Ord-East Kimberley Expansion Project – Weaber Plain Development Area

Non-breeding Gouldian Finch habitat and vegetation assessment (2020)

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SUMMARY

The Weaber Plain Development Project (the Project) is an irrigated agricultural development located approximately 30 km north-north-east of Kununurra in Western Australia. The Project was approved by the Department of Sustainability, Environment, Water, Population and Communities in 2011 under EPBC 2010/5491 Condition 6.

In order to offset the potential impacts of the Project on the endangered Gouldian Finch (*Erythrura gouldiae*), a Gouldian Finch Conservation Plan was prepared. The Gouldian Finch Conservation Plan was prepared to ensure appropriate management of the Gouldian Finch and its habitat during construction and operation of the Project. An action arising from the Conservation Plan was to undertake an assessment of vegetation condition in areas identified as key Gouldian Finch habitat within the buffer area and immediate surrounding reserves

A total of 41 transects were surveyed for feeding grasses, comprising 21 transects in the vicinity of breeding areas, and 20 plots in low-lying potential foraging habitat within the buffer area.

Overall, the most dominant available feeding grasses were *Sarga*/*Sorghum* spp. and *Triodia* spp., comprising 65.7% and 15.1% respectively of the total available feeding grasses.

The majority of transects recorded no evidence of fire. However, 'Patchy' and 'Low' evidence of fire were recorded at 12.5% and 10.0% of transects respectively. There were no recorded impacts from cattle during the October 2020 assessment.

No limitations were encountered during the survey that were expected to have impacted upon the results. As such, the survey was deemed adequate in providing an assessment of the vegetation condition of non-breeding Gouldian Finch habitat in 2020.

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1. INTRODUCTION

1.1 Project description

The Weaber Plain Development Project (the Project) is an irrigated agricultural development located approximately 30 km north-north-east of Kununurra in Western Australia (Figure 1). The Project was approved by the Department of Sustainability, Environment, Water, Population and Communities in 2011 under EPBC 2010/5491 Condition 6.

In order to offset the potential impacts of the Project on the endangered Gouldian Finch (*Erythrura gouldiae*), a Gouldian Finch Conservation Plan was prepared (Strategen 2014). The Gouldian Finch Conservation Plan (the Conservation Plan) was prepared to ensure appropriate management of the Gouldian Finch and its habitat during construction and operation of the Project. An action arising from the Conservation Plan was to undertake an assessment of vegetation condition in areas identified as key Gouldian Finch habitat within the buffer area and immediate surrounding reserves (Strategen 2014).

1.2 Gouldian Finch distribution

The Gouldian Finch had a former distribution across most of northern Australia, but within the last century, its range has contracted to the Kimberley and Northern Territory, with records in Queensland increasingly infrequent (O'Malley 2006).

Gouldian Finches are found throughout most of the Kimberley, typically ranging as far south as the Dampier Peninsula in the west, the King Leopold Ranges and Barnett River in the central Kimberley, and Spring Creek in the eastern Kimberley (Storr 1980).

1.3 General habitat

Habitat is typically savannah woodland, characterised by rocky hills with hollow-bearing gums, adjacent to a diverse grass assemblage (O'Malley 2006). Throughout the year, Gouldian Finches disperse widely throughout these habitats, in response to seasonal changes in food availability (Dostine *et al.* 2001).

1.3.1 Breeding habitat

Gouldian Finches commence egg-laying between February and June near Wyndham (Brazill-Boast *et al.* 2010), and January and August at Newry Station (east of Kununurra) in the Northern Territory (Tidemann *et al.* 1999). In the East Kimberley, Gouldian Finches are known to nest in the cavity-bearing small-fruited bloodwood (*Corymbia dichromophloia*) and Darwin woollybutt (*Eucalyptus miniata*) over a ground layer story of a suitable foraging grass (e.g. *Sorghum stipoideum*), within 2 km of a permanent water source (Brazill-Boast *et al.* 2010; Brazill-Boast *et al.* 2011). Nest selection has been shown to be highly dependent on the structural characteristics of a cavity, as well as the abundance of suitable nest trees at the landscape level (Brazill-Boast *et al.* 2010; Brazill-Boast *et al.* 2011).

