Annual Offset Condition Report

Picardy Station, Picardy Road, Dysart, Central Queensland

24000812

20 September 2023

KLEINFELDER
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Picardy Station, Picardy Road, Dysart, Central Queensland

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EXECUTIVE SUMMARY

Kleinfelder was commissioned by Anglo American Steelmaking Coal Coal (ASMC) to conduct a baseline BioCondition Assessment in the Picardy Station Offset Area (Offset Area) associated with offsets for the Grosvenor Coal Mine Enforceable Undertaking Offset Management Plan (OMP). The baseline assessment will be used as a measure against which interim and completion results can be compared to illustrate the level of compliance of the Offset Area with the OMP.

Kleinfelder undertook a field assessment in May 2023 to quantify the habitat quality as a baseline from which to measure any future conservation gain , and to identify any potential threatening processes to the target biodiversity values of the offset.

The Offset Area is characterised by *Acacia harpophylla* (Brigalow) regrowth over fine grained sediments and cracking clay soils. It is considered a suitable offset for:

- Regional Ecosystem 11.4.9 (*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains)– Endangered (Queensland).
- Brigalow Threatened Ecological Community – Endangered (Commonwealth).
- Ornamental Snake (*Denisonia maculata*) – Vulnerable (Queensland and Commonwealth).
- Australian Painted Snipe (*Rostratula australis*).

The Biocondition indices across the Offset Area are reflective of a regenerating ecosystem and this initial assessment indicates that the biodiversity is likely to increase through management as recommended in the Grosvenor OMP.

This report details the results of the Biocondition Assessment and includes general observations on potential threatening processes and additional significant observations. Recommendations have been included to mitigate potential threats and to support long term improvement of the Offset Area.

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1 INTRODUCTION

1.1 BACKGROUND

The Offsets Management Plan (OMP) for the Grosvenor Coal Mine Project (Project) describes how ASMC proposes to secure and manage biodiversity offsets as part of the Enforceable Undertaking issued under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) on 15 December 2021. Part of the significant residual impacts to Matters of National Environmental Significance (MNES) at Grosvenor will be offset consistent with the EPBC Act Environmental Offsets Policy and the Enforceable Undertaking (EU) in the Picardy Station Offset Area (Offset Area).

Kleinfelder Australia Pty Ltd (Kleinfelder) was engaged by ASMC to undertake a BioCondition assessment of the Offset Area to determine the baseline values. The baseline values will be used to measure the level improvement in the target ecological values of the Offset Area in future monitoring events to determine if the Offset Area is meeting the targets set in the OMP.

1.2 SITE DESCRIPTION

The Offset Area, on the Picardy Station, is centred at latitude -22.654954º S and longitude 148.526539º E, on Picardy Road 20 km southeast of Dysart (**Figure 1**). The Offset Area is in the Isaac Regional Council jurisdiction of Central Queensland on Lot 7 SP282139. The Offset Area is in two sections, the northern section is contiguous with remnant vegetation associated with Scott Creek and the southern section runs along the southeast fence line of Picardy Station with limited connectivity to remnant vegetation in the nearby Norwich Nature Refuge (NNR).

The landform of the Offset Area is gently undulating Cainozoic plains comprised of moderately deep to deep cracking clays with gilgai. The cracking clays are derived from the weathering of fine-grained sedimentary rocks.

Runoff from the Offset Area flows via Scott/Stephens Creeks and Blackburn Creek directly into the Isaac River and from Bore Creek via Rolf Creek into the Isaac River (Fitzroy River Catchment).

1.3 LEGISLATION

This project was undertaken in accordance with, and/or consideration of, the following Acts and Regulations:

Commonwealth:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *EPBC Act Environmental Offsets Policy 2012.*

State:

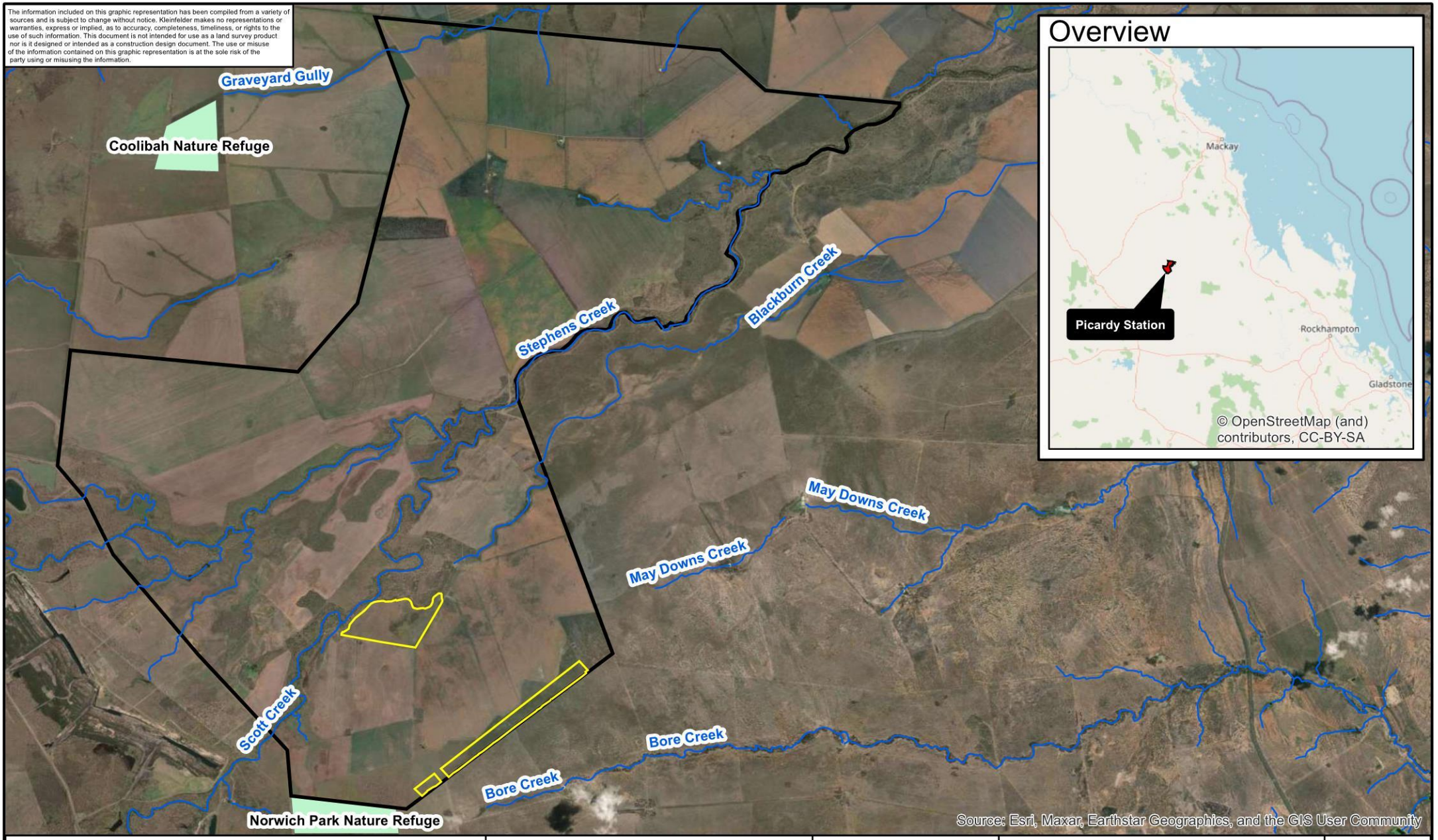
- *Nature Conservation Act 1992* (NC Act)
  - *Nature Conservation (Plants) Regulation 2020* (NC(P)R)
  - *Nature Conservation (Animals) Regulation 2020* (NC(A)R)
- *Biosecurity Act 2014* (Biosecurity Act)
- *Vegetation Management Act 1999* (VM Act)
- *Environmental Offsets Act 2014* (EO Act)
  - *Environmental Offsets Regulation 2014* (EOR).

