



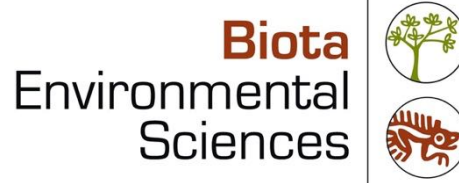
Winu Project Percival Paleovalley Tributary and MNES Fauna



Prepared for

Rio Tinto Winu Pty Ltd

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1.0 Executive Summary

Rio Tinto Winu Pty Limited (RTW) is proposing to develop a new copper-gold mine (the Winu Project), located approximately 320 km east of Port Hedland in the Pilbara region of Western Australia within both the Nyangumarta and Martu Peoples' Native Title Determination Areas. RTW's proposal was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for assessment (EPBC 2025/10208). In order to inform the referral decision, DCCEEW requested additional information in relation to the potential significance of the paleovalley tributary south of Rimfire for threatened fauna species listed as Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Biota Environmental Sciences (Biota) was commissioned to address this requirement.

The scope of this study was to provide a desktop study and on-ground assessment to investigate the potential significance of the paleovalley tributary south of Rimfire for MNES fauna species. This comprised a database search to compile a list of potentially occurring MNES species; an on-ground habitat assessment; a review of vegetation mapping units for the paleovalley tributary; a likelihood of occurrence assessment for any MNES species identified; and an assessment of potential habitat use and potential impacts to any MNES species identified.

Two zoologists from Biota undertook a site visit and conducted detailed habitat assessments of the tributary of the Percival paleovalley during a stygofauna survey of the Rimfire borefield over the 19-22nd December 2025. A total of 12 habitat assessments were made, distributed across the portion of the paleovalley tributary that is predicted to be impacted by the proposed groundwater abstraction associated with the Rimfire borefield. The vegetation communities and condition, the substrate types and any evidence of disturbance and feral animals was recorded, along with any evidence of MNES species or habitat to support MNES species. All 12 sites were described in the field as 'sandplain' with either sand or sandy loam substrate and would fit within the 'Shrub and Spinifex on Sandplain' fauna habitat described for the majority of the Winu development envelope.

Ten Threatened fauna species (two mammal, one reptile and seven bird species) and ten Migratory bird species were returned from the EPBC Protected Matters Search Tool (PMST) database search. Two of the bird species were listed as both Threatened and Migratory. Five of the overall total of 18 species were assessed as 'Likely to occur' and four as 'May occur'. For all nine of the Threatened species deemed either 'Likely to occur' or 'May occur', the habitat at the paleovalley tributary was not assessed as representing core habitat, only secondary habitat.

No evidence of MNES species was recorded during the site visit. It was noted that there was *Acacia monticola* present at some sites, which is a key foraging resource for Bilby but its occurrence was not abundant and while it could be used for foraging, its occurrence was not considered to be representative of a primary foraging area. Secondary evidence of cat (*Felis catus*) and camel (*Camelus dromedarius*) was noted.

This assessment of the value of the paleovalley tributary south of Rimfire for MNES fauna species determined that the habitats present there represent secondary habitats for nine potentially occurring MNES species. In terms of impacts that may result from the development of the proposed borefield, the primary impact would be a potential loss of foraging resources as a result of groundwater abstraction, if the foraging resources are groundwater-dependent vegetation.

2.0 Introduction

2.1 Project Background

Rio Tinto Winu Pty Limited (RTW) is proposing to develop a new copper-gold mine (the Winu Project), located approximately 320 km east of Port Hedland in the Pilbara region of Western Australia within both the Nyangumarta and Martu Peoples' Native Title Determination Areas. The Winu Project includes the development of a below-water table copper-gold deposit and associated infrastructure required to access, process and transport ore. This includes a regional borefield, the Rimfire Borefield, which overlaps a portion of the Percival Paleochannel (as mapped by Bell et al. (2012)).

RTW's proposal was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for assessment (EPBC 2025/10208). In order to inform the referral decision, DCCEEW requested additional information in relation to groundwater modelling (item 7 in Table A of Attachment A of DCCEEW's request for further information), which relates to: *"the potential impacts on fauna species habitat dependent on the paleochannel system in the vicinity of the site."* Subsequent to this RFI, further discussion between RTW and DCCEEW identified the potential significance of the paleochannel system south of Rimfire for Threatened fauna species listed as Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as an item also requiring further information to be provided. Biota Environmental Sciences (Biota) was commissioned to address this requirement.

2.2 Study Scope

The scope of this study was to provide a desktop study and an on-ground habitat assessment to investigate the potential significance of the paleovalley tributary south of Rimfire for MNES fauna species. The desktop study comprises:

- database searches to compile a list of potentially occurring MNES species;
- a review of vegetation mapping units (Western Botanical 2025) for the paleovalley tributary;
- a likelihood of occurrence assessment for any MNES species identified; and,
- an assessment of potential habitat use and potential impacts to any MNES species identified.

3.0 Desktop Study

3.1 Percival Paleovalley

The Rimfire borefield area overlaps a tributary of the Percival paleovalley (as mapped by Bell et al. (2012)), which is ultimately connected to the Percival Lakes drainage system. In order to refine the broad-scale mapping of the Percival paleovalley, Worley used airborne transient electromagnetics data (TEM) for the Rimfire area to delineate an ‘Inferred Percival Palaeochannel’, which shows “*an area of high conductivity lithology (interpreted as clay infill) within the palaeovalley boundary, comprising a 1.5 km wide main-channel, with elongate branches extending to the east and west*”(Worley 2025b). This ‘inferred paleochannel’ suggests a more limited extent of the paleovalley within the proposed Rimfire borefield than is mapped by Bell et al. (2012)(Figure 3.1).

3.2 Geology

Bedrock geology of the Rimfire Borefield and the paleovalley tributary is predominantly represented by the Anketell Formation, which comprises “Fine-grained sandstone and siltstone; lesser coarse-grained sandstone and conglomerate” (Geological Survey of Western Australia 2022). The paleovalley tributary extends southwards into the Callawa Formation, described as, “Very fine-grained to coarse-grained sandstone, and conglomerate; minor siltstone and claystone” (Geological Survey of Western Australia 2022).

Surface geology units as mapped by Geoscience Australia (2008) at the Rimfire borefield comprise two units; Czs (sandplain) and Qd (dunes) (Figure 3.1). As the paleovalley tributary extends southwards, discrete Czk (calcrete) units appear (Figure 3.1).

3.3 Soil Landscapes

In the absence of land system mapping for this region of the Great Sandy Desert, soil-landscape mapping prepared by DPIRD (2018) was examined. The Rimfire borefield and the paleovalley tributary are both represented by one soil-landscape unit, ‘AB40’, which is described as, ‘gently undulating plains with longitudinal dunes’ (DPIRD 2018).

3.4 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystems (GDEs) are natural ecosystems that require access to groundwater to meet all, or some, of their water requirements on a permanent or intermittent basis, so as to maintain their communities of plants and animals, ecosystem processes and ecosystem services (Richardson et al. 2011).

