Ironbark No. 1 Mine

EPBC Act Approval Annual Compliance Audit Report – 2022

for Fitzroy Australia Resources Pty Ltd

6 March 2023

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1 INTRODUCTION

Hansen Environmental Consulting was engaged by Fitzroy Australia Resources Pty Ltd (Fitzroy) to prepare the 2022 Annual Compliance Report for the Ironbark No.1 Mine in accordance with Condition 19 of the Ironbark No.1 Mine *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Approval (EPBC 2007/3643). This report provides the compliance assessment.

1.1 BACKGROUND

The Ironbark No.1 Mine involves the construction and operation of an underground coal mine on a greenfield site. The mine site comprises Mining Lease (ML) 700024. The mine site is located approximately 35 km north-east of the township of Moranbah in Central Queensland.

Fitzroy was granted an EPBC Act approval for the mine on 9 November 2018. The EPBC Act approval was varied on 7 June 2019 and again on 17 October 2022. This compliance assessment is based on the 17 October 2022 version of the EPBC Act approval.

EPBC Act Condition 19 requires that an Annual Compliance Report, addressing compliance with each of the EPBC Act approval conditions over the previous 12 months, is published within three (3) months of every 12 month anniversary of the commencement of the action. The commencement of the action was 12 December 2021. Mine construction commenced on this date. This is the first Annual Compliance Report, which is required to be published on Fitzroy's website by 12 March 2023. Documentary evidence providing proof of the date of publication and details of any non-compliance with any of the conditions of the EPBC Act approval must be provided to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) at the same time that the Annual Compliance Report is published. The report is required to remain on publication for the duration of the EPBC Act approval (i.e. until 1 August 2060).

Activities conducted during the term of this Annual Compliance Report (i.e. 12 December 2021 to 12 December 2022) included construction of mine surface infrastructure and underground mine access roadway development. Underground bord and pillar mining and longwall mining did not commence within the term of the audit.

1.2 SCOPE OF WORK

This report has been prepared in accordance with EPBC Act Condition 19 and presents the findings of the annual compliance audit undertaken by Hansen Environmental Consulting. The compliance audit was conducted by Rebecca Miller and Peter Hansen of Hansen Environmental Consulting.

The audit scope included:

- A detailed review of the documentation relevant to the EPBC Act approval; and
- Interviews with key Fitzroy personnel in early 2023, including Karin Fogarty, Environmental Specialist, and Sophie Bereyne, Environmental Manager.

A site visit was not conducted specifically for the purposes of the audit. The audit team is familiar with the mine site from previous site visits and approvals work conducted for the mine.

Appendix A provides a full list of the EPBC Act approval conditions and the corresponding detailed audit findings for compliance with each condition.

2 NON-COMPLIANCES AND RECTIFICATION ACTIONS

There were no non-compliances with any EPBC Act approval conditions identified during the audit period (i.e. 12 December 2021 to 12 December 2022). Therefore, there are no recommended rectification actions. Appendix A provides a full list of the EPBC Act conditions and the corresponding detailed audit findings for each condition.

For

HANSEN ENVIRONMENTAL CONSULTING

Rebecca Miller

Principal Environmental Scientist

Peter Hansen

Director
(RAB/QSA Auditor No. 13499)

Appendix A
EPBC Act Approval Compliance Audit Findings

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TABLE 1 IRONBARK NO. 1 MINE - EPBC ACT APPROVAL - COMPLIANCE AUDIT

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
1	The approval holder must undertake the action within the **Ironbark No.1 Coal project area**.	Y	Fitzroy provided a dxf of the mine disturbance footprint as of 12 December 2022 (including underground and surface disturbance areas). The dxf confirms that the mine activities have only been undertaken within the **Ironbark No. 1 Coal project area** (i.e. ML 700024 which is shown as black dashed lines and labelled 'Mining Lease' in the EPBC Act approval attachments A and B).
2	The approval holder must not **impact** more than 83 hectares (ha) of **EPBC Act listed threatened species and communities** habitat consisting of: a) 9.2 ha of **Brigalow ecological community** (TEC); b) 57 ha of **Squatter Pigeon breeding habitat**; c) 26 ha of **Squatter Pigeon foraging habitat**; and d) 74 ha of **Yakka Skink habitat**.	Y	Fitzroy provided a dxf of the mine disturbance footprint as of 12 December 2022 (including underground and surface disturbance areas). This dxf confirms that Fitzroy has impacted approximately 4.4 ha of the **EPBC Act listed threatened species and communities** habitat, which is less than the limit of 83 ha. As of 12 December 2022, Fitzroy had impacted the following specific habitat, which are all below the limits listed in EPBC Act Condition 2: a) 3.9 ha of **Brigalow TEC;** b) 0.5 ha of **Squatter Pigeon breeding habitat**; and c) 3.9 ha of **Squatter Pigeon foraging habitat**. As per the response to EPBC Act Approval Conditions 4 and 5, the Yakka Skink Report concluded that Yakka Skinks were not present within the mine site, therefore, provision of offsets for the Yakka Skink and tracking of Yakka Skink habitat disturbance areas is not required.
3	The approval holder must not impact any ***Xerothamnella parvifolia*** within the ***Xerothamnella parvifolia* habitat**.	Y	As stated in the EPBC Act approval definitions, *Xerothamnella parvifolia* habitat means the area labelled as the 'area incorrectly mapped as *X. parvifolia* habitat in the EIS' shown in Attachment A of the EPBC Act approval. This definition is based on the Section 143 EPBC Act approval variation application that was

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
			submitted on 7 June 2022, which included a report by Eco Solutions & Management (EcoSM). The EcoSM report confirmed that, based on a targeted field survey, there is no *X. parvifolia* present, or likely to be present, within the area of mapped *X. parvifolia* habitat in the EPBC Act approval (Attachment A). Hence, there is no *X. parvifolia* present within the incorrectly mapped habitat area in Attachment A and no potential for impact.
Pre-clearance Survey for the Yakka Skink (*Egernia rugosa*)			
4	Prior to the **commencement** of the action, the approval holder must undertake a pre-clearance survey for the presence of **Yakka Skink** in all areas of **Yakka Skink habitat** that will be **impacted** by the **mine infrastructure and ponding areas**. The pre-clearance survey must be undertaken by an **approved ecologist** and in accordance with a methodology approved by the **Department**.	Y	On 7 June 2019, Hansen Bailey, on behalf of Fitzroy, submitted the June 2019 Yakka Skink Survey Methodology (by Cumberland Ecology) to meet the requirements of EPBC Act Condition 4. This included details of the survey team members. The former Commonwealth Department of the Environment and Energy (DoEE) approved the Yakka Skink Survey Methodology and confirmed that the survey team met the requirements of an approved ecologist in a letter dated 7 June 2019. Cumberland Ecology undertook a pre-clearance survey between 15 and 21 June 2019 (prior to the commencement of the action on 12 December 2021) for the presence of Yakka Skink in all areas of Yakka Skink habitat that were predicted to be impacted by mine infrastructure and ponding areas.
5	The approval holder must submit a Yakka Skink Report for the written approval of the **Minister**. The Yakka Skink Report must demonstrate that the approved methodology was implemented to undertake a pre-clearance survey for the presence of **Yakka Skink** in all areas of **Yakka Skink habitat** that could be **impacted** by the **mine infrastructure and ponding areas**, including details of the survey timing and survey effort.	Y	The Yakka Skink Report, in accordance with EPBC Act Condition 5, was submitted to the former DoEE on 1 July 2019. DoEE approved the report in a letter dated 7 July 2019 and also confirmed that the Yakka Skink is not present at the mine site and that the requirements of EPBC Act Conditions 5A, 5B and 5C do not apply.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	If **Yakka Skink** presence is detected, the Report must include: a. the coordinates for, and a map showing the location of, **Yakka Skink** individuals or colonies detected within the **mine infrastructure and ponding areas**; and b. the condition of **Yakka Skink habitat**, and any associated microhabitat features, within a 200 m radius of any **Yakka Skink** records and/or colonies.		
5A	The approval holder must not **commence** the action until the Yakka Skink Report has been approved by the **Minister**. If the Yakka Skink Report approved by the **Minister** determined that **Yakka Skink** are not present within the **mine infrastructure and ponding areas**, then no offset for impacts to **Yakka Skink habitat** is required for the action. If the Yakka Skink Report approved by the **Minister** determined that **Yakka Skink** is present within the **mine infrastructure and ponding areas**, then the approval holder must submit for approval by the **Minister**, within six months of **commencement** (or as otherwise agreed in writing by the **Minister**), a Yakka Skink Offset Strategy to compensate for **impacts** on **Yakka Skink habitat** identified in the approved Yakka Skink Report.	N/A	Not applicable. See the response to EPBC Act Condition 5.
5B	The Yakka Skink Offset Strategy referred to in condition 5A:	N/A	Not applicable. See the response to EPBC Act Condition 5.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	a. must demonstrate that the proposed offset(s) meet the principles of the **EPBC Act Environmental Offsets Policy**; b. must demonstrate how high value **Yakka Skink** micro habitat will be identified and delivered at potential offset areas; c. may include a prioritized list of potential offset sites, only some of which may subsequently be secured as offsets, subject to detailed survey prior to submission of the Yakka Skink Offset Management Plan; d. must propose timelines and mechanisms for legally securing the proposed offset area(s); and e. must include details of how the Yakka Skink Offset Strategy will be updated to incorporate any new information or understanding of the **Yakka Skink**. The approval holder must implement the approved Yakka Skink Offset Strategy.		
5C	The approval holder must, within 6 months of submitting the Yakka Skink Offset Strategy specified in condition 5B, submit a Yakka Skink Offset Management Plan for the **Minister's** written approval. The Yakka Skink Offset Management Plan must be consistent with the approved Yakka Skink Offset Strategy, and must include: a. a field validation survey and baseline description of the current condition (prior to any management	N/A	Not applicable. See the response to EPBC Act Condition 5.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	activities) of the offset area(s), including existing vegetation; b. a description and map (including **shapefiles**) to clearly define the location and boundaries of the offset area(s), accompanied by the **offset attributes**; c. information about how the proposed offset area(s) provides connectivity with other relevant habitats and biodiversity corridors; d. commitment to ecological outcomes and offset completion criteria for **Yakka Skink habitat** and the timeframes in which these will be achieved; e. a description of the management measures (including timing, frequency and duration) that will be implemented in the offset area(s); f. a description of how proposed management measures take into account relevant **approved conservation advices** and are consistent with the measures contained in relevant **recovery plans** and **threat abatement plans**; g. completion criteria and performance targets for evaluating the effectiveness of the Yakka Skink Offset Management Plan implementation, and criteria for triggering corrective actions; h. a program to monitor and report on progress against the performance and completion criteria		

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	and review the effectiveness of the Yakka Skink Offset Management Plan; and i. a description of potential risks to the successful implementation of the offset(s), and contingency measures that would be implemented to mitigate against these risks. The approval holder must implement the approved Yakka Skink Offset Management Plan(s). The **Minister** may give notice to the approval holder of changes required to the Yakka Skink Offset Management Plan(s) for the plan to be suitable for approval by the **Minister**.		
Offset Management Plan			
6	The approval holder must submit an Offset Management Plan for the written approval of the **Minister**. The approved Offset Management Plan must be implemented. The Offset Management Plan must be prepared by a **suitably qualified person** in accordance with the **Department's Environmental Management Plan Guidelines**, and include: a. details of environmental offset/s to compensate, in accordance with the **EPBC Act Environmental Offsets Policy** to the satisfaction of the **Minister**, for the **EPBC Act listed threatened species and communities** habitat to be impacted as identified in condition 2a to 2c; b. a description of the habitat condition to be impacted for the **EPBC Act listed threatened**	Y	The Ironbark No. 1 Mine Offset Management Plan (OMP), in accordance with EPBC Act Condition 6, was submitted to the former DoEE on 15 January 2019. The former Commonwealth Department of Agriculture, Water and the Environment (DAWE) approved the OMP dated 11 February 2020 on 14 February 2020. The implementation of the plan is awaiting legal securement of the offset area.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	species and communities habitat as identified in condition 2a to 2c; c. details of how the proposed offset/s and Offset Management Plan meet the requirements of the **EPBC Act Environmental Offsets Policy**; d. a field validation survey and baseline description of the current condition (prior to any management activities) of the offset area/s, including existing vegetation; e. e. a description and map (including **shapefiles**) to clearly define the location and boundaries of the proposed offset area/s, accompanied by the **offset attributes**; f. information about how the proposed offset area/s provide connectivity with other relevant habitats and biodiversity corridors; g. a description of the management measures (including timing, frequency and duration) that will be implemented in each offset area/s; h. a discussion of how proposed management measures take into account relevant **approved conservation advices** and are consistent with the measures contained in relevant **recovery plans** and **threat abatement plans**; i. completion criteria and performance targets for evaluating the effectiveness of the Offset		

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	Management Plan implementation, and criteria for triggering corrective actions; j. a program to monitor, report on and review the effectiveness of the Offset Management Plan; k. a description of potential risks to the successful implementation of the offset/s, and contingency measures that would be implemented to mitigate against these risks; and l. details of the mechanism to **legally secure** the environmental offset/s.		
7	The approval holder must: a. have **control** of the offset area(s) by 12 December 2024; b. apply to **legally secure** the offset area(s) by 12 March 2025; c. **legally secure** the offset area(s) by 12 December 2025; and d. within 10 **business days** of each offset area being **legally secured**, provide the **Department** with written evidence demonstrating that the offset has been **legally secured** and, if different from those originally provided, **offset attributes** and **shapefiles** that clearly define the location and boundaries of the offset area.	N/A	The deadlines in EPBC Act Condition 7 are all future deadlines outside the term of this audit (i.e. 12 December 2021 to 12 December 2022). Fitzroy has confirmed (pers. comm. K. Fogarty) that the requirements of EPBC Act Condition 7 are planned to be met by the deadlines stated in Condition 7.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
8	The approval holder must not **commence** the action until the Offset Management Plan has been approved by the **Minister**.	Y	As stated in the response to EPBC Act Condition 6, the OMP was approved by the Minister on 14 February 2020. As stated in the response to EPBC Act Condition 4, the action commenced on 12 December 2021, after the approval of the OMP by the Minister.
Vegetation Clearance			
9	To manage potential **impacts to EPBC Act listed threatened species and communities** during vegetation clearance, the approval holder must implement the mitigation and management measures identified in section 4.2 of the **additional information**.	Y	Fitzroy has incorporated all of the mitigation and management measures listed in Section 4.2 of the **additional information** into the Ironbark No. 1 Mine Permit to Disturb procedure management measures. Section 4.2 of the **additional information** included the following key points and Fitzroy's evidence of compliance is stated in **bold**: • Areas disturbed for mine infrastructure will be rehabilitated to a post-mining landform that is stable, self-sustaining, safe and requires minimal maintenance. The post-mining land use will be grazing. **Not applicable. No rehabilitation works commenced within the audit term.** • A Rehabilitation Management Plan will be prepared in accordance with the requirements of the EA, prior to the commencement of rehabilitation. **Not applicable. EA Condition G12 requires that a Rehabilitation Management Plan is developed and submitted to the Queensland Department of the Environment and Science (DES) for review and approval at least 3 months prior to the commencement of any rehabilitation activities. Rehabilitation did not commence within the audit term and is not planned to commence in Q1 2023. Therefore, a Rehabilitation Management Plan is not yet required to be prepared in accordance with the EA.** • Gas Drainage Activities including the following key points:

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
			• The total area disturbed by gas drainage infrastructure is approximately 30 ha. **As of 12 December 2022, the total area disturbed by gas drainage infrastructure was 3.45 ha. This is below the maximum area of 30 ha**; • The total area disturbed by subsidence crack rehabilitation is approximately 1.5 ha. **Underground mining did not commence within the audit term. Therefore, no subsidence cracks due to underground mining developed, or were required to be rehabilitated**; and • Progressive clearing, decommissioning of gas wells and rehabilitation. **Progressive clearing for gas drainage was undertaken within the audit term (i.e. only 3.45 ha of the approved 30 ha, has been disturbed). No gas wells required decommissioning and, therefore, no rehabilitation was required within the audit term.** • Subsidence Crack Rehabilitation Program. **As stated above, underground mining did not commence within the audit term and therefore, no subsidence cracks or buckling due to underground mining developed, or were required to be rehabilitated.** • Vegetation Clearing Controls including the following key points: • Pre-clearing inspections. **Pre-clearing inspections were undertaken by qualified Spotter Catchers which complied with Section 4.2 of the Additional Information. The Spotter Catchers provided reports detailing the pre-clearance inspections.** • Clearing surveys. **Clearing surveys were undertaken by qualified Spotter Catchers which complied with Section 4.2 of the Additional Information. The Spotter Catcher provided reports detailing the clearing survey methodologies and results.**