1.4 OFFSET AREA

The MNES significant residual impacts for the Disturbance Areas at the Project, i.e. Brigalow Threatened Ecological Community (TEC), Ornamental Snake (*Denisonia maculata*) and Australian Painted Snipe (*Rostratula australis*) are listed in **Table 1**. The offset requirements calculated in the Offset Assessment Guide (OAG) at Picardy Station for the Project are also listed.

Table 1: MNES Significant Residual Impacts and Offset

Protected Matter	Maximum Disturbance Limit (ha)	OAG Calculation Output (ha)	Offset Area (ha)
Brigalow TEC	3.3	18	201
Ornamental Snake	46.9	201	
Australian Painted Snipe	24.18	127	



Legend

- Picardy Station
- Offset Areas
- Nature Refuges

Scale 0 0.5 1 2 3 4 Kilometres
1:100,000 (A4)
N

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Locality

Anglo American
EU OMP Picardy Offsets
Dysart QLD

FIGURE:
1

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2 METHODOLOGY

2.1 LITERATURE REVIEW

Literature reviewed as part of this project included:

- Grosvenor Coal Mine Enforceable Undertaking - Offset Management Plan (Anglo American 2022).
- Picardy 2022-23 Offset Management Report (Landholder 2023).
- Landholder Questionaire (Landholder 2023).
- BioCondition: A condition assessment framework for terrestrial biodiversity in Queensland - Assessment Manual V2.2 (Eyre *et al.* 2015).
- BioCondition Benchmarks (Queensland Government 2023).
- EPBC Act 1999 Environmental Offsets Policy (DSEWPC 2012).
- Queensland Environmental Offsets Policy V 1.12 (DES 2022).
- Guide to Determining Terrestrial Habitat Quality V 1.3 (DES 2020).

2.2 FIELD SURVEY

2.2.1 Overview

All field survey methods (outlined below) were consistent with the methods outlined in the BioCondition Assessment Framework and the Guide to Determining Terrestrial Habitat Quality V 1.3, as required under the Queensland Environmental Offset Policy.

BioCondition field assessments were undertaken at six locations established on 29-31 June 2023. Biocondition plot locations were recorded at the start and centre points in GDA94 Zone 55 projection. The assessment locations and details are provided in **Figure 2** and **Appendix A**. The assessment locations were used to undertake habitat and photo condition assessments, along with observations of significance including any potential threats. Field observations of relevance to the Scope were also collected throughout the local area.

2.2.2 BioCondition assessments

2.2.2.1 Habitat Quality Assessment

The key indicators used to determine habitat quality included:

- Site condition: a general condition assessment of vegetation compared to a benchmark.
- Landscape-scale Attributes: an analysis of the site in relation to the surrounding environment.
- Species Habitat Index: the ability of the site to support any matters relating to fauna.

Each of the key indicator attributes were assessed and scored against BioCondition Benchmarks in conjunction with the Landscape-scale Attributes to determine a BioCondition Score. The Site-based Attributes and Landscape-scale Attributes assessed, and their highest possible scores, are detailed in **Table 2** below. The Species Habitat Index was calculated by two methods. The first using the Site-based Attributes from the BioCondition Assessment and the second using the Species Habitat Attributes from the Guide to Determining Terrestrial Habitat Quality. Habitat relative to the Australian Painted Snipe and Ornamental Snake, including seed availability, grass cover, cracking clays and water proximity, were used. The full list is provided in **Appendix B**.

Table 2 Key indicator attributes and their highest possible scores

Site-based Attributes		Landscape-scale Attributes		Species Habitat Attributes	
Large trees	15	Size of patch	10	Threats to species	2.5
Tree canopy median height	5	Connectedness	5	Quality and availability of food and foraging habitat	2.5
Recruitment of woody perennial species	5	Context	5	Quality and availability of shelter and breeding habitat	2.5

Site-based Attributes		Landscape-scale Attributes		Species Habitat Attributes	
Tree canopy cover	5	Distance to permanent watering point	NA	Species mobility capacity	2.5
Shrub canopy cover	5	**Subtotal**	**20**	**Subtotal**	**10**
Coarse woody debris length	5				
Trees—species richness	5				
Shrubs—species richness	5				
Grasses—species richness	5				
Forbs—species richness	5				
Non-native plant cover	10				
Native perennial grass cover	5				
Litter Cover	5				
Subtotal (woodland/forest)	**80**				

NA – Not applicable for the Offset Area region.

2.2.2.2 Photo monitoring

Photo monitoring was conducted at each location. Photo monitoring provides a visual representation of changes in vegetation over time. Photos were taken at the centre point of each BioCondition plot, from 1.5 m in height above ground level in the direction of north, south, east and west. A record of the photos was taken and marked with GPS coordinates.

2.2.3 Biosecurity matters

To assess and provide guidance for the management of weeds and feral animals across the Offset Area, Kleinfelder assessed the general area at each monitoring point location and incidentally when traversing throughout the Offset Area to identify and record any weeds of significance or evidence of feral animal activity.

Weeds of Significance include all Restricted Matter under the Biosecurity Act, Weeds of National Significance (WoNS), and any environmental weed with the potential to cause degradation or exacerbate threats to the Offset Area (e.g., bushfire fuel loads). Density attribution (where relevant) was recorded in the BioCondition assessment.

2.2.4 Fauna Survey

Fauna survey was undertaken to determine if the Offset Area had any resident threatened fauna, in particular the Painted Snipe and Ornamental Snake. Bird species were recorded during the BioCondition surveys and opportunistically while travelling between sites. When threatened species were observed the location was recorded on the field GPS and the number of individuals was recorded. A spotlighting survey of the Offset Areas, riparian zone and a dam was carried out to determine if there were Ornamental Snakes in the Offset Area.

2.2.5 Erosion, bushfire, grazing and other

Additional observations were recorded on the following subjects:

- Erosion or subsidence events within the Offset Area or in proximity to the area where it may cause immediate or future impacts.
- Bushfire, including evidence of recent fire (since 2018), fire containment lines, and asset protection zones (ecological and infrastructure).
- Evidence of grazing regimes within the Offset Area.
- Additional observations relevant to the establishment of the Offset Area (e.g., fencing).

2.2.6 Plant Identification

Most species were identified on site, where possible, but if required, other specimens were photographed or collected for confirmation in the laboratory using several plant identification references, including:

- Plants of Central Queensland (Anderson 2003).
- Plants of Capricornia (Melzer and Plumb 2007).
- Australian Tropical Rainforest Plants (Zitch, F. A. *et al.* 2020).
- Euclid: Eucalypts of Australia (Slee, A. V. *et al.* 2019).
- WATTLE, Interactive Identification of Australian Acacia (Maslin, B. R. 2018).
- Weeds of Central and Northern Queensland(WSQ 2019)

2.3 MAPPING

Assessments of available imagery and associated vegetation mapping were undertaken using ArcMap Desktop V10.8.2. Either high resolution aerial images from Anglo American and/or ESRI World Imagery were used for the assessment.

2.4 ADDITIONAL INFORMATION

Appendix D of the Grosvenor OMP is an assessment of the Picardy Station to Determine its offsets values. The assessment included 23 BioCondition sites. One of these site (BC7) was inside the Offset Area for the Project. The data from BC7 was included in this baseline Offset Assessment and renamed BC07. Site BC07 will become a part of any future Biocondition assessment of the Offset Area.

2.5 WEATHER CONDITIONS

The field survey was completed on 29-31 May 2023. Weather conditions during the survey period are provided in **Table 3**. The region had experienced below average rainfall and above average temperatures for the survey period.

Table 3 Weather conditions during the survey period.

Date	Days	Temps		Rain (mm)
		Min (°C)	Max (°C)	
29-31 May-2023	3	3.7	24.7	0
Mean May		12.7	26.8	0* / 34.1

Source: Bureau of Meteorology 2023 Station 34035 (Moranbah) for Temperature and Station 35109 (Booroondarra) for rainfall. *denotes total monthly rainfall, # denotes May Average.