Flora and vegetation assessments undertaken by Western Botanical (2025) identified a strong correlation between the occurrence of a *Melaleuca lasiandra* shrubland community and the boundaries of the Percival paleovalley. Western Botanical (2025) noted that “*the strong correlation of the vegetation with the perched aquifer suggests that the vegetation may be utilising the groundwater source*”. Further south of this, *Eucalyptus victrix*, a potential indicator of GDEs, was also recorded. Though there is a lack of contextual data in the Great Sandy Desert region, and the GDE indicator species for the Winu area are currently undefined, the recorded communities along the Percival paleochannel were considered possible GDEs (Western Botanical 2025); “*The extent of the Melaleuca-dominated vegetation appears to correlate well with the Percival Paleovalley, with minor variations in floristics driven by proximity to underlying geomorphological and groundwater features (i.e., low lying clay-pans, calcrete rises etc)*” (Western Botanical 2025).

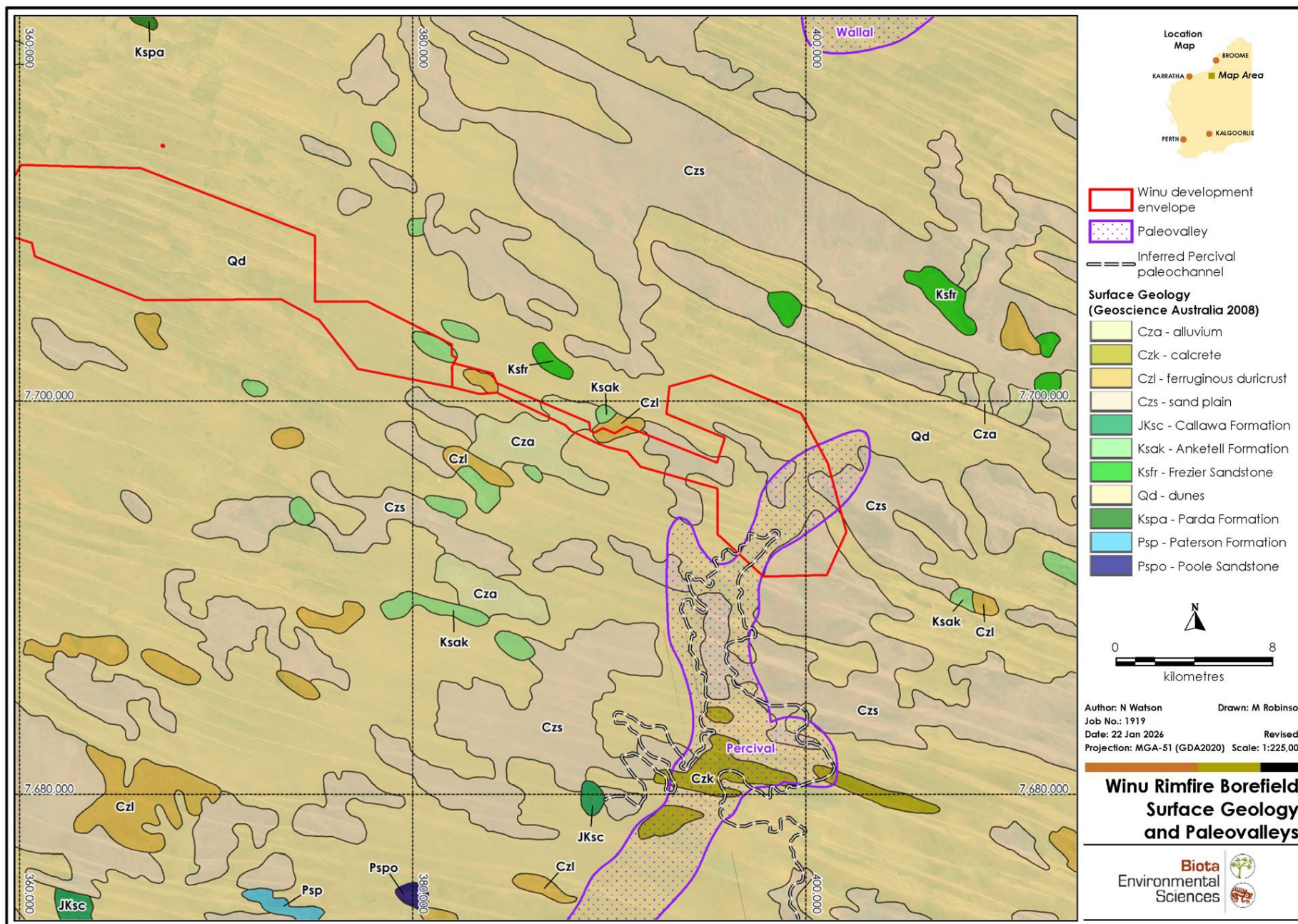


Figure 3.1: Surface geology and paleovalley mapping in relation to the Rimfire borefield.

3.5 Vegetation Associations

The vegetation associations and landforms identified across the Percival paleovalley by Western Botanical (2025) are presented in Table 3.1 and mapped in Figure 3.2. They comprise nine vegetation units across four landform types.

Table 3.1: Vegetation associations identified across Percival Paleochannel (reproduced from Western Botanical (2025)).

Landform	Veg Code	Vegetation Association	Total Extent (ha)
Sand Dunes and Associated Swales	*D4	<i>Melaleuca lasiandra</i> Open Low Shrubland over <i>Triodia schinzii</i>	72.72
Interdunal Sand Plain	*P19	<i>Melaleuca lasiandra</i> Low Open Shrubland over <i>Triodia schinzii</i>	49.09
	P23	<i>Melaleuca</i> spp. (boundaries defined, excludes subcategorization)	7,082.05
	P23a	<i>Melaleuca lasiandra</i> , <i>Melaleuca glomerata</i> (<i>Eucalyptus victrix</i> , <i>Acacia colei</i> var. <i>colei</i>) Open Shrubland over <i>Triodia basedowii</i> (<i>Acacia stellaticeps</i>)	929.40
	P23b	<i>Melaleuca lasiandra</i> (<i>Hakea lorea</i> , <i>Melaleuca glomerata</i>) Open Shrubland over <i>Triodia epactia</i> (<i>Euploca glandulifera</i> , <i>Ptilotus axillaris</i>)	92.45
	P23c	Interzone - <i>Melaleuca lasiandra</i> , <i>Melaleuca glomerata</i> , <i>Acacia ancistrocarpa</i> (<i>Acacia drepanocarpa</i> , <i>Acacia monticola</i>) Open Shrubland over <i>Triodia schinzii</i>	565.52
	P23d	<i>Melaleuca glomerata</i> Scattered Low Shrubs over <i>Trianthema turgidifolium</i> (<i>Triodia basedowii</i>)	49.77
	Melaleuca habitat (approximate)	<i>Melaleuca</i> spp. (observed; not assessed; boundaries not defined)	N/A
Claypans and Low-Lying Clay Flats	C8	Clay-Pan (<i>Eragrostis cumingii</i>) with Scattered Herbs and Grasses	3.41
Mosaic units	C1+P23	Mosaic <i>Eucalyptus victrix</i> Open Woodland + <i>Melaleuca</i> spp. Open Shrubland.	21.07

Grouping the vegetation associations detailed in Table 3.1 at a broader level identified the following three floristic formations (as determined by Western Botanical (2025)):

1. *Melaleuca lasiandra* Low Open Shrubland
2. *Eucalyptus victrix* Tall Open Woodland
3. *Melaleuca glomerata* Open Shrubland (with the small areas of the clay-pan association occurring within the *Melaleuca glomerata* floristic formation).

