea* var. *solanacea, Leptosema anomalum, Ptilotus calostachyus, Scaevola parvifolia* subsp. *parvifolia.*
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN26, WIN27, WIN28.
Notes	This vegetation unit was similar in appearance, structure and distribution to unit R2, but lacked the lateritic substrate of the low rises landform and consequent change in the dominant spinifex to *Triodia brizoides* (Plate 6.13 and Plate 6.14).

Plate 6.13: Vegetation unit P5.

Plate 6.14: Vegetation unit P5.

P6:	***Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Sorghum plumosum* var. *plumosum* very open tall tussock grassland over *Triodia schinzii*, (*T. epactia*) scattered hummock grasses**
Distribution and extent	This vegetation covered 0.9% of the WPA and generally occurred in small patches (Plate 6.15). Recent fires through the area (Plate 6.16) may have affected the current delineation of this vegetation unit's boundaries.
Other associated species	Low Shrubs: *Dicrastylis cordifolia*, *Indigofera boviperda* subsp. *eremaea*. Grasses: *Aristida holathera* var. *holathera*, *Eriachne lanata*, *E. obtusa*. Sedges: *Fimbristylis oxystachya*. Herbs: *Goodenia armitiana, Trianthema pilosum*.
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN06, WIN18. Relevé WIN-REL01.
Notes	The key indicator species *Sorghum plumosum* var. *plumosum* was present in other vegetation throughout the WPA, however in unit P6 it became the dominant species, forming an open grassland and precluding much additional grass cover.

Plate 6.15: Vegetation type P6.

Plate 6.16: Recently burnt vegetation type P6.

P7:	***Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa* low open shrubland *over Eulalia aurea, (Eriachne lanata)* very open tussock grassland over *Triodia epactia* open hummock grassland**
Distribution and extent	This vegetation unit comprised 1.6% of the WPA, and was present only in the western extent of the survey area (Plate 6.17, Plate 6.18).
Other associated species	Shrubs: *Acacia adsurgens.* Low Shrubs: *Acacia maitlandii.* Herbs: *Trigastrotheca molluginea.*
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN05, WIN41.
Notes	This vegetation unit was structurally similar to unit P2, but differed in the dominant *Triodia* species due to the different substrate. Only two sites were established in this vegetation due to its restricted distribution, and recent fire impacts.

Plate 6.17: Vegetation unit P7.

Plate 6.18: Vegetation unit P7.

6.2.3 Vegetation of Stony Rises and Gentle Outcroppings

R1:	***Acacia bivenosa*, (*A. ancistrocarpa*) open shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland**
Distribution and extent	This vegetation was present only on a laterite rise in the eastern extent of the WPA (Plate 6.19), and accounted for a small proportion (1.0%) of the WPA.
Other associated species	Trees: *Corymbia candida*. Shrubs: *Acacia orthocarpa*. Low Shrubs: *Indigofera monophylla*. Grasses: *Aristida holathera* var. *holathera*, *Eragrostis eriopoda*, *Eriachne aristidea, Paraneurachne muelleri, Yakirra australiensis* var. *australiensis*. Herbs: *Goodenia armitiana, Halgania solanacea* var. *solanacea, Heliotropium pachyphyllum, Tribulus hirsutus.*
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN20, WIN21, WIN22.
Notes	Large areas of this vegetation were recently burnt (Plate 6.20). Clearing of some of this vegetation unit for the Winu airstrip was underway at the time of the Phase 1 survey.

Plate 6.19: Vegetation unit R1.

Plate 6.20: Vegetation unit R1 with burnt patches.

R2:	***Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs over *Mirbelia viminalis*, (*Acacia hilliana*, *Calytrix carinata*) low shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland**
Distribution and extent	This vegetation unit was restricted to laterite rises and outcroppings in the eastern extent of the WPA, and covered 1.4% of the WPA.
Other associated species	Shrubs: *Acacia ancistrocarpa, A. drepanocarpa* subsp. *latifolia, Grevillea eriostachya.* Low Shrubs: *Dampiera candicans, Dicrastylis cordifolia, Dodonaea coriacea, Indigofera boviperda* subsp. *eremaea, Seringia elliptica, Sida arenicola, Tephrosia arenicola.* Grasses: *Eriachne lanata.* Herbs: *Halgania solanacea* var. *solanacea, Leptosema anomalum, Ptilotus calostachyus, Trigastrotheca molluginea.*
Vegetation condition	Excellent.
Sites in the WPA	Quadrats WIN15, WIN16, WIN19.
Notes	This vegetation unit was similar in structure and appearance to unit P5, but was restricted to laterite shallow rises and outcroppings, and therefore differed in the dominant *Triodia* spp. (Plate 6.21, Plate 6.22).

Plate 6.21: Vegetation unit R2.

Plate 6.22: Vegetation unit R2.

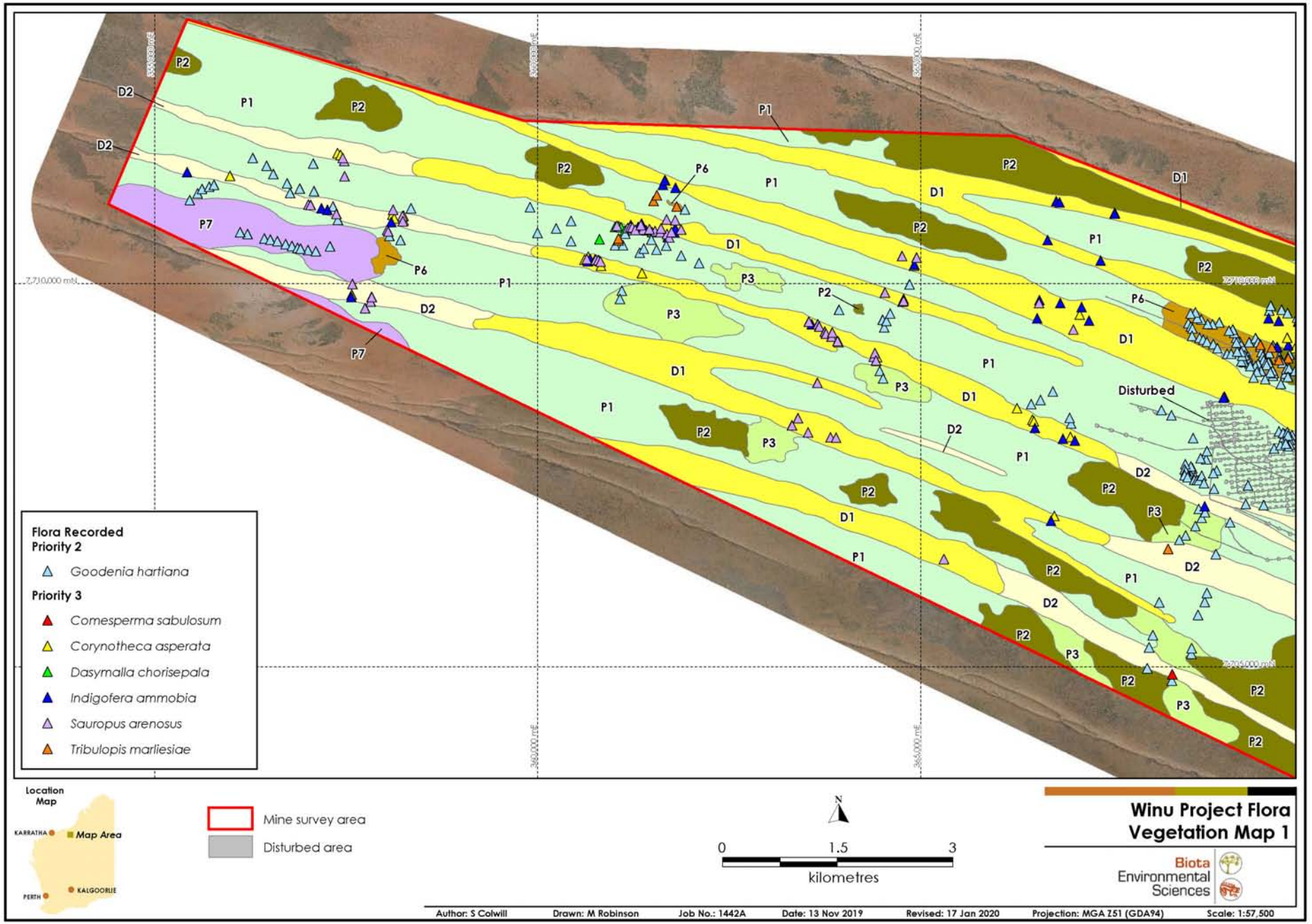

Figure 6.1: Vegetation units of the western WPA, showing Priority flora locations.

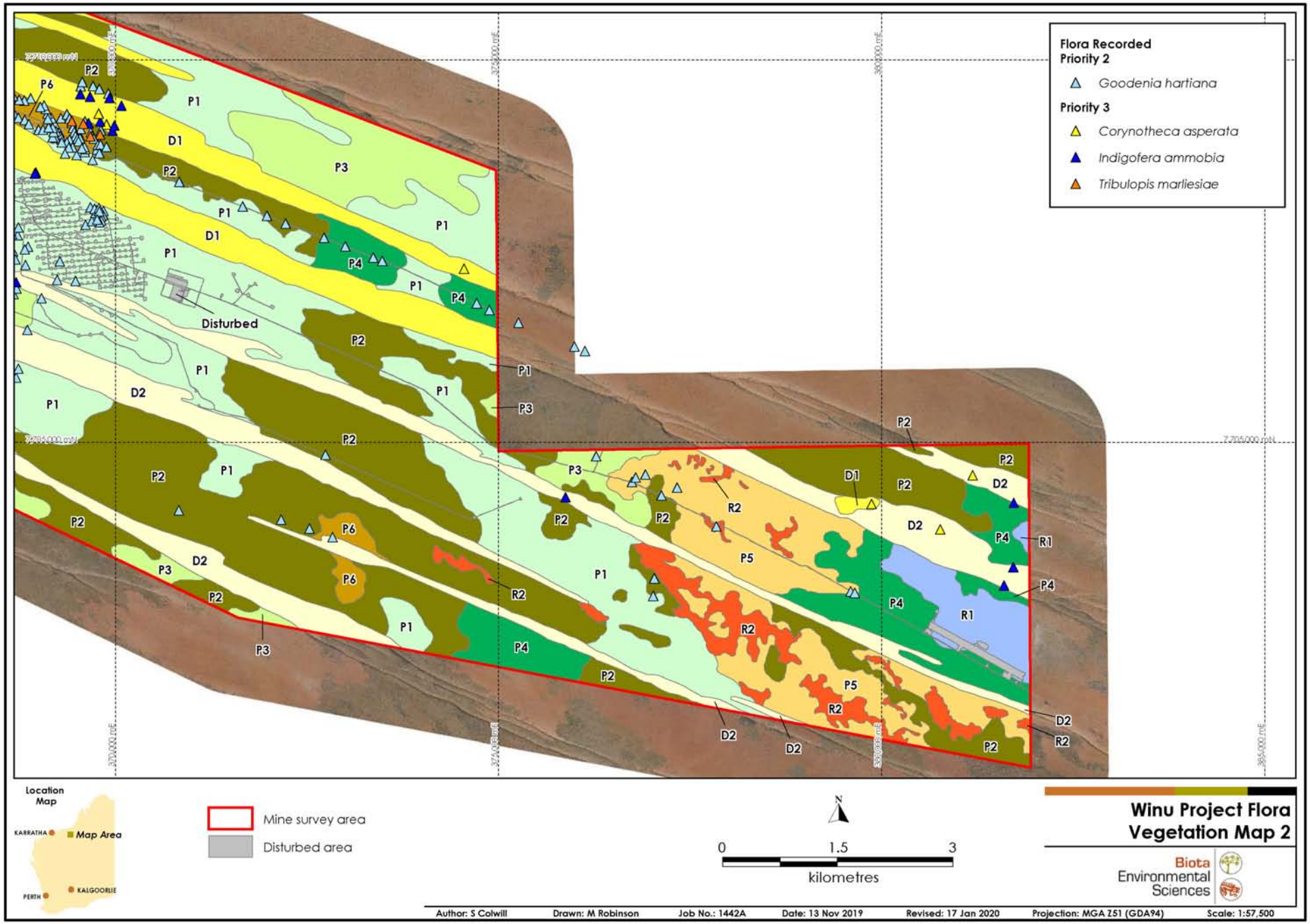

Figure 6.2: Vegetation units of the eastern WPA, showing Priority flora locations.

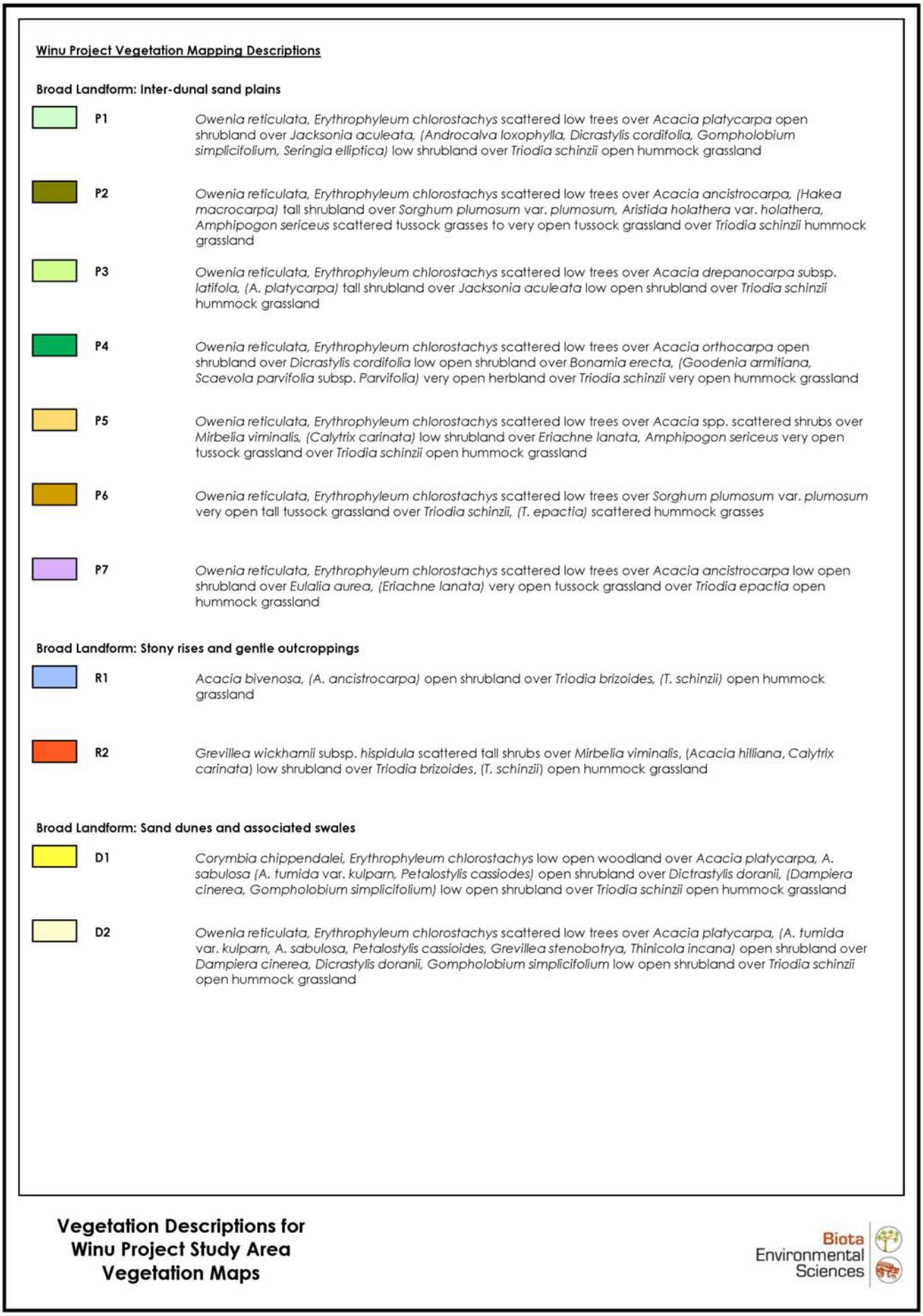

Figure 6.3: Legend describing vegetation units for the WPA vegetation maps.

6.3 Condition of the Vegetation Units

Vegetation condition assessments were based on the ranking scale developed by Trudgen (1988). The vegetation within the WPA was generally considered to be in 'Excellent' condition. The small number of existing cleared tracks (Plate 6.23), drill pads, and an airstrip (Plate 6.24) in the east of the WPA were considered to be 'Degraded'. These Degraded areas were small in size (75.6 ha, or 0.6% of the WPA), and the cleared areas did not affect the condition of the surrounding vegetation. The WPA was without weeds. The recent fires through the area are a natural occurrence and were not considered to impact the condition of the vegetation.

Plate 6.23: **Disturbed tracks.**

Plate 6.24: **Disturbed area for airstrip construction.**

6.4 Floristic Analysis

Three analyses were conducted, two using the sites within the WPA (using presence absence, and using percentage cover), and a third using all regional sites (percentage cover only). The three main types of analysis identified similar numbers of floristic groups: 13 groups for both analyses using the sites from within the WPA only, and 14 groups when regional sites were included. To obtain the groupings with regional site inclusion, a larger analysis was conducted on all sites within the WPA, WRAC, associated regional sites from Biota (2018b), and the included Astron (2019a) relevés from within the WRAC. This is detailed in Section 7.4.

Table 1 in Appendix 6 summarises the floristic groups that appeared to reveal the most consistent patterns of similarity for the sites from the WPA. This analysis was done using the sites within the WPA only, and based on percentage cover of both perennial and annual species. The dendrogram and NMDS plot are shown in Figure 6.4 and Figure 6.5.

The following observations were made from the analyses:

- There was a strong correlation between the vegetation types identified for the current study and the floristic groups generated through the clustering analysis, with most matching completely. Some of the separation of sites from their expected groupings is likely due to difference in fire ages throughout the area, which would influence the presence of typical early-successional species (i.e. those that colonise an area rapidly after fire, but tend to be out-competed in the longer term). Due to the frequency of fires throughout the Great Sandy Desert, fire age was problematic to determine, and there were few areas of 'long unburnt' vegetation within the survey boundaries in which to install sites.
- Quadrats on the dune habitat occurred in two distinct floristic groups when analysed by presence/absence, with one site (WIN01) without *C. chippendalei* grouping in with the *C. chippendalei* dune vegetation. However when analysed by percent cover, all the dune sites grouped together into one floristic group.
- There was notable floristic overlap between dune sites and plains sites, likely due to varying fire age through the area. One site (WIN17) grouped with sand plains sites when regional sites

were included in the analysis, due to the higher percentage cover of *Acacia platycarpa* 'desert form'.

- Two sites (WIN32 and WINREL02) were installed on swale vegetation, which initially grouped with plains vegetation when included in the analyses; these sites were subsequently excluded from these analyses as they were considered ecotonal in nature.
- Three vegetation types (P1, P2, and P3) shared floristic groupings between them, forming a mix of two floristic groups when analysed by presence/absence: three groups by percent cover; and four groups when regional sites were included. These sites often contained all three defining *Acacia* spp. (*A. platycarpa* 'desert form', *A. ancistrocarpa*, and *A. drepanocarpa* subsp. *latifolia*), with differing cover, occurring in a mosaic across the WPA.
- Quadrats on the rocky rises and gentle outcroppings occurred in distinct floristic groups when analysed by percentage cover, due to their unique species compositions.
- When analysed by presence/absence, quadrats within vegetation unit R2 grouped together with quadrats in unit P5 due to very similar species composition, differing mostly in the dominant *Triodia* spp.
- Overall, the rocky outcroppings were quite distinct from the plains and dune sites, while there was some crossover between the sand plain and sand dune sites. This may be attributed to fires heavily affecting sand dune sites, with regenerating species being similar to those in the adjacent sand plains.
- The three sites in unit P6 separated into two floristic groups, with WIN06 forming its own group. All three of these sites were burnt; while it appeared that WIN06 had recovered faster than the other two sites, none of the three grouped with any other site.
- The two sites in vegetation type P7 formed a single floristic group, due to the presence of *Triodia epactia*, which was not present at any other site in the WPA.

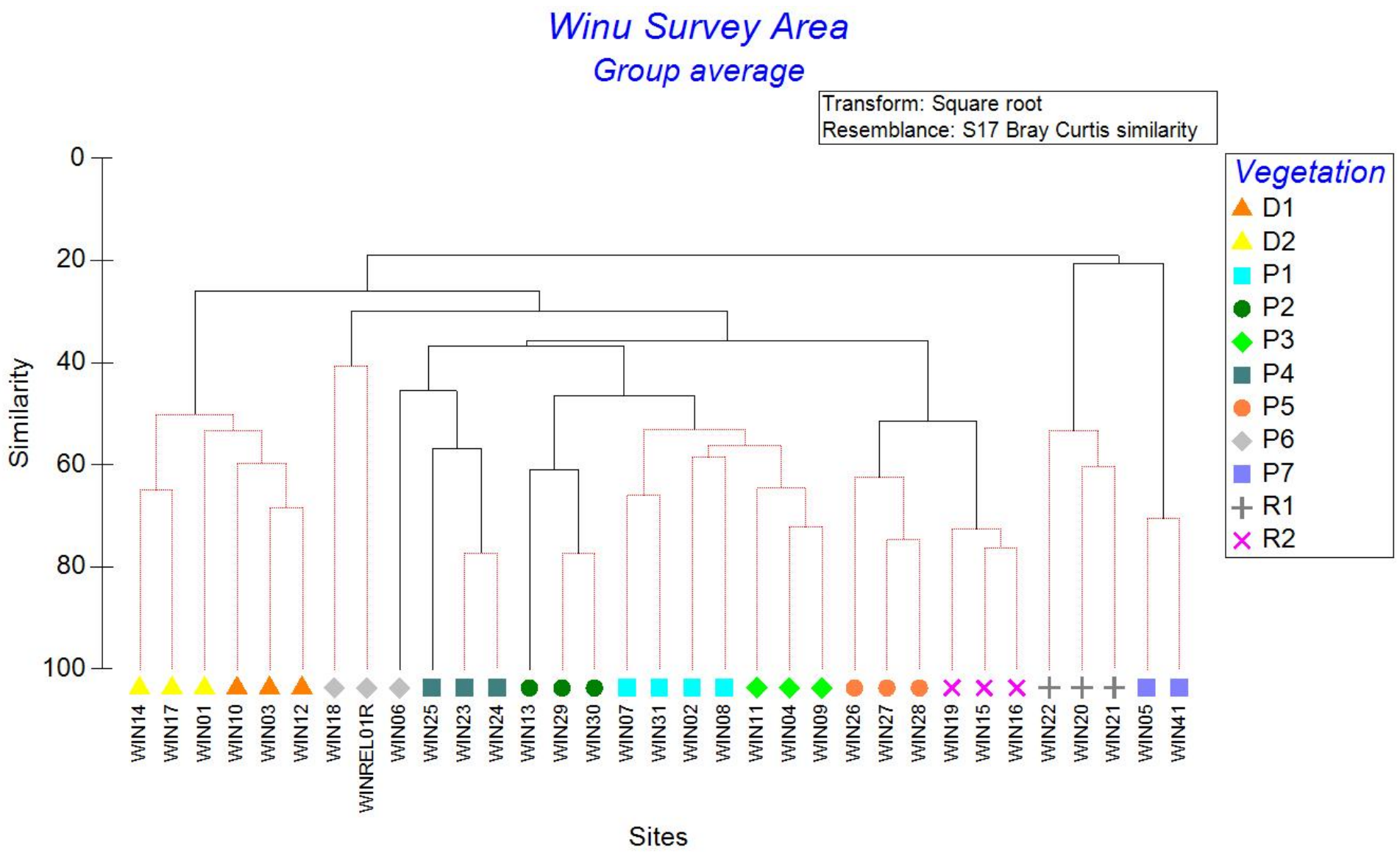

Figure 6.4 **Dendrogram of site similarity within the WPA (analysis based on percent cover data of all species).**

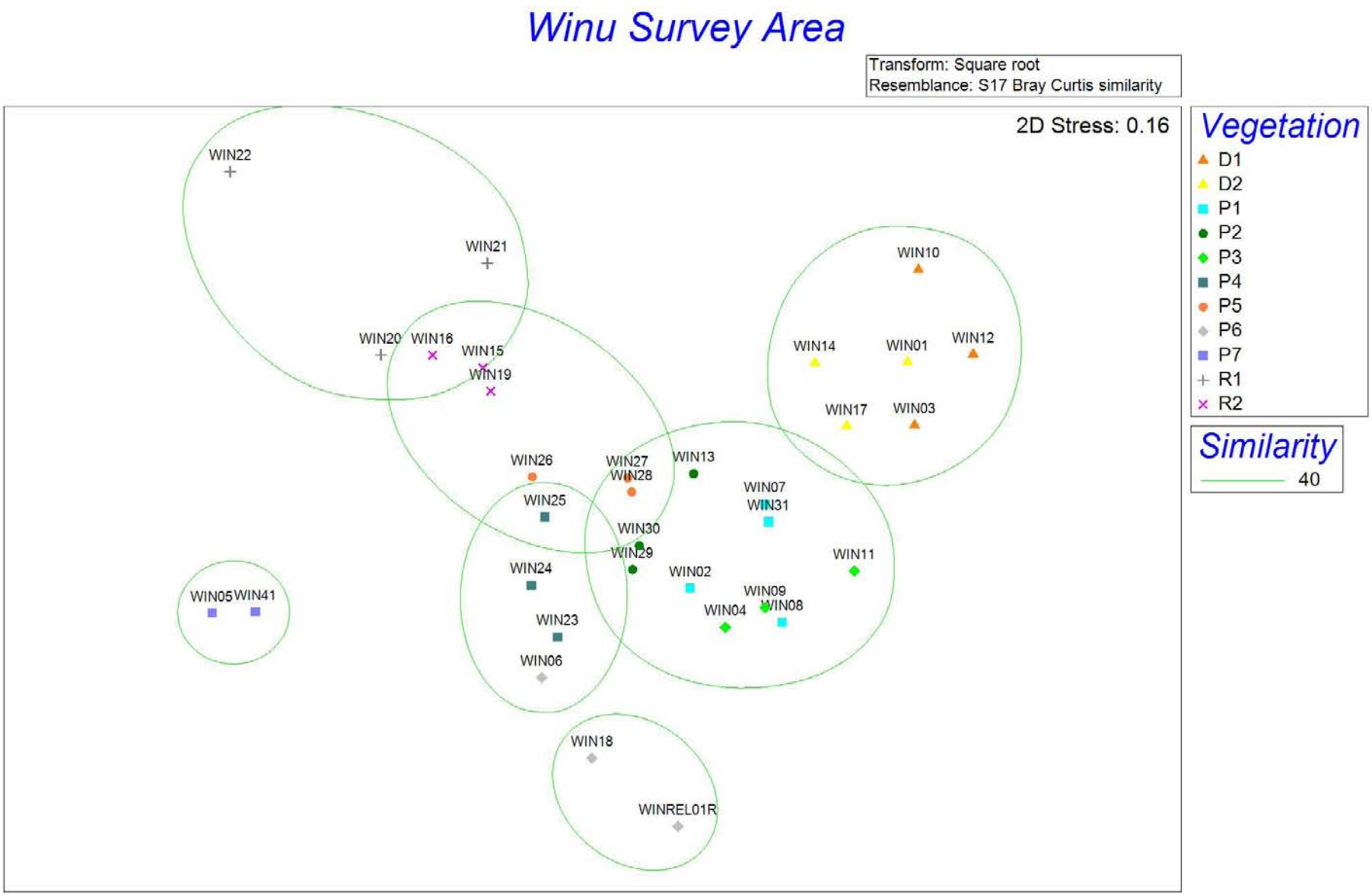

Figure 6.5 NMDS plot of sites within the WPA (analysis based on percent cover data of all species).

6.5 Vegetation of Conservation Significance

None of the vegetation types identified for the WPA represent TECs listed under either the Commonwealth EPBC Act or the WA *Biodiversity Conservation Act 2016* (BC Act).

Three vegetation units were considered of local significance as they supported large populations of Priority flora: vegetation units D1 and D2 of sand dunes, and P1 of the sand plains. Priority species were recorded on almost every search of sand dunes (Figure 6.1, Figure 6.2) and these species would be likely to occur almost continuously throughout the dune systems in the WPA. The Priority 2 species *Goodenia hartiana* was recorded in large numbers, and across numerous plains vegetation types, responding quickly to recent fires. As such, it is likely to be more common across the WPA than was captured during the current surveys.

6.6 Flora of the Winu Project Area

A total of 170 native vascular flora species from 90 genera and 37 families were recorded from the WPA by Biota during the combined Phase 1 and Phase 2 field surveys; the Phase 2 survey yielded six additional species from three additional genera. The plant groups with the highest species richness are summarised in Table 6.2. A complete species list is presented in Appendix 5, as a species by site matrix in conjunction with records from the WRAC.

Surveys within the WPA by Astron (2018, 2019b) identified 18 additional species and one additional genus, although it is considered that some may represent other species identified during this survey (see notes in Appendix 5).

Table 6.2: Dominant families and genera recorded from the WPA.

Family	No. of Native Species	Genus	No. of Native Species
Fabaceae	40	*Acacia*	19
Poaceae	25	*Heliotropium*	8
Malvaceae	12	*Ptilotus*	6
Lamiaceae	10	*Eriachne*	5

6.7 Flora of Conservation Significance

6.7.1 Threatened Flora

No species listed as Threatened under either State or Commonwealth legislation have been recorded in the WPA to date, and none would be expected to occur.

6.7.2 Priority Flora

Table 6.3 contains a summary of the Priority species recorded from the WPA based on all sampling to date. Detailed location information for each Priority species is presented in Figure 6.1, Figure 6.2 and Appendix 4[7].

One Priority 2 and six Priority 3 taxa were identified and counted in the WPA during the current field surveys, comprising:

- *Goodenia hartiana* (P2) – 81,413 individuals;
- *Comesperma sabulosum* (P3) – 10 individuals;
- *Corynotheca asperata* (P3) – 255 individuals;
- *Dasymalla chorisepala* (P3) – 21 individuals;

[7] Individuals recorded by Biota and Astron are not differentiated in the figures; this information is detailed in Appendix 4.

- *Indigofera ammobia* (P3) – 788 individuals;
- *Sauropus arenosus* (P3) – 233 individuals; and
- *Tribulopis marliesiae* (P3) – 30 individuals.

Goodenia hartiana and *Indigofera ammobia* were also recorded by Astron (2018) during prior surveys within the WPA, with an additional 4,829 and 18 individuals identified respectively.

Of these species, *Goodenia hartiana, Dasymalla chorisepala,* and *Tribulopis marliesiae* were present in inter-dunal sand plain habitat, while the remaining four species were present mostly on the crests, sides and swales of dune habitats. *Corynotheca asperata, Indigofera ammobia,* and *Sauropus arenosus* were present on almost every surveyed sand dune, and are likely to occur sporadically throughout the dune systems in the WPA.

Table 6.3: Summary of Priority flora recorded in the WPA, based on all sampling to date.

Species	Records in the WPA
Priority 2	
Goodenia hartiana	86,242 individuals from 335 locations (Biota, this study; Astron 2018, 2019a and targeted searches)
Priority 3	
Comesperma sabulosum	10 individuals from 1 location (Biota, this study)
Corynotheca asperata	255 individuals from 38 locations (Biota, this study)
Dasymalla chorisepala	21 individuals from 9 locations (Biota, this study)
Indigofera ammobia	806 individuals from 59 locations Biota, this study; Astron 2018)
Sauropus arenosus	233 individuals from 61 locations (Biota, this study)
Tribulopis marliesiae	30 individuals from 10 locations (Biota, this study)

Descriptions and photographs of each Priority species are provided below.

Goodenia hartiana **(Priority 2)**

Goodenia hartiana is an erect to spreading, multi-stemmed perennial herb to shrub (WA Herbarium 2019), typically with purple flowers (Plate 6.25). It is represented in the WA Herbarium by 23 voucher specimens from a range of almost 250 km in the Great Sandy Desert (this range excludes a single specimen from near Telfer that has been incorrectly assigned with coordinates in the Little Sandy Desert).

A total of 81,413 individuals were recorded from 115 locations within the WPA by Biota during the field surveys in 2018 and 2019, with an additional 4,829 individuals from 110 locations recorded by Astron (2019b) and during a targeted survey on the 8th of May 2019 (unpublished). The species appeared to be responding well to fire, and was present as an open herbland in some burnt areas, with both purple-flowered and white-flowered forms present (see Plate 6.26).

Plate 6.25: *Goodenia hartiana* flower.

Plate 6.26: Purple-flowered and white-flowered forms of *Goodenia hartiana*.

Comesperma sabulosum **(Priority 3)**

Comesperma sabulosum is an erect and usually well-branched, single stemmed shrub, with small leaves and glaucous young foliage (Plate 6.27, Plate 6.28). This species is usually associated with *Triodia* on red sands and sand dunes, and occurs sporadically over a broad area (Ford et al. 2017). It is represented in the WA Herbarium by 12 voucher specimens over a range of almost 800 km, covering almost the full ranges of both the Great Sandy Desert and Little Sandy Desert. A total of 10 individuals of *C. sabulosum* were recorded by Biota from a single location on the lower slopes of a sand dune in the WPA. This species is likely to be more widespread in the WPA.

Plate 6.27: ***Comesperma sabulosum*****.**

Plate 6.28: ***Comesperma sabulosum*** **flower and fruit.**

Corynotheca asperata **(Priority 3)**

Corynotheca asperata is a rhizomatous, much-branched perennial herb growing to 60 cm tall (Plate 6.29 and Plate 6.30); it has green-white flowers (WA Herbarium 2019), although all individuals present during the survey were sterile. This species is represented in the WA Herbarium by four voucher specimens, which are distributed across a range of more than 500 km within the Great Sandy Desert.

A total of 255 individuals of *C. asperata* were recorded by Biota from 38 locations across the WPA, including four quadrats. All of the locations were associated with vegetation units D1 and D2 in dunal habitat. This appears to be typical habitat for this species, and the species would be expected to occur more widely through the WPA within such vegetation. This species appeared to be present in similar densities in burnt and unburnt vegetation of the WPA.

Plate 6.29: ***Corynotheca asperata*****.**

Plate 6.30: ***Corynotheca asperata*** **branching habit.**

Dasymalla chorisepala **(Priority 3)**

Dasymalla chorisepala is an aromatic, compact to spreading perennial shrub growing to 1.5 m tall and 1.5 m wide, with dendritic hairs and white flowers (WA Herbarium 2019). It is represented by six specimens in the WA Herbarium. The records from the current surveys represent a 160 km range extension for the species, which was previously only recorded as far south as the border of the Great Sandy Desert and Dampierland bioregions. A total of 21 individuals of *D. chorisepala* were recorded by Biota from nine locations across the WPA, all within vegetation unit P1. This species appeared to respond well to fire.

Plate 6.31: ***Dasymalla chorisepala.***

Plate 6.32: ***Dasymalla chorisepala*** **flower.**

Indigofera ammobia **(Priority 3)**

This low shrub has an open habit, very fine narrow leaves and small pink flowers (Plate 6.33, Plate 6.34). It is represented in the WA Herbarium by 14 voucher specimens distributed across a range of more than 900 km, from near Shay Gap in the Pilbara, to Durack River Station in the Kimberley and Bilbarrd in the Great Sandy Desert (WA Herbarium 2019). There are also vouchered records on AVH from the Northern Territory, which extend the known distribution to over 1,400 km (CHAH 2019).

A total of 788 individuals of *I. ammobia* were recorded by Biota from 53 locations across the WPA. A further 18 individuals were recorded from three locations by Astron during a targeted survey in May 2019 (unpublished data). The species was recorded predominantly across the sides of the dune systems in vegetation units D1 and D2, occurring throughout the dunal habitat. This appears to be typical habitat for this species, and it would be expected to occur more widely through the WPA within this vegetation. The species appeared to be responding well to recent fires through the WPA, and may have increased in numbers due to the burns.

Plate 6.33: ***Indigofera ammobia.***

Plate 6.34: ***Indigofera ammobia*** **flower and fruit.**

Sauropus arenosus **(Priority 3)**

Sauropus arenosus is a spreading shrub growing to 1 m tall (Plate 6.35), with yellow-green to red-pink flowers (Plate 6.36). It is represented in the WA Herbarium by seven voucher specimens distributed across a range of more than 800 km (WA Herbarium 2019). There are also vouchered records on AVH from the Northern Territory, which extend the known distribution to over 1,000 km (CHAH 2019), with the majority of these records occurring in the Great Sandy Desert.

A total of 233 individuals of *S. arenosus* were recorded by Biota from 61 locations across the WPA, including three quadrats within the WPA. This species was recorded predominantly from the sides and crests of vegetation units D1 and D2 (and within the associated swale vegetation), occurring throughout the dune systems. This appears to be typical habitat for this species, and it would be expected to occur more widely through the WPA within this vegetation. This species appeared to be present in similar densities in burnt and unburnt vegetation of the WPA.

Plate 6.35: ***Sauropus arenosus*** **habit.**

Plate 6.36: ***Sauropus arenosus*** **flower.**

Tribulopis marliesiae **(Priority 3)**

This spreading herb has a perennial rootstock with corky bark, yellow flowers, and compound leaves with up to four pairs of terete to very slightly compressed linear leaflets (Plate 6.37 and Plate 6.38). A total of 30 individuals were recorded by Biota from 10 locations, including one quadrat, within the WPA. The majority of the individuals were recorded from vegetation of the sand plains, including units P1, P2, and P6.

Tribulopis marliesiae has been vouchered with the WA Herbarium from the vicinity of Pardoo Roadhouse to Roebuck Plains station and inland over 250 km to the east (see Barrett and Barrett 2015). The closest vouchered locations are currently approximately 100 km north of the WPA, on the southern side of Mandora Marsh (WA Herbarium 2019), and additional populations of this species have also been recorded on Pardoo Station, 200 km west of the WPA (EnviroWorks 2017a). This species was recorded from numerous locations during the AREH survey (Biota 2018a), with the closest locations being approximately 30 km west of the WPA. The individuals recorded during this survey represent a southeasterly extension of the known distribution for this species.

Plate 6.37: ***Tribulopis marliesiae*** **habit.**

Plate 6.38: ***Tribulopis marliesiae*** **growth form.**

6.8 Other Species of Interest and Range Extensions

Due to the limited botanical collecting that had been completed in the general locality, it was expected that many of the records from the current WPA would represent extensions of the known ranges of the taxa, or would fill gaps in the known ranges (based on the records shown on NatureMap). These novel records and locations are not indicative of unique species distributions, and are only indicative of the limited survey of the locality.

A number of taxa recorded during the study belong to known species complexes for the region, as denoted by "sens. lat." (an abbreviation of *sensu lato*, meaning "in the broad sense") in the species list in Appendix 5. Other taxa were either represented by insufficient material for full determination, or did not appear to key well to existing species based on the taxonomic keys available; these were generally denoted by "?", "aff." (meaning "with affinities to") or "sp.", with reasons provided in Appendix 5. Specimens of each of these taxa will be submitted to the WA Herbarium, provided suitable material is available. The most notable taxa from the WPA are listed below:

- ***Bonamia alatisemina***

  Some individuals of *Bonamia alatisemina* displayed a different growth habit, and had longer, more pronounced hairs. This form has been collected in the Pilbara historically by Biota and requires more collections with good flowering material for further investigation.

- ***Calytrix carinata***

  Two forms appear to be present, differing in the length and shape of the leaves, and possibly the shape of the calyx lobes. Additional collections of good flowering material are required.

- ***Acacia platycarpa*** **'desert form'**

  An *Acacia* species present as a dominant throughout vegetation unit P1 was collected and identified as *Acacia platycarpa* during Phase 1 of the survey; although this specimen was considered somewhat distinct from typical *A. platycarpa*, it was sterile and could not be identified further. The same entity was identified as *A. platycarpa* within the AREH (Biota 2018a), and as *A. retivenea* subsp. *clandestina* by Astron (2018, 2019b) within the WPA and WRAC. Further investigation during Phase 2 of this survey, when the taxon was in fruit, has led to the distinction of this taxon by Mike Hislop of the WA Herbarium as *A. platycarpa* 'desert form'.

  The phyllode and fruit of *A. platycarpa* and *A. platycarpa* 'desert form' appear to be identical, however the habit and habitat differ. True *Acacia platycarpa* is a tall shrub to tree with rough bark, growing in sand, mostly over sandstone and laterite, and in open forest, woodland, and shrubland (WA Herbarium and Shire of Dalwallinu 2019) (Plate 6.39). *A. platycarpa* 'desert form' is a distinct shrub with smooth bark (Plate 6.40), and two different variants: 'desert form pruinose' (Plate 6.41), and 'desert form non-pruinose' (Plate 6.42). *Acacia platycarpa* 'desert form' spreads clonally through its root system, and is present in

patchy populations throughout the area (Plate 6.43), which are likely all linked via root system and genetically identical (Plate 6.44, Plate 6.45). It is unknown if true *A. platycarpa* has the ability to spread clonally via roots.

It is theorised that *A. platycarpa* 'desert form' can reproduce both clonally and by successful seed production, to recover quickly from multiple successive fires, which are frequent in the desert environment. The clonal resprouting from rootstock would allow very quick recovery following fire, while seed production would allow for further spread during any extended periods without fire. Further work involving DNA analysis would be required to formally separate this taxon from *A. platycarpa*.

Plate 6.39: ***Acacia platycarpa.***
Photography by B.R. Maslin. Image used with the permission of the WA Herbarium, DBCA (https://florabase.dpaw.wa.gov.au/help/copyright). Accessed on Sunday, 15 September 2019.

Plate 6.40: ***Acacia platycarpa* 'desert form' in older growth vegetation.**

Plate 6.41: ***Acacia platycarpa* 'desert form pruinose'.**

Plate 6.42: ***Acacia platycarpa* 'desert form non-pruinose'.**

Plate 6.43: ***Acacia platycarpa* 'desert form' population showing distinct border between variants.**

Plate 6.44: ***Acacia platycarpa* 'desert form pruinose' clonal root systems.**

Plate 6.45: ***Acacia platycarpa* 'desert form non-pruinose' clonal root nodes.**

6.9 Introduced Species

No introduced taxa (weeds) were recorded within the WPA.

6.10 Key Findings

With the exception of the cleared tracks, drill pads and airstrip, the vegetation of the WPA was in Excellent condition. The 11 vegetation types described from the WPA do not represent any known TECs or PECs. It is not possible to determine the distribution of these vegetation units throughout the region, due to the limited data available for comparison, however given the widespread nature of the habitats it is unlikely that any of the units are particularly restricted.

Three units within the WPA (D1, D2 and P1) contain large numbers of Priority flora species, and are therefore considered of increased significance for the proposal. However, the species recorded from the WPA are all well known from the broader locality, and some have been recorded from locations up to 1,400 km away. It is likely that these represent species that have been poorly documented in the Great Sandy Desert.

No weeds were recorded from the WPA.

A total of 195 native vascular flora species from 95 genera and 37 families have been recorded from the WPA during the combined Phase 1 and Phase 2 field surveys (Table 6.2), and sampling by Astron (2018, 2019b). A complete species list is presented in Table 1 of Appendix 5. This represents a high level of diversity for a survey area of this size in this locality, given that the total represents just over half the number of native species recorded from the survey of the AREH, which contained a greater diversity of habitats, was much greater in size, and sampled under more suitable conditions.

7.0 Results and Discussion – Winu Road Access Corridor

7.1 Vegetation

The WRAC covered a large area and sampled new vegetation types, aligning with units identified by both Biota (2018a) and Astron (2019a), as well as vegetation identified within the WPA. The sites utilised from these studies are detailed in Table 7.1.

Table 7.1. Sites utilised to determine species composition within the WRAC.

Project	**WRAC Survey (Biota, this study)**		
Sites	WIN33, WIN34, WIN35, WIN36, WIN37,	WIN38, WIN39, WIN40, WINREL03,	WINREL04, WINREL05, WINREL06, WINREL07
Project	**Asian Renewable Energy Hub Survey (Biota 2018a)**		
Sites	AH05*, AH07*, AH08, AH09*, AH10*, AH12*, AH23*, AH25*,	AH28*, AH33, AH41, AH42, AH43, AH44, AH45, AH46, AH47,	AH48, AH50*, AH51*, AH52*, AH53*, AH56*, AHREL01
Project	**Astron Patterson Road Corridor Survey (Astron 2019a)**		
Sites	DR01, DR02, DR05, DR07, DR08, DR09, DR10, DR11, DR12,	DR13, DR14, DR15, DR16, DR17, DR18, DR19, DR20,	DR21, DR22, DR23, DR24, DR25, DR26, DR27, DR29

* Sites were surveyed over two phases.

7.2 Description of Vegetation Types

Vegetation within the majority of the WRAC had been mapped by Biota (2018a) and Astron (2019a), with Section 2 of the WRAC lying within the AREH study area, which overlaps with the section of the Old Dump Road mapped by Astron (2019a) (see Figure 2.1). Where applicable, vegetation units assessed by Biota during the Winu survey were aligned with those defined by Biota (2018a) and Astron (2019a), to compile a complete and consistent list of vegetation types for the WRAC. All vegetation types present within the WRAC have been coded to align with the naming conventions within this report, including vegetation types not sampled during the current survey. Data for these units were taken directly from either the Biota (2018a) or Astron (2019a) reports. Four vegetation types from within the WPA (P1, P2, P3 and P7) were also mapped within the WRAC; descriptions of these have been presented in Section 3.2.4, and are therefore not repeated in this section.

An overview of the vegetation mapped within the WRAC is detailed in Table 7.2, and Figures showing the distribution and boundaries of the vegetation are presented in Appendix 7.

Table 7.2: Vegetation units of the WRAC.

Broad Landform	Vegetation Code	Description	Sampling Sites in the WRAC	Extent in WRAC	
				Hectares	%
Sand Dunes and Associated Swales	D3	*Grevillea stenobotrya, G. wickhamii, Acacia anaticeps* tall open shrubland over *A. tumida* var. *kulparn, Cyanostegia cyanocalyx, Sida* sp. Western sand dunes (P.K. Latz 11980) open shrubland over *Dicrastylis doranii,* (*Dampiera cinerea, A. stellaticeps, Gompholobium simplicifolium, Newcastelia cladotricha*) low open shrubland over *Triodia schinzii* very open hummock grassland and *Eriachne obtusa, Aristida holathera* var. *holathera* very open tussock grassland.	AH23*, AH35*	69.2	1.1
Inter-dunal Sand Plains	P1	*Owenia reticulata*, *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Jacksonia aculeata,* (*Androcalva loxophylla, Dicrastylis cordifolia, Gompholobium simplicifolium, Seringia elliptica*) low shrubland over *Triodia schinzii* open hummock grassland	**WIN39**, WIN02†, WIN07†, WIN08†, WIN31†	151.5	2.5
	P2	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa,* (*Hakea macrocarpa*) tall shrubland over *Sorghum plumosum* var. *plumosum, Aristida holathera* var. *holathera, Amphipogon sericeus* scattered tussock grasses to very open tussock grassland over *Triodia schinzii* open hummock grassland	**WIN35**, **WIN37,** WIN13†, WIN29†, WIN30†	434.0	7.0
	P3	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia drepanocarpa* subsp. *latifolia,* (*A. platycarpa*) tall shrubland over *Jacksonia aculeata* low open shrubland over *Triodia schinzii* hummock grassland	**WIN36**, WIN04†, WIN09†, WIN11†	65.3	1.1
	P7	*Owenia reticulata*, *Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa* low open shrubland *over Eulalia aurea, (Eriachne lanata)* very open tussock grassland over *Triodia epactia* open hummock grassland	No sites established in the WRAC	26.7	0.4
	P8	*Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia eriopoda, A. sericophylla* tall open shrubland over *Androcalva loxophylla, Dicrastylis doranii, Jacksonia aculeata* low open shrubland over *Triodia schinzii,* (*T. epactia*) open hummock grassland.	**WIN40, WINREL03, WINREL06, WINREL07**, AH08*, DR03^, DR07^, DR08^	699.5	11.4
	P9	*Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa, A. monticola* tall open shrubland over *Triodia schinzii,* (*T. epactia*) open hummock grassland.	AH07*, AH12*, AH47*, DR06^, DR23^, DR25^	574.0	9.3
	P10	*Corymbia zygophylla, Erythrophleum chlorostachys* scattered low trees over *Grevillea eriostachya, G. wickhamii* scattered tall shrubs over *Gompholobium simplicifolium, Jacksonia aculeata,* (*Dicrastylis doranii, Dampiera cinerea, Acacia stellaticeps*) low open shrubland over *Triodia schinzii* very open hummock grassland.	**WIN33**, **WIN34**, **WIN38**, AH28*, AH33*, DR09^, DR14^, DR16^, DR22^, DR27^, DR29^	586.0	9.5
	P11	*Erythrophleum chlorostachys* scattered low trees over *Grevillea refracta* scattered tall shrubs over *Acacia ancistrocarpa, A. monticola, A. tumida* var. *kulparn* open shrubland over *Triodia epactia* open hummock grassland.	AH48*, AH51*, AH52*, AH53*	913	14.8

Broad Landform	Vegetation Code	Description	Sampling Sites in the WRAC	Extent in WRAC	
				Hectares	%
Inter-dunal Sand Plains (continued)	P12	*Grevillea refracta, Acacia monticola, A. colei* var. *colei* tall open shrubland over *A. hilliana, A. adoxa* var. *adoxa* scattered low shrubs over *Triodia epactia* open hummock grassland.	AH46*, DR04^	54.6	0.9
	P13	*Erythrophleum chlorostachys*, (*Owenia reticulata*, *Gardenia pyriformis* subsp. *keartlandii*) scattered low trees over *Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs over *Gompholobium simplicifolium*, *Jacksonia aculeata* low open shrubland over *Triodia schinzii* open hummock grassland.	DR01^, DR02^, DR05^, DR10^, DR11^, DR12^, DR13^, DR15^, DR17^, DR18^, DR19^, DR20^, DR21^, DR24^, DR26^	786.2	12.8
Stony Rises and Gentle Outcroppings	R3	*Acacia hilliana,* (*A. adoxa* var. *adoxa*) low open shrubland over *Triodia epactia* open hummock grassland.	**WINREL04, WINREL05**, AH05*, AH09*, AH10*, AH41*, AH42*, AH43*, AH45*, AH50*	1,772.3	28.8
	R4	*Ficus brachypoda* low open woodland over *Acacia monticola, A. colei* var. *colei, Grevillea pyramidalis* tall open shrubland over *Triodia epactia* open hummock grassland.	AH56*, AH-REL01*	1.3	<0.1

Bold sites were established by Biota during the current WRAC survey.
† Denotes site was established within the WPA.
* Denotes site was established by Biota (2018a) during the AREH survey.
^ Denotes relevé was established by Astron (2019a) during the Patterson Road Corridor survey.

7.2.1 Vegetation of Sand Dunes and Associated Swales

D3	***Grevillea stenobotrya, G. wickhamii, Acacia anaticeps* tall open shrubland over *A. tumida* var. *kulparn, Cyanostegia cyanocalyx, Sida* sp. Western sand dunes (P.K. Latz 11980) open shrubland over *Dicrastylis doranii,* (*Dampiera cinerea, A. stellaticeps, Gompholobium simplicifolium, Newcastelia cladotricha*) low open shrubland over *Triodia schinzii* very open hummock grassland and *Eriachne obtusa, Aristida holathera* var. *holathera* very open tussock grassland.**
Aligned vegetation	This unit aligns with unit S2a as described by Biota (2018a).
Distribution and extent	This vegetation unit was the only dune vegetation type recorded from within the WRAC (Plate 7.1 and Plate 7.2), representing only 1.1% of the total WRAC.
Other associated species	Trees/Tall Shrubs**:** *Acacia sericophylla, Erythrophleum chlorostachys.* Shrubs: *Acacia platycarpa. Crotalaria cunninghamii* subsp. *cunninghamii, Grevillea eriostachya, Thinicola incana.* Low Shrubs: *Calytrix carinata, Chamaecrista symonii, Gyrostemon tepperi, Indigofera ammobia, Jacksonia aculeata, Newcastelia spodiotricha, Ptilotus arthrolasius.* Grasses: *Eragrostis eriopoda, Eriachne aristidea.* Herbs: *Cassytha capillaris, Cleome uncifera* subsp. *uncifera, Corynotheca micrantha* var. *gracilis, Heliotropium transforme, Polygala isingii, Ptilotus polystachyus, Spermacoce occidentalis, Trianthema pilosum.*
Vegetation condition	Excellent. Camel tracks and scats were noted at most sites but there was no particular evidence of grazing or trampling.
Sites in WRAC	Biota did not survey any of this vegetation type during the WRAC survey.
Sites established previously in the WRAC	Biota (2018a) established 8 quadrats within this vegetation, two of which (AH23, AH35) lie within the WRAC footprint, towards the southern end of Section 2.
Notes	The two dune sites within the AREH project grouped together with dune vegetation types D1 and D2 from within the WPA during the floristic analysis (see Section 7.4), with the greatest similarity to unit D1, but lacking *Corymbia chippendalei.*

Plate 7.1: Vegetation type D3 (AH23) (Biota 2018a).

Plate 7.2: Vegetation type D3 (AH83) (Biota 2018a).