3 RESULTS

3.1 FIELD ASSESSMENT

3.1.1 Survey Effort

The field survey was conducted on the 29-31 May 2023. The survey effort included assessment of 6 BioCondition sites, bird searches, spotlighting at night and opportunistic observations (**Figure 2**).

3.1.2 Biocondition Results

The Offset Area had two Assessment Unit (AU) types which were based on Regional Ecosystem (RE) 11.4.9 (**Table 4** and **Figure 2**). RE 11.4.9 is described as "*Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains'. AU1 contained scattered low regrowth (1-2 m height) of Brigalow (*Acacia harpophylla*) and a ground cover of mainly grasses, but also contained sparse small shrubs and forbs. The dominant grass was the exotic Buffel Grass (*Cenchrus ciliaris*) at BC01 and BC05 with a native *Dichanthium sp*. dominant at BC04. AU2 contained mature regrowth (6-8 m height) Brigalow with a shrub layer dominated by native species, and a ground layer dominated by native grasses with Buffel Grass sub-dominant at sites BC02, BC03, BC06 and BC07.

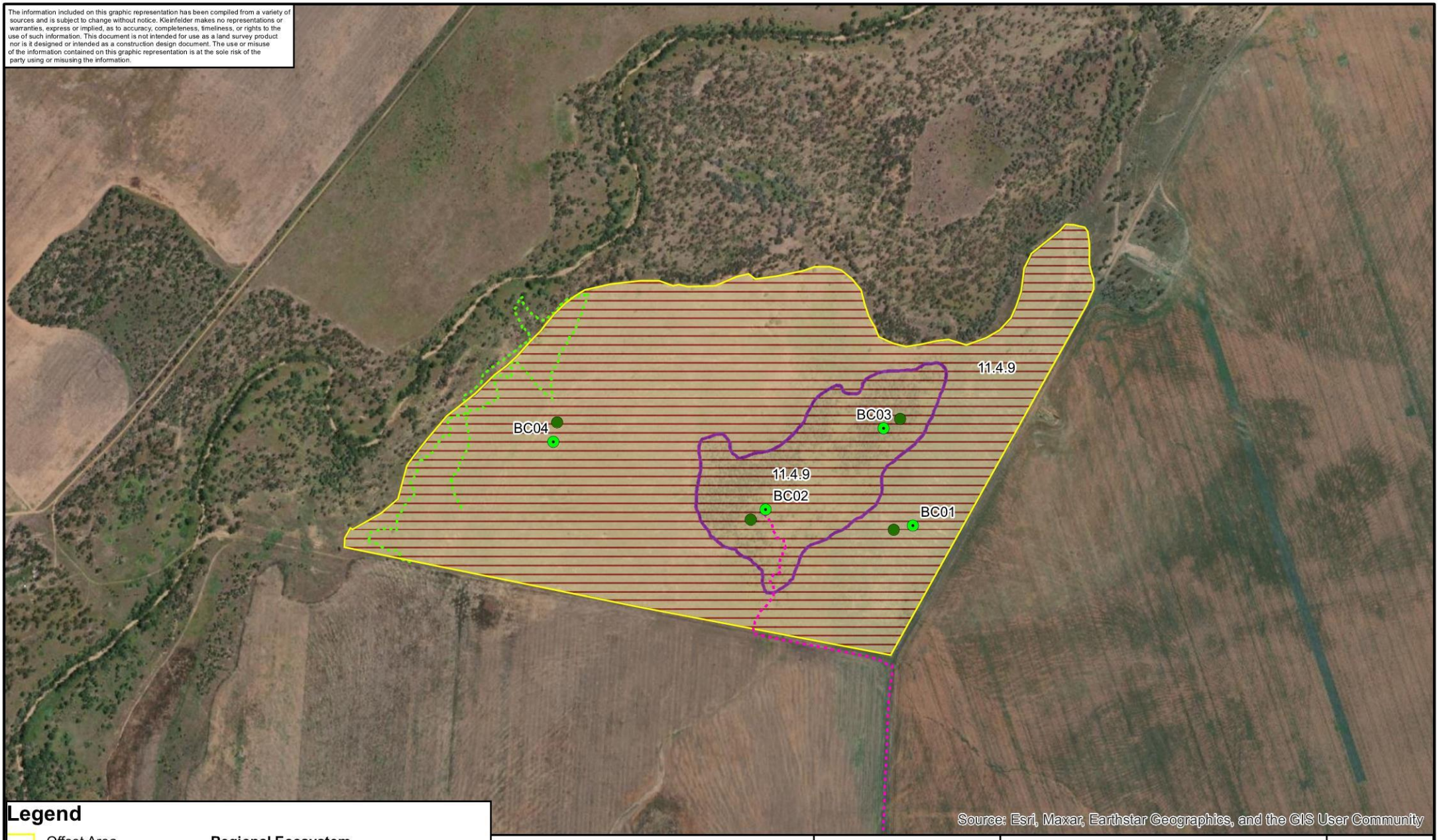
The vegetation in AU1 had a Bio-condition Score of 3 and the vegetation in AU2 had a Bio-condition Score of 4 (**Table 4**). These translated into a Biocondition Score of 4 for the Brigalow Offsets. The Biocondition Scores using the Site Based Attributes for the Ornamental Snake and Australian Painted Snipe were 3 and 4 respectively in AU1 and AU2. These figures provide the baseline values for comparison to measure BioCondition improvement in future monitoring.

The evaluation of habitat by using the Species Habitat Attributes were high compared to the Site-based Attributes, i.e., 6 and 7 respectively for AU1 and AU2 (**Table 4**).

Table 4 Vegetation types available for Offsets

AU/RE	Sites	Dominant Native Plant Species - dominance in layer	Status	BVG	BioCondition Score/Area (ha)	SHA Score/Area (ha)	Image
1/11.4.9 LR	BC01 BC04 BC05	Canopy height: 1-2m Trees: Scattered – Brigalow-a and Whitewood (*Atalaya hemiglauca*)-a Shrubs: Scattered – Nipan (*Capparis lasiantha*)-a, Sesbania Pea (*Sesbania cannabina*)-a Grasses: Buffel Grass (*Cenchrus ciliaris)*-d, Kangaroo Grass (*Themeda triandra*)-s, Forbs and others: Rhynchosia (*Rhynchosia minima*)-a and various exotics	Q-E F-E	10 - 25a	V – 3/167.93 APS – 3/111.23 OS – 3/167.93	APS – 6/111.23 OS – 6/167.93	
2/11.4.9 MR	BC02 BC03 BC06 BC07	Canopy height: 6-8m Trees: Brigalow-d, Whitewood-s Shrubs: Nipan -a, Sesbania Pea-a *Grasses: Dichanthium sp.-d,* , *Panicum queenslandicum*-a, Kangaroo Grass-a, *Cyperus rigidellus*-a, Buffel Grass-s Forbs and others: Ruby Saltbush (*Enchylaena tomentosa*)-a, Rhynchosia -a, and various exotics	Q-E	10 - 25a	V – 4/33.08 ha Brigalow TEC - 4/18.05 APS – 4/33.08 OS – 4/33.08	APS – 7/33.08 OS – 6/33.08	 

BVG = 5M - 1M. Dominance: d = dominant; c = co-dominant; s = sub-dominant; a = associated. BioCondition Score: V = vegetation; APS = Australian Painted Snipe; REs MR = mature regrowth; LR = low regrowth; SPA = Species Habitat Attributes.