These were dominated by the following species:

- *Melaleuca lasiandra*, Sandhill tea-tree; considered a facultative phreatophyte
- *Eucalyptus victrix*, Ghost Gum or Coolibah tree; considered a facultative phreatophyte
- *Melaleuca glomerata*, Inland tea-tree; considered an obligate groundwater user.

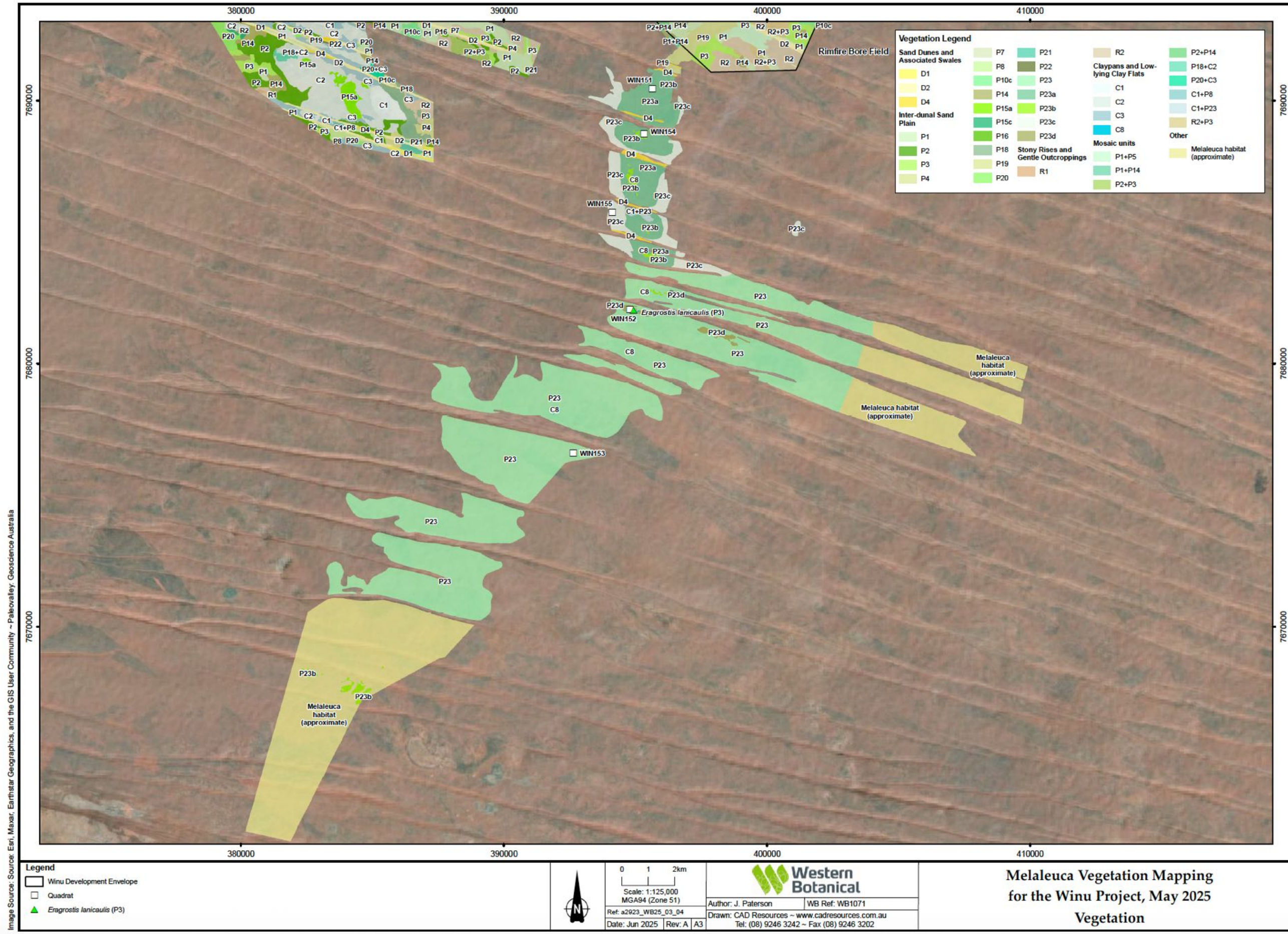


Figure 3.2: Melaleuca vegetation mapping across tributary of Percival Paleovalley (reproduced from Western Botanical (2025)).

3.6 Database Search

A search of the EPBC 'Protected Matters Search Tool' database was undertaken on 14/01/2026 using a 40 km around the Rimfire borefield. For each of the Threatened fauna species returned from this search, their likelihood of occurrence at the paleochannel tributary south of Rimfire was assessed using knowledge of habitat preferences, species distributions and contextual records.

3.7 Likelihood of Occurrence Assessment

The likelihood that threatened fauna species would occur in the paleovalley tributary has been assessed here using a set of rankings and criteria. This assessment utilises previous desktop studies and survey records from the assessments undertaken for the Winu Project, such that a species is determined:

1. 'Likely to occur', if:
 - There are existing records of the species in close proximity to the paleovalley; and
 - the species is strongly linked to a specific habitat, which is present; or
 - the species has more general habitat preferences, and suitable habitat is present.
2. 'May occur', if:
 - There are existing records of the species from the locality, however the species is strongly linked to a specific habitat, of which only a small amount is present; or the species has more general habitat preferences, but only some suitable habitat is present.
 - There is suitable habitat present, but the species is recorded infrequently in the locality.
3. 'Unlikely to occur', if:
 - The species is linked to a specific habitat, which is absent; or
 - Suitable habitat is present, however there are no existing records of the species from the locality despite reasonable previous search effort in suitable habitat; or
 - There is some suitable habitat, however the species is very infrequently recorded in the locality, or the only records are historical.
4. 'Would not occur', if:
 - The species is strongly linked to a specific habitat, which is absent; and/or
 - The species' range is very restricted and does not include the paleovalley.

4.0 Site Assessment

4.1 Timing

Two Biota zoologists undertook a site visit and conducted detailed habitat assessments of the tributary of the Percival paleovalley during a stygofauna survey of the Rimfire borefield. Timing and personnel details are provided in Table 4.1.

Table 4.1: Details of site assessment.

Date	Personnel	Role	Qualification	Years of Experience
19 th – 22 nd December 2025	M. Greenham	Senior Zoologist	Bachelor of Science (Zoology and Botany double major)	25
	S. Schmidt	Principal Zoologist	Bachelor of Science (Biology) with Honours (Zoology), Doctor of Philosophy (Zoology)	17

4.2 Habitat Assessments

Fauna habitats were assessed in the field based on Biota’s fauna landscape approach (Biota 2013), which identifies functional landforms within a broader landscape. Available digital aerial imagery was also considered in combination with soil, vegetation and geology mapping, to inform the extent of identified habitats. For the MNES species with potential to occur, available habitat was also classified as either:

- “core”- equivalent to “habitat critical to the survival of the species” as per Department of the Environment (2013). This comprised habitat considered to potentially contain roosting, denning or breeding sites, primary foraging areas, or refugia during drought, fire or other stress; or
- “secondary” – habitats which may be used on a transitory, dispersing or occasional basis, but does not represent core habitat.

