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RAVENSWORTH BIODIVERSITY OFFSET AREA MONITORING 2024

GLENCORE - RAVENSWORTH COAL MINE

January 2025

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Version Control

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1. Executive Summary

The 2024 monitoring programme has completed all monitoring actions required under the BMP, OMP and OAMP for the Biodiversity Offset Areas. The results from this monitoring programme form the tenth consecutive year of flora and fauna surveys after the 2012 baseline surveys.

Vegetation condition assessments conducted in 2024 indicate an overall increase in species diversity across the BOAs. Diversity of exotic species increased considerably and are at similar levels to 2016-2019. Species richness for all BOAs still remains substantially lower than the peak records of 2016 similarly to 2023 results. The increase in species richness in the current monitoring programme may be explained by the above average rainfall in the first half of 2024. Grassland and woodland sites have had an increase in exotic species diversity during the current monitoring year. Natural regeneration was apparent in many of the surveyed grassland plots. Some areas within COA and HOA do however lack evidence of canopy regeneration. It is likely these areas will require assistance to encourage recruitment of canopy and shrub species. It is noted that many of these areas have been prepared to receive tube stock however supply and climatic conditions delayed planting. Control of species that actively graze (i.e. Kangaroos & Rabbits) natural regeneration is recommended to improve likelihood of success.

Bird census monitoring showed increased species richness in grassland plots across all BOAs. Bird richness in grassland plots was much higher when compared with woodland, explanations for the can be easier detection via birds traversing from one patch of vegetation to another. This deviation, however, is still unusual and should be noted for monitoring in following years. One threatened bird species was observed in 2024, the Grey-crowned Babbler. As in previous years, targeted surveys were unsuccessful for the regent honeyeater and swift parrot. It was noted that there was limited flowering of eucalypts at the time monitoring was conducted. As this is an important factor in increasing the likelihood of the detection of the species presence recommendations have been made on survey timing and use of song meters to increase the likelihood of detection. Suitable habitat for these species remains present in all BOAs.

Hair tube survey did not detect any threatened fauna in 2024, nor did they collect any hair to be able to be analysed. Surveys for the Green and Golden Bell Frog was unsuccessful in 2024. Though suitable rainfall had not been recorded in the locality since July 2024. Conditions across the majority of dams was not suitable in 2024. Changes in the survey method for the species may be of benefit to detect the GGBF across the BOA's as discussed in the recommendations. These methods could also be utilised to detect the Regent Honeyeater and Swift Parrot.

2. Abbreviations

Table 1: List of abbreviations used within the report

BAM	*Biodiversity Assessment Method*
BC Act	*Biodiversity Conservation Act 2016*
BMP	Biodiversity Management Plan
BOA	Biodiversity Offset Area
Clifton/COA	Clifton Offset Area
DEC	Department of Environment and Conservation
DPI	Department of Primary Industries
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GIS	Geographic Information System
GGBF	Green and Golden Bell Frog
Hillcrest/HOA	Hillcrest Offset Area
HTE	High Threat Exotic
mm	Millimetres
NSW	New South Wales
PIR Camera	Passive Infra-red Camera
OAMP	Offset Area Management Programme
OEH	Office of Environment and Heritage
OMP	Offset and Green and Golden Bell Frog Management Plan
PCT	Plant Community Type
Rav. North/RNOA	Ravensworth North Offset Area
Stewart/SOA	Stewart Offset Area

3. Background Information

3.1 Location of the Study Site and Key Definitions

Biodiversity Australia Pty Ltd has been commissioned by Glencore Australia (Ravensworth Operations) to conduct monitoring of four Biodiversity Offset Areas (BOAs). These comprise of Clifton Offset Area, Hillcrest Offset Area, Ravensworth North Offset Area, and Stewart Offset Area (Figure 1).

