Ord-East Kimberley Expansion Project – Weaber Plain Development Area

Non-breeding Gouldian Finch counts (2020)

Prepared for:

Department of Primary Industry and Regional Development

Prepared by:

Nigel Jackett

PO Box 3221

Broome, Western Australia, 6725

February 2021

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 Gouldian Finch counts of the non-breeding population within the Buffer Area and immediate surrounding reserves, with a target of no significant reductions in the non-breeding population of Gouldian Finches.

A total of 76 plots were surveyed for Gouldian Finches, comprising 31 plots within the five confirmed breeding areas and 45 plots within the buffer area and adjacent conservation reserves.

No Gouldian Finches were recorded during the plot surveys. A juvenile Gouldian Finch was recorded in the presence of a mixed finch flock coming to drink from an irrigation channel.

The October 2020 Gouldian Finch counts were low compared to most years since 2011 but were comparable to the counts in 2012. The apparent absence of Gouldian Finches (apart from an individual) during the survey may be a result of their regular dispersal to low-lying areas in search of food resources outside of the breeding season.

There were no limitations 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 non-breeding Gouldian Finch population in 2020.

CONTENTS

Figures

Tables

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 Gouldian Finch counts of the non-breeding population within the Buffer Area and immediate surrounding reserves, with a target of no significant reductions in the non-breeding population of Gouldian Finches (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 Gouldian Finch non-breeding surveys

A total of 76 plots were surveyed for Gouldian Finches, comprising 31 plots within the five confirmed breeding areas and 45 plots within the buffer area and adjacent conservation reserves (Table 1, Figure 2). The location of each plot was pre-determined prior to the survey.

Each plot was two-hectares in area, and observers would search each plot for a total of 20 minutes. Only birds recorded within each two-hectare plot were recorded (with birds detected outside each plot recorded as incidentals). Surveys were conducted between 5:30 am and 9:30 am.

Where Gouldian Finches were detected, the following attributes were recorded:

- GPS location
- Count of the number of individuals
- Assessment of age classes and sex
- Activity of birds (e.g. foraging, drinking, flyover etc)
- If foraging, species of grass they were feeding on

Table 1. Survey effort expended during the October 2020 Non-breeding Gouldian Finch counts

Area	Two-hectare / 20 min plots	Person hours (hr:min)
Breeding	31	10:20
Buffer	45	15:00
Total	76	25:20

2.2 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 1).