1.3.2 Non-breeding habitat

Outside the breeding season, Gouldian Finches disperse widely in grassy woodland in lowland areas adjacent to breeding habitat on hills (Dostine *et al.* 2001). Observations over successive wet seasons suggest Gouldian Finches follow seed resources provided by perennial grasses (Dostine *et al.* 2001).

1.4 Key threats

The Gouldian Finch is an example of an obligate granivore than has experienced a significant reduction in range (Franklin 1999). Seed shortages at the end of the dry season or early wet season (i.e. November – January), potentially brought about by grazing pressure and altered fire regimes, has likely contributed to their declines (Franklin 1999; O'Malley 2006). Commercial trapping of wild finches throughout much of the Kimberley region until 1986 coincided with major population declines of the Gouldian Finch, particularly in the late 1970s (Franklin *et al.* 1999).

1.5 Conservation status

The Gouldian Finch is listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Department of Agriculture, Water and the Environment 2020). The taxon is also listed as Endangered under the Nature Conservation Act 1992 in Queensland, Vulnerable under the Territory Parks and Wildlife Conservation Act 2000 in the Northern Territory, and Priority 4 on the Department of Biodiversity, Conservation and Attractions Priority Flora and Priority Fauna List in Western Australia (Department of Agriculture, Water and the Environment 2020). The Action Plan for Australian Birds (Garnett *et al.* 2011) lists the Gouldian Finch as Near Threatened.

2. METHODS

2.1 Feeding grasses transects

A total of 41 permanent feeding grasses transects were re-surveyed in October 2020 (Table 1). Each transect starting point was previously marked with a numbered aluminium picket, from which a measuring tape was placed in a straight line from the starting point for 50 metres, adhering to a pre-determined orientation. A transect fell within the constraints of a surrounding 50 x 50 m quadrat.

The coverage of feeding grasses found along the transect line was measured (in cm) over a 1m section of the transect, every 5 metres along the 50 m transect line. A total of 10 x 1m measurements were conducted per transect (Figure 1).

The following potential feeding grasses were measured if they were present along a transect line:

- *Sarga/Sorghum* spp.
- *Trioda* spp. (spinifex)
- *Alloteropsis semialata* (cockatoo grass)
- *Chrysopogon fallax* (golden beard grass)
- *Heteropogon triticeus* (giant spear grass)
- *Sehima nervosum* (white grass) – not previously recorded
- *Xerochloa laniflora* (rice grass) – not previously recorded
- *Themeda triandra* (kangaroo grass)
- *Panicum decompositum* (native millet)

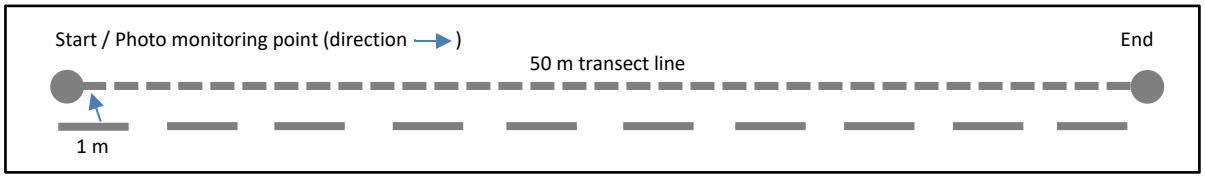


Figure 1. Feeding grasses transect layout

2.2 Phenology assessment of feeding grasses

At the request of the Department of Primary Industry and Regional Development, the phenology assessment was not conducted during the October 2020 survey. This decision was based on the results of previous assessments conducted during the late dry season, which suggested flowering and seeding of feeding grasses did not occur during this time.

2.3 Additional indicators affecting feeding grasses

In addition to feeding grass coverage, any evidence of fire (i.e. burnt areas) and cattle damage (i.e. grazing, trampling) was assessed. A single score (none, patchy, low, moderate, high and extreme) for both fire evidence and cattle damage was assigned following completion of a feeding grasses transect.

A photo of the vegetation at the start of each transect was taken from the marked aluminium picket, in the direction of the transect's orientation (Figure 1).