A total of 12 habitat assessments were made, these were distributed across the portion of the paleovalley tributary that is expected to be impacted by the proposed groundwater abstraction associated with the Rimfire borefield. The vegetation communities and condition, the substrate types and any evidence of disturbance of feral animals was recorded, along with any evidence of MNES species or habitat to support MNES species. The habitat assessment sites were targeted across the three broad floristic formations recognised along the tributary of the paleovalley by Western Botanical (2025)(see Table 4.2 and Figure 4.1). Four habitat assessment sites were located within *Melaleuca lasiandra* shrubland, seven sites were within *Melaleuca glomerata* shrubland, and one site was located within the small area represented by *Eucalyptus victrix* woodland (see Figure 4.1). All 12 habitat assessment sites were described in the field as ‘sandplain’ with either sand or sandy loam substrate. Habitat assessment sites are detailed in Appendix 1 and locations are mapped in Figure 4.1.

Table 4.2: Broad floristic formations (Western Botanical 2025).

Veg. Code	Broad Floristic Formation	Vegetation Description
P19	<i>Melaleuca lasiandra</i> Low Open Shrubland	<i>Melaleuca lasiandra</i> Low Open Shrubland over <i>Triodia schinzii</i>
C1+P23	<i>Eucalyptus victrix</i> Tall Open Woodland	Mosaic: <i>Eucalyptus victrix</i> Open Woodland + <i>Melaleuca</i> spp. Open Shrubland.
P23a	<i>Melaleuca glomerata</i> Open Shrubland	<i>Melaleuca lasiandra</i> , <i>Melaleuca glomerata</i> (<i>Eucalyptus victrix</i> , <i>Acacia colei</i> var. <i>colei</i>) Open Shrubland over <i>Triodia basedowii</i> (<i>Acacia stellaticeps</i>)

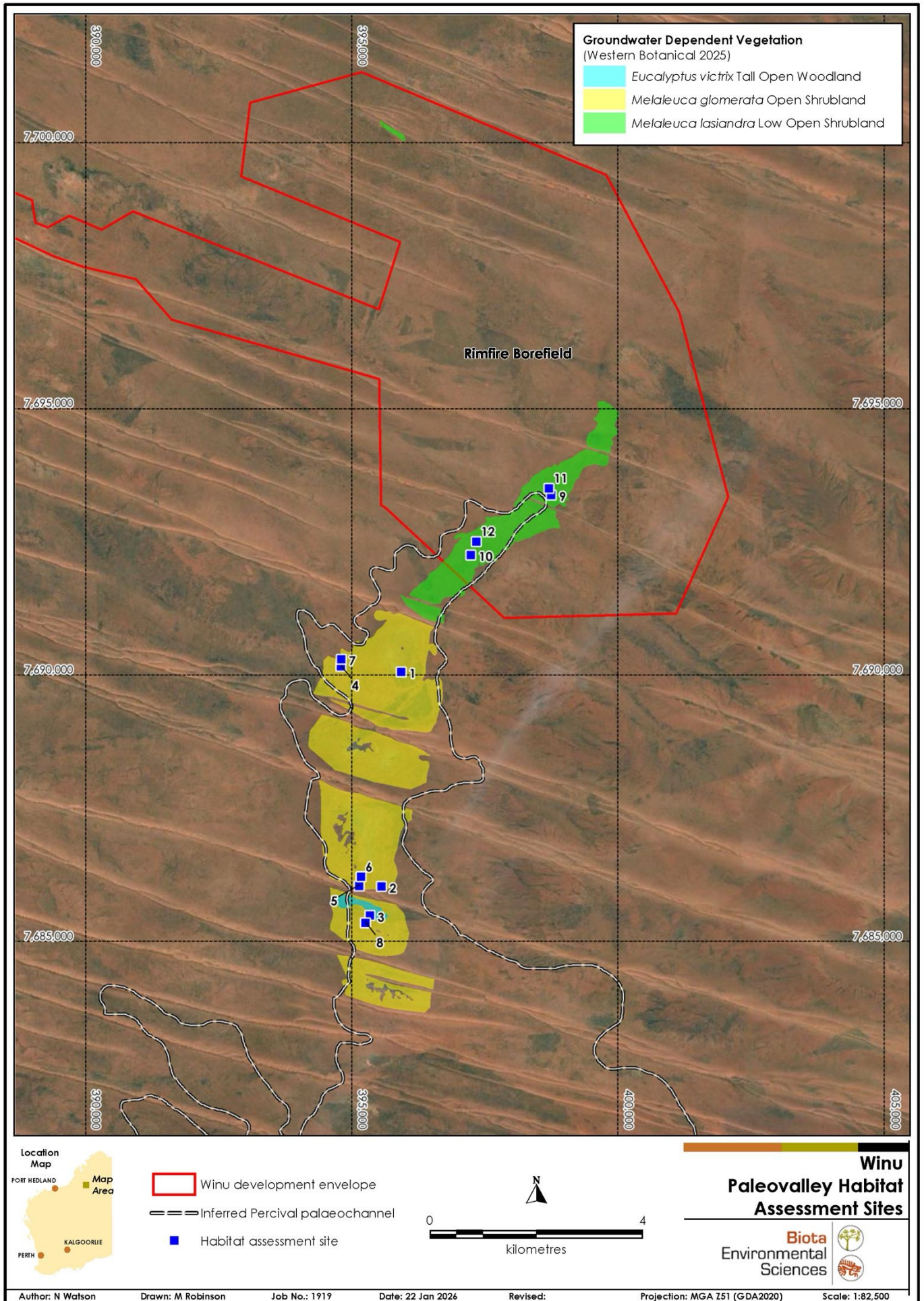


Figure 4.1: Habitat assessment sites across the three broad floristic formations.

4.3 Findings of Site Assessment

4.3.1 Fauna Habitats

Using the data collected from the desktop study (Section 3.0) and the habitat assessments undertaken during the site visit (Section 4.0), the following five fauna habitats were identified across the paleovalley tributary (see Figure 4.2):

1. Inland Sand Dune;
2. Shrub and Spinifex on Sandplain;
3. Gravelly Lateritic Rises (occurs where the paleovalley overlaps with the Rimfire borefield);
4. Ephemeral Claypan; and
5. Calcrete Outcropping.

Fauna habitats 1 – 4 above have been well characterised for the Winu development envelope (Biota 2025a), however, at the paleovalley, the vegetation associations of these fauna habitats (as identified by Western Botanical (2025) and described above in Table 3.1) differ to those within the Winu development envelope. For example, at the paleovalley tributary, the Shrub and Spinifex on Sandplain habitat is dominated by *Melaleuca* spp., rather than *Acacia* spp..

Table 4.3: Fauna habitats synthesised with Western Botanical's (2025) vegetation associations of the paleovalley.