7.2.2 Vegetation of Inter-Dunal Sand Plains

P8	***Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia eriopoda, A. sericophylla* tall open shrubland over *Androcalva loxophylla, Dicrastylis doranii, Jacksonia aculeata* low open shrubland over *Triodia schinzii,* (*T. epactia*) open hummock grassland.**
Aligned vegetation	This unit aligns with unit P3a as described by Biota (2018a), and unit P1 as described by Astron (2019a).
Distribution and extent	This vegetation type is the dominant vegetation through the Diversion, with a small area also present in the south of Section 2 of the WRAC, representing 11.4% of the total WRAC. It also appears to be relatively well represented through the AREH survey area (Biota 2018a).
Other associated species	Trees/Tall Shrubs: *Gardenia pyriformis* subsp. *keartlandii.* Shrubs: *Acacia ancistrocarpa, A. tumida* var. *kulparn.* Low Shrubs: *Calytrix carinata, Gompholobium simplicifolium, Goodenia hartiana* (P2)*, Halgania solanacea* var. *solanacea, Ptilotus arthrolasius, P. astrolasius, Scaevola parvifolia.* Grasses: *Aristida holathera* var. *holathera, Eriachne lanata, E. obtusa, Sorghum plumosum* var. *plumosum, Yakirra australiensis* var. *australiensis.* Sedges: *Bulbostylis barbata.* Herbs: *Bonamia alatisemina, Cassytha capillaris, Cleome uncifera* subsp. *uncifera, Polycarpaea corymbosa* var. *corymbosa, Polygala isingii, Trianthema pilosum, Tribulopis marliesiae, Trigastrotheca molluginea.*
Vegetation condition	Excellent.
Sites in WRAC	Quadrat WIN40; relevés WINREL03, WINREL06, WINREL07.
Sites established previously in the WRAC	Biota (2018a) established 14 quadrats within this vegetation type, two of which (AH08 and AH30) lie towards the eastern end of Section 2 of the WRAC. Astron (2019a) established three relevés within this vegetation type (DR03, DR07, DR08).
Notes	This vegetation was largely burnt, and displayed some varying dominant low shrub species when regenerating (Plate 7.3 and Plate 7.4). In longer unburnt areas, *Acacia eriopoda* formed a tall shrubland to open shrubland. These sites split into a number of distinct floristic groups with very little overlap to other groups; within the floristic analysis, the sites split mostly between a similarity to P9, or similarity to P10, likely related to fire age (see Section 7.4).

Plate 7.3: Vegetation type P8.

Plate 7.4: Vegetation type P8 after fire.

P9	***Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa, A. monticola* tall open shrubland over *Triodia schinzii,* (*T. epactia*) open hummock grassland.**
Aligned vegetation	This unit aligns with unit P3b as described by Biota (2018a), and unit DP as described by Astron (2019a).
Distribution and extent	This vegetation type was recorded from pindan plains in both the McLarty and Mackay subregions (Plate 7.5 and Plate 7.6), and was relatively well represented within the AREH study area (nine quadrats; Biota 2018a).
Other associated species	Trees/Tall Shrubs**:** *Acacia colei* var. *colei, A. sericophylla, Grevillea refracta.* Shrubs: *Sida arenicola.* Low Shrubs: *Corchorus sidoides* subsp. *vermicularis, Hibiscus leptocladus, Ptilotus astrolasius.* Grasses: *Aristida holathera* var. *holathera, Eragrostis eriopoda, Sorghum plumosum* var. *plumosum, Yakirra australiensis* var. *australiensis.* Sedges: *Bulbostylis barbata.* Herbs: *Boerhavia gardneri, Cassytha capillaris, Goodenia armitiana, Polycarpaea corymbosa* var. *corymbosa, Ptilotus polystachyus, Trianthema pilosum, Tribulopis marliesiae, Trigastrotheca molluginea.*
Vegetation condition	Excellent
Sites in WRAC	Biota did not survey any of this vegetation type during the WRAC survey.
Sites established previously in the WRAC	Biota (2018a) established nine quadrats within this vegetation type, three of which (AH07, AH12 and AH47) lie along the Nyangumarta Highway within or in very close proximity to the WRAC footprint. Astron (2019a) established three relevés within this vegetation type (DR06, DR23 and DR25).
Notes	The composition of this vegetation was somewhat variable. In some areas *Erythrophleum chlorostachys* formed a low open woodland and *Sorghum plumosum* var. *plumosum* formed a very open tussock grassland. The sites within this vegetation type formed two distinct clusters in the floristic analysis, separating distinctly by location (and the project they were recorded from). The nine Biota sites established in the AREH study area separated from the three Astron sites. One AREH site (AH74) grouped with the four P2 vegetation sites, due to a lower presence of *Acacia monticola*.

Plate 7.5: Vegetation type P9 (AH01) (Biota 2018a).

Plate 7.6: Vegetation type P9 (AH12) (Biota 2018a).

P10	***Corymbia zygophylla, Erythrophleum chlorostachys* scattered low trees over *Grevillea eriostachya, G. wickhamii* scattered tall shrubs over *Gompholobium simplicifolium, Jacksonia aculeata*, (*Dicrastylis doranii, Dampiera cinerea, Acacia stellaticeps*) low open shrubland over *Triodia schinzii* very open hummock grassland.**
Aligned vegetation	This unit aligns with unit P3c as described by Biota (2018a), and unit CP as described by Astron (2019a).
Distribution and extent	This vegetation type was typically recorded from narrow swales between sand dunes and sometimes from broader pindan plains, with all sites located in the southern half of the WRAC in the Mackay subregion (Plate 7.7 and Plate 7.8). This vegetation type was well represented through the area, with 11 sites within the AREH study area, and six sites within the Astron survey.
Other associated species	Trees/Tall Shrubs: *Acacia sericophylla, Gardenia pyriformis* subsp. *keartlandii.* Shrubs: *Acacia tumida* var. *kulparn, Gyrostemon tepperi.* Low Shrubs: *Calytrix carinata, Corchorus sidoides* subsp. *vermicularis, Dampiera cinerea*, *Goodenia hartiana* (P2), *Halgania solanacea* var. *solanacea, Newcastelia cladotricha, Ptilotus arthrolasius, Scaevola parvifolia.* Grasses: *Aristida holathera* var. *holathera, Eragrostis eriopoda, Eriachne obtusa.* Herbs: *Cassytha capillaris, Cleome uncifera* subsp. *uncifera, Oldenlandia pterospora, Polygala isingii, Trianthema pilosum.*
Vegetation condition	Excellent.
Sites in WRAC	Quadrats WIN33, WIN34, WIN38.
Sites established previously in the WRAC	Biota (2018a) established 11 quadrats within this vegetation type, two of which (AH28 and AH33) lie within or in very close proximity to the WRAC footprint, along the Old Dump Rd in Section 2. Astron (2019a) established six relevés within this vegetation type (DR09, DR14, DR16, DR22, DR27 and DR29).
Notes	This vegetation type was characterised by the presence of *Corymbia zygophylla*, and was floristically similar to P13, however P13 lacked the dominant *C. zygophylla.* The majority of these sites formed a single floristic group, with DR29 grouping with P13 sites due to the lack of *C. zygophylla* in the species list (Section 7.4). Some AREH sites grouped more closely to sand dune vegetation (S2b of Biota 2018a).

Plate 7.7: Vegetation type P10 after fire.

Plate 7.8: Vegetation type P10 (AH80) (Biota 2018a).

P11	***Erythrophleum chlorostachys* scattered low trees over *Grevillea refracta* scattered tall shrubs over *Acacia ancistrocarpa, A. monticola, A. tumida* var. *kulparn* open shrubland over *Triodia epactia* open hummock grassland.**
Aligned vegetation	This unit aligns with unit P3d as described by Biota (2018a); no corresponding vegetation was mapped by Astron (2019a).
Distribution and extent	This vegetation type was recorded from the McLarty subregion, mainly in the northeastern section of the AREH study area (Plate 7.9 and Plate 7.10). It was similar to P9, however *Triodia epactia* was dominant at all of the sites, and *Triodia schinzii* was only present at two of the sites. This vegetation was the dominant vegetation on sand plains in the WRAC, representing 14.8% of the total area, and 21.3% of the total plains habitat.
Other associated species	Shrubs: *Ptilotus calostachyus, Sida arenicola.* Low Shrubs: *Goodenia azurea* subsp. *hesperia, Hibiscus leptocladus, Ptilotus astrolasius.* Grasses: *Aristida holathera* var. *holathera, Eragrostis eriopoda, Sorghum plumosum* var. *plumosum, Yakirra australiensis* var. *australiensis.* Sedges: *Bulbostylis barbata.* Herbs: *Bonamia alatisemina, Cassytha capillaris, Euphorbia psilosperma, Goodenia armitiana, Polycarpaea corymbosa* var. *corymbosa, Trianthema pilosum, Tribulopis marliesiae, Trigastrotheca molluginea.*
Vegetation condition	Excellent.
Sites in WRAC	Only a small amount of this vegetation type was encountered during the WRAC survey and this was largely burnt, so no sites were established during the current surveys.
Sites established previously in the WRAC	Biota (2018a) established 12 quadrats within this vegetation type, four of which (AH48, AH51, AH52 and AH53) lie within the WRAC footprint, along the Nyangumarta Highway in Section 2.
Notes	This vegetation type occurred in areas surrounding laterite hills, and may be difficult to distinguish from P9 if the *Triodia* spp. are sterile during the survey. The majority of sites in this unit clustered in a single floristic group, however AH52 and AH53 clustered with sites in the R3 vegetation type, likely due to being spatially close to the R3 landform areas and thus sharing similar species. One site (AH86) grouped with P9 sites, due to the presence of *T. schinzii.*

Plate 7.9: Vegetation type P11 (AH36) (Biota 2018a).

Plate 7.10: Vegetation type P11 (AH48) (Biota 2018a).

P12	***Grevillea refracta, Acacia monticola, A. colei* var. *colei* tall open shrubland over *A. hilliana, A. adoxa* var. *adoxa* scattered low shrubs over *Triodia epactia* open hummock grassland.**
Aligned vegetation	This unit aligns with unit P3e as described by Biota (2018a), and unit P3 as described by Astron (2019a).
Distribution and extent	This vegetation type was recorded from the McLarty subregion (Plate 7.11 and Plate 7.12). Only two small areas of P12 were present in the WRAC, along Nyangumarta Highway. These represented 0.9% of the total WRAC.
Other associated species	Trees/Tall Shrubs: *Acacia ancistrocarpa, A. sericophylla, Grevillea wickhamii.* Shrubs: *Ptilotus calostachyus, Sida arenicola.* Low Shrubs: *Corchorus sidoides* subsp. *vermicularis, Dodonaea coriacea, Goodenia azurea* subsp. *hesperia, Hibiscus leptocladus, Leptosema anomalum, Ptilotus astrolasius.* Grasses: *Aristida holathera* var. *holathera, Eragrostis eriopoda, Eriachne obtusa, Eulalia aurea, Paspalidium rarum, Sorghum plumosum* var. *plumosum, Yakirra australiensis* var. *australiensis.* Sedges: *Bulbostylis barbata.* Herbs: *Boerhavia gardneri, Cassytha capillaris, Cleome viscosa, Euphorbia psilosperma, Goodenia armitiana, Polycarpaea corymbosa* var. *corymbosa, Ptilotus fusiformis, Trianthema pilosum, Trigastrotheca molluginea.*
Vegetation condition	Excellent
Sites in WRAC	No sites were sampled in this vegetation type during the current survey.
Sites established previously in the WRAC	Biota (2018a) established five quadrats within this vegetation type, one of which (AH46) lies within the WRAC, along the Nyangumarta Highway extent of Section 2. Astron (2019a) established one relevé (DR04) within this vegetation type, outside of the WRAC.
Notes	This unit was dominated by *Triodia epactia,* and *T. schinzii* was only present at one site, at 0.1% cover. All sites were located in close proximity to low laterite rises, suggesting that laterite close to the surface may be influencing the floristic composition of the sites. All the AREH sites clustered into one floristic group, however the Astron site DR04 grouped with P9 sites, due to the differing *Triodia* spp. It is considered that despite the difference in dominant *Triodia* spp., this unit is the same as unit P3 described by Astron (2019a), as sterile *T. schinzii* and *T. epactia* can be difficult to differentiate.

Plate 7.11: Vegetation type P12 (AH39) (Biota 2018a).

Plate 7.12: Vegetation type P12 (AH55) (Biota 2018a).

P13	***Erythrophleum chlorostachys*, (*Owenia reticulata*, *Gardenia pyriformis* subsp. *keartlandii*) scattered low trees over *Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs over *Gompholobium simplicifolium*, *Jacksonia aculeata* low open shrubland over *Triodia schinzii* open hummock grassland.**
Aligned Vegetation	This unit aligns with unit P2 as described by Astron (2019a).
Distribution and Extent	This unit was present extensively along the Old Dump Road stretch of Section 2 of the WRAC, representing 12.8% of the total area.
Other Associated Species	Shrubs: *Acacia anaticeps, Acacia tumida* var. *kulparn, Grevillea eriostachya.* Low Shrubs: *Atriplex sp., Calytrix carinata, Dampiera cinerea, Newcastelia cladotricha.* Herbs: *Cassytha capillaris, Ptilotus arthrolasius.*
Vegetation Condition	Excellent
Sites in WRAC	No sites were sampled in this vegetation type during the current survey.
Sites established previously in the WRAC	Astron (2019a) established 15 relevés (DR01, DR02, DR05, DR10, DR11, DR12, DR13, DR15, DR17, DR18, DR19, DR20, DR21, DR24, DR26) within this vegetation type.
Notes	This vegetation type was floristically similar to vegetation type P10, but lacked the dominant tree *Corymbia zygophylla*. All sites in this vegetation type were surveyed by Astron (2019a), and all clustered in a single floristic group, with all areas seen showing signs of recent fire (Plate 7.13 and Plate 7.14).

Plate 7.13: Vegetation type P13 (DR02) (Astron 2019a).

Plate 7.14: Vegetation type P13 (DRMN01) (Astron 2019a).

7.2.3 Vegetation of Stony Rises and Gentle Outcroppings

R3:	***Acacia hilliana*, (*A. adoxa* var. *adoxa*) low open shrubland over *Triodia epactia* open hummock grassland.**
Aligned vegetation	This unit aligns with unit H1 as described by Biota (2018a).
Distribution and extent	This vegetation type was recorded from low stony (gravelly) lateritic rises across the Nyangumarta Highway portion of Section 2 of the WRAC (Plate 7.15 and Plate 7.16), and was targeted as a borrow source area for road construction. This vegetation type represented more than a quarter of the WRAC (28.8%).
Other associated species	Trees/Tall Shrubs: *Acacia inaequilatera, A. monticola, Grevillea refracta, G. wickhamii.* Shrubs: *Acacia tumida* var. *kulparn, Ptilotus calostachyus*. Low Shrubs: *Calytrix carinata, Dampiera candicans, Dodonaea coriacea, Goodenia scaevolina, Halgania solanacea* var. *solanacea, Scaevola browniana* subsp. *browniana.* Grasses: *Eriachne lanata, E. pulchella.* Sedges: *Bulbostylis barbata, Fimbristylis simulans.* Herbs: *Cleome viscosa, Polycarpaea corymbosa* var. *corymbosa, Trigastrotheca molluginea.*
Vegetation condition	Excellent.
Sites in WRAC	WINREL04, WINREL05.
Sites established previously in the WRAC	Biota (2018a) established 19 quadrats and one relevé within this vegetation, eight of which (AH05, AH09, AH10, AH41, AH42, AH43, AH45 and AH50) lie within or in close proximity to the WRAC, along the Nyangumarta Highway extent of Section 2.
Notes	Tall shrubs were typically absent or scattered (see Plate 7.15), but formed a tall open shrubland in some areas (Plate 7.16). Most of the sites in this vegetation type clustered in a single floristic group, however a small number grouped more closely with sites on plains or on rocky outcroppings (see Section 7.4). This reflects the widespread nature of many of the species recorded.

Plate 7.15: Vegetation type R3.

Plate 7.16: Vegetation type R3 (AH50) (Biota 2018a).

R4	***Ficus brachypoda* low open woodland over *Acacia monticola, A. colei* var. *colei, Grevillea pyramidalis* tall open shrubland over *Triodia epactia* open hummock grassland.**
Aligned vegetation	This unit aligns with unit R1 as described by Biota (2018a).
Distribution and extent	This vegetation type was recorded from areas of rocky outcropping on the crests of stony rises and along low breakaways at the edge of hills (Plate 7.17 and Plate 7.18). Two small areas of this vegetation were identified within the WRAC by Biota (2018a); these were restricted to rocky areas within larger areas of R3 vegetation, occupying less than 0.1% of the WRAC.
Other associated species	Trees/Tall Shrubs: *Grevillea wickhamii.* Shrubs: *Abutilon leucopetalum.* Low Shrubs: *Acacia hilliana, Indigofera monophylla, Ptilotus incanus, Senna venusta, Solanum dioicum, S. diversiflorum, Tephrosia rosea* var. *clementii, T. rosea* var. *rosea, Triumfetta incana, T. johnstonii.* Climbers: *Tinospora smilacina.* Grasses: *Eriachne ciliata, E. lanata, Paspalidium tabulatum, Sorghum plumosum* var. *plumosum.* Sedges: *Bulbostylis barbata, Fimbristylis simulans.* Herbs: *Amaranthus undulatus, Cleome viscosa, Cucumis variabilis, Gomphrena cunninghamii, Polycarpaea corymbosa* var. *corymbosa, Trachymene oleracea* subsp. *oleracea, Trigastrotheca molluginea.*
Vegetation condition	Excellent.
Sites in WRAC	No sites were sampled in this vegetation type during the current survey.
Sites established previously in the WRAC	Biota (2018a) established three quadrats and three relevés in this vegetation type, of which one quadrat and one relevé (AH56 and AH-REL01) lie within the WRAC, along the Nyangumarta Highway in Section 2.
Notes	Two weed species (**Aerva javanica* and **Bidens bipinnata*) were recorded at some sites in this unit by Biota (2018a), however none of these records were within the WRAC. The three unburnt sites in this vegetation type occurred in a distinct floristic group when only perennial species were considered. AH56 occurred as an outlier site, while AH27 and AH-REL01 occurred in a separate group with quadrat AH63, which had been burnt in the last few years (see Section 7.4).

Plate 7.17: Vegetation type R4 (AH27) (Biota 2018a).

Plate 7.18: Vegetation type R4 (AH-REL02) (Biota 2018a).

7.3 Condition of the Vegetation Units

Vegetation condition assessments were based on the ranking scale developed by Trudgen (1988). The vegetation within WRAC was generally considered to be in 'Excellent' condition, with only the few existing roads, as well as minor historical borrow pits in the western extent (Plate 7.19) considered to be 'Degraded'. Areas mapped as Degraded totalled 24.6 ha (0.4%) of the WRAC, and the cleared areas did not appear to affect the condition of the surrounding vegetation. The WRAC was without weeds. The fire history through the area is a natural occurrence and was not considered to impact the condition of the vegetation.

Plate 7.19: Disturbed historical borrow pits.

7.4 Floristic Analysis

Table 2 in Appendix 6 summarises the floristic groups that were generated by the analyses that appeared to reveal the most consistent patterns of similarity for the sites from the WRAC, when regional sites were included. An analysis was also conducted on the sites that were present only within the WRAC, excluding all regional sites.

Within the regional analysis, 175 sites from the four relevant surveys were combined in a large-scale analysis (Appendix 6. Table 3), which resulted in 39 distinct floristic groups. The sites were coded by vegetation type to display similarities (Figure 1 in Appendix 6). For the majority of vegetation types, the sites within a particular unit were assigned to the same floristic group based on the percent cover data, however when presence/absence data were analysed, there were many vegetation types with less distinct site groupings. The following observations were made from the analyses:

- Sites from landform elements such as sand dunes and rocky rises occurred in distinctly separate floristic groups from the large cluster of sand plain sites (Appendix 6. Figure 2).
- As expected, sites from vegetation types on similar landforms showed some cross-over between floristic groups; particularly the sand dune vegetation units D1, D2 and D3 from this study and S2b from Biota (2018a) (see Table 2 in Appendix 6). This was caused by the similar suite of species occurring in these landforms, and slightly differing fire history among the sites.
- Most sand dune sites clustered together, however due to the fluid interface between the dune and swale landforms, and fire scars through the area, there was some crossover between sites on sand dunes and on plains.
- The sites on rocky rises formed two distinct groups: sites from the WPA (vegetation types R1 and R2) were distinctly different to sites from the WRAC (vegetation types R3 and R4) and AREH study area (Biota 2018a).
- Three outlier sites (list) from the AREH study area (Biota 2018a) separated distinctly from all other sites; these were from drainage vegetation that was not encountered in any other survey represented in the data set.

- When all regional sites were included, and coded by the source survey, the distribution of the sites indicates a difference in sites by the survey (see Figure 3 in Appendix 6). This may indicate that vegetation types that are perceived to be the same are actually somewhat distinct, when sampled over the very large spatial distance that is covered by the WRAC. It could also be indicative of differences in sampling over the different surveys (e.g. permanent two-phase quadrats versus relevés, different seasonal conditions, different practitioners etc).

7.5 Vegetation of Conservation Significance

None of the vegetation types identified for the WRAC represent TECs listed under either the Commonwealth EPBC Act or the WA BC Act.

7.6 Flora of the Winu Road Access Corridor

A combined species list from the entirety of the WRAC was compiled using relevant sites from the AREH (Biota 2018a), all sites from Astron (2019a), as well as the sites established during the current survey. The sites included are summarised in Table 7.1, while the species list is presented in Appendix 5.

A total of 201 species from 97 genera and 39 families were recorded in the compiled species list from the WRAC (Table 7.3).

Table 7.3: Dominant families and genera recorded from the WRAC, based on all sampling to date.

Family	No. of Native Species	Genus	No. of Native Species
Fabaceae	42	*Acacia*	24
Poaceae	29	*Grevillea*	9
Malvaceae	19	*Eriachne*	8
Proteaceae	11	*Goodenia*	6

7.7 Flora of Conservation Significance

7.7.1 Threatened Flora

One Threatened species: *Seringia exastia*, was recorded within the WRAC by Biota (2018a), with 88 individuals counted from three locations. However, it has been confirmed by Dr Carol Wilkins that a scientific paper has been accepted for publication that synonymises this species with the widespread and not threatened *S. elliptica*; *S. exastia* will become the name for this entity, as it was the first described (C. Wilkins, DBCA, pers. comm. 2019). Following the publication of the paper, this will mean *S. exastia* will no longer be a Threatened species, and is not of conservation significance. Within this report, all records of *S. exastia* are referred to as *S. elliptica* to avoid confusion regarding Threatened status.

No other species listed as Threatened under either State or Commonwealth legislation have been recorded in the WRAC to date, and none would be expected to occur.

7.7.2 Priority Flora

One Priority 2 and five Priority 3 species have been recorded within the WRAC based on all sampling to date (Table 7.4). Individuals of *G. hartiana* were abundant through the WRAC, in many cases forming an open herbland under the burnt mid-storey vegetation. This species responded very well to the recent fires in the area, but is unlikely to remain in such high numbers once the vegetation recovers post-fire.

Table 7.4: Summary of Priority flora recorded in or in close proximity to the WRAC.

Species	Records in the WRAC	Additional Records in Close Proximity to the WRAC
Priority 2		
Goodenia hartiana	64,434 individuals from 346 locations (Biota, this study; Astron 2019a)	62,098 individuals, from 155 locations (recorded for a modified polygon of "The Diversion", see Figure 8 and 9 of Appendix 7; Biota, this study)
Priority 3		
Bonamia oblongifolia	2 individuals at 1 location (Biota 2018a)	–
Dasymalla chorisepala	4 individuals from 4 locations (Biota, this study)	–
Indigofera ammobia	3 individuals from 2 locations (Biota 2018a, Astron 2019a)	–
Polymeria ? sp. Broome (K.F. Kenneally 9759)	–	1 individual at 1 location (160 m outside the WRAC; Biota 2018a)
Seringia katatona	150 individuals at 1 location (Biota 2018a)	–
Tribulopis marliesiae	22 individuals from 13 locations (Biota 2018a, this study)	3 individuals from 3 locations (within 100m of the WRAC; Biota 2018a)

Location records are presented in Appendix 4 and shown in Figures 1 to 15 in Appendix 7. Detailed descriptions and images of most of the Priority flora recorded from the WRAC are presented in Section 6.7.2, as all species except *Bonamia oblongifolia* were also recorded from the WPA. A description of *Bonamia oblongifolia* is provided below.

Bonamia oblongifolia **(Priority 3)**

Bonamia oblongifolia is a herbaceous perennial with hairy stems arising from a woody base and blue flowers (Plate 7.20 and Plate 7.21). The leaves are shortly petiolate (1–2 mm) or subsessile (with indistinct petioles), with oblong blades that are densely sericeous or villous with rust-coloured hairs (DBCA 2018). *Bonamia oblongifolia* is similar to other *Bonamia* species in the region, and is differentiated primarily by leaf shape.

Two individuals of this species were recorded from a single location in the WRAC during the survey by Biota (2018a). This location was in vegetation unit P9, at the edge of a rocky rise supporting R3. This species was commonly found in pindan plain habitat within the AREH study area, and would be expected to occur more widely through the WRAC during more suitable weather conditions.

Confirmed specimens of *Bonamia oblongifolia* are currently only lodged with the WA Herbarium from a few, widely spaced locations in the Dampierland and Great Sandy Desert bioregions, however an additional specimen from the northern Dampier Peninsula is lodged with the Northern Territory Herbarium (CHAH 2019). The vouchered range of this species therefore extends over approximately 460 km, from Wallal Downs Station to One Arm Point, with the closest vouchered population being 25 km west of the WRAC on Wallal Downs. While the species is not currently well documented, additional new populations were identified on Mandora Station, approximately 20 km northeast of the northern extent of Section 1 of the WRAC. Further populations have also been recently recorded on Pardoo Station, 120 km west of the Section 1 by EnviroWorks Consulting (EnviroWorks) (2017a), and on Anna Plains Station, ~200 km northeast of Section 1 (EnviroWorks 2017b). The combined populations at Wallal Downs, Pardoo and Anna Plains were estimated at over 1,200,000 plants (EnviroWorks 2017a). Considered together, these records show that the species is clearly not uncommon in suitable habitat.

Plate 7.20: ***Bonamia oblongifolia*** **habit (DBCA 2018).**

Plate 7.21: ***Bonamia oblongifolia*** **leaf and flower (DBCA 2018).**

7.8 Other Species of Interest and Range Extensions

The WRAC contained all the species listed as species of interest for the WPA, as detailed in Section 6.8.

7.9 Introduced Species

No introduced taxa (weeds) have been recorded from the WRAC to date. Ten weed species were recorded from the AREH survey area (Biota 2018a), however none of these records were within the WRAC. The northernmost extent of Section 1 of the WRAC has been amended to include an area overlapping a 1 km stretch of Great Northern Highway. This area has not been surveyed at the time of writing, and it is possible that common roadside weed species such as Buffel Grass (**Cenchrus ciliaris*), Birdwood Grass (**Cenchrus setiger*) and Kapok Bush (**Aerva javanica*) may be present.

7.10 Key Findings

With the exception of the cleared tracks and two historical borrow pits, the vegetation of the WRAC was in Excellent condition. The nine vegetation types described from the WRAC do not represent any known TECs or PECs. It is not possible to determine the actual distribution of these vegetation units throughout the region, however the report from the AREH survey (Biota 2018a) details the broader distribution of some aligned units through that study area. Given the widespread nature of the habitats, it is unlikely that any of the units are particularly restricted. Mapping of the potential borrow source areas of the WRAC was done retrospectively, as the areas were not identified at the time of the survey. Most of these areas are small, and the mapped vegetation is likely to be representative, however some areas are mapped with a lower level of confidence. These areas will be targeted by further fieldwork in 2020.

A total of 201 species from 97 different genera and 39 different families were recorded in the compiled species list from the WRAC (see Table 1 in Appendix 5). This number included one Priority 2 species and five Priority 3 species. In general these occurred in small numbers, however unit P8 of the WRAC contained large numbers of the Priority 2 species *Goodenia hartiana*, with hundreds of thousands of individuals present, mostly through the Diversion. This is likely to be mainly reflective of a higher intensity level of ground survey within this area, and also the large majority of the area being recently burnt (allowing for the increased numbers in response). As discussed in the key findings for the WPA (Section 6.10) the Priority species recorded from the WRAC are all well known from the broader locality, and some have been recorded from locations up to 1,400 km away. It is likely that these species have simply been poorly documented in the Great Sandy Desert due to the limited botanical sampling in the region.

Floristic analysis of the WRAC represents a difficult task, as multiple consultancies, proponents, and levels of survey were involved, over a long corridor area. Although care was taken when combining vegetation types to align data correctly, it was difficult to ensure consistency of data. Due to the nature of any corridor survey, only a small portion of the overall area can be surveyed, and therefore the sites and vegetation selected may not truly represent the overall vegetation through the region.

The WRAC was without weeds. Ten weed species were recorded during the AREH survey (Biota 2018a), however none of these records were within the WRAC.

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8.0 Glossary and Acronyms

*	Used prior to a species name to denote an introduced (weed) species.
aff.	Abbreviation of *affinis* (Latin); 'with affinities to'.
Annual (plant)	A plant that lives for only one year.
AREH	Asian Renewable Energy Hub.
BC Act	The WA *Biodiversity Conservation Act 2016*.
BOM	Bureau of Meteorology.
Conservation significant	A plant, community or habitat that has a formally assigned conservation ranking, usually because it is recognised to be rare, unusual, new or poorly sampled (see Appendix 1 for more on the conservation framework).
DBCA	The Department of Biodiversity, Conservation and Attractions, formerly Department of Parks and Wildlife, Department of Environment and Conservation (DEC), and Department of Conservation and Land Management (CALM).
Dominant species	The species that occur most abundantly in an area or vegetation stratum.
EPA	Environmental Protection Authority of Western Australia.
EPBC Act	The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
ESA	Environmentally Sensitive Area.
Foot traverse	Consists of walking through an area to confirm or note the vegetation and/or species presence (usually sampling a narrow corridor/cross section of vegetation).
IBRA	Interim Biogeographical Regionalisation for Australia.
Leaflet	A single part of a compound leaf containing multiple leaflets.
Mine Development Area	The section of the WPA area corresponding to the project development envelope.
Mine Survey Area	The area in which the WPA flora and vegetation survey was conducted.
Opportunistic record	A plant species collected from outside a formal sampling site (quadrat or relevé); sometimes abbreviated to "Opp."
PEC	Priority Ecological Community (see Appendix 1 for more on the WA conservation framework).
Perennial	A plant that lives for more than two growing seasons.
Priority flora	Flora listed by the DBCA as requiring additional information to properly evaluate their conservation significance, or requiring ongoing monitoring (see Appendix 1 for more on the WA conservation framework).
Pruinose	Covered in white powdery granules, frosted in appearance.
Quadrat	A bounded sample area of uniform vegetation in which all species present are recorded; the standard quadrat size for the Pilbara is 50 m by 50 m, or an equivalent area (2,500 m^2).
Relevé	An unbounded flora sampling site, with a similar area to a quadrat, in which most species present are recorded.
sp. (plural: spp.)	Abbreviation of 'species'.
Stand (vegetation)	A single instance of a vegetation community, defined by its immediate boundary.

Stratum (plural: strata)	A horizontal level of vegetation defined by growth habit (and sometimes height); e.g. low trees, tall trees, tussock grasses, hummock grasses, etc.
subsp. (plural: subspp.)	Abbreviation of 'subspecies'.
Swale	An area of low-lying sheltered vegetation between or within sand-dunes crests.
Taxon (plural: taxa)	A taxonomic entity; typically at species level or below.
Taxonomic key	Botanical publications containing a series of questions (regarding the plant's characteristics) aiding in the identification of a taxon.
TEC	Threatened Ecological Community (see Appendix 1 for more on the WA conservation framework).
Terete	Round in cross-section, cylindrical.
Threatened flora	Flora protected by legislation, either listed under the Commonwealth EPBC Act or the WA *Biodiversity Conservation Act 2016;* see Appendix 1 for more on the WA conservation framework.
var.	Abbreviation of 'variety'.
WPA	Winu Project Area.
WRAC	Winu Road Access Corridor.

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Appendix 1

Framework for Conservation Significance Ranking of Communities and Species in WA

A. Definitions, Categories and Criteria for Threatened and Priority Ecological Communities (DEC 2010)

1. General Definitions

Ecological Community
A naturally occurring biological assemblage that occurs in a particular type of habitat.

Note: The scale at which biological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified.

A **threatened ecological community** (TEC) is one which is found to fit into one of the following categories; "presumed totally destroyed", "critically endangered", "endangered" or "vulnerable".

Possible threatened ecological communities that do not meet survey criteria are added to the DBCA's Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

An **assemblage** is a defined group of biological entities.

Habitat is defined as the areas in which an organism and/or assemblage of organisms lives. It includes the abiotic factors (e.g. substrate and topography), and the biotic factors.

Occurrence: a discrete example of an ecological community, separated from other examples of the same community by more than 20 metres of a different ecological community, an artificial surface or a totally destroyed community.

By ensuring that every discrete occurrence is recognised and recorded future changes in status can be readily monitored.

Adequately Surveyed is defined as follows:
"An ecological community that has been searched for thoroughly in most likely habitats, by relevant experts."

Community structure is defined as follows:
"The spatial organisation, construction and arrangement of the biological elements comprising a biological assemblage" (e.g. *Eucalyptus salmonophloia* woodland over scattered small shrubs over dense herbs; structure in a faunal assemblage could refer to trophic structure, e.g. dominance by feeders on detritus as distinct from feeders on live plants).

Definitions of **Modification** and **Destruction** of an ecological community:

Modification: "changes to some or all of ecological processes (including abiotic processes such as hydrology), species composition and community structure as a direct or indirect result of human activities. The level of damage involved could be ameliorated naturally or by human intervention."

Destruction: "modification such that reestablishment of ecological processes, species composition and community structure within the range of variability exhibited by the original community is unlikely within the foreseeable future even with positive human intervention."

Note: Modification and destruction are difficult concepts to quantify, and their application will be determined by scientific judgement. Examples of modification and total destruction are cited below:

Modification of ecological processes: The hydrology of Toolibin Lake has been altered by clearing of the catchment such that death of some of the original flora has occurred due to dependence on fresh water. The system may be bought back to a semblance of the original state by redirecting saline runoff and pumping waters of the rising underground watertable away to restore the hydrological balance. Total destruction of downstream lakes has occurred due to hydrology being altered to the point that few of the original flora or fauna species are able to tolerate the level of salinity and/or water logging.

Modification of structure: The understorey of a plant community may be altered by weed invasion due to nutrient enrichment by addition of fertiliser. Should the additional nutrients be removed from the system the balance may be restored, and the original plant species better able to compete. Total destruction may occur if additional nutrients continue to be added to the system causing the understorey to be completely replaced by weed species, and death of overstorey species due to inability to tolerate high nutrient levels.

Modification of species composition: Pollution may cause alteration of the invertebrate species present in a freshwater lake. Removal of pollutants may allow the return of the original inhabitant species. Addition of residual highly toxic substances may cause permanent changes to water quality, and total destruction of the community.

Threatening processes are defined as follows:
"Any process or activity that threatens to destroy or significantly modify the ecological community and/or affect the continuing evolutionary processes within any ecological community."

Examples of some of the continuing threatening processes in Western Australia include: general pollution; competition, predation and change induced in ecological communities as a result of introduced animals; competition and displacement of native plants by introduced species; hydrological changes; inappropriate fire regimes; diseases resulting from introduced micro-organisms; direct human exploitation and disturbance of ecological communities.

Restoration is defined as returning an ecological community to its pre-disturbance or natural state in terms of abiotic conditions, community structure and species composition.

Rehabilitation is defined as the re-establishment of ecological attributes in a damaged ecological community although the community will remain modified.

2. Definitions and Criteria for Presumed Totally Destroyed, Critically Endangered, Endangered and Vulnerable Ecological Communities

ECOLOGICAL COMMUNITIES

Presumed Totally Destroyed (PD)
An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):

A) Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or

B) All occurrences recorded within the last 50 years have since been destroyed

Critically Endangered (CR)
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):

A) The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):

   i) geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years);

   ii) modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated.

B) Current distribution is limited, and one or more of the following apply (i, ii or iii):

   i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years);

   ii) there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes;

iii) there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes.

C) The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).

Endangered (EN)
An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):

A) The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):

i) the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years);

ii) modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.

B) Current distribution is limited, and one or more of the following apply (i, ii or iii):

i) geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years);

ii) there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes;

iii) there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.

C) The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

Vulnerable (VU)
An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):

A) The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.

B) The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.

C) The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.

3. Definitions and Criteria for Priority Ecological Communities

PRIORITY ECOLOGICAL COMMUNITY LIST
Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community Lists under Priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities. Ecological Communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities
Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Priority Two: Poorly-known ecological communities
Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:

(ii) communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or;

(iii) communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.

(a) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands.

(b) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.

(c) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities
Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

B. Categories for Flora and Fauna Species

1. Western Australian *Biodiversity Conservation Act 2016,* and Priority Species Classification

In Western Australia, 'Threatened', 'Extinct' and 'Specially Protected' fauna and flora species are protected under the *Biodiversity Conservation Act 2016* (the BC Act), making it an offence to take or disturb these species without Ministerial approval. The definition of 'take' is broad, and includes killing, injuring, harvesting or capturing fauna, and gathering, cutting, destroying, harvesting or damaging flora.

Such species are classified within a framework of several categories.

Species of the highest conservation significance are designated as Threatened species and are protected under sections 19(1)(a), 19(1)(b) and 19(1)(c) of the BC Act. Species are listed within one of three categories:

- Critically endangered (CR), Endangered (EN), or Vulnerable (V), representing those species listed in Schedules 1 to 3 respectively of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* or the *Wildlife Conservation (Rare Flora) Notice 2018*.

Presumed extinct species are protected under sections 24 and 25 of the BC Act and are listed in one of two categories:

- Extinct (EX), representing those species listed in Schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* or the *Wildlife Conservation (Rare Flora) Notice 2018*; or
- Extinct in the wild (EW); there are currently no listed species under this category.

Specially protected species are protected under section 13(1) of the BC Act, and include species of special conservation interest, migratory species, cetaceans, species subject to international agreement, or species otherwise in need of special protection. Of these:

- Migratory species (MI) are those listed under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*;
- Species of special conservation interest (conservation dependent fauna) (CD) are those listed under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*; and
- Other specially protected fauna (OS) are those listed under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*;

In addition to the species formally designated as protected under the BC Act, the WA Department of Biodiversity, Conservation and Attractions (DBCA) also maintains a list of 'Priority species'.

Species that appear to be rare or threatened, but for which there is insufficient information to properly evaluate their conservation significance, are assigned to one of three Priority categories (Priority 1 to Priority 3), while species that are adequately known but require regular monitoring are assigned to Priority 4.

Note that of the above classifications, only 'Threatened', 'Extinct' and 'Specially Protected' species have statutory standing. The Priority flora and fauna classifications are employed by the WA DBCA to manage and classify their database of species considered potentially rare or at risk, but these categories have no legislative status.

Further explanations of the categories is provided in more detail in the following pages.

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

CONSERVATION CODES

For Western Australian Flora and Fauna

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016.*

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T Threatened species

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN Endangered species

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

2 Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

3 Priority 3: Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

4 Priority 4: Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

[1] The definition of flora includes algae, fungi and lichens
[2]Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

2. Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

Many of the species that are specially protected at State level are also listed as Threatened species at the Federal level, as one of the Matters of National Environmental Significance (MNES) identified under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). These may be classified as 'critically endangered', 'endangered', 'vulnerable' or 'lower risk', consistent with IUCN categories:

1. **Critically Endangered (CR):** a taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
2. **Endangered (EN):** a taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
3. **Vulnerable (VU):** a taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.
4. **Lower Risk (LR):** a taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:
    - **Conservation Dependent (CD).** Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
    - **Near Threatened (NT).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
    - **Least Concern (LC).** Taxa which do not qualify for Conservation Dependent or Near Threatened.

In addition, numerous Migratory species are listed as MNES under the EPBC Act (some of which are also listed as Threatened). Migratory species are those animals that migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations. The list of migratory species consists of those species listed under the following international conventions:

1. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention);
2. China-Australia Migratory Bird Agreement (CAMBA);
3. Japan-Australia Migratory Bird Agreement (JAMBA); and,
4. Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Marine species are also protected under the EPBC Act, and are listed to ensure the long-term conservation of the species. Marine species include all Australian sea snakes, seals, crocodiles, dugongs, marine turtles, seahorses and seabirds that naturally occur in the Commonwealth marine area.

Under the terms of the EPBC Act, an action (e.g. a project or development) is required to be referred to the Australian Government Environment Minister for approval if it has, will have, or is likely to have, a significant impact on an MNES. The term 'action' includes projects and developments subsequent to commencement of the Act, however there are a number of exemptions (e.g. projects in Commonwealth areas). According to Department of the Environment (DotE 2013), a 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

Appendix 2

Vegetation Structural Classification and Condition Scale

Table 1: Vegetation structural classification used for this study (based on Specht 1970, as modified by Muir 1977, and Aplin 1979).

Stratum	Canopy Cover (%)				
	70-100%	**30-70%**	**10-30%**	**2-10%**	**<2%**
Trees over 30 m	Tall closed forest	Tall open forest	Tall woodland	Tall open woodland	Scattered tall trees
Trees 10-30 m	Closed forest	Open forest	Woodland	Open woodland	Scattered trees
Trees under 10 m	Low closed forest	Low open forest	Low woodland	Low open woodland	Scattered low trees
Shrubs over 2 m	Tall closed scrub	Tall open scrub	Tall shrubland	Tall open shrubland	Scattered tall shrubs
Shrubs 1-2 m	Closed heath	Open heath	Shrubland	Open shrubland	Scattered shrubs
Shrubs under 1 m	Low closed heath	Low open heath	Low shrubland	Low open shrubland	Scattered low shrubs
Hummock grasses	Closed hummock grassland	Hummock grassland	Open hummock grassland	Very open hummock grassland	Scattered hummock grasses
Grasses, Sedges, Herbs	Closed tussock grassland / bunch grassland / sedgeland / herbland	Tussock grassland / bunch grassland / sedgeland / herbland	Open tussock grassland / bunch grassland / sedgeland / herbland	Very open tussock grassland / bunch grassland / sedgeland / herbland	Scattered tussock grasses / bunch grasses / sedges / herbs

Table 2: Vegetation condition scale from EPA (2016a) (adapted from Trudgen 1988, and Keighery 1994).

Vegetation Condition	South West and Interzone Botanical Provinces	Eremaean and Northern Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.	
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor		Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Appendix 3

Raw Data from Flora Sampling Sites

Winu Project Area **WIN01**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 12-May-19 **Phase 2:** 23-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 357475 mE, 7711613 mN.

Habitat Aeolian dune E-W

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys*, (*Grevillea stenobotrya*) scattered low trees over *A. sabulosa* scattered shrubs over mixed low open shrubs over *Triodia schinzii* scattered hummock grasses over *Aristida holathera* var. *holathera* scattered tussock grasses.

Phase 2: *Erythrophleum chlorostachys*, (*Grevillea stenobotrya*) scattered low trees over *A. sabulosa* scattered shrubs over mixed low open shrubs over *Triodia schinzii* scattered hummock grasses over *Aristida holathera* var. *holathera* scattered tussock grasses.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt <1 year ago. **Phase 2:** Burnt <1 year ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia anaticeps	0.1	70		0.1	70	
Acacia platycarpa 'Desert Form Non-Pruinose'	2	70	WIN01-20	1	70	
Acacia platycarpa 'Desert Form Pruinose'	1	70	WIN01-13	2	70	
Acacia sabulosa	1.5	180	WIN01-19	1.5	180	
Aristida holathera var. *holathera*	1	50	WIN01-06	1	50	
Aristida sp.	0.1	30	WIN01-24			
Calytrix carinata	0.1	50	WIN01-18	0.1	50	
Cassytha capillaris				0.1	10	
Codonocarpus cotinifolius	0.1	90		0.1	90	
Cyanostegia cyanocalyx	0.1	60		0.1	60	
Dampiera cinerea	0.5	50	WIN01-11	0.5	50	
Dicrastylis doranii	0.5	40	WIN01-01	0.5	40	
Eragrostis eriopoda	0.1	40	WIN01-03	0.1	40	
Eriachne aristidea	0.1	40	WIN01-07	0.1	40	
Eriachne helmsii	0.1	40	WIN01-22	0.1	40	
Erythrophleum chlorostachys	1	250		1	250	
Euphorbia myrtoides	0.1	5	WIN01-10	0.1	5	
Gompholobium simplicifolium	1	70		1	70	
Grevillea eriostachya	0.1	50		0.1	50	
Grevillea stenobotrya	0.5	300		0.5	300	
Grevillea wickhamii subsp. *hispidula*	0.1	300	WIN01-14	0.1	300	
Gyrostemon tepperi	0.1	50		0.1	50	
Heliotropium diversifolium	0.1	20	WIN01-21			
Indigofera ammobia	0.1	50	WIN01-17	0.1	50	
Jacksonia aculeata	0.1	50		0.1	50	
Newcastelia spodiotricha	0.5	70	WIN01-02	0.5	70	
Paractaenum refractum	0.1	40	WIN01-09	0.1	40	WIN01R-01
Petalostylis cassioides	1	50		1	50	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Sauropus arenosus	0.1	30		0.1	30	
Scaevola parvifolia subsp. *parvifolia*	0.1	20	WIN01-05	0.1	20	
Sida sp. Western sand dunes (P.K. Latz 11980)	0.1	50	WIN01-23	0.1	50	
Spermacoce occidentalis	0.1	20	WIN01-16	0.1	20	
Triodia schinzii	1	40		1	40	
Yakirra australiensis var. *australiensis*	0.1	10	WIN01-04	0.1	10	

Phase 1

Phase 2

Winu Project Area **WIN02**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 12-May-19 **Phase 2:** 23-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 357465 mE, 7711292 mN.

Habitat Valley between dunes, somewhat like a swale

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys* low open woodland over *Jacksonia aculeata*, *Seringia elliptica*, *Acacia platycarpa* low open shrubland over *Bonamia erecta* very open herbland over *Triodia schinzii* open hummock grassland.

Phase 2: *Erythrophleum chlorostachys* low open woodland over *Jacksonia aculeata*, *Seringia elliptica*, *Acacia platycarpa* low open shrubland over *Bonamia erecta* very open herbland over *Triodia schinzii* hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** No sign of recent fire. **Phase 2:** No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	0.1	200		0.1	200	
Acacia colei	0.1	220		0.1	220	
Acacia platycarpa 'Desert Form Non-Pruinose'	0.1	90		0.1	90	
Acacia platycarpa 'Desert Form Pruinose'	2	70		2	70	
Acacia sericophylla	0.1	170		0.1	170	
Amphipogon sericeus	0.5	40		0.5	40	
Aristida holathera var. *holathera*	0.1	40		0.1	40	
Bonamia erecta	2	25	WIN02-01	2	25	
Calytrix carinata	0.1	80		0.1	80	
Corchorus sidoides subsp. *vermicularis*	0.1	40	WIN02-06	0.1	40	
Dicrastylis cordifolia	0.5	40		0.5	40	
Dodonaea coriacea	0.1	50	WIN02-11	0.1	50	
Eriachne lanata	0.1	40		0.1	40	
Eriachne obtusa				0.1	20	
Erythrophleum chlorostachys	3	250		3	250	
Fimbristylis oxystachya	0.1	5	WIN02-09			
Gompholobium simplicifolium	0.1	50		0.1	50	
Goodenia armitiana	0.1	25	WIN02-05	0.1	25	
Grevillea eriostachya	0.1	100		0.1	100	
Grevillea wickhamii subsp. *hispidula*	0.1	120	WIN02-07	0.1	120	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Hibiscus leptocladus	0.1	90		0.1	90	
Jacksonia aculeata	4	70	WIN02-02	4	70	
Newcastelia cladotricha	0.1	40	WIN02-10	0.1	40	
Owenia reticulata	0.1	180		0.1	180	
Ptilotus arthrolasius	0.1	70		0.1	70	
Ptilotus astrolasius	0.1	40	WIN02-04	0.1	40	
Ptilotus calostachyus	0.1	70	WIN02-12			

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Scaevola parvifolia subsp. *parvifolia*	0.5	30		0.5	30	
Seringia elliptica	3	40		3	40	
Sida sp. Pindan (B.G. Thomson 3398)	0.1	30		0.1	30	
Tephrosia arenicola	0.1	50	WIN02-08	0.1	50	
Trichodesma zeylanicum	0.1	80				
Triodia schinzii	18	35	WIN02-03	18	35	

Phase 1

Phase 2

Winu Project Area **WIN03**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 12-May-19 **Phase 2:** 21-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 360853 mE, 7710303 mN.

Habitat Sand dune east-west

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Corymbia chippendalei*, (*Erythrophleum chlorostachys*) low open woodland over *Acacia sabulosa* scattered shrubs over *A. platycarpa* low open shrubland over *Triodia schinzii* open hummock grassland.

Phase 2: *Corymbia chippendalei*, (*Erythrophleum chlorostachys*) low open woodland over *Acacia sabulosa* scattered shrubs over *A. platycarpa* low open shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** No sign of recent fire. **Phase 2:** No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia anaticeps	0.1	50		0.1	50	
Acacia platycarpa 'Desert Form Pruinose'	3	80		3	80	
Acacia sabulosa	1.5	200		1.5	200	
Acacia tumida var. *kulparn*	0.1	110		0.1	110	
Aristida holathera var. *holathera*	0.1	70		0.1	70	
Cassytha capillaris	0.1	30		0.1	30	
Corymbia chippendalei	3	600	WIN03-05	3	600	
Corynotheca asperata	0.1	40	WIN03-07	0.1	40	
Crotalaria cunninghamii subsp. *cunninghamii*	0.1	60		0.1	60	
Cyanostegia cyanocalyx	0.1	90		0.1	90	
Dampiera cinerea	1	35		1	35	
Dicrastylis doranii	2	30		2	30	
Duboisia hopwoodii	0.1	120	WIN03-09	0.1	120	
Eragrostis eriopoda	0.1	30		0.1	30	
Eriachne aristidea	0.1	50		0.1	50	
Eriachne obtusa	0.1	30	WIN03-03	0.1	30	
Erythrophleum chlorostachys	1	320		1	320	
Gompholobium simplicifolium	0.1	50		0.1	50	
Grevillea stenobotrya	0.1	210		0.1	210	
Grevillea wickhamii subsp. *hispidula*				0.1	90	
Indigofera ammobia	0.1	20	WIN03-01	0.1	20	
Newcastelia spodiotricha				0.1	60	WIN03R-01
Oldenlandia pterospora	0.1	20	WIN03-08			
Petalostylis cassioides	0.1	70		0.1	70	
Ptilotus arthrolasius	0.1	40		0.1	40	
Sauropus arenosus	0.1	20		0.1	20	
Scaevola parvifolia subsp. *parvifolia*	0.1	30		0.1	30	
Seringia elliptica	0.1	40	WIN03-04	0.1	40	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Sida sp. Western sand dunes (P.K. Latz 11980)	0.1	100		0.1	100	
Spermacoce occidentalis	0.1	15	WIN03-02	0.1	15	
Triodia schinzii	15	30		15	30	

Phase 2 - NW

Phase 2 - SE

Winu Project Area **WIN04**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 12-May-19 **Phase 2:** 21-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 361059 mE, 7709836 mN.

Habitat Swale, plain

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia drepanocarpa* subsp. *latifolia*, (*Erythrophleum chlorostachys*) shrubland over *Jacksonia aculeata* low open shrubland over *Bonamia erecta*, (*Halgania solanacea* var. *solanacea*) very open herbland over *Triodia schinzii* open hummock grassland.

Phase 2: *Acacia drepanocarpa* subsp. *latifolia*, (*Erythrophleum chlorostachys*) shrubland over *Jacksonia aculeata* low open shrubland over *Bonamia erecta*, (*Halgania solanacea* var. *solanacea*) very open herbland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia drepanocarpa subsp. *latifolia*	40	165	WIN04-01	40	165	
Acacia sericophylla	0.1	100		0.1	100	
Amphipogon sericeus	0.1	40		0.1	40	
Aristida holathera var. *holathera*				0.1	30	
Bonamia alatisemina	0.1	30		0.1	30	
Bonamia erecta	3	35		3	35	
Calytrix carinata	0.1	60		0.1	60	
Cassytha capillaris				0.1	30	
Corchorus sidoides subsp. *vermicularis*				0.1	20	
Corynotheca asperata	0.1	40				
Dicrastylis cordifolia	0.1	20		0.1	20	
Eriachne lanata	0.1	40		0.1	40	
Eriachne obtusa	0.1	50		0.1	50	
Erythrophleum chlorostachys	0.5	120		0.5	120	
Goodenia armitiana	0.1	30		0.1	30	
Goodenia hartiana				0.1	20	
Grevillea eriostachya	0.1	100				
Grevillea stenobotrya	0.1	90				
Grevillea wickhamii subsp. *hispidula*	0.1	200	WIN04-05	0.1	200	
Hakea macrocarpa				0.1	70	
Halgania solanacea var. *solanacea*	1	30		1	30	
Hibiscus leptocladus	0.1	60		0.1	60	
Indigofera boviperda subsp. *eremaea*	0.5	35		0.5	35	
Jacksonia aculeata	4	70		4	70	
Leptosema anomalum	0.1	30	WIN04-04	0.1	30	
Paraneurachne muelleri	0.1	50	WIN04-02	0.1	50	
Ptilotus arthrolasius				0.1	30	
Ptilotus astrolasius	0.5	30		0.1	40	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Trigastrotheca molluginea	0.1	20		0.1	20	
Triodia schinzii	20	30		20	30	

Phase 2 - NW

Phase 2 - SE

Winu Project Area **WIN05**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 13-May-19 **Phase 2:** 23-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 355628 mE, 7710883 mN.