Table 1. Starting location and orientation of feeding grasses transects

Transect	Latitude	Longitude	Distance (m)	Orientation	Area
V101	-15.5100	128.8380	50	SW	Breeding
V102	-15.5107	128.8372	50	SSE	Breeding
V103	-15.5119	128.8373	50	SSE	Breeding
V104	-15.5129	128.8370	50	NW	Breeding
V105	-15.5016	128.8429	50	SW	Breeding
V106	-15.5010	128.8436	50	N	Breeding
V107	-15.4996	128.8444	50	NE	Breeding
V108	-15.4987	128.8452	50	SSE	Breeding
V109	-15.4906	128.8598	50	ESE	Breeding
V110	-15.4902	128.8604	50	N	Breeding
V111	-15.4900	128.8615	50	SSE	Breeding
V112	-15.4448	128.9475	50	SSE	Breeding
V113	-15.4466	128.9477	50	SE	Breeding
V114	-15.4473	128.9454	50	NW	Breeding
V115	-15.4483	128.9448	50	NNW	Breeding
V116	-15.4322	128.9482	50	SSE	Breeding
V117	-15.4335	128.9482	50	SE	Breeding
V118	-15.4349	128.9475	50	SSE	Breeding
V119	-15.4346	128.9462	50	NW	Breeding
V120	-15.4356	128.9446	50	NW	Breeding
V121	-15.4370	128.9443	50	ESE	Breeding
V122	-15.4401	128.9271	50	NE	Buffer
V123	-15.4379	128.9255	50	E	Buffer
V124	-15.4315	128.9255	50	E	Buffer
V125	-15.4321	128.9114	50	WSW	Buffer
V126	-15.4336	128.9118	50	E	Buffer
V127	-15.4355	128.9122	50	WSW	Buffer

Transect	Latitude	Longitude	Distance (m)	Orientation	Area
V128	-15.4986	128.8355	50	SE	Buffer
V129	-15.4986	128.8367	50	ENE	Buffer
V130	-15.4980	128.8379	50	NE	Buffer
V131	-15.4986	128.8387	50	S	Buffer
V132	-15.4986	128.8396	50	ENE	Buffer
V133	-15.4952	128.8344	50	NNE	Buffer
V134	-15.4943	128.8353	50	ENE	Buffer
V135	-15.4952	128.8333	50	E	Buffer
V136	-15.4644	128.8735	50	NNW	Buffer
V137	-15.4633	128.8742	50	NNE	Buffer
V138	-15.4624	128.8757	50	NNE	Buffer
V139	-15.4604	128.8761	50	NNW	Buffer
V140	-15.4690	128.8734	50	W	Buffer
V141	-15.4677	128.8734	50	W	Buffer

2.3 Survey timing

The non-breeding Gouldian Finch habitat and vegetation assessment was conducted between the 17th and 22nd of October 2020. The timing of the survey coincided with the late dry season in the East Kimberley. Rainfall at Kimberley Research Station (Kununurra) (DPIRD 2021) in the 12 months prior to the survey was similar to the long-term average (Figure 2).