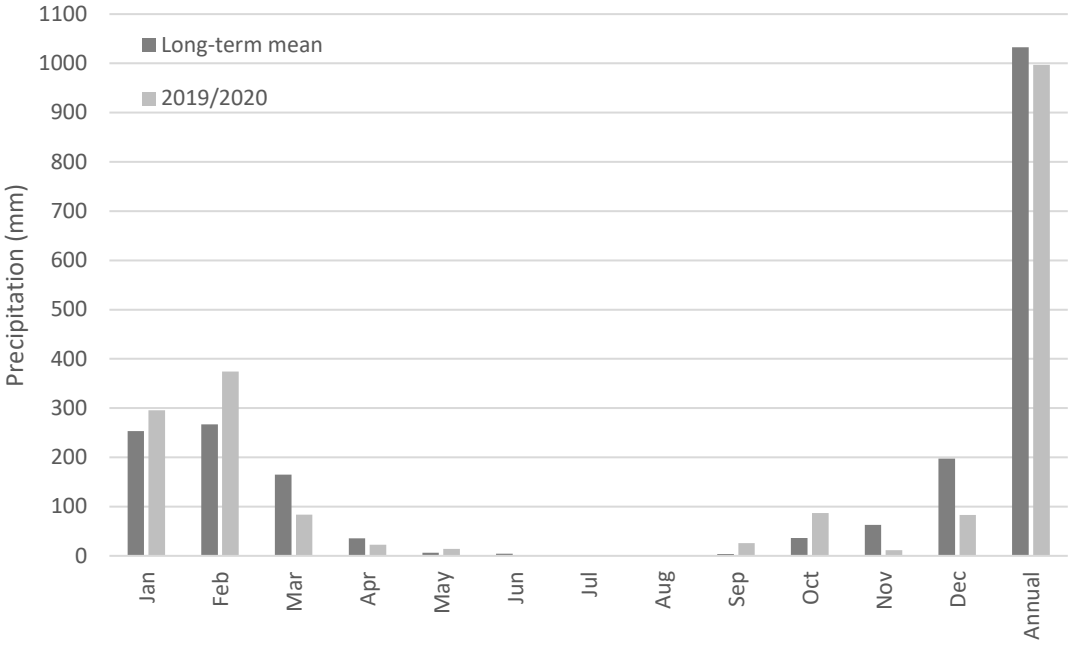


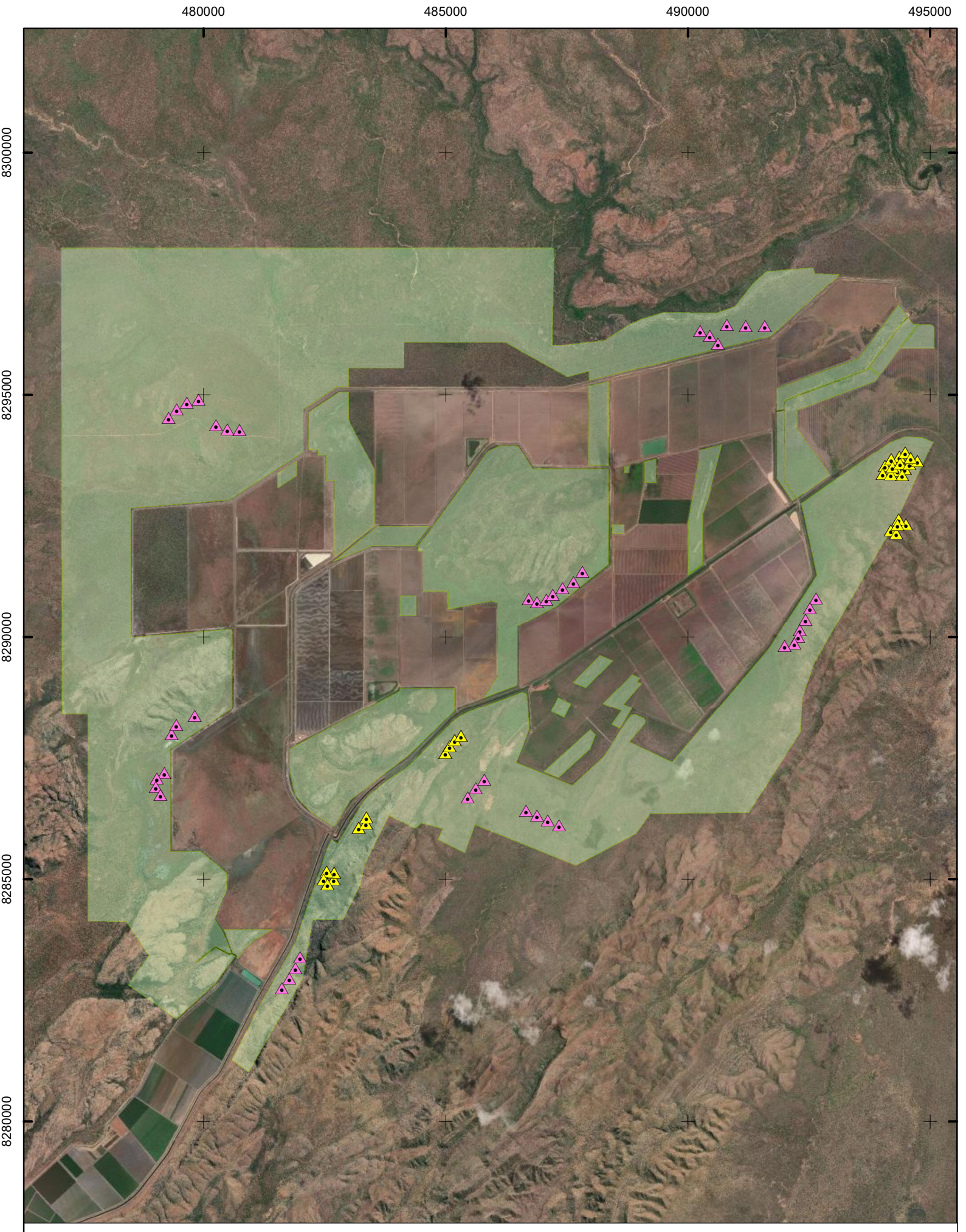
Figure 1. Long-term mean rainfall comparison with 12 months prior to survey at Kimberley Research Station.