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
			• Works in, or adjacent to, creeks/drainage lines. **No works in, or adjacent to, creeks/drainage lines were conducted within the audit term.**
Riparian Area			
10	Prior to the **commencement** of **mining activities**, a **suitably qualified person** must undertake ecological surveys in accordance with the **Department's** survey guidelines or best practice guidelines in effect at the time of the surveys to determine the extent (in hectares) and **habitat condition** for **EPBC Act listed threatened species and communities and groundwater - dependent ecosystems** in the **riparian area**. The approval holder must report its findings in the first Annual Compliance Report required under condition 19.	Y	As stated in the response to EPBC Act Condition 4, the action commenced on 12 December 2021. Trevor Meers from Cumberland Ecology (a suitably qualified person) undertook an ecology survey in accordance with EPBC Act Condition 10. The ecology survey was conducted between 29 September and 7 October 2018, 7 and 12 November 2018, and 7 and 13 March 2019, prior to the commencement of the action. The Riparian Area Baseline Survey Report, including the findings of the survey, is provided in Appendix B of this first Annual Compliance Report.
11	To identify any potential adverse **impacts**, for the duration of this approval, the approval holder must implement an annual monitoring program to monitor the **habitat condition** for **EPBC Act listed threatened species and communities** and **groundwater-dependent ecosystems** in the **riparian area**. A monitoring program must be developed and implemented within 12 months of **commencement** by a **suitably qualified person** and include: a. quantitative (e.g. ecological field survey results) and qualitative data (e.g. photo-point monitoring sites) to determine current **habitat condition**	Y	EcoSM developed an annual monitoring program in accordance with EPBC Act Condition 11, which Fitzroy implemented, on 12 December 2022 (12 months after the commencement of the action). Fitzroy have confirmed that mining under Spade Creek and Alpha Creek (i.e. the commencement of potential impacts to the riparian area) is not due to commence until approximately 2027.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	against baseline data collected under condition 10; and b. ecological surveys are to be conducted in accordance with the **Department's survey guidelines** or current best practice surveys in effect at the time of the surveys.		
12	At any time after the **commencement** of the action, for any adverse **impacts** to the **habitat condition** for **EPBC Act listed threatened species and communities** and **any groundwater-dependent ecosystems** in the **riparian area**, the approval holder must provide environmental offset/s in accordance with the **EPBC Act Environmental Offsets Policy**, unless demonstrated that adverse impacts are not related to, or cannot be attributed to, **mining activities**.	Y	Fitzroy provided a dxf of the current mine disturbance footprint as of 12 December 2022. The dxf confirms that no impacts have occurred in the vicinity of the riparian area. Therefore, offsets are not required under EPBC Act Condition 12 at this point in time.
13	If an offset is required under condition 12, the approval holder must not commence the subsequent longwall until an Offset Management Plan addressing the adverse **impacts** identified at condition 12 is approved by the **Minister** in writing. The approved Offset Management Plan must be implemented.	N/A	Not applicable. See response to EPBC Act Condition 12.
14	The Offset Management Plan required under condition 13 must be prepared by a **suitably qualified person** in accordance with the **Department's Environmental Management Plan Guidelines** and include: a. details of the environmental offset/s required to compensate for the **EPBC Act listed threatened**	N/A	Not applicable. See response to EPBC Act Condition 12.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	species and communities habitat in the **riparian area** adversely **impacted** by **mining activities** as identified by the annual monitoring program required under condition 11; b. details of how the proposed offset/s and Offset Management Plan meet the requirements of the **EPBC Act Environmental Offsets Policy**; and c. details of the mechanism to **legally secure** the environmental offset/s.		
15	The approval holder must **legally secure** the environmental offset/s within two (2) years of condition 12 coming into force.	N/A	Not applicable. See response to EPBC Act Condition 12.
Subsidence Management			
16	To manage subsidence **impacts** on habitat for **EPBC Act listed threatened species and communities** in the **riparian area** of **Alpha Creek**, all management measures, monitoring, reporting and corrective actions outlined in the Subsidence Management Plan required under the Queensland **Environmental Authority (EA)** for **Spade Creek** must also be implemented for **Alpha Creek**.	N/A	As stated in the response to EPBC Act Condition 12, underground mining is not scheduled to commence in the vicinity of Alpha Creek or Spade Creek until approximately 2027. The Subsidence Management Plan required under the EA for Spade Creek will be developed and implemented for both Spade Creek and Alpha Creek, in accordance with EPBC Act Condition 16, prior to the commencement of mining under Spade Creek and Alpha Creek.
Standard administrative conditions			
17	Within 10 days after the **commencement** of the action, the approval holder must advise the **Department** in writing of the actual date of **commencement**.	Y	The mine commenced on 12 December 2021. Fitzroy notified the former DAWE on 17 December 2021 of the commencement of the action. Notification occurred 5 days after the commencement of the mine, well within the 10 day notification period.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
18	The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plans required by this approval, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 or the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.	Y	During the course of the audit, Fitzroy was able to provide documentation confirming compliance with all of the EPBC Act approval conditions and Fitzroy has confirmed that they have maintained accurate records substantiating all activities associated with, or relevant to, the conditions of the EPBC Act approval, including measures taken to implement the management plans required by the EPBC Act approval. DCCEEW have not conducted an audit, nor have they requested an independent auditor to conduct an audit in accordance with Section 458 of the EPBC Act.
19	Within three (3) months of every 12 month anniversary of the **commencement** of the action, the approval holder must publish a report (the Annual Compliance Report) on its website addressing compliance with each of the conditions of this approval during the previous 12 months. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the Annual Compliance Report is published. Reports must remain published for the duration of this approval. The approval holder must continue to publish the Annual Compliance Report until otherwise advised by the **Minister** in writing.	Y	This report is the Annual Compliance Report. It will be published on Fitzroy's website within three (3) months of the 12 month anniversary of the commencement of the action. The action commenced on 12 December 2021. Therefore, this Annual Compliance Report must be published on Fitzroy's website by 12 March 2023. Fitzroy intends to submit documentary evidence providing proof of the date of publication and details of any non-compliances with any of the conditions of this approval to DCCEEW at the same time as this report is published. Fitzroy has confirmed that this Annual Compliance Report will continue to be published until otherwise advised by the Minister.
20	The approval holder must report any contravention of the conditions of this approval to the **Department** in	Y	Fitzroy is not aware of any contraventions to this EPBC Act approval within the audit term.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	writing within five (5) business days of the approval holder becoming aware of a contravention.		
21	Upon the direction of the **Minister**, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The approval holder must not commence the audit until the **Minister** approves the independent auditor and audit criteria in writing. The audit report must address the criteria to the satisfaction of the **Minister**.	N/A	Fitzroy has confirmed that the Minister has not asked Fitzroy to conduct an independent audit of compliance with the conditions of the EPBC Act approval and submit a report to the Minister.
22	The approval holder may, at any time, apply to the **Minister** for a variation to an action management plan approved by the **Minister** or as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the **EPBC Act**. If the **Minister** approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous action management plan.	N/A	Fitzroy has advised that it has not applied to the Minister for any variations to action management plans that have been approved by the Minister or as subsequently revised in accordance with the EPBC Act conditions.
23	**REVOKED**		
24	**REVOKED**		
25	**REVOKED**		
26	If, after five (5) years from the date of this approval, the approval holder has not **commenced** the action, then	N/A	The original EPBC Act approval was granted on 9 November 2018. The action commenced on 12 December 2021, less than 5 years from the date of the original EPBC Act approval. Therefore, this condition is not applicable.

EPBC Act Approval Condition Number	EPBC Act Approval Condition	Compliant (Y/N)	Evidence of Compliance
	the approval holder must not **commence** the action without the written agreement of the **Minister**.		
27	Unless otherwise agreed to in writing by the **Minister**, the approval holder must publish all plans referred to in the conditions of this approval on its website. Each plan must be published on the website within one (1) month of being approved by the **Minister**. All plans must remain on the website for the duration of this approval unless otherwise agreed to in writing by the **Minister**.	Y	The only plan referred to in the conditions of the EPBC Act approval that was developed and approved by the Minister in the audit term is the OMP required by EPBC Act Condition 6. The OMP was approved on 14 February 2020 and was published on Fitzroy's website on 20 February 2020, less than one (1) month from the date of the Minister's approval. As of the date of this report, the OMP was still published on Fitzroy's website at https://www.fitzroyoz.com.au/news/ironbark-no-1-project-epbc-2007-3643-offsets-management-plan/.

APPENDIX B

Riparian Area Baseline Survey Report

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Ironbark No. 1 Coal Mine

Riparian Area Baseline Survey Report

Hansen Environmental Consulting

3 March 2023

Final

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Report No. 20044RP1

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Approved by:	
Position:	Senior Ecologist/Queensland Manager
Signed:	
Date:	3 March, 2023

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Glossary

Term/Acronym	Definition
AU	Assessment Unit, which is a relatively homogeneous areas of the same Regional Ecosystem in a similar condition state
BioCondition transect	The sampling site, which is a 50 x 100m plot assessed by the BioCondition assessment method
BOM	Bureau of Meteorology
Brigalow TEC	Brigalow (*Acacia harpophylla* dominant and co-dominant) ecological community
DSITIA	Queensland Department of Science, Information Technology, Innovation and Arts
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GPS	Global Positioning System
GDE(s)	Groundwater dependent ecosystem(s)
Mine site	ML 700024 which covers an area of approximately 3,400 ha
RE	Regional Ecosystem
Riparian Area	All lands defined as being within the outer banks of a stream or lake
RSA	Riparian Survey Area

1. Introduction

1.1. Purpose

The Ironbark No.1 Coal Mine (the Mine) involves the construction and operation of an underground coal mine on a greenfield site in Central Queensland. The Mine is located approximately 35 km north-east of Moranbah Township. The Minesite comprises ML 700024 which covers an area of approximately 3,400 ha (see **Figure 1**). The Mine proponent is Fitzroy Australia Resources Pty Ltd.

The purpose of this report is to describe the results of the Riparian Area survey that is required, under Condition 10 of the Mine's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval. Condition 10 of the EPBC Act approval requires an ecological survey, prior to the commencement of mining activities, of the habitat condition for the Brigalow (*Acacia harpophylla*) Threatened Ecological Community (TEC), Squatter Pigeon (Southern) (*Geophaps scripta scripta*) habitat, and potential Groundwater Dependent Ecosystems (GDEs), within the riparian areas of Alpha Creek and Spade Creek within the Mine site.

1.2. Background

1.2.1. Mine Site Description

The Mine is an underground coal mine which utilises longwall and board and pillar mining techniques to extract coal from the Leichhardt Seam. There is also above-ground impacts from above ground infrastructure and areas of ponding caused by subsidence.

The Mine site is situated within the Wotonga Pastoral Lease (cattle property) and is predominantly flat with sporadic rocky outcrops/hills that are ironstone/laterite 'jump ups' or plateaux. Extensive areas have been cleared, prior to the commencement of the mine, for broad pasture cattle farming. Two ephemeral creek systems cross the Mine site and flow during periods of heavy rain. The dominant vegetation types within the Mine site are Poplar Box (*Eucalyptus populnea*) grassy woodlands on flat areas, with Lancewood (*Acacia shirleyi*) open forest on the ironstone/laterite 'jump ups' and Queensland Blue Gum (*Eucalyptus tereticornis*) woodlands along the creek systems.

1.2.2. EPBC Act Approval Conditions

The Mine was granted EPBC Act approval (EPBC 2007/3643) on 9 November 2018. Condition 10 of the Mine's EPBC approval states:

*10. Prior to the **commencement** of **mining activities**, a **suitably qualified person** must undertake ecological surveys in accordance with the Department's survey guidelines or best practice guidelines in effect at the time of the surveys to determine the extent (in hectares) and habitat condition for **EPBC Act listed threatened species and communities** and **groundwater-dependent ecosystems** in the **riparian area**. The approval holder must report its findings in the first Annual Compliance Report required under condition 19.*

This report addresses the Mine's EPBC Act Condition 10, and details the results of the pre-mining ecology survey.

The words and phrases in bold in Condition 10 are all defined in the Mine's EPBC Act approval as follows:

- Commencement: The first instance of any specified activity associated with the action including clearance of vegetation and construction of any infrastructure. Clearing for the Mine commenced on 12 December 2021.
- Mining activities: Mining coal from the coal measures, including the removal of overburden. Mining activities (i.e. the removal of overburden) commenced in January 2022.
- Suitably qualified person: A person who has professional qualifications and at least three (3) years of relevant work experience related to the nominated subject matters and can give an authoritative assessment, advice and analysis on performance relative to the subject matter using relevant protocols, standards, methods or literature. If the person does not have appropriate professional qualifications, the person must have at least five (5) years of work experience related to the subject matters and can give an authoritative assessment, advice and analysis on performance relative to the subject matter using relevant protocols, standards, methods or literature. Dr Trevor Meers from Cumberland Ecology meets the definition of a suitably qualified person. See **Appendix A** for Trevor Meers' CV.
- EPBC Act listed threatened species and communities: A threatened flora or fauna species listed under the EPBC Act and/or an ecological community listed under the EPBC Act for which this approval has effect, including the Brigalow TEC, Squatter Pigeon (Southern), and Yakka Skink (*Egernia rugosa*). The extents of Brigalow TEC and Squatter Pigeon (Southern) habitat within the mine site are shown in Attachment A and Attachment B, respectively, of the Mine's EPBC Act approval (**Figures 1** and **2** of this report). The Mine's EPBC Act approval Conditions 4 and 5 relate to the Yakka Skink. The Yakka Skink pre-clearance survey (Condition 4) and Yakka Skink Report (Conditions 5 and 5A) have been completed and the report was approved by the Minister on 7 July 2019. The Yakka Skink Report concluded that Yakka Skinks were not present within the mine site, therefore, provision of offsets for the Yakka Skink and tracking of Yakka Skink habitat disturbance are not required. Therefore, this monitoring program only includes the Brigalow TEC and Squatter Pigeon (Southern) habitat.
- GDEs: Ecosystems that require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes, and ecosystem services. GDEs include terrestrial vegetation, wetlands (swamps, lakes and rivers) and ecosystems in aquifers and caves. The mine site includes terrestrial vegetation and ephemeral creeks. Groundwater field investigations conducted as part of the EIS groundwater study confirmed that alluvial sediments are confined to a narrow, relatively thin, band along the creeks that traverse the site. The majority of the alluvium is dry with saturated alluvium limited to the lower reach of Alpha Creek, just upstream of the junction with Bullock Creek. This area is beyond the underground mining area and the saturated alluvium (and related aquifer ecosystems) is not predicted to be impacted by mining. There are no swamps, lakes or caves in the mine site. The GDE assessment in this report is, therefore, limited to the potential terrestrial GDEs in the riparian areas.

- Riparian area: All of the areas along Spade Creek or Alpha Creek within the mine site. The extent of Spade Creek and Alpha Creeks within the mine site are shown in Attachment A of the Mine's EPBC Act approval and **Figure 7** of this report. The extent of the riparian area has been defined in this report (***Section 3.2***).

2. Riparian Survey Area

As stated in ***Section 1.2.2,*** the riparian area is defined in the mine's EPBC Act approval. A Riparian Survey Area (RSA) was designed to cover both the Alpha Creek and Spade Creek systems within the mine site (see **Figure 3**). The survey area was derived using the Queensland Government mapped extent of Quaternary geology (i.e. potential alluvium) or, where the Quaternary geology was not present or was less than 100 m from the centreline of the creek, a buffer area of 100 m from the centreline of the creeks.

These two creeks join up at the western edge of the Mine site to form a fourth order stream, Teviot Brook, which is a tributary of the Isaac River. Spade Creek is a third order stream for most of the length of the RSA, while Alpha Creek is a third order stream until approximately the centre of the mine site when it splits into two tributaries which are both second order streams (these are referred to Alpha Creek North and Alpha Creek South throughout this report). Several unnamed first order streams also join both creeks within the RSA.

Regional Ecosystems (REs) within the RSA were groundtruthed for the 2009 Environmental Impact Statement (EIS) and then amended as necessary during the baseline riparian surveys undertaken by Cumberland Ecology in 2018 and 2019. The REs in the RSA generally included woodlands dominated by Queensland Blue Gum on the riparian fringe of these creeks (RE 11.3.25) and on adjacent alluvial plains (RE 11.3.4). Adjacent Cainozoic sand plains within the RSA supported woodlands dominated by Poplar Box (RE 11.5.3) or Narrow-leaved Ironbark (*Eucalyptus crebra*) (RE 11.5.9), while adjacent clay plains support Brigalow dominated woodlands or open forests (RE 11.4.9). Some cleared areas (non-remnant vegetation) are also present within the RSA, mostly located further from the creeks.

Groundtruthed RE mapping for the RSA is shown in **Figure 4** with short descriptions of all REs present as per the Queensland Herbarium (2019) Regional Ecosystem Description Database Version 11.1 provided in **Table 1**.

Table 1 Regional Ecosystem short descriptions for REs present in the RSA

RE Number	Short Description
11.3.2/11.9.7	Poplar Box woodland on alluvial plains/ Poplar Box, *Eremophila mitchellii* shrubby woodland on fine-grained sedimentary rocks
11.3.4	Queensland Blue Gum and/or *Eucalyptus* spp. woodland on alluvial plains
11.3.25	Queensland Blue Gum or *Eucalyptus camaldulensis* woodland fringing drainage lines
11.4.9	*Brigalow* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains
11.4.9 regrowth	Regrowth of Brigalow shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains
11.5.3	Poplar Box +/- *Eucalyptus melanophloia* +/- *Corymbia clarksoniana* woodland on Cainozoic sand plains and/or remnant surfaces
11.5.9	Narrow-leaved Ironbark and other *Eucalyptus* spp. and *Corymbia* spp. woodland on Cainozoic sand plains and/or remnant surfaces

RE Number	Short Description
11.9.7	Poplar Box, *Eremophila mitchellii* shrubby woodland on fine-grained sedimentary rocks

3. Survey Methodology

The survey methodology for the RSA included:

- Riparian Area mapping;
- GDE mapping;
- Habitat quality assessments;
- BioCondition assessments; and
- Photographic monitoring.

Each of these, plus the timing of the surveys, is discussed in the following sections.

3.1. Timing

The RSA was surveyed twice:

- Nine BioCondition transects located within or adjacent to the RSA (i.e. within vegetation polygons extending into the RSA from adjacent areas) were surveyed between 29 September and 7 October 2018 and 7 to 12 November 2018 as part of the Mine's BioCondition Assessment (Cumberland Ecology 2019 – Appendix B). These nine transects are numbered P03, P04, P05, P06, P07, P08, P16, P18 and P19 on **Figure 5**; and
- 15 BioCondition transects located within the RSA were surveyed between 7 and 13 March 2019. These 15 transects are numbered RO1 to R15 on **Figure 5**.

Details of the weather conditions during and leading up to the 2018 survey periods are detailed in **Appendix D**. In summary, the conditions were dry in the lead up to the September/October 2018 survey and there was significant rainfall in the lead up to the November 2018 survey.