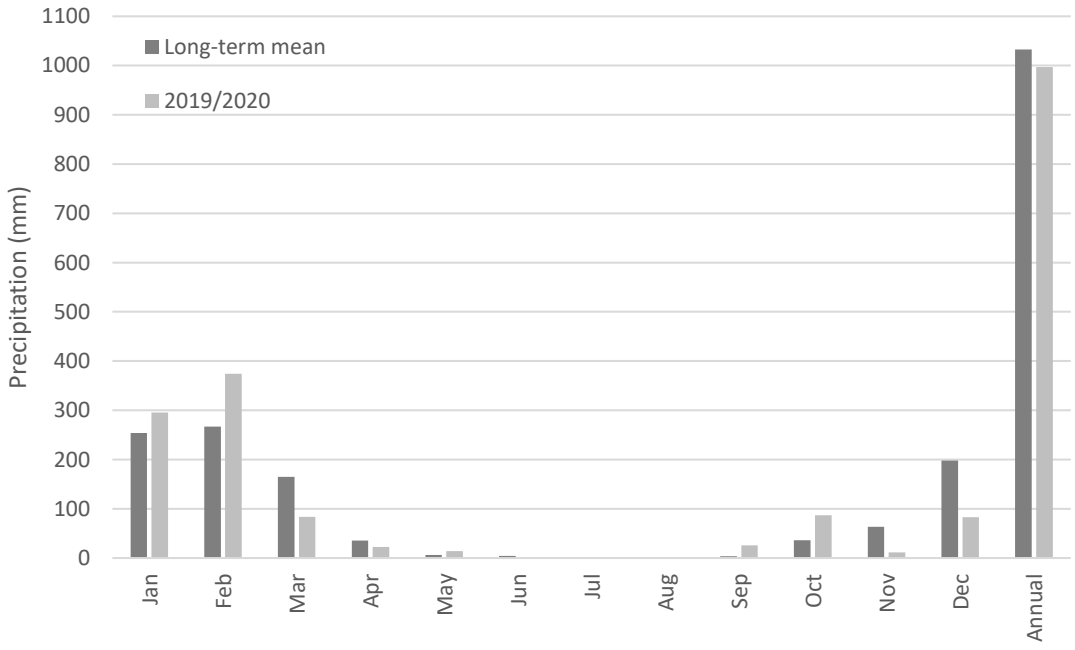


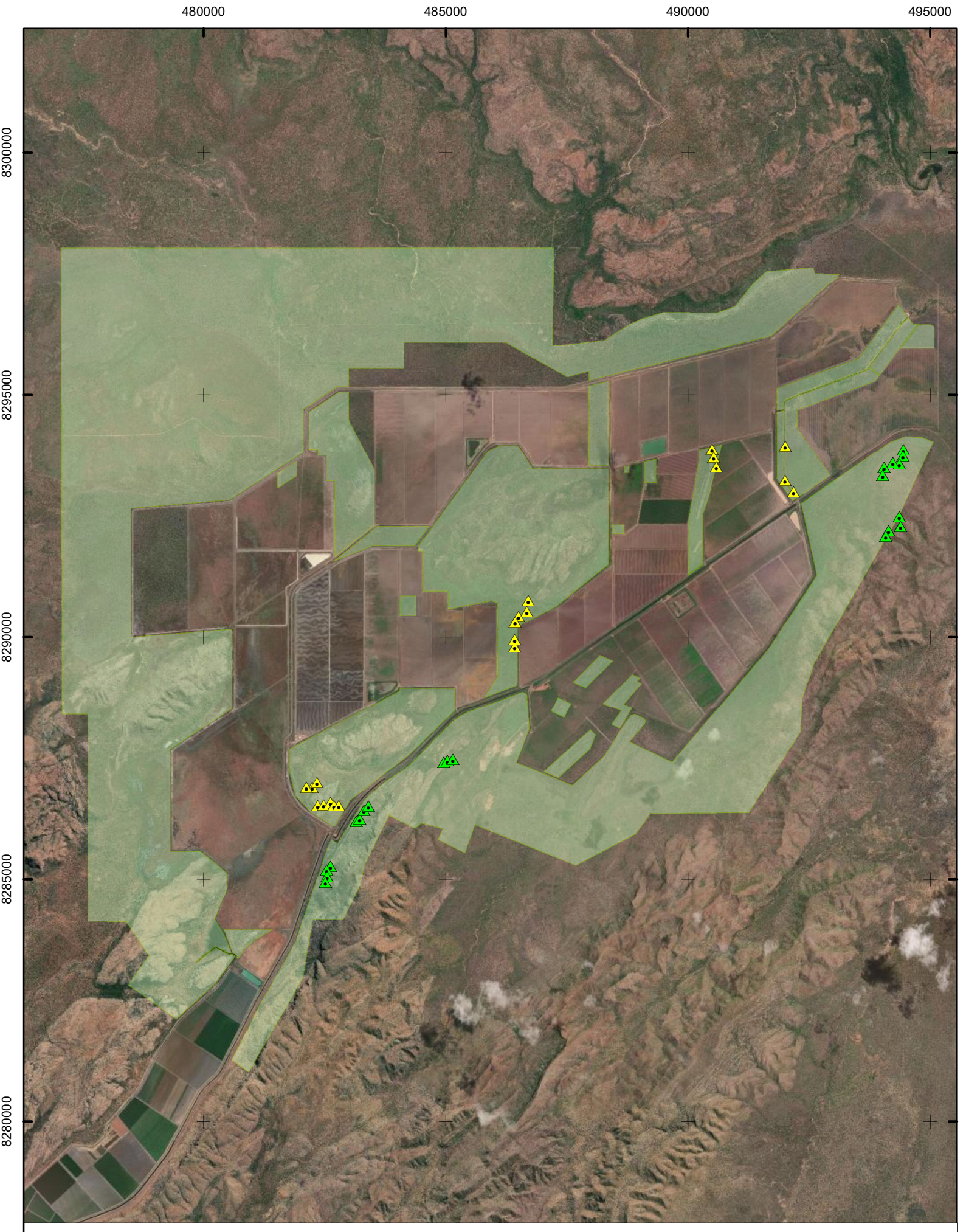
Figure 2. Long-term mean rainfall comparison with 12 months prior to survey at Kimberley Research Station