2.3 Survey team

The non-breeding Gouldian Finch survey described in this document was planned and coordinated by Nigel Jackett. The two-hectare plot surveys 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

- 2ha plot (breeding)
- 2ha plot (buffer)
- Buffer area

Location of non-breeding Gouldian Finch plots

Figure 2.
Date drawn: 16/11/20
Map Datum: GDA 1994
Zone: 52

N

0 1 2 km

1:95,000

3. RESULTS

3.1 Gouldian Finch non-breeding surveys

A total of 76 plots were surveyed for Gouldian Finches, comprising 31 plots within the five confirmed breeding areas, and 45 plots within the buffer area and adjacent conservation reserves.

No Gouldian Finches were recorded during the plot surveys.

A juvenile Gouldian Finch was recorded in the presence of a mixed finch flock coming to drink from an irrigation channel on the 19/10/2020 (Figure 3, Figure 4, Table 3).

Table 3. Gouldian Finches recorded during survey

Date	Time	Plot No.	Latitude	Longitude	Count	Comments
19/10/2020	08:42	Incidental	-15.45830	128.92888	1	Part of mixed finch flock coming to drink from irrigation channel

Figure 3. Gouldian Finch (right) with Long-tailed Finch recorded during the October 2020 survey

3.2 Gouldian Finch non-breeding activity and feeding grasses

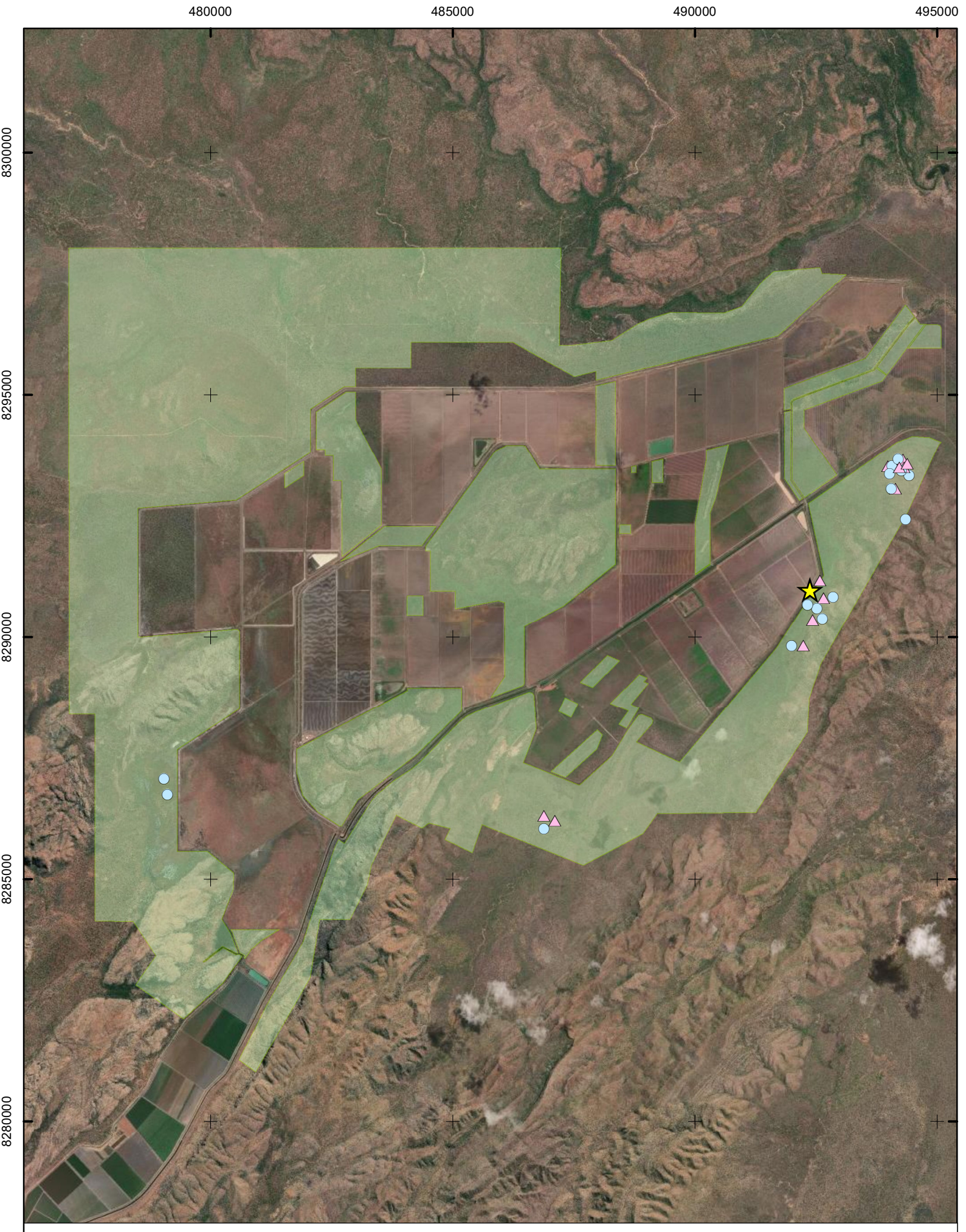
No Gouldian Finches were observed feeding on grasses during the survey.