Habitat Swale, valley

Soil Sand to loamy sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia ancistrocarpa* low open shrubland over *Eulalia aurea*, (*Eriachne lanata*) very open tussock grassland over *Triodia epactia* open hummock grassland.
Phase 2: *Acacia ancistrocarpa* low open shrubland over *Eulalia aurea* scattered tussock grasses over *Triodia epactia* hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** No sign of recent fire. **Phase 2:** No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia adsurgens	0.1	70	WIN05-06	0.1	70	
Acacia ancistrocarpa	4	160		6	160	
Acacia maitlandii	0.1	80		0.1	80	
Amphipogon sericeus				0.1	30	
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Calytrix carinata	0.1	80	WIN05-08	0.1	80	
Cassytha capillaris	0.1	25		0.1	25	
Eriachne lanata	0.5	40		0.1	40	
Eulalia aurea	2	50	WIN05-02	1	50	
Goodenia armitiana	0.1	30		0.1	30	
Grevillea wickhamii subsp. *hispidula*	0.1	20		0.1	20	
Leptosema anomalum	0.1	20		0.1	20	
Mirbelia viminalis	0.1	70		0.1	70	
Ptilotus calostachyus	0.1	60				
Trigastrotheca molluginea	0.1	20		0.1	20	
Triodia epactia	18	50	WIN05-01	40	50	
Velleia panduriformis	0.1	15	WIN05-03			

Phase 1

Phase 2

Winu Project Area **WIN06**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 13-May-19 **Phase 2:** 21-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 357959 mE, 7710443 mN.

Habitat Swale, valley

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys*, *Acacia drepanocarpa* scattered low shrubs over *Sorghum plumosum* var. *plumosum* very open tussock grassland over *Triodia schinzii*, *T. epactia* very open hummock grassland.

Phase 2: *Erythrophleum chlorostachys*, *Acacia drepanocarpa* scattered low shrubs over *Sorghum plumosum* var. *plumosum* very open tussock grassland over *Triodia schinzii*, *T. epactia* very open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago / No sign of recent fire. **Phase 2:** Burnt 3-5 years ago / No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia drepanocarpa subsp. *latifolia*	0.5	90		0.5	90	
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Bonamia erecta	2.5	45		2.5	45	
Calytrix carinata	0.1	35	WIN06-04	0.1	35	
Cleome viscosa	0.1	60		0.1	60	
Dampiera candicans	0.1	30		0.1	30	
Dicrastylis cordifolia	0.1	30		0.1	30	
Eragrostis eriopoda	0.1	30	WIN06-03	0.1	30	
Eriachne lanata	0.1	1		0.1	1	
Eriachne obtusa	0.1	40				
Erythrophleum chlorostachys	0.5	90		0.5	90	
Fimbristylis oxystachya	0.1	15	WIN06-02			
Goodenia armitiana	0.5	30		0.5	30	
Hakea macrocarpa	0.1	160		0.1	160	
Hibiscus leptocladus	0.1	30		0.1	30	
Paraneurachne muelleri	0.1	30		0.1	30	
Polygala isingii	0.1	20	WIN06-01			
Ptilotus arthrolasius	0.1	25		0.1	25	
Ptilotus astrolasius	0.1	40		0.1	40	
Ptilotus calostachyus	0.1	40		0.1	40	
Senna notabilis				0.1	5	
Sida arenicola	0.1	5				
Solanum diversiflorum	0.1	25		0.1	25	
Sorghum plumosum var. *plumosum*	5	180		5	180	
Tephrosia arenicola	0.1	40		0.1	40	
Trianthema pilosum	0.1	8		0.1	8	
Triodia epactia	3	40		3	40	
Triodia schinzii	4	50		4	50	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Yakirra australiensis var. *australiensis*	0.1	10		0.1	10	

Phase 1

Phase 2

Winu Project Area **WIN07**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 13-May-19 **Phase 2:** 21-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 364887 mE, 7710126 mN.

Habitat Swale, valley

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys*, *Grevillea wickhamii* subsp. *hispidula* low open woodland over *Acacia platycarpa*, (*Androcalva loxophylla*, *Grevillea eriostachya*) low open shrubland over *Dicrastylis doranii*, *Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* open hummock grassland.

Phase 2: *Erythrophleum chlorostachys*, *Grevillea wickhamii* subsp. *hispidula* low open woodland over *Acacia platycarpa*, (*Androcalva loxophylla*, *Grevillea eriostachya*) low open shrubland over *Dicrastylis doranii*, *Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** No sign of recent fire. **Phase 2:** No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia platycarpa 'Desert Form Non-Pruinose'	1	90		1	90	
Acacia platycarpa 'Desert Form Pruinose'	5	90		5	90	
Acacia sericophylla	0.1	240		0.1	240	
Amphipogon sericeus	0.1	50		0.1	50	
Androcalva loxophylla	1	120		0.5	120	
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Calytrix carinata	0.1	70	WIN07-03	0.1	70	
Cassytha capillaris	0.1	30	WIN07-06	0.1	30	
Dampiera candicans	0.1	80				
Dampiera cinerea	0.1	40		0.1	50	
Dicrastylis cordifolia	0.1	25		0.1	25	
Dicrastylis doranii	2	40		2	40	
Dodonaea coriacea	0.1	90		0.1	90	
Dodonaea hispidula var. *arida*	0.1	230	WIN07-07	0.1	230	
Eragrostis eriopoda	0.1	40	WIN07-02	0.1	40	
Eriachne aristidea				0.1	40	
Eriachne lanata	1	60	WIN07-04	1	60	
Erythrophleum chlorostachys	3	350		3	350	
Gompholobium simplicifolium	1	80		1	80	
Grevillea eriostachya	1	170		1	170	
Grevillea wickhamii subsp. *hispidula*	2	320	WIN07-01	1	320	
Gyrostemon tepperi				0.1	50	
Hakea macrocarpa	0.1	210		0.1	210	
Halgania solanacea var. *solanacea*	0.5	40		0.5	40	
Indigofera boviperda subsp. *eremaea*	0.1	40		0.1	40	
Jacksonia aculeata	0.1	40		0.1	40	
Petalostylis cassioides				0.1	70	
Ptilotus arthrolasius	0.5	30		0.5	30	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Scaevola parvifolia subsp. *parvifolia*	0.1	25		0.1	25	
Seringia elliptica	1	70		1	70	
Sorghum plumosum var. *plumosum*	0.1	180		0.1	180	
Trigastrotheca molluginea	0.1	30		0.1	30	
Triodia schinzii	16	40		20	40	

Phase 1

Phase 2

Winu Project Area **WIN08**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 13-May-19 **Phase 2:** 20-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 364474 mE, 7709546 mN.

Habitat Swale/ valley

Soil Sand

Rock Type N/A

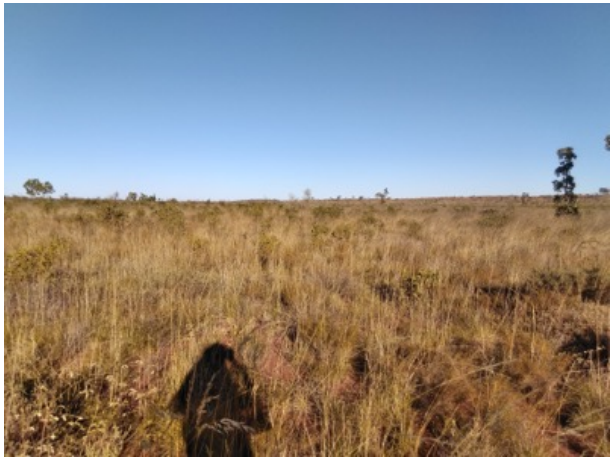
Vegetation **Phase 1:** *Owenia reticulata*, *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Jacksonia aculeata*, (*Gompholobium simplicifolium*, *Bonamia erecta*, *Androcalva loxophylla*) low shrubland over *Triodia schinzii* open hummock grassland.

Phase 2: *Owenia reticulata*, *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Jacksonia aculeata*, (*Gompholobium simplicifolium*, *Bonamia erecta*, *Androcalva loxophylla*) low shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago / No sign of recent fire. **Phase 2:** Burnt 3-5 years ago / No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia platycarpa 'Desert Form Non-Pruinose'	6	120		6	120	
Acacia platycarpa 'Desert Form Pruinose'	0.1	120		0.1	120	
Acacia sericophylla	0.1	50		0.1	50	
Amphipogon sericeus				0.1	30	
Androcalva loxophylla	1	70		1	70	
Bonamia erecta	2	50		0.1	50	
Cassytha capillaris	0.1	30		0.1	30	
Corchorus sidoides subsp. *vermicularis*	0.1	40		0.1	40	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	40		0.1	40	
Dodonaea hispidula var. *arida*	0.1	120		0.1	120	
Eragrostis eriopoda	0.5	30				
Eriachne obtusa				0.1	45	WIN08R-01
Erythrophleum chlorostachys	0.5	240		0.5	240	
Gompholobium simplicifolium	2.5	70		2.5	70	
Goodenia azurea subsp. *hesperia*	0.1	50				
Goodenia hartiana				0.1	50	
Grevillea wickhamii subsp. *hispidula*	0.1	100	WIN08-01	0.1	100	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Indigofera boviperda subsp. *eremaea*	0.5	45		0.1	45	
Jacksonia aculeata	11	70		11	70	
Leptosema anomalum	0.1	30		0.1	30	
Owenia reticulata	0.5	350		0.5	350	
Petalostylis cassioides	0.1	110		0.1	110	
Ptilotus astrolasius				0.1	40	
Trigastrotheca molluginea	0.1	15		0.1	15	
Triodia schinzii	25	40		25	40	



Phase 1

Phase 2

Winu Project Area **WIN09**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 14-May-19 **Phase 2:** 20-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 364499 mE, 7708795 mN.

Habitat Plain between dunes ?semi swale

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys* scattered low trees over *Acacia drepanocarpa* subsp. *latifolia* tall shrubland over *Jacksonia aculeata*, (*A. platycarpa*) low open shrubland over *Triodia schinzii* hummock grassland.

Phase 2: *Erythrophleum chlorostachys* scattered low trees over *Acacia drepanocarpa* subsp. *latifolia* tall shrubland over *Jacksonia aculeata*, (*A. platycarpa*) low open shrubland over *Triodia schinzii* hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia drepanocarpa subsp. *latifolia*	11	220		11	220	
Acacia platycarpa 'Desert Form Pruinose'	1	80		1	80	
Amphipogon sericeus	0.5	50		0.5	50	
Androcalva loxophylla	0.1	45		0.1	45	
Aristida holathera var. *holathera*	0.1	50				
Bonamia erecta	0.5	40		0.5	40	
Calytrix carinata	0.1	50	WIN09-02	0.1	50	
Dicrastylis cordifolia	0.1	40		0.1	40	
Eriachne lanata	0.5	40	WIN09-01	0.5	40	
Erythrophleum chlorostachys	0.5	170		0.5	170	
Goodenia hartiana				0.1	30	
Grevillea wickhamii subsp. *hispidula*	0.1	140		0.1	140	
Gyrostemon tepperi	0.1	140		0.1	140	
Halgania solanacea var. *solanacea*	1	40		1	40	
Heliotropium transforme				0.1	45	
Indigofera boviperda subsp. *eremaea*	0.5	40		0.5	40	
Jacksonia aculeata	4	50		4	50	
Leptosema anomalum	0.1	30		0.1	30	
Ptilotus arthrolasius	0.5	40		0.5	40	
Ptilotus astrolasius	0.1	35		0.1	35	
Triodia schinzii	32	40		32	40	

Phase 1

Phase 2

Winu Project Area **WIN10**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 14-May-19 **Phase 2:** 20-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 366997 mE, 7707986 mN.

Habitat Dune

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Corymbia chippendalei* low open woodland over *Acacia sabulosa*, (*A. tumida* var. *kulparn*, *Petalostylis cassioides*) tall open shrubland over *A. sabulosa*, *Dicrastylis doranii* low open shrubland over *Triodia schinzii* very open hummock grassland.

Phase 2: *Corymbia chippendalei* low open woodland over *Acacia sabulosa*, (*A. tumida* var. *kulparn*, *Petalostylis cassioides*) tall open shrubland over *A. sabulosa*, *Dicrastylis doranii* low open shrubland over *Triodia schinzii* very open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia anaticeps	1	60		1	60	
Acacia sabulosa	3	240		3	240	
Acacia tumida var. *kulparn*	1	250		1	250	
Aristida holathera var. *holathera*	1.5	50	WIN10-10	1.5	50	
Cassytha capillaris	0.1	50		0.1	50	
Corymbia chippendalei	3	550	WIN10-01	3	550	
Corynotheca asperata	0.1	40		0.1	40	WIN01R-01
Crotalaria cunninghamii subsp. *cunninghamii*	0.1	120	WIN10-12	0.1	120	
Cucumis variabilis	0.1	40	WIN10-09	0.1	40	
Dicrastylis doranii	4	50		4	50	
Eragrostis eriopoda	0.1	40	WIN10-02	0.1	40	
Eriachne aristidea	0.1	40		0.1	40	
Eriachne obtusa	0.5	50		0.5	50	
Euphorbia myrtoides	0.1	20	WIN10-11			
Gompholobium simplicifolium	0.1	70		0.1	70	
Grevillea stenobotrya	0.1	250		0.1	250	
Grevillea wickhamii subsp. *hispidula*	0.1	100		0.1	100	
Gyrostemon tepperi	0.1	90	WIN10-05b	0.1	90	
Indigofera ammobia	0.1	40		0.1	40	
Indigofera boviperda subsp. *eremaea*	0.1	40	WIN10-06	0.1	40	
Oldenlandia pterospora	0.1	25	WIN10-07			
Petalostylis cassioides	0.5	220		0.5	220	
Polycarpaea longiflora	0.1	30	WIN10-04	0.1	30	
Setaria surgens	0.1	30	WIN10-08			
Sida sp. Western sand dunes (P.K. Latz 11980)	0.1	180		0.1	180	
Spermacoce occidentalis	0.1	30	WIN10-03	0.1	30	
Thinicola incana	0.1	70		0.1	70	
Trianthema pilosum	0.1	20		0.1	20	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Triodia schinzii	4	40	WIN10-05a	4	40	

Phase 1

Phase 2

Winu Project Area **WIN11**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 14-May-19 **Phase 2:** 21-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 362790 mE, 7709997 mN.

Habitat Pindan plain

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys* scattered low trees over *Acacia drepanocarpa* subsp. *latifolia* shrubland over *Jacksonia aculeata*, *Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* open hummock grassland.

Phase 2: *Erythrophleum chlorostachys* scattered low trees over *Acacia drepanocarpa* subsp. *latifolia* shrubland over *Jacksonia aculeata*, *Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 1-2 years ago. **Phase 2:** Burnt 1-2 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia drepanocarpa subsp. *latifolia*	13	170		13	170	
Acacia platycarpa 'Desert Form Non-Pruinose'				0.1	40	
Acacia platycarpa 'Desert Form Pruinose'	1	90		1	90	
Amphipogon sericeus	0.1	40		0.1	40	
Bonamia erecta	0.1	40		0.1	40	
Calytrix carinata	0.1	80		0.1	80	
Dampiera cinerea	0.1	40		0.1	40	
Dicrastylis doranii	3	40		3	40	
Dodonaea coriacea				0.1	40	
Dodonaea hispidula var. *arida*	0.1	140		0.1	140	
Eriachne helmsii	0.1	40	WIN11-03	0.1	40	
Erythrophleum chlorostachys	1	280		1	280	
Gompholobium simplicifolium	4	70		4	70	
Grevillea eriostachya	0.1	140		0.1	140	
Grevillea wickhamii subsp. *hispidula*	0.5	250	WIN11-01	0.5	250	
Halgania solanacea var. *solanacea*	0.1	40				
Indigofera boviperda subsp. *eremaea*				0.1	20	
Jacksonia aculeata	4	60		4	60	
Leptosema anomalum	0.1	30				
Newcastelia cladotricha	0.1	40		0.1	40	WIN11R-01
Polygala isingii	0.1	10	WIN11-02			
Ptilotus arthrolasius	0.1	30		0.1	30	
Scaevola parvifolia subsp. *parvifolia*	0.1	20		0.1	20	
Triodia schinzii	28	40		28	40	

Phase 1

Phase 2

Winu Project Area **WIN12**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 14-May-19 **Phase 2:** 20-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 363526 mE, 7709535 mN.

Habitat Pindan dune

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Corymbia chippendalei* low open woodland over *Acacia platycarpa*, (*A. tumida* var. *kulparn*) tall open shrubland over *Aristida holathera* very open tussock grassland over *Triodia schinzii* very open hummock grassland.

Phase 2: *Corymbia chippendalei* low open woodland over *Acacia platycarpa*, (*A. tumida* var. *kulparn*) tall open shrubland over *Aristida holathera* very open tussock grassland over *Triodia schinzii* very open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia anaticeps	0.1	70		0.1	70	
Acacia platycarpa 'Desert Form Pruinose'	9	220		9	220	
Acacia sabulosa	0.5	220		0.5	220	
Acacia tumida var. *kulparn*	1	200		1	200	
Aristida holathera var. *holathera*	2	40		2	40	
Aristida holathera var. *latifolia*	2	50		2	50	
Cassytha capillaris	0.1	50		0.1	50	
Corymbia chippendalei	7	700		3	700	WIN12R-01
Corynotheca asperata	0.1	40		0.1	40	
Cucumis variabilis	0.1	110		0.1	110	
Cyanostegia cyanocalyx	0.1	80		0.1	80	
Dampiera cinerea	0.5	50		0.1	50	
Dicrastylis doranii	1	50		0.5	50	
Eragrostis aff. *eriopoda*	0.1	40	WIN12-02	0.1	40	
Eriachne aristidea	0.1	50		0.1	50	
Erythrophleum chlorostachys	0.1	50		0.1	50	
Gompholobium simplicifolium	0.5	50		0.5	50	
Grevillea stenobotrya	0.1	140		0.1	140	
Gyrostemon tepperi	0.1	120		0.1	120	
Indigofera ammobia	0.1	40		0.1	40	
Petalostylis cassioides	0.1	80		0.1	80	
Ptilotus arthrolasius	0.1	40		0.1	40	
Sauropus arenosus	0.1	40		0.1	40	
Setaria surgens	0.1	30				
Sida sp. Western sand dunes (P.K. Latz 11980)	0.1	160		0.1	160	
Spermacoce occidentalis	0.1	30	WIN12-01	0.1	30	
Triodia schinzii	8	40		8	40	

Phase 1

Phase 2

Winu Project Area **WIN13**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 15-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 376968 mE, 7703118 mN.

Habitat Pindan plain

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia ancistrocarpa*, (*Dodonaea hispidula* var. *arida*) tall shrubland over *Acacia platycarpa* scattered shrubs over *Amphipogon sericeus*, *Aristida holathera* var. *holathera* scattered tussock grasses over *Triodia schinzii* open hummock grassland.

Phase 2: *Acacia ancistrocarpa*, (*Dodonaea hispidula* var. *arida*) tall shrubland over *Acacia platycarpa* scattered shrubs over *Amphipogon sericeus*, *Aristida holathera* var. *holathera* scattered tussock grasses over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	9	280		9	280	
Acacia platycarpa 'Desert Form Pruinose'	1	100		1	100	
Amphipogon sericeus	1	50		1	50	
Aristida holathera var. *holathera*	0.5	40		0.5	40	
Aristida holathera var. *latifolia*	0.1	40		0.1	40	
Bonamia alatisemina				0.1	10	WIn13R-02
Calytrix carinata	0.1	60		0.1	60	
Corymbia zygophylla	0.1	280	WIN13-02	0.1	280	
Dampiera cinerea	0.1	40		0.1	40	WIN13R-01
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	50		0.1	50	
Dodonaea hispidula var. *arida*	1	250		1	250	
Eragrostis eriopoda	0.1	40	WIN13-01			
Eriachne aristidea	0.1	40				
Eriachne lanata	0.1	50				
Eriachne obtusa				0.1	15	
Gompholobium simplicifolium	0.1	60		0.1	60	
Goodenia armitiana	0.1	40		0.1	40	
Grevillea eriostachya	0.1	140		0.1	140	
Grevillea wickhamii subsp. *hispidula*	0.5	190		0.5	190	
Gyrostemon tepperi	0.1	110		0.1	110	
Halgania solanacea var. *solanacea*	0.5	40		0.5	40	
Indigofera boviperda subsp. *eremaea*	1	40		1	40	
Jacksonia aculeata	0.1	40		0.1	40	
Ptilotus arthrolasius	0.1	40		0.1	40	
Ptilotus astrolasius	0.1	50				
Ptilotus calostachyus	0.1	50				
Scaevola parvifolia subsp. *parvifolia*	0.1	40		0.1	40	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Seringia elliptica	0.1	50		0.1	50	
Sida sp. Pindan (B.G. Thomson 3398)	0.1	50				
Triodia schinzii	11	40		11	40	

Phase 1

Phase 2

Winu Project Area **WIN14**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 15-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 377100 mE, 7703645 mN.

Habitat Pindan dune

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Grevillea wickhamii* scattered tall shrubs over *Grevillea stenobotrya*, *Petalostylis cassioides*, *Acacia anaticeps*, (*Thinicola incana*) open shrubland over *Dampiera cinerea*, *Dicrastylis doranii* scattered low shrubs over *Triodia schinzii* very open hummock grassland.

Phase 2: *Grevillea wickhamii* scattered tall shrubs over *Grevillea stenobotrya*, *Petalostylis cassioides*, *Acacia anaticeps*, (*Thinicola incana*) open shrubland over *Dampiera cinerea*, *Dicrastylis doranii* scattered low shrubs over *Triodia schinzii* very open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia anaticeps	3	190		3	190	
Acacia platycarpa 'Desert Form Non-Pruinose'	1	80		1	80	
Acacia tumida var. *kulparn*	0.5	170	WIN14-01	0.5	170	
Androcalva loxophylla	0.1	50		0.1	50	
Aristida holathera var. *holathera*	0.5	40	WIN14-04	0.5	40	
Calytrix carinata	0.1	60		0.1	60	
Cassytha capillaris				0.1	50	
Cyanostegia cyanocalyx	0.1	100		0.1	100	
Dampiera cinerea	1.5	50		1.5	50	
Dicrastylis doranii	1	60		1	60	
Dodonaea coriacea	0.1	40		0.1	40	
Eriachne aristidea	0.1	40		0.1	40	
Eriachne obtusa	0.1	40		0.1	40	
Gompholobium simplicifolium	0.1	70		0.1	70	
Goodenia armitiana				0.1	20	
Grevillea eriostachya	0.1	170		0.1	170	
Grevillea stenobotrya	4	190		4	190	
Grevillea wickhamii subsp. *hispidula*	0.5	250	WIN14-05	0.5	250	
Gyrostemon tepperi	0.1	110		0.1	110	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Jacksonia aculeata	0.1	50		0.1	50	
Newcastelia cladotricha				0.1	50	WIN14R-01
Petalostylis cassioides	3	100		3	100	
Scaevola parvifolia subsp. *parvifolia*	0.1	40		0.1	40	
Spermacoce occidentalis	0.1	30	WIN14-02	0.1	30	
Tephrosia arenicola	0.1	60	WIN14-03	0.1	60	
Thinicola incana	1	190		1	190	
Triodia schinzii	8	40		8	40	

Phase 1

Phase 2

Winu Project Area **WIN15**

Described by **Phase 1:** PLDK **Phase 2:** SCRM **Date** **Phase 1:** 15-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 377425 mE, 7702785 mN.

Habitat Plain

Soil Loamy sand

Rock Type Granite

Vegetation **Phase 1:** *Grevillea wickhamii* scattered shrubs over *Mirbelia viminalis*, (*Tephrosia arenicola*) low open shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland.

Phase 2: *Grevillea wickhamii* scattered shrubs over *Mirbelia viminalis*, (*Tephrosia arenicola*) low open shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	0.1	90		0.1	90	
Acacia drepanocarpa subsp. *latifolia*	0.1	100		0.1	100	
Amphipogon sericeus	0.5	40	WIN15-03	0.5	40	
Calytrix carinata	1	80	WIN15-02	1	80	
Cassytha capillaris	0.1	20		0.1	20	
Codonocarpus cotinifolius	0.1	130		0.1	130	
Corchorus sidoides subsp. *sidoides*				0.1	20	
Dampiera candicans	0.1	40		0.1	40	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	40		0.1	40	
Eragrostis aff. *eriopoda*	0.1	40	WIN15-05	0.1	40	
Eriachne lanata	0.1	40				
Goodenia azurea subsp. *hesperia*	0.1	50		0.1	50	
Grevillea eriostachya	0.1	60		0.1	60	
Grevillea wickhamii subsp. *hispidula*	1	150		1	150	
Gyrostemon tepperi	0.1	40		0.1	40	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Leptosema anomalum	0.1	40	WIN15-04	0.1	40	
Mirbelia viminalis	7	140		7	140	
Ptilotus astrolasius	0.1	50				
Ptilotus calostachyus	0.1	80		0.1	80	
Scaevola parvifolia subsp. *parvifolia*	0.1	40				
Tephrosia arenicola	0.5	80		0.5	80	
Trigastrotheca molluginea	0.1	15		0.1	15	
Triodia brizoides	16	30	WIN15-01	16	30	
Triodia schinzii	1	40		1	40	

Phase 1

Phase 2

Winu Project Area **WIN16**

Described by **Phase 1:** SCRM **Phase 2:** SCRM **Date** **Phase 1:** 15-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 377216 mE, 7703108 mN.

Habitat Plain, Swale

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs over *Mirbelia viminalis*, (*Acacia hilliana*, *Calytrix carinata*) low shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland.

Phase 2: *Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs over *Mirbelia viminalis*, (*Acacia hilliana*, *Calytrix carinata*) low shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	0.1	60		0.1	60	
Acacia hilliana	4	40		4	40	
Amphipogon sericeus	0.1	30		0.1	30	
Calytrix carinata	2	40		2	40	
Cassytha capillaris	0.1	30		0.1	30	
Dampiera candicans	0.1	45		0.1	45	
Dicrastylis cordifolia	0.1	30		0.1	30	
Dodonaea coriacea	0.1	50		0.1	50	
Eriachne lanata	0.1	35		0.1	35	
Goodenia armitiana				0.1	30	
Goodenia azurea subsp. *hesperia*				0.1	20	
Grevillea eriostachya	0.1	25		0.1	25	
Grevillea wickhamii subsp. *hispidula*	1	210		1	210	
Halgania solanacea var. *solanacea*	0.1	25		0.1	25	
Indigofera boviperda subsp. *eremaea*	0.1	40		0.1	40	
Jacksonia aculeata				0.1	50	
Leptosema anomalum	0.1	30		0.1	30	
Mirbelia viminalis	20	90		20	90	
Ptilotus calostachyus	0.1	60		0.1	60	
Seringia elliptica	0.5	50	WIN16-01	0.5	50	
Sida arenicola	0.1	90	WIN16-02	0.1	90	
Tephrosia arenicola	0.5	50		0.5	50	
Trigastrotheca molluginea	0.1	30		0.1	30	
Triodia brizoides	18	30		18	30	
Triodia schinzii	1	30		1	30	

Phase 1

Phase 2

Winu Project Area **WIN17**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 15-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 373029 mE, 7702603 mN.

Habitat Pindan dune

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa*, *A. tumida* var. *kulparn*, (*Thinicola incana*) open shrubland over *Dampiera cinerea*, *Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* open hummock grassland.

Phase 2: *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa*, *A. tumida* var. *kulparn*, (*Thinicola incana*) open shrubland over *Dampiera cinerea*, *Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Very Good. **Phase 2:** Very Good.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia anaticeps	0.1	60		0.1	60	
Acacia drepanocarpa subsp. *latifolia*	0.1	100		0.1	100	
Acacia platycarpa 'Desert Form Pruinose'	7	140		7	140	
Acacia tumida var. *kulparn*	2	170		2	170	
Aristida holathera var. *holathera*	0.5	40		0.5	40	
Bonamia erecta	0.1	40				
Calytrix carinata	0.1	170		0.1	170	
Cassytha capillaris	0.1	40		0.1	40	
Cyanostegia cyanocalyx	0.1	60		0.1	60	
Dampiera cinerea	3	50		3	50	
Dicrastylis doranii	0.1	50		0.1	50	
Eriachne aristidea				0.1	20	
Eriachne helmsii	0.1	50	WIN17-02	0.1	50	
Eriachne obtusa				0.1	40	WIN17R-01
Erythrophleum chlorostachys	1	260		1	260	
Gompholobium simplicifolium	1	50		1	50	
Grevillea eriostachya	0.1	90		0.1	90	
Grevillea stenobotrya	0.1	140		0.1	140	
Grevillea wickhamii subsp. *hispidula*	0.5	280	WIN17-01	0.5	280	
Gyrostemon tepperi	0.1	40		0.1	40	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Paraneurachne muelleri				0.1	20	
Petalostylis cassioides	0.5	100		0.5	100	
Scaevola parvifolia subsp. *parvifolia*	0.5	40		0.5	40	
Seringia elliptica	0.1	60		0.1	60	
Thinicola incana	0.5	190		0.5	190	
Triodia schinzii	12	40		12	40	

Phase 1

Phase 2

Winu Project Area **WIN18**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 15-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 373140 mE, 7703065 mN.

Habitat Pindan plain

Soil Loamy sand

Rock Type N/A

Vegetation **Phase 1:** *Sorghum plumosum* var. *plumosum* very open tall tussock grassland over *Calytrix carinata*, *Gompholobium simplicifolium*, *Bonamia erecta* low open shrubland.
Phase 2: *Sorghum plumosum* var. *plumosum* very open tall tussock grassland over *Calytrix carinata*, *Gompholobium simplicifolium*, *Bonamia erecta* low open shrubland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 1-2 years ago. **Phase 2:** Burnt 1-2 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Amphipogon sericeus	0.5	40		0.5	40	
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Bonamia erecta	1	40		1	40	
Calytrix carinata	1	60		1	60	
Dampiera candicans				0.1	15	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	80				
Eragrostis eriopoda	0.1	40	WIN18-01			
Eriachne lanata	0.1	40		0.1	40	
Eriachne obtusa				0.1	30	WIN18R-01
Gompholobium simplicifolium	1	50		1	50	
Grevillea wickhamii subsp. *hispidula*	0.1	40		0.1	40	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Indigofera boviperda subsp. *eremaea*	0.1	40		0.1	40	
Jacksonia aculeata	0.1	50		0.1	50	
Sorghum plumosum var. *plumosum*	9	140		9	140	
Trigastrotheca molluginea	0.1	15		0.1	15	
Triodia schinzii	0.1	10		0.1	10	

Phase 1

Phase 2

Winu Project Area **WIN19**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 15-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 377714 mE, 7702462 mN.

Habitat Low lateritic rise

Soil Loamy sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia drepanocarpa* subsp. *latifolia*, *A. orthocarpa*, (*Grevillea wickhamii* subsp. *hispidula*) open shrubland over *Mirbelia viminalis*, (*Calytrix carinata*) low open shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland.

Phase 2: *Acacia drepanocarpa* subsp. *latifolia*, *A. orthocarpa*, (*Grevillea wickhamii* subsp. *hispidula*) open shrubland over *Mirbelia viminalis*, (*Calytrix carinata*) low open shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	0.1	100		0.1	100	
Acacia colei	0.1	50		0.1	50	
Acacia drepanocarpa subsp. *latifolia*	2	160		2	160	
Acacia monticola	0.1	70		0.1	70	
Acacia orthocarpa	1	160		1	160	
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Calytrix carinata	1	70	WIN19-02	1	70	
Cassytha capillaris				0.1	5	
Codonocarpus cotinifolius	0.1	100		0.1	100	
Corchorus sidoides subsp. *vermicularis*	0.1	40				
Dampiera candicans	0.5	40		0.5	40	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dicrastylis sp.	0.1	60	WIN19-01	0.1	60	
Dodonaea coriacea	0.1	50		0.1	50	
Eriachne lanata	0.1	50		0.1	50	
Goodenia armitiana	0.1	40		0.1	40	
Goodenia azurea subsp. *hesperia*	0.1	40		0.1	40	
Grevillea wickhamii subsp. *hispidula*	0.5	100		0.5	100	
Gyrostemon tepperi	0.1	90		0.1	90	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Indigofera boviperda subsp. *eremaea*	0.1	40		0.1	40	
Jacksonia aculeata				0.1	50	
Mirbelia viminalis	6	70		6	70	
Paraneurachne muelleri				0.1	20	
Ptilotus arthrolasius	0.1	40				
Ptilotus calostachyus	0.1	70		0.1	70	
Scaevola parvifolia subsp. *parvifolia*				0.1	10	
Seringia elliptica	0.1	60		0.1	60	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Sida arenicola	0.1	120				
Tephrosia arenicola	0.1	60		0.1	60	
Trigastrotheca molluginea	0.1	15				
Triodia brizoides	19	30		19	30	
Triodia schinzii	2	40		2	40	

Phase 1

Phase 2

Winu Project Area **WIN20**

Described by **Phase 1:** PLDK **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 18-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 380811 mE, 7702732 mN.

Habitat Plain

Soil Loamy sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia orthocarpa* scattered tall shrubs over *A. bivenosa*, *A. ancistrocarpa* low open shrubland over *Triodia brizoides*, (*T. schinzii*, *T. epactia*) open hummock grassland.

Phase 2: *Acacia orthocarpa* scattered tall shrubs over *A. bivenosa*, *A. ancistrocarpa* open shrubland over *Triodia brizoides*, (*T. schinzii*, *T. epactia*) open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Patchily burnt – 1-2 years ago, and 3-5 years ago. **Phase 2:** Burnt 1-2 years ago / Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	0.5	60		0.5	60	
Acacia bivenosa	1	120	WIN20-04	1	120	
Acacia orthocarpa	1	220	WIN20-01	1	220	
Aristida holathera var. *holathera*	0.1	40				
Calytrix carinata	0.1	40		0.1	40	
Dampiera candicans	0.1	40		0.1	40	
Eriachne aristidea	0.1	30		0.1	30	
Goodenia armitiana	0.1	40		0.1	40	
Grevillea wickhamii subsp. *hispidula*	0.1	100		0.1	100	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Heliotropium pachyphyllum	0.1	30	WIN20-03	0.1	30	
Heliotropium sp.	0.1	3	WIN20-07			
Indigofera monophylla	0.1	80	WIN20-02	0.1	80	
Mirbelia viminalis	0.1	70		0.1	70	
Paraneurachne muelleri	0.1	40		0.1	40	
Ptilotus calostachyus	0.1	80		0.1	80	
Ptilotus fusiformis				0.1	10	WIN20R-01
Senna notabilis	0.1	25		0.1	25	
Sporobolus australasicus	0.1	25	WIN20-05			
Streptoglossa macrocephala				0.1	20	
Streptoglossa sp.	0.1	40		0.1	40	
Tephrosia arenicola	0.5	50		0.5	50	
Tribulus hirsutus	0.1	8	WIN20-06	0.1	8	
Trigastrotheca molluginea	0.1	15		0.1	15	
Triodia brizoides	10	40		10	40	
Triodia epactia	1	40		1	40	
Triodia schinzii	2	40		2	40	
Yakirra australiensis var. *australiensis*	0.1	10				

Phase 1

Phase 2

Winu Project Area **WIN21**

Described by **Phase 1:** SCRM **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 18-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 381245 mE, 7702720 mN.

Habitat Plain, low lying between dunes

Soil Loamy sand

Rock Type Ironstone/laterite

Vegetation **Phase 1:** *Acacia bivenosa* open shrubland over *Triodia brizoides* open hummock grassland.

Phase 2: *Acacia bivenosa* open shrubland over *Triodia brizoides*, (*T. schinzii*) open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Patchily burnt: Burnt <1 year ago / No sign of recent fire. **Phase 2:** Patchily burnt: Burnt <1 year ago / No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia adsurgens	0.1	50	WIN21-04	0.1	50	
Acacia ancistrocarpa	0.1	100		0.1	100	
Acacia bivenosa	2	150		2	150	
Acacia tenuissima	0.1	80	WIN21-02	0.1	80	
Aristida holathera var. *holathera*	1	15		1	15	
Cleome viscosa	0.1	40				
Corchorus sidoides subsp. *vermicularis*	0.1	10		0.1	10	
Dicrastylis cordifolia	0.1	10				
Eragrostis eriopoda	0.1	20	WIN21-03	0.1	20	
Eriachne aristidea	0.1	15		0.1	15	
Eriachne lanata	0.1	20				
Evolvulus alsinoides	0.1	10	WIN21-06			
Fimbristylis dichotoma	0.1	20	WIN21-07	0.1	20	WIN21R-01
Fimbristylis oxystachya	0.1	15	WIN21-09	0.1	15	
Goodenia armitiana	0.1	30		0.1	30	
Haloragis gossei var. *gossei*				0.1	5	WIN21R-02
Heliotropium cunninghamii	0.1	15	WIN21-08	0.1	15	
Heliotropium glabellum	0.1	40	WIN21-05			
Heliotropium ovalifolium	0.1	5		0.1	5	
Indigofera monophylla	0.1	45		0.1	45	
Paraneurachne muelleri	0.1	30		0.1	30	
Ptilotus calostachyus	0.1	15		0.1	15	
Senna notabilis	0.1	20		0.1	20	
Tephrosia arenicola	0.1	40		0.1	40	
Tribulus hirsutus	0.1	5	WIN21-01	0.1	5	
Trigastrotheca molluginea				0.1	5	
Triodia brizoides	15	20		15	20	
Triodia schinzii	0.1	15		5	15	
Yakirra australiensis var. *australiensis*	0.1	10		0.1	10	

Phase 2 - NW

Phase 2 - SE

Winu Project Area **WIN22**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 18-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 381682 mE, 7702525 mN.

Habitat Low semi lateritic rise: calcrete chert

Soil Loamy sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia bivenosa*, *A. ancistrocarpa* open shrubland over *Triodia brizoides* open hummock grassland.

Phase 2: *Acacia bivenosa*, *A. ancistrocarpa* open shrubland over *Triodia brizoides* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	1	140		1	140	
Acacia bivenosa	2	140		2	140	
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Eragrostis eriopoda	0.1	40	WIN22-00			
Eriachne pulchella				0.1	5	WIN22R-01
Goodenia armitiana	0.1	40		0.1	40	
Halgania solanacea var. *solanacea*	0.1	40				
Heliotropium cunninghamii	0.1	25				
Heliotropium pachyphyllum	0.1	30		0.1	30	
Heliotropium sp.	0.1	25				
Indigofera monophylla	0.1	120		0.1	120	
Paraneurachne muelleri	0.1	40		0.1	40	
Ptilotus exaltatus	0.1	30	WIN22-01	0.1	30	
Sida arenicola				0.1	50	
Sporobolus australasicus	0.1	25				
Streptoglossa decurrens	0.1	40		0.1	40	
Trianthema triquetrum	0.1	10	WIN22-02			
Triodia brizoides	22	40		25	40	

Phase 1

Phase 2

Winu Project Area **WIN23**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 18-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 380249 mE, 7702678 mN.

Habitat Pindan plain

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia orthocarpa*, *Petalostylis cassioides*, (*Dicrastylis cordifolia*) low open shrubland over *Bonamia erecta*, *Goodenia armitiana*, *Scaevola parvifolia* very open herbland over *Triodia schinzii* very open hummock grassland.

Phase 2: *Acacia orthocarpa*, *Petalostylis cassioides*, (*Dicrastylis cordifolia*) low open shrubland over *Bonamia erecta*, *Goodenia armitiana*, *Scaevola parvifolia* very open herbland over *Triodia schinzii* very open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 1-2 years ago. **Phase 2:** Burnt 1-2 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia monticola				0.1	5	
Acacia orthocarpa	3	100		3	100	
Amphipogon sericeus	0.1	50				
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Bonamia erecta	4	40		4	40	
Calytrix carinata				0.1	30	
Dampiera candicans	0.1	50		0.1	50	
Dicrastylis cordifolia	2	40		2	40	
Eriachne lanata	0.1	50		0.1	50	
Gompholobium simplicifolium	0.1	50		0.1	50	
Goodenia armitiana	2	40		2	40	
Grevillea wickhamii subsp. *hispidula*	0.1	80		0.1	80	
Gyrostemon tepperi	0.1	50		0.1	50	
Hakea macrocarpa	0.1	80	=	0.1	80	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Hibiscus leptocladus	0.1	40		0.1	40	
Indigofera boviperda subsp. *eremaea*	0.5	40		0.5	40	
Jacksonia aculeata	0.1	50		0.1	50	
Owenia reticulata	0.5	500		0.5	500	
Petalostylis cassioides	3	80		3	80	
Ptilotus astrolasius	0.5	40		0.5	40	
Ptilotus calostachyus	0.1	70		0.1	70	
Scaevola parvifolia subsp. *parvifolia*	1	30	WIN23-01	1	30	
Tephrosia arenicola	0.1	50		0.1	50	
Triodia schinzii	3	15		3	15	
Yakirra australiensis var. *australiensis*	0.1	20		0.1	20	

Phase 1

Phase 2

Winu Project Area **WIN24**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 18-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 379908 mE, 7702979 mN.

Habitat Pindan plain

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Owenia reticulata* scattered low trees over *Acacia orthocarpa*, *Dicrastylis cordifolia* low open shrubland over *Bonamia erecta*, (*Goodenia armitiana*, *Scaevola parvifolia*) very open herbland over *Triodia schinzii* very open hummock grassland.

Phase 2: *Owenia reticulata* scattered low trees over *Acacia orthocarpa* open shrubland over *Dicrastylis cordifolia* low open shrubland over *Bonamia erecta*, (*Goodenia armitiana*, *Scaevola parvifolia*) very open herbland over *Triodia schinzii* very open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 1-2 years ago. **Phase 2:** Burnt 1-2 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia monticola				0.1	5	
Acacia orthocarpa	2.5	100		2.5	100	
Amphipogon sericeus	0.1	50		0.1	50	
Androcalva loxophylla	0.1	40		0.1	40	
Aristida holathera var. *holathera*	0.5	30		0.5	30	
Bonamia erecta	4	40		4	40	
Calytrix carinata	0.1	50	WIN24-01	0.1	50	
Corchorus sidoides subsp. *vermicularis*	0.1	40	WIN24-03	0.1	40	
Dampiera candicans	0.1	50		0.1	50	
Dicrastylis cordifolia	2	40		2	40	
Eragrostis eriopoda	0.1	40		0.1	40	
Eriachne aristidea	0.1	30		0.1	30	
Eriachne lanata	0.1	50		0.1	50	
Fimbristylis oxystachya	0.1	30	WIN24-05	0.1	30	
Goodenia armitiana	1	40		1	40	
Grevillea wickhamii subsp. *hispidula*	0.1	80		0.1	80	
Gyrostemon tepperi	0.1	50		0.1	50	
Hakea macrocarpa	0.1	170		0.1	170	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Heliotropium diversifolium	0.1	25	WIN24-02	0.1	25	
Hibiscus leptocladus	0.1	40		0.1	40	
Jacksonia aculeata	0.1	40		0.1	40	
Owenia reticulata	0.1	500		0.1	500	
Paraneurachne muelleri	0.1	40		0.1	40	
Ptilotus arthrolasius	0.1	40		0.1	40	
Ptilotus astrolasius	0.5	40		0.5	40	
Ptilotus calostachyus	0.1	70		0.1	70	
Scaevola parvifolia subsp. *parvifolia*	1	30		1	30	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Senna notabilis	0.1	20				
Seringia elliptica	0.5	50		0.5	50	
Sida arenicola	0.1	60		0.1	60	
Solanum centrale	0.1	40	WIN24-04	0.1	40	
Tephrosia arenicola	0.1	50		0.1	50	
Trigastrotheca molluginea	0.1	10		0.1	10	
Triodia schinzii	3	15		3	15	
Yakirra australiensis var. *australiensis*	0.1	15		0.1	15	

Phase 1

Phase 2

Winu Project Area **WIN25**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 18-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 381145 mE, 7702171 mN.

Habitat Pindan plain

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Dicrastylis cordifolia*, (*Acacia orthocarpa*) low open shrubland over *Eriachne lanata*, *Amphipogon sericeus* very open tussock grasses over *Triodia schinzii* very open hummock grassland.

Phase 2: *Acacia orthocarpa* scattered shrubs over *Dicrastylis cordifolia* scattered low shrubs over *Eriachne lanata*, *Amphipogon sericeus* very open tussock grasses over *Triodia schinzii* very open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 1-2 years ago. **Phase 2:** Burnt 1-2 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia monticola	0.1	140		0.1	140	
Acacia orthocarpa	0.5	100		0.5	120	
Amphipogon sericeus	1	50		1	50	
Androcalva loxophylla	0.1	40				
Aristida holathera var. *holathera*	0.1	30				
Calytrix carinata	0.5	50		0.5	50	
Dampiera candicans	0.1	50		0.1	50	
Dicrastylis cordifolia	3	40		3	40	
Eragrostis eriopoda	0.1	30				
Eriachne aristidea	0.1	20				
Eriachne lanata	2	50		2	50	
Eulalia aurea	0.1	40		0.1	40	
Goodenia armitiana	0.5	40		0.5	40	
Grevillea wickhamii subsp. *hispidula*	0.1	80		0.1	80	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Leptosema anomalum	0.1	30		0.1	30	
Paraneurachne muelleri	0.1	40		0.1	40	
Ptilotus astrolasius				0.1	15	
Ptilotus calostachyus				0.1	30	
Scaevola parvifolia subsp. *parvifolia*	0.1	30		0.1	30	
Senna notabilis				0.1	5	
Sida arenicola	0.1	70		0.1	70	
Solanum centrale	0.1	40		0.1	40	
Tephrosia arenicola	0.1	50		0.1	50	
Trigastrotheca molluginea	0.1	10		0.1	10	
Triodia schinzii	8	15		8	15	

Phase 1

Phase 2

Winu Project Area **WIN26**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 18-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 379517 mE, 7703089 mN.

Habitat Pindan plain, slightly elevated

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia orthocarpa*, *A. monticola*, *A. ancistrocarpa* scattered shrubs over *Mirbelia viminalis* low shrubland over *Triodia schinzii*, (*T. epactia*) open hummock grassland.

Phase 2: *Acacia orthocarpa*, *A. monticola*, *A. ancistrocarpa* scattered shrubs over *Mirbelia viminalis* low open heath over *Triodia schinzii*, (*T. epactia*) open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	0.5	140		0.5	140	
Acacia monticola	0.5	140		0.5	140	
Acacia orthocarpa	0.5	140		0.5	140	
Amphipogon sericeus	1	40	WIN26-01	0.1	40	
Bonamia erecta	0.1	40		0.1	40	
Calytrix carinata	0.1	50		0.1	50	
Cassytha capillaris	0.1	20		0.1	20	
Dampiera candicans	0.1	40		0.1	40	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	40				
Eriachne lanata	0.5	40				
Goodenia armitiana	0.1	40				
Goodenia azurea subsp. *hesperia*	0.1	40				
Grevillea wickhamii subsp. *hispidula*	0.1	170	WIN26-02	0.1	170	
Halgania solanacea var. *solanacea*				0.1	20	
Heliotropium vestitum	0.1	40	WIN26-03	0.1	40	
Indigofera boviperda subsp. *eremaea*	0.1	40		0.1	40	
Jacksonia aculeata				0.1	40	
Leptosema anomalum				0.1	10	
Mirbelia viminalis	18	90		31	90	
Paraneurachne muelleri	0.1	40		0.1	40	
Ptilotus astrolasius				0.1	20	
Ptilotus calostachyus	0.1	50		0.1	50	
Scaevola parvifolia subsp. *parvifolia*	0.1	40				
Tephrosia arenicola				0.1	30	
Trigastrotheca molluginea	0.1	20		0.1	20	
Triodia brizoides	0.1	40	=	0.1	40	
Triodia epactia	4	40		4	40	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Triodia schinzii	15	40		15	40	

Phase 1

Phase 2

Winu Project Area **WIN27**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 18-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 377461 mE, 7704480 mN.

Habitat Pindan plain

Soil Loamy sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys* scattered low trees over *Mirbelia viminalis*, (*Calytrix carinata*, *Acacia drepanocarpa* subsp. *latifolia*) low shrubland over *Amphipogon sericeus* very open tussock grassland over *Triodia schinzii* open hummock grassland.

Phase 2: *Erythrophleum chlorostachys* scattered low trees over *Mirbelia viminalis*, (*Calytrix carinata*, *Acacia drepanocarpa* subsp. *latifolia*) low shrubland over *Amphipogon sericeus* very open tussock grassland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia drepanocarpa subsp. *latifolia*	1	80		1	80	
Acacia hilliana	0.1	30		0.1	30	
Amphipogon sericeus	2	40	WIN27-01	2	40	
Bonamia erecta	0.5	40		0.5	40	
Calytrix carinata	3	80		3	80	
Dampiera candicans	0.1	50		0.1	50	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	40		0.1	40	
Eriachne lanata	1	40		1	40	
Erythrophleum chlorostachys	0.5	140		0.5	140	
Gompholobium simplicifolium	0.1	60		0.1	60	
Goodenia azurea subsp. *hesperia*	0.1	50				
Grevillea wickhamii subsp. *hispidula*	0.1	90		0.1	90	
Gyrostemon tepperi	0.1	90		0.1	90	
Halgania solanacea var. *solanacea*	1	40		1	40	
Indigofera monophylla				0.1	60	
Jacksonia aculeata	1	60		1	60	
Leptosema anomalum	0.1	30		0.1	30	
Mirbelia viminalis	15	90		15	90	
Ptilotus arthrolasius	0.1	30		0.1	30	
Ptilotus calostachyus	0.1	50		0.1	50	
Tephrosia arenicola	0.1	60				
Trigastrotheca molluginea				0.1	10	
Triodia brizoides	0.1	40		0.1	40	
Triodia schinzii	15	30		15	30	

Phase 1

Phase 2

Winu Project Area **WIN28**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 16-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 376896 mE, 7704609 mN.

Habitat Pindan plain

Soil Loamy sand

Rock Type N/A

Vegetation **Phase 1:** *Mirbelia viminalis*, (*Calytrix carinata*, *Acacia drepanocarpa* subsp. *latifolia*, *Seringia elliptica*) low shrubland over *Eriachne lanata* very open tussock grassland over *Triodia schinzii* open hummock grassland.

Phase 2: *Mirbelia viminalis*, (*Calytrix carinata*, *Acacia drepanocarpa* subsp. *latifolia*, *Seringia elliptica*) low shrubland over *Eriachne lanata* very open tussock grassland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago. **Phase 2:** Burnt 3-5 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	0.1	70		0.1	70	
Acacia drepanocarpa subsp. *latifolia*	2	80		2	80	
Amphipogon sericeus	0.5	40		0.5	40	
Aristida holathera var. *holathera*				0.1	10	
Bonamia erecta	1	40		1	40	
Calytrix carinata	3	80		3	80	
Cassytha capillaris	0.1	30		0.1	30	
Corchorus sidoides subsp. *vermicularis*	0.1	50				
Dampiera candicans	0.1	50		0.1	50	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	40		0.1	40	
Eragrostis eriopoda	0.1	40		0.1	40	
Eriachne lanata	3	40		3	40	
Gompholobium simplicifolium	0.5	60		0.5	60	
Goodenia azurea subsp. *hesperia*	0.1	50				
Goodenia hartiana				0.1	20	
Grevillea wickhamii subsp. *hispidula*	0.1	90		0.1	90	
Hakea macrocarpa	0.1	70		0.1	70	
Halgania solanacea var. *solanacea*	0.5	40		0.5	40	
Indigofera boviperda subsp. *eremaea*				0.1	30	
Jacksonia aculeata	0.5	60		0.5	60	
Leptosema anomalum	0.1	30	=	0.1	30	
Mirbelia viminalis	13	90		13	90	
Ptilotus calostachyus	0.1	50		0.1	50	
Scaevola parvifolia subsp. *parvifolia*	0.1	40		0.1	40	
Seringia elliptica	3	50		3	50	
Sida sp. Pindan (B.G. Thomson 3398)	0.1	40				
Tephrosia arenicola	0.1	60		0.1	60	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Triodia schinzii	15	40		15	40	

Phase 1

Phase 2

Winu Project Area **WIN29**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 17-May-19 **Phase 2:** 20-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 369857 mE, 7708844 mN.

Habitat Pindan plain.

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Owenia reticulata* scattered low trees over *Acacia ancistrocarpa*, (*Hakea macrocarpa*) open shrubland over *Bonamia erecta* very open herbland over *Aristida holathera* var. holathera, *Eriachne lanata*, *Amphipogon sericeus* very open tussock grassland over *Triodia schinzii* hummock grassland.

Phase 2: *Owenia reticulata* scattered low trees over *Acacia ancistrocarpa*, (*Hakea macrocarpa*) open shrubland over *Bonamia erecta* very open herbland over *Aristida holathera* var. holathera, *Eriachne lanata*, *Amphipogon sericeus* very open tussock grassland over *Triodia schinzii* hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** No sign of recent fire. **Phase 2:** No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	7	250		7	250	
Acacia sericophylla	0.1	160		0.1	160	
Amphipogon sericeus	0.5	40		0.5	40	
Androcalva loxophylla	0.1	45		0.1	45	
Aristida holathera var. *holathera*	1	30		0.1	30	
Bonamia alatisemina	0.1	30		0.1	30	
Bonamia erecta	5	40		5	40	
Calytrix carinata	0.1	150		0.1	150	
Cassytha capillaris	0.1	30		0.1	30	
Corchorus sidoides subsp. *vermicularis*	0.1	20		0.1	20	
Dampiera candicans				0.1	25	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	40		0.1	40	
Eragrostis eriopoda				0.1	30	WIN29R-01
Eragrostis sp.	0.1	10	WIN29-01			
Eriachne aristidea	0.1	25				
Eriachne lanata	0.5	40		0.1	40	
Eriachne obtusa	0.1	40		0.1	40	
Erythrophleum chlorostachys	0.1	120		0.1	120	
Goodenia armitiana	0.1	30		0.1	30	
Goodenia azurea subsp. *hesperia*	0.5	30				
Goodenia hartiana				0.1	30	
Grevillea wickhamii subsp. *hispidula*	0.1	110		0.1	110	
Hakea macrocarpa	1	180		1	180	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Hibiscus leptocladus				0.1	10	
Indigofera boviperda subsp. *eremaea*	0.1	40		0.1	40	
Jacksonia aculeata	0.1	60		0.1	60	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Owenia reticulata	0.5	400		0.5	400	
Paraneurachne muelleri	0.1	30		0.1	30	
Petalostylis cassioides	0.1	50		0.1	50	
Ptilotus arthrolasius				0.1	30	
Ptilotus astrolasius	0.1	30		0.1	30	
Ptilotus calostachyus	0.1	70				
Scaevola parvifolia subsp. *parvifolia*				0.1	10	
Senna curvistyla	0.1	50	WIN29-02			
Sorghum plumosum var. *plumosum*	0.5	110		0.5	110	
Trigastrotheca molluginea	0.1	20		0.1	20	
Triodia schinzii	28	40		28	40	

Phase 1

Phase 2

Winu Project Area **WIN30**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 17-May-19 **Phase 2:** 20-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 369549 mE, 7709739 mN.