Fauna Habitat	Vegetation Association	Veg. Code	Detail from Western Botanical (2025)
Inland Sand Dune	<i>Melaleuca lasiandra</i> Open Low Shrubland over <i>Triodia schinzii</i>	D4	-
Shrub and Spinifex on Sandplain	<i>Melaleuca lasiandra</i> Low Open Shrubland over <i>Triodia schinzii</i>	P19	-
	<i>Melaleuca</i> spp.	P23	-
	<i>Melaleuca lasiandra</i> , <i>Melaleuca glomerata</i> (<i>Eucalyptus victrix</i> , <i>Acacia colei</i> var. <i>colei</i>) Open Shrubland over <i>Triodia basedowii</i> (<i>Acacia stellaticeps</i>)	P23a	"Occurs in low flat drainage areas, associated with the Percival Paleovalley, on red to grey sandy-clay soils."
	Interzone - <i>Melaleuca lasiandra</i> , <i>Melaleuca glomerata</i> , <i>Acacia ancistrocarpa</i> (<i>Acacia drepanocarpa</i> , <i>Acacia monticola</i>) Open Shrubland over <i>Triodia schinzii</i>	P23c	"Broad and mixed boundary between the <i>Melaleuca</i> -dominated P23 Vegetation of the Percival Paleovalley and <i>Acacia</i> -dominated Vegetation Associations occurring outside."
	Mosaic <i>Eucalyptus victrix</i> Open Woodland + <i>Melaleuca</i> spp. Open Shrubland.	C1 + P23	-
Calcrete Outcropping	<i>Melaleuca lasiandra</i> (<i>Hakea lorea</i> , <i>Melaleuca glomerata</i>) Open Shrubland over <i>Triodia epactia</i> (<i>Euploca glandulifera</i> , <i>Ptilotus axillaris</i>)	P23b	"Occurs on low calcrete outcropping associated with the Percival Paleochannel. The soil is described as firm red sand with patches of clay."
Ephemeral Claypan	Clay-Pan (<i>Eragrostis cumingii</i>) with Scattered Herbs and Grasses	C8	"Occurs on isolated claypans associated with the Percival Paleovalley."
	<i>Melaleuca glomerata</i> Scattered Low Shrubs over <i>Trianthema turgidifolium</i> (<i>Triodia basedowii</i>)	P23d	"Occurs on claypan drainage areas associated with the Percival Paleovalley. It occurs on red sand and hard grey clay, with some surface lag and crust."

Fauna habitat 5, Calcrete Outcropping, is a new fauna habitat identified in relation to the Winu project and occurs along the paleovalley but has not been identified within the Winu development envelope. Calcrete outcroppings are the surface exposure of calcrete deposits, which “*occur widely in palaeovalleys across the arid zone, particularly in the upper nearsurface sediments. They are deposited from laterally migrating shallow groundwater...Calcrete deposits are typically up to 10 metres thick, although thicker deposits may exist...Calcrete deposits may extend across the entire width of the host-palaeovalley, typically beyond the limits of the underlying, narrower palaeochannel sand facies* (Magee 2009). The Calcrete Outcropping fauna habitat coincides with the *Melaleuca lasiandra* (*Hakea lorea*, *Melaleuca glomerata*) Open Shrubland over *Triodia epactia* (*Euploca glandulifera*, *Ptilotus axillaris*) vegetation association described by Western Botanical (2025). This fauna habitat does not represent critical habitat for any MNES fauna species.

4.3.2 Evidence of MNES Species

No evidence of MNES species was recorded during the site visit. It was noted that there was *Acacia monticola* present at some sites, which is a key foraging resource for Bilby but its occurrence was not abundant, and while it could be used for foraging, its occurrence was not considered to be representative of a typical primary foraging area.

4.3.3 Evidence of Feral Species

Secondary evidence of cat (*Felis catus*) and camel (*Camelus dromedarius*) was noted.

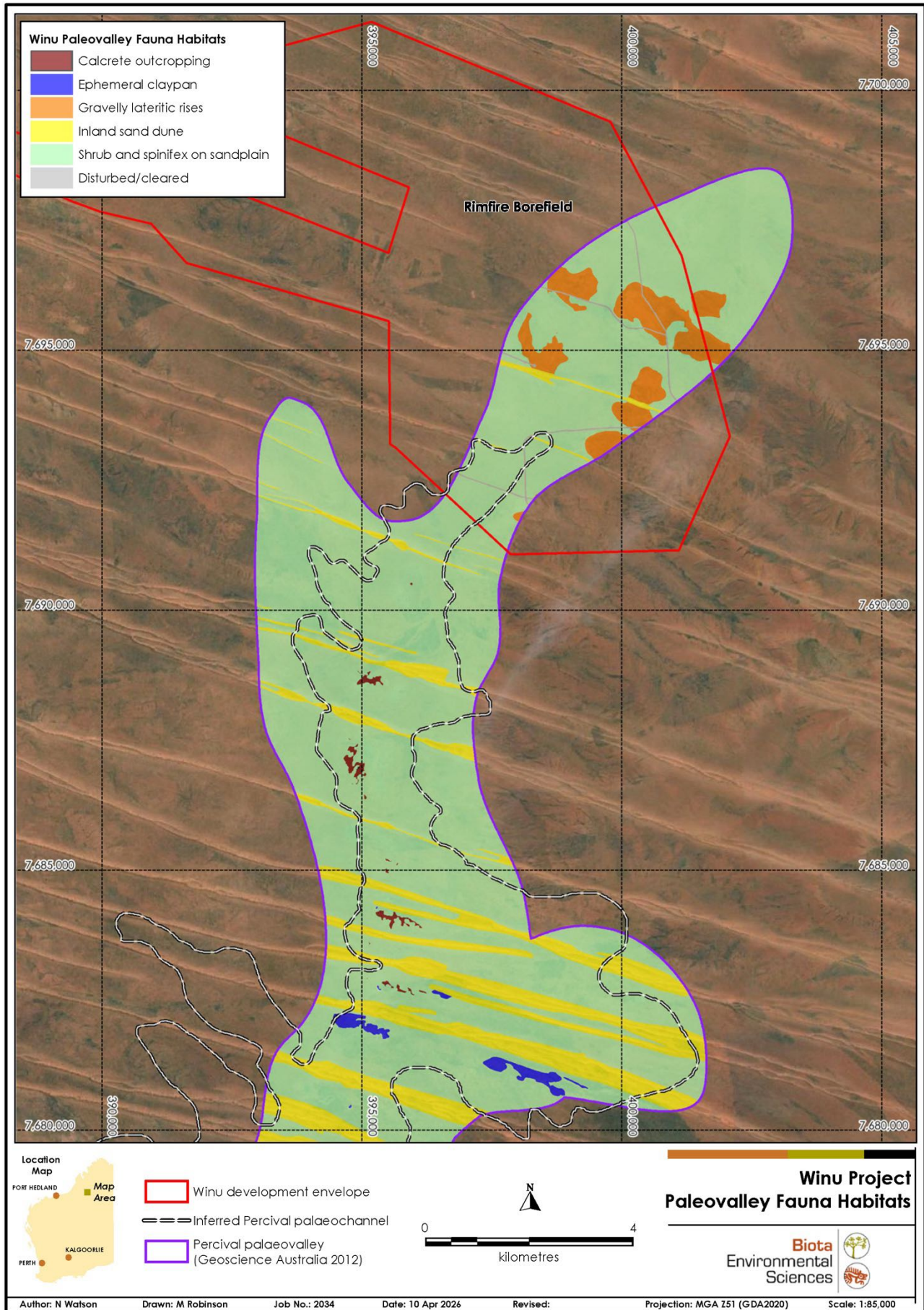


Figure 4.2: Fauna habitats of the paleovalley tributary.