A juvenile Gouldian Finch was recording coming to drink from an irrigation channel with other finch species.

Table 4. Comparison of non-breeding Gouldian Finch counts between 2011-2020

Number of surveys								
Area	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2020**
Breeding	45	45	31	31	31	31	31	31
Buffer	44	52	45	45	41	41	41	45
Development	40	-	-	-	-	-	-	-
Total	**129**	**97**	**76**	**76**	**72**	**72**	**72**	**76**
Number of Gouldian Finches								
Breeding	4	0	14	21	28	26	38	0
Buffer	61	0	0	8	10	7	14	1
Development	8	-	-	-	-	-	-	-
Total	**73**	**0**	**14**	**29**	**38**	**33**	**52**	**1**

* No surveys were conducted in the Development area after 2011 following land clearing; no non-breeding counts were undertaken in the Breeding or Buffer areas in 2018 or 2019.


480000
485000
490000
495000
8300000
8295000
8290000
8285000
8280000
Species
Gouldian Finch
Long-tailed Finch
Masked Finch
Buffer area
Location of Gouldian Finch recorded during the October 2020 counts
Figure 4.
Date drawn: 16/11/20
Map Datum: GDA 1994
Zone: 52
N
0
1
2
km
1:95,000

4. DISCUSSION

The October 2020 Gouldian Finch counts were low compared to most years since 2011 but were comparable to the counts in 2012. However, in 2012, there was increased land clearing activity, high grazing pressure and recent fire damage that may have resulted in the lack of Gouldian Finches detected (Save the Gouldian Fund 2017). The results from the 2020 non-breeding habitat and vegetation assessment (Jackett 2020) indicate there was minimal pressure from grazing throughout the buffer and breeding areas, or little evidence of recent fires. It is therefore suggested that caution be taken when comparing the 2012 and 2020 datasets.

Non-breeding surveys were not conducted during the two years prior (i.e. 2018, 2019) to this survey. It is therefore unknown if the 2020 count is representative of all years since the last count (2017) or was a particularly low count during this period. From 2017 – 2020 there was an increase in irrigation activity in plots south of Moonamang Rd (DPIRD pers. comm.). It is possible that this increase in surface water availability within the newly irrigated area may have provided a year-round water resource for the Gouldian Finches. However, it is unknown to what extent Gouldian Finches utilise irrigated farmland within the Project area, or whether this relatively sudden change in land use in proximity to their breeding areas has been beneficial or detrimental to maintaining their local population. The continuation of both non-breeding and breeding counts will ultimately provide the information required to assess changes in the Gouldian Finch population over time.

Rainfall totals for the 12 months prior to the October 2020 counts were considered representative of the long-term average, and therefore seed abundance and diversity were expected to be typical for the time of year. However, above average rainfall at the end of September 2020, and early October 2020 (DPIRD 2021) may have influenced the distribution of Gouldian Finches within the greater region during the counts. Areas that received this rainfall (>100 mm) may have shown greater surface water availability than usual for the time of year, permitting Gouldian Finches to access food resources over a larger area within the typically dry landscape. This could potentially reduce the overall Gouldian Finch density within the buffer and breeding areas, or temporarily re-distribute the local population entirely as they exploit newly available resources more typical of the wet season. Dispersal to low-lying areas in search of food resources outside of the breeding season is typical of the species (Dostine *et al.* 2001), and is a possible explanation for their noted absence from at least the breeding areas.