Habitat Pindan plain.

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa*, (*Hakea macrocarpa*) tall shrubland over *Sorghum plumosum* scattered tall tussock grasses over *Aristida holathera* var. holathera, *Amphipogon sericeus* very open tussock grassland over *Triodia schinzii* open hummock grassland.

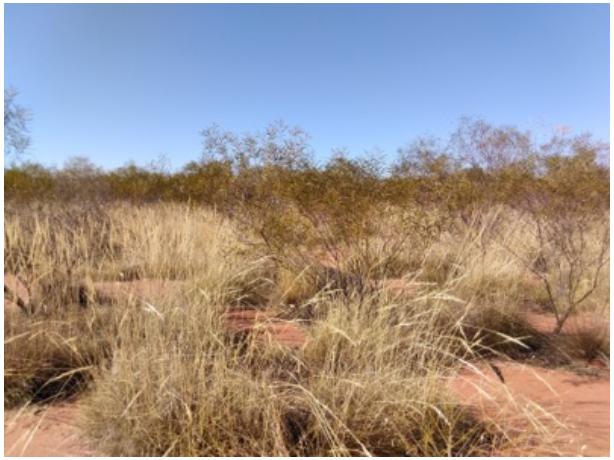
Phase 2: *Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa*, (*Hakea macrocarpa*) tall shrubland over *Sorghum plumosum* scattered tall tussock grasses over *Aristida holathera* var. holathera, *Amphipogon sericeus* very open tussock grassland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** No sign of recent fire. **Phase 2:** No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia ancistrocarpa	15	250		15	250	
Acacia sericophylla	0.1	160		0.1	160	
Amphipogon sericeus	1	40	WIN30-05	1	40	
Androcalva loxophylla	0.1	45				
Aristida holathera var. *holathera*	1	30		0.1	30	
Aristida inaequiglumis	0.1	70	WIN30-01	0.1	70	
Bonamia alatisemina	0.1	30				
Calytrix carinata	0.1	150		0.1	150	
Cassytha capillaris	0.1	30		0.1	30	
Corchorus sidoides subsp. *vermicularis*	0.1	20	WIN30-03	0.1	20	
Dampiera cinerea	0.1	30		0.1	30	
Dicrastylis cordifolia	0.1	40		0.1	40	
Dodonaea coriacea	0.1	40				
Eragrostis eriopoda				0.1	30	
Eragrostis aff. *eriopoda*	0.1	30				
Eriachne aristidea	0.1	25				
Eriachne lanata	0.1	40		0.1	40	
Eriachne obtusa	0.1	40		0.1	40	
Erythrophleum chlorostachys	0.5	250		0.5	250	
Goodenia armitiana	0.1	30		0.1	30	
Goodenia azurea subsp. *hesperia*	1	30				
Goodenia hartiana				0.1	30	
Grevillea wickhamii subsp. *hispidula*	0.1	110		0.1	110	
Hakea macrocarpa	0.5	180		0.5	180	
Halgania solanacea var. *solanacea*	0.1	40		0.1	40	
Heliotropium vestitum	0.1	25	WIN30-02			
Hibiscus leptocladus	0.1	40		0.1	40	
Indigofera boviperda subsp. *eremaea*	0.1	40		0.1	40	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Jacksonia aculeata	0.1	60		0.1	60	
Orianthera centralis	0.1	30				
Paraneurachne muelleri	0.1	30		0.1	30	
Petalostylis cassioides	0.1	50				
Polygala isingii	0.1	10	WIN30-04	0.1	10	WIN30R-01
Ptilotus astrolasius	0.1	30		0.1	30	
Ptilotus calostachyus	0.1	70		0.1	70	
Sorghum plumosum var. *plumosum*	0.5	110		0.5	110	
Trigastrotheca molluginea	0.1	20		0.1	20	
Triodia schinzii	12	40		12	40	



Phase 1

Phase 2

Winu Project Area **WIN31**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 17-May-19 **Phase 2:** 19-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 371753 mE, 7706828 mN.

Habitat Pindan plain

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys* low open woodland over *Acacia platycarpa* open shrubland over *Gompholobium simplicifolium*, *Dicrastylis cordifolia* low open shrubland over *Triodia schinzii* open hummock grassland.

Phase 2: *Erythrophleum chlorostachys* low open woodland over *Acacia platycarpa* open shrubland over *Gompholobium simplicifolium*, *Dicrastylis cordifolia* low open shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 3-5 years ago in small patches. **Phase 2:** Burnt 3-5 years ago in small patches.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia drepanocarpa subsp. *latifolia*	0.1	180		0.1	180	
Acacia platycarpa 'Desert Form Non-Pruinose'	6	120		6	120	
Acacia platycarpa 'Desert Form Pruinose'	3	95		3	95	
Amphipogon sericeus	0.1	40		0.1	40	
Aristida holathera var. *holathera*	0.1	40		0.1	40	
Bonamia erecta	0.1	30				
Calytrix carinata	0.1	50	WIN31-02	0.1	50	
Dampiera candicans	0.1	40		0.1	40	
Dampiera cinerea	0.1	40		0.1	40	
Dicrastylis cordifolia	1	40		1	40	
Dicrastylis doranii	0.1	40				
Dodonaea coriacea	0.1	110		0.1	110	
Eriachne lanata	0.1	50		0.1	50	
Erythrophleum chlorostachys	3	280		3	280	
Gompholobium simplicifolium	2	90		2	90	
Grevillea eriostachya	0.1	145		0.1	145	
Grevillea wickhamii subsp. *hispidula*	0.1	170	WIN31-01	0.1	170	
Gyrostemon tepperi	0.1	120		0.1	120	
Halgania solanacea var. *solanacea*	0.1	30		0.1	30	
Jacksonia aculeata	0.1	50		0.1	50	
Leptosema anomalum	0.1	20		0.1	20	
Orianthera centralis	0.1	50		0.1	50	
Scaevola parvifolia subsp. *parvifolia*	0.1	20				
Triodia schinzii	18	30		18	30	

Phase 1

Phase 2

Winu Project Area **WIN32**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 17-May-19 **Phase 2:** 20-Sep-19

Type Quadrat 50 x 50 m

Central Coordinate 366016 mE, 7708422 mN.

Habitat Swale

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Owenia reticulata* scattered low trees over *Acacia tumida* var. *kulparn*, (*A. platycarpa*) open shrubland over *Dampiera cinerea*, *Gompholobium simplicifolium*, (*Jacksonia aculeata*, *Dicrastylis doranii*) low open shrubland over *Triodia schinzii* open hummock grassland.

Phase 2: *Owenia reticulata* scattered low trees over *Acacia tumida* var. *kulparn*, (*A. platycarpa*) open shrubland over *Dampiera cinerea*, *Gompholobium simplicifolium*, (*Jacksonia aculeata*, *Dicrastylis doranii*) low open shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** No sign of recent fire. **Phase 2:** No sign of recent fire.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia platycarpa 'Desert Form Non-Pruinose'	0.5	110				
Acacia platycarpa 'Desert Form Pruinose'				0.5	110	
Acacia tumida var. *kulparn*	3	160		3	160	
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Calytrix carinata	0.1	50		0.1	50	
Cassytha capillaris	0.1	30		0.1	30	
Dampiera cinerea	3	50		3	50	
Dicrastylis doranii	1	40		1	40	
Dodonaea coriacea	0.1	80		0.1	80	
Eragrostis eriopoda	0.1	40		0.1	40	
Eriachne aristidea	0.1	40		0.1	40	
Eriachne obtusa	0.1	40	WIN32-01	0.1	40	
Erythrophleum chlorostachys	1	80		1	80	
Gompholobium simplicifolium	3	50		3	50	
Grevillea eriostachya	0.1	90		0.1	90	
Gyrostemon tepperi	0.1	50		0.1	50	
Hakea macrocarpa	0.1	160		0.1	160	
Halgania solanacea var. *solanacea*	0.1	50		0.1	50	
Heliotropium transforme	0.1	35				
Jacksonia aculeata	1	50		1	50	
Newcastelia cladotricha	0.5	40				
Owenia reticulata	0.1	350		0.1	350	
Paraneurachne muelleri				0.1	25	
Petalostylis cassioides	0.1	160		0.1	160	
Ptilotus arthrolasius	0.1	40		0.1	40	
Scaevola parvifolia subsp. *parvifolia*	0.1	25		0.1	25	
Seringia elliptica	0.1	40		0.1	40	
Sida sp. Pilbara (A.A. Mitchell PRP 1543)	0.1	25		0.1	25	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Spermacoce occidentalis	0.1	40	WIN32-02	0.1	40	
Triodia schinzii	28	40		28	40	

Phase 1

Phase 2

Winu Project Area **WIN41**

Described by SCRM **Date** 23-Sep-19

Type Quadrat 50 x 50m

Central Coordinate 356118 mE, 7710673 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Acacia ancistrocarpa*, *A. orthocarpa* tall shrubland over *Triodia epactia* hummock grassland.

Veg Condition Excellent.

Fire Age No sign of recent fire.

Species	Cover	Height	Specimen	Notes
Acacia ancistrocarpa	6	220		
Acacia orthocarpa	5	200	WIN40-01	
Amphipogon sericeus	0.1	20		
Aristida holathera var. holathera	0.1	20		
Cassytha capillaris	0.1	20		
Dampiera candicans	0.1	30		
Eriachne lanata	0.1	20		
Goodenia armitiana	0.1	20		
Goodenia hartiana	0.1	30		N=2
Grevillea wickhamii subsp. *hispidula*	0.1	50		
Halgania solanacea var. *solanacea*	0.1	20		
Ptilotus astrolasius	0.1	30		
Ptilotus calostachyus	0.1	50		
Senna notabilis	0.1	30		
Sida arenicola	0.1	30		
Tephrosia arenicola	0.1	20		
Trigastrotheca molluginea	0.1	10		
Triodia epactia	31	40		

Phase 2 - NW

Phase 2 - SE

Winu Project Area **WINREL01**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 14-May-19 **Phase 2:** 20-Sep-19

Type Relevé 50 x 50 m

Central Coordinate 361808 mE, 7711007 mN.

Habitat Pindan plain

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Erythrophleum chlorostachys*, (*Acacia sericophylla*) low open woodland over *Sorghum plumosum* var. *plumosum* very open tall tussock grassland over *Halgania solanacea* var. *solanacea* scattered low shrubs.

Phase 2: *Erythrophleum chlorostachys*, (*Acacia sericophylla*) low open woodland over *Sorghum plumosum* var. *plumosum* very open tall tussock grassland over *Halgania solanacea* var. *solanacea* scattered low shrubs.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Burnt 1-2 years ago. **Phase 2:** Burnt 1-2 years ago.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia platycarpa 'Desert Form Non-Pruinose'				0.1	90	
Acacia platycarpa 'Desert Form Pruinose'	0.1	90				
Acacia sericophylla	1	250		1	250	
Amphipogon sericeus	0.1	40		0.1	40	
Bonamia alatisemina	0.1	10	WINREL1-03	0.1	10	
Dicrastylis cordifolia	0.5	40		0.5	40	
Dodonaea hispidula var. *arida*	0.1	90		0.1	90	
Eriachne lanata	0.1	50		0.1	50	
Eriachne obtusa	0.1	70				
Erythrophleum chlorostachys	7	250		7	250	
Fimbristylis oxystachya	0.1	25	WINREL1-04	0.1	25	
Goodenia armitiana	0.1	40				
Goodenia hartiana				0.1	30	
Hakea macrocarpa				0.1	90	
Halgania solanacea var. *solanacea*	1.5	40		1.5	40	
Indigofera boviperda subsp. *eremaea*	0.1	50		0.1	50	
Indigofera monophylla	0.1	70		0.1	70	
Jacksonia aculeata	0.1	50		0.1	50	
Petalostylis cassioides	0.5	100		0.5	100	
Ptilotus arthrolasius	0.1	40		0.1	40	
Ptilotus astrolasius	0.5	50		0.5	50	
Scaevola parvifolia subsp. *parvifolia*	0.1	30	WINREL1-01	0.1	30	
Seringia elliptica	1	50		1	50	
Sorghum plumosum var. *plumosum*	8	190		8	190	
Trianthema pilosum	0.1	20				
Tribulopis marliesiae	0.1	30	WINREL1-02	0.1	30	
Trigastrotheca molluginea				0.1	15	
Triodia schinzii				0.1	5	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Yakirra australiensis var. *australiensis*	0.1	20		0.1	20	

Phase 1

Phase 2

Winu Project Area **WINREL02**

Described by **Phase 1:** PL/RM **Phase 2:** SCRM **Date** **Phase 1:** 17-May-19 **Phase 2:** 24-Sep-19

Type Relevé 30 x 80 m

Central Coordinate 368228 mE, 7706541 mN.

Habitat Swale

Soil Sand

Rock Type N/A

Vegetation **Phase 1:** *Acacia tumida* var. *kulparn*, (*Erythrophleum chlorostachys*) scattered tall shrubs over *A. platycarpa*, *Grevillea wickhamii* subsp. *hispidula* scattered shrubs over *Dicrastylis doranii*, *A. stellaticeps* (*Dampiera cinerea*, *Gompholobium simplicifolium*) low open shrubland over *Triodia schinzii* open hummock grassland.

Phase 2: *Acacia tumida* var. *kulparn*, (*Erythrophleum chlorostachys*) scattered tall shrubs over *A. platycarpa*, *Grevillea wickhamii* subsp. *hispidula* scattered shrubs over *Dicrastylis doranii*, *A. stellaticeps* (*Dampiera cinerea*, *Gompholobium simplicifolium*) low open shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition **Phase 1:** Excellent. **Phase 2:** Excellent.

Fire Age **Phase 1:** Patchily burnt 3-5 years ago, some unburnt. **Phase 2:** Patchily burnt 3-5 years ago, some unburnt.

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Acacia platycarpa 'Desert Form Non-Pruinose'	1	110		1	90	
Acacia platycarpa 'Desert Form Pruinose'	1	90		1	110	
Acacia stellaticeps	3	50		1	50	
Acacia tumida var. *kulparn*	1.5	280	WINREL2-02	1.5	280	
Aristida holathera var. *holathera*	0.1	30		0.1	30	
Calytrix carinata	0.1	50		0.1	50	
Cassytha capillaris	0.1	30		0.1	30	
Corynotheca micrantha var. *gracilis*	0.1	50		0.1	50	
Cyanostegia cyanocalyx	0.1	70		0.1	70	
Dampiera cinerea	1	50		1	50	
Dicrastylis doranii	6	40		6	40	
Dodonaea coriacea	0.1	80		0.1	80	
Eragrostis eriopoda	0.1	40		0.1	40	
Eriachne aristidea	0.1	40		0.1	40	
Eriachne lanata				0.1	30	
Erythrophleum chlorostachys	1	80		1	80	
Gompholobium simplicifolium	1	50		1	50	
Grevillea eriostachya	0.1	100		0.1	100	
Grevillea wickhamii subsp. *hispidula*	1	150	WINREL2-01	1	150	
Gyrostemon tepperi	0.1	50		0.1	50	
Halgania solanacea var. *solanacea*	0.1	50		0.1	50	
Heliotropium transforme	0.1	30		0.1	30	
Hibiscus leptocladus	0.1	50				
Newcastelia cladotricha	0.1	50		0.1	50	
Petalostylis cassioides	0.5	160		0.5	160	
Santalum lanceolatum	0.1	70		0.1	70	
Scaevola parvifolia subsp. *parvifolia*	0.1	30		0.1	30	
Thinicola incana				0.1	150	

Species	Phase 1			Phase 2		
	Cover (%)	Height (cm)	Specimen	Cover (%)	Height (cm)	Specimen
Triodia schinzii	20	40		20	40	

Phase 1

Phase 2

Winu Road Access Corridor **WIN33**

Described by SCRM **Date** 24-Aug-19

Type Quadrat 50 x 50m

Central Coordinate 259064 mE, 7803864 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Acacia tumida* var. *kulparn*, (*Erythrophleum chlorostachys*) scattered tall shrubs over *A. platycarpa*, *Grevillea wickhamii* subsp. *hispidula* scattered shrubs over *Dicrastylis doranii*, *A. stellaticeps* (*Dampiera cinerea*, *Gompholobium simplicifolium*) low open shrubland over *Triodia schinzii* open hummock grassland.

Veg Condition Excellent.

Fire Age No sign of recent fire.

Species	Cover	Height (cm)	Specimen	Notes
Acacia anaticeps	5	300		
Acacia sericophylla	0.1	150	WIN33-03	
Acacia stellaticeps	1	30		
Acacia tumida var. *kulparn*	5	60		
Bonamia alatisemina	0.1	15	WIN33-04	
Corymbia zygophylla	0.1	150		
Corynotheca micrantha var. *gracilis*	0.1	20	WIN33-05	
Cyanostegia cyanocalyx	0.1	80		
Erythrophleum chlorostachys	0.1	220		
Gardenia pyriformis subsp. *keartlandii*	0.1	120		
Gompholobium simplicifolium	0.1	45		
Goodenia hartiana	0.1	20	WIN33-02	N=27
Jacksonia aculeata	0.1	40		
Sorghum plumosum var. *plumosum*	0.1	50		
Triodia epactia	30	40		
Triodia schinzii	20	40		

North

South

Winu Road Access Corridor **WIN34**

Described by SCRM **Date** 24-Aug-19

Type Quadrat 50 x 50m

Central Coordinate 332935 mE, 7770593 mN.

Habitat Sand Plain

Soil Sand

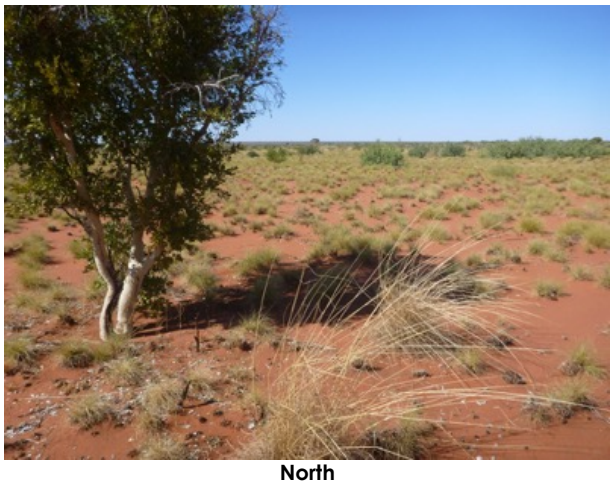
Rock Type N/A

Vegetation *Corymbia zygophylla*, (*Gardenia pyriformis* subsp. *keartlandii*) low open woodland over *Sorghum plumosum* var. *plumosum* scattered tussock grasses over *Triodia epactia* open hummock grassland

Veg Condition Excellent.

Fire Age No sign of recent fire.

Species	Cover	Height (cm)	Specimen	Notes
Acacia monticola	0.1	5		
Acacia tumida var. *kulparn*	0.1	90		
Boerhavia gardneri	0.1	30		
Bonamia alatisemina	0.1	20	WIN34-03	
Cleome uncifera subsp. *uncifera*	0.1	30		
Cleome viscosa	0.1	30		
Corymbia zygophylla	3	180	WIN34-07	
Cucumis variabilis	0.1	20		
Eragrostis eriopoda	0.1	20		
Eriachne ciliata	0.1	15		
Evolvulus alsinoides var. *decumbens*	0.1	20	WIN34-02	
Gardenia pyriformis subsp. *keartlandii*	0.1	300		
Goodenia hartiana	0.1	30		N=65
Ptilotus polystachyus	0.1	45		
Senna notabilis	0.1	15		
Sorghum plumosum var. *plumosum*	0.5	60		
Tinospora smilacina	0.1	80	WIN34-05	
Tribulopis marliesiae	0.1	20	WIN34-01	N=3
Trigastrotheca molluginea	0.1	15		
Triodia sp.	15	30	WIN34-06	
Yakirra australiensis var. *australiensis*	0.1	5	WIN34-04	



North

South

Winu Road Access Corridor **WIN35**

Described by SCRM **Date** 24-Aug-19

Type Quadrat 50 x 50m

Central Coordinate 352638 mE, 7712739 mN.

Habitat Sand Plain

Soil Sand

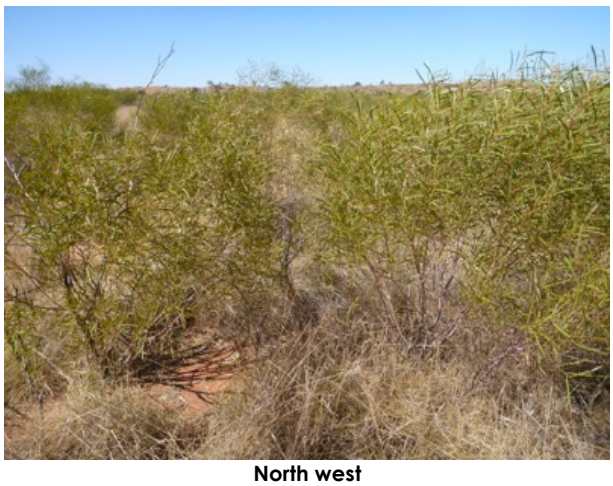
Rock Type N/A

Vegetation *Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa* tall shrubland over *A. sericophylla* scattered shrubs over *Indigofera monophylla* scattered low shrubs over *Triodia schinzii* hummock grassland

Veg Condition Excellent.

Fire Age No sign of recent fire.

Species	Cover	Height (cm)	Specimen
Acacia ancistrocarpa	15	220	
Acacia sericophylla	1	150	WIN35-01
Amphipogon sericeus	1	40	
Aristida holathera var. *holathera*	0.1	20	WIN35-03
Calytrix carinata	0.1	60	
Cleome uncifera subsp. *uncifera*	0.1	30	
Dicrastylis cordifolia	0.1	40	
Dodonaea coriacea	0.1	50	
Eriachne obtusa	0.1	30	WIN35-02
Erythrophleum chlorostachys	1	250	
Goodenia armitiana	0.1	30	
Grevillea eriostachya	0.1	70	WIN35-04
Grevillea wickhamii	0.1	180	
Gyrostemon tepperi	0.1	100	
Hakea macrocarpa	0.1	90	
Halgania solanacea var. *solanacea*	0.1	40	
Indigofera monophylla	2	40	
Jacksonia aculeata	0.1	60	
Leptosema anomalum	0.1	15	
Ptilotus astrolasius	0.1	20	
Ptilotus calostachyus	0.1	50	
Seringia elliptica	0.1	60	
Sida arenicola	0.1	150	
Sorghum plumosum var. *plumosum*	0.1	50	
Tephrosia sp. D Kimberley Flora (R.D. Royce 1848)	0.1	5	
Trichodesma zeylanicum var. *zeylanicum*	0.1	60	
Triodia schinzii	45	40	



North west

South east

Winu Road Access Corridor **WIN36**

Described by SCRM **Date** 22-Aug-19

Type Quadrat 50 x 50m

Central Coordinate 267979 mE, 7790296 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Gardenia pyriformis* subsp. *keartlandii* scattered low trees over *Acacia* sp. Nalgi (N.T. Burbidge 1317) open heath over *Acacia stellaticeps* scattered low shrubs over *Triodia epactia*, (*T. schinzii*) open hummock grassland

Veg Condition Excellent.

Fire Age No sign of recent fire.

Species	Cover	Height (cm)	Specimen	Notes
Acacia ancistrocarpa	0.1	250		
Acacia colei var. *colei*	0.1	20	WIN36-18	
Acacia ? drepanocarpa x trachycarpa	0.1	180	WIN36-14	S. Dillon ID
Acacia aff. *drepanocarpa*	0.1	120	WIN36-09	S. Dillon ID
Acacia sericophylla	0.1	15	WIN36-08	
Acacia sp. Nalgi (N.T. Burbidge 1317)	40	150		S. Dillon ID
Acacia stellaticeps	1	30		
Achyranthes aspera	0.1	30		
Bonamia alatisemina	0.1	10	WIN36-05	
Cassytha capillaris	0.1	20	WIN36-04	
Cleome uncifera subsp. *uncifera*	0.1	15	WIN36-06	
Corchorus sidoides subsp. *vermicularis*	0.1	30	WIN36-03	
Cucumis variabilis	0.1	20		
Cyperus conicus	0.1	30	WIN36-11	
Eragrostis eriopoda	0.1	30	WIN36-01	
Eriachne lanata	0.1	20	WIN36-16	
Eriachne obtusa	0.1	20	WIN36-15	
Evolvulus alsinoides	0.1	10		
Gardenia pyriformis subsp. *keartlandii*	0.5	300	WIN36-10	
Gyrostemon tepperi	0.1	50		
Heliotropium vestitum	0.1	30	WIN36-02	
Hibiscus leptocladus	0.1	15	WIN36-17	
Jacksonia aculeata	0.1	50		
Paraneurachne muelleri	0.1	15		
Ptilotus astrolasius	0.1	20		
Seringia elliptica	0.1	15	WIN36-07	
Sorghum plumosum var. *plumosum*	1	50		
Tinospora smilacina	0.1	300	WIN36-12	
Trigastrotheca molluginea	0.1	15		
Triodia epactia	15	30		
Triodia schinzii	1	30		
Zornia chaetophora	0.1	20	WIN36-13	

North

South

Winu Road Access Corridor **WIN37**

Described by SCRM **Date** 23-Aug-19

Type Quadrat 50 x 50m

Central Coordinate 264407 mE, 7794216 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Acacia ancistrocarpa* tall open shrubland over *A. drepanocarpa* subsp. *latifolia* scattered shrubs over *Indigofera monophylla* scattered low shrubs over *Eriachne obtusa* scattered tussock grasses over *Triodia schinzii*, *T. epactia* hummock grassland

Veg Condition Excellent.

Fire Age Very long unburnt.

Species	Cover	Height (cm)	Specimen	Notes
Acacia ancistrocarpa	5	400		
Acacia aff. *drepanocarpa*	0.1	160		S. Dillon ID
Acacia drepanocarpa subsp. *latifolia*	2	350		
Acacia sericophylla	0.1	90	WIN37-04	
Bonamia alatisemina	0.1	20		
Corchorus sidoides subsp. *vermicularis*	0.1	30		
Eragrostis eriopoda	0.1	30		
Eriachne lanata	0.1	30		
Eriachne obtusa	0.5	30		
Gossypium australe (Burrup Peninsula Form)	0.1	80		
Hakea macrocarpa	0.1	160	WIN37-01	
Indigofera monophylla	0.5	40		
Leptosema anomalum	0.1	20		
Paraneurachne muelleri	0.1	30		
Phyllanthus sp.	0.1	50	WIN37-03	Insufficient material
Ptilotus astrolasius	0.1	40		
Sorghum plumosum var. *plumosum*	0.1	50		
Trianthema pilosum	0.1	20		
Trigastrotheca molluginea	0.1	20		
Triodia epactia	20	40		
Triodia schinzii	30	40		
Zornia chaetophora	0.1	15	WIN37-02	

North

Winu Road Access Corridor **WIN38**

Described by SCRM **Date** 23-Aug-19

Type Quadrat 50 x 50m

Central Coordinate 260724 mE, 7800902 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Acacia anaticeps* scattered shrubs over *A. tumida* var. *kulparn*, *A. stellaticeps*, *Gompholobium simplicifolium* low open shrubland over *Triodia epactia* open hummock grassland

Veg Condition Excellent.

Fire Age Burnt 1-2 years ago.

Species	Cover	Height (cm)	Specimen	Notes
Acacia anaticeps	0.5	180		
Acacia aff. *drepanocarpa*	0.1	60		S. Dillon ID
Acacia sericophylla	0.1	60		
Acacia stellaticeps	2	25		
Acacia tumida var. *kulparn*	0.5	90	WIN38-02	
Bonamia alatisemina	0.1	20	WIN38-01	
Corynotheca micrantha var. *gracilis*	0.1	30		
Cyanostegia cyanocalyx	0.1	60		
Gardenia pyriformis subsp. *keartlandii*	0.1	280		
Gompholobium simplicifolium	2	45		
Gyrostemon tepperi	0.1	40		
Jacksonia aculeata	0.1	30		
Ptilotus arthrolasius	0.1	30		
Ptilotus astrolasius	0.1	25		
Scaevola parvifolia	0.1	20		
Trigastrotheca molluginea	0.1	20		
Triodia epactia	12	40		

North

South

Winu Road Access Corridor **WIN39**

Described by SCRM **Date** 27-Aug-19

Type Quadrat 50 x 50m

Central Coordinate 339672 mE, 7716709 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Owenia reticulata*, *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Dicrastylis doranii,* (*A. stellaticeps*) low open shrubland over *Triodia schinzii* open hummock grassland

Veg Condition Excellent.

Fire Age Burnt 1-2 years ago. Small strip unburnt.

Species	Cover	Height (cm)	Specimen	Notes
Acacia platycarpa 'Desert Form Pruinose'	3	120	WIN39-03	
Acacia sericophylla	0.1	200	WIN39-04	
Acacia stellaticeps	1	40		
Acacia tumida var. *pilbarensis*	0.1	60		
Aristida holathera var. *holathera*	0.1	15	WIN39-06	
Bonamia alatisemina	0.1	1	WIN39-02	
Dicrastylis doranii	6	40	WIN39-01	
Eriachne helmsii	0.1	20	WIN39-07	
Erythrophleum chlorostachys	1	220		
Gompholobium simplicifolium	0.1	50		
Goodenia hartiana	0.5	20		N=61
Goodenia triodiophila	0.1	15		
Grevillea wickhamii subsp. *hispidula*	0.1	40		
Gyrostemon tepperi	0.1	40		
Halgania solanacea var. *solanacea*	0.1	20		
Indigofera boviperda subsp. *eremaea*	0.1	30		
Jacksonia aculeata	0.1	40		
Owenia reticulata	1	500		
Ptilotus arthrolasius	0.1	20		
Sorghum plumosum var. *plumosum*	0.1	60		
Triodia schinzii	12	30		
Yakirra australiensis var. *australiensis*	0.1	20	WIN39-05	

North west

South east

Winu Road Access Corridor **WIN40**

Described by SCRM **Date** 24-Aug-19

Type Quadrat 50 x 50m

Central Coordinate 336059 mE, 7719512 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Corymbia zygophylla* scattered low trees over *Acacia eriopoda* tall shrubland over *Dicrastylis doranii* and *Gompholobium simplicifolium* low open shrubland over *Triodia schinzii* hummock grassland

Veg Condition Excellent.

Fire Age No sign of recent fire.

Species	Cover	Height (cm)	Specimen	Notes
Acacia eriopoda	15	250	WIN40-01	
Acacia melleodora	0.1	200	WIN40-03	
Acacia sericophylla	0.1	280		
Acacia tumida var. *kulparn*	0.1	100		
Aristida holathera var. *holathera*	0.1	20		
Calytrix carinata	0.1	50		
Cassytha capillaris	0.1	30		
Corymbia zygophylla	1	220	WIN40-02	
Dicrastylis doranii	3	50		
Dodonaea coriacea	0.1	120		
Erythrophleum chlorostachys	0.1	90		
Gompholobium simplicifolium	3	60		
Grevillea wickhamii	0.1	250		
Indigofera boviperda subsp. *eremaea*	0.1	40		
Jacksonia aculeata	0.1	60		
Ptilotus arthrolasius	0.1	50		
Triodia schinzii	35	40		

North

South

Winu Road Access Corridor **WINREL03**

Described by SCRM **Date** 24-Aug-19

Type Relevé 50 x 50m

Central Coordinate 333178 mE, 7769248 mN.

Habitat Sand Plain, gentle rise

Soil Sand

Rock Type N/A

Vegetation *Erythrophleum chlorostachys* scattered low trees over *Acacia adsurgens* open shrubland over *Sorghum plumosum* var. *plumosum* scattered tussock grasses over *Triodia epactia* very open hummock grassland

Veg Condition Excellent.

Fire Age Burnt 3-5 years ago. Regrowing.

Species	Cover	Height (cm)	Specimen	Notes
Acacia adsurgens	4	120		
Acacia sericophylla	0.1	250	REL03-02	
Acacia tumida var. *kulparn*	0.1	60		
Aristida sp.	0.1	20	REL03-01	Sterile.
Cleome uncifera subsp. *uncifera*	0.1	20		
Eragrostis eriopoda	0.1	30		
Eriachne lanata	0.1	30	REL03-03	
Erythrophleum chlorostachys	0.5	300		
Ptilotus astrolasius	0.1	30		
Sorghum plumosum var. *plumosum*	0.5	50		
Trianthema pilosum	0.1	10		
Triodia epactia	3	20		
Zornia chaetophora	0.1	20		

Winu Road Access Corridor **WINREL04**

Described by SCRM **Date** 24-Aug-19

Type Relevé 50 x 50m

Central Coordinate 333794 mE, 7764031 mN.

Habitat Stony hill, low rise

Soil Loamy sand

Rock Type Ironstone

Vegetation *Grevillea refracta* scattered shrubs over *Acacia hilliana* and *Calytrix carinata* low open heath over *Triodia schinzii*, (*Triodia epactia*) open hummock grassland

Veg Condition Excellent.

Fire Age Burnt 1-2 years ago.

Species	Cover	Height (cm)	Specimen	Notes
Acacia hilliana	20	30		
Amphipogon sericeus	0.1	20	REL04-04	
Calytrix carinata	15	30		
Eriachne lanata	0.1	20	REL04-01	
Goodenia azurea subsp. *hesperia*	0.1	10		
Grevillea refracta subsp. *refracta*	0.1	180		
Grevillea wickhamii subsp. *hispidula*	0.1	60		
Hybanthus aurantiacus	0.1	30	REL04-02	
Jacksonia aculeata	0.1	30		
Ptilotus astrolasius	0.1	20		
Ptilotus calostachyus	0.1	60		
Sida arenicola	0.1	50		
Trigastrotheca molluginea	0.1	10		
Triodia epactia	1	20		
Triodia schinzii	8	20		
Yakirra australiensis var. *australiensis*	0.1	5	REL04-03	

Winu Road Access Corridor **WINREL05**

Described by SCRM **Date** 26-Aug-19
Type Quadrat 50 x 50m
Central Coordinate 333327 mE, 7764957 mN.
Habitat Stony hill, low rise
Soil Loamy sand
Rock Type Ironstone
Vegetation *Triodia schinzii* open hummock grassland
Veg Condition Excellent.
Fire Age Burnt 1-2 years ago.

Species	Cover	Height (cm)	Specimen	Notes
Acacia hilliana	0.1	50		
Bulbostylis barbata	0.1	20		
Calytrix carinata	0.1	40		
Eriachne lanata	0.1	30		
Eriachne obtusa	0.1	30	REL05-01	Sens. lat.
Grevillea refracta subsp. *refracta*	0.1	120		0
Grevillea wickhamii	0.1	70		0
Ptilotus calostachyus	0.1	60		0
Trianthema pilosum	0.1	20		0
Trigastrotheca molluginea	0.1	30		0
Triodia schinzii	8	20		0

Winu Road Access Corridor **WINREL06**

Described by SCRM **Date** 26-Aug-19

Type Relevé 50 x 50m

Central Coordinate 335171 mE, 7762860 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Gardenia pyriformis* subsp. *keartlandii* and *Owenia reticulata* scattered low trees over *Acacia adsurgens* open shrubland over *Goodenia hartiana* scattered herbs over *Triodia schinzii* very open hummock grassland

Veg Condition Excellent.

Fire Age Burnt 1-2 years ago.

Species	Cover	Height (cm)	Specimen	Notes
Acacia adsurgens	5	120		
Acacia monticola	0.1	5		
Amphipogon sericeus	0.1	20		
Androcalva loxophylla	0.1	20		
Aristida holathera var. *holathera*	0.1	20	REL06-01	
Bonamia alatisemina	0.1	10		
Cleome uncifera subsp. *uncifera*	0.1	20		
Corchorus incanus	0.1	10		
Eriachne obtusa	0.1	20		
Gardenia pyriformis subsp. *keartlandii*	0.5	300		
Gompholobium simplicifolium	0.1	20		
Goodenia hartiana	2	20		N=200
Owenia reticulata	0.1	500		
Ptilotus astrolasius	0.1	20		
Trigastrotheca molluginea	0.1	5		
Triodia schinzii	3	20		
Yakirra australiensis var. *australiensis*	0.1	10		

Winu Road Access Corridor **WINREL07**

Described by SCRM **Date** 24-Aug-19

Type Relevé 50 x 50m

Central Coordinate 336143 mE, 7760613 mN.

Habitat Sand Plain

Soil Sand

Rock Type N/A

Vegetation *Acacia eriopoda* tall open shrubland over *Dicrastylis doranii, Jacksonia aculeata,* (*Gompholobium simplicifolium*) low open herbland over *Triodia epactia, T. schinzii* open hummock grassland.

Veg Condition Excellent.

Fire Age No sign of recent fire.

Species	Cover	Height (cm)	Specimen
Acacia eriopoda	4	280	
Acacia eriopoda x *monticola* (B.R. Maslin 7322)	0.1	250	REL07-01
Acacia sericophylla	0.1	300	
Acacia tumida var. *kulparn*	0.1	200	
Calytrix carinata	0.1	50	
Dicrastylis doranii	4	30	
Dodonaea hispidula var. *arida*	0.1	150	
Gompholobium simplicifolium	1	60	
Grevillea eriostachya	0.1	150	
Grevillea wickhamii subsp. *hispidula*	0.1	250	
Jacksonia aculeata	3	50	
Ptilotus astrolasius	0.1	30	
Triodia epactia	10	40	
Triodia schinzii	5	40	

Appendix 4

Records of Conservation Significant Flora

Table 1: Records of conservation significant flora within the Winu Project Area and Winu Road Access Corridor.

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Priority 2							
Goodeniaceae	*Goodenia hartiana*	Biota	WPA	OPP-RS	355461	7711095	100
		Biota	WPA	OPP-RS	355563	7711182	200
		Biota	WPA	OPP-RS	355621	7711237	50
		Biota	WPA	OPP-RS	355712	7711269	20
		Biota	WPA	OPP-RS	355776	7711293	30
		Biota	WPA	WIN41	356118	7710673	2
		Biota	WPA	OPP-RS	356216	7710648	30
		Biota	WPA	OPP-RS	356284	7711641	100
		Biota	WPA	OPP-RS	356435	7710591	5
		Biota	WPA	OPP-RS	356464	7711542	50
		Biota	WPA	OPP-RS	356511	7710576	50
		Biota	WPA	OPP-RS	356551	7711432	50
		Biota	WPA	OPP-RS	356606	7710559	1000
		Biota	WPA	OPP-RS	356712	7710517	150
		Biota	WPA	OPP-RS	356731	7711313	1000
		Biota	WPA	OPP-RS	356769	7711187	1000
		Biota	WPA	OPP-RS	356793	7710492	1000
		Biota	WPA	OPP-RS	356867	7710470	1000
		Biota	WPA	OPP-RS	356896	7711244	1000
		Biota	WPA	OPP-RS	356904	7710460	20
		Biota	WPA	OPP-RS	357002	7710442	100
		Biota	WPA	OPP-RS	357070	7711569	200
		Biota	WPA	OPP-RS	357079	7711208	1000
		Biota	WPA	OPP-RS	357104	7710425	1000
		Biota	WPA	OPP-RS	357291	7710491	50
		Biota	WPA	OPP-RS	357329	7711008	2
		Biota	WPA	OPP-RS	357391	7710835	500
		Biota	WPA	OPP-SC	358067	7710626	2000
		Biota	WPA	OPP-RS	358213	7710570	2000
		Biota	WPA	OPP-RS	358348	7710984	15
		Biota	WPA	OPP-RS	359900	7711001	2000
		Biota	WPA	OPP-RS	360000	7710666	1000
		Biota	WPA	OPP-RS	360243	7710725	2000
		Biota	WPA	OPP-RS	360436	7710818	1000
		Biota	WPA	OPP-RS	360437	7710558	5000
		Biota	WPA	OPP-RS	361013	7710505	6
		Biota	WPA	WIN04R	361075	7709803	8
		Biota	WPA	OPP-RS	361098	7709909	15
		Biota	WPA	OPP-RS	361116	7710503	1000
		Biota	WPA	OPP-RS	361144	7710653	5
		Biota	WPA	OPP-RS	361335	7710405	1000
		Biota	WPA	OPP-RS	361385	7710460	2000
		Biota	WPA	OPP-RS	361486	7710575	200
		Biota	WPA	OPP-RS	361551	7710443	1000
		Biota	WPA	OPP-RS	361681	7710498	3
		Biota	WPA	OPP-RS	361875	7710369	200
		Biota	WPA	OPP-RS	361923	7710972	1000
		Biota	WPA	OPP-RS	362105	7710272	50
		Biota	WPA	OPP-RS	363935	7709660	35
		Biota	WPA	OPP-RS	364464	7708862	5
		Biota	WPA	WIN08R	364505	7709530	30
		Biota	WPA	WIN09R	364508	7708767	16

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WPA	OPP-RS	364522	7709434	17
		Biota	WPA	OPP-RS	364551	7709517	25
		Biota	WPA	OPP-RS	364603	7709610	11
		Biota	WPA	OPP-RS	364855	7709992	120
		Biota	WPA	OPP-RS	366444	7708431	20
		Biota	WPA	OPP-RS	366565	7708484	35
		Biota	WPA	OPP-RS	366723	7708594	150
		Biota	WPA	OPP-RS	366945	7708249	50
		Biota	WPA	OPP-RS	366961	7708175	250
		Biota	WPA	OPP-RS	367956	7704982	20
		Biota	WPA	OPP-RS	367979	7705251	20
		Biota	WPA	OPP-RS	368030	7705414	1
		Biota	WPA	OPP-RS	368111	7705843	5
		Biota	WPA	OPP-RS	368144	7708349	5000
		Biota	WPA	WINREL01R	368228	7706541	11
		Biota	WPA	OPP-RS	368271	7708283	5000
		Biota	WPA	OPP-RS	368280	7704819	15
		Biota	WPA	OPP-RS	368374	7706655	150
		Biota	WPA	OPP-RS	368460	7706716	200
		Biota	WPA	OPP-RS	368529	7705172	3
		Biota	WPA	OPP-RS	368538	7705242	3
		Biota	WPA	OPP-RS	368584	7706838	300
		Biota	WPA	OPP-RS	368621	7705676	2
		Biota	WPA	OPP-RS	368628	7707060	2000
		Biota	WPA	OPP-RS	368670	7706941	500
		Biota	WPA	OPP-RS	368706	7705848	25
		Biota	WPA	OPP-RS	368711	7707015	2000
		Biota	WPA	OPP-RS	368737	7705966	1
		Biota	WPA	OPP-RS	368851	7706473	60
		Biota	WPA	OPP-RS	369036	7706885	25
		Biota	WPA	OPP-RS	369548	7709652	200
		Biota	WPA	WIN30R	369569	7709713	50
		Biota	WPA	OPP-RS	369708	7709659	1000
		Biota	WPA	OPP-RS	369790	7709618	2000
		Biota	WPA	WIN29R	369886	7708864	27
		Biota	WPA	OPP-RS	369908	7709561	3000
		Biota	WPA	OPP-RS	370831	7704115	100
		Biota	WPA	OPP-RS	370832	7708405	2000
		Biota	WPA	OPP-RS	371663	7708085	2000
		Biota	WPA	OPP-RS	371979	7707962	1000
		Biota	WPA	OPP-RS	372162	7703994	100
		Biota	WPA	OPP-RS	372220	7707861	1500
		Biota	WPA	OPP-RS	372533	7703876	1000
		Biota	WPA	OPP-RS	372723	7707675	2000
		Biota	WPA	OPP-RS	372741	7704840	1000
		Biota	WPA	OPP-RS	372836	7703763	50
		Biota	WPA	OPP-RS	372999	7707562	5000
		Biota	WPA	OPP-RS	373367	7707419	2000
		Biota	WPA	OPP-RS	373483	7707375	2000
		Biota	WPA	OPP-RS	374716	7706816	2000
		Biota	WPA	OPP-RS	374882	7706732	500
		Biota	WPA	OPP-RS	375260	7706565	5000
		Biota	WPA	OPP-RS	375992	7706253	200
		Biota	WPA	OPP-RS	376126	7706194	150
		Biota	WPA	OPP-RS	376742	7704485	35

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WPA	OPP-RS	376788	7704543	3
		Biota	WPA	WIN28R	376919	7704582	4
		Biota	WPA	OPP-RS	377020	7703001	25
		Biota	WPA	OPP-RS	377036	7703227	15
		Biota	WPA	OPP-RS	377126	7704312	7
		Biota	WPA	OPP-RS	377333	7704414	1
		Biota	WPA	OPP-RS	379596	7703058	100
		Biota	WPA	OPP-RS	379651	7703040	30
		Astron	WPA	Historical	368442	7707575	200
		Astron	WPA	Historical	368442	7707500	15
		Astron	WPA	Historical	368454	7707644	45
		Astron	WPA	Historical	368456	7707550	50
		Astron	WPA	Historical	368484	7707472	15
		Astron	WPA	Historical	368490	7709488	10
		Astron	WPA	Historical	368497	7707501	60
		Astron	WPA	Historical	368521	7709613	8
		Astron	WPA	Historical	368525	7707496	120
		Astron	WPA	Historical	368526	7709444	20
		Astron	WPA	Historical	368527	7707617	5
		Astron	WPA	Historical	368541	7709318	35
		Astron	WPA	Historical	368545	7709416	35
		Astron	WPA	Historical	368545	7707590	4
		Astron	WPA	Historical	368557	7707988	25
		Astron	WPA	Historical	368570	7707439	28
		Astron	WPA	Historical	368580	7707477	35
		Astron	WPA	Historical	368583	7709626	6
		Astron	WPA	Historical	368602	7707435	38
		Astron	WPA	Historical	368607	7709552	2
		Astron	WPA	Historical	368631	7707436	38
		Astron	WPA	Historical	368638	7709296	50
		Astron	WPA	Historical	368652	7707725	60
		Astron	WPA	Historical	368665	7709532	25
		Astron	WPA	Historical	368666	7707494	7
		Astron	WPA	Historical	368689	7709273	80
		Astron	WPA	Historical	368695	7707395	10
		Astron	WPA	Historical	368724	7707709	12
		Astron	WPA	Historical	368735	7707813	36
		Astron	WPA	Historical	368737	7709244	80
		Astron	WPA	Historical	368745	7709476	12
		Astron	WPA	Historical	368811	7709469	12
		Astron	WPA	Historical	368817	7707526	18
		Astron	WPA	Historical	368818	7709214	20
		Astron	WPA	Historical	368827	7707321	28
		Astron	WPA	Historical	368862	7707561	108
		Astron	WPA	Historical	368872	7709159	20
		Astron	WPA	Historical	368898	7709496	22
		Astron	WPA	Historical	368998	7709086	20
		Astron	WPA	Historical	369022	7709386	10
		Astron	WPA	Historical	369054	7709087	20
		Astron	WPA	Historical	369070	7709405	30
		Astron	WPA	Historical	369091	7709361	40
		Astron	WPA	Historical	369116	7709297	20
		Astron	WPA	Historical	369122	7709231	10
		Astron	WPA	Historical	369130	7709116	20
		Astron	WPA	Historical	369166	7709241	7

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Astron	WPA	Historical	369183	7709112	51
		Astron	WPA	Historical	369185	7708990	70
		Astron	WPA	Historical	369192	7709061	7
		Astron	WPA	Historical	369205	7709167	5
		Astron	WPA	Historical	369216	7708980	40
		Astron	WPA	Historical	369216	7709015	27
		Astron	WPA	Historical	369229	7709067	100
		Astron	WPA	Historical	369243	7707124	22
		Astron	WPA	Historical	369270	7709047	130
		Astron	WPA	Historical	369274	7707367	57
		Astron	WPA	Historical	369278	7709003	50
		Astron	WPA	Historical	369288	7709237	80
		Astron	WPA	Historical	369293	7708962	4
		Astron	WPA	Historical	369300	7708924	65
		Astron	WPA	Historical	369344	7708775	10
		Astron	WPA	Historical	369367	7709289	110
		Astron	WPA	Historical	369368	7708924	125
		Astron	WPA	Historical	369390	7708852	35
		Astron	WPA	Historical	369403	7708954	23
		Astron	WPA	Historical	369403	7709236	8
		Astron	WPA	Historical	369433	7709178	30
		Astron	WPA	Historical	369442	7708861	110
		Astron	WPA	Historical	369445	7709112	35
		Astron	WPA	Historical	369466	7709057	50
		Astron	WPA	Historical	369478	7709003	200
		Astron	WPA	Historical	369478	7707109	27
		Astron	WPA	Historical	369494	7708756	15
		Astron	WPA	Historical	369504	7708970	130
		Astron	WPA	Historical	369517	7708938	60
		Astron	WPA	Historical	369539	7708974	35
		Astron	WPA	Historical	369540	7709007	33
		Astron	WPA	Historical	369548	7709097	65
		Astron	WPA	Historical	369563	7708842	34
		Astron	WPA	Historical	369595	7708865	25
		Astron	WPA	Historical	369600	7708797	120
		Astron	WPA	Historical	369600	7709195	15
		Astron	WPA	Historical	369609	7708835	70
		Astron	WPA	Historical	369612	7707847	4
		Astron	WPA	Historical	369647	7709170	15
		Astron	WPA	Historical	369677	7708074	30
		Astron	WPA	Historical	369682	7709053	40
		Astron	WPA	Historical	369694	7709003	10
		Astron	WPA	Historical	369696	7707895	2
		Astron	WPA	Historical	369702	7708691	5
		Astron	WPA	Historical	369719	7708970	8
		Astron	WPA	Historical	369728	7708055	45
		Astron	WPA	Historical	369739	7708001	66
		Astron	WPA	Historical	369755	7708037	55
		Astron	WPA	Historical	369760	7708830	7
		Astron	WPA	Historical	369764	7707914	90
		Astron	WPA	Historical	369774	7708887	7
		Astron	WPA	Historical	369788	7708063	25
		Astron	WPA	Historical	369791	7707878	130
		Astron	WPA	Historical	369793	7708021	20
		Astron	WPA	Historical	369793	7708782	5

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Astron	WPA	Historical	369807	7708895	3
		Astron	WPA	Historical	369812	7709076	4
		Astron	WPA	Historical	369814	7707954	60
		Astron	WPA	Historical	369816	7707900	100
		Astron	WPA	Historical	369838	7707972	400
		Astron	WPA	Historical	369846	7708025	40
		Astron	WPA	Historical	376275	7704821	10
		Astron	WPA	Historical	377844	7703906	4
		Biota	WRAC	OPP-C-SC	259036	7803781	200
		Biota	WRAC	OPP-C-SC	259036	7803781	200
		Biota	WRAC	OPP-C-SC	259036	7803802	75
		Biota	WRAC	OPP-C-SC	259036	7803802	75
		Biota	WRAC	WIN33	259064	7803864	27
		Biota	WRAC	WIN33	259064	7803864	27
		Biota	WRAC	OPP-C-SC	332890	7770790	150
		Biota	WRAC	OPP-C-SC	332890	7770790	150
		Biota	WRAC	OPP-C-SC	332897	7770842	180
		Biota	WRAC	OPP-C-SC	332897	7770842	180
		Biota	WRAC	OPP-C-SC	332901	7770758	50
		Biota	WRAC	OPP-C-SC	332901	7770758	50
		Biota	WRAC	OPP-C-SC	332919	7770623	55
		Biota	WRAC	OPP-C-SC	332919	7770623	55
		Biota	WRAC	OPP-C-SC	332919	7770681	5
		Biota	WRAC	OPP-C-SC	332919	7770681	5
		Biota	WRAC	WIN34	332935	7770593	65
		Biota	WRAC	WIN34	332935	7770593	65
		Biota	WRAC	OPP-C-SC	332946	7770535	50
		Biota	WRAC	OPP-C-SC	332946	7770535	50
		Biota	WRAC	OPP-C-SC	332954	7770709	120
		Biota	WRAC	OPP-C-SC	332954	7770709	120
		Biota	WRAC	OPP-C-SC	332981	7770680	185
		Biota	WRAC	OPP-C-SC	332981	7770680	185
		Biota	WRAC	OPP-C-SC	333013	7770158	155
		Biota	WRAC	OPP-C-SC	333013	7770158	155
		Biota	WRAC	OPP-C-SC	333030	7770141	25
		Biota	WRAC	OPP-C-SC	333030	7770141	25
		Biota	WRAC	OPP-C-SC	333032	7770693	1
		Biota	WRAC	OPP-C-SC	333032	7770693	1
		Biota	WRAC	OPP-C-SC	333035	7770612	60
		Biota	WRAC	OPP-C-SC	333035	7770612	60
		Biota	WRAC	OPP-C-SC	333044	7770198	27
		Biota	WRAC	OPP-C-SC	333044	7770198	27
		Biota	WRAC	OPP-C-SC	333046	7770561	85
		Biota	WRAC	OPP-C-SC	333046	7770561	85
		Biota	WRAC	OPP-C-SC	333052	7766114	500
		Biota	WRAC	OPP-C-SC	333052	7766114	500
		Biota	WRAC	OPP-C-SC	333057	7766418	53
		Biota	WRAC	OPP-C-SC	333057	7766418	53
		Biota	WRAC	OPP-C-SC	333067	7770613	120
		Biota	WRAC	OPP-C-SC	333067	7770613	120
		Biota	WRAC	OPP-C-SC	333068	7770396	75
		Biota	WRAC	OPP-C-SC	333068	7770396	75
		Biota	WRAC	OPP-C-SC	333078	7766216	300
		Biota	WRAC	OPP-C-SC	333078	7766216	300
		Biota	WRAC	OPP-C-SC	333083	7765934	150