Legend

- Offset Area

BioCondition Sites

- Start Point
- Mid Point
- Bird Survey
- Spotlighting Survey

Regional Ecosystem

- 11.4.9
- Brigalow Offset 18ha
- Australian Painted Snipe Offset 127ha
- Ornamental Snake Offset 201ha

Scale 0 50 100 200 300 400
1:12,500 (A4) Metres

N

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BioCondition Sites (North)

Anglo American
EU OMP Picardy Offsets
Dysart QLD

FIGURE:
2A

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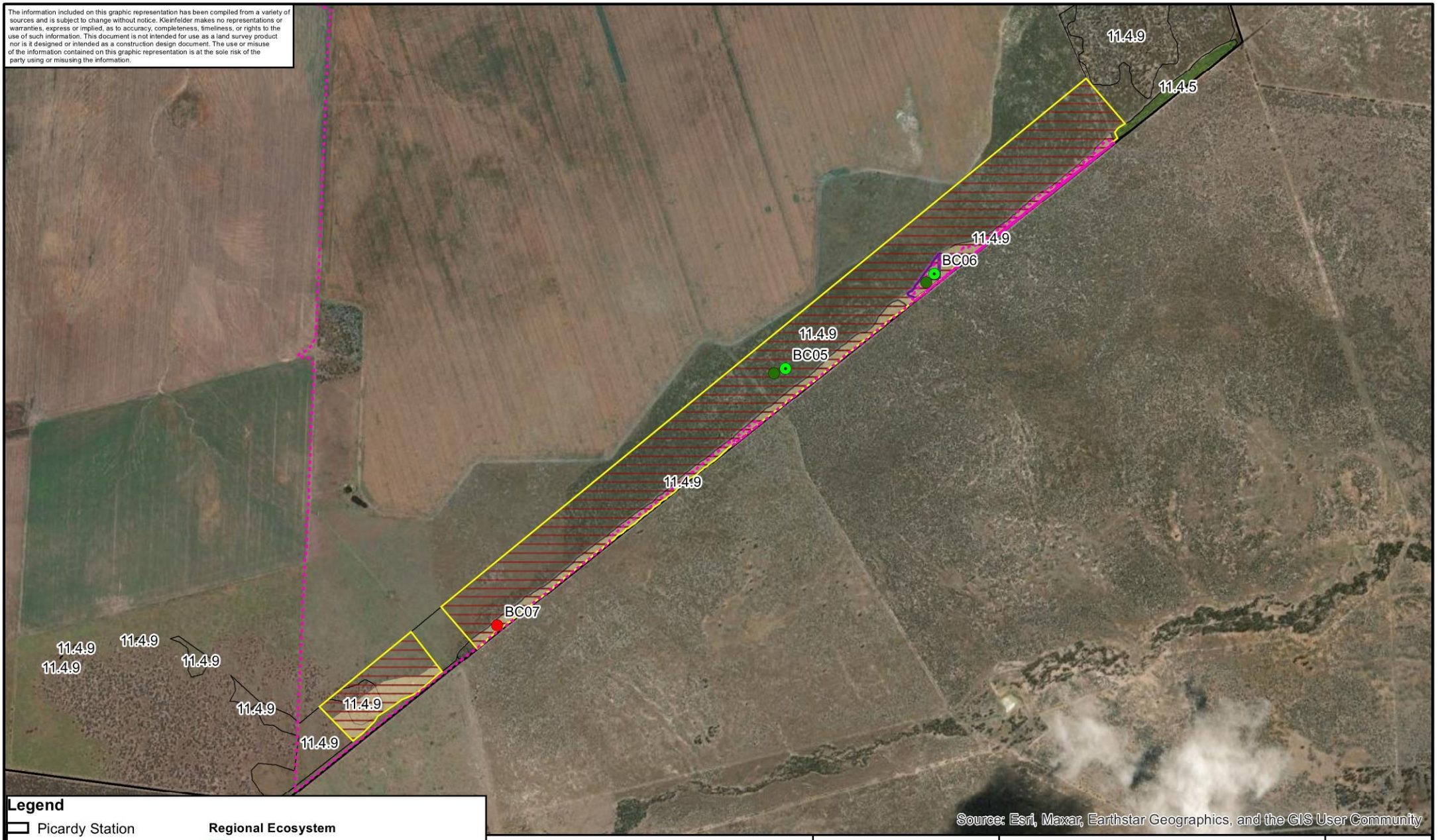

Legend

- Picardy Station
- Offset Area

BioCondition Sites

- Start Point
- Mid Point
- Historic Site
- Spotlighting Survey

Regional Ecosystem

- 11.4.5
- 11.4.9
- Brigalow Offset 18ha
- Ornamental Snake Offset 201ha
- Australian Painted Snipe Offset 127ha

Scale 1:20,000 (A4) — 0 100 200 400 600 800 Metres

N

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BioCondition Sites (South)

Anglo American
EU OMP Picardy Offsets
Dysart QLD

FIGURE:
2B

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3.1.3 Threatened Species

Offsets for the Australian Painted Snipe and Ornamental Snake were required in the Offset Area and having these species in the area enhances its value for this purpose. Ornamental Snakes have been recorded in the Norwich Nature Refuge and on Picardy Station near the NNR. However, the Australian Painted Snipe has not been recorded in the locality. Neither species has been recorded in the Offset Area.

Both species were not observed in or near the Offset Area during the field survey associated with this report. Australian Painted Snipe are nomadic and it is unlikely they would be observed in the small window available for this survey, moreover the cool and dry weather conditions would have made it unlikely for the Ornamental Snake to be observed.

3.1.4 Biosecurity Matters

Under the Biosecurity Act 2014 (B Act) Category 3 Restricted species landholders must not distribute or dispose of the restricted matter unless the distribution or disposal meets the criteria in Section 43 of the B Act. The strategies for Weeds of National Significance (WONS) are aimed to:

- Prevent spread and new infestations.
- Reduce adverse impacts of existing infestations.
- Establish and maintain national commitment.
- Coordinate management at a national level.
- Increase community awareness.

The draft Isaac Region Biosecurity Plan (IRBP) sets operational guides to control priority weeds in the Isaac Region.

There were five restricted plants and one restricted fauna pest observed in the Offset Area (**Table 5** and **Figure** 3). Restricted weeds were recorded at sites BC03 and BC06. All species, excluding Buffel Grass and Noogoora Burr, are classified as Category 3 Restricted Invasive Plants and three are classified as Weeds of National Significance. Noogoora Burr is a priority weed in the IRBP and Buffel Grass was included due to its high level of invasiveness and the suppression of native grasses.

Most restricted plants were in low numbers except for two patches of Parthenium outside of the Offset Area (**Table 5** and **Figure 3**). At present, the density of the restricted weeds is low, however monitoring of the extent of the Restricted Plants will be required in the future to determine if infestations are stable or are reducing within the Offset Area or to determine if targeted management will be required.