The Masked Finch (*Poephila personata*) and Long-tailed Finch (*P. acuticauda*) are two grass finch species that regularly co-occur with Gouldian Finches (Woinarski and Tidemann 1992; Franklin *et al.* 1998). Both species were recorded during the survey in both the breeding and buffer areas, and the observed Gouldian Finch was in the presence of both species. Without knowledge of typical counts of

these associated species, it is not possible to assess whether their populations were also below average or were typical for that time of year. Including these two species in future non-breeding counts may provide further contextual information relevant to the local occurrence of Gouldian Finches.

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 avifauna surveys 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 monitoring the Gouldian Finch. These included 2ha/20 min survey plots, and transects through potential feeding grasses present within the study area.
Proportion of fauna identified, recorded and/or collected	No	All birds detected during the survey were identified to species level.
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 31 plots in the Breeding area, and 45 plots 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 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 recent disturbances that may have impacted upon the results of the survey.
Intensity (in retrospect, was the intensity adequate)	No	The 31 plots within the Breeding areas and 45 plots within the Buffer area were consistent with previous surveys to count Gouldian Finches within the Weaber Plain Development Area.
Completeness (e.g. was relevant area fully surveyed)	No	All five Breeding areas were surveyed comprehensively, and coverage of the Buffer area was considered good.
Resources (e.g. degree of expertise available in animal identification to taxon level)	No	The Gouldian Finch is a readily identified species in all age classes and has a distinctive call. The consultants have extensive experience surveying for Gouldian Finches.
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 fauna surveys within the Weaber Plain Development Area.

6. REFERENCES

Brazill-Boast, J., Dessmann, J. K., Davies, G. T., Pryke, S. R., & Griffith, S. C. (2011). Selection of breeding habitat by the endangered Gouldian Finch (Erythrura gouldiae) at two spatial scales. *Emu - Austral Ornithology, 111*(4), 304-311.

Brazill-Boast, J., Pryke, S. R., & Griffith, S. C. (2010). Nest-site utilisation and niche overlap in two sympatric, cavity-nesting finches. *Emu - Austral Ornithology, 110*(2), 170-177.

Department of Agriculture, Water and the Environment. (2020). *Erythrura gouldiae* - Gouldian Finch in Species Profile and Threats Database, Department of Agriculture, Water and the Environment, Canberra. Available from: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=413. Accessed 25 November 2020.

Dostine, P., Johnson, G., Franklin, D. C., Zhang, Y., & Hempel, C. (2001). Seasonal use of savanna landscapes by the Gouldian finch, *Erythrura gouldiae*, in the Yinberrie Hills area, Northern Territory. *Wildlife Research, 28*(4), 445-458.

DPIRD. (2021). Department of Primary Industries and Regional Development, DPIRD Weather Website. Available from https://weather.agric.wa.gov.au/station/KN. Accessed 08 February 2021.

Franklin, D., Burbidge, A., & Dostine, P. (1999). The harvest of wild birds for aviculture: an historical perspective on finch trapping in the Kimberley with special emphasis on the Gouldian Finch. *Australian Zoologist, 31*(1), 92-109.

Franklin, D., Dostine, P., & Tidemann, S. C. (1998). Post-juvenile moult strategies of co-existing Gouldian, Long-tailed and Masked Finches. *Corella, 22*(3), 73-79.

Franklin, D. C. (1999). Evidence of disarray amongst granivorous bird assemblages in the savannas of northern Australia, a region of sparse human settlement. *Biological Conservation, 90*(1), 53-68.

Garnett, S. T., Szabo, J. K., & Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. Collingwood: CSIRO Publishing.

Jackett, N. A. (2020). Ord-East Kimberley Expansion Project - Weaber Plain Development. Gouldian Finch non-breeding habitat and vegetation assessment (2020). Report prepared for Ord-East Kimberley Expansion Project, Department of Primary Industry and Regional Development, December 2020.