During the 2019 survey there was heavy rainfall which resulted in temporary flow in both creeks, although this is not reflected on the rainfall records for the nearest weather station at Moranbah Airport (**Table 2**). The 2019 survey was at the end of the summer wet season in the tropics and was considered to be the ideal time to undertake BioCondition assessments, as some BioCondition assessment variables such as species richness and grass cover can be dependent on rainfall (Eyre *et al.* 2015).

Table 2 Rainfall observations for the lead-up to and including the 2019 survey period, for BOM weather station 034035 at Moranbah Airport

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/03/19	19.1	32.3	0
2/03/19	20.1	32.8	0
3/03/19	20.1	32.8	0
4/03/19	19.8	33.8	0
5/03/19	20.6	33.2	0
6/03/19	23.3	30.1	0
7/03/19	21.3	36.7	1
8/03/19	22.7	28.7	0

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
9/03/19	22.8	32.6	0.4
10/03/19	19.9	36.6	0.2
11/03/19	19.4	38.9	0
12/03/19	23.6	40.1	0
13/03/19	21.5	37.5	9

3.2. Riparian Area Mapping

The Riparian Area was defined using the Queensland *Water Act 2000* definition for Riparian Environment. The Riparian Area, therefore, consists of all lands within the outer banks of a stream or lake. The outer bank is considered to be the uppermost bank of a watercourse and may include internal features such as alluvial terraces, levee banks and the low banks of the stream channel. Under Section 5.A of the *Water Act 2000* the outer bank is the edge of the floodplain. However, if there is no floodplain, the outer bank is considered to be the highest place on the bank of the watercourse marked by a scour mark or depositional feature. Mapping of the Riparian Area was undertaken in March 2019.

Mapping of the Riparian Area involved delineation of the extent of the flood plain along both sides of Spade Creek and Alpha Creek (and relevant tributaries) within the RSA through walking the length of the outer bank on both sides of both creeks and their tributaries and recording the location of the outer bank using a hand-held Global Positioning System (GPS) unit at regular intervals. If the flood plain/outer bank was not clearly distinguishable, then extent of the outer bank was mapped by noting any depositional features or scouring.

3.3. GDE Mapping

As described in Section 1.2.2, GDE's are defined in the Mine's EPBC Act approval and within the riparian area, are limited to terrestrial GDEs.

Terrestrial GDEs are defined below, from the Queensland Government *WetlandInfo* website:

- Terrestrial GDEs. Terrestrial GDEs are terrestrial ecosystems (e.g. REs) which require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services. Riverine RE GDEs and Wetland GDEs are both types of Terrestrial GDEs.
    - Riverine RE GDEs: Riverine RE GDEs are riverine wetland ecosystems (e.g. terrestrial vegetation associated with wetlands and creeks) which require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services.
    - Wetland GDEs: Wetland GDEs are wetlands which require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services. Wetland GDEs are dependent on the surface expression of groundwater.

To determine the extent of potential GDEs, the length Spade Creek and Alpha Creek (and their tributaries) was walked in March 2019, noting the following within the channels and adjacent areas:

- REs present within the RSA (as an indicator of terrestrial and riparian vegetation);
- Presence of pools and evidence of flow (as an indicator of rivers, creeks, drainage lines and any surface expression of groundwater which could indicate potential aquatic GDEs);
- Presence of billabongs and other wetlands (noting that there were no swamps or lakes within the mine site); and
- Presence of species on the Flora Wetland Indicator Species List (DES 2013). The presence of these species in the RSA would indicate the possible presence of wetlands that have the potential to be GDEs.

In addition, the BOM National Atlas GDE mapping of Aquatic and Terrestrial GDEs was considered to determine the extent of GDEs in the RSA.

The potential GDEs within the RSA were classified into the following categories:

- Moderate potential to be a GDEs – REs on floodplains and/or stream channels dominated by canopy species known to access groundwater, with Wetland Indicator Species Present, and presence of pools, billabongs or evidence of flow; or
- Low potential to be a GDE – other vegetation located on floodplains/alluvial plains that does not show evidence of reliance on regular flows (i.e. absence of Wetland Indicator Species or canopy species known to access groundwater); or
- Non-GDE vegetation – REs located on higher landforms (Cainozoic sand plains or clay plains) where vegetation is unlikely to access groundwater.

3.4. Habitat Quality Assessments

The habitat quality assessment followed the Queensland Government's *Guide to Determining Terrestrial Habitat Quality* (Queensland Government 2017). 'Habitat quality' is measured based on three key indicators, site condition, site context and species habitat index. This approach aligns with the Commonwealth Government's *Environmental Offsets Policy* (DSEWPaC 2012) measure of 'habitat quality' and is intended to provide a consistent framework for environmental offsets in Queensland.

In accordance with the Queensland Government's *Guide to Determining Terrestrial Habitat Quality*, habitat index assessments were undertaken for the EPBC Act protected matters listed in Section 1.2.2, namely Brigalow TEC, potential GDEs and the Squatter Pigeon habitat.

For vegetation communities (Brigalow TEC and potential GDEs), habitat index assessments were undertaken for the following variables:

- Threat to species/communities (assumed to be minor and associated with subsidence and edge effects); and

- Role of the site to overall species population/community in the State (assumed not be critical to survival due to the minor impacts from the mine, the moderate condition of the Brigalow TEC and potential GDEs within the mine site and the extensive extent of these communities within the mine site and larger Moranbah area).

For the Squatter Pigeon, the following was assumed for the species habitat index assessment:

- Future impacts to the species will be low as they will be limited to some subsidence within habitat, and minor fragmentation associated with the construction of a Haul Road across the RSA;
- Quality of available of foraging habitat and shelter habitat was determined from the map of Squatter Pigeon breeding and foraging habitat as shown in the mine's EPBC Act approval (Attachment 2), combined with the condition assessment;
- Species mobility is assumed to be a minor restriction as the species is highly mobile; and
- The species is known to be present in the area and therefore, the habitat in the mine site is important for breeding and foraging. However, due the extent of similar habitat and abundance of recorded individuals within the mine site and the larger Moranbah area, the habitat in the mine site is not considered critical for the species overall population in Queensland.

The surrounding landscape and adjacent land uses can directly influence the quality and security of habitat through edge effects, environmental buffering, or threatening processes. As such, a suite of landscape attributes were measured to describe the location of the habitat within the surrounding landscape and the influence of its associated threats in accordance with the *Guide to Determining Terrestrial Habitat Quality* (Queensland Government 2017).

Assessment unit area habitat quality scores were not calculated as the purpose of this riparian management plan in not to identify offset requirements for the RSA.

3.4.1. Site Selection

The *Guide to Determining Terrestrial Habitat Quality* (Queensland Government 2017) provides a suggestive number of sampling sites based on the area of assessment units (AUs), where AUs are areas of the same RE of uniform or the same general condition. The suggested number of survey sites based on AU area is:

- 0-50 ha – at least two sites;
- 50-100 ha – three sites; and
- 100-500 ha – four sites.

The *Guide to Determining Terrestrial Habitat Quality* (Queensland Government 2017) stated that "Field assessment across a single assessment unit containing discrete polygons can be streamlined if it can be demonstrated that each polygon is uniform or in the same general condition". To assess the condition of the RSA, all areas of the RSA were walked through, with photographs taken, including the photographs taken at the photograph monitoring

points. Based on this assessment, several REs were found to be present in more than one condition as shown in **Table 3**.

The overall number of BioCondition transects was fairly consistent with the suggested number in the *Guide to Determining Terrestrial Habitat Quality* (Queensland Government 2017) as shown in **Table 3**, although some small AUs of ~0.5ha or less contained a single transect.

Table 3 General condition of assessment units/REs and the number of survey sites.

RE Number	General Condition	AU area (ha)	Survey Sites	Total Survey Sites
11.3.2/11.9.7	Good, with some historic thinning	9.13	R12, R13	2
11.3.25	Very good, generally intact riparian vegetation	84.56	P19, R03	2
11.3.4	Good, typically with some historical thinning and fragmentation	126.57	P04, P06, R10, R14	4
11.3.4	Very good, typically with large old trees	28.24	R01, R05, R08	3
11.4.9	Good to moderate, often impacted by gully erosion	30.73	P07, R07, R15	3
11.4.9 regrowth	Brigalow regrowth in poor condition	0.52	P03	1
11.5.3	Moderate, mostly with historical thinning and regrowth trees	158.45	R09, P08, R06	3
11.5.3	Very good, contains large old trees	24.4	P05, R02	2
11.5.9	Fair, typically heavily thinned	51.48	P18, R04, R11	3
11.9.7	Moderate, mostly historically thinned with regrowth trees	0.06	P16	1
Total		**514.13**		**24**

3.5. BioCondition Assessment

Each BioCondition assessment was conducted in accordance with the *BioCondition Assessment Manual* (Eyre *et al.* 2015). It involved surveying 50 x 100 m plots and assessing the following features at the sites described in Table 3 in accordance with the *BioCondition Assessment Manual* (Eyre *et al.* 2015):

- Mean canopy height;
- Number of large native trees;
- Recruitment of woody perennial species;
- Canopy and shrub layer cover;
- Length of coarse woody debris;
- Perennial grass cover;
- Leaf litter cover;

- Non-native plant cover; and
- Species richness of trees, shrubs, grasses and forbs.

The locations of each BioCondition survey site (shown as the centre line of the 100 m plot) are shown in **Figure 5**.

BioCondition scores were calculated for each survey site by assessing the values for each feature measured against the relevant RE benchmark derived from *Benchmarks for the Brigalow Belt Bioregion* (DSITI 2016).

BioCondition Scores for landscape attributes were calculated using Patch Size, Context and Connectivity following the *BioCondition Assessment Manual* (Eyre *et al.* 2015) as the Bowen Basin North Subregion of the Brigalow Belt Bioregion is a fragmented subregion. Ecological corridors were determined from mapping available through Queensland Globe. Patch Size refers to the entire area of vegetation in which the transect is located, and therefore does not necessarily correspond to the AU area.

We note that there is a discrepancy between the *BioCondition Assessment Manual* (Eyre *et al.* 2015) and *Guide to Determining Terrestrial Habitat Quality* (Queensland Government 2017) in assigning the values for species richness. We have been advised by the Department of Science, Information Technology, Innovation and Arts (DSITIA) that the *BioCondition Assessment Manual* is correct and as such and *Guide to Determining Terrestrial Habitat Quality* is to be updated in the future (T. Eyre pers. comm. 2019).

For areas mapped as RE 11.3.2/11.9.7 the benchmark for RE 11.3.2 was used as RE 11.3.2 is the dominant RE.

3.6. Photograph Monitoring

3.6.1. Site Selection, Location and Marking

Photograph monitoring points were set up at the centre-point (50m) of each of the 15 BioCondition transects surveyed in March 2019. An additional five photograph monitoring points were also set up to monitor features/areas not captured within the BioCondition transects such as areas of significant erosion, steep banks and wetlands.

The location of photograph monitoring points is shown in **Figure 6**.

Given that the RSA is prone to flooding, tall star pickets were not used to mark photograph monitoring points. Rather short 60 cm star pickets were used to mark points and pushed in to ground to a depth of 30 cm. These were located where ground appeared to be stable and unlikely to erode in the near future.

3.6.2. Photograph Monitoring

Photographs were taken at each point at a height of 1.5 m in each direction: north, east, south and west. All photographs were taken with a digital Nikon Coolpix W100 camera.

At each photograph monitoring point the following information was recorded:

- Photo direction;
- Details of what is shown in photographs;

- Photo/file number;
- Global Positioning System (GPS) location; and
- Date and time.

4. Results

4.1. Overview

Overall the condition of the RSA is fair as a result of ongoing pastoral activities, including past clearing and thinning and the establishment of exotic pasture grasses and the concentration of cattle around waterpoints and stockyards. Condition is poorest downstream, in particular in the vicinity of a stockyard located near the lower reaches of Alpha Creek (shown on **Figure 3**). In many areas there is severe gully and tunnel erosion, in particular where areas with dispersive clay subsoils are located adjacent to, or from the high banks of the creeks, or areas where the topography is steeper, such as where the creeks flow in close proximity to ironstone 'jump-ups'. Condition improves heading upstream, in particular adjacent to the tributaries of Alpha Creek where the adjacent vegetation has not been cleared.

4.2. Riparian Area

For Spade Creek the Riparian Area closely follows the RSA along most of its length. However, for Alpha Creek the Riparian Area is typically narrower than the RSA. This is largely due to a large area above the outer banks being located between Alpha Creek north and Alpha Creek south tributaries. An area located above the outer banks is also located near the junction of Spade and Alpha Creeks. The Riparian Area becomes narrower heading upstream, with the narrowest point being along Alpha Creek North where this creek flows through a rocky area, effectively forming a narrow gorge with a rocky outer bank on either side. The Riparian Area was also narrow along the unnamed tributary of Alpha Creek, but this was due to this creek flowing outside of the RSA at one location.

Figure 7 shows the extent of the Riparian Area within the RSA.

4.3. Terrestrial Groundwater Dependent Ecosystems

Queensland Blue Gum and *Corymbia tessellaris* are species that are likely to be dependent on groundwater (IESC 2018). As such, all REs dominated by these species have potential to be GDEs, such as RE 11.3.4 and RE 11.3.25. Given the depth of groundwater below these creek systems is largely in the range of 5-10 m (AGE Consultants 2019), REs 11.3.4 and 11.3.25 have a moderate potential to be terrestrial GDEs (**Figure 8**). This classification is broadly consistent with the BOM National Atlas of Terrestrial GDEs (BOM 2020).

The only other RE in the Riparian Area that is situated in the alluvium, and could be a potential GDE, is RE 11.3.2. RE 11.3.2 (Poplar Box woodland on alluvial plains) only occurs within the Riparian Area in mixed polygons with RE 11.9.7 (Poplar Box woodland located on fine-grained sediments) on the banks of Spade Creek. RE 11.3.2 is considered to be a low potential GDE (**Figure 8**) because within the Riparian Area it was found on a mixed landform (i.e. a mixture of alluvial plains and fine-grain sediments) and because REs 11.3.2 and 11.9.7 were not dominated by other species (such as Queensland Blue Gum and *Corymbia tessellaris*) that were likely to constitute GDEs (IESC 2018).

All of the other REs within the Riparian Area are located on non-alluvial landforms (i.e. land zones 4 and 5) and are, therefore, considered unlikely to be GDEs (**Figure 8**).

4.3.1.1. Riverine RE GDEs

Throughout the majority of the Riparian Area, both Alpha Creek and Spade Creek are fringed by REs 11.3.25 and 11.3.4. As stated in Section 4.3.2, these REs are dominated by Queensland Blue Gum and *Corymbia tessellaris*, which is considered to be dependent on groundwater. Therefore, these RE have a moderate potential to be Riverine RE GDEs (Figure 8). This classification is broadly consistent with the BOM National Atlas of Terrestrial GDEs (BOM 2020).

4.3.1.2. Wetland GDEs

A single billabong wetland was observed on the floodplain of Spade Creek and is likely to be ephemeral and fed primarily by overland flow on the floodplain. Given the absence of any significant groundwater base flow in Spade Creek or its floodplain, the billabong is not considered to be a Wetland GDE.

A single woody Wetland Indicator Species was observed in the Riparian Area, namely *Melaleuca fluviatalis*. This species occurred exclusively within or on the banks of stream channels along Alpha Creek and Alpha Creek North, including on occasion meandering side channels. Within this area it occurred as a subcanopy tree within fringing vegetation dominated by Queensland Blue Gum (equivalent to RE 11.3.25 or RE 11.3.4). The distribution was scattered, but more or less continuous, in the upstream reaches of Alpha and Spade Creeks. However, in the downstream reaches of Alpha and Spade Creek the distribution of *Melaleuca fluviatalis* became more sporadic and was restricted to isolated stands. The areas with *Melaleuca fluviatalis* (REs 11.3.25 and 11.3.4) have a moderate potential to be Wetland GDEs due to the presence of the Wetland Indicator Species along all of the Riparian Area (**Figure 8**).

A number of herbaceous Wetland Indicator Species were distributed sparsely across the RSA, either within stream channels, or on adjacent floodplains (within RE 11.3.4 and 11.3.25).These species included:

- *Cyperus exaltatus;*
- *Cyperus nutans* var. *eleusinoides;*
- Darling Lily (*Crinum flaccidum*) *;*
- Common Rush (*Juncus usitatus*) ;
- *Leptochloa digitata*; and
- *Persicaria attenuata.*

The presence of a wetland indicator species does not, in itself, confirm an area to be a wetland (DES 2020) or a GDE. The areas where these herbaceous Wetland Indicator Species were found, therefore, have moderate potential to be GDEs (as mapped in **Figure 8**) as these species could be present either due to reliance on surface flows or the surface expression of groundwater. *Eucalyptus tereticornis* is a species that is likely to be a dependent on groundwater, as is *Corymbia tessellaris*, which forms a component of RE 11.3.4 (IESC 2018). As such all REs dominated by these species have potential to be GDEs. Given the depth of groundwater below these creek systems is largely in the range of 5-10m

(AGE Consultants 2019) we consider these REs to be moderate potential terrestrial GDEs only, which is broadly consistent with the BOM National Atlas of GDEs (BOM 2020).

Regional Ecosystem 11.3.2 occurs in mixed polygons with RE11.9.7 (located on fine-grained sediments) on the banks of Spade Creek and is considered to be a low potential GDE, both based on the mixed land-form and that it as it is not dominated by species that are likely to be a GDE (IESC 2018). All other vegetation located on non-alluvial landforms (i.e. land zones 4 and 5) is considered unlikely to be a GDE due to location on higher landforms.

4.4. Habitat Quality Assessments

The habitat quality assessment scoring system involved scores out of 10, whereby a maximum score of 10 represented a fully intact system, scores of 4, 5 and 6 indicated good quality regrowth or medium value habitat, and a minimum score of 1 indicated a totally cleared area.