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	333083	7765934	150
		Biota	WRAC	OPP-C-SC	333095	7766572	35
		Biota	WRAC	OPP-C-SC	333095	7766572	35
		Biota	WRAC	OPP-C-SC	333097	7766154	1000
		Biota	WRAC	OPP-C-SC	333097	7766154	1000
		Biota	WRAC	OPP-C-SC	333099	7766035	500
		Biota	WRAC	OPP-C-SC	333099	7766035	500
		Biota	WRAC	OPP-C-SC	333101	7765618	12
		Biota	WRAC	OPP-C-SC	333101	7765618	12
		Biota	WRAC	OPP-C-SC	333105	7765439	500
		Biota	WRAC	OPP-C-SC	333105	7765439	500
		Biota	WRAC	OPP-C-SC	333106	7765562	250
		Biota	WRAC	OPP-C-SC	333106	7765562	250
		Biota	WRAC	OPP-C-SC	333109	7765982	1000
		Biota	WRAC	OPP-C-SC	333109	7765982	1000
		Biota	WRAC	OPP-C-SC	333127	7765760	200
		Biota	WRAC	OPP-C-SC	333127	7765760	200
		Biota	WRAC	OPP-C-SC	333129	7765695	50
		Biota	WRAC	OPP-C-SC	333129	7765695	50
		Biota	WRAC	OPP-C-SC	333130	7767632	35
		Biota	WRAC	OPP-C-SC	333130	7767632	35
		Biota	WRAC	OPP-C-SC	333140	7765577	100
		Biota	WRAC	OPP-C-SC	333140	7765577	100
		Biota	WRAC	OPP-C-SC	333146	7766245	200
		Biota	WRAC	OPP-C-SC	333146	7766245	200
		Biota	WRAC	OPP-C-SC	333146	7767281	6
		Biota	WRAC	OPP-C-SC	333146	7767281	6
		Biota	WRAC	OPP-C-SC	333149	7765504	500
		Biota	WRAC	OPP-C-SC	333149	7765504	500
		Biota	WRAC	OPP-C-SC	333162	7765406	1000
		Biota	WRAC	OPP-C-SC	333162	7765406	1000
		Biota	WRAC	OPP-C-SC	333165	7766136	150
		Biota	WRAC	OPP-C-SC	333165	7766136	150
		Biota	WRAC	OPP-C-SC	333170	7766572	250
		Biota	WRAC	OPP-C-SC	333170	7766572	250
		Biota	WRAC	OPP-C-SC	333173	7765948	150
		Biota	WRAC	OPP-C-SC	333173	7765948	150
		Biota	WRAC	OPP-C-SC	333178	7765906	100
		Biota	WRAC	OPP-C-SC	333178	7765906	100
		Biota	WRAC	OPP-C-SC	333178	7766466	32
		Biota	WRAC	OPP-C-SC	333178	7766466	32
		Biota	WRAC	OPP-C-SC	333180	7766417	80
		Biota	WRAC	OPP-C-SC	333180	7766417	80
		Biota	WRAC	OPP-C-SC	333182	7765776	300
		Biota	WRAC	OPP-C-SC	333182	7765776	300
		Biota	WRAC	OPP-C-SC	333184	7766398	55
		Biota	WRAC	OPP-C-SC	333184	7766398	55
		Biota	WRAC	OPP-C-SC	333186	7765887	35
		Biota	WRAC	OPP-C-SC	333186	7765887	35
		Biota	WRAC	OPP-C-SC	333199	7765687	85
		Biota	WRAC	OPP-C-SC	333199	7765687	85
		Biota	WRAC	OPP-C-SC	333205	7765593	120
		Biota	WRAC	OPP-C-SC	333205	7765593	120
		Biota	WRAC	OPP-C-SC	333207	7765519	200
		Biota	WRAC	OPP-C-SC	333207	7765519	200

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	333207	7766094	67
		Biota	WRAC	OPP-C-SC	333207	7766094	67
		Biota	WRAC	OPP-C-SC	333211	7766222	80
		Biota	WRAC	OPP-C-SC	333211	7766222	80
		Biota	WRAC	OPP-C-SC	333213	7766182	59
		Biota	WRAC	OPP-C-SC	333213	7766182	59
		Biota	WRAC	OPP-C-SC	333215	7766564	42
		Biota	WRAC	OPP-C-SC	333215	7766564	42
		Biota	WRAC	OPP-C-SC	333221	7765950	250
		Biota	WRAC	OPP-C-SC	333221	7765950	250
		Biota	WRAC	OPP-C-SC	333222	7765458	80
		Biota	WRAC	OPP-C-SC	333222	7765458	80
		Biota	WRAC	OPP-C-SC	333229	7765744	78
		Biota	WRAC	OPP-C-SC	333229	7765744	78
		Biota	WRAC	OPP-C-SC	333233	7765401	220
		Biota	WRAC	OPP-C-SC	333233	7765401	220
		Biota	WRAC	OPP-C-SC	333233	7765805	150
		Biota	WRAC	OPP-C-SC	333233	7765805	150
		Biota	WRAC	OPP-C-SC	333242	7765662	500
		Biota	WRAC	OPP-C-SC	333242	7765662	500
		Biota	WRAC	OPP-C-SC	333242	7765343	40
		Biota	WRAC	OPP-C-SC	333242	7765343	40
		Biota	WRAC	OPP-C-SC	333246	7765281	180
		Biota	WRAC	OPP-C-SC	333246	7765281	180
		Biota	WRAC	OPP-C-SC	333249	7765577	250
		Biota	WRAC	OPP-C-SC	333249	7765577	250
		Biota	WRAC	OPP-C-SC	333258	7764783	81
		Biota	WRAC	OPP-C-SC	333258	7764783	81
		Biota	WRAC	OPP-C-SC	333262	7765436	115
		Biota	WRAC	OPP-C-SC	333262	7765436	115
		Biota	WRAC	OPP-C-SC	333281	7765386	175
		Biota	WRAC	OPP-C-SC	333281	7765386	175
		Biota	WRAC	OPP-C-SC	333299	7765273	55
		Biota	WRAC	OPP-C-SC	333299	7765273	55
		Biota	WRAC	OPP-C-SC	333304	7765226	38
		Biota	WRAC	OPP-C-SC	333304	7765226	38
		Biota	WRAC	OPP-C-SC	333343	7764708	200
		Biota	WRAC	OPP-C-SC	333343	7764708	200
		Biota	WRAC	OPP-C-SC	333356	7764611	300
		Biota	WRAC	OPP-C-SC	333356	7764611	300
		Biota	WRAC	OPP-C-SC	333429	7764507	500
		Biota	WRAC	OPP-C-SC	333429	7764507	500
		Biota	WRAC	OPP-C-SC	333432	7764723	34
		Biota	WRAC	OPP-C-SC	333432	7764723	34
		Biota	WRAC	OPP-C-SC	333433	7764658	29
		Biota	WRAC	OPP-C-SC	333433	7764658	29
		Biota	WRAC	OPP-C-SC	333470	7764655	3
		Biota	WRAC	OPP-C-SC	333470	7764655	3
		Biota	WRAC	OPP-C-SC	333516	7764635	85
		Biota	WRAC	OPP-C-SC	333516	7764635	85
		Biota	WRAC	OPP-C-SC	333546	7764490	71
		Biota	WRAC	OPP-C-SC	333546	7764490	71
		Biota	WRAC	OPP-C-SC	333563	7764427	27
		Biota	WRAC	OPP-C-SC	333563	7764427	27
		Biota	WRAC	OPP-C-SC	333573	7764359	2

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	333573	7764359	2
		Biota	WRAC	OPP-C-SC	333652	7764304	15
		Biota	WRAC	OPP-C-SC	333652	7764304	15
		Biota	WRAC	OPP-RS	333701	7763666	15
		Biota	WRAC	OPP-RS	333701	7763666	15
		Biota	WRAC	OPP-RS	333792	7763813	15
		Biota	WRAC	OPP-RS	333792	7763813	15
		Biota	WRAC	OPP-C-SC	333823	7763961	2
		Biota	WRAC	OPP-C-SC	333823	7763961	2
		Biota	WRAC	OPP-RS	333833	7763778	45
		Biota	WRAC	OPP-RS	333833	7763778	45
		Biota	WRAC	OPP-C-SC	333856	7763988	5
		Biota	WRAC	OPP-C-SC	333856	7763988	5
		Biota	WRAC	OPP-C-SC	333872	7763912	25
		Biota	WRAC	OPP-C-SC	333872	7763912	25
		Biota	WRAC	OPP-RS	333879	7763518	120
		Biota	WRAC	OPP-RS	333879	7763518	120
		Biota	WRAC	OPP-RS	333914	7763429	1000
		Biota	WRAC	OPP-RS	333914	7763429	1000
		Biota	WRAC	OPP-RS	333915	7763728	25
		Biota	WRAC	OPP-RS	333915	7763728	25
		Biota	WRAC	OPP-C-SC	333957	7763889	50
		Biota	WRAC	OPP-C-SC	333957	7763889	50
		Biota	WRAC	OPP-RS	333982	7763352	800
		Biota	WRAC	OPP-RS	333982	7763352	800
		Biota	WRAC	OPP-C-SC	333988	7763813	150
		Biota	WRAC	OPP-C-SC	333988	7763813	150
		Biota	WRAC	OPP-C-SC	334000	7763941	20
		Biota	WRAC	OPP-C-SC	334000	7763941	20
		Biota	WRAC	OPP-RS	334023	7763667	180
		Biota	WRAC	OPP-RS	334023	7763667	180
		Biota	WRAC	OPP-C-SC	334032	7763842	100
		Biota	WRAC	OPP-C-SC	334032	7763842	100
		Biota	WRAC	OPP-C-SC	334074	7763863	55
		Biota	WRAC	OPP-C-SC	334074	7763863	55
		Biota	WRAC	OPP-C-SC	334083	7763732	500
		Biota	WRAC	OPP-C-SC	334083	7763732	500
		Biota	WRAC	OPP-RS	334086	7763590	500
		Biota	WRAC	OPP-RS	334086	7763590	500
		Biota	WRAC	OPP-C-SC	334088	7763794	300
		Biota	WRAC	OPP-C-SC	334088	7763794	300
		Biota	WRAC	OPP-C-SC	334103	7763921	83
		Biota	WRAC	OPP-C-SC	334103	7763921	83
		Biota	WRAC	OPP-RS	334130	7763298	20
		Biota	WRAC	OPP-RS	334130	7763298	20
		Biota	WRAC	OPP-C-SC	334134	7763871	47
		Biota	WRAC	OPP-C-SC	334134	7763871	47
		Biota	WRAC	OPP-C-SC	334139	7763737	300
		Biota	WRAC	OPP-C-SC	334139	7763737	300
		Biota	WRAC	OPP-RS	334155	7763278	38
		Biota	WRAC	OPP-RS	334155	7763278	38
		Biota	WRAC	OPP-C-SC	334165	7763668	500
		Biota	WRAC	OPP-C-SC	334165	7763668	500
		Biota	WRAC	OPP-RS	334170	7763502	2000
		Biota	WRAC	OPP-RS	334170	7763502	2000

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	334173	7763800	600
		Biota	WRAC	OPP-C-SC	334173	7763800	600
		Biota	WRAC	OPP-C-SC	334190	7763701	500
		Biota	WRAC	OPP-C-SC	334190	7763701	500
		Biota	WRAC	OPP-C-SC	334191	7763856	57
		Biota	WRAC	OPP-C-SC	334191	7763856	57
		Biota	WRAC	OPP-RS	334216	7763230	150
		Biota	WRAC	OPP-RS	334216	7763230	150
		Biota	WRAC	OPP-C-SC	334232	7763757	350
		Biota	WRAC	OPP-C-SC	334232	7763757	350
		Biota	WRAC	OPP-C-SC	334233	7763672	1000
		Biota	WRAC	OPP-C-SC	334233	7763672	1000
		Biota	WRAC	OPP-RS	334237	7763461	500
		Biota	WRAC	OPP-RS	334237	7763461	500
		Biota	WRAC	OPP-C-SC	334252	7763794	400
		Biota	WRAC	OPP-C-SC	334252	7763794	400
		Biota	WRAC	OPP-RS	334271	7763174	600
		Biota	WRAC	OPP-RS	334271	7763174	600
		Biota	WRAC	OPP-C-SC	334277	7763751	18
		Biota	WRAC	OPP-C-SC	334277	7763751	18
		Biota	WRAC	OPP-C-SC	334286	7763700	1000
		Biota	WRAC	OPP-C-SC	334286	7763700	1000
		Biota	WRAC	OPP-C-SC	334292	7763635	1000
		Biota	WRAC	OPP-C-SC	334292	7763635	1000
		Biota	WRAC	OPP-C-SC	334319	7763559	500
		Biota	WRAC	OPP-C-SC	334319	7763559	500
		Biota	WRAC	OPP-RS	334325	7763126	200
		Biota	WRAC	OPP-RS	334325	7763126	200
		Biota	WRAC	OPP-RS	334335	7763377	25
		Biota	WRAC	OPP-RS	334335	7763377	25
		Biota	WRAC	OPP-C-SC	334344	7763667	1000
		Biota	WRAC	OPP-C-SC	334344	7763667	1000
		Biota	WRAC	OPP-RS	334361	7763092	2000
		Biota	WRAC	OPP-RS	334361	7763092	2000
		Biota	WRAC	OPP-C-SC	334369	7763581	300
		Biota	WRAC	OPP-C-SC	334369	7763581	300
		Biota	WRAC	OPP-C-SC	334372	7763706	500
		Biota	WRAC	OPP-C-SC	334372	7763706	500
		Biota	WRAC	OPP-C-SC	334398	7763541	2000
		Biota	WRAC	OPP-C-SC	334398	7763541	2000
		Biota	WRAC	OPP-C-SC	334406	7763690	55
		Biota	WRAC	OPP-C-SC	334406	7763690	55
		Biota	WRAC	OPP-RS	334413	7763344	100
		Biota	WRAC	OPP-RS	334413	7763344	100
		Biota	WRAC	OPP-RS	334418	7763028	1000
		Biota	WRAC	OPP-RS	334418	7763028	1000
		Biota	WRAC	OPP-C-SC	334423	7763603	13
		Biota	WRAC	OPP-C-SC	334423	7763603	13
		Biota	WRAC	OPP-C-SC	334430	7763634	130
		Biota	WRAC	OPP-C-SC	334430	7763634	130
		Biota	WRAC	OPP-C-SC	334444	7763460	100
		Biota	WRAC	OPP-C-SC	334444	7763460	100
		Biota	WRAC	OPP-RS	334459	7763239	5000
		Biota	WRAC	OPP-RS	334459	7763239	5000
		Biota	WRAC	OPP-RS	334476	7763951	50

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-RS	334476	7763951	50
		Biota	WRAC	OPP-C-SC	334484	7763553	160
		Biota	WRAC	OPP-C-SC	334484	7763553	160
		Biota	WRAC	OPP-C-SC	334508	7763534	100
		Biota	WRAC	OPP-C-SC	334508	7763534	100
		Biota	WRAC	OPP-RS	334519	7763864	500
		Biota	WRAC	OPP-RS	334519	7763864	500
		Biota	WRAC	OPP-RS	334534	7764241	11
		Biota	WRAC	OPP-RS	334534	7764241	11
		Biota	WRAC	OPP-C-SC	334538	7763504	65
		Biota	WRAC	OPP-C-SC	334538	7763504	65
		Biota	WRAC	OPP-C-SC	334552	7763556	95
		Biota	WRAC	OPP-C-SC	334552	7763556	95
		Biota	WRAC	OPP-RS	334554	7763805	500
		Biota	WRAC	OPP-RS	334554	7763805	500
		Biota	WRAC	OPP-RS	334572	7763716	1000
		Biota	WRAC	OPP-RS	334572	7763716	1000
		Biota	WRAC	OPP-C-SC	334572	7763462	110
		Biota	WRAC	OPP-C-SC	334572	7763462	110
		Biota	WRAC	OPP-RS	334585	7764096	40
		Biota	WRAC	OPP-RS	334585	7764096	40
		Biota	WRAC	OPP-RS	334597	7762898	30
		Biota	WRAC	OPP-RS	334597	7762898	30
		Biota	WRAC	OPP-RS	334605	7763144	5000
		Biota	WRAC	OPP-RS	334605	7763144	5000
		Biota	WRAC	OPP-C-SC	334622	7763296	500
		Biota	WRAC	OPP-C-SC	334622	7763296	500
		Biota	WRAC	OPP-C-SC	334647	7763430	35
		Biota	WRAC	OPP-C-SC	334647	7763430	35
		Biota	WRAC	OPP-RS	334649	7764014	85
		Biota	WRAC	OPP-RS	334649	7764014	85
		Biota	WRAC	OPP-RS	334651	7763661	1000
		Biota	WRAC	OPP-RS	334651	7763661	1000
		Biota	WRAC	OPP-C-SC	334654	7763326	1000
		Biota	WRAC	OPP-C-SC	334654	7763326	1000
		Biota	WRAC	OPP-RS	334681	7763108	2000
		Biota	WRAC	OPP-RS	334681	7763108	2000
		Biota	WRAC	OPP-C-SC	334699	7763246	150
		Biota	WRAC	OPP-C-SC	334699	7763246	150
		Biota	WRAC	OPP-C-SC	334703	7763294	60
		Biota	WRAC	OPP-C-SC	334703	7763294	60
		Biota	WRAC	OPP-C-SC	334727	7763328	500
		Biota	WRAC	OPP-C-SC	334727	7763328	500
		Biota	WRAC	OPP-RS	334730	7763046	250
		Biota	WRAC	OPP-RS	334730	7763046	250
		Biota	WRAC	OPP-RS	334761	7762767	25
		Biota	WRAC	OPP-RS	334761	7762767	25
		Biota	WRAC	OPP-C-SC	334773	7763250	1000
		Biota	WRAC	OPP-C-SC	334773	7763250	1000
		Biota	WRAC	OPP-RS	334773	7763972	500
		Biota	WRAC	OPP-RS	334773	7763972	500
		Biota	WRAC	OPP-RS	334776	7763623	1000
		Biota	WRAC	OPP-RS	334776	7763623	1000
		Biota	WRAC	OPP-C-SC	334776	7763377	245
		Biota	WRAC	OPP-C-SC	334776	7763377	245

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae	*Goodenia hartiana*	Biota	WRAC	OPP-C-SC	334780	7763303	1
(cont.)	(cont.)	Biota	WRAC	OPP-C-SC	334780	7763303	1
		Biota	WRAC	OPP-C-SC	334793	7763161	1000
		Biota	WRAC	OPP-C-SC	334793	7763161	1000
		Biota	WRAC	OPP-RS	334822	7762938	5000
		Biota	WRAC	OPP-RS	334822	7762938	5000
		Biota	WRAC	OPP-C-SC	334824	7763193	1000
		Biota	WRAC	OPP-C-SC	334824	7763193	1000
		Biota	WRAC	OPP-C-SC	334827	7763310	210
		Biota	WRAC	OPP-C-SC	334827	7763310	210
		Biota	WRAC	OPP-RS	334849	7763636	500
		Biota	WRAC	OPP-RS	334849	7763636	500
		Biota	WRAC	OPP-RS	334855	7762722	1000
		Biota	WRAC	OPP-RS	334855	7762722	1000
		Biota	WRAC	OPP-RS	334893	7763967	1000
		Biota	WRAC	OPP-RS	334893	7763967	1000
		Biota	WRAC	OPP-RS	334904	7762842	50
		Biota	WRAC	OPP-RS	334904	7762842	50
		Biota	WRAC	OPP-C-SC	334907	7763192	45
		Biota	WRAC	OPP-C-SC	334907	7763192	45
		Biota	WRAC	OPP-RS	334919	7763613	1000
		Biota	WRAC	OPP-RS	334919	7763613	1000
		Biota	WRAC	OPP-C-SC	334943	7763098	500
		Biota	WRAC	OPP-C-SC	334943	7763098	500
		Biota	WRAC	OPP-C-SC	334951	7763191	70
		Biota	WRAC	OPP-C-SC	334951	7763191	70
		Biota	WRAC	OPP-RS	334955	7763956	150
		Biota	WRAC	OPP-RS	334955	7763956	150
		Biota	WRAC	OPP-C-SC	334971	7763031	50
		Biota	WRAC	OPP-C-SC	334971	7763031	50
		Biota	WRAC	OPP-RS	334988	7762668	1000
		Biota	WRAC	OPP-RS	334988	7762668	1000
		Biota	WRAC	OPP-RS	334995	7762589	500
		Biota	WRAC	OPP-RS	334995	7762589	500
		Biota	WRAC	OPP-RS	335010	7762781	150
		Biota	WRAC	OPP-RS	335010	7762781	150
		Biota	WRAC	OPP-RS	335048	7763988	250
		Biota	WRAC	OPP-RS	335048	7763988	250
		Biota	WRAC	OPP-RS	335072	7763455	1000
		Biota	WRAC	OPP-RS	335072	7763455	1000
		Biota	WRAC	OPP-C-SC	335102	7762899	85
		Biota	WRAC	OPP-C-SC	335102	7762899	85
		Biota	WRAC	OPP-RS	335103	7763758	200
		Biota	WRAC	OPP-RS	335103	7763758	200
		Biota	WRAC	OPP-RS	335106	7763408	80
		Biota	WRAC	OPP-RS	335106	7763408	80
		Biota	WRAC	OPP-C-SC	335106	7763040	45
		Biota	WRAC	OPP-C-SC	335106	7763040	45
		Biota	WRAC	OPP-RS	335125	7762661	1000
		Biota	WRAC	OPP-RS	335125	7762661	1000
		Biota	WRAC	OPP-C-SC	335137	7763061	110
		Biota	WRAC	OPP-C-SC	335137	7763061	110
		Biota	WRAC	OPP-RS	335146	7762385	100
		Biota	WRAC	OPP-RS	335146	7762385	100
		Biota	WRAC	OPP-C-SC	335154	7762843	500

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	335154	7762843	500
		Biota	WRAC	OPP-C-SC	335164	7762885	300
		Biota	WRAC	OPP-C-SC	335164	7762885	300
		Biota	WRAC	OPP-RS	335166	7763377	1000
		Biota	WRAC	OPP-RS	335166	7763377	1000
		Biota	WRAC	WINREL06	335171	7762860	200
		Biota	WRAC	WINREL06	335171	7762860	200
		Biota	WRAC	OPP-C-SC	335220	7762851	1000
		Biota	WRAC	OPP-C-SC	335220	7762851	1000
		Biota	WRAC	OPP-C-SC	335232	7762920	500
		Biota	WRAC	OPP-C-SC	335232	7762920	500
		Biota	WRAC	OPP-RS	335243	7762538	100
		Biota	WRAC	OPP-RS	335243	7762538	100
		Biota	WRAC	OPP-RS	335267	7762337	50
		Biota	WRAC	OPP-RS	335267	7762337	50
		Biota	WRAC	OPP-C-SC	335290	7762914	75
		Biota	WRAC	OPP-C-SC	335290	7762914	75
		Biota	WRAC	OPP-C-SC	335291	7762765	1000
		Biota	WRAC	OPP-C-SC	335291	7762765	1000
		Biota	WRAC	OPP-RS	335293	7763311	400
		Biota	WRAC	OPP-RS	335293	7763311	400
		Biota	WRAC	OPP-C-SC	335314	7762845	500
		Biota	WRAC	OPP-C-SC	335314	7762845	500
		Biota	WRAC	OPP-RS	335325	7762458	500
		Biota	WRAC	OPP-RS	335325	7762458	500
		Biota	WRAC	OPP-C-SC	335356	7762895	85
		Biota	WRAC	OPP-C-SC	335356	7762895	85
		Biota	WRAC	OPP-RS	335358	7762297	30
		Biota	WRAC	OPP-RS	335358	7762297	30
		Biota	WRAC	OPP-C-SC	335379	7762810	15
		Biota	WRAC	OPP-C-SC	335379	7762810	15
		Biota	WRAC	OPP-C-SC	335394	7762714	1000
		Biota	WRAC	OPP-C-SC	335394	7762714	1000
		Biota	WRAC	OPP-RS	335400	7763699	150
		Biota	WRAC	OPP-RS	335400	7763699	150
		Biota	WRAC	OPP-C-SC	335402	7762642	500
		Biota	WRAC	OPP-C-SC	335402	7762642	500
		Biota	WRAC	OPP-RS	335407	7762230	20
		Biota	WRAC	OPP-RS	335407	7762230	20
		Biota	WRAC	OPP-C-SC	335418	7762837	75
		Biota	WRAC	OPP-C-SC	335418	7762837	75
		Biota	WRAC	OPP-RS	335429	7763263	1000
		Biota	WRAC	OPP-RS	335429	7763263	1000
		Biota	WRAC	OPP-C-SC	335432	7762770	400
		Biota	WRAC	OPP-C-SC	335432	7762770	400
		Biota	WRAC	OPP-C-SC	335444	7762674	600
		Biota	WRAC	OPP-C-SC	335444	7762674	600
		Biota	WRAC	OPP-RS	335455	7762123	40
		Biota	WRAC	OPP-RS	335455	7762123	40
		Biota	WRAC	OPP-C-SC	335468	7762750	300
		Biota	WRAC	OPP-C-SC	335468	7762750	300
		Biota	WRAC	OPP-C-SC	335492	7762727	12
		Biota	WRAC	OPP-C-SC	335492	7762727	12
		Biota	WRAC	OPP-C-SC	335493	7762762	300
		Biota	WRAC	OPP-C-SC	335493	7762762	300

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-RS	335507	7762336	150
		Biota	WRAC	OPP-RS	335507	7762336	150
		Biota	WRAC	OPP-RS	335511	7763106	100
		Biota	WRAC	OPP-RS	335511	7763106	100
		Biota	WRAC	OPP-RS	335526	7763608	35
		Biota	WRAC	OPP-RS	335526	7763608	35
		Biota	WRAC	OPP-C-SC	335528	7762692	75
		Biota	WRAC	OPP-C-SC	335528	7762692	75
		Biota	WRAC	OPP-C-SC	335532	7762739	175
		Biota	WRAC	OPP-C-SC	335532	7762739	175
		Biota	WRAC	OPP-C-SC	335540	7762663	23
		Biota	WRAC	OPP-C-SC	335540	7762663	23
		Biota	WRAC	OPP-RS	335564	7763023	200
		Biota	WRAC	OPP-RS	335564	7763023	200
		Biota	WRAC	OPP-C-SC	335589	7762554	2000
		Biota	WRAC	OPP-C-SC	335589	7762554	2000
		Biota	WRAC	OPP-C-SC	335628	7762598	150
		Biota	WRAC	OPP-C-SC	335628	7762598	150
		Biota	WRAC	OPP-C-SC	335645	7762658	68
		Biota	WRAC	OPP-C-SC	335645	7762658	68
		Biota	WRAC	OPP-C-SC	335646	7762506	100
		Biota	WRAC	OPP-C-SC	335646	7762506	100
		Biota	WRAC	OPP-RS	335660	7763415	500
		Biota	WRAC	OPP-RS	335660	7763415	500
		Biota	WRAC	OPP-RS	335679	7762262	30
		Biota	WRAC	OPP-RS	335679	7762262	30
		Biota	WRAC	OPP-C-SC	335717	7762582	18
		Biota	WRAC	OPP-C-SC	335717	7762582	18
		Biota	WRAC	OPP-RS	335764	7762202	5
		Biota	WRAC	OPP-RS	335764	7762202	5
		Biota	WRAC	OPP-C-SC	335765	7762539	125
		Biota	WRAC	OPP-C-SC	335765	7762539	125
		Biota	WRAC	OPP-C-SC	335784	7762488	200
		Biota	WRAC	OPP-C-SC	335784	7762488	200
		Biota	WRAC	OPP-RS	335821	7763195	300
		Biota	WRAC	OPP-RS	335821	7763195	300
		Biota	WRAC	OPP-RS	335822	7762247	200
		Biota	WRAC	OPP-RS	335822	7762247	200
		Biota	WRAC	OPP-C-SC	335832	7762505	56
		Biota	WRAC	OPP-C-SC	335832	7762505	56
		Biota	WRAC	OPP-RS	335837	7762911	50
		Biota	WRAC	OPP-RS	335837	7762911	50
		Biota	WRAC	OPP-RS	335851	7761989	75
		Biota	WRAC	OPP-RS	335851	7761989	75
		Biota	WRAC	OPP-C-SC	335856	7762289	350
		Biota	WRAC	OPP-C-SC	335856	7762289	350
		Biota	WRAC	OPP-C-SC	335868	7762337	200
		Biota	WRAC	OPP-C-SC	335868	7762337	200
		Biota	WRAC	OPP-C-SC	335888	7762391	23
		Biota	WRAC	OPP-C-SC	335888	7762391	23
		Biota	WRAC	OPP-RS	335898	7761774	9
		Biota	WRAC	OPP-RS	335898	7761774	9
		Biota	WRAC	OPP-RS	335905	7762904	500
		Biota	WRAC	OPP-RS	335905	7762904	500
		Biota	WRAC	OPP-RS	335914	7762087	30

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-RS	335914	7762087	30
		Biota	WRAC	OPP-C-SC	335924	7762286	1000
		Biota	WRAC	OPP-C-SC	335924	7762286	1000
		Biota	WRAC	OPP-RS	335944	7762807	1000
		Biota	WRAC	OPP-RS	335944	7762807	1000
		Biota	WRAC	OPP-C-SC	335948	7762426	38
		Biota	WRAC	OPP-C-SC	335948	7762426	38
		Biota	WRAC	OPP-RS	335952	7761633	22
		Biota	WRAC	OPP-RS	335952	7761633	22
		Biota	WRAC	OPP-C-SC	335997	7762379	195
		Biota	WRAC	OPP-C-SC	335997	7762379	195
		Biota	WRAC	OPP-RS	335998	7763043	1000
		Biota	WRAC	OPP-RS	335998	7763043	1000
		Biota	WRAC	OPP-RS	336006	7761372	40
		Biota	WRAC	OPP-RS	336006	7761372	40
		Biota	WRAC	OPP-C-SC	336015	7762292	250
		Biota	WRAC	OPP-C-SC	336015	7762292	250
		Biota	WRAC	OPP-RS	336029	7762640	300
		Biota	WRAC	OPP-RS	336029	7762640	300
		Biota	WRAC	OPP-C-SC	336037	7762345	27
		Biota	WRAC	OPP-C-SC	336037	7762345	27
		Biota	WRAC	OPP-C-SC	336069	7762301	80
		Biota	WRAC	OPP-C-SC	336069	7762301	80
		Biota	WRAC	OPP-RS	336079	7762725	150
		Biota	WRAC	OPP-RS	336079	7762725	150
		Biota	WRAC	OPP-RS	336102	7761709	200
		Biota	WRAC	OPP-RS	336102	7761709	200
		Biota	WRAC	OPP-C-SC	336155	7762097	150
		Biota	WRAC	OPP-C-SC	336155	7762097	150
		Biota	WRAC	OPP-RS	336183	7762446	55
		Biota	WRAC	OPP-RS	336183	7762446	55
		Biota	WRAC	OPP-RS	336221	7761653	300
		Biota	WRAC	OPP-RS	336221	7761653	300
		Biota	WRAC	OPP-C-SC	336250	7762123	18
		Biota	WRAC	OPP-C-SC	336250	7762123	18
		Biota	WRAC	OPP-RS	336260	7762528	5
		Biota	WRAC	OPP-RS	336260	7762528	5
		Biota	WRAC	OPP-C-SC	336262	7762022	15
		Biota	WRAC	OPP-C-SC	336262	7762022	15
		Biota	WRAC	OPP-C-SC	336270	7762171	65
		Biota	WRAC	OPP-C-SC	336270	7762171	65
		Biota	WRAC	OPP-RS	336305	7762413	5
		Biota	WRAC	OPP-RS	336305	7762413	5
		Biota	WRAC	OPP-C-SC	336365	7762038	50
		Biota	WRAC	OPP-C-SC	336365	7762038	50
		Biota	WRAC	OPP-C-SC	336378	7762061	37
		Biota	WRAC	OPP-C-SC	336378	7762061	37
		Biota	WRAC	OPP-C-SC	336383	7762009	120
		Biota	WRAC	OPP-C-SC	336383	7762009	120
		Biota	WRAC	OPP-C-SC	336402	7761851	5
		Biota	WRAC	OPP-C-SC	336402	7761851	5
		Biota	WRAC	OPP-RS	336434	7761547	1000
		Biota	WRAC	OPP-RS	336434	7761547	1000
		Biota	WRAC	OPP-RS	336436	7762491	250
		Biota	WRAC	OPP-RS	336436	7762491	250

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-RS	336469	7762408	50
		Biota	WRAC	OPP-RS	336469	7762408	50
		Biota	WRAC	OPP-RS	336486	7761480	100
		Biota	WRAC	OPP-RS	336486	7761480	100
		Biota	WRAC	OPP-RS	336496	7761422	30
		Biota	WRAC	OPP-RS	336496	7761422	30
		Biota	WRAC	OPP-RS	336514	7762454	55
		Biota	WRAC	OPP-RS	336514	7762454	55
		Biota	WRAC	OPP-RS	336524	7762370	100
		Biota	WRAC	OPP-RS	336524	7762370	100
		Biota	WRAC	OPP-C-SC	336539	7719148	200
		Biota	WRAC	OPP-C-SC	336539	7719148	200
		Biota	WRAC	OPP-RS	336567	7762326	100
		Biota	WRAC	OPP-RS	336567	7762326	100
		Biota	WRAC	OPP-RS	336580	7762425	110
		Biota	WRAC	OPP-RS	336580	7762425	110
		Biota	WRAC	OPP-C-SC	336638	7761789	17
		Biota	WRAC	OPP-C-SC	336638	7761789	17
		Biota	WRAC	OPP-C-SC	336639	7719065	500
		Biota	WRAC	OPP-C-SC	336639	7719065	500
		Biota	WRAC	OPP-RS	336652	7761289	1000
		Biota	WRAC	OPP-RS	336652	7761289	1000
		Biota	WRAC	OPP-RS	336684	7761188	75
		Biota	WRAC	OPP-RS	336684	7761188	75
		Biota	WRAC	OPP-C-SC	336686	7761646	180
		Biota	WRAC	OPP-C-SC	336686	7761646	180
		Biota	WRAC	OPP-C-SC	336697	7761766	135
		Biota	WRAC	OPP-C-SC	336697	7761766	135
		Biota	WRAC	OPP-C-SC	336704	7761710	200
		Biota	WRAC	OPP-C-SC	336704	7761710	200
		Biota	WRAC	OPP-C-SC	336716	7761570	150
		Biota	WRAC	OPP-C-SC	336716	7761570	150
		Biota	WRAC	OPP-RS	336724	7761402	1000
		Biota	WRAC	OPP-RS	336724	7761402	1000
		Biota	WRAC	OPP-RS	336741	7762375	250
		Biota	WRAC	OPP-RS	336741	7762375	250
		Biota	WRAC	OPP-RS	336748	7762203	120
		Biota	WRAC	OPP-RS	336748	7762203	120
		Biota	WRAC	OPP-C-SC	336751	7761581	30
		Biota	WRAC	OPP-C-SC	336751	7761581	30
		Biota	WRAC	OPP-C-SC	336769	7761519	350
		Biota	WRAC	OPP-C-SC	336769	7761519	350
		Biota	WRAC	OPP-RS	336797	7761361	250
		Biota	WRAC	OPP-RS	336797	7761361	250
		Biota	WRAC	OPP-RS	336807	7761330	110
		Biota	WRAC	OPP-RS	336807	7761330	110
		Biota	WRAC	OPP-C-SC	336813	7761516	200
		Biota	WRAC	OPP-C-SC	336813	7761516	200
		Biota	WRAC	OPP-C-SC	336856	7761455	120
		Biota	WRAC	OPP-C-SC	336856	7761455	120
		Biota	WRAC	OPP-C-SC	336880	7718862	50
		Biota	WRAC	OPP-C-SC	336880	7718862	50
		Biota	WRAC	OPP-C-SC	336889	7761451	1000
		Biota	WRAC	OPP-C-SC	336889	7761451	1000
		Biota	WRAC	OPP-C-SC	336915	7761561	180

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	336915	7761561	180
		Biota	WRAC	OPP-RS	336925	7761800	100
		Biota	WRAC	OPP-RS	336925	7761800	100
		Biota	WRAC	OPP-RS	336926	7762269	300
		Biota	WRAC	OPP-RS	336926	7762269	300
		Biota	WRAC	OPP-C-SC	336939	7761473	200
		Biota	WRAC	OPP-C-SC	336939	7761473	200
		Biota	WRAC	OPP-RS	336939	7761605	35
		Biota	WRAC	OPP-RS	336939	7761605	35
		Biota	WRAC	OPP-C-SC	336942	7761503	160
		Biota	WRAC	OPP-C-SC	336942	7761503	160
		Biota	WRAC	OPP-C-SC	336947	7761452	35
		Biota	WRAC	OPP-C-SC	336947	7761452	35
		Biota	WRAC	OPP-RS	336968	7761930	30
		Biota	WRAC	OPP-RS	336968	7761930	30
		Biota	WRAC	OPP-RS	336996	7762229	500
		Biota	WRAC	OPP-RS	336996	7762229	500
		Biota	WRAC	OPP-RS	336996	7761747	75
		Biota	WRAC	OPP-RS	336996	7761747	75
		Biota	WRAC	OPP-C-SC	337002	7718790	30
		Biota	WRAC	OPP-C-SC	337002	7718790	30
		Biota	WRAC	OPP-RS	337027	7762118	500
		Biota	WRAC	OPP-RS	337027	7762118	500
		Biota	WRAC	OPP-RS	337028	7761834	250
		Biota	WRAC	OPP-RS	337028	7761834	250
		Biota	WRAC	OPP-RS	337065	7762184	1000
		Biota	WRAC	OPP-RS	337065	7762184	1000
		Biota	WRAC	OPP-RS	337103	7761927	150
		Biota	WRAC	OPP-RS	337103	7761927	150
		Biota	WRAC	OPP-RS	337115	7762113	1000
		Biota	WRAC	OPP-RS	337115	7762113	1000
		Biota	WRAC	OPP-RS	337126	7761997	250
		Biota	WRAC	OPP-RS	337126	7761997	250
		Biota	WRAC	OPP-RS	337152	7762158	500
		Biota	WRAC	OPP-RS	337152	7762158	500
		Biota	WRAC	OPP-RS	337206	7762069	250
		Biota	WRAC	OPP-RS	337206	7762069	250
		Biota	WRAC	OPP-RS	337219	7762143	100
		Biota	WRAC	OPP-RS	337219	7762143	100
		Biota	WRAC	OPP-C-SC	338401	7717592	25
		Biota	WRAC	OPP-C-SC	338401	7717592	25
		Biota	WRAC	OPP-C-SC	338711	7717267	100
		Biota	WRAC	OPP-C-SC	338711	7717267	100
		Biota	WRAC	OPP-C-SC	338803	7717461	18
		Biota	WRAC	OPP-C-SC	338803	7717461	18
		Biota	WRAC	OPP-C-SC	338843	7717279	22
		Biota	WRAC	OPP-C-SC	338843	7717279	22
		Biota	WRAC	OPP-C-SC	338886	7717173	23
		Biota	WRAC	OPP-C-SC	338886	7717173	23
		Biota	WRAC	OPP-C-SC	338887	7717245	29
		Biota	WRAC	OPP-C-SC	338887	7717245	29
		Biota	WRAC	OPP-C-SC	338900	7717149	250
		Biota	WRAC	OPP-C-SC	338900	7717149	250
		Biota	WRAC	OPP-C-SC	338923	7717359	27
		Biota	WRAC	OPP-C-SC	338923	7717359	27

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	339316	7716777	60
		Biota	WRAC	OPP-C-SC	339316	7716777	60
		Biota	WRAC	OPP-C-SC	339339	7716807	1000
		Biota	WRAC	OPP-C-SC	339339	7716807	1000
		Biota	WRAC	OPP-C-SC	339365	7716827	85
		Biota	WRAC	OPP-C-SC	339365	7716827	85
		Biota	WRAC	OPP-C-SC	339400	7716765	150
		Biota	WRAC	OPP-C-SC	339400	7716765	150
		Biota	WRAC	OPP-C-SC	339425	7716787	220
		Biota	WRAC	OPP-C-SC	339425	7716787	220
		Biota	WRAC	OPP-C-SC	339517	7716748	120
		Biota	WRAC	OPP-C-SC	339517	7716748	120
		Biota	WRAC	OPP-C-SC	339545	7716738	150
		Biota	WRAC	OPP-C-SC	339545	7716738	150
		Biota	WRAC	OPP-C-SC	339599	7716780	600
		Biota	WRAC	OPP-C-SC	339599	7716780	600
		Biota	WRAC	WIN39	339672	7716709	61
		Biota	WRAC	WIN39	339672	7716709	61
		Biota	WRAC	OPP-C-SC	339689	7716752	4
		Biota	WRAC	OPP-C-SC	339689	7716752	4
		Biota	WRAC	OPP-C-SC	339784	7716733	250
		Biota	WRAC	OPP-C-SC	339784	7716733	250
		Biota	WRAC	OPP-C-SC	339945	7716617	1000
		Biota	WRAC	OPP-C-SC	339945	7716617	1000
		Biota	WRAC	OPP-C-SC	339951	7716680	1500
		Biota	WRAC	OPP-C-SC	339951	7716680	1500
		Biota	WRAC	OPP-C-SC	339958	7716627	5000
		Biota	WRAC	OPP-C-SC	339958	7716627	5000
		Biota	WRAC	OPP-C-SC	340029	7716612	1200
		Biota	WRAC	OPP-C-SC	340029	7716612	1200
		Biota	WRAC	OPP-C-SC	340052	7716639	220
		Biota	WRAC	OPP-C-SC	340052	7716639	220
		Biota	WRAC	OPP-C-SC	340168	7716580	65
		Biota	WRAC	OPP-C-SC	340168	7716580	65
		Biota	WRAC	OPP-C-SC	340195	7716605	55
		Biota	WRAC	OPP-C-SC	340195	7716605	55
		Biota	WRAC	OPP-C-SC	340349	7716567	15
		Biota	WRAC	OPP-C-SC	340349	7716567	15
		Biota	WRAC	OPP-C-SC	340404	7716554	250
		Biota	WRAC	OPP-C-SC	340404	7716554	250
		Biota	WRAC	OPP-C-SC	340413	7716576	20
		Biota	WRAC	OPP-C-SC	340413	7716576	20
		Biota	WRAC	OPP-C-SC	340511	7716528	6
		Biota	WRAC	OPP-C-SC	340511	7716528	6
		Biota	WRAC	OPP-C-SC	340743	7716475	23
		Biota	WRAC	OPP-C-SC	340743	7716475	23
		Biota	WRAC	OPP-C-SC	340759	7716462	16
		Biota	WRAC	OPP-C-SC	340759	7716462	16
		Biota	WRAC	OPP-C-SC	340911	7716390	600
		Biota	WRAC	OPP-C-SC	340911	7716390	600
		Biota	WRAC	OPP-C-SC	340921	7716404	225
		Biota	WRAC	OPP-C-SC	340921	7716404	225
		Biota	WRAC	OPP-C-SC	341279	7716326	50
		Biota	WRAC	OPP-C-SC	341279	7716326	50
		Biota	WRAC	OPP-C-SC	341288	7716344	150

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	341288	7716344	150
		Biota	WRAC	OPP-C-SC	341356	7716329	30
		Biota	WRAC	OPP-C-SC	341356	7716329	30
		Biota	WRAC	OPP-C-SC	341420	7716278	90
		Biota	WRAC	OPP-C-SC	341420	7716278	90
		Biota	WRAC	OPP-C-SC	341528	7716319	135
		Biota	WRAC	OPP-C-SC	341528	7716319	135
		Biota	WRAC	OPP-C-SC	341585	7716266	100
		Biota	WRAC	OPP-C-SC	341585	7716266	100
		Biota	WRAC	OPP-C-SC	341696	7716291	85
		Biota	WRAC	OPP-C-SC	341696	7716291	85
		Biota	WRAC	OPP-C-SC	341730	7716275	150
		Biota	WRAC	OPP-C-SC	341730	7716275	150
		Biota	WRAC	OPP-C-SC	341789	7716199	50
		Biota	WRAC	OPP-C-SC	341789	7716199	50
		Biota	WRAC	OPP-C-SC	341791	7716179	200
		Biota	WRAC	OPP-C-SC	341791	7716179	200
		Biota	WRAC	OPP-C-SC	341867	7716238	20
		Biota	WRAC	OPP-C-SC	341867	7716238	20
		Biota	WRAC	OPP-C-SC	341917	7716172	7
		Biota	WRAC	OPP-C-SC	341917	7716172	7
		Biota	WRAC	OPP-C-SC	341935	7716221	20
		Biota	WRAC	OPP-C-SC	341935	7716221	20
		Biota	WRAC	OPP-C-SC	341950	7716156	10
		Biota	WRAC	OPP-C-SC	341950	7716156	10
		Biota	WRAC	OPP-C-SC	342159	7716139	30
		Biota	WRAC	OPP-C-SC	342159	7716139	30
		Biota	WRAC	OPP-C-SC	342167	7716136	47
		Biota	WRAC	OPP-C-SC	342167	7716136	47
		Biota	WRAC	OPP-C-SC	342269	7716138	5
		Biota	WRAC	OPP-C-SC	342269	7716138	5
		Biota	WRAC	OPP-C-SC	342328	7716045	25
		Biota	WRAC	OPP-C-SC	342328	7716045	25
		Biota	WRAC	OPP-C-SC	342668	7716017	25
		Biota	WRAC	OPP-C-SC	342668	7716017	25
		Biota	WRAC	OPP-C-SC	342916	7715988	15
		Biota	WRAC	OPP-C-SC	342916	7715988	15
		Biota	WRAC	OPP-C-SC	342937	7715936	80
		Biota	WRAC	OPP-C-SC	342937	7715936	80
		Biota	WRAC	OPP-C-SC	343026	7715909	8
		Biota	WRAC	OPP-C-SC	343026	7715909	8
		Biota	WRAC	OPP-C-SC	343105	7715896	100
		Biota	WRAC	OPP-C-SC	343105	7715896	100
		Biota	WRAC	OPP-C-SC	343120	7715910	25
		Biota	WRAC	OPP-C-SC	343120	7715910	25
		Biota	WRAC	OPP-C-SC	343288	7715871	35
		Biota	WRAC	OPP-C-SC	343288	7715871	35
		Biota	WRAC	OPP-C-SC	343528	7715814	15
		Biota	WRAC	OPP-C-SC	343528	7715814	15
		Biota	WRAC	OPP-C-SC	343769	7715613	15
		Biota	WRAC	OPP-C-SC	343769	7715613	15
		Biota	WRAC	OPP-C-SC	343796	7715569	5
		Biota	WRAC	OPP-C-SC	343796	7715569	5
		Biota	WRAC	OPP-C-SC	343824	7715685	15
		Biota	WRAC	OPP-C-SC	343824	7715685	15

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae	*Goodenia hartiana*	Biota	WRAC	OPP-C-SC	343845	7715846	12
(cont.)	(cont.)	Biota	WRAC	OPP-C-SC	343845	7715846	12
		Biota	WRAC	OPP-C-SC	343860	7715531	18
		Biota	WRAC	OPP-C-SC	343860	7715531	18
		Biota	WRAC	OPP-C-SC	343871	7715681	10
		Biota	WRAC	OPP-C-SC	343871	7715681	10
		Biota	WRAC	OPP-C-SC	343884	7715690	7
		Biota	WRAC	OPP-C-SC	343884	7715690	7
		Biota	WRAC	OPP-C-SC	343890	7715523	22
		Biota	WRAC	OPP-C-SC	343890	7715523	22
		Biota	WRAC	OPP-C-SC	343921	7715525	15
		Biota	WRAC	OPP-C-SC	343921	7715525	15
		Biota	WRAC	OPP-C-SC	343970	7715527	25
		Biota	WRAC	OPP-C-SC	343970	7715527	25
		Biota	WRAC	OPP-C-SC	343977	7715848	53
		Biota	WRAC	OPP-C-SC	343977	7715848	53
		Biota	WRAC	OPP-C-SC	344014	7715637	13
		Biota	WRAC	OPP-C-SC	344014	7715637	13
		Biota	WRAC	OPP-C-SC	344024	7715525	3
		Biota	WRAC	OPP-C-SC	344024	7715525	3
		Biota	WRAC	OPP-C-SC	344038	7715832	28
		Biota	WRAC	OPP-C-SC	344038	7715832	28
		Biota	WRAC	OPP-C-SC	344064	7715849	26
		Biota	WRAC	OPP-C-SC	344064	7715849	26
		Biota	WRAC	OPP-C-SC	344066	7715526	18
		Biota	WRAC	OPP-C-SC	344066	7715526	18
		Biota	WRAC	OPP-C-SC	344076	7715793	150
		Biota	WRAC	OPP-C-SC	344076	7715793	150
		Biota	WRAC	OPP-C-SC	344077	7715715	8
		Biota	WRAC	OPP-C-SC	344077	7715715	8
		Biota	WRAC	OPP-C-SC	344081	7715837	15
		Biota	WRAC	OPP-C-SC	344081	7715837	15
		Biota	WRAC	OPP-C-SC	344195	7715581	5
		Biota	WRAC	OPP-C-SC	344195	7715581	5
		Biota	WRAC	OPP-C-SC	344485	7715476	25
		Biota	WRAC	OPP-C-SC	344485	7715476	25
		Biota	WRAC	OPP-C-SC	344548	7715474	65
		Biota	WRAC	OPP-C-SC	344548	7715474	65
		Biota	WRAC	OPP-C-SC	345251	7715249	5
		Biota	WRAC	OPP-C-SC	345251	7715249	5
		Biota	WRAC	OPP-C-SC	345908	7714980	150
		Biota	WRAC	OPP-C-SC	345908	7714980	150
		Biota	WRAC	OPP-C-SC	345946	7715008	40
		Biota	WRAC	OPP-C-SC	345946	7715008	40
		Biota	WRAC	OPP-C-SC	346026	7714955	35
		Biota	WRAC	OPP-C-SC	346026	7714955	35
		Biota	WRAC	OPP-C-SC	346085	7714947	1
		Biota	WRAC	OPP-C-SC	346085	7714947	1
		Biota	WRAC	OPP-C-SC	346444	7714786	55
		Biota	WRAC	OPP-C-SC	346444	7714786	55
		Biota	WRAC	OPP-C-SC	346823	7714705	180
		Biota	WRAC	OPP-C-SC	346823	7714705	180
		Biota	WRAC	OPP-C-SC	346897	7714631	150
		Biota	WRAC	OPP-C-SC	346897	7714631	150
		Biota	WRAC	OPP-C-SC	347051	7714637	8

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Biota	WRAC	OPP-C-SC	347051	7714637	8
		Biota	WRAC	OPP-C-SC	347316	7714501	140
		Biota	WRAC	OPP-C-SC	347316	7714501	140
		Biota	WRAC	OPP-C-SC	347386	7714511	60
		Biota	WRAC	OPP-C-SC	347386	7714511	60
		Biota	WRAC	OPP-C-SC	347395	7714472	150
		Biota	WRAC	OPP-C-SC	347395	7714472	150
		Biota	WRAC	OPP-C-SC	347440	7714422	45
		Biota	WRAC	OPP-C-SC	347440	7714422	45
		Biota	WRAC	OPP-C-SC	347614	7714362	100
		Biota	WRAC	OPP-C-SC	347614	7714362	100
		Biota	WRAC	OPP-C-SC	347917	7714253	25
		Biota	WRAC	OPP-C-SC	347917	7714253	25
		Biota	WRAC	OPP-C-SC	348070	7714234	15
		Biota	WRAC	OPP-C-SC	348070	7714234	15
		Biota	WRAC	OPP-C-SC	348167	7714175	25
		Biota	WRAC	OPP-C-SC	348167	7714175	25
		Biota	WRAC	OPP-C-SC	348369	7714128	30
		Biota	WRAC	OPP-C-SC	348369	7714128	30
		Biota	WRAC	OPP-C-SC	350571	7713416	300
		Biota	WRAC	OPP-C-SC	350571	7713416	300
		Biota	WRAC	OPP-C-SC	350583	7713339	400
		Biota	WRAC	OPP-C-SC	350583	7713339	400
		Astron	WRAC	Opp	328458	7722808	70
		Astron	WRAC	Opp	328496	7722755	25
		Astron	WRAC	Opp	328508	7722732	80
		Astron	WRAC	Opp	328543	7723194	11
		Astron	WRAC	Opp	328607	7722602	55
		Astron	WRAC	Opp	328880	7722336	50
		Astron	WRAC	Opp	328889	7725201	45
		Astron	WRAC	Opp	328975	7722369	11
		Astron	WRAC	Opp	329077	7722163	65
		Astron	WRAC	Opp	329131	7722132	5
		Astron	WRAC	Opp	329164	7722184	30
		Astron	WRAC	Opp	329249	7722083	12
		Astron	WRAC	Opp	329284	7722003	15
		Astron	WRAC	Opp	329312	7722055	24
		Astron	WRAC	Opp	329432	7722245	30
		Astron	WRAC	Opp	329493	7727079	23
		Astron	WRAC	Opp	329502	7722096	12
		Astron	WRAC	Opp	329508	7722010	25
		Astron	WRAC	Opp	329583	7722117	5
		Astron	WRAC	Opp	329598	7722523	22
		Astron	WRAC	Opp	329599	7722500	30
		Astron	WRAC	Opp	329604	7722455	28
		Astron	WRAC	Opp	329606	7722614	15
		Astron	WRAC	Opp	329651	7722633	30
		Astron	WRAC	Opp	329657	7722496	28
		Astron	WRAC	Opp	329686	7722664	40
		Astron	WRAC	Opp	329715	7722318	50
		Astron	WRAC	Opp	329781	7722187	22
		Astron	WRAC	Opp	329814	7722354	35
		Astron	WRAC	Opp	329835	7727751	49
		Astron	WRAC	Opp	329854	7722417	38
		Astron	WRAC	Opp	329858	7722289	17