2.4 Survey team

The non-breeding Gouldian Finch habitat and vegetation assessment described in this document was planned and coordinated by Nigel Jackett. The feeding grasses transects, fire evidence and cattle impact assessments were conducted by George Swann and Adrian Boyle. The qualifications and experience of the team are provided in Table 2.

Table 2. Project staff, qualifications and experience

Name	Position	Qualifications	Professional experience
Nigel Jackett	Project leader, Ornithologist	BSc (Hons)	14 years
George Swann	Ornithological consultant	-	28 years
Adrian Boyle	Ornithological consultant	-	20 years



Legend

- Transect (breeding area)
- Transect (buffer area)
- Buffer area

Location of feeding grasses transects

Figure 3.
Date drawn: 16/11/20
Map Datum: GDA 1994
Zone: 52

N

0 1 2 km

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3. RESULTS

3.1 Feeding grasses transects

A total of 41 transects were surveyed for feeding grasses, comprising 21 transects in the vicinity of breeding areas, and 20 plots in low-lying potential foraging habitat within the buffer area (Figure 3).

Overall, the most dominant available feeding grasses were *Sarga*/*Sorghum* spp. and *Triodia* spp., comprising 65.7% and 15.1% respectively of the total available feeding grasses (Table 3).

There were notable differences between some feeding grasses when comparing breeding areas and buffer areas. Feeding grasses that were particularly prevalent in one area as opposed to the other included *Triodia* spp. (41.1% in breeding areas, 0.0% in buffer areas), *Themeda triandra* (0.3% in breeding areas, 14.0% in buffer areas) and *Heteropogon triticeus* (0.0% in breeding areas, 6.1% in buffer areas)(Table 3).

Table 3. Overall available feeding grasses in vegetation transects during October 2020 survey

Species	Vegetation cover (m)			% Critical feeding grasses available		
	Breeding	Buffer	Overall	Breeding	Buffer	Overall
Sarga/*Sorghum* spp.	146.4	315.5	461.9	56.8	70.8	65.7
Triodia spp.	105.9	0.0	105.9	41.1	0.0	15.1
Themeda triandra	0.9	62.5	63.3	0.3	14.0	9.0
Alloteropsis semialata	0.0	31.3	31.3	0.0	7.0	4.4
Heteropogon triticeus	0.0	27.3	27.3	0.0	6.1	3.9
Panicum decompositum	3.2	9.3	12.5	1.2	2.1	1.8
Chyrsopogon fallax	1.3	0.0	1.3	0.5	0.0	0.2

3.2 Evidence of fire

The majority of transects recorded no evidence of fire (Figure 4). However, 'Patchy' and 'Low' evidence of fire were recorded at 12.5% and 10.0% of transects respectively (Figure 4). Fire has therefore occurred in some parts of the Weaber Plain Development Area since survey in 2017/2018 (see Save the Gouldian Fund 2018), where no evidence of fire was recorded.