A summary of the habitat quality scores are provided in **Table 4** for Brigalow TEC and potential GDEs and in **Table 5** for Squatter Pigeon breeding and foraging habitat. The detailed data from the habitat quality assessments is provided in **Appendix B.**

4.5. Potential GDEs

For potential GDEs, habitat quality scores suggest habitat quality ranges from good (7 or 8) to moderate (5 or 6). In general, the transects with higher scores were located along the upstream reaches of Alpha Creek, where there was a large area of continuous vegetation. These include transects R01, R02, R04, R11 and P19. Transects located in more fragmented vegetation, on the middle to upper reaches of Spade Creek had moderate habitat quality scores (5 or 6) including transects P04, P18, R10, R13, R14. This indicates that impacts associated with clearing and fragmentation for cattle grazing along Spade Creek resulted in an overall reduction to habitat quality.

4.5.1. Brigalow TEC

The Brigalow TEC habitat quality scores were relatively consistent (6 to 7) across the RSA suggesting that the Brigalow TEC was moderate to good quality habitat across the RSA. There was one fragmented patch of Brigalow regrowth (survey site P03) with a lower score of 5, however this lower score was expected for regrowth.

4.5.2. Squatter Pigeon Habitat

For Squatter Pigeon habitat, most of the habitat quality scores were between 7 and 8. However, some transects along Spade Creek had habitat quality scores of 6 where the vegetation was more fragmented and therefore degraded through edge effects. Areas of Brigalow TEC which were foraging habitat for the Squatter Pigeon, also had habitat quality scores of 6 and represent medium value foraging habitat. There was one patch of Brigalow regrowth scoring a 5 for medium value foraging habitat.

4.6. BioCondition Surveys

A summary of BioCondition scores are provided in **Table 5** for Brigalow TEC and potential GDEs and in **Table 5** for Squatter Pigeon breeding and foraging habitat. The detailed data from the BioCondition surveys is provided in **Appendix B**.

When assessed against BioCondition benchmarks, most plots had scores lower than the benchmark for a range of variables including:

- Reduced number of large trees in some areas due to historical thinning;
- Lower native perennial grass cover (due to invasion of exotic pasture grasses and scalding in some areas);
- Higher shrub cover (typically well above benchmark values due to dense patches of Currant Bush (*Carissa ovata*) which resulted in lower scores); and
- Higher exotic plant cover (due to high cover of introduced pasture grasses).

Plots along Alpha Creek scored highly against landscape variables due to the intact area of riparian vegetation along this creek, which extended to connect with a large area of intact vegetation upstream. In contrast, riparian vegetation along Spade Creek is narrower and more heavily fragmented resulting in lower scores for landscape variables for transects located along this creek.

Table 4 Summary of BioCondition Scores and Habitat Quality Scores for Brigalow TEC and potential GDEs for relevant transects within the Riparian Survey Area.

Transect No.	RE	AU area	BioCondition Score (max 80)	Landscape Score (max 26)	Brigalow TEC			Potential GDEs		
					Habitat Index (max 20)	Total Score (max 126)	Habitat Quality Score	Habitat Index (max 20)	Total Score (max 126)	Habitat Quality Score
P03	11.4.9 regrowth	0.52	48	2	16	65	5			
P04	11.3.4	126.57	48.5	4				16	68.5	5
P06	11.3.4	126.57	49.5	16				16	81.5	6
P07	11.4.9	30.73	61	16	16	92	7			
P18	11.5.9	51.48	50.5	11				16	77.5	6
P19	11.3.25	84.56	61	18				16	95	8
R01	11.3.4	28.24	60	19				16	95	8
R03	11.3.25	84.56	50.5	19				16	85.5	7
R04	11.5.9	51.48	51	18				16	85	7
R05	11.3.4	28.24	51	20				16	87	7
R07	11.4.9	30.73	54	18	16	73	6			
R08	11.3.4	28.24	44	13				16	73	6
R10	11.3.4	126.57	45	14				16	75	6
R11	11.5.9	51.48	61	19				16	96	8
R12	11.3.2/11.9.7	9.13	58.5	8				16	82.5	7

Transect No.	RE	AU area	BioCondition Score (max 80)	Landscape Score (max 26)	Brigalow TEC			Potential GDEs		
					Habitat Index (max 20)	Total Score (max 126)	Habitat Quality Score	Habitat Index (max 20)	Total Score (max 126)	Habitat Quality Score
R13	11.3.2/11.9.7	9.13	44	6				16	66	5
R14	11.3.4	126.57	51.5	14				16	91.5	6
R15	11.4.9	30.73	53	17	16	71	6			

Table 5 Summary of BioCondition Scores and Habitat Quality Scores for Squatter Pigeon habitat for each transect within the Riparian Survey Area

Transect No.	RE	AU area	BioCondition Score (max 80)	Landscape Score (max. 26)	Breeding Habitat			Foraging Habitat		
					Habitat Index (max 50)	Total Score (max 156)	Habitat Quality Score	Habitat Index (max 50)	Total Score (max 156)	Habitat Quality Score
P03	11.4.9 regrowth	0.52	48	2				28	78	5
P04	11.3.4	126.57	48.5	4	46	98.5	6			
P05*	11.5.3	24.4	71.5	14	36	121.5	8	36	121.5	8
P06	11.3.4	126.57	49.5	16	46	111.5	7			
P07	11.4.9	30.73	61	16	28	105	7			
P08	11.5.3	158.45	63	12	44	119	8			
P16	11.9.7	0.06	56	11				36	103	7
P18	11.5.9	51.48	50.5	11	46	107.5	7			

Transect No.	RE	AU area	BioCondition Score (max 80)	Landscape Score (max. 26)	Breeding Habitat		Foraging Habitat			
					Habitat Index (max 50)	Total Score (max 156)	Habitat Quality Score	Habitat Index (max 50)	Total Score (max 156)	Habitat Quality Score
P19	11.3.25	84.56	61	18	46	125	8			
R01*	11.3.4	28.24	60	19	46	125	8	46	125	8
R02	11.5.3	24.4	63.5	17	44	124.5	8			
R03	11.3.25	84.56	50.5	19	46	115.5	7			
R04	11.5.9	51.48	51	18	44	113	7			
R05	11.3.4	28.24	51	20	46	117	8			
R06*	11.5.3	158.45	67	19	44	130	8	44	130	8
R07	11.4.9	30.73	54	18				28	100	6
R08	11.3.4	28.24	44	13	46	103	7			
R09	11.5.3	158.45	61	16	36	113	7			
R10	11.3.4	126.57	45	14	46	105	7			
R11	11.5.9	51.48	61	19	44	124	8			
R12	11.3.2/11.9.7	9.13	58.5	8	46	112.5	7			
R13	11.3.2/11.9.7	9.13	44	6	46	96	6			
R14	11.3.4	126.57	51.5	14	46	111.5	7			
R15	11.4.9	30.73	53	17				28	98	6

*Areas containing both breeding and foraging habitat

4.7. Photograph Monitoring

The photograph monitoring provided a visual representation of the various conditions of the RSA and its vegetation, which included:

- Queensland Blue Gum woodlands on riparian fringes and adjacent alluvial plains containing large old trees (PP03, PP05, PP08 and PP15);
- Thinned Queensland Blue Gum woodlands (PP01, PP10, PP14);
- Thinned and regrowth dominated Poplar Box dominated woodlands (PP06, PP12, PP13 and PP18)
- Area containing large, old, remnant trees of Poplar Box (PP02);
- Heavily thinned woodlands dominated by Narrow-leaved Ironbark (PP04 and PP11);
- Moderate to good condition open forests dominated by Brigalow (PP07, PP20);
- Areas with severe gully erosion on adjacent high banks (PP09, PP16);
- An area with steep rocky stream banks (PP17); and
- A small billabong/wetland (PP19).

Photographs from the photograph monitoring and accompanying details are provided in **Appendix C**.

5. References

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APPENDIX A :

CV of Person who Prepared this Report

Dr Trevor Meers

Senior Project Manager / Ecologist

Experience

Dr Trevor Meers is a Senior Project Manager / Ecologist at Cumberland Ecology, based on the Sunshine Coast, Queensland. He has a PhD in Restoration Ecology in addition to a Bachelor of Applied Science (Natural Resource Management), with numerous publications in scientific literature based on this research.

Trevor has over 15 years' environmental consulting experience undertaking and managing ecology studies throughout Australia. His experience has focussed strongly on botany, ecological restoration, and land rehabilitation, including offsets and monitoring. Trevor is an Accredited Assessor for the Biodiversity Assessment Method (BAM).

Trevor's has a strong understanding of environmental legislation as it relates to offsets, threatened species, vegetation mapping, ecological assessment, and monitoring.

Trevor currently manages Cumberland Ecology's Queensland office.

Project Management

Trevor has managed ecological assessment and monitoring projects across Queensland, the Northern Territory, New South Wales, and Victoria. He has managed the ecological components of a suite of projects including residential/industrial development applications, infrastructure projects, mining and coal seam gas projects, renewable energy projects, offset monitoring programs and rehabilitation projects. Trevor has also worked on a suite of legal projects involving land clearance issues including assessment of historical vegetation clearing.

Report Preparation

Trevor has been the primary or contributing author on a variety of documents including:

- Biodiversity Development Assessment Reports;
- Ecological impact statements;
- Ecological constraints assessments;
- Rehabilitation management and monitoring reports;
- Vegetation and biodiversity management plans;
- Biodiversity offsets reports;
- Groundwater Dependent Ecosystem (GDE) identification and monitoring;
- Koala habitat assessments; and
- Ecological monitoring reports.

Field Surveys

Trevor is actively involved in undertaking field surveys and has with extensive experience in designing and undertaking surveys and monitoring in Victoria, New South Wales, across Queensland and the Northern Territory (with a focus on the Top End). In New South Wales, Trevor's field experience is mostly within the Hunter Valley, north-west slopes and plains, and the Northern Rivers.

Field surveys have included:

- Vegetation mapping including assessment against Plant Community Types, Regional Ecosystems and threatened ecological community definitions;
- Condition assessments including BAM and BioCondition plots;
- Targeted threatened flora and fauna surveys;
- Offset survey and monitoring;
- GDE and riparian monitoring; and
- Rehabilitation monitoring.

Education

- Bachelor of Applied Science (Honours) in Natural Resource Management. Deakin University, 2002.
- PhD (Restoration Ecology), School of Forest and Ecosystem Science. University of Melbourne, 2007.
- BAM Accredited Assessor Training. Greencap (Accredited to August 2024).

APPENDIX B :
BioCondition Data

Variable	Measured Value	Benchmark	% of Benchmark	Score
P03: RE 11.4.9 regrowth				
Proportion of canopy species with recruitment	100%	100%	100%	5
Number of large eucalypts	0	-	-	-
Number of large non-eucalypt trees	8	45	-	-
Total large trees (ha)	8	45	17.78	5
Tree canopy height (m)	8	13	61.54	3
Sub-canopy height (m)	5	8	62.50	3
Mean height score (canopy and sub-canopy)	-	-	-	3
Tree canopy cover (%)	0	25	0	0
Sub-canopy cover (%)	8.7	10	87.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	2.5
Shrub canopy cover (%)	41	5	820.00	3
Tree species richness	5	5	100.00	5
Shrub species richness	9	10	90.00	5
Grass species richness	5	5	100.00	5
Forb species richness	4	10	40.00	2.5
Weed cover (%)	25	0%	-	5
Length of coarse woody debris (m/ha)	205	1200	17.08	2
Native perennial grasses (%)	1.6	20	8.00	0
Litter cover (%)	31.40%	45.00%	69.78	5
Subtotal (maximum 80)				*48*
Landscape Variables				
Patch size	<5ha	-	-	0
Connectivity	Low	-	-	0
Context	Medium	-	-	2
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*2*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	Poor	-	-	1

Variable	Measured Value	Benchmark	% of Benchmark	Score
Quality of Shelter	Poor	-	-	1
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*28*
Calculations for Squatter Pigeon				
Total score				78
Maximum possible score				156
Habitat quality score				*5*
Assessment Unit Area (ha)				0.52
Habitat Index (Brigalow TEC)				
Threats to community	Low	-	-	15
Role of site to overall population	Critical	-	-	1
Total Score				*16*
Calculations for Brigalow TEC				
Total score				65
Maximum possible score				126
Habitat quality score				*5*

Variable	Measured Value	Benchmark	% of Benchmark	Score
P04: RE 11.3.4				
Proportion of canopy species with recruitment	50.00%	100.00%	50.00	3
Number of large eucalypts	6	26	-	-
Number of large non-eucalypt trees	4	9	-	-
Total large trees (ha)	10	35	28.57	5
Tree canopy height (m)	16	22	72.73	5
Sub-canopy height (m)	10	12	83.33	5
Mean height score (canopy and sub-canopy)		-	-	5
Tree canopy cover (%)	58.5	17	344.12	3
Sub-canopy cover (%)	22.3	5	446.00	3
Mean cover score (canopy and sub-canopy)	-	-	-	3

Variable	Measured Value	Benchmark	% of Benchmark	Score
Shrub canopy cover (%)	1.3	1	130.00	5
Tree species richness	8	4	200.00	5
Shrub species richness	4	2	200.00	5
Grass species richness	4	7	57.14	2.5
Forb species richness	9	10	90.00	5
Weed cover (%)	50%	0%	-	3
Length of coarse woody debris (m/ha)	190	384	49.48	2
Native perennial grasses (%)	4	43	9.30	0
Litter cover (%)	39.00%	20.00%	195.00	5
Subtotal (maximum 80)				*48.5*
Landscape Variables				
Patch size	5-25ha	-	-	2
Connectivity	Low	-	-	0
Context	Medium	-	-	2
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*4*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				98.5
Maximum possible score				156
Habitat quality score				*6*
Assessment Unit Area (ha)				126.57
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not Critical	-	-	1
Subtotal (Maximum 20)				*16*
Calculations for Potential GDEs				
Total score				68.5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Maximum possible score				126
Habitat quality score				*5*

Variable	Measured Value	Benchmark	% of Benchmark	Score
P05: RE 11.5.3				
Proportion of canopy species with recruitment	50.00%	100.00%	50.00	3
Number of large eucalypts	10	9	-	-
Number of large non-eucalypt trees	8	1	-	-
Total large trees (ha)	18	10	180.00	15
Tree canopy height (m)	14	16	87.50	5
Sub-canopy height (m)	8	7	114.29	5
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	29.6	20	148.00	5
Sub-canopy cover (%)	3.1	3	103.33	5
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	10.6	3	353.33	3
Tree species richness	10	6	166.67	5
Shrub species richness	14	6	233.33	5
Grass species richness	11	6	183.33	5
Forb species richness	3	10	30.00	2.5
Weed cover (%)	3%	0%	-	10
Length of coarse woody debris (m/ha)	185	314	58.92	5
Native perennial grasses (%)	10.4	19	54.74	3
Litter cover (%)	32.40%	20.00%	162.00	5
Subtotal (maximum 80)				*71.5*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Medium	-	-	2
Context	Medium	-	-	2

Variable	Measured Value	Benchmark	% of Benchmark	Score
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*14*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	Moderate	-	-	5
Quality of Shelter	Moderate	-	-	5
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*36*
Calculations for Squatter Pigeon				
Total score				121.5
Maximum possible score				156
Habitat quality score				*8*
Assessment Unit Area (ha)				24.4

Variable	Measured Value	Benchmark	% of Benchmark	Score
P06: RE 11.3.4				
Proportion of canopy species with recruitment	25.00%	100.00%	25.00	3
Number of large eucalypts	4	26	-	-
Number of large non-eucalypt trees	10	9	-	-
Total large trees (ha)	18	26	69.23	10
Tree canopy height (m)	16	22	72.73	5
Sub-canopy height (m)	6	12	50.00	3
Mean height score (canopy and sub-canopy)	-	-	-	4
Tree canopy cover (%)	30.5	17	179.41	5
Sub-canopy cover (%)	18.6	5	372.00	3
Mean cover score (canopy and sub-canopy)	-	-	-	4
Shrub canopy cover (%)	2.7	1	270.00	3
Tree species richness	15	4	375.00	5
Shrub species richness	3	2	150.00	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Grass species richness	3	7	42.86	2.5
Forb species richness	2	10	20.00	0
Weed cover (%)	25%	0%	-	5
Length of coarse woody debris (m/ha)	230	384	59.90	5
Native perennial grasses (%)	0	43	0.00	0
Litter cover (%)	60.00%	20.00%	300.00	3
Subtotal (maximum 80)				*49.5*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Medium	-	-	2
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*16*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				111.5
Maximum possible score				156
Habitat quality score				*7*
Assessment Unit Area (ha)				126.57
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not Critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				81.5
Maximum possible score				126
Habitat quality score				*6*

Variable	Measured Value	Benchmark	% of Benchmark	Score
P07: RE 11.4.9				
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5
Number of large eucalypts	0	-	-	-
Number of large non-eucalypt trees	24	45	-	-
Total large trees (ha)	24	45	53.33	10
Tree canopy height (m)	11	13	84.62	5
Sub-canopy height (m)	7	8	87.50	5
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	17.7	25	70.80	5
Sub-canopy cover (%)	8.1	10	81.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	37.4	5	748.00	3
Tree species richness	9	5	180.00	5
Shrub species richness	12	10	120.00	5
Grass species richness	4	5	80.00	2.5
Forb species richness	3	10	30.00	2.5
Weed cover (%)	1%	0%	-	10
Length of coarse woody debris (m/ha)	290	1200	24.17	2
Native perennial grasses (%)	2.6	20	13.00	1
Litter cover (%)	38	45	84.00	5
Subtotal (maximum 80)				*61*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Medium	-	-	2
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*16*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	Poor	-	-	1
Quality of Shelter	Poor	-	-	1
Species mobility capacity	Minor restriction	-	-	10

Variable	Measured Value	Benchmark	% of Benchmark	Score
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*28*
Calculations for Squatter Pigeon				
Total score				105
Maximum possible score				156
Habitat quality score				*7*
Assessment Unit Area (ha)				30.73
Habitat Index (Brigalow TEC)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Brigalow TEC				
Total score				92
Maximum possible score				126
Habitat quality score				*7*