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Astron	WRAC	Opp	329891	7727734	62
		Astron	WRAC	Opp	329951	7727778	34
		Astron	WRAC	Opp	331185	7732058	35
		Astron	WRAC	Opp	331398	7732246	10
		Astron	WRAC	Opp	331400	7732241	15
		Astron	WRAC	Opp	331579	7732558	6
		Astron	WRAC	Opp	332940	7737472	25
		Astron	WRAC	Opp	332988	7737516	4
		Astron	WRAC	Opp	333045	7737558	33
		Astron	WRAC	Opp	333076	7737680	8
		Astron	WRAC	Opp	333119	7737694	4
		Astron	WRAC	Opp	333143	7737854	49
		Astron	WRAC	Opp	333171	7737873	151
		Astron	WRAC	Opp	333274	7738111	9
		Astron	WRAC	Opp	333371	7739323	20
		Astron	WRAC	Opp	333372	7739241	28
		Astron	WRAC	Opp	333392	7739055	12
		Astron	WRAC	Opp	333418	7739481	20
		Astron	WRAC	Opp	333427	7739010	82
		Astron	WRAC	Opp	333440	7739438	20
		Astron	WRAC	Opp	333454	7739566	40
		Astron	WRAC	Opp	333492	7739655	34
		Astron	WRAC	Opp	333494	7739033	9
		Astron	WRAC	Opp	333494	7739032	6
		Astron	WRAC	Opp	333517	7738491	35
		Astron	WRAC	Opp	333546	7739741	28
		Astron	WRAC	Opp	333557	7738843	12
		Astron	WRAC	Opp	333602	7739840	25
		Astron	WRAC	Opp	333638	7739892	20
		Astron	WRAC	Opp	333680	7739986	20
		Astron	WRAC	Opp	333683	7739901	64
		Astron	WRAC	Opp	333783	7740204	13
		Astron	WRAC	Opp	333877	7740280	60
		Astron	WRAC	Opp	334259	7740974	60
		Astron	WRAC	Opp	334265	7740876	24
		Astron	WRAC	Opp	334304	7741045	20
		Astron	WRAC	Opp	334323	7740959	35
		Astron	WRAC	Opp	334878	7742272	80
		Astron	WRAC	Opp	336501	7745667	28
		Astron	WRAC	Opp	336713	7746384	27
		Astron	WRAC	Opp	336750	7761228	25
		Astron	WRAC	Opp	336751	7751690	90
		Astron	WRAC	Opp	336759	7751619	118
		Astron	WRAC	Opp	336765	7746748	54
		Astron	WRAC	Opp	336777	7761206	43
		Astron	WRAC	Opp	336782	7761277	25
		Astron	WRAC	Opp	336793	7751588	40
		Astron	WRAC	Opp	336798	7746792	12
		Astron	WRAC	Opp	336835	7761339	22
		Astron	WRAC	Opp	336865	7747041	3
		Astron	WRAC	Opp	336870	7747354	73
		Astron	WRAC	Opp	336885	7747280	28
		Astron	WRAC	Opp	336900	7761418	260
		Astron	WRAC	Opp	336918	7761450	165
		Astron	WRAC	Opp	336931	7761418	135

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Goodeniaceae (cont.)	*Goodenia hartiana* (cont.)	Astron	WRAC	Opp	336937	7761493	105
		Astron	WRAC	Opp	336954	7753993	40
		Astron	WRAC	Opp	336955	7761520	165
		Astron	WRAC	Opp	336987	7761606	55
		Astron	WRAC	Opp	336994	7761527	280
		Astron	WRAC	Opp	337084	7761768	255
		Astron	WRAC	Opp	337098	7761746	41
		Astron	WRAC	Opp	337112	7761756	127
		Astron	WRAC	Opp	337187	7761964	185
		Astron	WRAC	Opp	337212	7761961	425
		Astron	WRAC	Opp	337233	7762048	220
		Astron	WRAC	Opp	337305	7762188	95
		Astron	WRAC	Opp	337315	7762181	193
		Astron	WRAC	Opp	337324	7762251	95
		Astron	WRAC	Opp	337346	7762292	48
		Astron	WRAC	Opp	337384	7762380	152
		Astron	WRAC	Opp	337398	7762403	125
		Astron	WRAC	Opp	337411	7762379	300
		Astron	WRAC	Opp	337511	7762660	225
		Astron	WRAC	Opp	337550	7762740	25
		Astron	WRAC	Opp	337559	7762719	370
		Astron	WRAC	Opp	337575	7762722	100
		Astron	WRAC	Opp	337594	7762778	45
		Astron	WRAC	Opp	337604	7762808	50
		Astron	WRAC	Opp	337615	7762830	100
		Astron	WRAC	Opp	337628	7762908	90
		Astron	WRAC	Opp	337636	7762858	65
		Astron	WRAC	Opp	337656	7762913	40
		Astron	WRAC	Opp	337664	7762983	40
		Astron	WRAC	Opp	337686	7763052	30
		Astron	WRAC	Opp	337688	7762952	140
		Astron	WRAC	Opp	337756	7763151	200
		Astron	WRAC	Opp	337799	7763249	90
		Astron	WRAC	Opp	337820	7763305	80
		Astron	WRAC	Opp	337825	7763102	100
		Astron	WRAC	Opp	337826	7763175	80
		Astron	WRAC	Opp	337853	7763224	70
		Astron	WRAC	Opp	337860	7763447	180
		Astron	WRAC	Opp	337863	7753221	60
		Astron	WRAC	Opp	337878	7763287	80
		Astron	WRAC	Opp	337884	7763514	80
		Astron	WRAC	Opp	337916	7763624	30
		Astron	WRAC	Opp	337976	7763871	120
		Astron	WRAC	Opp	338138	7764035	15
		Astron	WRAC	Opp	338208	7764207	12
		Astron	WRAC	Opp	338358	7764565	6
		Astron	WRAC	Opp	338437	7764732	6
Priority 3							
Polygalaceae	*Comesperma sabulosum*	Biota	WPA	OPP-RS	368283	7704903	10
Hemerocallidaceae	*Corynotheca asperata*	Biota	WPA	OPP-RS	355983	7711408	9
		Biota	WPA	OPP-SC	357390	7711706	5
		Biota	WPA	OPP-SC	357425	7711682	1
		Biota	WPA	OPP-SC	357573	7709863	3
		Biota	WPA	OPP-SC	357832	7709829	2
		Biota	WPA	OPP-SC	358106	7710901	2

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Hemerocallidaceae (cont.)	*Corynotheca asperata* (cont.)	Biota	WPA	OPP-SC	358126	7710852	5
		Biota	WPA	OPP-RS	358248	7710886	9
		Biota	WPA	OPP-RS	358251	7710832	6
		Biota	WPA	OPP-RS	360614	7710313	50
		Biota	WPA	OPP-RS	360662	7710353	15
		Biota	WPA	OPP-RS	360685	7710319	31
		Biota	WPA	OPP-RS	360758	7710309	11
		Biota	WPA	OPP-RS	360800	7710304	25
		Biota	WPA	WIN03R	360822	7710287	6
		Biota	WPA	OPP-PR	360826	7710237	3
		Biota	WPA	WIN04	361075	7709803	1
		Biota	WPA	OPP-PR	361360	7710139	1
		Biota	WPA	OPP-SC	361662	7711353	1
		Biota	WPA	WIN12R	363541	7709503	1
		Biota	WPA	OPP-RS	363931	7709235	1
		Biota	WPA	OPP-PR	364430	7709042	2
		Biota	WPA	OPP-RS	364777	7709804	1
		Biota	WPA	OPP-PR	364915	7710238	1
		Biota	WPA	OPP-RS	366258	7708376	7
		Biota	WPA	OPP-RS	366457	7708222	1
		Biota	WPA	OPP-RS	366478	7708207	1
		Biota	WPA	OPP-SC	366744	7706968	1
		Biota	WPA	OPP-RS	366953	7708002	1
		Biota	WPA	WIN10R	367011	7707953	8
		Biota	WPA	OPP-PR	367073	7709600	3
		Biota	WPA	OPP-SC	367534	7710929	12
		Biota	WPA	OPP-PR	369783	7709297	6
		Biota	WPA	OPP-RS	369883	7709157	1
		Biota	WPA	OPP-SC	374550	7707272	15
		Biota	WPA	OPP-SC	379868	7704199	1
		Biota	WPA	OPP-SC	380765	7703869	3
		Biota	WPA	OPP-SC	381190	7704574	3
Lamiaceae	*Dasymalla chorisepala*	Biota	WPA	OPP-RS	360809	7710583	2
		Biota	WPA	OPP-RS	361012	7710743	4
		Biota	WPA	OPP-RS	361059	7710754	2
		Biota	WPA	OPP-RS	361091	7710738	2
		Biota	WPA	OPP-RS	361138	7710695	1
		Biota	WPA	OPP-RS	361231	7710730	2
		Biota	WPA	OPP-RS	361350	7710718	1
		Biota	WPA	OPP-RS	361418	7710700	6
		Biota	WPA	OPP-RS	361492	7710672	1
		Biota	WRAC	OPP-C-SC	343384	7715837	1
		Biota	WRAC	OPP-C-RM	344016	7715726	1
		Biota	WRAC	OPP-C-SC	344043	7715621	1
		Biota	WRAC	OPP-C-SC	344065	7715539	1
Fabaceae	*Indigofera ammobia*	Biota	WPA	OPP-PR	355423	7711458	8
		Biota	WPA	OPP-RS	357179	7710987	1
		Biota	WPA	OPP-RS	357257	7710966	1
		Biota	WPA	WIN01	357456	7711641	4
		Biota	WPA	OPP-SC	357570	7709827	50
		Biota	WPA	OPP-PR	358088	7710807	1
		Biota	WPA	OPP-RS	360656	7710295	2
		Biota	WPA	OPP-RS	360685	7710321	3
		Biota	WPA	OPP-RS	360749	7710313	5
		Biota	WPA	WIN03	360822	7710287	5

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Fabaceae (cont.)	*Indigofera ammobia* (cont.)	Biota	WPA	OPP-SC	361216	7710768	18
		Biota	WPA	OPP-PR	361312	7710740	7
		Biota	WPA	OPP-PR	361350	7710769	20
		Biota	WPA	OPP-SC	361355	7710787	35
		Biota	WPA	OPP-PR	361605	7710708	1
		Biota	WPA	OPP-SC	361637	7711291	100
		Biota	WPA	OPP-SC	361657	7711352	50
		Biota	WPA	OPP-RS	361700	7710612	1
		Biota	WPA	OPP-SC	361788	7710671	11
		Biota	WPA	OPP-SC	361796	7710722	15
		Biota	WPA	OPP-SC	361799	7711254	7
		Biota	WPA	WIN12R	363541	7709503	3
		Biota	WPA	OPP-RS	363576	7709471	2
		Biota	WPA	OPP-PR	364422	7708995	2
		Biota	WPA	OPP-RS	364761	7709767	10
		Biota	WPA	OPP-PR	364917	7710248	1
		Biota	WPA	OPP-RS	366491	7708117	3
		Biota	WPA	OPP-SC	366519	7709551	6
		Biota	WPA	OPP-SC	366550	7709788	6
		Biota	WPA	OPP-SC	366655	7710574	65
		Biota	WPA	OPP-SC	366698	7706902	3
		Biota	WPA	OPP-SC	366766	7711076	5
		Biota	WPA	OPP-SC	366812	7711065	18
		Biota	WPA	OPP-SC	366820	7709747	4
		Biota	WPA	OPP-RS	366855	7707976	1
		Biota	WPA	WIN10R	367011	7707953	15
		Biota	WPA	OPP-PR	367098	7709693	1
		Biota	WPA	OPP-PR	367196	7709522	1
		Biota	WPA	OPP-SC	367348	7710305	8
		Biota	WPA	OPP-SC	367534	7710919	5
		Biota	WPA	OPP-SC	368706	7707096	10
		Biota	WPA	OPP-SC	368963	7708526	15
		Biota	WPA	OPP-RS	369541	7709550	15
		Biota	WPA	OPP-PR	369672	7709515	40
		Biota	WPA	OPP-PR	369782	7709297	5
		Biota	WPA	OPP-PR	369799	7709196	40
		Biota	WPA	OPP-RS	369924	7709503	15
		Biota	WPA	OPP-SC	369964	7709074	80
		Biota	WPA	OPP-SC	369986	7709140	30
		Biota	WPA	OPP-SC	370080	7709398	25
		Biota	WPA	OPP-PR	381599	7703138	1
		Biota	WPA	OPP-SC	381721	7703377	3
		Biota	WPA	OPP-SC	381722	7704214	5
		Astron	WPA	Historical	368951	7708512	5
		Astron	WPA	Historical	369652	7709173	12
		Astron	WPA	Historical	375873	7704286	1
		Astron	WRAC	Opp	336827	7751789	2
Phyllanthaceae	*Sauropus arenosus*	Biota	WPA	OPP-RS	357007	7711036	2
		Biota	WPA	OPP-RS	357038	7711028	4
		Biota	WPA	OPP-RS	357372	7710912	15
		Biota	WPA	WIN01R	357456	7711641	15
		Biota	WPA	OPP-RS	357477	7711602	2
		Biota	WPA	OPP-RS	357481	7711407	1
		Biota	WPA	OPP-SC	357585	7709999	3
		Biota	WPA	OPP-SC	357747	7709682	3

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Phyllanthaceae (cont.)	*Sauropus arenosus* (cont.)	Biota	WPA	OPP-SC	357823	7709769	1
		Biota	WPA	OPP-SC	357835	7709829	1
		Biota	WPA	OPP-RS	358038	7710703	2
		Biota	WPA	OPP-PR	358048	7710684	1
		Biota	WPA	OPP-SC	358114	7710965	1
		Biota	WPA	OPP-RS	358236	7710884	1
		Biota	WPA	OPP-RS	358239	7710816	1
		Biota	WPA	OPP-RS	360642	7710324	5
		Biota	WPA	OPP-RS	360687	7710316	17
		Biota	WPA	OPP-RS	360759	7710312	5
		Biota	WPA	OPP-RS	360793	7710308	2
		Biota	WPA	WIN03R	360822	7710287	13
		Biota	WPA	OPP-RS	361036	7710756	1
		Biota	WPA	OPP-RS	361175	7710729	4
		Biota	WPA	OPP-RS	361212	7710742	1
		Biota	WPA	OPP-RS	361237	7710738	4
		Biota	WPA	OPP-SC	361274	7710704	6
		Biota	WPA	OPP-SC	361349	7710769	7
		Biota	WPA	OPP-RS	361376	7710707	1
		Biota	WPA	OPP-RS	361458	7710712	2
		Biota	WPA	OPP-RS	361534	7710688	4
		Biota	WPA	OPP-RS	361603	7710673	5
		Biota	WPA	OPP-SC	361612	7710723	2
		Biota	WPA	OPP-SC	361684	7710838	1
		Biota	WPA	OPP-RS	361689	7710649	2
		Biota	WPA	OPP-RS	361716	7710606	1
		Biota	WPA	OPP-RS	361748	7710672	2
		Biota	WPA	OPP-RS	361797	7710829	1
		Biota	WPA	OPP-RS	361874	7710708	1
		Biota	WPA	OPP-SC	363319	7708152	5
		Biota	WPA	OPP-SC	363399	7708242	3
		Biota	WPA	OPP-SC	363528	7708057	2
		Biota	WPA	WIN12R	363541	7709503	5
		Biota	WPA	OPP-SC	363653	7708706	4
		Biota	WPA	OPP-RS	363655	7709472	2
		Biota	WPA	OPP-RS	363677	7709441	11
		Biota	WPA	OPP-RS	363747	7709372	1
		Biota	WPA	OPP-RS	363761	7709349	1
		Biota	WPA	OPP-SC	363824	7707995	1
		Biota	WPA	OPP-RS	363834	7709308	1
		Biota	WPA	OPP-SC	363847	7709363	7
		Biota	WPA	OPP-SC	363895	7707992	1
		Biota	WPA	OPP-RS	363916	7709250	1
		Biota	WPA	OPP-SC	364386	7709046	10
		Biota	WPA	OPP-SC	364403	7709097	2
		Biota	WPA	OPP-SC	364416	7708997	3
		Biota	WPA	OPP-PR	364535	7709887	1
		Biota	WPA	OPP-SC	364757	7710362	1
		Biota	WPA	OPP-RS	364774	7709779	1
		Biota	WPA	OPP-SC	364948	7710344	1
		Biota	WPA	OPP-SC	365300	7706407	2
		Biota	WPA	OPP-SC	366544	7709751	25
		Biota	WPA	OPP-SC	366994	7709403	2
Zygophyllaceae	*Tribulopis marliesiae*	Biota	WPA	OPP-PR	361053	7710592	1
		Biota	WPA	OPP-PR	361057	7710566	2

Family	Species	Recorder	Project Area	Site	Easting	Northing	Count
Zygophyllaceae (cont.)	*Tribulopis marliesiae* (cont.)	Biota	WPA	OPP-SC	361512	7711081	2
		Biota	WPA	OPP-SC	361556	7711154	3
		Biota	WPA	OPP-SC	361815	7711010	1
		Biota	WPA	WINREL01	368228	7706541	4
		Biota	WPA	OPP-PR	369432	7709202	1
		Biota	WPA	OPP-RS	369583	7709167	6
		Biota	WPA	OPP-RS	369675	7709002	8
		Biota	WPA	OPP-PR	369799	7709027	2
		Biota	WRAC	OPP-C-SC	333156	7769435	1
		Biota	WRAC	OPP-C-SC	333164	7769373	1
		Biota	WRAC	OPP-C-SC	336639	7719064	1
		Biota	WRAC	OPP-C-SC	338617	7717339	1
		Biota	WRAC	OPP-C-SC	338850	7717127	2
		Biota	WRAC	OPP-C-SC	344138	7715618	1

Appendix 5

Vascular Flora Lists for the Winu Project Area and the Winu Road Access Corridor

Table 1: Combined species by project matrix for the WPA and WRAC.

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Aizoaceae	*Trianthema pilosum*		Y	Y	Y		Y	Y	Y	
Aizoaceae	*Trianthema triquetrum*						Y			
Amaranthaceae	*Achyranthes aspera*		Y	Y						
Amaranthaceae	*Amaranthus undulatus*			Y	Y					
Amaranthaceae	*Gomphrena cunninghamii*			Y						
Amaranthaceae	*Gomphrena lanata*				Y					
Amaranthaceae	*Ptilotus arthrolasius*		Y	Y	Y	Y	Y	Y	Y	Y
Amaranthaceae	*Ptilotus astrolasius*		Y	Y	Y	Y	Y	Y	Y	
Amaranthaceae	*Ptilotus calostachyus*		Y	Y	Y	Y	Y	Y	Y	Y
Amaranthaceae	*Ptilotus exaltatus*						Y	Y		Y
Amaranthaceae	*Ptilotus fusiformis*			Y			Y	Y		
Amaranthaceae	*Ptilotus incanus*			Y		Y				
Amaranthaceae	*Ptilotus polystachyus*		Y	Y	Y	Y		Y		
Apocynaceae	*Cynanchum pedunculatum*			Y						
Araliaceae	*Trachymene oleracea* subsp. *oleracea*			Y						
Asteraceae	*Pterocaulon serrulatum* var. *velutinum*						Y			
Asteraceae	*Streptoglossa decurrens*			Y			Y	Y		
Asteraceae	*Streptoglossa macrocephala*			Y	Y	Y	Y	Y		
Asteraceae	*Streptoglossa* sp. (inadequate material)						Y	Y		
Bignoniaceae	*Dolichandrone occidentalis*		Y							
Boraginaceae	*Halgania solanacea* var. Mt Doreen (G.M. Chippendale 4206)					Y			Y	Y
Boraginaceae	*Halgania solanacea* var. *solanacea*		Y	Y	Y	Y	Y	Y		
Boraginaceae	*Heliotropium cunninghamii*						Y	Y		
Boraginaceae	*Heliotropium diversifolium*						Y	Y		
Boraginaceae	*Heliotropium glabellum*				Y		Y			
Boraginaceae	*Heliotropium leptaleum*			Y						
Boraginaceae	*Heliotropium ovalifolium*						Y	Y		
Boraginaceae	*Heliotropium pachyphyllum*						Y	Y		
Boraginaceae	*Heliotropium transforme*			Y			Y	Y		

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Boraginaceae	*Heliotropium vestitum*		Y				Y	Y		
Boraginaceae	*Heliotropium* sp. (inadequate material)						Y			
Boraginaceae	*Trichodesma zeylanicum* var. *zeylanicum*		Y	Y						
Boraginaceae	*Trichodesma zeylanicum* (var. not determined)						Y			Y
Caryophyllaceae	*Polycarpaea corymbosa* var. *corymbosa*			Y	Y					
Caryophyllaceae	*Polycarpaea holtzei*			Y	Y					
Caryophyllaceae	*Polycarpaea longiflora*			Y	Y	Y	Y	Y		
Chenopodiaceae	*Atriplex* sp.					Y			Y	
Chenopodiaceae	*Dysphania rhadinostachya* subsp. *rhadinostachya*			Y						
Chenopodiaceae	*Dysphania* sp.						Y			
Cleomaceae	*Cleome uncifera* subsp. *microphylla*					Y				
Cleomaceae	*Cleome uncifera* subsp. *uncifera*		Y	Y	Y					
Cleomaceae	*Cleome viscosa*		Y	Y	Y		Y	Y		
Convolvulaceae	*Bonamia alatisemina*		Y	Y	Y		Y	Y		
Convolvulaceae	*Bonamia erecta*			Y			Y	Y	Y	Y
Convolvulaceae	*Bonamia linearis*					Y			Y	
Convolvulaceae	*Cuscuta victoriana*			Y						
Convolvulaceae	*Evolvulus alsinoides* var. *decumbens*		Y	Y						
Convolvulaceae	*Evolvulus alsinoides* var. *villosicalyx*				Y					
Convolvulaceae	*Evolvulus alsinoides* (sterile; var. not determined)		Y				Y			
Convolvulaceae	*Polymeria* ? sp. Broome (K.F. Kenneally 9759)			Y						
Cucurbitaceae	*Cucumis variabilis*		Y	Y	Y	Y	Y	Y	Y	
Cyperaceae	*Bulbostylis barbata*		Y	Y	Y		Y			Y
Cyperaceae	*Cyperus conicus*		Y							
Cyperaceae	*Cyperus cunninghamii* subsp. *cunninghamii*			Y						
Cyperaceae	*Fimbristylis ammobia*				Y					
Cyperaceae	*Fimbristylis dichotoma*						Y	Y		Y
Cyperaceae	*Fimbristylis oxystachya*						Y	Y		
Cyperaceae	*Fimbristylis simulans*			Y	Y					
Euphorbiaceae	*Euphorbia albrechtii*						Y			

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Euphorbiaceae	*Euphorbia myrtoides*						Y	Y		
Euphorbiaceae	*Euphorbia psilosperma*			Y	Y		Y			
Euphorbiaceae	*Euphorbia vaccaria* var. *vaccaria*						Y			
Euphorbiaceae	*Euphorbia wheeleri*								Y	
Fabaceae	*Acacia adoxa* var. *adoxa*			Y	Y	Y				
Fabaceae	*Acacia adsurgens*		Y				Y	Y		
Fabaceae	*Acacia anaticeps*		Y	Y	Y	Y	Y	Y	Y	
Fabaceae	*Acacia ancistrocarpa*		Y	Y	Y	Y	Y	Y	Y	Y
Fabaceae	*Acacia arida*					Y				Y
Fabaceae	*Acacia bivenosa*						Y	Y	Y	Y
Fabaceae	*Acacia colei* (sterile; var. not determined)						Y	Y		
Fabaceae	*Acacia colei* var. *colei*		Y	Y	Y	Y			Y	Y
Fabaceae	*Acacia drepanocarpa* subsp. *drepanocarpa*			Y	Y	Y				
Fabaceae	*Acacia drepanocarpa* subsp. *latifolia*		Y				Y	Y		
Fabaceae	*Acacia ? drepanocarpa* x *trachycarpa*		Y							
Fabaceae	*Acacia* aff. *drepanocarpa*		Y							
Fabaceae	*Acacia eriopoda*		Y	Y		Y	Y			
Fabaceae	*Acacia eriopoda* x monticola (B.R. Maslin 7322)		Y							
Fabaceae	*Acacia hilliana*		Y	Y	Y	Y	Y	Y	Y	
Fabaceae	*Acacia maitlandii*						Y	Y		
Fabaceae	*Acacia melleodora*		Y			Y				
Fabaceae	*Acacia monticola*		Y	Y	Y	Y	Y	Y	Y	Y
Fabaceae	*Acacia orthocarpa*		Y	Y	Y		Y	Y		
Fabaceae	*Acacia platycarpa*		Y			Y	Y	Y		
Fabaceae	*Acacia ptychophylla*								Y	Y
Fabaceae	*Acacia retivenea* subsp. *clandestina* (NB. thought to be referring to *A. platycarpa*)					Y			Y	
Fabaceae	*Acacia sabulosa*		Y	Y			Y	Y		
Fabaceae	*Acacia sericophylla*		Y	Y	Y	Y	Y	Y	Y	
Fabaceae	*Acacia spondylophylla*									Y

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Fabaceae	*Acacia stellaticeps*		Y	Y	Y	Y	Y	Y	Y	
Fabaceae	*Acacia stipuligera*						Y			
Fabaceae	*Acacia tenuissima*						Y	Y		
Fabaceae	*Acacia tumida* var. *kulparn*		Y	Y	Y	Y	Y	Y		Y
Fabaceae	*Acacia tumida* var. *pilbarensis*		Y						Y	
Fabaceae	*Acacia* sp. Nalgi (N.T. Burbidge 1317)		Y							
Fabaceae	*Crotalaria cunninghamii* subsp. *cunninghamii*						Y	Y	Y	
Fabaceae	*Crotalaria ramosissima*			Y						
Fabaceae	*Cullen martinii*			Y			Y			
Fabaceae	*Cullen stipulaceum*						Y			
Fabaceae	*Erythrophleum chlorostachys*		Y	Y	Y	Y	Y	Y	Y	Y
Fabaceae	*Gompholobium simplicifolium*		Y	Y	Y	Y	Y	Y		
Fabaceae	*Indigofera ammobia*						Y	Y	Y	
Fabaceae	*Indigofera boviperda* subsp. *eremaea*		Y	Y	Y	Y	Y	Y		
Fabaceae	*Indigofera linnaei*						Y			
Fabaceae	*Indigofera monophylla*		Y	Y	Y		Y	Y		Y
Fabaceae	*Indigofera trita*					Y			Y	Y
Fabaceae	*Jacksonia aculeata*		Y	Y	Y	Y	Y	Y	Y	Y
Fabaceae	*Leptosema anomalum*		Y	Y	Y		Y	Y		Y
Fabaceae	*Mirbelia viminalis*						Y	Y	Y	Y
Fabaceae	*Petalostylis cassioides*						Y	Y		
Fabaceae	*Petalostylis labicheoides*								Y	Y
Fabaceae	*Rhynchosia minima*				Y					
Fabaceae	*Senna artemisioides* subsp. *oligophylla* x subsp. *helmsii*						Y			Y
Fabaceae	*Senna costata*		Y							
Fabaceae	*Senna curvistyla*						Y			
Fabaceae	*Senna notabilis*		Y	Y	Y		Y	Y		
Fabaceae	*Senna symonii*						Y			
Fabaceae	*Tephrosia arenicola*						Y	Y	Y	
Fabaceae	*Tephrosia rosea* var. *clementii*			Y						

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Fabaceae	*Tephrosia rosea* var. *rosea*			Y						
Fabaceae	*Tephrosia simplicifolia*			Y						
Fabaceae	*Tephrosia* sp. Bungaroo Creek (M.E. Trudgen 11601)			Y	Y		Y			
Fabaceae	*Tephrosia* sp. D Kimberley Flora (R.D. Royce 1848)		Y	Y	Y	Y	Y			
Fabaceae	*Tephrosia* sp.									Y
Fabaceae	*Thinicola incana*						Y	Y	Y	
Fabaceae	*Zornia albiflora*						Y			
Fabaceae	*Zornia chaetophora*		Y	Y	Y	Y				
Fabaceae	Fabaceae sp.								Y	Y
Goodeniaceae	*Dampiera candicans*					Y	Y	Y	Y	Y
Goodeniaceae	*Dampiera cinerea*			Y	Y	Y	Y	Y	Y	
Goodeniaceae	*Goodenia armitiana*		Y	Y	Y		Y	Y	Y	
Goodeniaceae	*Goodenia azurea* subsp. *azurea*					Y				
Goodeniaceae	*Goodenia azurea* subsp. *hesperia*		Y	Y	Y		Y	Y		
Goodeniaceae	*Goodenia hartiana*	Priority 2	Y			Y	Y	Y	Y	
Goodeniaceae	*Goodenia lamprosperma*						Y			Y
Goodeniaceae	*Goodenia scaevolina*			Y	Y					Y
Goodeniaceae	*Goodenia triodiophila*		Y	Y			Y			
Goodeniaceae	*Scaevola browniana* subsp. *browniana*			Y	Y					
Goodeniaceae	*Scaevola parvifolia* subsp. *parvifolia*						Y	Y	Y	Y
Goodeniaceae	*Scaevola parvifolia* (sterile; subsp. not determined)		Y	Y		Y				
Goodeniaceae	*Velleia panduriformis*			Y			Y			
Gyrostemonaceae	*Codonocarpus cotinifolius*		Y	Y	Y		Y	Y		
Gyrostemonaceae	*Gyrostemon tepperi*		Y	Y	Y	Y	Y	Y	Y	
Haloragaceae	*Haloragis gossei* var. *gossei*						Y	Y		
Hemerocallidaceae	*Corynotheca asperata*	Priority 3					Y	Y		
Hemerocallidaceae	*Corynotheca micrantha* (var. not determined)					Y				
Hemerocallidaceae	*Corynotheca micrantha* var. *gracilis*		Y				Y	Y		
Lamiaceae	*Clerodendrum tomentosum* var. *tomentosum*					Y		Y		
Lamiaceae	*Clerodendrum tomentosum* (juvenile; var. not determined)			Y		Y				

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Lamiaceae	*Cyanostegia cyanocalyx*		Y	Y	Y	Y	Y	Y		
Lamiaceae	*Dasymalla chorisepala*	Priority 3	Y				Y	Y		
Lamiaceae	*Dicrastylis cordifolia*		Y				Y	Y	Y	Y
Lamiaceae	*Dicrastylis doranii*		Y	Y	Y		Y	Y		Y
Lamiaceae	*Dicrastylis exsuccosa*						Y	Y		
Lamiaceae	*Dicrastylis* sp. (inadequate material)						Y	Y		Y
Lamiaceae	*Newcastelia cladotricha*			Y	Y	Y	Y	Y	Y	Y
Lamiaceae	*Newcastelia spodiotricha*						Y	Y		
Lauraceae	*Cassytha capillaris*		Y	Y	Y		Y	Y	Y	
Lauraceae	*Cassytha filiformis*					Y				
Loganiaceae	*Orianthera centralis*						Y	Y	Y	
Loranthaceae	*Amyema sanguinea* var. *sanguinea*					Y				
Malvaceae	*Abutilon leucopetalum*			Y	Y					
Malvaceae	*Abutilon otocarpum*			Y						
Malvaceae	*Abutilon* sp. (inadequate material)						Y			
Malvaceae	*Androcalva loxophylla*		Y	Y	Y	Y	Y	Y	Y	
Malvaceae	*Corchorus incanus*		Y							
Malvaceae	*Corchorus sidoides* subsp. *sidoides*							Y		
Malvaceae	*Corchorus sidoides* subsp. *vermicularis*		Y	Y	Y		Y	Y		
Malvaceae	*Corchorus sidoides* (subsp. not determined)					Y				
Malvaceae	*Gossypium australe*		Y				Y			
Malvaceae	*Hibiscus leptocladus*		Y	Y	Y	Y	Y	Y	Y	
Malvaceae	*Melhania oblongifolia*								Y	
Malvaceae	*Seringia elliptica*		Y			Y	Y	Y	Y	
Malvaceae	*Seringia nephrosperma*		Y	Y	Y					
Malvaceae	*Seringia* sp. (sterile)			Y						
Malvaceae	*Sida arenicola*		Y	Y	Y	Y	Y	Y		
Malvaceae	*Sida* ? *arenicola* (A.A. Mitchell PRP 360)					Y				
Malvaceae	*Sida* sp. Pilbara (A.A. Mitchell PRP 1543)						Y	Y		
Malvaceae	*Sida* sp. Pindan (B.G. Thomson 3398)			Y		Y	Y	Y	Y	

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Malvaceae	*Sida* sp. Western sand dunes (P.K. Latz 11980)			Y	Y		Y	Y		
Malvaceae	*Sida* sp.					Y				
Malvaceae	*Triumfetta deserticola*		Y				Y			
Malvaceae	*Triumfetta incana*			Y						
Malvaceae	*Triumfetta ? maconochieana*			Y	Y					
Malvaceae	*Triumfetta* sp. (inadequate material)		Y							
Meliaceae	*Owenia reticulata*		Y	Y		Y	Y	Y	Y	Y
Menispermaceae	*Tinospora smilacina*		Y	Y	Y	Y				
Molluginaceae	*Trigastrotheca molluginea*		Y	Y	Y	Y	Y	Y	Y	
Moraceae	*Ficus brachypoda*			Y	Y					
Myrtaceae	*Calytrix carinata*		Y	Y	Y	Y	Y	Y	Y	Y
Myrtaceae	*Corymbia aspera*									Y
Myrtaceae	*Corymbia candida*						Y	Y		
Myrtaceae	*Corymbia chippendalei*						Y	Y		
Myrtaceae	*Corymbia* opaca								Y	
Myrtaceae	*Corymbia zygophylla*		Y	Y	Y	Y	Y	Y		
Myrtaceae	*Eucalyptus odontocarpa*		Y							
Nyctaginaceae	*Boerhavia coccinea*			Y	Y		Y			
Nyctaginaceae	*Boerhavia gardneri*		Y	Y	Y					
Nyctaginaceae	*Commicarpus australis*			Y						
Orobanchaceae	*Striga curviflora*			Y			Y			
Phrymaceae	*Peplidium* sp. (inadequate material)						Y			
Phyllanthaceae	*Phyllanthus eremicus*			Y	Y					
Phyllanthaceae	*Phyllanthus exilis*					Y				
Phyllanthaceae	*Phyllanthus* sp. (inadequate material)		Y			Y				
Phyllanthaceae	*Sauropus arenosus*	Priority 3					Y	Y		
Poaceae	*Amphipogon sericeus*		Y				Y	Y	Y	Y
Poaceae	*Aristida contorta*									Y
Poaceae	*Aristida holathera* (var. not determined)					Y			Y	
Poaceae	*Aristida holathera* var. *holathera*		Y	Y	Y	Y	Y	Y		

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Poaceae	*Aristida holathera* var. *latifolia*			Y			Y	Y		
Poaceae	*Aristida inaequiglumis*						Y	Y		
Poaceae	*Aristida* sp. (inadequate material)		Y			Y	Y			
Poaceae	*Chrysopogon fallax*						Y			
Poaceae	*Cynodon convergens*									Y
Poaceae	*Digitaria brownii*			Y						Y
Poaceae	*Eragrostis cumingii*					Y			Y	
Poaceae	*Eragrostis eriopoda*		Y	Y	Y	Y	Y	Y		
Poaceae	*Eragrostis* aff. *eriopoda*						Y	Y		
Poaceae	*Eragrostis* sp. (inadequate material)						Y		Y	
Poaceae	*Eriachne aristidea*			Y		Y	Y	Y	Y	Y
Poaceae	*Eriachne ciliata*		Y	Y	Y					
Poaceae	*Eriachne helmsii*		Y				Y	Y		
Poaceae	*Eriachne lanata*		Y	Y	Y	Y	Y	Y	Y	Y
Poaceae	*Eriachne mucronata*					Y				
Poaceae	*Eriachne obtusa*		Y	Y	Y		Y	Y		
Poaceae	*Eriachne pulchella*			Y	Y		Y	Y		
Poaceae	*Eriachne sulcata*					Y				
Poaceae	*Eulalia aurea*			Y	Y		Y	Y		
Poaceae	*Paractaenum refractum*			Y			Y	Y		
Poaceae	*Paraneurachne muelleri*		Y	Y			Y	Y		
Poaceae	*Paspalidium rarum*			Y	Y		Y			
Poaceae	*Paspalidium tabulatum*			Y	Y					
Poaceae	*Schizachyrium fragile*			Y						
Poaceae	*Setaria surgens*			Y		Y	Y			
Poaceae	*Sorghum plumosum* var. *plumosum*		Y	Y	Y	Y	Y	Y	Y	
Poaceae	*Sporobolus australasicus*						Y			Y
Poaceae	*Triodia basedowii*									Y
Poaceae	*Triodia brizoides*						Y	Y		
Poaceae	*Triodia epactia*		Y	Y	Y		Y	Y		

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Poaceae	*Triodia schinzii*		Y	Y	Y	Y	Y	Y	Y	Y
Poaceae	*Triodia* sp. (sterile soft spinifex; *epactia* or *schinzii*)		Y							
Poaceae	*Urochloa holosericea* subsp. *velutina*			Y	Y					
Poaceae	*Yakirra australiensis* var. *australiensis*		Y	Y	Y		Y	Y		Y
Polygalaceae	*Comesperma sabulosum*	Priority 3						Y		
Polygalaceae	*Polygala glaucifolia*			Y	Y					
Polygalaceae	*Polygala isingii*			Y	Y		Y	Y	Y	
Portulacaceae	*Calandrinia strophiolata*			Y						
Portulacaceae	*Portulaca filifolia*			Y						
Proteaceae	*Grevillea eriostachya*		Y	Y	Y	Y	Y	Y	Y	
Proteaceae	*Grevillea pyramidalis* (subsp. not determined)			Y	Y					
Proteaceae	*Grevillea pyramidalis* subsp. *pyramidalis*			Y						
Proteaceae	*Grevillea refracta* subsp. *refracta*		Y	Y	Y	Y				
Proteaceae	*Grevillea stenobotrya*			Y	Y	Y	Y	Y	Y	
Proteaceae	*Grevillea wickhamii* (sterile; subsp. not determined)		Y	Y	Y	Y				Y
Proteaceae	*Grevillea wickhamii* subsp. *aprica*					Y				
Proteaceae	*Grevillea wickhamii* subsp. *hispidula*		Y	Y	Y	Y	Y	Y	Y	
Proteaceae	*Grevillea wickhamii* subsp. *macrodonta*			Y	Y					
Proteaceae	*Hakea lorea*					Y			Y	Y
Proteaceae	*Hakea macrocarpa*		Y				Y	Y		
Proteaceae	*Persoonia falcata*							Y		
Rubiaceae	*Gardenia pyriformis* subsp. *keartlandii*		Y	Y	Y	Y				
Rubiaceae	*Oldenlandia crouchiana*				Y					
Rubiaceae	*Oldenlandia pterospora*									Y
Rubiaceae	*Oldenlandia mitrasacmoides* subsp. *mitrasacmoides*			Y						
Rubiaceae	*Oldenlandia pterospora*			Y	Y		Y			
Rubiaceae	*Spermacoce occidentalis*			Y	Y		Y	Y	Y	
Santalaceae	*Santalum lanceolatum*						Y	Y	Y	
Sapindaceae	*Dodonaea coriacea*		Y	Y	Y	Y	Y	Y	Y	Y
Sapindaceae	*Dodonaea hispidula* var. *arida*		Y			Y	Y	Y	Y	

Family	Species	Status	WRAC				WPA			
			Biota	AREH* Ph1	AREH* Ph2	Astron (2019a)	Biota Ph1	Biota Ph2	Astron (2019b)	Astron (2018)
Scrophulariaceae	*Eremophila latrobei*						Y			
Solanaceae	*Duboisia hopwoodii*						Y	Y		
Solanaceae	*Solanum centrale*						Y	Y		
Solanaceae	*Solanum dioicum*		Y	Y	Y					
Solanaceae	*Solanum diversiflorum*			Y			Y	Y		Y
Thymelaeaceae	*Pimelea ammocharis*						Y	Y		
Violaceae	*Hybanthus aurantiacus*		Y	Y	Y					
Zygophyllaceae	*Tribulopis marliesiae*	Priority 3	Y	Y	Y		Y	Y		
Zygophyllaceae	*Tribulus hirsutus*						Y	Y		
Zygophyllaceae	*Tribulus occidentalis*						Y			

* Asian Renewable Energy Hub (Biota 2018b)

Appendix 6

Selected Inputs and Outputs of the Floristic Clustering Analyses

Table 1. List of species that were omitted or referred to other species for the floristic analysis.

Species	Occurrences			Status	Name referred to for analysis
	AREH Ph1+2	Winu Ph1+2	Astron		
Abutilon lepidum	1			Omitted; singleton record	NA
Abutilon sp.	1			Omitted; singleton record	NA
Acacia arida			1	Omitted; singleton record	NA
Acacia colei var. *colei*	45	1	5	Referred to species	*Acacia colei*
Acacia drepanocarpa subsp. *drepanocarpa*	5		1	Referred to species	*Acacia drepanocarpa*
Acacia drepanocarpa subsp. *latifolia*	1	21		Referred to species	*Acacia drepanocarpa*
Acacia eriopoda x *monticola* (B.R. Maslin 7322)		1		Omitted; singleton record	NA
Acacia retivenea subsp. *clandestina*			2	Likely to be *Acacia platycarpa*	*Acacia platycarpa*
Acacia sp.		1		Referred to species	*Acacia drepanocarpa*
Acacia sp. Nalgi (N.T. Burbidge 1317)		1		Referred to species	*Acacia drepanocarpa*
Acacia tumida var. *pilbarensis*		1		Referred to species	*Acacia tumida* var. *kulparn*
Aenictophyton reconditum subsp. *reconditum*	1			Omitted; singleton record	NA
Aerva javanica	6			Omitted; weed	NA
Amyema sanguinea var. *sanguinea*			1	Omitted; singleton record	NA
Aristida holathera			3	Likely to be var. *holathera*	*Aristida holathera* var. *holathera*
Aristida holathera var. *latifolia*	2	4		Referred to var. *holathera*	*Aristida holathera* var. *holathera*
Aristida sp.		2	3	Omitted; may represent multiple species	NA
Atriplex sp.			21	Likely to be *Dicrastylis doranii*	*Dicrastylis doranii*
Bidens bipinnata	1			Omitted; weed	NA
Bonamia linearis			5	Could be confused with *B. alatisemina*	*Bonamia alatisemina*
Calandrinia tepperiana	1			Omitted; singleton record	NA
Capparis umbonata	1			Omitted; singleton record	NA
Cassytha filiformis	2		12	Could be confused with *C. capillaris*	*Cassytha capillaris*
Cenchrus ciliaris	3			Omitted; weed	NA
Cenchrus setiger	2			Omitted; weed	NA
Citrullus colocynthis	2			Omitted; weed	NA
Cleome uncifera subsp. *microphylla*			3	Referred to species	*Cleome uncifera*
Cleome uncifera subsp. *uncifera*	35			Referred to species	*Cleome uncifera*
Clerodendrum floribundum var. *angustifolium*	1			Omitted; singleton record	NA
Clerodendrum tomentosum var. *mollissima*	3			Referred to species	*Clerodendrum tomentosum*
Clerodendrum tomentosum var. *tomentosum*	3		1	Referred to species	*Clerodendrum tomentosum*
Commicarpus australis	1			Omitted; singleton record	NA
Corchorus incanus		1		Omitted; singleton record	NA
Corchorus sidoides subsp. *sidoides*		1		Referred to species	*Corchorus sidoides*

Species	Occurrences			Status	Name referred to for analysis
	AREH Ph1+2	Winu Ph1+2	Astron		
Corchorus sidoides subsp. *vermicularis*	42	17		Referred to species	*Corchorus sidoides*
Corynotheca micrantha			1	Likely to be *C. micrantha* var. *gracilis*	*Corynotheca micrantha* var. *gracilis*
Cuscuta victoriana	1			Omitted; singleton record	NA
Cymbopogon sp.	1			Omitted; singleton record	NA
Cyperus sp.	1			Omitted; singleton record	NA
Datura ? leichhardtii	1			Omitted; singleton record	NA
Dicrastylis sp.		2		Omitted; may represent multiple species	NA
Dolichandrone occidentalis	1			Omitted; singleton record	NA
Dysphania plantaginella	1			Omitted; singleton record	NA
Dysphania sp.	1			Omitted; singleton record	NA
Enchylaena tomentosa var. *tomentosa*	1			Omitted; singleton record	NA
Enneapogon ? purpurascens	1			Omitted; singleton record	NA
Eragrostis minor	2			Omitted; weed	NA
Eragrostis sp.	1	1		Omitted; may represent multiple species	NA
Euphorbia ? albrechtii	1			Omitted; singleton record	NA
Euphorbia ? myrtoides	4			Referred to most similar species	*Euphorbia myrtoides*
Euphorbia ? wheeleri	4			Omitted; may represent multiple species	NA
Euphorbia sp.	2			Omitted; may represent multiple species	NA
Evolvulus alsinoides var. *decumbens*	23	1		Referred to species	*Evolvulus alsinoides*
Evolvulus alsinoides var. *villosicalyx*	4			Referred to species	*Evolvulus alsinoides*
Fimbristylis ammobia	1			Omitted; singleton record	NA
Goodenia ? azurea subsp. *hesperia*	1			Could be confused with *G. hartiana*	*Goodenia hartiana*
Goodenia azurea subsp. *azurea*			1	Could be confused with *G. hartiana*	*Goodenia hartiana*
Goodenia microptera	1			Omitted; singleton record	NA
Grevillea pyramidalis subsp. *pyramidalis*	3			Referred to species	*Grevillea pyramidalis*
Grevillea wickhamii subsp. *aprica*			5	Referred to species	*Grevillea wickhamii*
Grevillea wickhamii subsp. *hispidula*	9	59	10	Referred to species	*Grevillea wickhamii*
Grevillea wickhamii subsp. *macrodonta*	14			Referred to species	*Grevillea wickhamii*
Hakea lorea			1	Omitted; singleton record	NA
Halgania solanacea var. Mt Doreen (G.M. Chippendale 4206)			10	Could be confused with var. *solanacea*	*Halgania solanacea* var. *solanacea*
Haloragis gossei var. *gossei*		1		Omitted; singleton record	NA
Heliotropium sp.	3	2		Omitted; may represent multiple species	NA
Hibiscus apodus	1			Omitted; singleton record	NA
Indigofera boviperda		1		Likely to be subsp. eremaea	*Indigofera boviperda* subsp. *eremaea*
Indigofera trita			1	Omitted; singleton record	NA

Species	Occurrences			Status	Name referred to for analysis
	AREH Ph1+2	Winu Ph1+2	Astron		
Indigofera trita subsp. *trita*	1			Omitted; singleton record	NA
Ipomoea coptica	1			Omitted; singleton record	NA
Ipomoea pes-caprae subsp. *brasiliensis*	1			Omitted; singleton record	NA
Mallotus nesophilus	1			Omitted; singleton record	NA
Melaleuca alsophila	1			Omitted; singleton record	NA
Neobassia astrocarpa	1			Omitted; singleton record	NA
Paspalidium clementii	1			Omitted; singleton record	NA
Perotis rara	1			Omitted; singleton record	NA
Petalostylis labicheoides	1			Omitted; singleton record	NA
Phyllanthus exilis			1	Omitted; singleton record	NA
Phyllanthus sp.		1	1	Omitted; may represent multiple species	NA
Polymeria ? sp. Broome (K.F. Kenneally 9759)	2			Omitted; may represent multiple species	NA
Portulaca aff. *australis*	2			Omitted; may represent multiple species	NA
Portulaca oleracea	1			Omitted; singleton record	NA
Pterocaulon sp.	2			Omitted; may represent multiple species	NA
Ptilotus lanatus	1			Omitted; singleton record	NA
Salsola australis	1			Omitted; singleton record	NA
Scaevola amblyanthera var. *centralis*	1			Omitted; singleton record	NA
Scaevola crassifolia	1			Omitted; singleton record	NA
Scaevola parvifolia subsp. *parvifolia*	5	35		Referred to species	*Scaevola parvifolia*
Scaevola parvifolia subsp. *pilbarae*	1			Referred to species	*Scaevola parvifolia*
Senna artemisioides subsp. *helmsii*	1			Omitted; singleton record	NA
Senna artemisioides subsp. *oligophylla* x subsp. *helmsii*	1			Omitted; singleton record	NA
Senna ? *glaucifolia*	1			Omitted; singleton record	NA
Senna glutinosa subsp. *glutinosa*	1			Omitted; singleton record	NA
Seringia exastia	4			Merge with *S. elliptica*	*Seringia elliptica*
Seringia sp.	13			Likely to be *S. elliptica*	*Seringia elliptica*
Setaria dielsii	1			Omitted; singleton record	NA
Setaria verticillata	1			Omitted; weed	NA
Sida ? *arenicola* (A.A. Mitchell PRP360)			1	Omitted; singleton record	NA
Sida sp.			1	Omitted; may represent multiple species	NA
Solanum horridum	1			Omitted; singleton record	NA
Sorghum plumosum			2	Likely to be var. *plumosum*	*Sorghum plumosum* var. *plumosum*
Stemodia grossa	1			Omitted; singleton record	NA
Streptoglossa sp.		2		Omitted; may represent multiple species	NA

Species	Occurrences			Status	Name referred to for analysis
	AREH Ph1+2	Winu Ph1+2	Astron		
Stylobasium spathulatum	1			Omitted; singleton record	NA
Stylosanthes hamata	1			Omitted; weed	NA
Tephrosia leptoclada	1			Omitted; singleton record	NA
Tephrosia rosea var. Port Hedland (A.S. George 1114) PN	1			Omitted; singleton record	NA
Tephrosia sp. NW Eremaean (S. van Leeuwen et al. PBS 0356) PN	1			Omitted; singleton record	NA
Tephrosia supina	1			Omitted; singleton record	NA
Tephrosia virens	1			Omitted; singleton record	NA
Threlkeldia diffusa	1			Omitted; singleton record	NA
Trianthema portulacastrum	1			Omitted; weed	NA
Tribulopis angustifolia	1			Omitted; singleton record	NA
Trichodesma zeylanicum var. *zeylanicum*	3	1		Referred to species	*Trichodesma zeylanicum*
Triodia sp.		1		Omitted; singleton record	NA
Triraphis mollis	1			Omitted; singleton record	NA
Triumfetta ? maconochieana	3			Omitted; may represent multiple species	NA
Triumfetta aff. *plumigera*	3			Omitted; may represent multiple species	NA
Waltheria indica	1			Omitted; singleton record	NA

Table 2: Summary of floristic groups for the two main cluster analyses conducted using the sites in the WPA.
NB: Shading indicates dominant floristic groups (any that included at least half the sites in a given survey area).

Habitat	Vegetation	Sites	Floristic Group (Annual + Perennial Species)		
			WPA Pres/Abs	WPA % Cover	All Regional Sites % Cover
Sand Dunes	D1	WIN03	c	a	t
	D1	WIN10	c	a	t
	D1	WIN12	c	a	t
Sand Dunes	D2	WIN01	c	a	t
	D2	WIN14	b	a	t
	D2	WIN17	b	a	q
Sand Plains	P1	WIN02	i	g	z
	P1	WIN07	i	g	q
	P1	WIN08	i	g	z
	P1	WIN31	h	g	q
Sand Plains	P2	WIN13	i	e	x
	P2	WIN29	i	f	y
	P2	WIN30	i	f	y
Sand Plains	P3	WIN04	i	g	z
	P3	WIN09	h	g	z
	P3	WIN11	h	g	z
Sand Plains	P4	WIN23	f	j	am
	P4	WIN24	f	j	am
	P4	WIN25	f	i	al
Sand Plains	P5	WIN26	g	d	aj
	P5	WIN27	g	d	aj
	P5	WIN28	g	d	aj
Sand Plains	P6	WIN06	e	h	ak
	P6	WIN18	i	b	n
	P6	WINREL01	i	b	n
Sand Plains	P7	WIN05	d	k	h
	P7	WIN41	d	k	h
Rocky Rises and Outcroppings	R1	WIN20	a	l	ag
	R1	WIN21	a	l	ag
	R1	WIN22	a	l	ag
Rocky Rises and Outcroppings	R2	WIN15	g	c	ai
	R2	WIN16	g	c	ai
	R2	WIN19	g	c	ai

Table 3: Summary of floristic groups for the two main cluster analyses conducted using the sites in the Winu regional area.

NB: Shading indicates dominant floristic groups (any that included at least half the sites in a given survey area).