In order to address State and Federal approval conditions, a Biodiversity Offset Management Plan (BMP) (Glencore 2015) and a Green and Golden Bell Frog Management Plan (Xstrata Coal 2013) were prepared respectively. To address the commitments made in these aforementioned documents, an Offset Area Management Programme was implemented over these BOAs in 2013 (Cumberland Ecology 2013). This detailed implementation programme has since been updated (Glencore 2019) to support the updated Biodiversity Offset Management Plan [BOMP] (Glencore 2024). Each of these documents form the framework under which the BOAs are managed.

Biodiversity monitoring of these BOAs commenced in 2012, with the establishment of 28 permanent monitoring sites in 2013 as per the Offset Area Management Programme. Monitoring has continued annually in line with the requirements of this programme. This report addresses the 2023 annual monitoring requirements and provides comparisons to data of previous monitoring years.

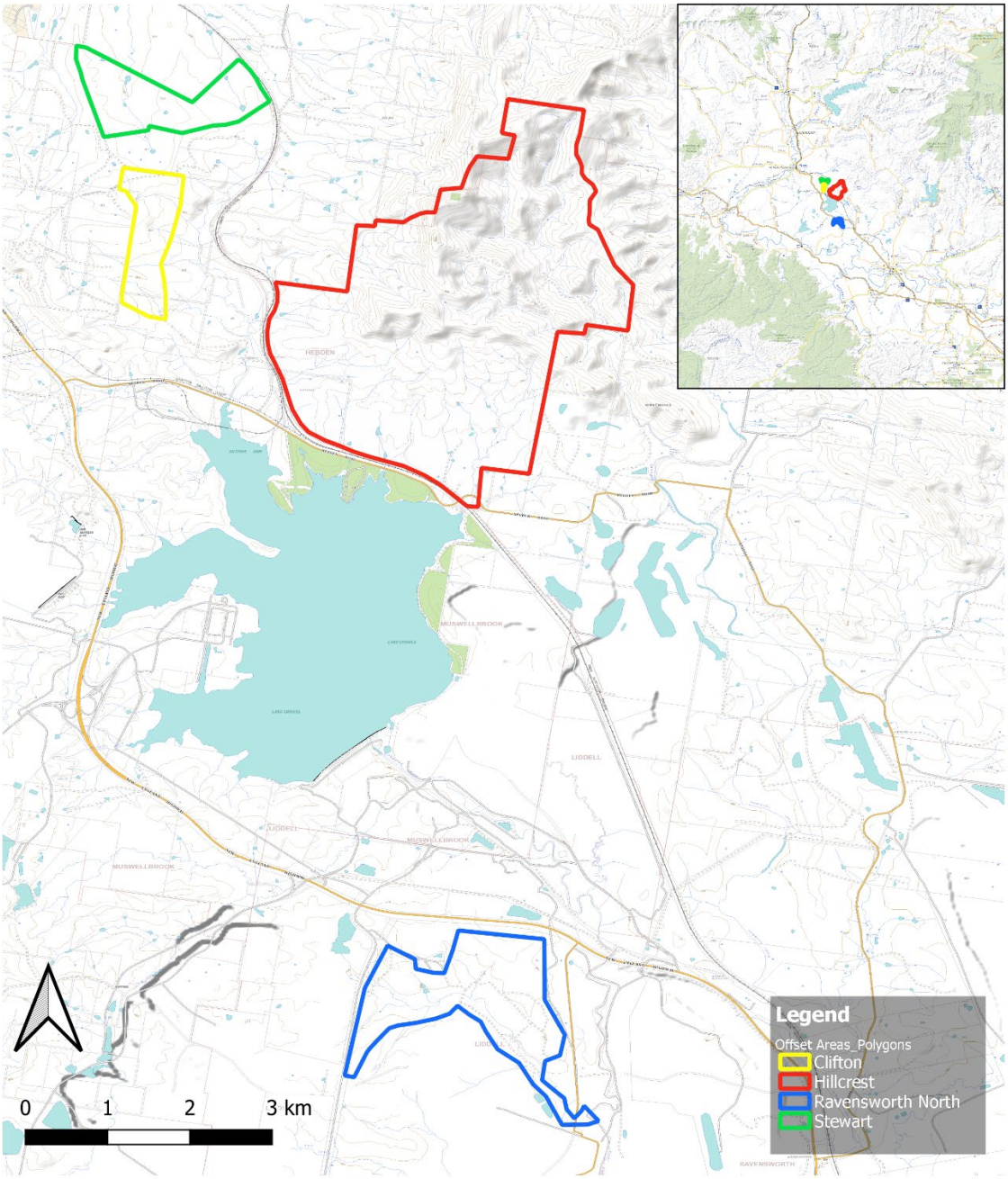
3.2 Offset Area Locations

The Ravensworth Mine Complex is situated approximately 90 kilometres northwest of Newcastle in the Hunter Valley. The offset areas managed under the Biodiversity Management Plan are located as follows:

- Clifton Offset Area (COA) – approximately six kilometres northwest of the Ravensworth Complex and covers 105.4 hectares of land.
- Hillcrest Offset Area (HOA) –approximately six kilometres north of the Ravensworth Complex and covers 1376.4 hectares of land.
- Ravensworth North Offset Area (RNOA) – directly to the north of the Ravensworth North Mine and covers 288 hectares of land.
- Stewart Offset Area (SOA) - approximately six kilometres northwest of the Ravensworth Complex and covers 164.6 hectares of land.