O'Malley, C. (2006). National Recovery Plan for the Gouldian Finch (*Erythrura gouldiae*). WWF-Australia, Sydney and Parks and Wildlife NT, Department of Natural Resources, Environment and the Arts, NT Government, Palmerston.

Save the Gouldian Fund. (2017). Ord-East Kimberley Expansion Project - Weabler Plain Development. Gouldian Finch Non Breeding Counts (2017). Report prepared for Ord-East Kimberley Expansion Project, Department of Regional Development, October 2017.

Storr, G. M. (1980). *Birds of the Kimberley Division, Western Australia*: Western Australian Museum.

Strategen. (2014). Ord Project - Gouldian Finch Conservation Management Plan, version 2. Revised from original management plan prepared for LandCorp, January 2014.

Tidemann, S. C., Lawson, C., Elvish, R., Boyden, J., & Elvish, J. (1999). Breeding Biology of the Gouldian Finch *Erythrura gouldiae*, an Endangered Finch of Northern Australia. *Emu, 99*, 191-199.

Woinarski, J. C. Z., & Tidemann, S. (1992). Survivorship and some population parameters for the Endangered Gouldian Finch *Erythrura gouldiae* at two other finch species at two sites in tropical northern Australia. *Emu, 92*, 33-38.

Appendix 1a. Results of survey plots: breeding areas

Species	Breeding areas two-hectare / 20 minute plot survey site																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Brown Quail				3																											
Australasian Grebe									2																						
Wedge-tailed Eagle																			2												
Brown Goshawk			1								1							1													
Black Kite		3	2							3	2	1		4																	
Whistling Kite		1		1				1		1	2																				
Brolga																						2	8				1				
Chestnut-backed Buttonquail																										1	1				
Crested Pigeon																		1													
Peaceful Dove				3		2	1	1				2	1	1	1	2		2	1	6	2	4			2		2	2	2	4	
Bar-shouldered Dove				5		2	3	1										2				2								1	
Pheasant Coucal						3	1															1					1				
Pacific Koel		1														1						1				1			1		
Horsfield's Bronze Cuckoo												1											1						1		
Tawny Frogmouth																				1											
Oriental Dollarbird			1	1		1			2		1		1					1			3	2			2	1	2			1	
Blue-winged Kookaburra		1			1			1	1	1		2		1		1						5			3		2				
Sacred Kingfisher																1		2	1		2	2						1			
Rainbow Bee-eater																				2	1								2		
Red-tailed Black Cockatoo			9	2														2	2											3	
Galah																8		2	5				2	2							
Little Corella																						2	4		3				13	40	
Sulphur-crested Cockatoo					1																										
Red-collared Lorikeet					2																										
Red-winged Parrot				2															4	1	2		4				1		12		4
Great Bowerbird	1		1	1		1	2	1				1	1		1											1			2	1	
Black-tailed Treecreeper																	1						1								

Species	Breeding areas two-hectare / 20 minute plot survey site																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Red-backed Fairywren																											3		4		
Banded Honeyeater																				1						2			1		2
Brown Honeyeater				5																						1					
Little Friarbird									1	1								1				3			1						2
Silver-crowned Friarbird			1					1														2									1
White-throated Honeyeater				3										3				1													
Rufous-throated Honeyeater																		1							2	1					
Yellow-throated Miner			2	3											1		5														
White-gaped Honeyeater				3																										1	
Yellow-tinted Honeyeater																					3										
Striated Pardalote																		1				1									
Weebill					4						1	1	2	2	2		2				2				1						
White-throated Gerygone												1																			
Grey-crowned Babbler				4					3				4	4			5	5	5				4		5	2	3				
Black-faced Woodswallow													2			2		2	2		2				1		2	1			2
Silver-backed Butcherbird			1	1	2		2																								
Pied Butcherbird						1	1					1			1		1								1						
Black-faced Cuckooshrike								1		1	3	1	1		1			1										2		1	2
White-bellied Cuckooshrike					1	1				1	2					1	1			1											
White-winged Triller																		1			1		2		1	1		1			1
Varied Sittella													3			4															
Rufous Whistler						1	2					1	1	1		1	1	1	1	1	1	1	1	1	1	3	2		2	2	2
Grey Shrikethrush														1	1	2	1										1	1	1		1
Olive-backed Oriole			1		1	1										1	1										1			1	
Willie Wagtail																2	1														
Magpie-lark					7																		1							2	
Leaden Flycatcher						1							1																	2	
Torresian Crow			1	1		1															2	1	2						1		
Jacky Winter																		1						3	1	2		1			