Habitat	Site	Veg Code	Number of Sampling Phases	Project	Floristic Group	
					Ann+Per, % Cover	Ann+Per, Pres Abs
Sand Dunes	WIN03	D1	2	WPA	t	v
	WIN10		2	WPA	t	v
	WIN12		2	WPA	t	v
	WIN32		2	WPA	q	y
Sand Dunes	WIN01	D2	2	WPA	t	v
	WIN14		2	WPA	t	y
	WIN17		2	WPA	q	y
	WINREL02		2	WPA	q	y
Sand Dunes	AH23	D3	2	AREH	t	w
	AH31		2	AREH	t	v
	AH35		2	AREH	t	w
	AH69		2	AREH	t	u
	AH76		2	AREH	s	t
	AH77		2	AREH	t	u
	AH83		2	AREH	t	w
	AH87		2	AREH	t	u
Sand Dunes	AH21	A-S2b	2	AREH	q	ac
	AH22		2	AREH	q	ac
	AH32		2	AREH	q	y
	AH82		2	AREH	r	w
	AH85		2	AREH	q	y
Sand Plains	WIN02	P1	2	WPA	z	k
	WIN07		2	WPA	q	j
	WIN08		2	WPA	z	m
	WIN31		2	WPA	q	j
	WIN39		1	WRAC	q	z
Sand Plains	WIN13	P2	2	WPA	x	j
	WIN29		2	WPA	y	o
	WIN30		2	WPA	y	o
	WIN35		1	WRAC	w	k
	WIN37		1	WRAC	l	aq
Sand Plains	WIN04	P3	2	WPA	z	n
	WIN09		2	WPA	z	j
	WIN11		2	WPA	z	j
	WIN36		1	WRAC	l	aq
Sand Plains	WIN23	P4	2	WPA	am	q
	WIN24		2	WPA	am	q
	WIN25		2	WPA	al	q
Sand Plains	WIN26	P5	2	WPA	aj	r
	WIN27		2	WPA	aj	r
	WIN28		2	WPA	aj	r
Sand Plains	WIN06	P6	2	WPA	ak	i
	WIN18		2	WPA	n	j
	WINREL01		2	WPA	n	l

Habitat	Site	Veg Code	Number of Sampling Phases	Project	Floristic Group	
					Ann+Per, % Cover	Ann+Per, Pres Abs
Sand Plains	WIN05	P7	2	WPA	h	h
	WIN41		1	WPA	h	h
Sand Plains	AH03	P8	2	AREH	ad	ap
	AH06		2	AREH	ac	ap
	AH08		2	AREH	ac	ap
	AH102		2	AREH	ad	ap
	AH11		2	AREH	ad	ap
	AH14		2	AREH	ad	ap
	AH26		2	AREH	ad	ap
	AH30		2	AREH	ad	ab
	AH44		2	AREH	aa	ai
	AH62		2	AREH	ad	ap
	AH73		2	AREH	ad	ap
	AH95		2	AREH	ab	ap
	AH97		2	AREH	l	s
	DR03		1	Astron	u	aq
	DR07		1	Astron	o	x
	DR08		1	Astron	o	x
	WIN40		1	WRAC	o	z
	WINREL03		1	WRAC	m	aq
	WINREL06		1	WRAC	m	ad
	WINREL07		1	WRAC	o	x
Sand Plains	AH01	P9	2	AREH	af	ai
	AH07		2	AREH	af	ak
	AH12		2	AREH	ae	ak
	AH13		2	AREH	ae	an
	AH17		2	AREH	ae	an
	AH47		2	AREH	ae	ao
	AH74		2	AREH	v	p
	AH81		2	AREH	af	ab
	AH89		2	AREH	ae	ao
	DR06		1	Astron	u	ah
	DR23		1	Astron	u	f
	DR25		1	Astron	u	f
Sand Plains	AH24	P10	2	AREH	r	ab
	AH28		2	AREH	r	z
	AH29		2	AREH	q	z
	AH33		2	AREH	r	aa
	AH34		2	AREH	r	aa
	AH70		2	AREH	r	ab
	AH71		2	AREH	q	ac
	AH72		2	AREH	r	ab
	AH78		2	AREH	r	ab
	AH79		2	AREH	r	ab
	AH80		2	AREH	z	y
	DR09		1	Astron	r	y
	DR14		1	Astron	r	aa

Habitat	Site	Veg Code	Number of Sampling Phases	Project	Floristic Group	
					Ann+Per, % Cover	Ann+Per, Pres Abs
	DR16		1	Astron	r	aa
	DR22		1	Astron	r	aa
	DR27		1	Astron	r	y
	DR29		1	Astron	p	y
	WIN33		1	WRAC	l	s
	WIN34		1	WRAC	m	ad
	WIN38		1	WRAC	l	s
Sand Plains	AH101	P11	2	AREH	i	ap
	AH25		2	AREH	h	ak
	AH36		2	AREH	h	ak
	AH37		2	AREH	h	ai
	AH40		2	AREH	h	ak
	AH48		2	AREH	h	ak
	AH51		2	AREH	h	ah
	AH52		2	AREH	g	ah
	AH53		2	AREH	f	ai
	AH86		2	AREH	af	al
	AH88		2	AREH	h	al
	AH99		2	AREH	i	ag
Sand Plains	AH18	P12	2	AREH	e	an
	AH39		2	AREH	e	aj
	AH46		2	AREH	e	ai
	AH49		2	AREH	e	ak
	AH55		2	AREH	e	aj
	DR04		1	Astron	u	e
Sand Plains	DR01	P13	1	Astron	p	y
	DR02		1	Astron	p	y
	DR05		1	Astron	p	y
	DR10		1	Astron	p	y
	DR11		1	Astron	p	y
	DR12		1	Astron	p	y
	DR13		1	Astron	p	y
	DR15		1	Astron	p	y
	DR17		1	Astron	p	y
	DR18		1	Astron	p	y
	DR19		1	Astron	p	y
	DR20		1	Astron	p	y
	DR21		1	Astron	p	y
	DR24		1	Astron	p	y
	DR26		1	Astron	p	y
Sand Plains	AH100	A-P2	2	AREH	k	af
	AH65		2	AREH	j	ae
	AH98		2	AREH	k	af
Rocky Rises and Outcroppings	WIN20	R1	2	WPA	ag	g
	WIN21		2	WPA	ag	g
	WIN22		2	WPA	ag	g

Habitat	Site	Veg Code	Number of Sampling Phases	Project	Floristic Group	
					Ann+Per, % Cover	Ann+Per, Pres Abs
Rocky Rises and Outcroppings	WIN15	R2	2	WPA	ai	r
	WIN16		2	WPA	ai	r
	WIN19		2	WPA	ai	r
Rocky Rises and Outcroppings	AH-REL07	R3	2	AREH	g	d
	AH02		2	AREH	g	d
	AH04		2	AREH	g	d
	AH05		2	AREH	g	d
	AH09		2	AREH	g	d
	AH10		2	AREH	g	d
	AH15		2	AREH	g	d
	AH16		2	AREH	e	b
	AH19		2	AREH	g	d
	AH20		2	AREH	f	d
	AH41		2	AREH	g	d
	AH42		2	AREH	g	d
	AH43		2	AREH	g	d
	AH45		2	AREH	g	ai
	AH50		2	AREH	f	d
	AH64		2	AREH	g	d
	AH66		2	AREH	f	e
	AH67		2	AREH	g	d
	AH68		2	AREH	g	d
	AH75		2	AREH	g	d
	WINREL04		1	WRAC	ah	e
	WINREL05		1	WRAC	ah	e
Rocky Rises and Outcroppings	AH-REL01	R4	2	AREH	d	c
	AH-REL02		2	AREH	b	b
	AH27		2	AREH	d	c
	AH56		2	AREH	c	c
	AH63		2	AREH	d	c
Drainage	AH60	A-D1	2	AREH	a	a
	AH61		2	AREH	a	a
	AH96		2	AREH	a	a
Drainage	AH-REL03	A-D2a	2	AREH	e	ai
	AH38		2	AREH	e	aj
	AH54		2	AREH	f	ai
	AH93		2	AREH	e	am

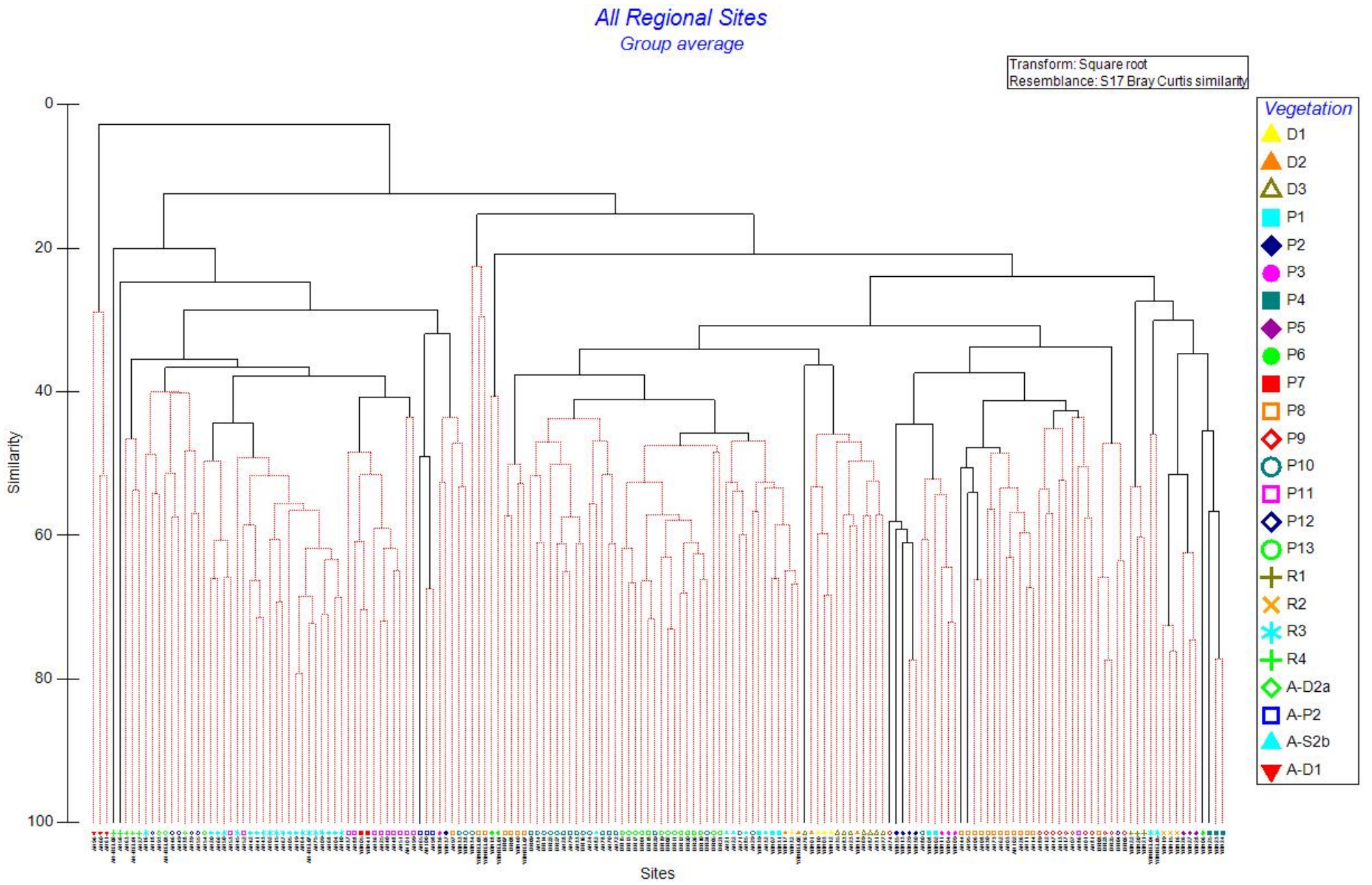


Figure 1: **Dendrogram showing clustering of sites from the Winu regional area, coded by vegetation type (analysis based on percent cover data for annual and perennial species).**

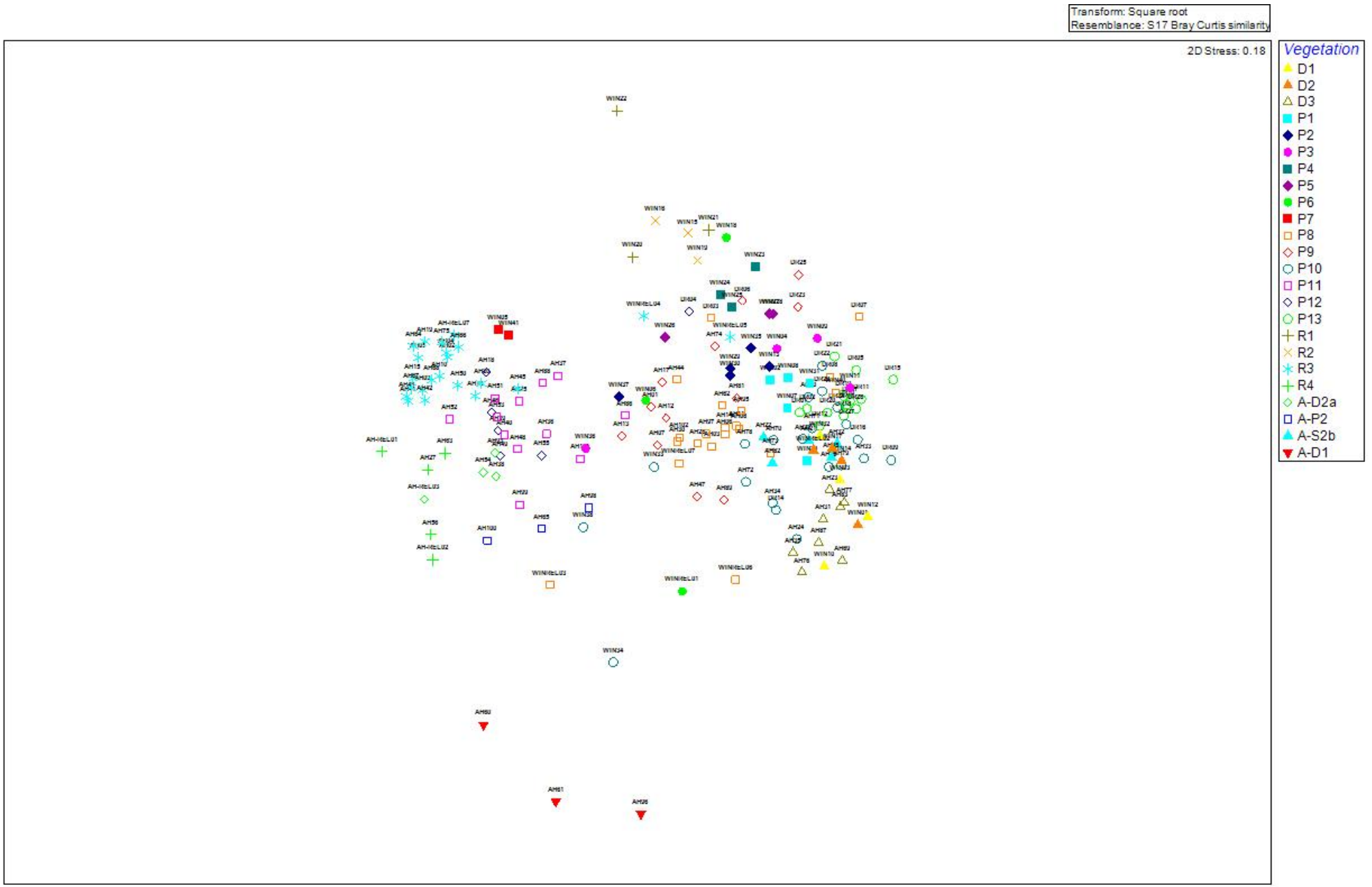


Figure 2: **NMDS plot showing all regional sites, coded by assigned vegetation type.**

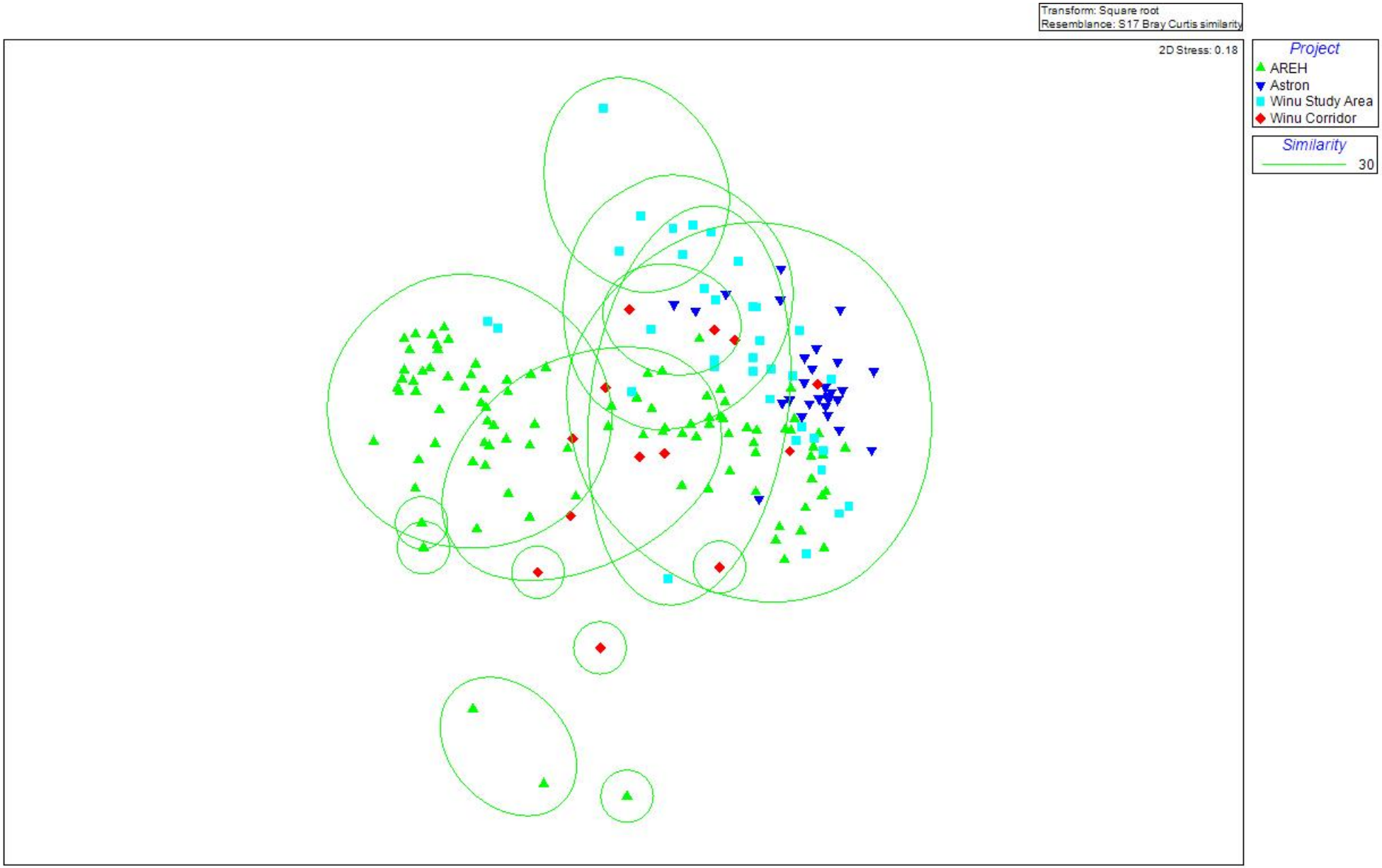


Figure 3: NMDS plot with all regional sites coded by project.

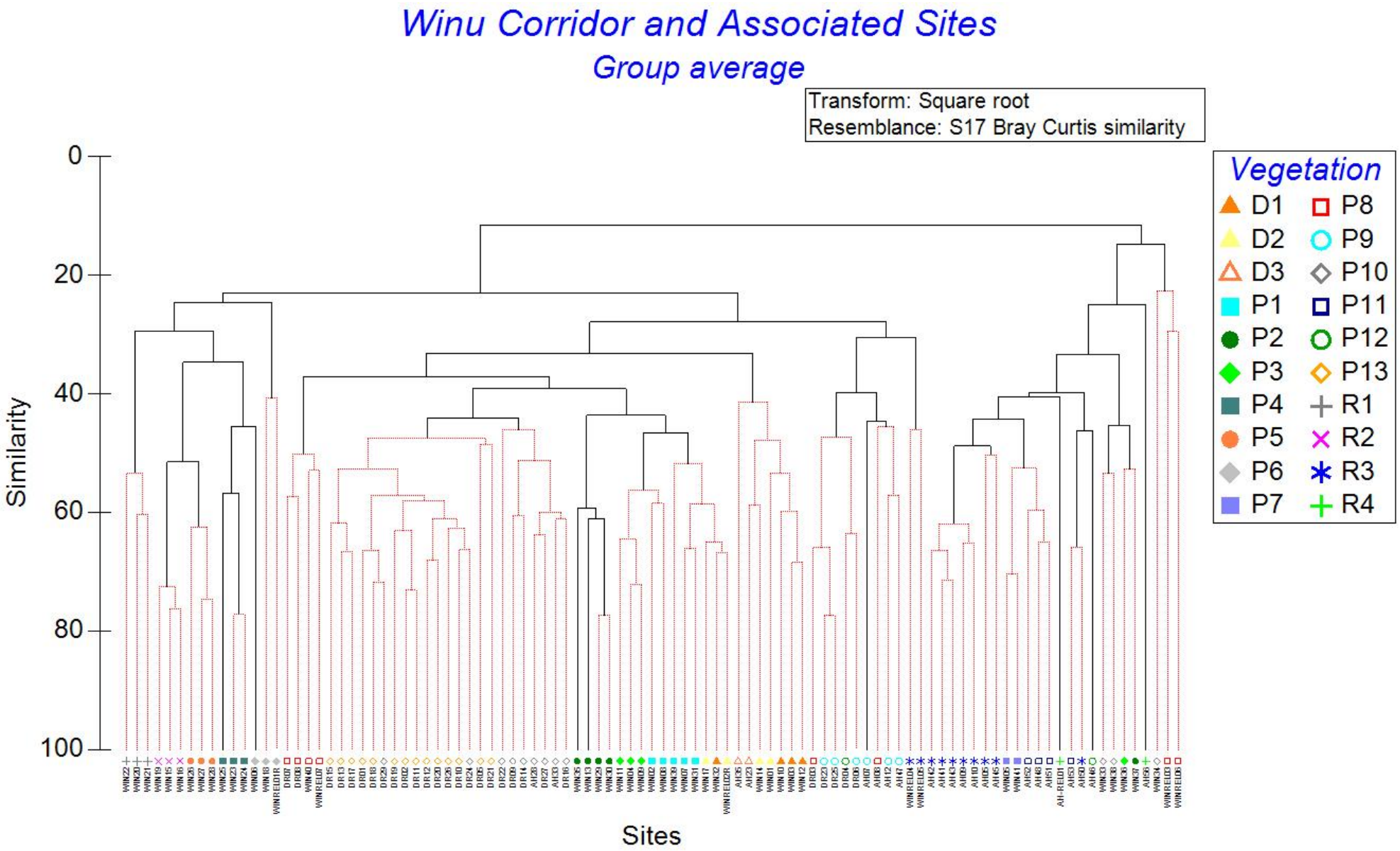


Figure 4: **Dendrogram of all sites within the WRAC and WPA, coded by vegetation type.**

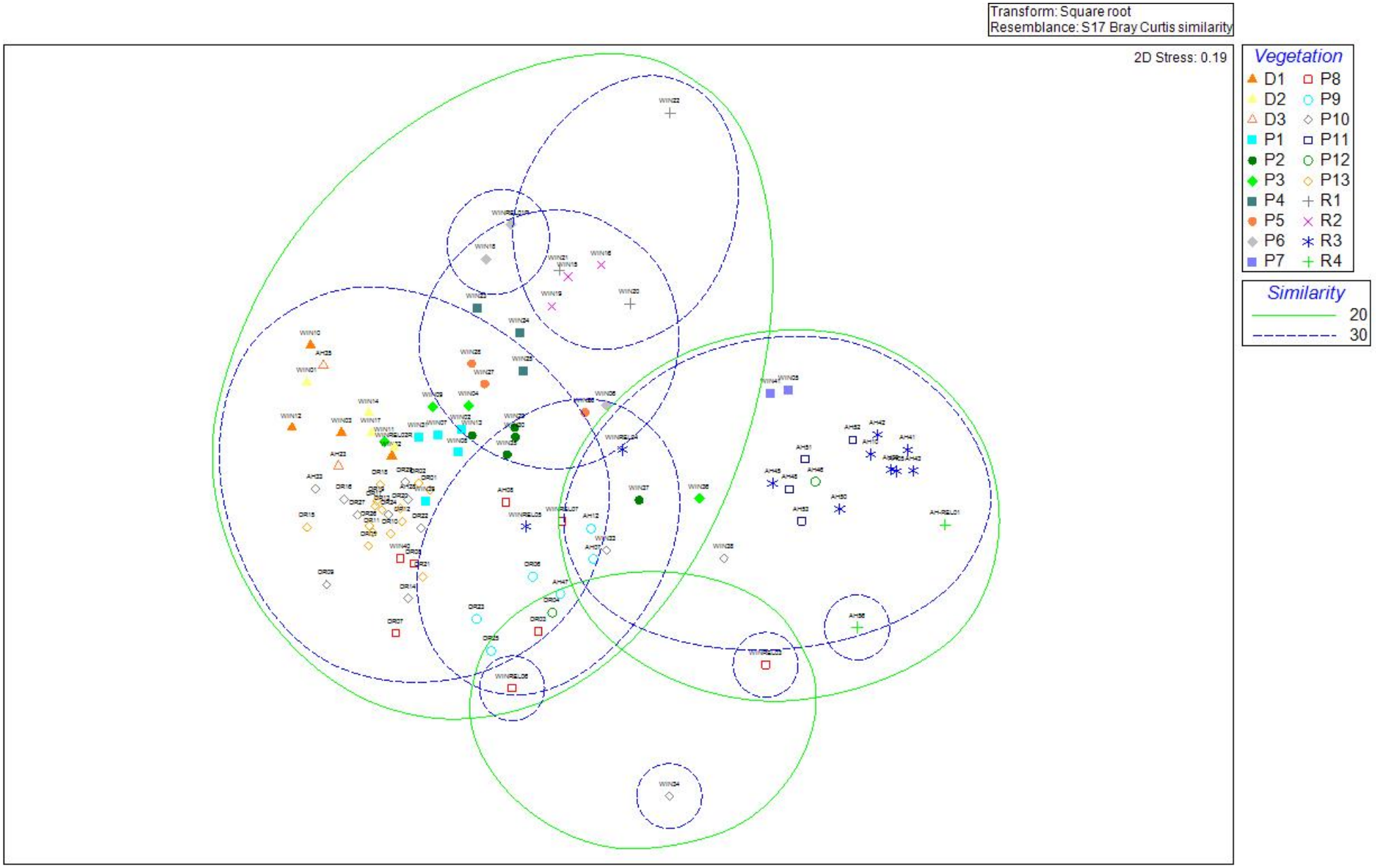
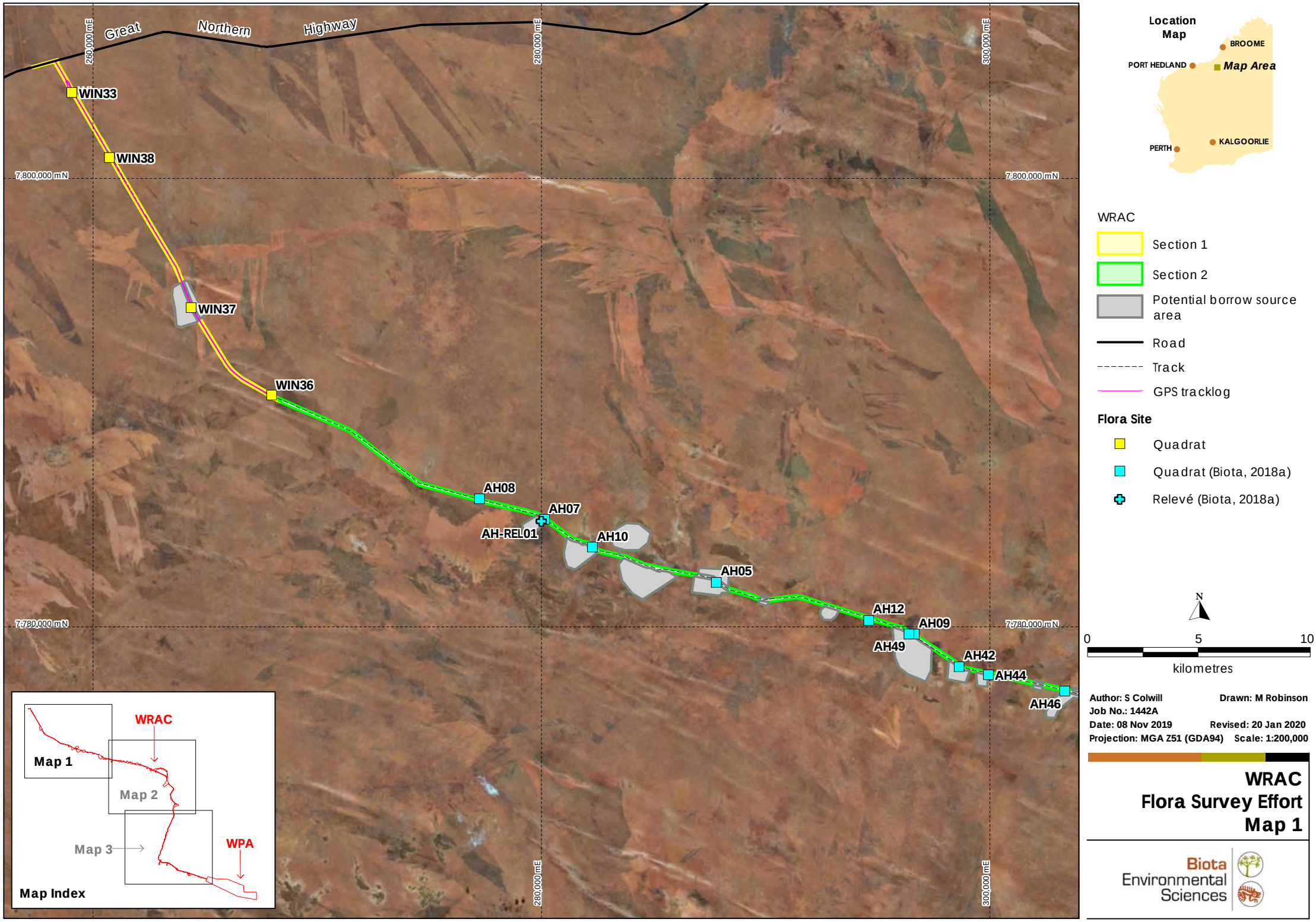


Figure 5: **NMDS plot of all sites within the WRAC and WPA, coded by vegetation type.**

Appendix 7

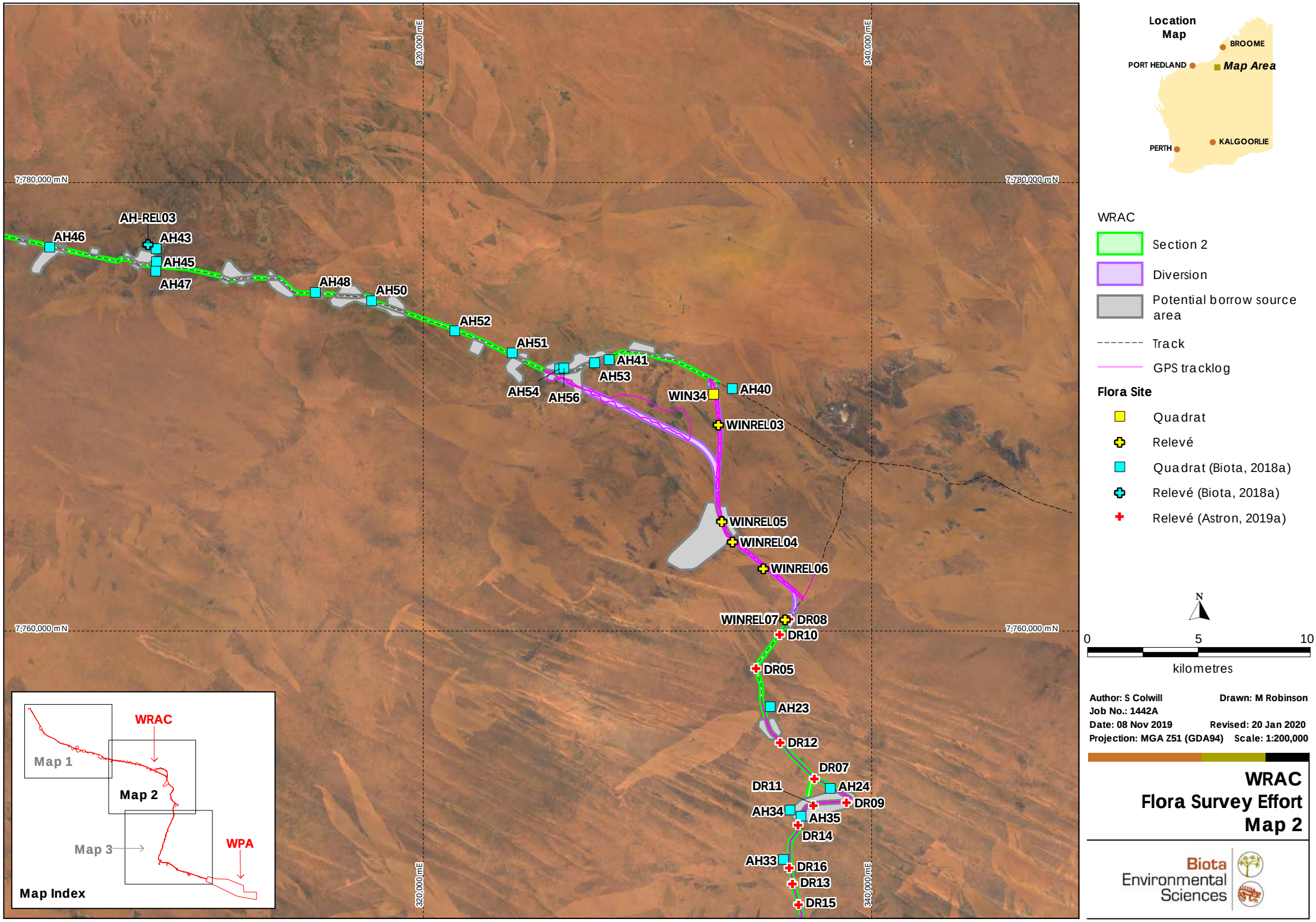
Vegetation Mapping and Site Locations for the Winu Road Access Corridor



Author: S Colwill Drawn: M Robinson
Job No.: 1442A
Date: 08 Nov 2019 Revised: 20 Jan 2020
Projection: MGA Z51 (GDA94) Scale: 1:200,000

WRAC Flora Survey Effort Map 1

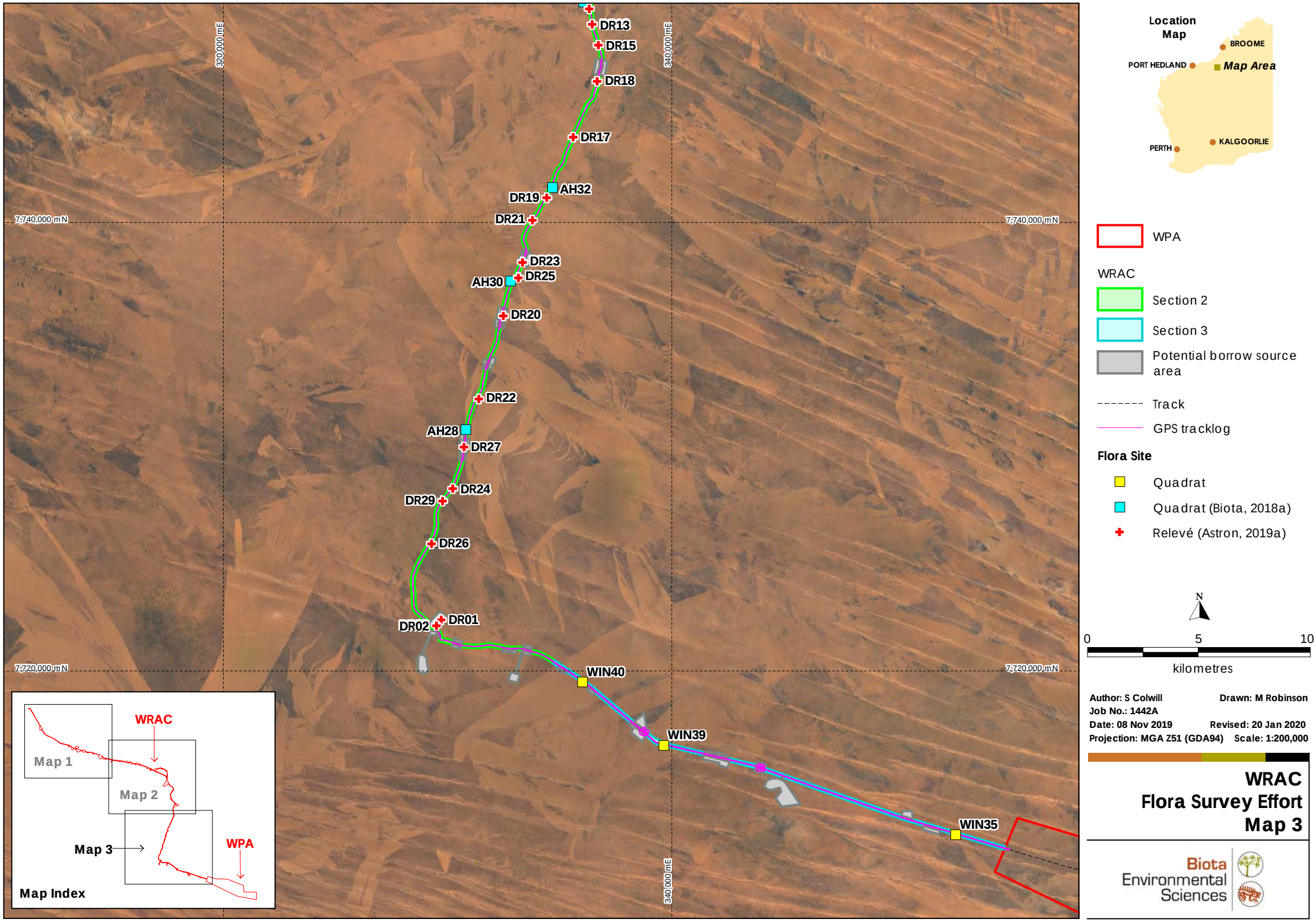
Biota Environmental Sciences



Author: S Colwill
Drawn: M Robinson
Job No.: 1442A
Date: 08 Nov 2019
Revised: 20 Jan 2020
Projection: MGA Z51 (GDA94)
Scale: 1:200,000

WRAC
Flora Survey Effort
Map 2

Biota Environmental Sciences



Author: S Colwill
Drawn: M Robinson
Job No.: 1442A
Date: 08 Nov 2019
Revised: 20 Jan 2020
Projection: MGA Z51 (GDA94)
Scale: 1:200,000

WRAC Flora Survey Effort Map 3

Biota Environmental Sciences

Winu Project Vegetation Mapping Descriptions

Broad Landform: Sand dunes and associated swales

D3 *Grevillea stenobotrya, G. wickhamii, Acacia anaticeps* tall open shrubland over *A. tumida* var. *kulparn, Cyanostegia cyanocalyx, Sida* sp. Western sand dunes (P.K. Latz 11980) open shrubland over *Dicrastylis doranii,* (*Dampiera cinerea, A. stellaticeps, Gompholobium simplicifolium, Newcastelia cladotricha*) low open shrubland over *Triodia schinzii* very open hummock grassland and *Eriachne obtusa, Aristida holathera* var. *holathera* very open tussock grassland

Broad Landform: Inter-dunal sand plains

P1 *Owenia reticulata, Erythrophyleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Jacksonia aculeata, (Androcalva loxophylla, Dicrastylis cordifolia, Gompholobium simplicifolium, Seringia elliptica)* low shrubland over *Triodia schinzii* open hummock grassland

P2 *Owenia reticulata, Erythrophyleum chlorostachys* scattered low trees over *Acacia ancistrocarpa, (Hakea macrocarpa)* tall shrubland over *Sorghum plumosum* var. *plumosum, Aristida holathera* var. *holathera, Amphipogon sericeus* scattered tussock grasses to very open tussock grassland over *Triodia schinzii* hummock grassland

P3 *Owenia reticulata, Erythrophyleum chlorostachys* scattered low trees over *Acacia drepanocarpa* subsp. *latifola, (A. platycarpa)* tall shrubland over *Jacksonia aculeata* low open shrubland over *Triodia schinzii* hummock grassland

P7 *Owenia reticulata, Erythrophyleum chlorostachys* scattered low trees over *Acacia ancistrocarpa* low open shrubland over *Eulalia aurea, (Eriachne lanata)* very open tussock grassland over *Triodia epactia* open hummock grassland

P8 *Owenia reticulata, Erythrophleum chlorostachys* scattered low trees over *Acacia eriopoda, A. sericophylla* tall open shrubland over *Androcalva loxophylla, Dicrastylis doranii, Jacksonia aculeata* low open shrubland over *Triodia schinzii,* (*T. epactia*) open hummock grassland

P9 *Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa, A. monticola* tall open shrubland over *Triodia schinzii,* (*T. epactia*) open hummock grassland

P10 *Corymbia zygophylla, Erythrophleum chlorostachys* scattered low trees over *Grevillea eriostachya, G. wickhamii* scattered tall shrubs over *Gompholobium simplicifolium, Jacksonia aculeata,* (*Dicrastylis doranii, Dampiera cinerea, Acacia stellaticeps*) low open shrubland over *Triodia schinzii* very open hummock grassland

P11 *Erythrophleum chlorostachys* scattered low trees over *Grevillea refracta* scattered tall shrubs over *Acacia ancistrocarpa, A. monticola, A. tumida* var. *kulparn* open shrubland over *Triodia epactia* open hummock grassland

P12 *Grevillea refracta, Acacia monticola, A. colei* var. *colei* tall open shrubland over *A. hilliana, A. adoxa* var. *adoxa* scattered low shrubs over *Triodia epactia* open hummock grassland

P13 *Erythrophleum chlorostachys*, (*Owenia reticulata*, *Gardenia pyriformis* subsp. *keartlandii*) scattered low trees over *Grevillea wickhamii* subsp. *hispidula* scattered tall shrubs over *Gompholobium simplicifolium*, *Jacksonia aculeata* low open shrubland over *Triodia schinzii* open hummock grassland

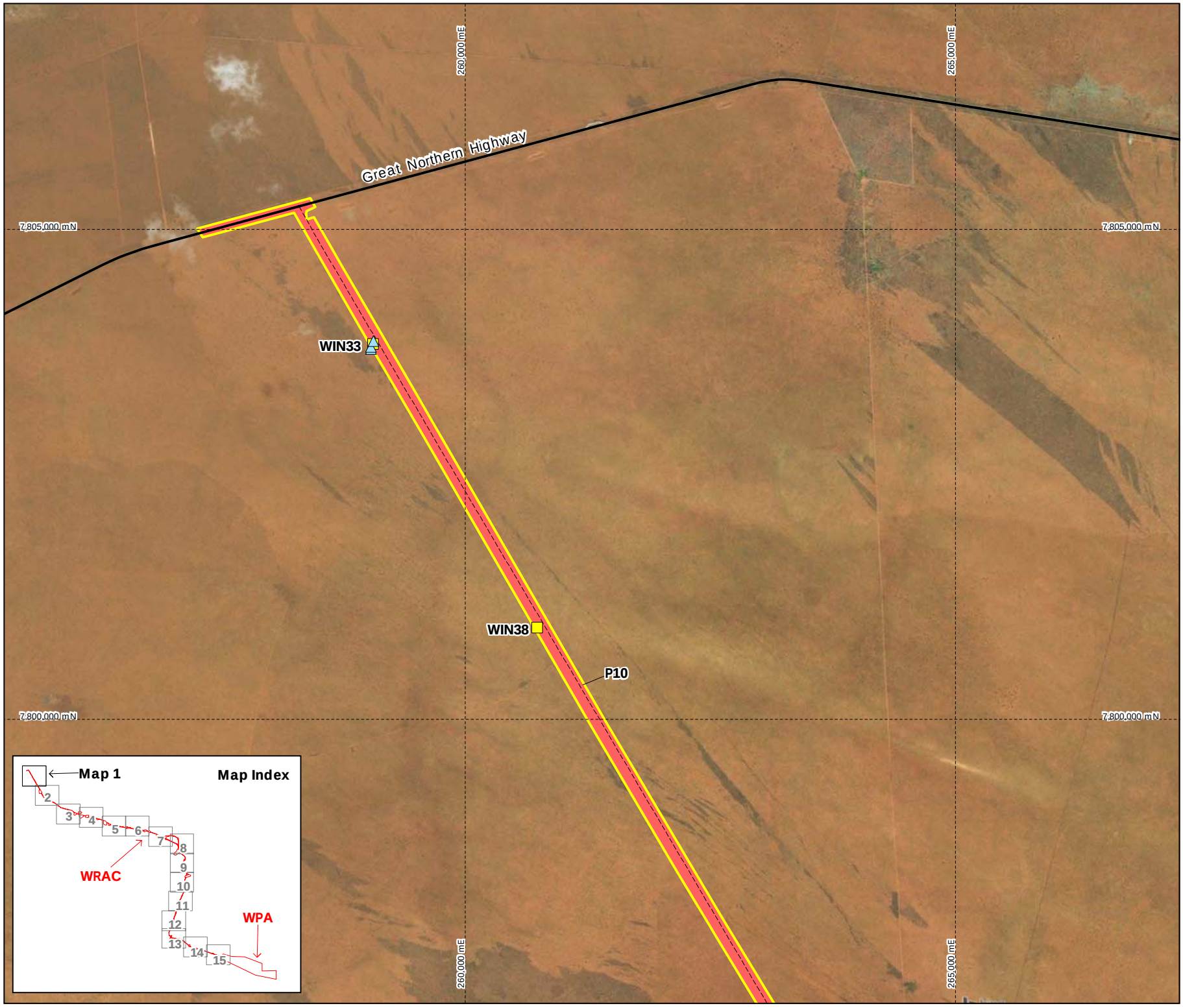
Broad Landform: Stony rises and gentle outcroppings

R3 *Acacia hilliana,* (*A. adoxa* var. *adoxa*) low open shrubland over *Triodia epactia* open hummock grassland

R4 *Ficus brachypoda* low open woodland over *Acacia monticola, A. colei* var. *colei, Grevillea pyramidalis* tall open shrubland over *Triodia epactia* open hummock grassland

Vegetation Descriptions for Winu Project Road Access Corridor Vegetation Maps

Biota Environmental Sciences



WRAC section 1

Road

Track

Flora Site

Quadrat

Flora Recorded Priority 2

Goodenia hartiana

Vegetation Units

P10

N

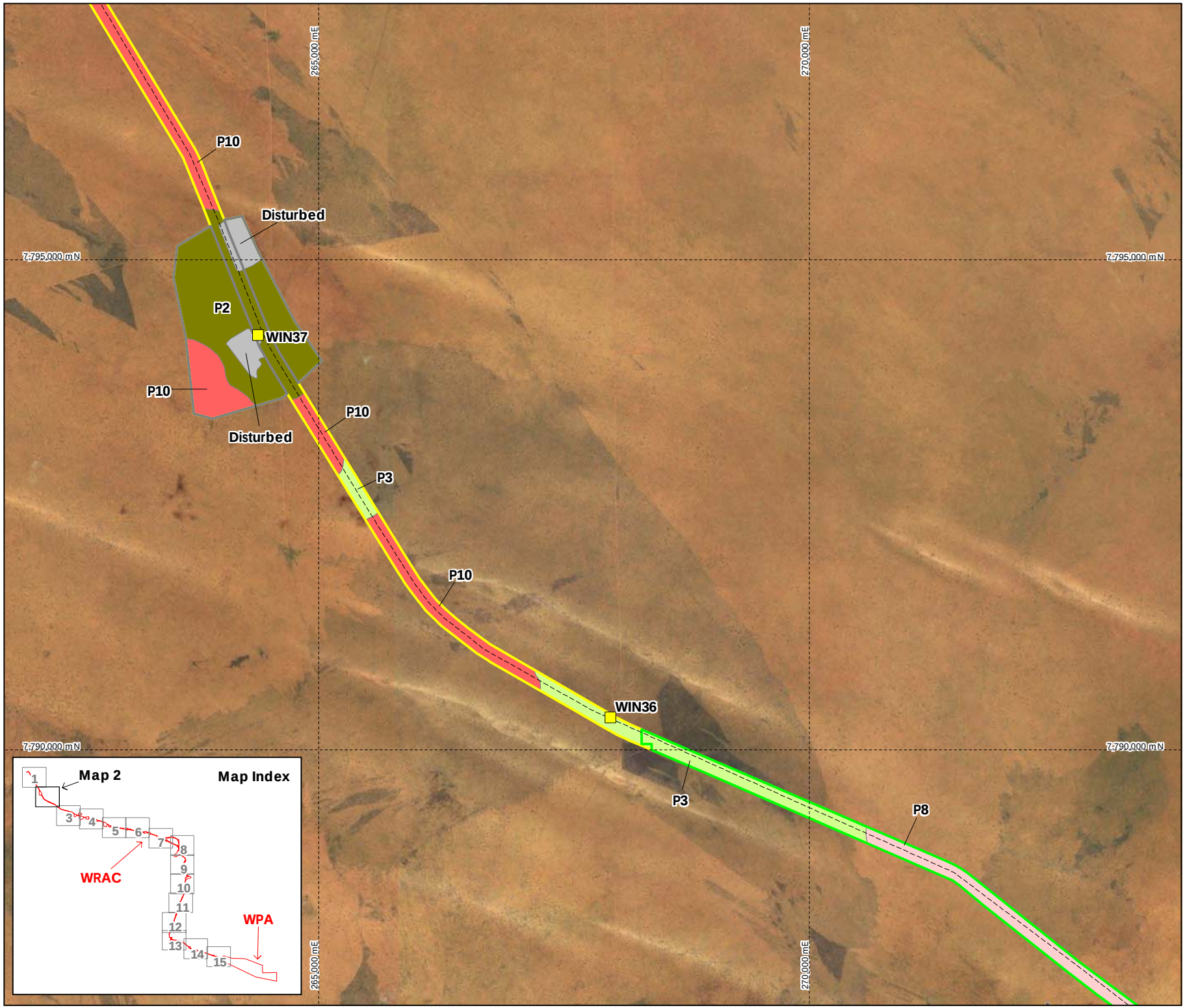
0 1 2

kilometres

Author: S Colwill **Drawn: M Robinson**
Job No.: 1442A
Date: 13 Nov 2019 **Revised: 20 Jan 2020**
Projection: MGA Z51 (GDA94) **Scale: 1:50,000**

Winu Project Flora Vegetation Map 1

Biota Environmental Sciences



Location Map

WRAC section 1

WRAC section 2

Potential borrow source area

Track

Flora Site

Quadrat

Vegetation Units

P2

P3

P8

P10

N

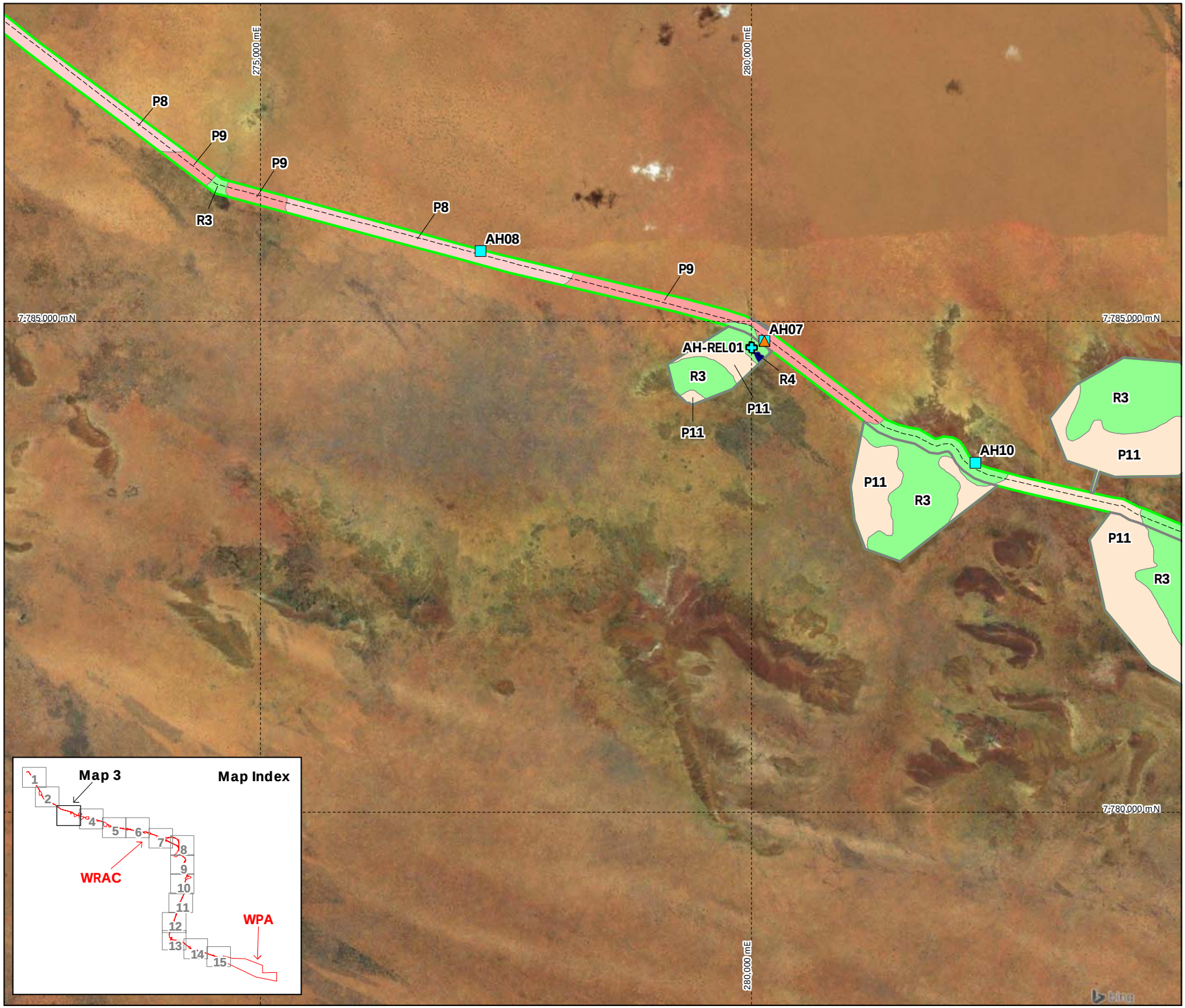
0 1 2

kilometres

Author: S Colwill Drawn: M Robinson
Job No.: 1442A
Date: 13 Nov 2019 Revised: 20 Jan 2020
Projection: MGA Z51 (GDA94) Scale: 1:50,000