Variable	Measured Value	Benchmark	% of Benchmark	Score
P08 RE 11.5.3				
Proportion of canopy species with recruitment	50.00%	100.00%	50.00	3
Number of large eucalypts	4	9	-	-
Number of large non-eucalypt trees	2	1	-	-
Total large trees (ha)	6	10	60.00	10
Tree canopy height (m)	14	16	87.50	5
Sub-canopy height (m)	6	7	85.71	5
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	10.8	20	54.00	5
Sub-canopy cover (%)	40.6	3	1353.33	3
Mean cover score (canopy and sub-canopy)	-	-	-	4
Shrub canopy cover (%)	2.1	3	70.00	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Tree species richness	6	6	100.00	5
Shrub species richness	6	6	100.00	5
Grass species richness	6	6	100.00	5
Forb species richness	2	10	20.00	0
Weed cover (%)	5%	0%	-	10
Length of coarse woody debris (m/ha)	325	314	103.50	5
Native perennial grasses (%)	8.2	19	43.16	1
Litter cover (%)	1	0	328.00	5
Subtotal (maximum 80)				*63*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Medium	-	-	2
Context	Low	-	-	0
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*12*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	9
Quality of Shelter	High	-	-	9
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*44*
Calculations for Squatter Pigeon				
Total score				119
Maximum possible score				156
Habitat quality score				*8*
Assessment Unit Area (ha)				158.45

Variable	Measured Value	Benchmark	% of Benchmark	Score
P16 RE 11.9.7				
Proportion of canopy species with recruitment	0.00%	100.00%	0.00	0

Variable	Measured Value	Benchmark	% of Benchmark	Score
Number of large eucalypts	6	14	-	-
Number of large non-eucalypt trees	18	22	-	-
Total large trees (ha)	24	36	66.67	10
Tree canopy height (m)	12	16	75.00	5
Sub-canopy height (m)	4	9	44.44	3
Mean height score (canopy and sub-canopy)	-	-	-	4
Tree canopy cover (%)	5.8	27	21.48	2
Sub-canopy cover (%)	5.5	12	45.83	2
Mean cover score (canopy and sub-canopy)	-	-	-	2
Shrub canopy cover (%)	3.2	1	320.00	3
Tree species richness	5	3	166.67	5
Shrub species richness	8	5	160.00	5
Grass species richness	4	9	44.44	2.5
Forb species richness	11	28	39.29	2.5
Weed cover (%)	2%	0%	-	10
Length of coarse woody debris (m/ha)	690	287	240.42	2
Native perennial grasses (%)	61	26	234.62	5
Litter cover (%)	18.40%	15.00%	122.67	5
Subtotal (maximum 80)				*56*
Landscape Variables				
Patch size	25-100ha	-	-	5
Connectivity	Medium	-	-	2
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*11*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	Moderate	-	-	5
Quality of Shelter	Moderate	-	-	5
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*36*

Variable	Measured Value	Benchmark	% of Benchmark	Score
Calculations for Squatter Pigeon				
Total score				103
Maximum possible score				156
Habitat quality score				*7*
Assessment Unit Area (ha)				0.06

Variable	Measured Value	Benchmark	% of Benchmark	Score
P18 RE 11.5.9				
Proportion of canopy species with recruitment	0.00%	100.00%	0.00	0
Number of large eucalypts	12	19	-	-
Number of large non-eucalypt trees	8	1	-	-
Total large trees (ha)	20	20	100.00	15
Tree canopy height (m)	17	17	100.00	5
Sub-canopy height (m)	6	8	75.00	5
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	35.1	25	140.40	5
Sub-canopy cover (%)	2.8	5	56.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	3.6	10	36.00	3
Tree species richness	9	3	300.00	5
Shrub species richness	5	6	83.33	2.5
Grass species richness	4	9	44.44	2.5
Forb species richness	7	11	63.64	2.5
Weed cover (%)	60%	0%	-	0
Length of coarse woody debris (m/ha)	380	342	111.11	5
Native perennial grasses (%)	0	26	0.00	0
Litter cover (%)	25.80%	30.00%	86.00	5
Subtotal (maximum 80)				*50.5*
Landscape Variables				
Patch size	25-100ha	-	-	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Connectivity	Medium	-	-	2
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*11*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				107.5
Maximum possible score				156
Habitat quality score				*7*
Assessment Unit Area (ha)				51.48
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				77.50
Maximum possible score				126
Habitat quality score				*6*

Variable	Measured Value	Benchmark	% of Benchmark	Score
P19 RE 11.3.25				
Proportion of canopy species with recruitment	75.00%	100.00%	75.00	5
Number of large eucalypts	14	14	-	-
Number of large non-eucalypt trees	10	7	-	-
Total large trees (ha)	24	21	114.29	15
Tree canopy height (m)	19	23	82.61	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Sub-canopy height (m)	n/a	n/a	n/a	n/a
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	40.9	22	185.91	5
Sub-canopy cover (%)	n/a	n/a	n/a	n/a
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	1.9	1	190.00	5
Tree species richness	11	4	275.00	5
Shrub species richness	9	2	450.00	5
Grass species richness	2	8	25.00	2.5
Forb species richness	5	12	41.67	2.5
Weed cover (%)	35%	0%	-	3
Length of coarse woody debris (m/ha)	230	375	61.33	5
Native perennial grasses (%)	0.4	12	3.33	0
Litter cover (%)	31.20%	15.00%	208.00	3
Subtotal (maximum 80)				*61*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	High	-	-	4
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*18*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				125
Maximum possible score				156
Habitat quality score				*8*

Variable	Measured Value	Benchmark	% of Benchmark	Score
Assessment Unit Area (ha)				84.56
Habitat Index (Potential GDEs)				
Threats to community		-	-	15
Role of site to overall population		-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				95
Maximum possible score				126
Habitat quality score				*8*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R01 RE 11.3.4				
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5
Number of large eucalypts	6	26	-	-
Number of large non-eucalypt trees	8	9	-	-
Total large trees (ha)	14	35	40.00	5
Tree canopy height (m)	15	22	68.18	3
Sub-canopy height (m)	8	12	66.67	3
Mean height score (canopy and sub-canopy)	-	-	-	3
Tree canopy cover (%)	30.5	17	179.41	5
Sub-canopy cover (%)	5	5	100.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	11.6	1	1160.00	3
Tree species richness	11	4	275.00	5
Shrub species richness	10	2	500.00	5
Grass species richness	9	7	128.57	5
Forb species richness	18	10	180.00	5
Weed cover (%)	2%	0%	-	10
Length of coarse woody debris (m/ha)	450	384	117.19	5
Native perennial grasses (%)	18.4	43	42.79	1

Variable	Measured Value	Benchmark	% of Benchmark	Score
Litter cover (%)	46.00%	20.00%	230.00	3
Subtotal (maximum 80)				*60*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Very High	-	-	5
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*19*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				125
Maximum possible score				156
Habitat quality score				*8*
Assessment Unit Area (ha)				28.24
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				95
Maximum possible score				126
Habitat quality score				*8*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R02 RE 11.5.3				
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Number of large eucalypts	14	9	-	-
Number of large non-eucalypt trees	0	1	-	-
Total large trees (ha)	14	10	140.00	15
Tree canopy height (m)	13	16	81.25	5
Sub-canopy height (m)	6	7	85.71	5
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	31.1	20	155.50	5
Sub-canopy cover (%)	4.2	3	140.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	4.3	3	143.33	5
Tree species richness	10	6	166.67	5
Shrub species richness	16	6	266.67	5
Grass species richness	5	6	83.33	2.5
Forb species richness	10	10	100.00	5
Weed cover (%)	5%	0%	-	5
Length of coarse woody debris (m/ha)	1780	314	566.88	2
Native perennial grasses (%)	8	19	42.11	1
Litter cover (%)	47.80%	20.00%	239.00	3
Subtotal (maximum 80)				*63.5*
Landscape Variables				
Patch size	100-200ha	-	-	7
Connectivity	Medium	-	-	2
Context	High	-	-	4
Ecological Corridors	Adjacent to	-	-	4
Subtotal (maximum 26)				*17*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	9
Quality of Shelter	High	-	-	9
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*44*

Variable	Measured Value	Benchmark	% of Benchmark	Score
Calculations for Squatter Pigeon				
Total score				124.5
Maximum possible score				156
Habitat quality score				*8*
Assessment Unit Area (ha)				24.4

Variable	Measured Value	Benchmark	% of Benchmark	Score
R03 RE 11.3.25				
Proportion of canopy species with recruitment	33.00%	100.00%	33.00	3
Number of large eucalypts	18	14	-	-
Number of large non-eucalypt trees	4	7	-	-
Total large trees (ha)	22	21	104.76	15
Tree canopy height (m)	19	23	82.61	5
Sub-canopy height (m)	n/a	n/a	n/a	n/a
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	24.1	22	109.55	5
Sub-canopy cover (%)	n/a	n/a	n/a	n/a
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	1.2	1	120.00	5
Tree species richness	7	4	175.00	5
Shrub species richness	5	2	250.00	5
Grass species richness	1	8	12.50	0
Forb species richness	7	12	58.33	2.5
Weed cover (%)	80%	0%	-	0
Length of coarse woody debris (m/ha)	880	375	234.67	2
Native perennial grasses (%)	0	12	0.00	0
Litter cover (%)	49.80%	15.00%	332.00	3
Subtotal (maximum 80)				*50.5*
Landscape Variables				

Variable	Measured Value	Benchmark	% of Benchmark	Score
Patch size	100-200ha	-	-	7
Connectivity	High	-	-	4
Context	High	-	-	4
Ecological Corridors	Adjacent to	-	-	4
Subtotal (maximum 26)				*19*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				115.5
Maximum possible score				156
Habitat quality score				*7*
Assessment Unit Area (ha)				84.56
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				85.50
Maximum possible score				126
Habitat quality score				*7*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R04 RE 11.5.9				
Proportion of canopy species with recruitment	75.00%	100.00%	75.00	5
Number of large eucalypts	2	19	-	-
Number of large non-eucalypt trees	0	1	-	-
Total large trees (ha)	2	20	10.00	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Tree canopy height (m)	15	17	88.24	5
Sub-canopy height (m)	4	8	50.00	3
Mean height score (canopy and sub-canopy)	-	-	-	4
Tree canopy cover (%)	13.6	25	54.40	5
Sub-canopy cover (%)	4	5	80.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	4.3	10	43.00	3
Tree species richness	7	3	233.33	5
Shrub species richness	5	6	83.33	2.5
Grass species richness	5	9	55.56	2.5
Forb species richness	2	11	18.18	0
Weed cover (%)	1%	0%	-	10
Length of coarse woody debris (m/ha)	205	342	59.94	5
Native perennial grasses (%)	7.2	26	27.69	1
Litter cover (%)	14.00%	30.00%	46.67	3
Subtotal (maximum 80)				*51*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	High	-	-	4
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*18*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	9
Quality of Shelter	High	-	-	9
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*44*
Calculations for Squatter Pigeon				
Total score				113
Maximum possible score				156

Variable	Measured Value	Benchmark	% of Benchmark	Score
Habitat quality score				*7*
Assessment Unit Area (ha)				51.48
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				85
Maximum possible score				126
Habitat quality score				*7*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R05 RE 11.3.4				
Proportion of canopy species with recruitment	0.00%	100.00%	0.00	0
Number of large eucalypts	34	26	-	-
Number of large non-eucalypt trees	0	9	-	-
Total large trees (ha)	34	35	97.14	10
Tree canopy height (m)	19	22	86.36	5
Sub-canopy height (m)	5	12	41.67	3
Mean height score (canopy and sub-canopy)	-	-	-	4
Tree canopy cover (%)	61.4	17	361.18	3
Sub-canopy cover (%)	6.4	5	128.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	4
Shrub canopy cover (%)	2.4	1	240.00	3
Tree species richness	15	4	375.00	5
Shrub species richness	10	2	500.00	5
Grass species richness	2	7	28.57	2.5
Forb species richness	7	10	70.00	2.5
Weed cover (%)	20%	0%	-	5
Length of coarse woody debris (m/ha)	430	384	111.98	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Native perennial grasses (%)	0.4	43	0.93	0
Litter cover (%)	31.40%	20.00%	157.00	5
Subtotal (maximum 80)				*51*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Very High	-	-	5
Context	Very High	-	-	5
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*20*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				117
Maximum possible score				156
Habitat quality score				*8*
Assessment Unit Area (ha)				28.24
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				87
Maximum possible score				126
Habitat quality score				*7*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R06 RE 11.5.3				

Variable	Measured Value	Benchmark	% of Benchmark	Score
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5
Number of large eucalypts	4	9	-	-
Number of large non-eucalypt trees	0	1	-	-
Total large trees (ha)	4	10	40.00	5
Tree canopy height (m)	14	16	87.50	5
Sub-canopy height (m)	4.5	7	64.29	3
Mean height score (canopy and sub-canopy)	-	-	-	4
Tree canopy cover (%)	34.1	20	170.50	5
Sub-canopy cover (%)	5.7	3	190.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	14.7	3	490.00	3
Tree species richness	7	6	116.67	5
Shrub species richness	10	6	166.67	5
Grass species richness	10	6	166.67	5
Forb species richness	22	10	220.00	5
Weed cover (%)	1%	0%	-	10
Length of coarse woody debris (m/ha)	220	314	70.06	5
Native perennial grasses (%)	21.4	19	112.63	5
Litter cover (%)	33.00%	20.00%	165.00	5
Subtotal (maximum 80)				*67*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Very High	-	-	5
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*19*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	9
Quality of Shelter	High	-	-	9
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1

Variable	Measured Value	Benchmark	% of Benchmark	Score
Subtotal (maximum 50)				*44*
Calculations for Squatter Pigeon				
Total score				130
Maximum possible score				156
Habitat quality score				*8*
Assessment Unit Area (ha)				158.45

Variable	Measured Value	Benchmark	% of Benchmark	Score
R07 RE 11.4.9				
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5
Number of large eucalypts	0	-	-	-
Number of large non-eucalypt trees	26	45	-	-
Total large trees (ha)	26	45	57.78	10
Tree canopy height (m)	11	13	84.62	5
Sub-canopy height (m)	5	8	62.50	3
Mean height score (canopy and sub-canopy)	-	-	-	4
Tree canopy cover (%)	10.7	25	42.80	2
Sub-canopy cover (%)	14.8	10	148.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	3.5
Shrub canopy cover (%)	35.9	5	718.00	3
Tree species richness	8	5	160.00	5
Shrub species richness	15	10	150.00	5
Grass species richness	10	5	200.00	5
Forb species richness	6	10	60.00	2.5
Weed cover (%)	5	0%	-	5
Length of coarse woody debris (m/ha)	460	1200	38.33	2
Native perennial grasses (%)	6.8	20	34.00	1
Litter cover (%)	10.20%	45.00%	22.67	3
Subtotal (maximum 80)				*54*
Landscape Variables				

Variable	Measured Value	Benchmark	% of Benchmark	Score
Patch size	>200ha	-	-	10
Connectivity	High	-	-	4
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*18*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	Poor	-	-	1
Quality of Shelter	Poor	-	-	1
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*28*
Calculations for Squatter Pigeon				
Total score				100
Maximum possible score				156
Habitat quality score				*6*
Assessment Unit Area (ha)				30.73
Habitat Index (Brigalow TEC)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Brigalow TEC				
Total score				73
Maximum possible score				126
Habitat quality score				*6*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R08 RE 11.3.4				
Proportion of canopy species with recruitment	33.00%	100.00%	33.00	3
Number of large eucalypts	14	26	-	-
Number of large non-eucalypt trees	2	9	-	-
Total large trees (ha)	16	35	45.71	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Tree canopy height (m)	20	22	90.91	5
Sub-canopy height (m)	7	12	58.33	3
Mean height score (canopy and sub-canopy)	-	-	-	4
Tree canopy cover (%)	29.6	17	174.12	5
Sub-canopy cover (%)	0.5	5	10.00	2
Mean cover score (canopy and sub-canopy)	-	-	-	3.5
Shrub canopy cover (%)	4.4	1	440.00	3
Tree species richness	8	4	200.00	5
Shrub species richness	9	2	450.00	5
Grass species richness	4	7	57.14	2.5
Forb species richness	12	10	120.00	5
Weed cover (%)	50%	0%	-	3
Length of coarse woody debris (m/ha)	1450	384	377.60	2
Native perennial grasses (%)	0.4	43	0.93	0
Litter cover (%)	83.00%	20.00%	415.00	3
Subtotal (maximum 80)				*44*
Landscape Variables				
Patch size	100-200ha	-	-	7
Connectivity	Medium	-	-	2
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*13*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				103
Maximum possible score				156

Variable	Measured Value	Benchmark	% of Benchmark	Score
Habitat quality score				*7*
Assessment Unit Area (ha)				28.24
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				73
Maximum possible score				126
Habitat quality score				*6*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R09 RE 11.5.3				
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5
Number of large eucalypts	2	9	-	-
Number of large non-eucalypt trees	0	1	-	-
Total large trees (ha)	2	10	20.00	5
Tree canopy height (m)	11	16	68.75	3
Sub-canopy height (m)	4	7	57.14	3
Mean height score (canopy and sub-canopy)	-	-	-	3
Tree canopy cover (%)	12.2	20	61.00	5
Sub-canopy cover (%)	0	3	0.00	0
Mean cover score (canopy and sub-canopy)	-	-	-	2.5
Shrub canopy cover (%)	4.5	3	150.00	5
Tree species richness	5	6	83.33	2.5
Shrub species richness	6	6	100.00	5
Grass species richness	12	6	200.00	5
Forb species richness	13	10	130.00	5
Weed cover (%)	1%	0%	-	10
Length of coarse woody debris (m/ha)	290	314	92.36	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Native perennial grasses (%)	19	19	100.00	5
Litter cover (%)	3.80%	20.00%	19.00	3
Subtotal (maximum 80)				*61*
Landscape Variables				
Patch size	25-100ha	-	-	5
Connectivity	Medium	-	-	2
Context	High	-	-	4
Ecological Corridors	Not within	-	-	5
Subtotal (maximum 26)				*16*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	Moderate	-	-	5
Quality of Shelter	Moderate	-	-	5
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*36*
Calculations for Squatter Pigeon				
Total score				113
Maximum possible score				156
Habitat quality score				*7*
Assessment Unit Area (ha)				158.45