Species	Breeding areas two-hectare / 20 minute plot survey site																														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Rufous Songlark																									1	1					
Golden-headed Cisticola								1																							
Mistletoebird					1																			1				1			
Crimson Finch				2																											
Star Finch				40																											
Masked Finch																		8									11	2			
Long-tailed Finch																4		8						2	3		17				
Double-barred Finch				10				3																							

Appendix 1b. Results of survey plots: buffer areas and incidentals

Species	Buffer areas / 20 minute plot survey site																						
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Magpie Goose																							
Wandering Whistling Duck																							
Radjah Shelduck																		2	2				
Pink-eared Duck																							
Maned Duck																							
Green Pygmy Goose																							
Pacific Black Duck																							
Grey Teal																							
Hardhead																							
Brown Quail										2						2							
Australasian Grebe																							
Black-necked Stork																							
Australian White Ibis															4								
Straw-necked Ibis																							
Royal Spoonbill																							
Eastern Cattle Egret																							

Species	Buffer areas / 20 minute plot survey site																						
	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	Incidental
Magpie Goose																							75
Wandering Whistling Duck																							15
Radjah Shelduck																							6
Pink-eared Duck																							1
Maned Duck																							2
Green Pygmy Goose																							25
Pacific Black Duck																							103
Grey Teal																							13
Hardhead																							155
Brown Quail				2		2																	
Australasian Grebe																							54
Black-necked Stork																							6
Australian White Ibis																							8
Straw-necked Ibis																							117
Royal Spoonbill																							25
Eastern Cattle Egret																							4

Species	Buffer areas / 20 minute plot survey site																																												
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	Incidental
White-necked Heron																																														7
Great Egret																																														2
Intermediate Egret																																														4
White-faced Heron																																														19
Little Egret																																														1
Australian Pelican																																														26
Little Pied Cormorant																																														7
Little Black Cormorant																																														66
Australasian Darter																																														1
Black-breasted Buzzard		2			1																																									1
Brown Goshawk																	1				2											1												1		1
Swamp Harrier	1																																													
Black Kite		1		3	5		2																							1		2	2							2						3
Whistling Kite				1													1																			1	1		1							4
White-bellied Sea-eagle			1																																											1
Australian Bustard																																														1
Australasian Swamphen															2																															
Brolga															1	6			1	1	1						1			5		1			5											261

Species	Buffer areas / 20 minute plot survey site																																												
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	Incidental
Red-backed Buttonquail								1	1	2								3							1																					
Bush Stone-curlew																																														1
Pied Stilt																																														47
Masked Lapwing																																														23
Red-kneed Dotterel																																														4
Oriental Plover																																														6
Black-fronted Dotterel																																														2
Little Curlew																																														32
Marsh Sandpiper																																														2
Common Greenshank																																														11
Wood Sandpiper																																														3
Common Sandpiper																																														1
Sharp-tailed Sandpiper																																														11
Australian Pratincole																																														67
Whiskered Tern																																														22
Crested Pigeon												3																																		
Diamond Dove							1						1																																	
Peaceful Dove	11	2		2	5	8	6	2	22	8	10	1	1	4	5	3	3	4	10	6			3			11					3	5	2	7	3	1	1	16	20	3	6	2	2	4	2	1

Species	Buffer areas / 20 minute plot survey site																																													
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	Incidental
Bar-shouldered Dove					1	2	1		1					4		2			5	2	2	1							1		1	3	3		2	1	1	3			4		4			1
Pheasant Coucal											1	1					1			1								1													1	2	1	1		
Pacific Koel																	1			1	1		1		1	1		1				1														
Channel-billed Cuckoo																						1																								
Horsfield's Bronze Cuckoo																						1		1		1						1														
Pallid Cuckoo												1																																		
Brush Cuckoo												1																		1																
Tawny Frogmouth													1					1																							2					
Oriental Dollarbird		1							1	1		1	1	1	3		1		1				1												1											
Blue-winged Kookaburra	1					1			1		1					1	2			2		1		3		4						2		2									1	1		
Sacred Kingfisher	3	1	2		1	1		1	1										1					1															1							
Red-backed Kingfisher							1																																							
Rainbow Bee-eater		2	2			1		1							2			2			1	1							4	2	3	2	2	1							1	1	1	2		
Brown Falcon											1																										1		2							
Red-tailed Black Cockatoo			2									6	3	16	1							1						8		1												2	4	2		
Galah								5			2	2																																		4
Little Corella													1					2					1	4				4																		30
Sulphur-crested Cockatoo																		1																												