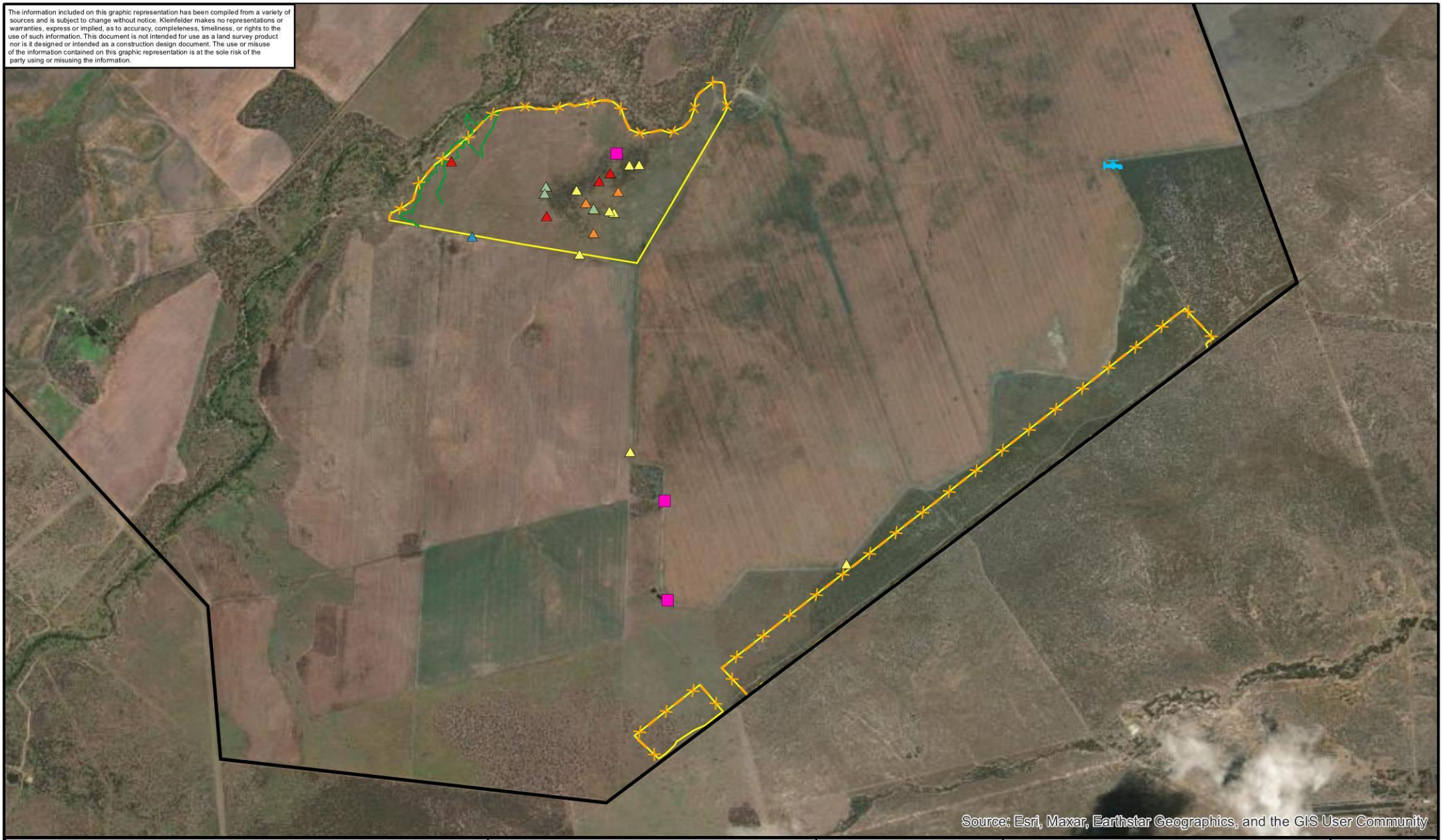
Although only one dead Feral Pig (*Sus scrofa*) was seen in the Offset Area, a large group was seen on Picardy Station in the cropping areas (**Table 5** and **Figure 3**). Other feral animals (Wild Dog *Canis lupus dingo/familiaris* and European Rabbit *Oryctolagus cuniculus*) occurred on Picardy Station. However, all three species are highly mobile and the Feral Pigs and Rabbits could cause damage to vegetation within the Offset Area as well. Feral Pigs and Wild Dogs could also predate threatened animals within the Offset Area. Monitoring in the Offset Area should include assessment of damage caused by the feral animals to determine if targeted management would be required.

The Landholder Questionnaire determined that compliance for the monitoring and management of the above pest animals has been compliant: The landholder stated:

- Monitoring of creeks and other areas occur for signs of the pest animals. This is done whenever staff are driving on the property on most weekdays.
- Management/control is done by shooting but no trapping or baiting. Control is more easily managed by shooting and no other animal impacted by baits. Aerial and on-ground shooting is shared with other neighbours to a ensure a larger area is controlled.
- There have been three aerial pig shoots in the last 12 months and spotlight shooting has occurred regularly as a part of crop and offset management.

Table 5: Weed species requiring control within the Offset Area

Scientific Name	Common Name	Category	WONS	Priority IRBP	Location	Density
Weeds						
Harrisia martinii	Harrisia cactus	3, Restricted Invasive	-	X	BC03, BC06 Offset Area	Scattered
Opuntia stricta	Prickly Pear	3, Restricted Invasive	X	X	Offset Area	Scattered
Opuntia tomentosa	Velvety Tree Pair	3, Restricted Invasive	X	X	Offset Area	Scattered
Parthenium hysterophorus	Parthenium	3, Restrictive Invasive	X	X	Offset Area Picardy Station	Scattered Very high
Xanthium pungens	Noogoora Burr	-	-	Invasive	Offset Area	Scattered
Cenchrus ciliaris	Buffel Grass	-	-	-	All BC sites	Moderate to high
Feral Animals						
Oryctolagus cuniculus	Rabbit	3, 4, 5, 6, Invasive	-		Picardy Station	Low
Sus scrofa	Feral Pig	3, 4, 6, Restrictive Invasive	-		Offset Area, Picardy Station	Moderate
Canis lupus dingo/familiaris	Wild dog	3, 4, 6, Restrictive Invasive	-	X	Picardy Station	Low



Legend

- Picardy Station
- Offset
- Missing Fence
- Bird Survey
- Livestock Watering Point
- Pest Animal Evidence

Weed Locations

- Harrisia Cactus
- Noogoora Burr
- Parthenium
- Prickly Pear
- Velvet Tree Pear

0 150 300 600 900 1,200
Scale 1:30,000 (A4) Metres

N

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Land Management

Anglo American
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Dysart QLD

FIGURE:
3

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3.1.5 Erosion and slumping

There was no major erosion or slumping of creek banks, of significance, noted within the Offset Area during the survey; the black clays are generally not prone to dispersion. There was erosion in the immediate area just south of the Offset Area along the creek. If this erosion progresses into the Offset Area, intervention may become necessary.

3.1.6 Bushfire

There was no evidence of bushfire, such as blackened tree stems or charred logs, observed on site during the survey. Historical imagery was interrogated back to 2002 and no evidence or fire scars were detected over that time, including between the years of survey, 2018 – 2020 (Queensland Globe imagery and the CapCoal 2022 imagery).

3.1.7 Grazing and Fencing

No evidence of grazing was recorded within the Offset Area since the properties primary usage is cropping land. There was no fencing around the southern section of the Offset Area except for the existing property fence. A section of the existing fence along the southern section of the Offset Area has been damaged which could lead to cattle entering the Offset Area. In Addition, there was no fence-line along the creek for the northern section of the Offset Area. *Cenchrus ciliaris* (Buffel Grass), a preferred pasture grass of cattle, dominates the open areas through the site.

3.1.8 Other observations of significance

The gilgai found throughout the site were all holding water and providing good foraging habitat for the Ornamental Snake (Appendix 4). One Broad-palmed Frog (*Litoria latopalmata*) was found during the survey. The Broad-palmed Frog is one of the commonly recorded frog species present where Ornamental Snakes occur.

4 DISCUSSION

4.1 HABITAT CONDITION

The below subsections discuss points of interest from the results of the BioCondition assessments in relation to compliance with the OMP. Functionality is discussed in relation to the condition scores which are presented from score 1 (low functionality) to score 10 (high functionality) with score 5 being considered as of moderate function.

4.1.1 Brigalow TEC / RE 11.4.9

Vegetation that was assessed across the Offset Area (AU1), appears to be consistent with RE 11.10.7 (*Acacia harpophylla* open forest on Cainozoic fine-grained sedimentary rocks). This ecosystem is classified as endangered under the VMA Act and is recognised as an ecosystem that comprises the Brigalow TEC which is listed as endangered under the EPBC Act. Elevation between the northern and southern section varied by approximately 10 m. However, both sections were dominated by cracking clays with gilgai formation present except for a raised area between the Brigalow Offset in the northern section and Scott Creek which was also cracking clays that did not contain gilgai.

Brigalow regrowth is healthy and advanced in the Brigalow Offset Area and supported by sub canopy species including *Atalaya hemiglauca.* The groundstorey was sparse but contained species indicative of Brigalow ecosystems including *Enchylaena tomentosa* and *Einadia nutans*. The dominant grass species were native.

The Brigalow Offset produced positive scores for recruitment, organic litter, shrubs and grasses. The impact of Buffel Grass was more evident in the northern section where the Brigalow regrowth was less advanced. However, initial assessment suggests that the threat is manageable and does not present an unacceptable level of risk in terms of the offset being able to demonstrate an ecological benefit.

Overall, the RE averages a Biocondition score of 4 which is considered as moderately functional. The current functionality of this ecosystem can be viewed positively given the age and maturity of the system, and this view further supports the likelihood of compliance gains in the future. Importantly, the Offset Area is also inside a regional biodiversity corridor as described under Queensland's regional biodiversity network mapping.