Variable	Measured Value	Benchmark	% of Benchmark	Score
R10 RE 11.3.4				
Proportion of canopy species with recruitment	0.00%	100.00%	0.00	0
Number of large eucalypts	16	26	-	-
Number of large non-eucalypt trees	6	9	-	-
Total large trees (ha)	20	35	57.14	10
Tree canopy height (m)	14	22	63.64	3
Sub-canopy height (m)	7	12	58.33	3
Mean height score (canopy and sub-canopy)	-	-	-	3

Variable	Measured Value	Benchmark	% of Benchmark	Score
Tree canopy cover (%)	13.1	17	77.06	5
Sub-canopy cover (%)	19.8	5	396.00	3
Mean cover score (canopy and sub-canopy)	-	-	-	4
Shrub canopy cover (%)	2.7	1	270.00	3
Tree species richness	6	4	150.00	5
Shrub species richness	2	2	100.00	5
Grass species richness	2	7	28.57	2.5
Forb species richness	6	10	60.00	2.5
Weed cover (%)	20%	0%	-	5
Length of coarse woody debris (m/ha)	1300	384	338.54	2
Native perennial grasses (%)	2.4	43	5.58	0
Litter cover (%)	9.60%	20.00%	48.00	3
Subtotal (maximum 80)				*45*
Landscape Variables				
Patch size	25-100ha	-	-	5
Connectivity	High	-	-	5
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*14*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				105
Maximum possible score				156
Habitat quality score				*7*
Assessment Unit Area (ha)				126.57
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15

Variable	Measured Value	Benchmark	% of Benchmark	Score
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				75
Maximum possible score				126
Habitat quality score				*6*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R11 RE11.5.9				
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5
Number of large eucalypts	6	19	-	-
Number of large non-eucalypt trees	2	1	-	-
Total large trees (ha)	10	20	50.00	5
Tree canopy height (m)	15	17	88.24	5
Sub-canopy height (m)	7	8	87.50	5
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	29	25	116.00	5
Sub-canopy cover (%)	3	5	60.00	5
Mean cover score (canopy and sub-canopy)	-	-	-	5
Shrub canopy cover (%)	6.5	10	65.00	5
Tree species richness	10	3	333.33	5
Shrub species richness	11	6	183.33	5
Grass species richness	12	9	133.33	5
Forb species richness	19	11	172.73	0
Weed cover (%)	4%	0%	-	10
Length of coarse woody debris (m/ha)	639	342	186.84	5
Native perennial grasses (%)	7.8	26	30.00	1
Litter cover (%)	25.20%	30.00%	84.00	5
Subtotal (maximum 80)				*61*
Landscape Variables				

Variable	Measured Value	Benchmark	% of Benchmark	Score
Patch size	>200ha	-	-	10
Connectivity	High	-	-	5
Context	High	-	-	4
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*19*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	9
Quality of Shelter	High	-	-	9
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*44*
Calculations for Squatter Pigeon				
Total score				124
Maximum possible score				156
Habitat quality score				*8*
Assessment Unit Area (ha)				51.48
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				96
Maximum possible score				126
Habitat quality score				*8*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R12 RE 11.3.2/11.9.7				
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5
Number of large eucalypts	6	22	-	-
Number of large non-eucalypt trees	0	0	-	-
Total large trees (ha)	6	22	27.27	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Tree canopy height (m)	13	18	72.22	5
Sub-canopy height (m)	n/a	n/a	n/a	n/a
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	36.9	40	92.25	5
Sub-canopy cover (%)	0	0	0.00	n/a
Mean cover score (canopy and sub-canopy)	n/a	n/a	n/a	5
Shrub canopy cover (%)	0.4	2	20.00	3
Tree species richness	7	2	350.00	5
Shrub species richness	5	2	250.00	5
Grass species richness	8	9	88.89	2.5
Forb species richness	20	17	117.65	5
Weed cover (%)	20%	0%	-	5
Length of coarse woody debris (m/ha)	550	307	179.15	5
Native perennial grasses (%)	20.8	35	59.43	3
Litter cover (%)	29.80%	30.00%	99.33	5
Subtotal (maximum 80)				*58.5*
Landscape Variables				
Patch size	5-25ha	-	-	2
Connectivity	High	-	-	4
Context	Medium	-	-	2
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*8*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				112.5
Maximum possible score				156

Variable	Measured Value	Benchmark	% of Benchmark	Score
Habitat quality score				*7*
Assessment Unit Area (ha)				9.13
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				82.5
Maximum possible score				126
Habitat quality score				*7*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R13 RE 11.3.2/11.9.7				
Proportion of canopy species with recruitment	75.00%	100.00%	75.00	5
Number of large eucalypts	0	22	-	-
Number of large non-eucalypt trees	0	0	-	-
Total large trees (ha)	0	22	0.00	0
Tree canopy height (m)	11	18	61.11	3
Sub-canopy height (m)	n/a	n/a	n/a	n/a
Mean height score (canopy and sub-canopy)	-	-	--	3
Tree canopy cover (%)	10.6	40	26.50	2
Sub-canopy cover (%)	0	0	0.00	n/a
Mean cover score (canopy and sub-canopy)	n/a	n/a	n/a	2
Shrub canopy cover (%)	4.3	2	215.00	3
Tree species richness	6	2	300.00	5
Shrub species richness	5	2	250.00	5
Grass species richness	12	9	133.33	5
Forb species richness	18	17	105.88	5
Weed cover (%)	30%	0%	-	3
Length of coarse woody debris (m/ha)	740	307	241.04	2

Variable	Measured Value	Benchmark	% of Benchmark	Score
Native perennial grasses (%)	14	35	40.00	1
Litter cover (%)	16.00%	30.00%	53.33	5
Subtotal (maximum 80)				*44*
Landscape Variables				
Patch size	5-25ha	-	-	2
Connectivity	Medium	-	-	2
Context	Medium	-	-	2
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*6*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				96
Maximum possible score				156
Habitat quality score				*6*
Assessment Unit Area (ha)				9.13
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				66
Maximum possible score				126
Habitat quality score				*5*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R14 RE 11.3.4				

Variable	Measured Value	Benchmark	% of Benchmark	Score
Proportion of canopy species with recruitment	0.00%	100.00%	0.00	0
Number of large eucalypts	10	26	-	-
Number of large non-eucalypt trees	10	9	-	-
Total large trees (ha)	20	35	57.14	10
Tree canopy height (m)	18	22	81.82	5
Sub-canopy height (m)	n/a	12	n/a	n/a
Mean height score (canopy and sub-canopy)	-	-	-	5
Tree canopy cover (%)	36.4	17	214.12	3
Sub-canopy cover (%)	n/a	5	n/a	n/a
Mean cover score (canopy and sub-canopy)	-	-	-	3
Shrub canopy cover (%)	1.6	1	160.00	5
Tree species richness	10	4	250.00	5
Shrub species richness	8	2	400.00	5
Grass species richness	2	7	28.57	2.5
Forb species richness	13	10	130.00	5
Weed cover (%)	60%	0%	-	0
Length of coarse woody debris (m/ha)	260	384	67.71	5
Native perennial grasses (%)	1.2	43	2.79	1
Litter cover (%)	17.60%	20.00%	88.00	5
Subtotal (maximum 80)				*51.5*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Medium	-	-	2
Context	Medium	-	-	2
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*14*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	High	-	-	10
Quality of Shelter	High	-	-	10
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1

Variable	Measured Value	Benchmark	% of Benchmark	Score
Subtotal (maximum 50)				*46*
Calculations for Squatter Pigeon				
Total score				111.5
Maximum possible score				156
Habitat quality score				*7*
Assessment Unit Area (ha)				126.57
Habitat Index (Potential GDEs)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Potential GDEs				
Total score				81.50
Maximum possible score				126
Habitat quality score				*6*

Variable	Measured Value	Benchmark	% of Benchmark	Score
R15 RE 11.4.9				
Proportion of canopy species with recruitment	100.00%	100.00%	100.00	5
Number of large eucalypts	0	-	-	-
Number of large non-eucalypt trees	22	45	-	-
Total large trees (ha)	22	45	48.89	5
Tree canopy height (m)	11	13	84.62	5
Sub-canopy height (m)	4	8	50.00	3
Mean height score (canopy and sub-canopy)	-	-	-	4
Tree canopy cover (%)	8.3	25	33.20	2
Sub-canopy cover (%)	1.7	10	17.00	2
Mean cover score (canopy and sub-canopy)	-	-	-	2
Shrub canopy cover (%)	7.8	5	156.00	5
Tree species richness	5	5	100.00	5
Shrub species richness	15	10	150.00	5

Variable	Measured Value	Benchmark	% of Benchmark	Score
Grass species richness	12	5	240.00	5
Forb species richness	15	10	150.00	5
Weed cover (%)	30	0%	-	3
Length of coarse woody debris (m/ha)	1420	1200	118.33	5
Native perennial grasses (%)	6.6	20	33.00	1
Litter cover (%)	22.00%	45.00%	48.89	3
Subtotal (maximum 80)				*53*
Landscape Variables				
Patch size	>200ha	-	-	10
Connectivity	Medium	-	-	2
Context	High	-	-	5
Ecological Corridors	Not within	-	-	0
Subtotal (maximum 26)				*17*
Habitat Index (Squatter Pigeon)				
Threats to species	Low	-	-	15
Foraging Habitat	Poor	-	-	1
Quality of Shelter	Poor	-	-	1
Species mobility capacity	Minor restriction	-	-	10
Role of site to overall population	Not critical	-	-	1
Subtotal (maximum 50)				*28*
Calculations for Squatter Pigeon				
Total score				98
Maximum possible score				156
Habitat quality score				*6*
Assessment Unit Area (ha)				30.73
Habitat Index (Brigalow TEC)				
Threats to community	Low	-	-	15
Role of site to overall population	Not critical	-	-	1
Total Score				*16*
Calculations for Brigalow TEC				
Total score				71
Maximum possible score				126
Habitat quality score				*6*

APPENDIX C :
Photos from Photograph Monitoring

Table 6 Summary details for each photograph taken

Photo Point	Regional Ecosystem	Date	Time (24 hour)	Photo No.	Direction (degrees)	What is shown
PP01	11.3.4	7/03/2019	13.12	174	0	Bank of Alpha Creek
			13.13	175	90	Looking at high bank
			13.13	176	180	looking upstream along Alpha Creek
			13.14	177	270	looking downstream along Alpha Creek
			13.15	178	Down	Looking down at groundcover
PP02	11.5.3	9/03/2019	15.13	194	0	Looking upstream above high bank
			15.14	195	90	Looking towards Spade Creek
			15.14	196	180	Looking downstream towards high bank
			15.13	197	270	Looking away from creek
			15.13	198	Down	Looking down at groundcover
PP03	11.3.25	10/03/2019	14.57	220	0	Looking away from Alpha Creek
			14.57	221	90	Looking upstream
			14.57	222	180	Looking to north bank of Alpha Creek
			14.57	223	270	Looking downstream at large Queensland Blue Gums
			14.58	224	Down	Looking down at groundcover
PP04	11.5.9	11/03/2019	9.13	230	0	Looking across plain
			9.14	231	90	Looking across plain
			9.14	232	180	Looking to outer bank
			9.14	233	270	Looking at outer bank
			9.15	234	Down	Looking down at groundcover
PP05	11.3.4	11/03/2019	10.48	235	0	Looking up alluvial plain
			10.48	236	90	Looking at large Queensland Blue Gums
			10.49	237	180	Looking down alluvial plain

Photo Point	Regional Ecosystem	Date	Time (24 hour)	Photo No.	Direction (degrees)	What is shown
			10.49	238	270	Looking to outer bank
			10.50	239	Down	Looking down at groundcover
PP06	11.5.3	11/03/2019	12.24	240	0	Looking across sand plain
			12.24	241	90	Looking across sand plain
			12.24	242	180	Looking across sand plain
			12.24	243	270	Looking across sand plain
			12.25	244	Down	Looking down at groundcover
PP07	11.4.9	11/03/2019	14.03	245	0	Looking up a side gully
			14.03	246	90	Looking to high bank
			14.03	247	180	Looking to Alpha Creek
			14.03	248	270	Looking to fenceline
			14.04	249	Down	Looking down at groundcover
PP08	11.3.4	12/03/2019	8.37	255	0	Looking across floodplain
			8.38	256	90	Looking across floodplain
			8.38	257	180	Looking towards outer bank
			8.39	258	270	Looking across floodplain
			8.39	259	Down	Looking down at groundcover
PP09	11.5.3	12/03/2019	10.14	260	0	Looking up erosion gully
			10.15	261	90	Looking across eroded high bank
			10.15	262	180	Looking downstream to Spade Creek
			10.15	263	270	Looking to sand plain
			10.16	264	Down	Looking down at groundcover
PP10	11.3.4	12/03/2019	11.19	265	0	Looking upstream up Spade Creek
			11.20	266	90	Looking at outer bank
			11.20	267	180	Looking downstream down Spade Creek

Photo Point	Regional Ecosystem	Date	Time (24 hour)	Photo No.	Direction (degrees)	What is shown
			11.20	268	270	Looking at bank
			11.21	269	Down	Looking down at groundcover
PP11	11.5.9	12/03/2019	14.05	273	0	Looking at high bank
			14.06	274	90	Looking upstream
			14.06	275	180	Looking at opposite bank
			14.06	276	270	looking at gently sloping outer bank
			14.07	277	Down	Looking down at groundcover
PP12	11.3.2/11.9.7	13/03/2019	8.31	278	0	Looking across alluvial plain
			8.33	279	90	Looking towards Spade Creek
			8.33	280	180	Looking downstream along Spade Creek
			8.34	281	270	Looking to outer bank
			8.34	282	Down	Looking down at groundcover
PP13	11.3.2/11.9.7	13/03/2019	9.29	283	0	Looking up erosion area
			9.30	284	90	Looking up alluvial plain
			9.30	285	180	Looking at Spade Creek
			9.30	286	270	Looking at erosion bank
			9.31	287	Down	Looking down at groundcover
PP14	11.3.4	13/03/2019	11.15	290	0	Looking at outer bank of Spade Creek
			11.16	291	90	Looking up Spade Creek
			11.16	292	180	Looking across alluvial plain
			11.16	293	270	Looking downstream down Spade Creek
			11.17	294	Down	Looking down at groundcover
PP15	11.3.25	10/03/2019	8.50	199	0	Looking upstream up Alpha Creek
			8.50	192	90	Looking upstream up tributary
			8.50	185	180	Looking downstream down Alpha Creek

Photo Point	Regional Ecosystem	Date	Time (24 hour)	Photo No.	Direction (degrees)	What is shown
			8.50	178	270	Looking at west bank of Alpha Creek
			8.52	171	Down	Looking down at groundcover
PP16	non-remnant	10/03/2019	9.30	204	0	Looking up erosion gully
			9.30	205	90	Looking up erosion area
			9.30	206	180	Looking down erosion area
			9.30	207	270	Looking across erosion area
			9.30	208	Down	Looking down at groundcover
PP17	11.3.4 bordering 11.4.9	10/03/2019	10.44	212	0	Looking at rocky bank
			10.44	213	90	Looking upstream along rocky bank
			10.44	214	180	Looking downstream
			10.44	215	270	Looking at west facing rocky bank
			10.46	216	Down	Looking down at groundcover
PP18	11.5.3	11/03/2019	8.02	225	0	Looking upstream
			8.02	226	90	Looking away from creek
			8.02	227	180	Looking downstream
			8.03	228	270	Looking at opposite bank
			8.03	229	Down	Looking down at groundcover
PP19	11.3.4 bordering non-remnant	11/03/2019	14.53	250	0	Looking across wetland
			14.53	251	90	Looking up wetland
			14.53	252	180	Looking away from wetland
			14.54	253	270	Looking towards creek
			14.55	254	Down	Looking down at groundcover
PP20	11.4.9	13/03/2019	12.41	295	0	Looking to outer bank
			12.41	296	90	Looking across outer bank
			12.42	297	180	Looking towards creek

Photo Point	Regional Ecosystem	Date	Time (24 hour)	Photo No.	Direction (degrees)	What is shown
			12.42	298	270	Looking across clay plain
			12.42	299	Down	Looking down at groundcover