Winu Project Flora Vegetation Map 2

Biota Environmental Sciences



WRAC section 2

Potential borrow source area

Track

Flora Site

Quadrat (Biota, 2018a)

Relevé (Biota, 2018a)

Flora Recorded Priority 3

Tribulopis marliesiae

Vegetation Units

P8

P9

P11

R3

R4

N

0 1 2

kilometres

Author: S Colwill **Drawn:** M Robinson

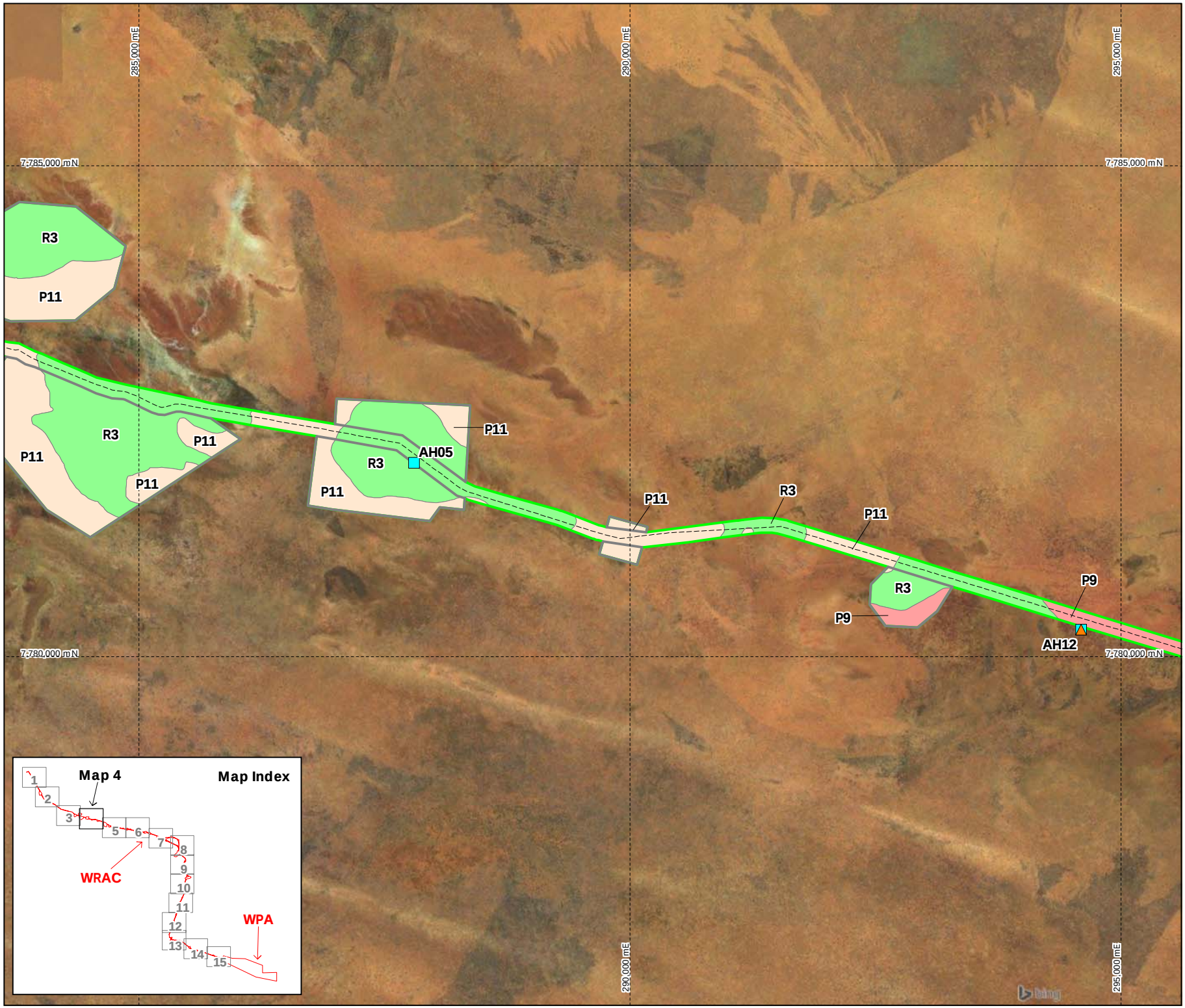
Job No.: 1442A

Date: 13 Nov 2019 **Revised:** 20 Jan 2020

Projection: MGA Z51 (GDA94) **Scale:** 1:50,000

Winu Project Flora Vegetation Map 3

Biota Environmental Sciences



WRAC section 2

Potential borrow source area

Track

Flora Site

Quadrat (Biota, 2018a)

Flora Recorded Priority 3

Tribulopis marliesiae

Vegetation Units

P9

P11

R3

N

0 1 2

kilometres

Author: S Colwill Drawn: M Robinson

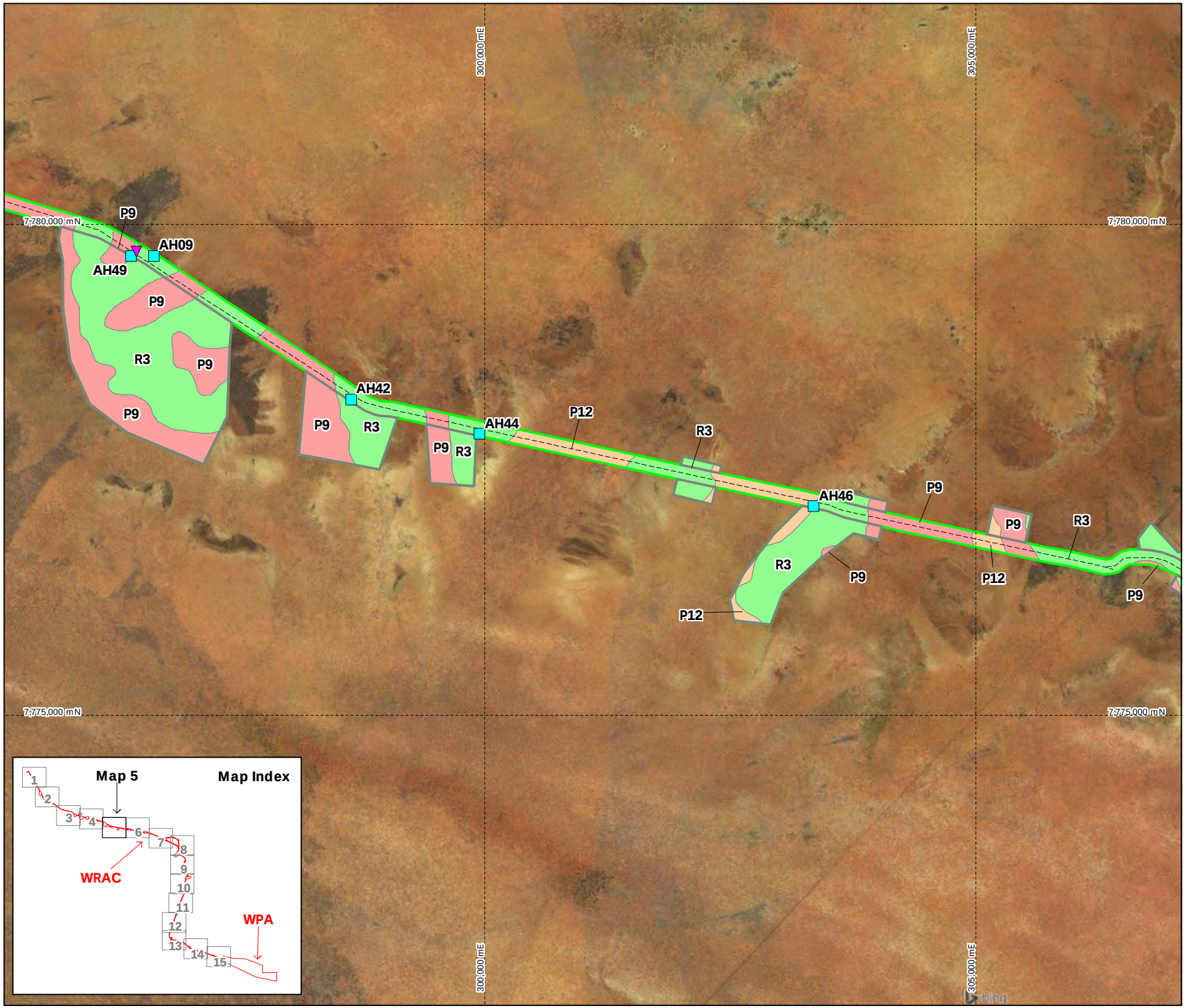
Job No.: 1442A

Date: 13 Nov 2019 Revised: 20 Jan 2020

Projection: MGA Z51 (GDA94) Scale: 1:50,000

Winu Project Flora Vegetation Map 4

Biota Environmental Sciences



Location Map

WRAC section 2

Potential borrow source area

Track

Flora Site

Quadrat (Biota, 2018a)

Flora Recorded Priority 3

Bonamia oblongifolia

Vegetation Units

P9

P12

R3

N

0 1 2

kilometres

Author: S Colwill Drawn: M Robinson

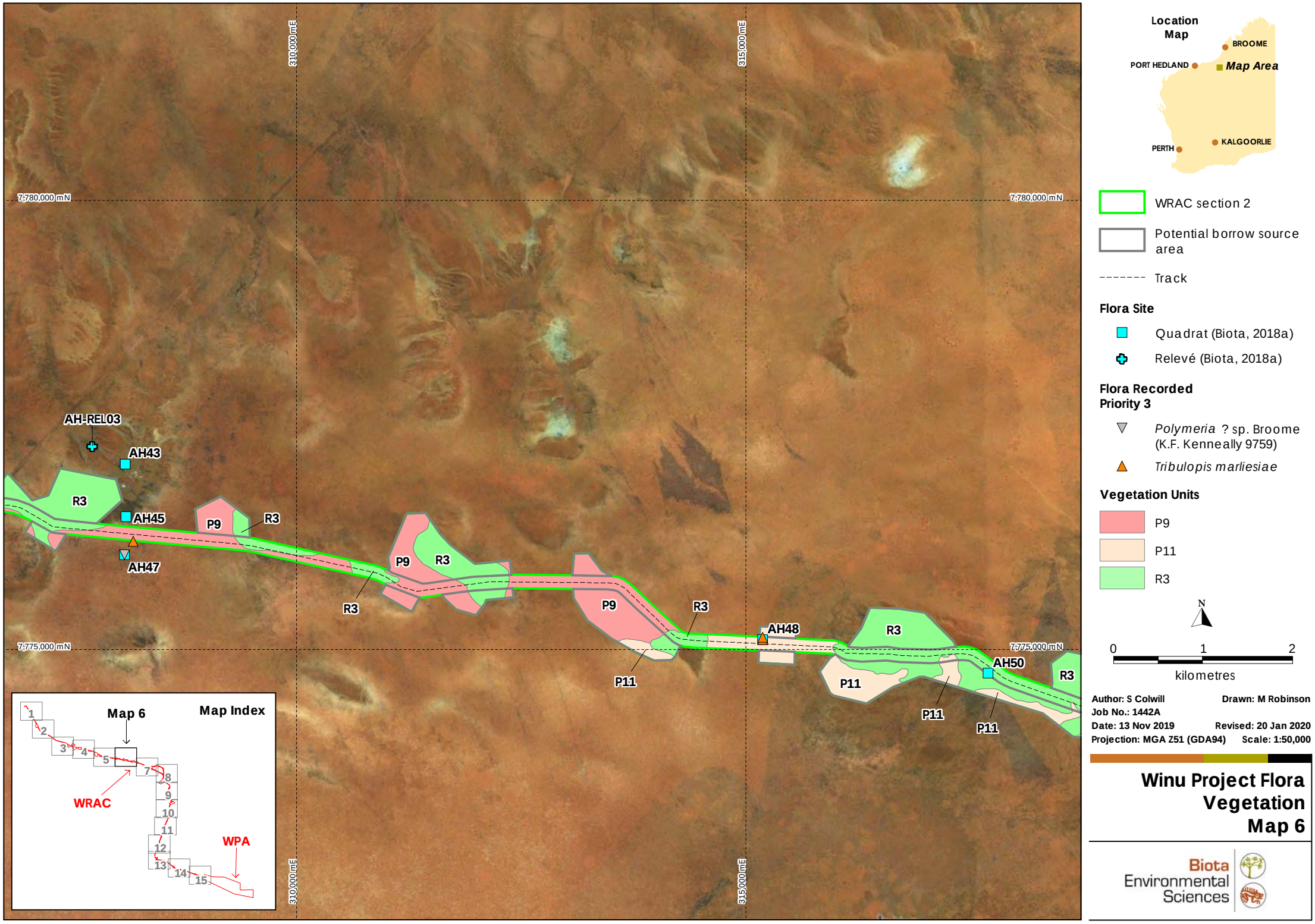
Job No.: 1442A

Date: 13 Nov 2019 Revised: 20 Jan 2020

Projection: MGA Z51 (GDA94) Scale: 1:50,000

Winu Project Flora Vegetation Map 5

Biota Environmental Sciences



Location Map

WRAC section 2

Potential borrow source area

Track

Flora Site

Quadrat (Biota, 2018a)

Relevé (Biota, 2018a)

Flora Recorded Priority 3

Polymeria ? sp. Broome (K.F. Kenneally 9759)

Tribulopis marliesiae

Vegetation Units

P9

P11

R3

N

0 1 2

kilometres

Author: S Colwill Drawn: M Robinson

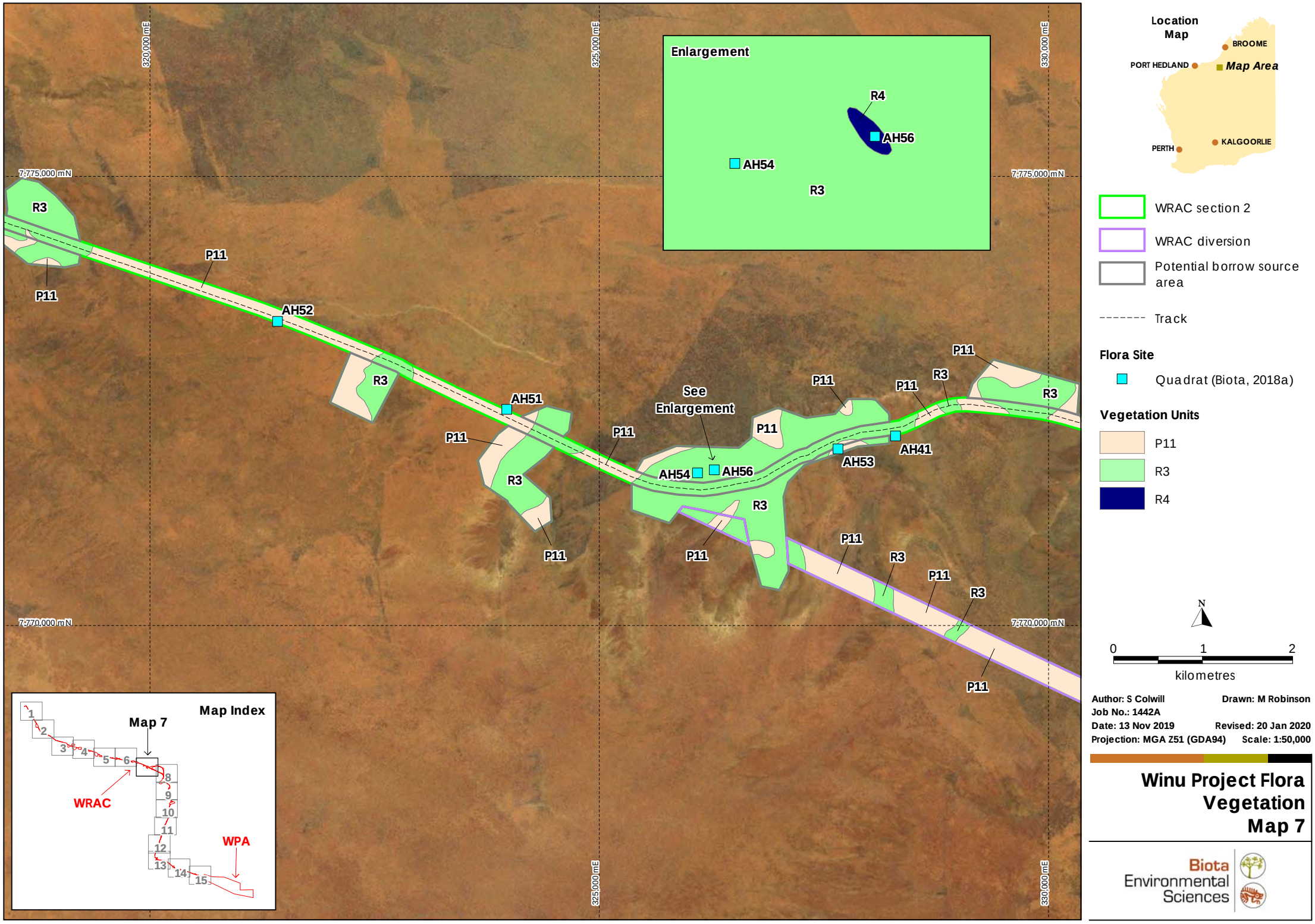
Job No.: 1442A

Date: 13 Nov 2019 Revised: 20 Jan 2020

Projection: MGA Z51 (GDA94) Scale: 1:50,000

Winu Project Flora Vegetation Map 6

Biota Environmental Sciences



Location Map

WRAC section 2

WRAC diversion

Potential borrow source area

Track

Flora Site

Quadrat (Biota, 2018a)

Vegetation Units

P11

R3

R4

N

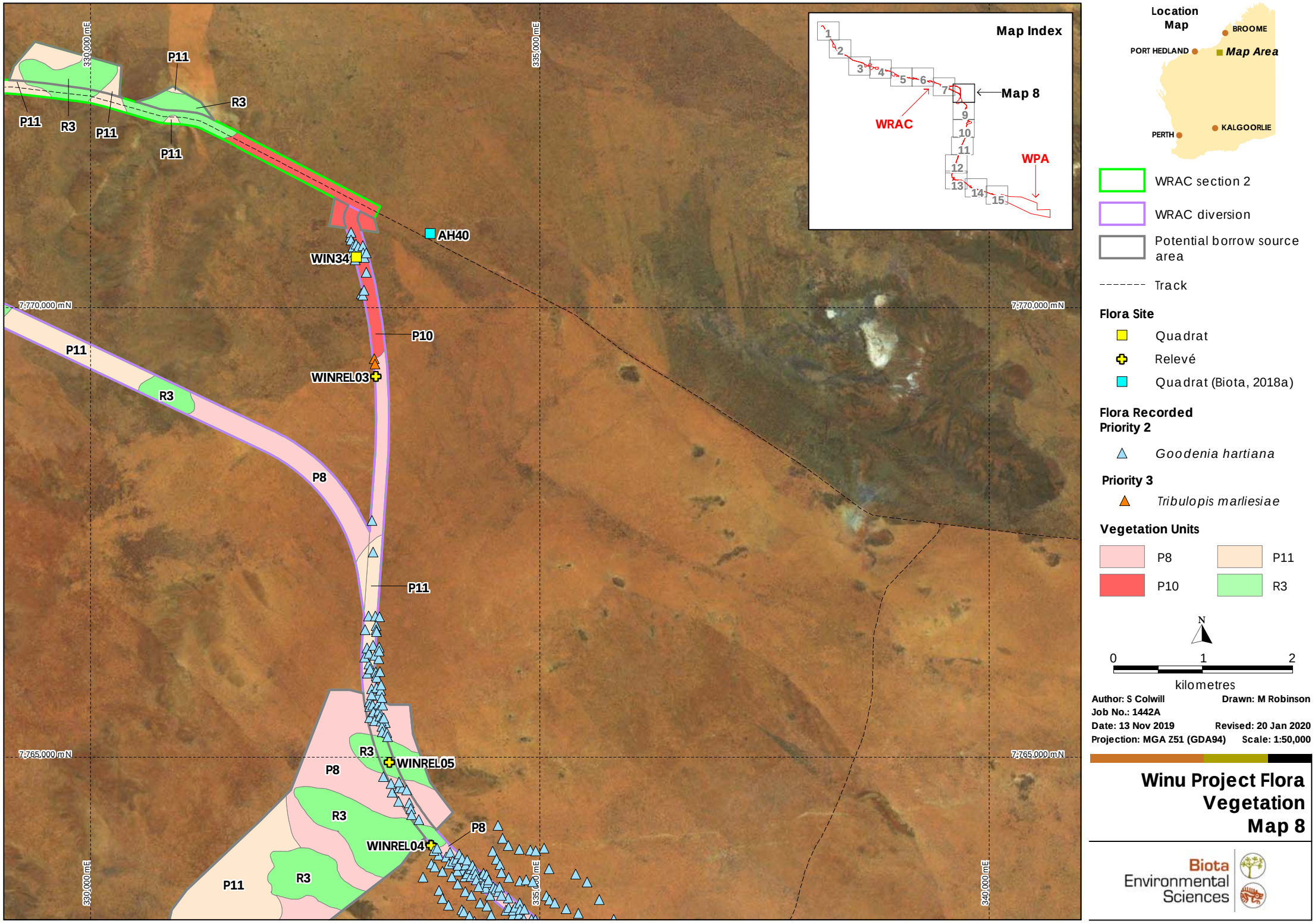
0 1 2

kilometres

Author: S Colwill Drawn: M Robinson
Job No.: 1442A
Date: 13 Nov 2019 Revised: 20 Jan 2020
Projection: MGA Z51 (GDA94) Scale: 1:50,000

Winu Project Flora Vegetation Map 7

Biota Environmental Sciences



Location Map

WRAC section 2

WRAC diversion

Potential borrow source area

Track

Flora Site

Quadrat

Relevé

Quadrat (Biota, 2018a)

Flora Recorded

Priority 2

Goodenia hartiana

Priority 3

Tribulopis marliesiae

Vegetation Units

P8 P11

P10 R3

N

0 1 2

kilometres

Author: S Colwill **Drawn: M Robinson**

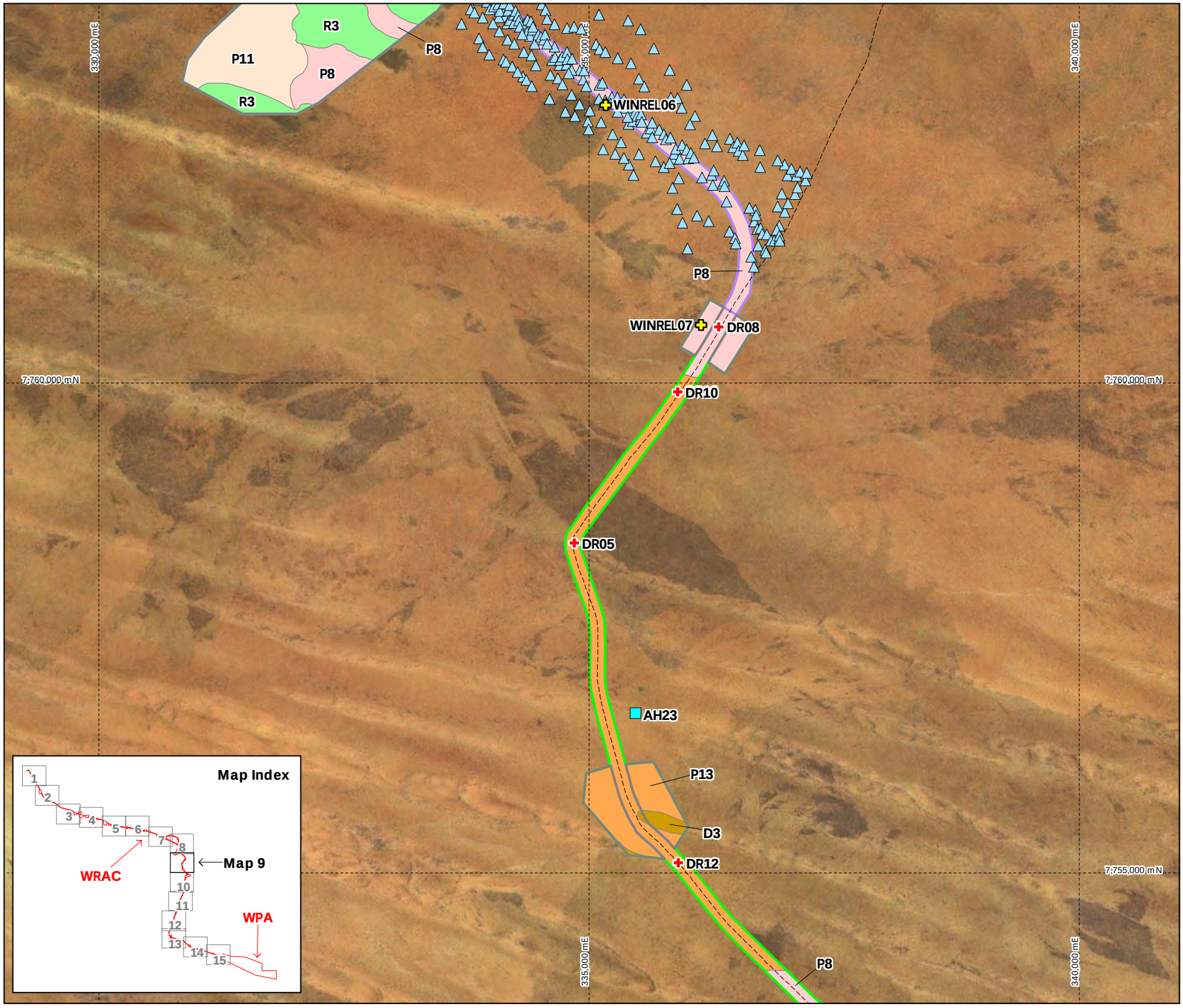
Job No.: 1442A

Date: 13 Nov 2019 **Revised: 20 Jan 2020**

Projection: MGA Z51 (GDA94) **Scale: 1:50,000**

Winu Project Flora Vegetation Map 8

Biota Environmental Sciences



Location Map

WRAC section 2

WRAC diversion

Potential borrow source area

Track

Flora Site

Relevé

Quadrat (Biota, 2018a)

Relevé (Astron, 2019a)

Flora Recorded Priority 2

Goodenia hartiana

Vegetation Units

P8

R3

P11

D3

P13

N

0 1 2

kilometres

Author: S Colwill Drawn: M Robinson

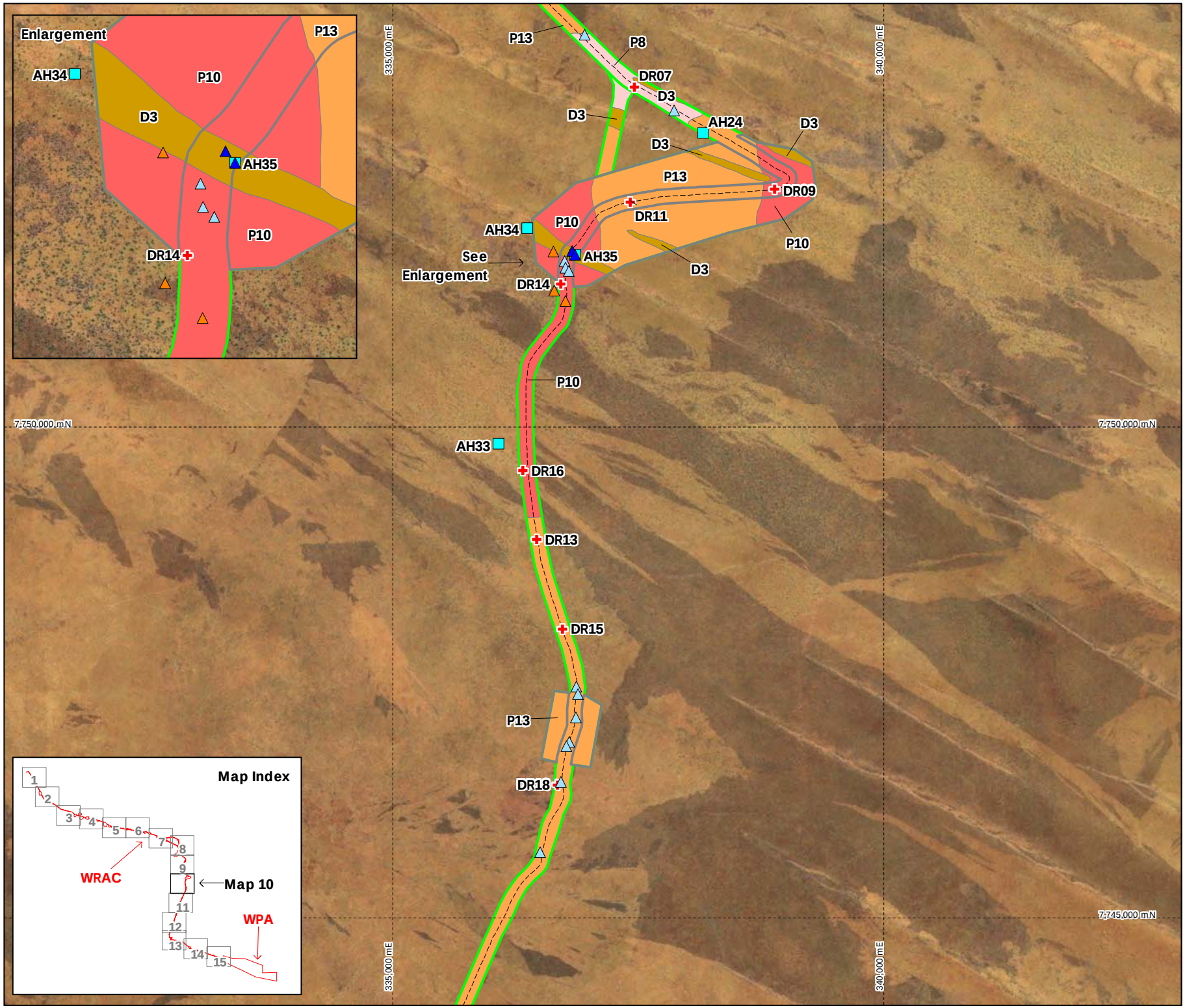
Job No.: 1442A

Date: 13 Nov 2019 Revised: 20 Jan 2020

Projection: MGA Z51 (GDA94) Scale: 1:50,000

Winu Project Flora Vegetation Map 9

Biota Environmental Sciences



Location Map

WRAC section 2

Potential borrow source area

Track

Flora Site

Quadrat (Biota, 2018a)

Relevé (Astron, 2019a)

Flora Recorded

Priority 2

Goodenia hartiana

Priority 3

Indigofera ammobia

Tribulopis marliesiae

Vegetation Units

P8 P13 P10 D3

N

0 1 2

kilometres

Author: S Colwill Drawn: M Robinson

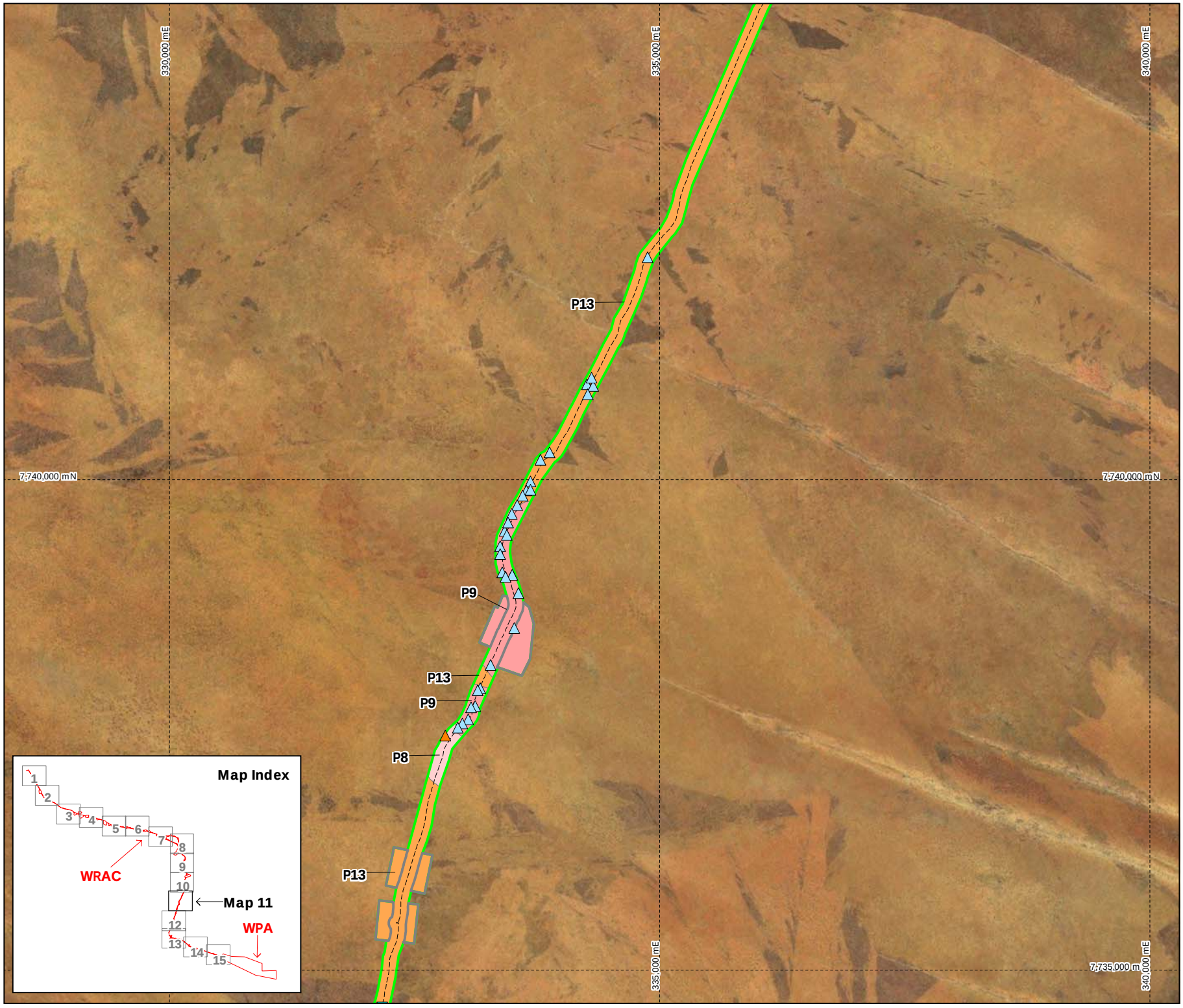
Job No.: 1442A

Date: 13 Nov 2019 Revised: 20 Jan 2020

Projection: MGA Z51 (GDA94) Scale: 1:50,000

Winu Project Flora Vegetation Map 10

Biota Environmental Sciences



Location Map

WRAC section 2

Potential borrow source area

Track

Flora Site

Quadrat (Biota, 2018a)

Relevé (Astron, 2019a)

Flora Recorded

Priority 2

Goodenia hartiana

Priority 3

Tribulopis marliesiae

Vegetation Units

P8

P9

P13

N

0 1 2

kilometres

Author: S Colwill **Drawn: M Robinson**
Job No.: 1442A
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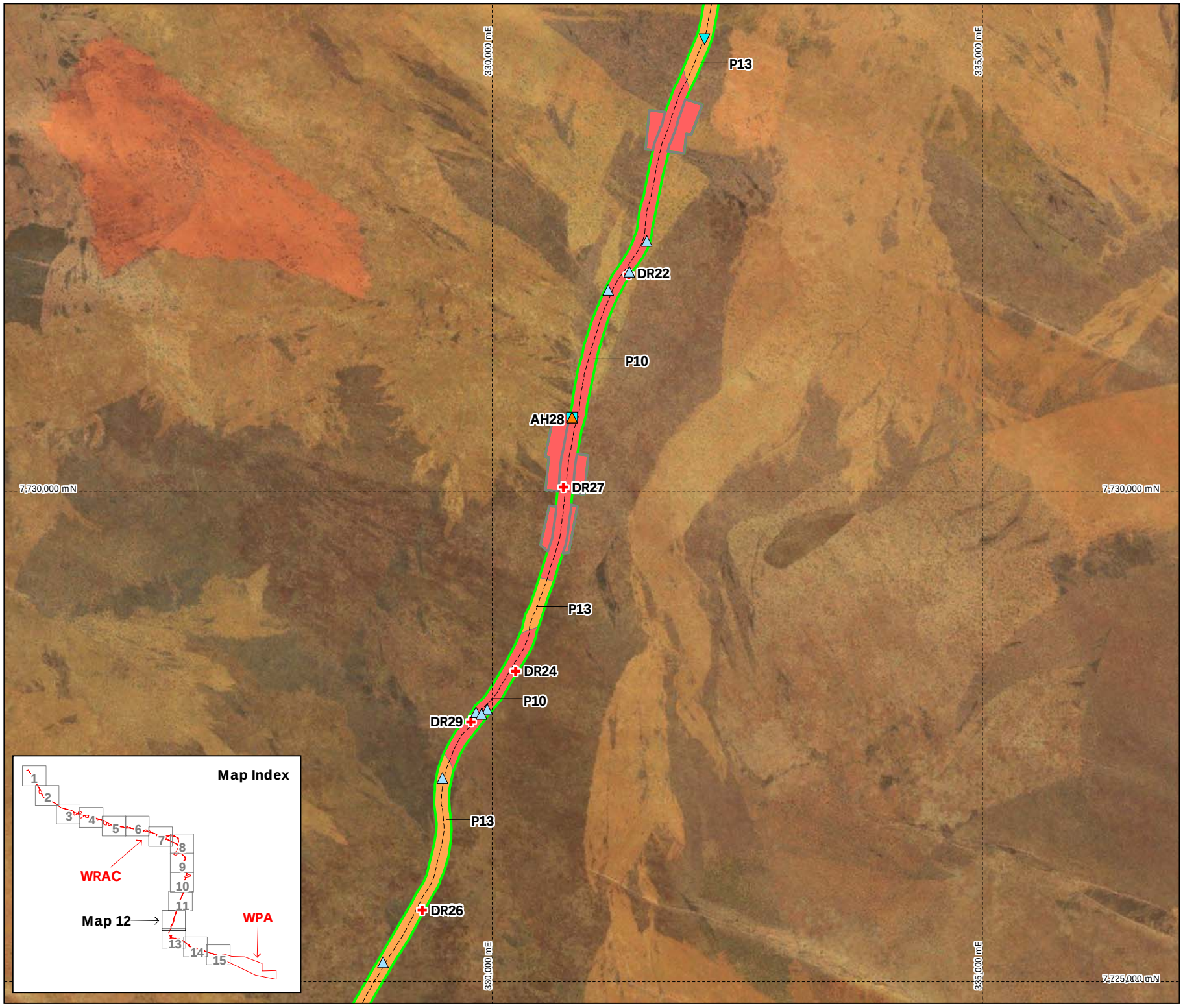
Projection: MGA Z51 (GDA94) **Scale: 1:50,000**

Winu Project Flora Vegetation Map 11

Biota Environmental Sciences



Location Map

WRAC section 2

Potential borrow source area

Track

Flora Site

Quadrat (Biota, 2018a)

Relevé (Astron, 2019a)

Flora Recorded

Priority 2

Goodenia hartiana

Priority 3

Seringia katatona

Tribulopis marliesiae

Vegetation Units

P10

P13

N

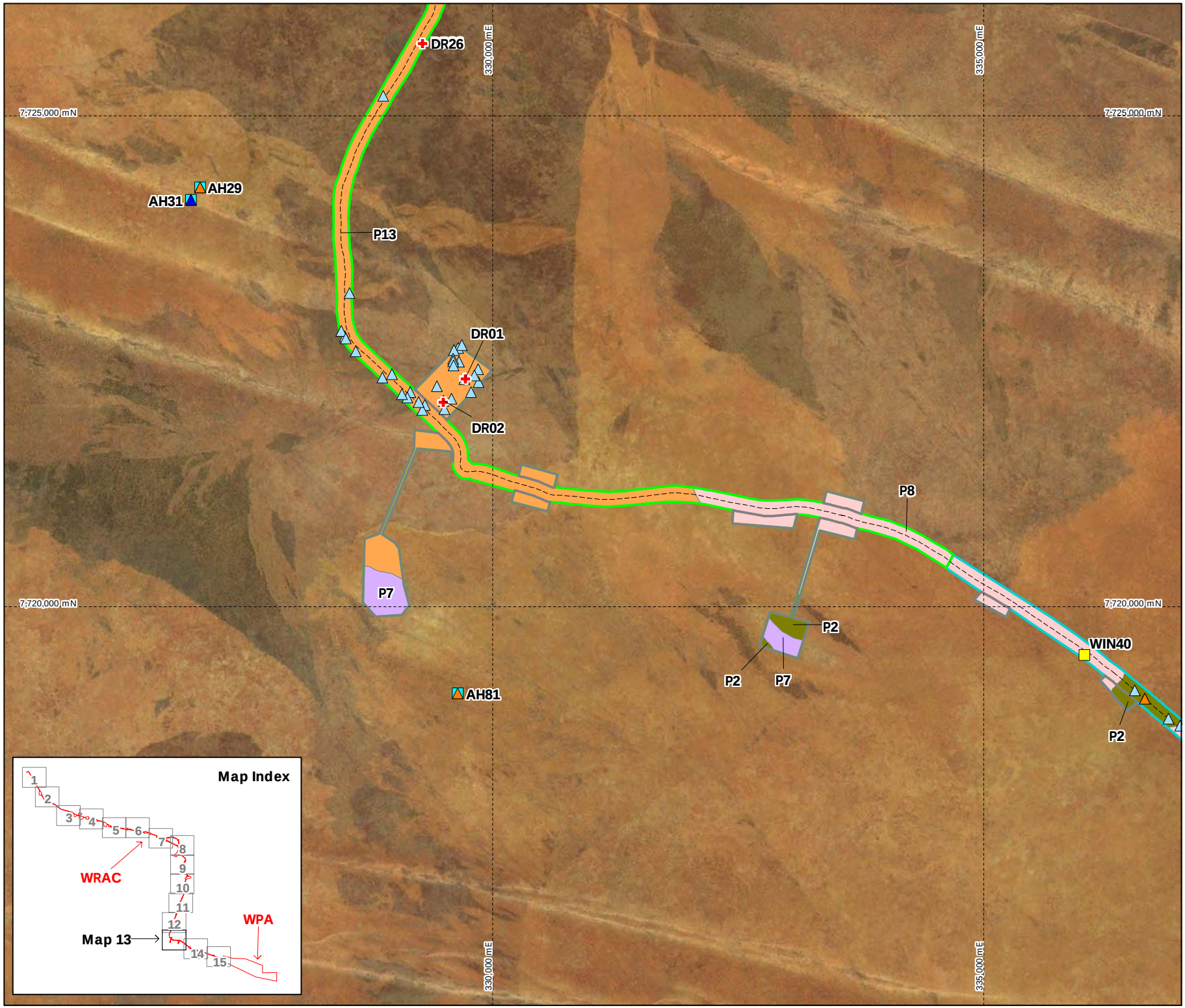
0 1 2

kilometres

Author: S Colwill **Drawn:** M Robinson
Job No.: 1442A
Date: 13 Nov 2019 **Revised:** 20 Jan 2020
Projection: MGA Z51 (GDA94) **Scale:** 1:50,000

Winu Project Flora Vegetation Map 12

Biota Environmental Sciences



WRAC section 2

WRAC section 3

Potential borrow source area

Track

Flora Site

Quadrat

Quadrat (Biota, 2018a)

Relevé (Astron, 2019a)

Flora Recorded

Priority 2

Goodenia hartiana

Priority 3

Indigofera ammobia

Tribulopis marliesiae

Vegetation Units

P2 P8

P7 P13

N

0 1 2

kilometres

Author: S Colwill **Drawn: M Robinson**

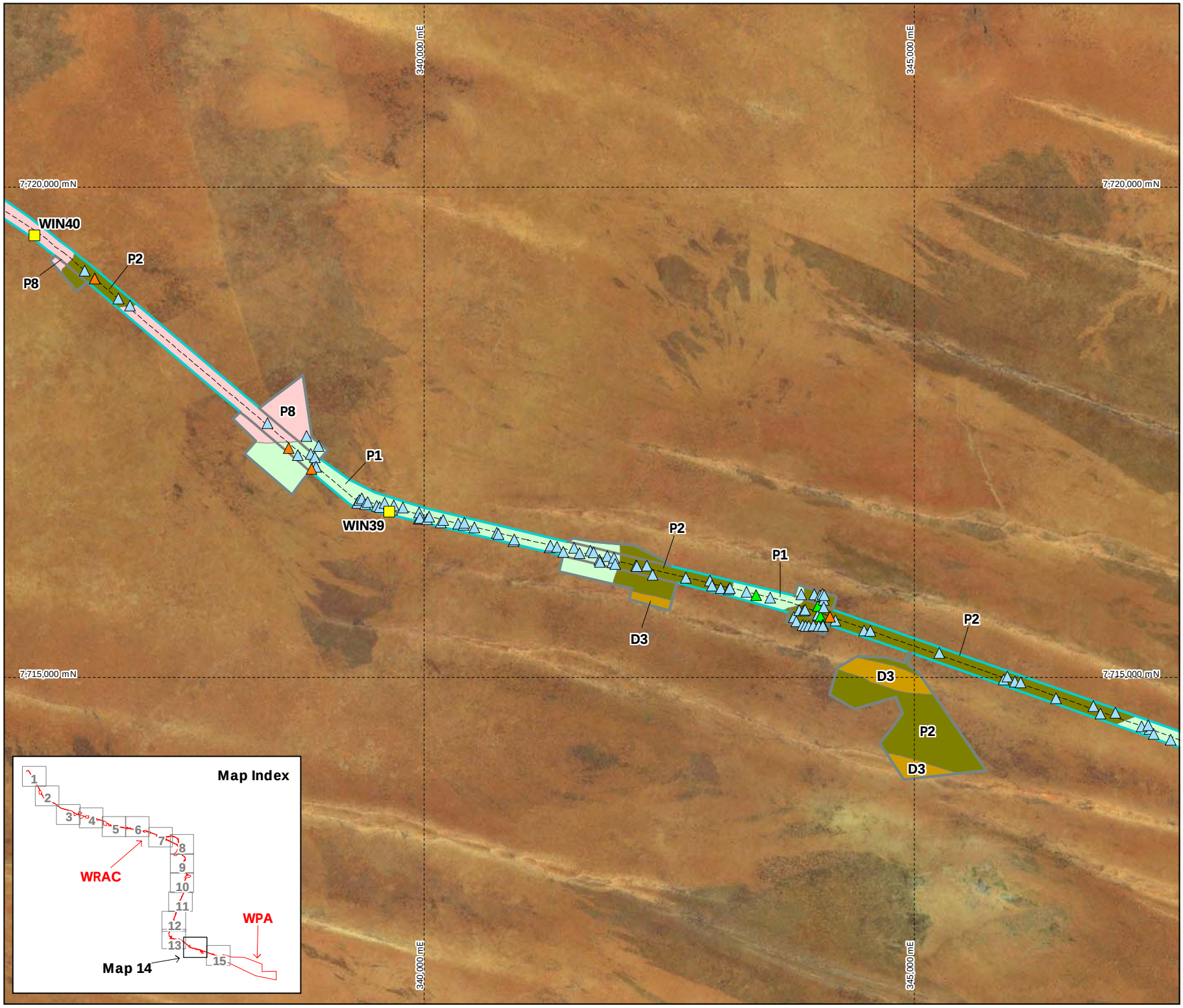
Job No.: 1442A

Date: 13 Nov 2019 **Revised: 20 Jan 2020**

Projection: MGA Z51 (GDA94) **Scale: 1:50,000**

Winu Project Flora Vegetation Map 13

Biota Environmental Sciences



Location Map

WRAC section 3

Potential borrow source area

Track

Flora Site

Quadrat

Flora Recorded

Priority 2

Goodenia hartiana

Priority 3

Dasymalla chorisepala

Tribulopis marliesiae

Vegetation Units

P1 P8

P2 D3

N

0 1 2

kilometres

Author: S Colwill **Drawn:** M Robinson

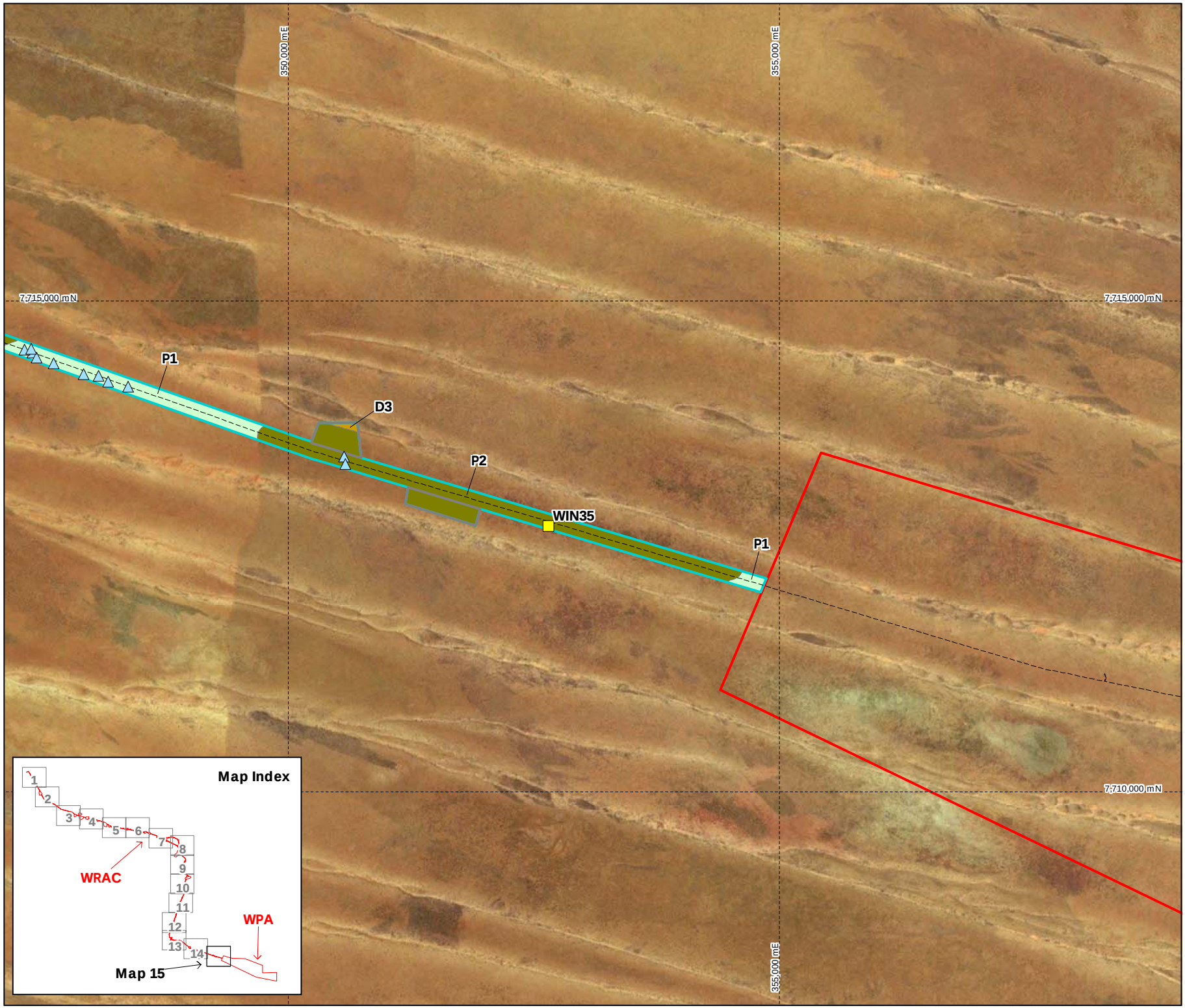
Job No.: 1442A

Date: 13 Nov 2019 **Revised:** 20 Jan 2020

Projection: MGA Z51 (GDA94) **Scale:** 1:50,000

Winu Project Flora Vegetation Map 14

Biota Environmental Sciences



WPA

WRAC section 3

Potential borrow source area

Track

Flora Site

Quadrat

Flora Recorded Priority 2

Goodenia hartiana

Vegetation Units

P1

P2

D3

N

0 1 2

kilometres

Author: S Colwill **Drawn: M Robinson**
Job No.: 1442A
Date: 13 Nov 2019 **Revised: 20 Jan 2020**
Projection: MGA Z51 (GDA94) **Scale: 1:50,000**

Winu Project Flora Vegetation Map 15

Biota Environmental Sciences