4.1.2 Ornamental Snake and Australian Painted Snipe

The Offset Area provides habitat that can be considered as suitable for the Ornamental Snake and a frog species that would be a part of its common diet. The areas of Brigalow Offsets above are part of the OS and APS Offsets but also include the areas of low regrowth (AU1). Both AUs provide cracking clays and gilgai, important habitat associated to the lifecycle of both species. Gilgai have high water retention capabilities and provides a range of food resources (vegetation and seeds, frogs, insects, worms and molluscs, crustaceans and other invertebrates) for both species. In dryer months the cracking of the clay substrate provides an important refuge for the Ornamental Snake. Amphibian surveys should also be considered to supplement the information on site suitability and the likelihood of occurrence.

Records indicate that the Ornamental Snake has been recorded within Picardy Station outside of the Offset Area.

Threats to the Ornamental Snake and Australian Painted Snipe within the Offset Area include habitat degradation through Feral Pig excavations and predation by Feral Pigs and Wild Dogs. Impacts from weeds could also impact on foraging for both species.

The Habitat Index (Site-based Attributes) score of 3 in AU1 and 4 in AU2 indicates the Offset Area is of low to moderate function for the Ornamental Snake and Australian painted Snipe. However, this can be expected to increase as the vegetation matures and management objectives are put in place to increase and protect the biodiversity onsite, and subsequently reduce the likelihood and impacts of threatening processes.

An evaluation of Habitat Index by using the Species Habitat Attributes were high compared to the Site-based Attributes, i.e. 6 and 7 respectively for AU1 and AU2 (**Table 4**). The use of the Species Habitat Attributes for habitat evaluation will need to be assessed and revised before it can be used successfully as a measure.

4.2 RISKS OR POTENTIAL THREATS

4.2.1 Weeds

4.2.1.1 Cacti

Harrisia spp. (Harrisia) was found scattered throughout the Offset Area. Harrisia can forms dense clumps in the understorey and produces large amounts of viable seed in a succulent fruit. These are eaten by frugivorous birds and non-volant mammals and the seeds are subsequently spread through their droppings. Harrisia can also reproduce vegetatively if it is displaced. It is a common weed of Brigalow communities and notably develops under roost sites from bird droppings. Large populations could displace the natural understorey through competition/shading and have a negative impact on terrestrial fauna movement. . Harrisia Cactus are biologically controlled by two species a stem-boring longicorn beetle (*Alcidion cereicola*) and a mealy bug (*Hypogeococcus festerianus*). There was no evidence of these in the Harrisia Cactus, but the scattered distribution of the plants at the time of the survey indicates some control by these insects.

Opuntia spp. were observed sporadically throughout the Offset Area. *Opuntia also* produce a large amount of seed which is dispersed by birds and water courses. The *Opuntia* species observed were all affected by *Cactoblastis cactorum* (Cactoblastis Moth). Opuntia species are classified as Restricted Matter and WoNS, however, the confirmed presence of the moth means that *Opuntia* cacti are not considered to be a significant threat in the Offset Area.

4.2.1.2 Parthenium

Parthenium (*Parthenium hysterophorus*) is weed species that thrives on soils with high nutrient levels (cracking clays) with low groundcover and low shade. These conditions can be caused either by overgrazing (especially in dry periods) or mechanical disturbance from cattle tracks, vehicle tracks and machinery movement. The best method to reduce Parthenium is to provide a high level of groundcover that outcompetes the Parthenium. With management of the Offset Area the above should occur in the future.

4.2.1.3 Buffel Grass

Buffel Grass (*Cenchrus ciliaris*) was observed throughout the Offset Area reflecting the sites grazing history. It was less abundant in areas where the Brigalow regeneration is more advanced and where gilgais are more common, however it was the dominant understorey species in other parts of the Offset Area. Buffel Grass is a highly adaptive plant producing large numbers of seeds which are dispersed by fauna, wind and water. A suitable mechanism for the control of Buffel Grass in this situation involves the strategic and combined distribution of different herbicides to reduce Buffel Grass populations and encourage the expansion of the native ecosystem, without providing long term residual impacts to native grass species.

4.2.2 Feral Animals

4.2.2.1 Feral Pigs

Feral Pig were observed at two locations during the assessment. Pigs contribute to the overall degradation of gilgais, damp areas and other native species habitat. Damage occurs through wallowing, rooting for food and selective feeding; they are omnivorous and therefore impact flora and fauna simultaneously. Feral Pigs reproduce very successfully and sites often require treatment to manage localised populations. Suitable control methods for Feral Pigs are baiting as well as trapping, with the former being more effective on large infestations.

4.2.2.2 Rabbits

Scratching's and droppings of *Oryctolagus cuniculus* (European Rabbit) were observed on Picardy Station but not in the Offset Area. High density populations of rabbits can impact on the recruitment of native plant species through selective grazing, which can also have long term effects on biodiversity and ecosystem development if key indicator species are excluded by their grazing. Selective grazing may also impact threatened flora within Brigalow communities. Extensive burrowing by rabbits may also lead to erosion concerns, however this threat is mitigated by the occurrence of clay soils which are not considered suitable for warrens.

Rabbits are classified as Restricted Matter in Queensland. However, they are not considered to be a significant threat as widespread plant species known to be impacted by rabbit occurrence are not present within the ecosystems. Future monitoring should consider the presence of this animal and any notable increase in density may require a thorough abundance and impact assessment.

4.2.2.3 Wild Dogs

Wild Dogs could be responsible for predation on the Ornamental Snake and Australian Painted Snipe if numbers are high. If signs of predation on native wildlife is observed in the Offset Area or Picardy Station, a management Program would be required.

4.2.3 Other Potential Threats

Cattle were not observed within Picardy Station or the Offset Area due to the land being used for cropping. It is unlikely that cattle will impact the offset values found within the site due to the restrictions placed on the landholder for cattle.

Bushfires are possible due to the presence of Buffel Grass in the locality (along with other grass species). Buffel Grass can develop considerable biomass and burn with more heat intensity than native communities with comparable fuel biomass, therefore exacerbating the spread and intensity of destructive bushfire. The RE present is fire sensitive and fuel loads in and surrounding the Offset Area should be monitored and managed to mitigate the impacts of bushfire on the Offset Area. The fuel loads in AU1 and AU2 in the Northern Section were from 3,840-7550 kg/ha but less (700 kg/ha) in Southern Section AU2. A fuel load of 1,200kg/ha is the level required In the OMP to reduce erosion, but the lower amount in the more mature Brigalow would be offset by the higher values of litter and coarse woody debris. A reduction may be required in wet periods to prevent the fuel load building up to a level that could make it a fire hazard.

5 CONCLUSIONS

The results of the 2023 assessment identified that the Picardy Station Offset Area is low to moderately functional for Brigalow TEC (specifically RE 11.4.9) and is similar for the Ornamental Snake and Australian Painted Snipe. Importantly, opportunity exists to increase the value of the offset through appropriate management measures.

There are sufficient observations to support the conclusion that the site is a suitable and viable offset for Brigalow TEC, the Ornamental Snake and the Australian Painted Snipe. Although it will take time to attain remnant vegetation status, the Offset Area exhibits positive habitat qualities for its development.

Recommendations to increase the value of the area include:

- The general exclusion of cattle and grazing except for control of Buffel Grass if required.
- The management of Buffel Grass to support the sites biodiversity values and manage the risk of bushfire.
- Increasing the connectivity in the southern section of the Offset Area through active revegetation along the southern fence-line for connection to the Norwich Park nature Refuge.

6 LIMITATIONS

6.1 STATEMENT OF LIMITATIONS

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Kleinfelder has used a professional standard of skill and care ordinarily exercised by reputable members of the same profession practicing in the same or similar locality.