5.0 Likelihood of Occurrence of Threatened Fauna

Ten Threatened fauna species (two mammal, one reptile and seven bird species) and ten Migratory bird species were returned from the EPBC PMST database search. Two bird species were listed as both Threatened and Migratory (see Table 5.1). The likelihood of occurrence assessment is presented in Table 5.1. Five of the overall total of 18 species were assessed as 'Likely to occur' and four as 'May occur':

- Likely to occur:
 1. Bilby, *Macrotis lagotis* (Vulnerable)
 2. Grey Falcon, *Falco hypoleucos* (Vulnerable)
 3. Oriental Pratincole, *Glareola maldivarum* (Migratory)
 4. Pacific Swift, *Apus pacificus* (Migratory)
 5. Oriental Plover, *Anarhynchus veredus* (Migratory)
- May occur:
 1. Northern Quoll, *Dasyurus hallucatus* (Endangered)
 2. Night Parrot, *Pezoporus occidentalis* (Critically Endangered)
 3. Princess Parrot, *Polytelis alexandrae* (Vulnerable)
 4. Barn Swallow, *Hirundo rustica* (Migratory)

The remaining 13 species were assessed as either 'Unlikely to occur' or 'Would not occur' and are discussed in Table 5.1.

5.1 Potential Habitat Use

For all nine of the Threatened species deemed either 'Likely to occur' or 'May occur', the habitats assessed at the paleovalley tributary did not represent core habitat (as defined in Section 4.2). None of three floristic formations identified in Section 3.5 are recognised as representing primary foraging habitat for any of the MNES species listed in Section 5.0. However, for all nine species, the habitats (or vegetation associations) present at the paleovalley tributary potentially represent secondary habitat in the form of occasional foraging or dispersal habitat (see Table 5.1 for further detail). Two MNES bird species (the Princess Parrot and the Grey Falcon; both listed as Vulnerable) have habitat preferences which include eucalypts and warrant further discussion in relation to the *Eucalyptus victrix* Tall Open Woodland vegetation association. The Princess Parrot is known to forage lerps amongst *Eucalyptus* spp. (Pavey et al. 2014) (though *E. victrix* has not been specifically identified as a preferred species), so there is potential for occasional use by this species. It is also acknowledged that the Grey Falcon may use large *Eucalyptus* spp. for nesting (if previously built nests are available) but for this species, large *Eucalyptus* trees in a riparian setting are preferred (Sutton 2010) and the *Eucalyptus* dominated habitat identified at the paleovalley tributary does not represent this (see Appendix 1).

In relation to the Night Parrot, a targeted species-specific habitat assessment has been undertaken separately, including sampling and habitat mapping across a larger area of the paleovalley tributary than examined here (last updated in October 2025). This work identified potential foraging habitat for the Night Parrot along the paleovalley tributary to the south of the areas assessed in this report. These areas of potential Night Parrot foraging habitat on the

paleovalley are currently outside of the extent of the proposed groundwater drawdowns for the Rimfire borefield. See Table 5.1 and Biota (2025e) for further discussion.

5.2 Potential Impacts

This assessment of the value of the paleovalley tributary south of Rimfire for MNES fauna species has determined that the habitats present there represent secondary habitats for nine potentially occurring MNES species. In terms of impacts that may result from the development of the proposed borefield, the primary impact would be a potential loss of occasional foraging resources as a result of groundwater abstraction, if;

- A) the fauna species' preferred foraging resources are groundwater-dependent species, and,
- B) There is hydraulic connectivity between the shallow aquifer and the deeper aquifer.

The assessment here has identified that the *Eucalyptus victrix* tall open woodland represents potential occasional foraging habitat for the Princess Parrot, which 'May occur'. It is not known if groundwater abstraction would affect this habitat, with *Eucalyptus victrix* being a facultative phreatophyte and the connection between the shallow groundwater and deeper aquifer not being well understood.

One Migratory bird species, the Oriental Plover, was identified as 'Likely to occur' at the paleovalley tributary and may forage within the Ephemeral Claypan habitat present, though these drainage features are regarded as "*likely associated with localised areas of ephemeral, perched water table which expresses at surface after high rainfall events*" (Worley 2025a), and are therefore unlikely to be impacted by groundwater abstraction (if the shallow aquifer or perched water table is not in connection with the deeper aquifer).

Table 5.1: Likelihood of occurrence of threatenend fauna species at paleovalley tributary (species likely to occur highlighted in green).

Species Name	Common Name	Significance*	Preferred Habitat	Core habitat present?	Secondary habitat present?	Likelihood of Occurrence
Mammals						
<i>Macrotis lagotis</i>	Bilby, Dalgyte	VU	<i>Acacia</i> shrubland, open tussock grassland.	×	✓	Likely: Bilby recorded in Rimfire borefield and south of Rimfire corridor (Biota 2025a). Habitat present in paleovalley. Foraging species present.
<i>Dasyurus hallucatus</i>	Northern Quoll	EN	Rocky habitats, commonly utilising gorges, breakaways, outcrops and hills. Also occurs near creek lines and drainage lines.	×	✓	May occur: Recorded at Winu as transient individuals (Biota 2025a). No core habitat at paleovalley. For further discussion of local and regional occurrence see species-specific assessment in Biota (2025b).
Reptiles						
<i>Liopholis kintorei</i>	Great Desert Skink	VU	Generally red sandplains and sand ridges. Mosaic vegetation different ages (regenerating vegetation important), usually consisting of hummock grasslands with scattered shrubs and trees. Preferred habitat has at least 50% bare ground.	×	✓	Unlikely to occur: Potentially suitable habitat available but no records from the locality and Winu is outside of the documented distribution. For further discussion see species-specific assessment in Biota (2025d).
Birds						
<i>Pezoporus occidentalis</i>	Night Parrot	CR	Roosting/nesting: widespread long unburnt spinifex with significant structural complexity. Foraging: Floristically diverse run-on areas providing a broad array of grasses and forbs, ranging from small depressions and gilgai formations to large floodplains.	×	✓	May occur: Night Parrot calls recorded south of Rimfire corridor and potential roosting and foraging habitat recorded north and south of Rimfire corridor (Biota 2025c). Night Parrot habitat assessment of Rimfire and the paleovalley tributary identified potential foraging habitat further south along paleovalley (nearest area mapped is approx. 1 km south of site 8 (most southerly habitat assessment site) and extends approx. 8 km south). For further discussion see habitat assessment provided in Biota (2025e).
<i>Calidris ferruginea</i>	Curlew Sandpiper	CR; MI	Coastal and estuarine intertidal flats and adjacent sandy beaches and rocky shorelines, shallow fresh and saline wetlands including sewage ponds and salt ponds.	×	×	Unlikely to occur: Preferred habitat absent.
<i>Erythroriorchis radiatus</i>	Red Goshawk	EN	Tall open forest and woodland, especially along watercourses with tall eucalypts and melaleucas, potentially occupying wider range of habitats post-breeding.	×	×	Unlikely to occur: Outside of currently published distribution but some potential for dispersal through arid zones.
<i>Rostratula australis</i>	Australian Painted-snipe	EN	Freshwater wetlands, preferring ephemeral wetlands with a mix of shallow water, exposed mud, and dense fringing vegetation.	×	×	Unlikely to occur: Wetland habitat absent.
<i>Falco hypoleucos</i>	Grey Falcon	VU	Diverse from rainforest to arid shrublands, from coastal heath to alpine, mainly about cliffs along coasts, rivers and ranges and about wooded watercourses and lakes.	×	✓	Likely: Recorded at Winu (Biota 2025a) and foraging habitat present. For further discussion see species-specific assessment in Biota (2025b).
<i>Polytelis alexandrae</i>	Princess Parrot	VU	Desert sand dune country with scattered trees (particularly marble gums and desert oak) and good ground cover of shrubs and spinifex (<i>Triodia</i>).	×	✓	May occur: No records from the locality but some suitable habitat present. For further discussion of regional occurrence see species-specific assessment in Biota (2025b).
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	VU; MI	Shallows and margins of coastal and inland wetlands, preferring freshwater, less commonly coastal and estuarine intertidal mudflats.	×	×	Unlikely to occur: Wetland habitat absent.
<i>Glareola maldivarum</i>	Oriental Pratincole	MI	Lightly wooded and untimbered lowland plains that are crossed by major watercourses lined with taller trees or isolated manmade structures such as communications towers.	×	✓	Likely: Recorded at Winu and the locality (Biota 2025a). Likely to use airspace over all habitats for foraging. For further discussion see species-specific assessment in Biota (In prep.)
<i>Motacilla tschutschensis</i>	Eastern Yellow Wagtail	MI	Short grasslands and open margins of water bodies, including human-modified environments such as sports fields and sewage ponds.	×	×	Unlikely to occur: Common migrant to the Kimberley and coastal Pilbara but no suitable habitat present.
<i>Motacilla cinerea</i>	Grey Wagtail	MI	In Australia, near running water in disused quarries, sandy, rocky streams in escarpments and rainforest, sewerage ponds, ploughed fields and airfields.	×	×	Would not occur: A rare migrant to the Kimberley and vagrant outside of the Kimberley. No preferred habitat.
<i>Hirundo rustica</i>	Barn Swallow	MI	Open country with low vegetation, often near manmade structures.	×	✓	May occur: Suitable habitat present and some historical records within the locality. For further discussion see species-specific assessment in Biota (In prep.)
<i>Apus pacificus</i>	Pacific Swift	MI	Aerial over most habitats, largest numbers usually over coastal and near coastal plains.	×	✓	Likely: Recorded at Winu and the locality and foraging habitat present (likely to use airspace over all habitats for foraging). For further discussion see species-specific assessment in Biota (In prep.)