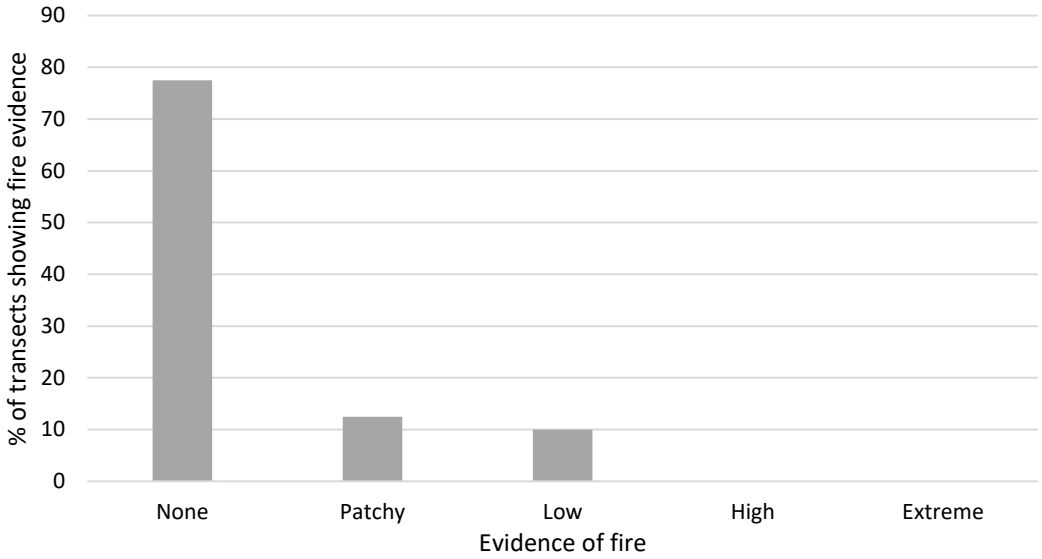

Figure 4. Evidence of fire recorded during the survey

3.3 Evidence of cattle impact

Similarly to the results of the most recent prior assessment of cattle impact in the Weaber Plain Development Area (i.e. 2016-2018) there were no recorded impacts from cattle during the October 2020 assessment (Table 4).

Table 4. Comparison of proportion of vegetation transects showing cattle impacts since 2012-2013

Score	2012-2013	2013-2014	2014-2015	2015-2016	2016-2018	2020
None	4.9	56.2	83.5	84.7	0.0	0.0
Low	18.3	5.4	3.4	3.2	0.0	0.0
Patchy	12.2	36.9	13.1	12.1	0.0	0.0
High	18.3	1.5	0.0	0.0	0.0	0.0
Extreme	46.3	0.0	0.0	0.0	0.0	0.0

Figure 5. Example of feeding grasses transect lines. Sites V103 (above) and V121 (below).

4. DISCUSSION

The October 2020 vegetation and habitat assessment produced similar results to those in 2017 when the most recent late dry season assessments were conducted (Save the Gouldian Fund 2018). Overall, the total cover of feeding grasses was slightly lower than in 2017, but the relative proportions of each feeding grass species was comparable.

Although the phenology component of the assessment was not conducted in the October 2020 survey, none of the feeding grasses measured along transects were observed to be flowering or in seed, which is the expected result based on previous phenology assessments (Save the Gouldian Fund 2018).

Impacts from cattle and fire appeared to be minimal during the October 2020 survey, with no cattle damage recorded at any of the transect sites. Similarly, most transects lacked evidence of recent fire scars, and the 12.5% of transects that showed evidence of fire, were of relatively low fire intensity. It is therefore unlikely that fire or cattle impacts will have heavily influenced the availability of feeding grasses during 2020.

5. SURVEY LIMITATIONS

The potential limitations of the survey are listed in Table 5. Given the few limitations encountered, the objectives of the study are considered to have been met.

Table 5. Survey limitations

Limitation	Relevant (yes/no)	Comment
Competency/experience of the consultant carrying out the survey	No	The consultants have extensive experience conducting environmental assessments throughout the Kimberley region, including previous experience within the Weaber Plain Development Area.
Scope (what faunal groups were sampled and were some sampling methods not able to be employed because of constraints such as weather conditions)	No	The survey replicated previous sampling techniques deemed suitable for assessing feeding grasses and impacts from fire and cattle.
Proportion of fauna identified, recorded and/or collected	No	All potential feeding grasses were identified in the field.
Sources of information e.g. previously available information (whether historic or recent) as distinct from new data	No	The survey was consistent with previous surveys within the Weaber Plain Development Area, for which previous reports were available for context.
Proportion of the task achieved and further work which might be needed	No	A total of 21 transects in the Breeding area, and 20 transects in the Buffer area were surveyed, consistent with previous annual monitoring within the Weaber Plain Development Area.
Timing/weather/season/cycle;	No	The objective of the survey was to assess the availability of feeding grasses for the Gouldian Finch population within the Weaber Plain Development during the non-breeding period. The October timing of the survey was nearing the end of the dry season, and consistent with the non-breeding period.
Disturbances (e.g. fire, flood, accidental human intervention etc.) which affected results of survey.	No	There were no significant disturbances that may have impacted upon the results of the survey. Low evidence of fire was present at some transect sites. No evidence of cattle impact was detected.
Intensity (in retrospect, was the intensity adequate)	No	The 21 transects within the Breeding areas and 20 transects within the Buffer area were consistent with previous surveys to assess feeding grasses for Gouldian Finches.
Completeness (e.g. was relevant area fully surveyed)	No	All previously surveyed transects were repeated during the current survey.
Resources (e.g. degree of expertise available in animal identification to taxon level)	No	Previously available data on feeding grasses present in the study area was available. Consultants were previously familiar with the grass species present from prior work in the Weaber Plain Development Area.
Remoteness and/or access problems	No	There were no access problems encountered during the field survey.
Availability of contextual (e.g. biogeographic) information on the region	No	The Victoria Bonaparte biogeographic region has been extensively surveyed, including multiple environmental asssessments within the Weaber Plain Development Area.