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APPENDIX A: RAW DATA

Biocondition Sites

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
Date			30/05/2023	30/05/2023	30/05/2023	31/05/2023	31/05/2023	31/05/2023
Observer			JM/PQ	JM/PQ	JM/PQ	JM/PQ	JM/PQ	JM/PQ
Location								
Bioregion			11	11	11	11	11	11
Datum			GDA94	GDA94	GDA94	GDA94	GDA94	GDA94
Zone			Z55	Z55	Z55	Z55	Z55	Z55
Easting (add from GIS)	Plot Origin (100x50m)		656297.9	655930	656224.8	655401.5	658060.2	658655.6
Northing			7495099	7495140	7495343	7495309	7493313	7493693
Easting	Plot Centre (100x50m)		656249.7	655892.9	656265.4	655410.2	658014.5	658623.3
Northing			7495089	7495115	7495367	7495358	7493295	7493660
Plot Bearing	Degrees		290	240	50	10	270	250
Plot Alignment Description								
Locality Description	Lot/Plan or Lease							
RE / Tree heights								
Regional Ecosystem			cat x	11.4.9	11.4.9	cat x	cat x	11.4.9
Tree Canopy Hgt (EDL)	m median		0	6	6	1.1	2	6.5
50x20m Area								
Coarse Woody Debris	m							
					0.75	0.75	1.5	2.2

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
					0.65			2.4
								2.75
								3
								1.75
								1.9
								4.1
								3.15
Total	m		**0**	**0**	**1.4**	**0.75**	**1.5**	**21.25**
100x50m Area								
EDL spp recruitment	100%		-	0.66	0.66	1	-	-
Native Species Richness (Layer e=emergent,t1-tree1, t2=tree2, s1=shrub1, s2=shrub2, g=ground)	d=dom, C=co-dom, s=dub-dom, a = assoc		**2**	**3**	**3**	**2**	**2**	**2**
Plant Species Richness	**Common name**							
Native Trees								
Acacia harpophylla	Brigalow		t1s	t1c	t1d	t1s	t1a	t 1d
Atalaya hemiglauca	Whitewood		s1a	t1a		t1a s1a	t1a	t1a
Lysiphyllum carronii	Red Bauhinia			t1a	t1a			
Santalum lanceolatum	Sandalwood				t1a			
50x10m Area								
Shrub spp. richness			**2**	**1**	**1**	**3**	**2**	**2**
Plant Species	Common name							
Apophyllum anomalum	Broom Bush				s1a			

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
Capparis lasiantha	Nipan		s1a			s1a	s1a	s1a
Carissa ovata	Currant Bush							s1a
Sesbania cannabina	Sesbania Pea			s1a		s1a	s1a	
	no leaf tiny spine broom					s1a		
Grass spp. richness			**3**	**6**	**5**	**7**	**4**	**4**
Cyperus rigidellus	Flat Sedge				ga	ga		ga
Panicum queenslandicum	Umbrella Grass			gs	gc			
Setaria surgeons	Pigeon Grass						ga	
Sporobolus caroli	Fairy Grass							ga
Themeda triandra	kangaroo grass			ga		ga	ga	
dicanthium tall sample waist high						ga		
red knee grass sample			ga	ga				
spring grass sample			gs	gd	gs	ga		
dicanthium sample			gd	ga	ga	gd	ga	ga
distans grass				ga	gs			
sporobolus sample						ga		
bothriochloa sample						ga		
baumea sample							ga	
eragrostis sample								ga
Forb & other spp richness			**1**	**2**	**1**	**2**	**1**	**2**

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
Alternanthera nodiflora	Nody						ga	
Alternanthera nodosa				ga				
Colotis cuneifolia	Small Daisy						gs	
Einadia nutans	Climbing Saltbush							ga
Enchylaena tomentosa	Ruby Salt Bush				ga			ga
Rhynchosia minima	Rhynchosia		ga			ga		
saltbush sample	possible euphobia drummondi					ga		
alternanthera sample							ga	
Native spp richness			**8**	**12**	**10**	**14**	**9**	**10**
Non-native Cover %	0.1--0.9 or 1--100		**50.5**	**6**	**12**	**6**	**88**	**13.5**
Plant Species	Common name							
Acanthospermum hispidum	Star Burr							1
Achyranthes aspera	Devil's Horsewhip				0.5			0.5
Bidens pilosa	Cobblers Peg			0.5				
Cenchrus ciliaris	Buffel Grass		50	5	10	5	85	10
Chloris gayana	Rhodes Grass				1		3	1
Harrisia martinii	Harrisia cactus	Restricted			0.5			2
Malvastrum americanum	Spiked Mallow		0.5	0.5		0.5		
Stylosanthes scabra	Shrubby Stylo					0.5		
cows vine			0.5					
abutilon sample 1.2m tall			1	0.5	0.5	0.5		0.5

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
canegrass					2			
many flower sample	.3-.5						0.5	
large daisy flower	1.1						0.5	
pubes							0.5	
spurge							0.5	
spend end of life green panic								5
vine from eric book banana like								0.5
eragrostis sample								1
sida sp. nearly dead								0.5
Five x 1m plots	%							
Groundcover								0
Native perennial (decreaser) grass Cover	**Total**		**6.4**	**0**	**9**	**46.8**	**1**	**2.6**
1			25			96	5	5
2			5			40		
3			2		40	68		5
4					5			
5						30		3
Native other grass (if relevant)	**Total**		**0**	**0**	**0**	**0**	**1**	**0**
1								
2							5	
3								

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
4								
5								
Native forbs and other	**Total**		**0**	**0**	**0**	**1**	**0**	**8.4**
1								25
2								15
3								
4								1
5						5		1
Native shrubs (<1m	**Total**		**0**	**13**	**2.6**	**0**	**0**	**9.6**
1								1
2					10			1
3								15
4				25	3			1
5				40				30
Non-native grass	**Total**		**83.6**	**40.6**	**0**	**20**	**75**	**6.8**
1			60	60			90	2
2			90	10			80	
3			71	78			40	
4			100	20		85	65	30
5			97	35		15	100	2
Non-native forbs and shrubs	**Total**		**0.4**	**0**	**0.1**	**0.6**	**2**	**0**

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
1						1	5	
2					0.5			
3			2			2	5	
4								
5								
Litter	**Total**		**9.6**	**34**	**44.4**	**31.6**	**21**	**33.4**
1			15	65	50	3		37
2			5	20	30	60	15	19
3			25		40	30	55	64
4				60	97	15	35	33
5			3	25	5	50		14
Rock	**Total**		**0**		**1**	**0**	**0**	**0.2**
1								
2								
3								1
4								
5					5			
Bare Ground	**Total**		**0**	**13.4**	**43.9**	**0**	**0**	**39**
1	10			40	50			30
2	20			25	59.5			65
3	40			2	20			15
4	10							35

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
5	20				90			50
Cryptograms	**Total**		**0**	**0**	**0**	**0**	**0**	**0**
1	10							
2	10							
3								
4								
5	30							
Total			**100**	**101**	**101**	**100**	**100**	**100**
100x50m area	Benchmark							
Eucalypt large tree DBH (cm)								
No. large eucalypts								
Non-eucalypt large tree DBH (cm)				28	*28*			28
No. large non-eucalypts								
Total			**0**	**0**	**0**	**0**	**0**	**0**
100m Transect								
Canopy	**Total**		**0.75**	**31.88**	**42.2**	**0**	**0.9**	**43.3**
			0.25	11.94	10	nil	0.9	1.3
			0.5	4.22	0.4			5.1
				0.51	5.2			2.1
				2.14	5.9			5
				4.77	3			5.5

Site ID		Status	BC01	BC02	BC03	BC04	BC05	BC06
				1.7	1.6			10
				3.7	4.1			4.5
				2.9	3.9			4
					4.5			3.1
					3.6			2.7
					4.2			7.2
					10.4			5.2
								5.8
								7.9
Native Shrub	**Total**		**0**	**0**	**0**	**0.4**	**0**	**0**
						0.4		