Plate 1 Photos taken at PP01

North

East

South

West

Ground

Plate 2 Photos taken at PP02

North

East

South

West

Ground

Plate 3 Photos taken at PP03

North

East

South

West

Ground

Plate 4 Photos taken at PP04

North

East

South

West

Ground

Plate 5 Photos taken at PP05

North

East

South

West

Ground

Plate 6 Photos taken at PP06

North

East

South

West

Ground

Plate 7 Photos taken at PP07

North

East

South

West

Ground

Plate 8 Photos taken at PP08

North

East

South

West

Ground

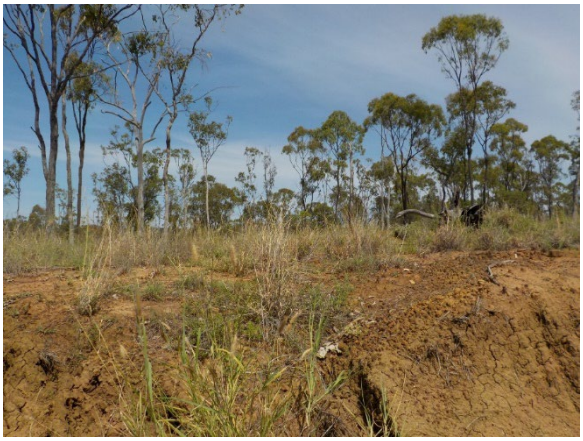
Plate 9 Photos taken at PP09

North

East

South

West



Ground

Plate 10 Photos taken at PP010

North

East

South

West

Ground

Plate 11 Photos taken at PP011

North

East

South

West

Ground

Plate 12 Photos taken at PP012

North

East

South

West

Ground

Plate 13 Photos taken at PP013

North

East

South

West

Ground

Plate 14 Photos taken at PP014

North

East

South

West

Ground

Plate 15 Photos taken at PP015

North

East

South

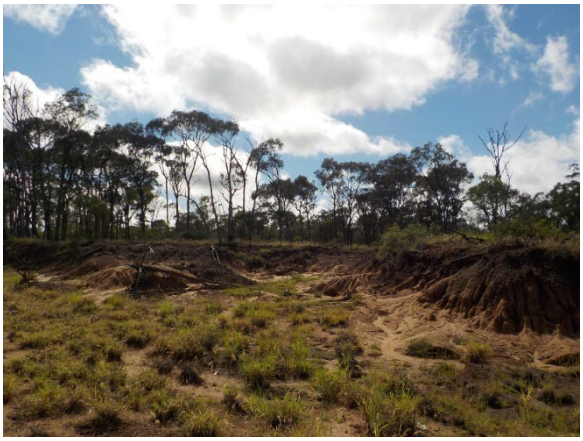
West

Ground

Plate 16 Photos taken at PP016

North

East



South

West

Ground

Plate 17 Photos taken at PP017

North

East

South

West

Ground

Plate 18 Photos taken at PP018

North

East

South

West

Ground

Plate 19 Photos taken at PP019

North

East

South

West

Ground

Plate 20 Photos taken at PP20

North

East

South

West

Ground

APPENDIX D :

Weather Conditions from 2018 Survey

Table 7 Daily Weather Observations (Bureau of Meteorology Observations from Moranbah Airport station 034035)

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
10/09/2018	11.0	29.3	0
11/09/2018	11.6	28.6	0
12/09/2018	12.2	28.8	0
13/09/2018	11.0	30.6	0
14/09/2018	11.4	31.4	0
15/09/2018	10.7	31.7	0
16/09/2018	14.2	34.0	0
17/09/2018	14.1	30.4	0
18/09/2018	14.4	31.6	0
19/09/2018	13.1	31.5	0
20/09/2018	12.8	33.6	0
21/09/2018	15.5	29.1	0
22/09/2018	13.6	28.1	0
23/09/2018	12.4	29.7	0
24/09/2018	12.5	29.6	0
25/09/2018	13.0	30.2	0
26/09/2018	12.9	30.6	0
27/09/2018	11.7	32.2	0
28/09/2018	13.4	32.8	0
29/09/2018	13.0	32.8	0
30/09/2018	**15.1**	**33.4**	**0**
1/10/2018	**18.0**	**31.5**	**0**
2/10/2018	**14.6**	**30.1**	**0**
3/10/2018	13.5	29.8	0
4/10/2018	10.0	32.4	0
5/10/2018	14.2	34.0	0
6/10/2018	16.7	32.7	0
7/10/2018	15.9	32.5	0
8/10/2018	16.3	33.1	0
9/10/2018	17.1	35.3	0
10/10/2018	16.5	36.4	0
11/10/2018	22.0	38.3	0.4
12/10/2018	22.2	27.9	0

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
13/10/2018	17.4	31.6	5.8
14/10/2018	15.8	30.1	28.2
15/10/2018	17.4	33.8	0
16/10/2018	17.6	34.2	0
17/10/2018	21.6	33.1	0
18/10/2018	19.2	32.1	0.8
19/10/2018	19.6	32.6	0
20/10/2018	18.0	34.6	0
21/10/2018	18.1	35.7	0
22/10/2018	20.7	35.9	0.2
23/10/2018	20.1	34.3	0
24/10/2018	18.3	35.5	0
25/10/2018	16.6	36.4	0
26/10/2018	16.3	37.6	0
27/10/2018	21.9	41.4	0
28/10/2018	19.7	41.3	0
29/10/2018	23.0	38.7	0
30/10/2018	21.5	36.4	0
31/10/2018	19.1	32.3	34.6
1/11/2018	20.7	32.6	0
2/11/2018	18.9	33.0	0
3/11/2018	17.1	32.5	0
4/11/2018	16.0	34.7	0
5/11/2018	18.9	37.1	0
6/11/2018	17.2	37.5	0
7/11/2018	**16.8**	**37.8**	**0**
8/11/2018	**22.5**	**34.0**	**0**