6. REFERENCES

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Appendix 1. Feeding grasses transects and assessment of fire and grazing impacts

Transect	*Sarga/ Sorghum* spp.	*Triodia* spp.	*Themeda triandra*	*Alloteropsis semialata*	*Heteropogon triticeus*	*Panicum decompositum*	*Chrysopogon fallax*	Cattle impact	Fire evidence
V101	29.8%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	None	Patchy
V102	0.2%	6.9%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V103	0.3%	19.7%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V104	0.5%	21.8%	0.0%	0.0%	0.0%	0.0%	0.0%	None	Low
V105	45.9%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%	None	Patchy
V106	14.5%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V107	34.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	Patchy
V108	7.3%	15.2%	0.0%	0.0%	0.0%	0.0%	0.0%	None	Patchy
V109	14.5%	2.5%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V110	35.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V111	25.1%	21.3%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V112	10.3%	17.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	Patchy
V113	22.0%	13.2%	0.0%	0.0%	0.0%	0.0%	0.0%	None	Patchy
V114	15.2%	21.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V115	10.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V116	3.5%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	None	Low
V117	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	None	Low
V118	19.5%	9.8%	0.0%	0.0%	0.0%	6.0%	0.0%	None	None
V119	0.0%	0.0%	1.5%	0.0%	0.0%	0.4%	0.0%	None	None
V120	4.1%	23.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	Low

Transect	*Sarga/ Sorghum* spp.	*Triodia* spp.	*Themeda triandra*	*Alloteropsis semialata*	*Heteropogon triticeus*	*Panicum decompositum*	*Chrysopogon fallax*	Cattle impact	Fire evidence
V121	0.0%	31.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V122	4.0%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	None	None
V123	43.5%	0.0%	2.0%	0.0%	0.0%	0.0%	0.0%	None	None
V124	67.0%	0.0%	2.4%	0.0%	0.0%	0.0%	0.0%	None	None
V125	36.0%	0.0%	0.0%	0.0%	0.0%	4.0%	0.0%	None	None
V126	42.0%	0.0%	8.0%	0.0%	0.0%	0.0%	0.0%	None	None
V127	9.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V128	44.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V129	43.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V130	22.0%	0.0%	47.5%	0.0%	0.0%	0.0%	0.0%	None	None
V131	64.0%	0.0%	2.5%	0.5%	0.0%	0.0%	0.0%	None	None
V132	21.7%	0.0%	5.0%	8.0%	0.0%	0.0%	0.0%	None	None
V133	34.0%	0.0%	0.0%	14.0%	0.0%	3.0%	0.0%	None	None
V134	1.5%	0.0%	4.5%	25.0%	14.5%	0.0%	0.0%	None	None
V135	1.0%	0.0%	33.0%	15.0%	0.0%	0.0%	0.0%	None	None
V136	40.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V137	45.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	None	None
V138	9.0%	0.0%	2.5%	0.0%	6.0%	0.0%	0.0%	None	None
V139	71.0%	0.0%	6.5%	0.0%	0.0%	0.0%	0.0%	None	None
V140	22.5%	0.0%	0.0%	0.0%	33.0%	11.5%	0.0%	None	None
V141	8.5%	0.0%	9.0%	0.0%	1.0%	0.0%	0.0%	None	None