Species Name	Common Name	Significance*	Preferred Habitat	Core habitat present?	Secondary habitat present?	Likelihood of Occurrence
<i>Anarhynchus veredus</i>	Oriental Plover	MI	Open plains, bare, rolling country, muddy or sandy wastes near inland swamps or tidal mudflats, bare claypans, margins of coastal marshes, grassy airfields, sportsfields, lawns and coastal dune areas.	×	✓	Likely: Recorded at Winu and the locality and foraging habitat present. For further discussion see species-specific assessment in Biota (In prep.)
<i>Calidris melanotos</i>	Pectoral Sandpiper	MI	Shallows and margins of freshwater wetlands, occasionally coastal or estuarine intertidal flats and flooded samphire.	×	×	Unlikely to occur: Wetland habitat absent.
<i>Actitis hypoleucos</i>	Common Sandpiper	MI	Margins of coastal and inland wetlands, including mangroves/mangrove creeks, rocky shorelines, river banks, sewage ponds, but less often intertidal flats.	×	×	Unlikely to occur: Wetland habitat absent.

* Status under EPBC Listing: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; MI = Migratory.

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Appendix 1 Habitat Assessments

Table.6.1: Details of habitat assessments undertaken.

Habitat Assessment Site	Latitude	Longitude	Site Description	Site Photograph
1	-20.8866	121.9995	Area of high water table (only 4 m) dominated by <i>Melaleuca</i> sp., and <i>Eucalyptus</i> sp. over <i>Melaleuca</i> sp. and <i>Acacia ancistrocarpa</i> over <i>Melaleuca</i> sp. and <i>A stellaticeps</i> over <i>Triodia schinzii</i> and <i>T. epactia</i>. <i>A. stellaticeps</i> present but somewhat sparse understorey - not enough to be considered core habitat for Bilby, but could be utilised. Long unburnt mature <i>Triodia</i> still with dead florets suggesting reasonable condition. Compact large clumps up to 1m and large rings combined with open areas of assorted grasses (<i>Aristida</i>, <i>Eragrostis</i>, <i>Eriachne</i> spp.) providing possible habitat for Night Parrot. Vegetation reasonably complex with numerous annuals and low shrubs present, in reasonable condition. Leaf litter present under <i>Melaleuca</i> and <i>A. stellaticeps</i> (5-10%).	
2	-20.9229	121.9957	Area of high water table (only 4 m) dominated by <i>Melaleuca</i> sp., and <i>Eucalyptus</i> sp. (possibly <i>victrix</i>) over <i>Melaleuca</i> sp. and <i>A. ancistrocarpa</i> over <i>Melaleuca</i> sp. and <i>A stellaticeps</i> over <i>T. schinzii</i> and <i>T epactia</i>. <i>A. stellaticeps</i> denser and taller in areas, however no signs of Bilby diggings were recorded and would not be considered core habitat for Bilby, but could be occasionally utilised. <i>Triodia</i> neither as dense nor as tall and without large rings and does not represent roosting and foraging opportunities for Night Parrot. No herbs and annuals were seen and the <i>Triodia</i> drier in condition here and leaf litter was again (5-10%)	

Habitat Assessment Site	Latitude	Longitude	Site Description	Site Photograph
3	-20.9278	121.9935	Area of high water table (only 6 m at nearby bore) dominated by <i>E. victrix</i> and <i>Melaleuca</i> sp. over <i>Pluchea ferdinandi-muelleri</i> over <i>A. stellaticeps</i> over <i>Triodia</i> (?<i>T. schinzii</i>). <i>A. stellaticeps</i> dominant under 1m in areas, otherwise present but more <i>Pluchea ferdinandi-muelleri</i> the dominant low shrub. Where <i>A. stellaticeps</i> dominant, possibly suitable for Bilby but only small areas so would not represent core habitat but could be utilised. Long unburnt mature <i>Triodia</i> still with dead florets suggesting reasonable condition, barely any dead parts. Compact large clumps up to 0.8 m but only few small clumps forming tight rings. Bare open areas, and areas with no <i>Triodia</i> but low shrubs. Some areas with tussock grasses but sparse a very few herbs/annuals, so unlikely to currently be suitable for Night Parrot. Generally vegetation more complex than at other assessment sites but not very diverse, dry but otherwise very good condition, no disturbance observed. Leaf litter present under <i>Melaleuca</i>, <i>Eucalyptus</i>, <i>Pluchea</i> spp. and <i>A. stellaticeps</i> (5-10%).	
4	-20.8856	121.9886	Assuming area of high water table, dominated by <i>Melaleuca</i> sp. (broad leaf) over <i>Melaleuca</i> sp. (broad leaf) and <i>A. ancistrocarpa</i> over <i>A. stellaticeps</i> over <i>Triodia</i> (?<i>T. schinzii</i>). <i>A. stellaticeps</i> present but sparse, not dense enough to represent core habitat for Bilby. Long unburnt mature <i>Triodia</i> with tall florets (up to 1.7 m) and recently dropped seeds suggesting reasonable condition. Some large clumps up to 0.5 m but no ring-forming <i>Triodia</i>. Bare open areas, no live tussock grasses, very few herbs/annuals, mostly dead or very dry so unlikely to currently be suitable for Night Parrot. Generally vegetation not very complex, dry but otherwise very good condition, no tracks seen but tussock grasses grazed, assume camel. Leaf litter present under <i>Melaleuca</i>, <i>A. stellaticeps</i> and patches of dropped seeds around <i>Triodia</i> (<10%).	