*Dates in **bold** are survey dates on the Mine Site.*

FIGURES

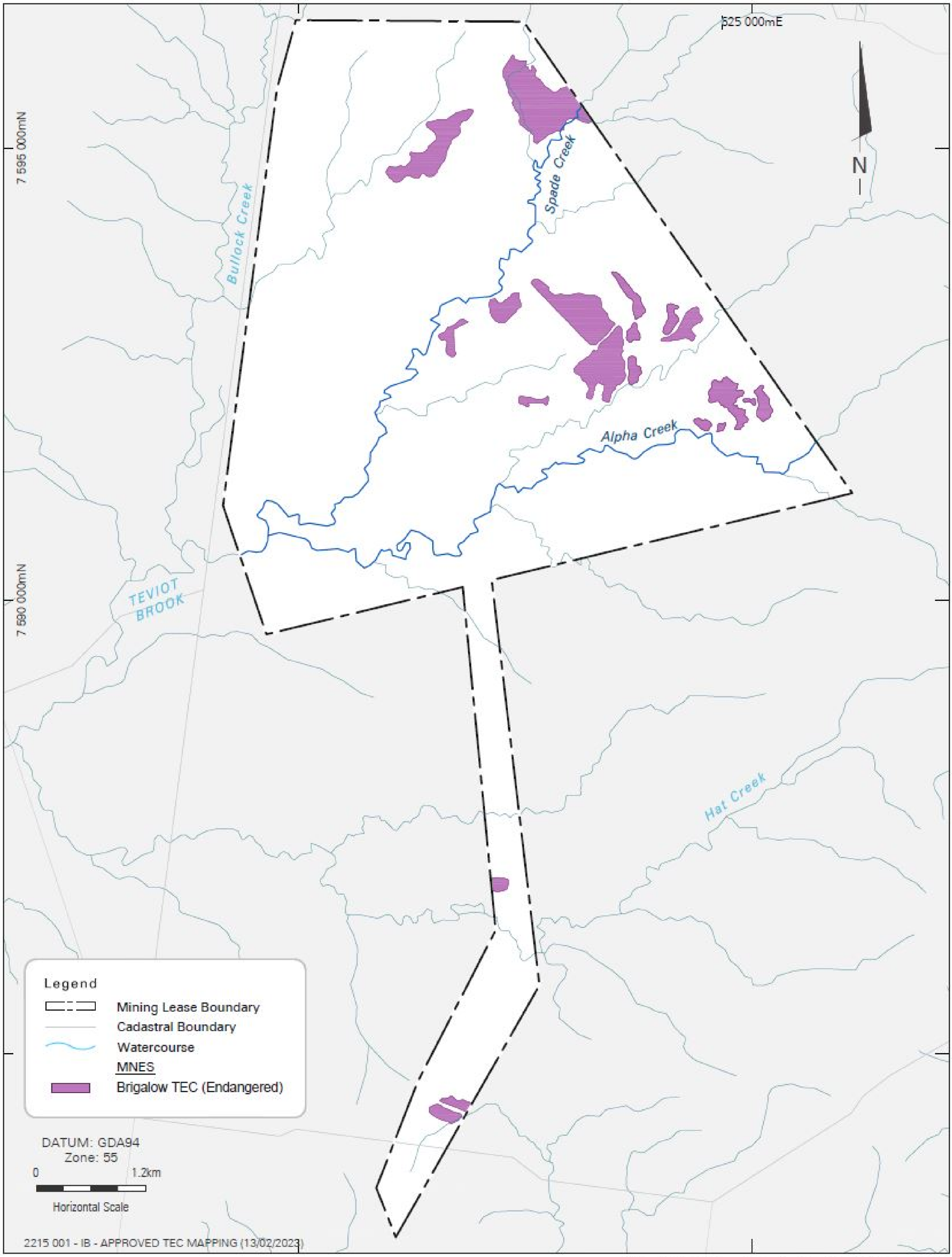


Figure 1. EPBC Act Approved Brigalow Threatened Ecological Community

Image Source: Hansen Environmental Consulting 2023

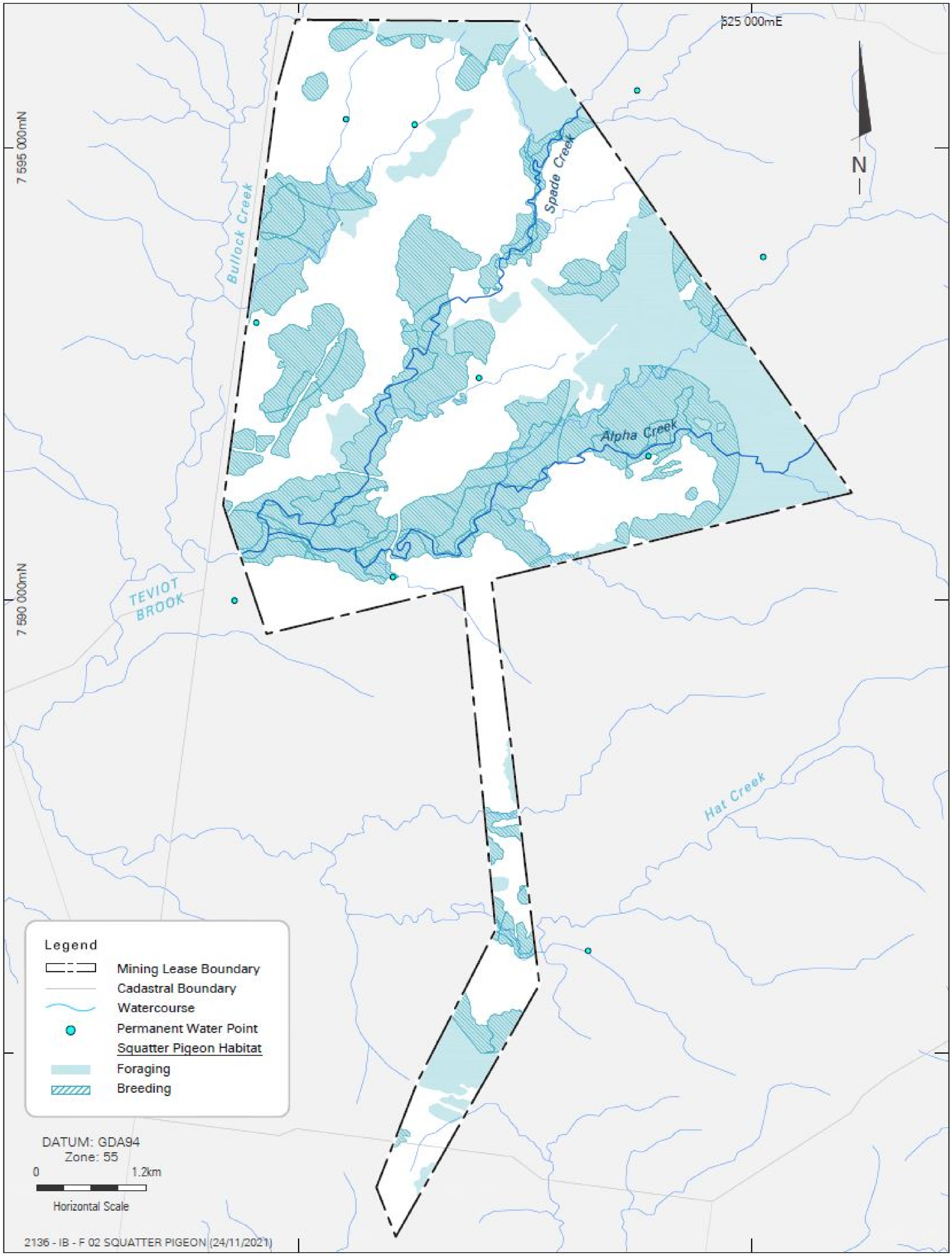


Figure 2. EPBC Act Approved Squatter Pigeon Breeding and Foraging Habitat

Image Source: Hansen Environmental Consulting 2023

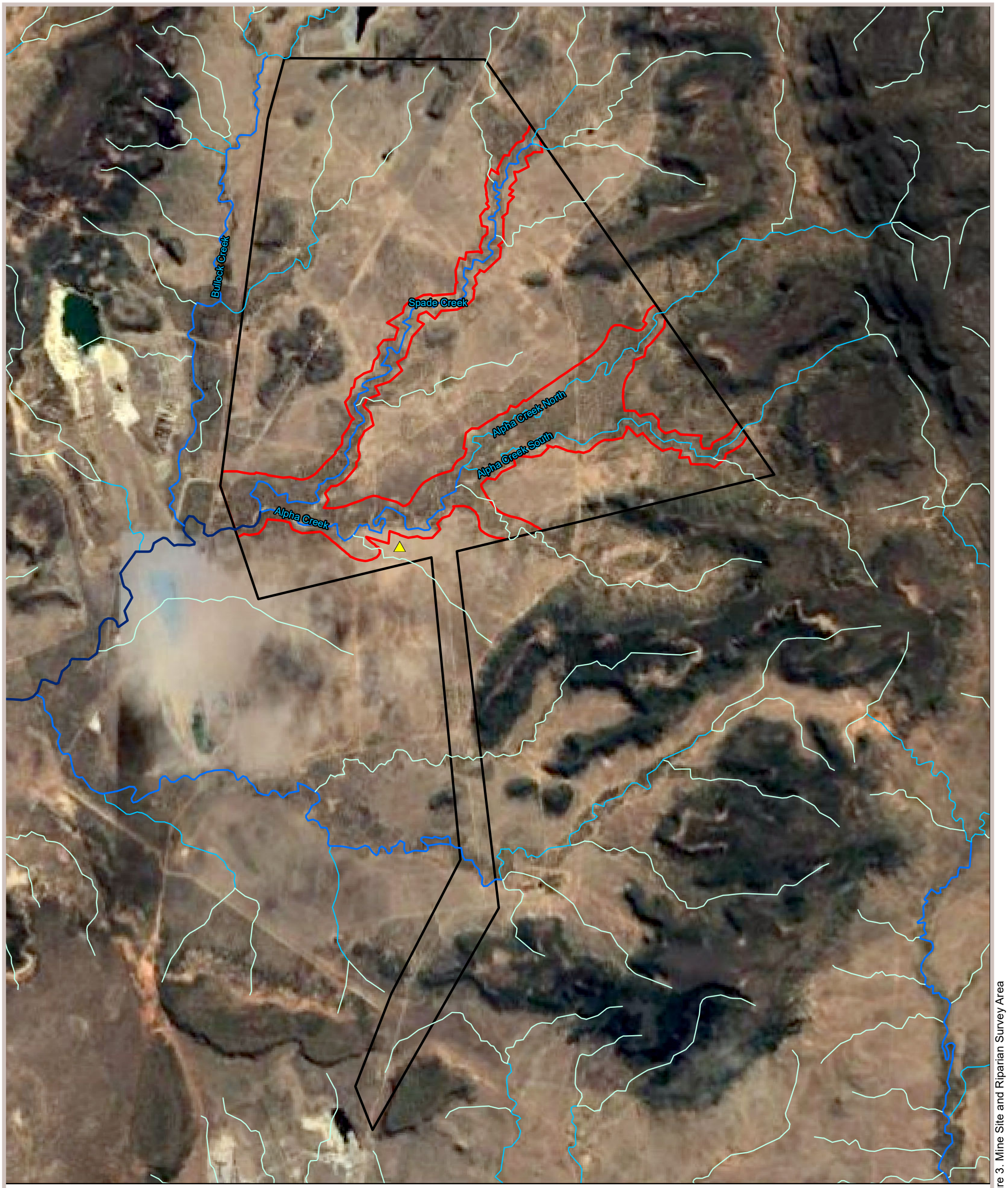


Figure 3. Mine Site and Riparian Survey Area

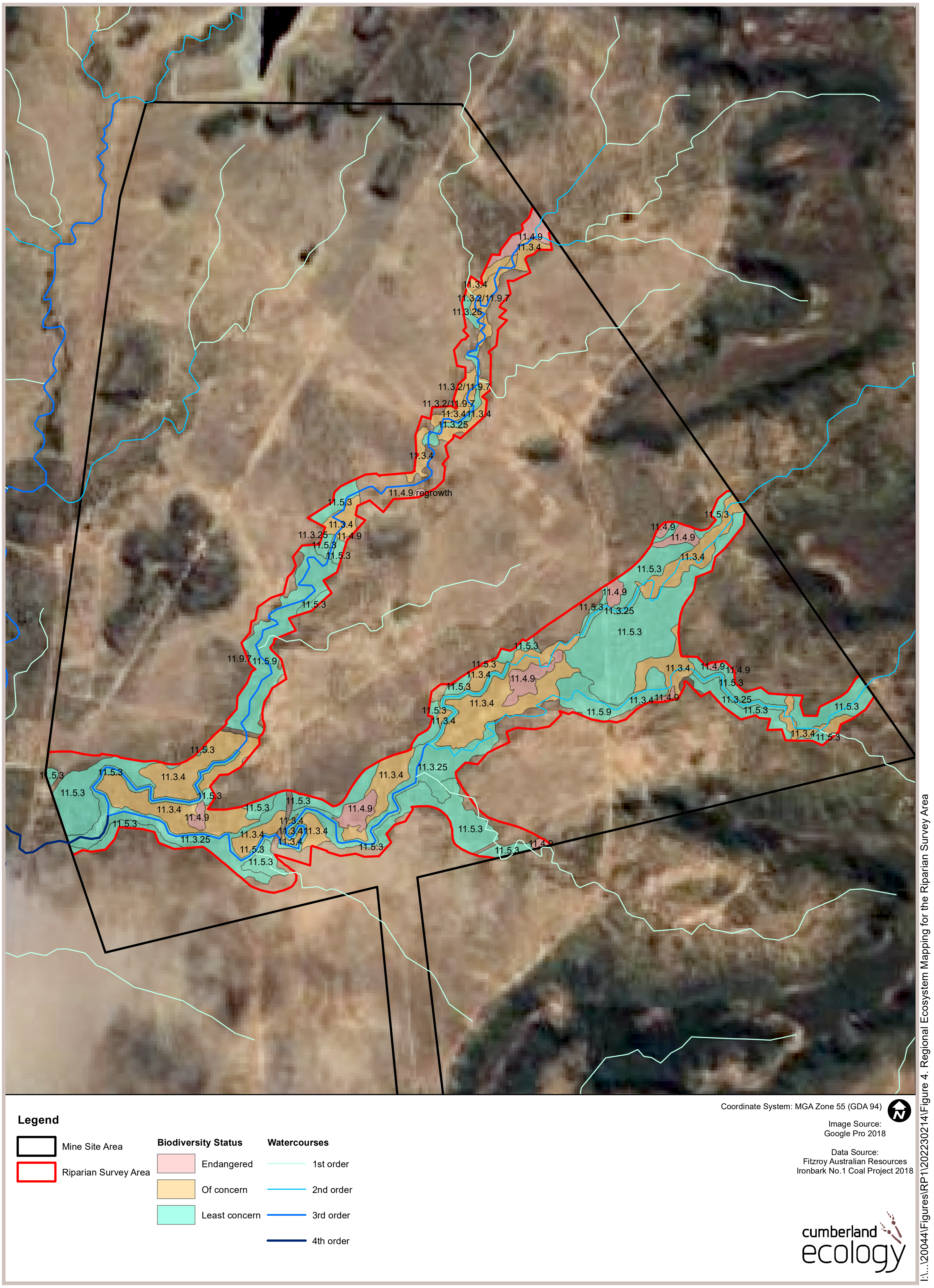
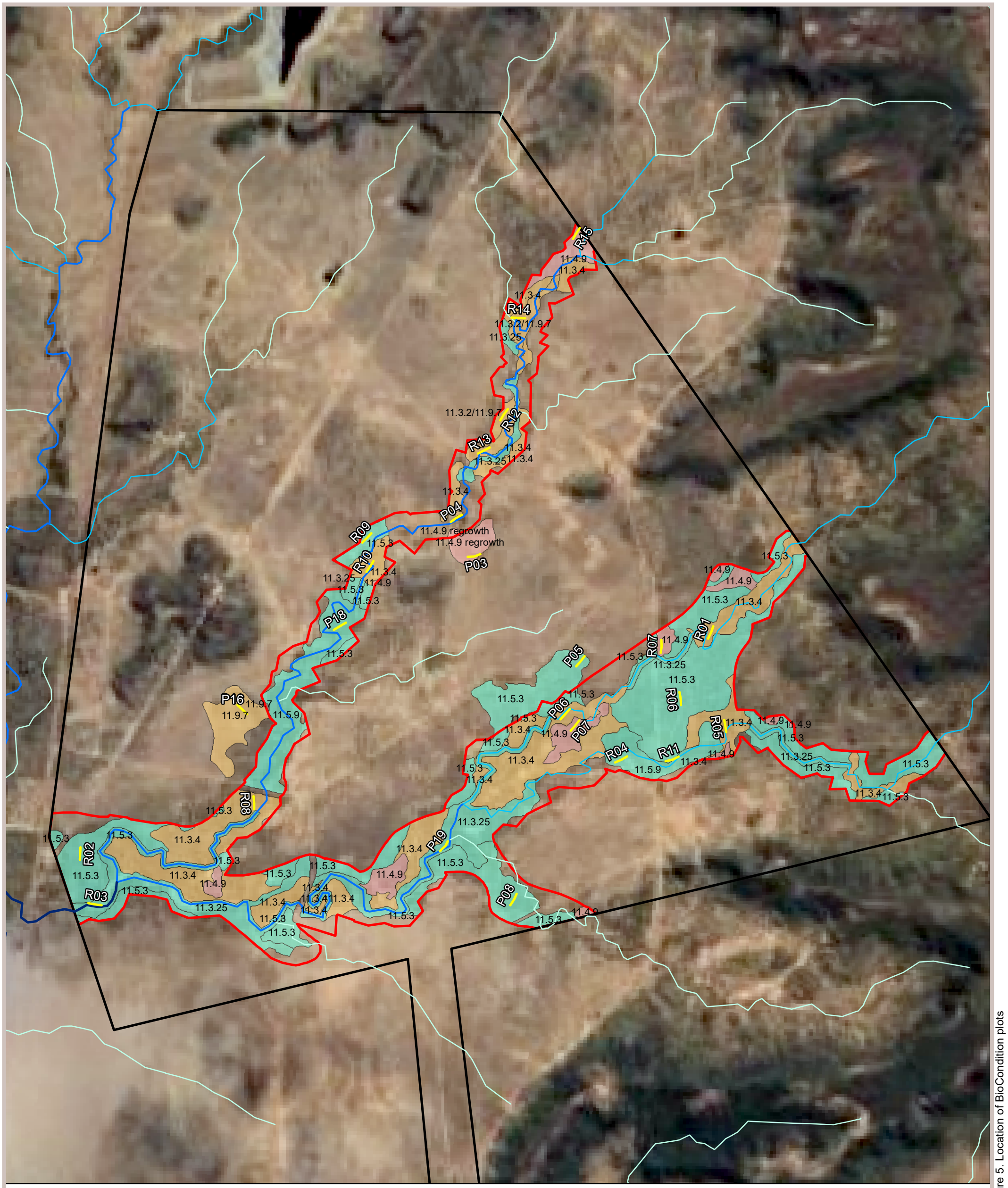


Figure 4. Regional Ecosystem Mapping for the Riparian Survey Area



Legend

- Mine Site Area
- Riparian Survey Area
- Biocondition Transect

Biodiversity Status

- Endangered
- Of concern
- Least concern

Watercourses

- 1st order
- 2nd order
- 3rd order
- 4th order

Coordinate System: MGA Zone 55 (GDA 94)

Image Source:
Google Pro 2018

Data Source:
Fitzroy Australian Resources
Ironbark No.1 Coal Project 2018

cumberland ecology

I:\...\20044\Figures\RP1\20230214\Figure 5. Location of BioCondition plots

Figure 5. Location of BioCondition plots

0 0.25 0.5 0.75 1 km

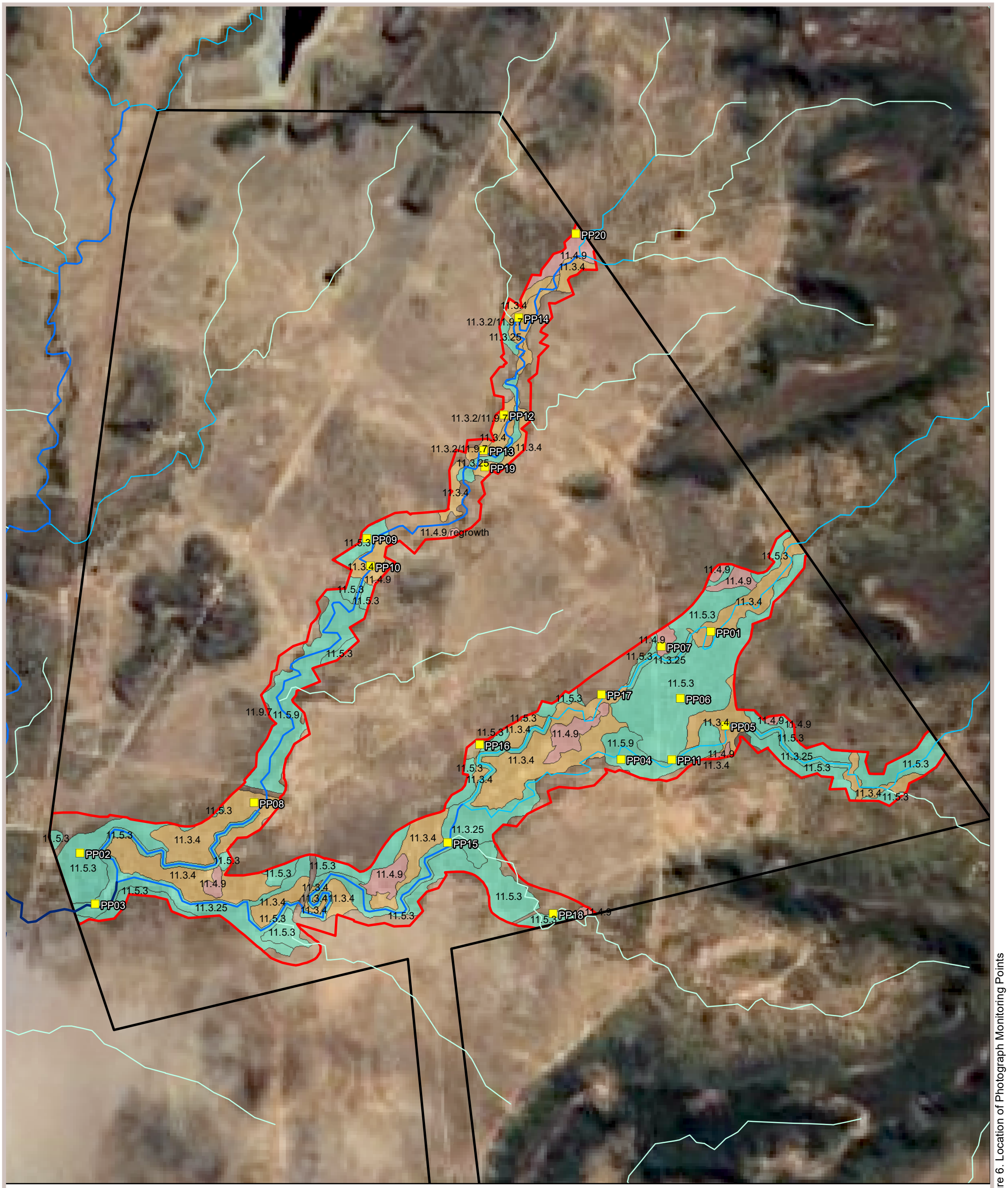


Figure 6. Location of Photograph Monitoring Points

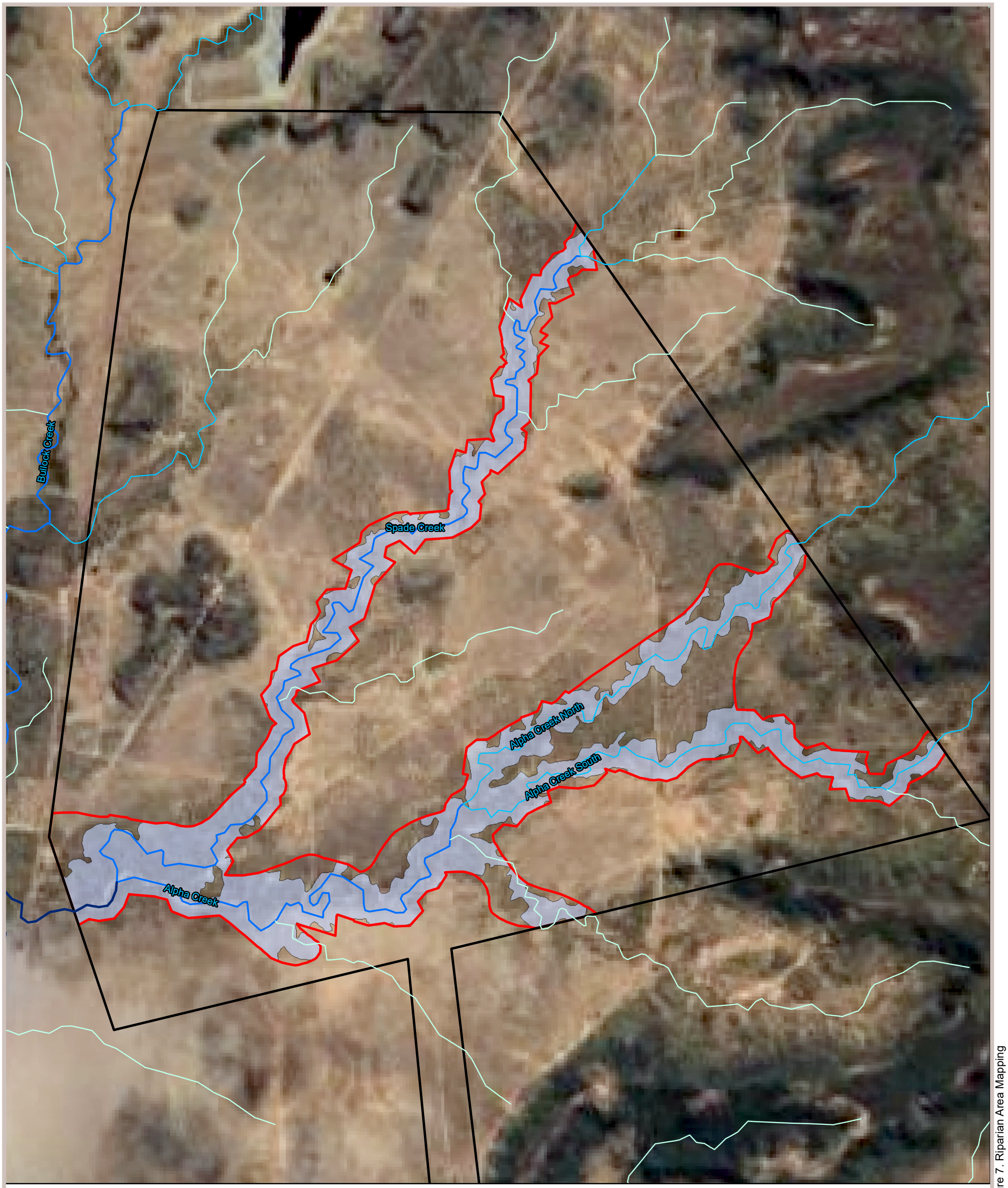


Figure 7. Riparian Area Mapping

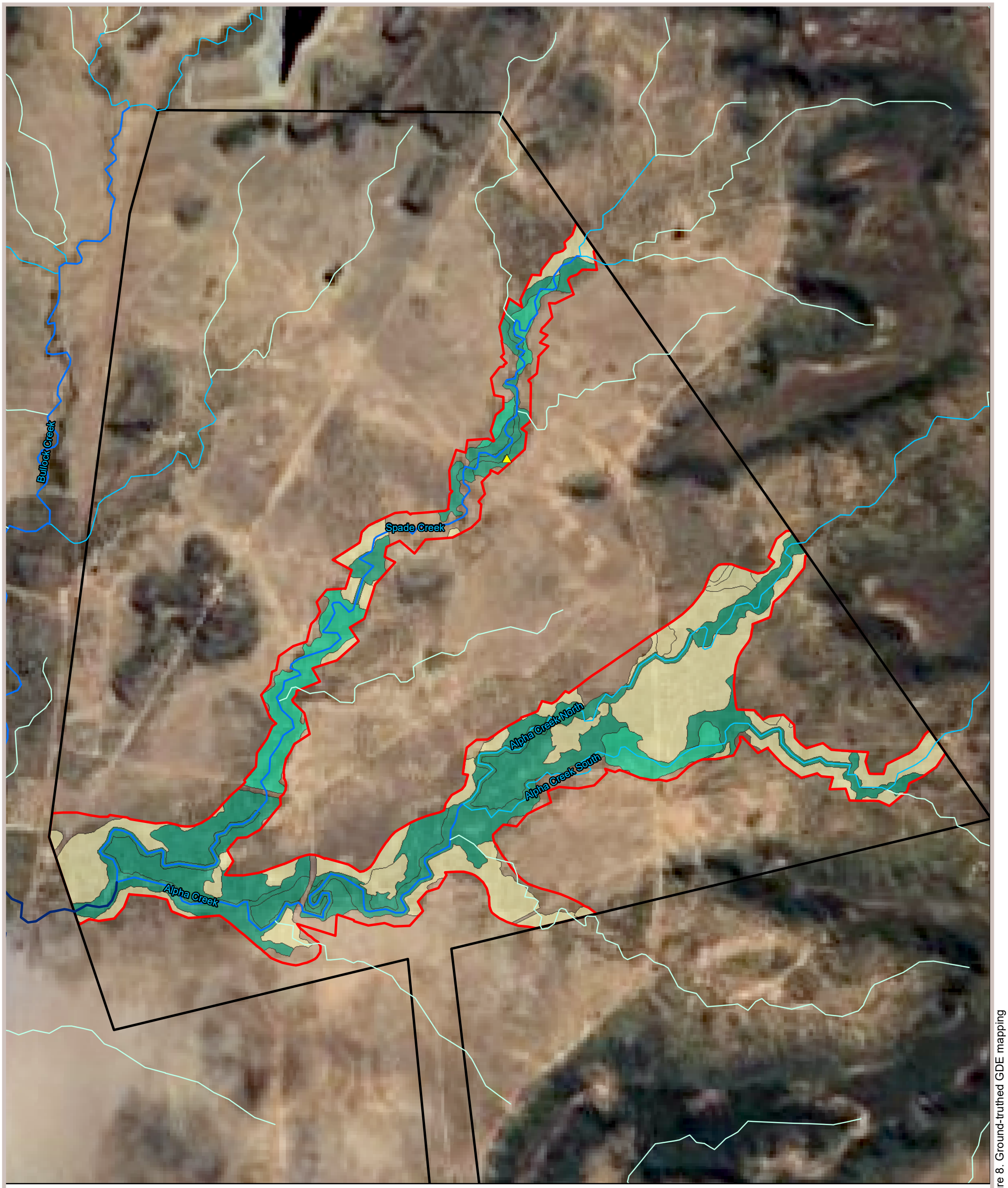


Figure 8. Ground-truthed GDE mapping