Species Habitat Attributes

Site	BC01	BC02	BC03	BC04	BC05	BC06	BC07
Food and Foraging Habitat							
Plant species	2	3	3	2	3	2	2
Prey species	3	3	3	2	3	3	3
Grass seeds	4	4	4	4	4	4	4
Flowering/fruiting plants	2	2	2	2	2	2	2
Termite mounds							
Watercourses	2	3	2	2	1	1	1
Water Proximity	4	4	3	3	1	1	1
Habitat shelter/breeding							
HBTs (largest hollow ≤6cm)							
HBTs (largest hollow ≤12cm)							
HBTs (largest hollow ≤22cm)							
HBTs (largest hollow >22cm)							
Grass Cover	4	3	3	4	4	4	4
Logs							
Log piles							
Caves							
Large shady Trees		2	2				
Cracking Clays	5	5	5	3	5	5	5
Gilgai	1	4	4	1	5	5	5
Rocky outcrops							

Site	BC01	BC02	BC03	BC04	BC05	BC06	BC07
Rocks							
Rock piles							
Habitat for mobility							
Vegetation structure	4	3	3	4	4	3	3
Vegetation composition	2	3	3	2	2	3	3
Vegetated corridors	2	3	3	2	3	3	3
Dead trees							
Riparian vegetation	2	3	2	2	1	1	1
Severity of Threats (reverse order)_							
Weeds	4	4	4	4	4	4	4
Clearing	1	3	3	1	1	1	1
Pest Species	3	3	3	3	3	3	3
Fire Regime	5	5	5	5	5	5	5
Erosion	4	4	4	4	4	4	4
Competition for Habitat	3	3	3	3	3	3	3
Native Predators	2	3	3	3	4	4	4
Disease or Pathogens	5	5	5	5	5	5	5
Barriers to Movement	5	5	5	5	5	5	5
Australian Painted Snipe							
Food and Foraging	1.4	1.6	1.4	1.3	1.2	1.1	1.1
Habitat and Shelter	1.3	1.8	1.8	1.3	2.3	2.3	2.3

Site	BC01	BC02	BC03	BC04	BC05	BC06	BC07
Habitat for Mobility	1.3	1.5	1.5	1.3	1.5	1.5	1.5
Severity of Threats	1.8	1.9	1.9	1.8	1.9	1.9	1.9
Total	**6**	**7**	**7**	**6**	**7**	**7**	**7**
Ornamental Snake							
Food and Foraging	1.5	1.7	1.3	1.2	0.8	0.8	0.8
Habitat and Shelter	1.0	1.5	1.5	0.7	1.7	1.7	1.7
Habitat for Mobility	1.3	1.5	1.4	1.3	1.3	1.3	1.3
Severity of Threats	1.75	1.94	1.94	1.81	1.88	1.88	1.88
Total	**6**	**7**	**6**	**5**	**6**	**6**	**6**

APPENDIX B: BIOCONDITION SITE PHOTOGRAPHS

In order of North South, East and West

BC01

BC02

BC03

BC04

BC05

BC06

APPENDIX C: BIOCONDITION CALCULATIONS

Site / Assessment Unit		BC01 / AU1				BC02 / AU2				BC03 / AU2				BC04 / AU1			
Attribute	**Weighting**	**Field**	**Bench.**	**%**	**Score**	**Field**	**Bench.**	**%**	**Score**	**Field**	**Bench.**	**%**	**Score**	**Field**	**Bench.**	**%**	**Score**
Large trees	15	0	28	0	0	0	28	0	0	0	28	0	0	0	28	0	0
Tree canopy median height	5	0	10	0	0	6	10	60	3	6	10	60	3	1.1	10	11	0
Recruitment of woody perennial species%	5	0	100	0	0	0.66	100	1	0	0.66	100	1	0	1	100	1	0
Tree canopy cover %	5	0.75	25	3	0	31.88	25	128	5	42.2	25	169	5	0	25	0	0
Native shrub canopy cover %	5	0	5	0	0	0	5	0	0	0	5	0	0	0.4	5	8	0
Coarse woody debris length m	5	0	980	0	0	0	980	0	0	14	980	1	0	7.5	980	1	0
Native plant spp richness																	
Trees	5	2	2	100	5	3	2	150	5	3	2	150	5	2	2	100	5
Shrubs	5	2	5	40	2.5	1	5	20	0	1	5	20	0	3	5	60	2.5
Grasses	5	3	5	60	2.5	6	5	120	5	5	5	100	5	7	5	140	5
Forbs and other	5	1	10	10	0	2	10	20	0	1	10	10	0	2	10	20	0
Non-native plant cover	10	52	0	52	0	6.5	0	7	5	12.5	0	13	5	6	0	6	5
Native perennial grass cover %	5	6.4	16	40	1	0	16	0	0	9	16	56	3	46.8	16	293	5
Litter Cover %	5	9.6	45	21	3	34	45	76	5	44.4	45	99	5	31.6	45	70	5
Sub-Score	**80**				**14**				**28**				**31**				**27.5**
Landscape Scale Attributes																	

Site / Assessment Unit		BC01 / AU1				BC02 / AU2				BC03 / AU2				BC04 / AU1			
Patch size	10				7				7				7				7
Connectivity	5				2				2				2				2
Context	5				2				2				2				2
Sub-score	**20**				**11**				**11**				**11**				**11**
Total Point Score	**100**				**25**				**39**				**42**				**38.5**
Biocondition Score Site					3				4				4				4
Biocondition Score AU					**3**				**4**								
Brigalow (18.05 ha)									**4**								
Habitat Index - Site-Based Attributes					**2**				**4**				**4**				**3**
Australian Painted Snipe					3				4								
Ornamental Snake					3				4								
Habitat Index - Species Habitat Attributes																	
Australian Painted Snipe Site					6				7				7				6
Australian Painted Snipe Area					**6**				**7**								
Ornamental Snake Site					6				7				6				5
Ornamental Snake Area					**6**				**6**								
Patch Area (ha) (from GIS)					**94.09**				**17.15**				**17.15**				**94.09**

Site / Assessment Unit		BC05 / AU1				BC06 / AU2				BC07 / AU2			
Attribute	**Weighting**	**Field**	**Bench.**	**%**	**Score**	**Field**	**Bench.**	**%**	**Score**	**Field**	**Bench.**	**%**	**Score**
Large trees	15	0	28	0	0	0	28	0	0	0	28	0	0
Tree canopy median height	5	2	10	20	0	6.5	10	65	3	8	10	80	5
Recruitment of woody perennial species%	5	0	100	0	0	0	100	0	0	50	100	50	3
Tree canopy cover %	5	0.9	25	4	0	43.3	25	173	5	32.6	25	130	5
Native shrub canopy cover %	5	0	5	0	0	0	5	0	0	13.9	5	278	3
Coarse woody debris length m	5	15	980	2	0	212.5	980	22	2	245	980	25	2
Native plant spp richness											0	0	0
Trees	5	2	2	100	5	2	2	100	5	4	2	200	5
Shrubs	5	2	5	40	2.5	2	5	40	2.5	5	5	100	5
Grasses	5	4	5	80	2.5	4	5	80	2.5	6	5	120	5
Forbs and other	5	2	10	20	0	2	10	20	0	8	10	80	2.5
Non-native plant cover	10	88	0	88	0	13.5	0	14	5	30	0	30	3
Native perennial grass cover %	5	1	16	6	0	2.6	16	16	1	5	16	31	1
Litter Cover %	5	21	45	47	3	33.4	45	74	5	42	45	93	5
Sub-Score	**80**				**13**				**31**				44.5

Site / Assessment Unit		BC05 / AU1				BC06 / AU2				BC07 / AU2			
Landscape Scale Attributes													
Patch size	10				5				2				2
Connectivity	5				0				0				0
Context	5				0				0				0
Sub-score	**20**				**5**				**2**				**2**
Total Score	**100**				**18**				**33**				**46.5**
Biocondition Score Site					2				3				5
Habitat Index - Site Based Attributes					**2**				**4**				**6**
Habitat Index - Species Habitat Attributes (Site)													
Australian Painted Snipe Site					7				7				7
Ornamental Snake Site					6				6				6
Patch Area (ha) (from GIS)					**73.88**				**15.93**				**15.93**