Species	Buffer areas / 20 minute plot survey site																																													
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	Incidental
Red-collared Lorikeet								2									2							2		7	1	2																		
Northern Rosella																											2	1																		
Red-winged Parrot	2			2									1					2			6					1						10									2	1	5			
Great Bowerbird	2								1		1						1		1	1	1	1		3	1	1		1	1	2	1	1		2	1							1	1	2		
Red-backed Fairywren	5		4			1		4			4				4	5		4													4	8											4	4	4	
Banded Honeyeater								4		1							1							3	6	1	1									1										
Brown Honeyeater												1										1		1	1	22	3		3	1			4												2	
Little Friarbird							1	3	2		1	6	3	2									1			5	6	3									1				1					
Silver-crowned Friarbird															1		1		1	2	1	1	1		2	2				1					2									2		
Blue-faced Honeyeater															3											3	7	1	3	2											1					
White-throated Honeyeater	3	2							2			1								3	1					17			3				1								1		1	4		
Rufous-throated Honeyeater								2			2	2			2	2							2			2			2		2															
Yellow-throated Miner																			3	2			2																					2		
White-gaped Honeyeater	3																			2	3										1	1												2		
Yellow-tinted Honeyeater	2		1																																											
Striated Pardalote									1											1						1				1			2													
Weebill	2	2	2			1					2				4	2	2	2				1	2		3				2				3						2	2					1	

Species	Buffer areas / 20 minute plot survey site																																												
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	Incidental
Grey-crowned Babbler				4		3	4			5		3		12			5			3		4					5						4	5									4			
Black-faced Woodswallow									2	4	1																					3														
Silver-backed Butcherbird																			2	2	1																				1			2		
Pied Butcherbird		1			1					1				1	2		2		1	2		1	2	2	1	2	2	2													1	1				
Australian Magpie						2	4															2																								
Black-faced Cuckooshrike				1				1		2			1		1							1			2			3		1									1		1	1		1	1	1
White-bellied Cuckooshrike							1		1		1	3	1			1						1					1					2										1	2	4		
White-winged Triller		1						1	4	8	4																			1																
Rufous Whistler	2	2	1	1		2	2	1	1		1	1	1	2			1	1	1	2	1	2	2		1	1	1	1	3	1	2	5	4	4	4	3	2	4	2	3	1		1	2	2	
Grey Shrikethrush		1		1		1	1															1			1																			1		
Sandstone Shrikethrush																																											1			1
Olive-backed Oriole										1		2										1	2		1	1	1		1			1		1	1											
Willie Wagtail				1										1																																
Northern Fantail																																		1										1		
Magpie-lark	2					1		10	2	2	2				2																		2													
Leaden Flycatcher											1									1														1	2					1			1	1		
Paperbark Flycatcher																			1																											

Species	Buffer areas / 20 minute plot survey site																																												
	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	Incidental
Torresian Crow									2							1	1		1	1	3	2															2		2			1	1		1	
Fairy Martin																																														20
Australian Reed Warbler															1																															1
Golden-headed Cisticola			1						1		1				2			1															1										2			4
Mistletoebird																							1						1	1	1	1									1					
Crimson Finch																	2	6			5																									
Star Finch	2						1		9	22					1						15																									315
Masked Finch	4		2				17		3	2																																				11
Long-tailed Finch	7	5	42				30			3						1		2																												94
Double-barred Finch	2		1									2						6			15								2										30					10		2
Gouldian Finch																																														1
Yellow-rumped Mannikin										12																																				6
Chestnut-breasted Mannikin							2		5	54					2						7																						4	2		355
Australian Pipit																																														2