Habitat Assessment Site	Latitude	Longitude	Site Description	Site Photograph
5	-20.9228	121.9916	Assuming area of high water table, dominated by <i>Melaleuca</i> sp. (broad leaf) and <i>Hakea</i> sp. over <i>Melaleuca</i> sp. (broad leaf) over <i>A. stellaticeps</i> and <i>Jacksonia</i> sp. over <i>Triodia</i> (?<i>T. schinzii</i>). <i>A. stellaticeps</i> present but sparse, not enough to be considered core habitat for Bilby but could be occasionally utilised. Long unburnt mature <i>Triodia</i> still with dead florets suggesting reasonable condition. Compact large clumps up to 1m but no ring-forming <i>Triodia</i>. Bare open areas, no live tussock grasses, very few herbs/annuals, mostly dead or very dry so not much diversity, so unlikely to currently be suitable for Night Parrot.. Generally vegetation not very complex, dry but otherwise very good condition, no tracks seen but tussock grasses grazed, assume camel. Leaf litter present under <i>Melaleuca</i> and <i>A. stellaticeps</i> (<10%). Cat tracks.	
6	-20.9213	121.9919	Sparse eucalypts and taller <i>Melaleuca</i> over very open <i>Melaleuca</i> woodland over very open <i>Acacia</i> shrubland over <i>Triodia</i> grassland on a sandy loamy soil with very fine surface buckshot <i>Triodia</i> reasonably large and dense hummocks and some large rings. <i>A. stellaticeps</i> quite sparse. No recorded signs of target species, no burrows, diggings nor tracks found. Does not represent core habitat for Bilby.	

Habitat Assessment Site	Latitude	Longitude	Site Description	Site Photograph
7	-20.8843	121.9886	Narrow plain between longitudinal dunes. Gravelly sandy soil supporting very open <i>Melaleuca</i> woodland over <i>Acacia/ Grevillea/ Melaleuca</i> shrubland over <i>Triodia</i> grassland. Both species of <i>Melaleuca</i> present, far more open than in other assessment sites. <i>A. stellaticeps</i> present in reasonable size and density, however, very dry and in poor condition. <i>Triodia</i> medium size and density. Not core habitat for either Bilby nor Night Parrot.	
8	-20.9291	121.9928	Narrow plain between longitudinal dunes. A sandy gravelly soil dominated by very open sparse <i>E. victrix</i> woodland over very open <i>Acacia/ Grevillea/ Melaleuca</i> shrubland over <i>Triodia</i> grassland. Surface covered in light buckshot and plain interspersed with low but slightly elevated gravelled areas dominated by <i>G. wickhamii</i>. <i>A. stellaticeps</i> drops out almost completely on south side of track, some patches of <i>A. ancistrocarpa</i> and mostly low (<1m) <i>Melaleuca</i> sp. <i>Triodia</i> medium to large in size. No sign of scats, burrows, diggings nor tracks were recorded for Bilby and this does not represent core habitat. <i>C isolepis</i> recorded as well as camel, cat and bustard tracks.	

Habitat Assessment Site	Latitude	Longitude	Site Description	Site Photograph
9	-20.8567	122.0267	Narrow sandy plain between two longitudinal dunes dominated by <i>M. lasiandra</i> and <i>H. lorea</i> very open woodland over very open assorted <i>Acacia</i> shrubland over <i>Triodia</i> grassland. Very dry with smaller species in poorer condition, lack of herbaceous species and grasses all very dry. No evidence (burrows, diggings nor tracks) of Bilby activity. Not considered core habitat for MNES species.	
10	-20.8668	122.0122	Broad sandy plain dominated by very open <i>M. lasiandra</i> woodland over a mixed very open <i>Acacia</i> (<i>A. monticola</i>, <i>A. dictyphleba</i>) shrubland over a <i>T. epactia</i> and <i>T. schinzii</i> grassland. Very dry nor many grasses (some <i>Aristida</i>), lack of herbs and some of the lower shrub layer (<i>Jacksonia</i> and <i>Seringia</i>) in poor condition. Sparsely distributed <i>M. lasiandra</i>, (lack of <i>M. glomerata</i>), ranging from small trees to low shrubs. No evidence of use by Bilbys (no burrows, tracks nor diggings). Not core habitat for any MNES species.	

Habitat Assessment Site	Latitude	Longitude	Site Description	Site Photograph
11	-20.8556	122.0263	Assume area of high water table dominated by <i>Melaleuca</i> sp. and scattered <i>Hakea</i>, over <i>Melaleuca</i> sp. over <i>Melaleuca</i> sp., <i>A. monticola</i> and <i>A. ?tumida</i> over <i>Melaleuca</i> sp., <i>Gompholobium</i> sp. and <i>A. ?tumida</i> over <i>Triodia</i> (?<i>T. epactia</i>). Few <i>A. monticola</i> so likely unsuitable for Bilby but possibly could be utilised. Long unburnt mature <i>Triodia</i> still with dead florets suggesting reasonable condition with patches of recently dropped seeds, few hummocks with dead parts. Compact large clumps up to 0.5 m but no rings, florets up to 1.5m. Bare open areas with few grazed and dead tussock grasses and very few herbs/annuals, mostly dead or very dry. Generally, vegetation a little more complex than other assessment sites but not very diverse, dry but otherwise very good condition, no disturbance observed. Leaf litter present under <i>Melaleuca</i>, <i>A. tumida</i> and seeds around <i>Triodia</i> (<5%).	
12	-20.8646	122.0132	Assume area of high water table dominated by <i>Melaleuca</i> sp. and scattered <i>Hakea</i> over <i>Melaleuca</i> sp. broad leaf <i>A. monticola</i> over <i>Melaleuca</i> sp., <i>Hakea</i>, <i>A. monticola</i> over <i>Jacksonia</i> over <i>Triodia</i> (?<i>T. epactia</i>). <i>A. monticola</i> present so could be suitable for Bilby but only scattered so would not consider core habitat. Long unburnt mature <i>Triodia</i> still with dead florets suggesting reasonable condition, not many hummocks with dead parts. Compact large clumps up to 0.6 m but no rings, florets up to 1.5 m, many recently dropped seeds. Bare open areas with few dead tussock grasses and very few herbs/annuals, mostly dead or very dry so little diversity. Generally, vegetation more complex than other assessment sites but not very diverse, dry but otherwise very good condition, no disturbance observed. Leaf litter present under <i>Melaleuca</i>, <i>A. monticola</i> and seeds around <i>Triodia</i> (<5%).	