The location of each of these offset areas is provide in Figure 1.

Figure 1: The location of each BOA



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	Drawn By: LW	Site: Ravensworth Offset Areas	Job Number: ENS5741	Scale: 1:8,000
	Date: Jan 2024	Client: Ravensworth Operations Pty Ltd	Spatial Reference: MGA Zone 56/GDA2020	

3.3 Monitoring Point Locations

As per the requirements of the OAMP, a total of 28 permanent monitoring locations were established across all BOAs in 2013. These include grassland and woodland sites which are each marked with fixed star-pickets. The following table identifies the location of each of these sites is presented in Figure 2, Figure 3 and Figure 4, below.

Table 2: Monitoring point locations in each BOA

BOA	Site	Habitat Type	Latitude	Longitude
Clifton	CG1	Grassland	-32.32343	150.97049
	CG2	Grassland	-32.31374	150.96788
	CG3	Grassland	-32.33161	150.96832
	CW1	Woodland	-32.32618	150.96949
	CW2	Woodland	-32.31744	150.96769
	CW3	Woodland	-32.31991	150.97102
Hillcrest	HG1	Grassland	-32.33057	150.98691
	HG2	Grassland	-32.34096	151.00492
	HG3	Grassland	-32.34315	151.01455
	HG4	Grassland	-32.33357	151.01124
	HG5	Grassland	-32.33193	151.01562
	HW1	Woodland	-32.33218	150.98832
	HW2	Woodland	-32.34105	151.00381
	HW3	Woodland	-32.34280	151.01523
	HW4	Woodland	-32.33332	151.01262
	HW5	Woodland	-32.33193	151.01481
RNOA	RG1	Grassland	-32.41321	151.01349
	RG2	Grassland	-32.41633	151.01359
	RG3	Grassland	-32.42298	151.01477
	RW1	Woodland	-32.41917	151.00750
	RW2	Woodland	-32.41689	151.01300
	RW3	Woodland	-32.42889	151.01940
Stewart	SG1	Grassland	-32.30269	150.96197
	SG2	Grassland	-32.29993	150.96545
	SG3	Grassland	-32.30444	150.97743
	SW1	Woodland	-32.29999	150.96158
	SW2	Woodland	-32.30173	150.96784
	SW3	Woodland	-32.30600	150.97845

Figure 2: Monitoring point locations in Stewart and Clifton

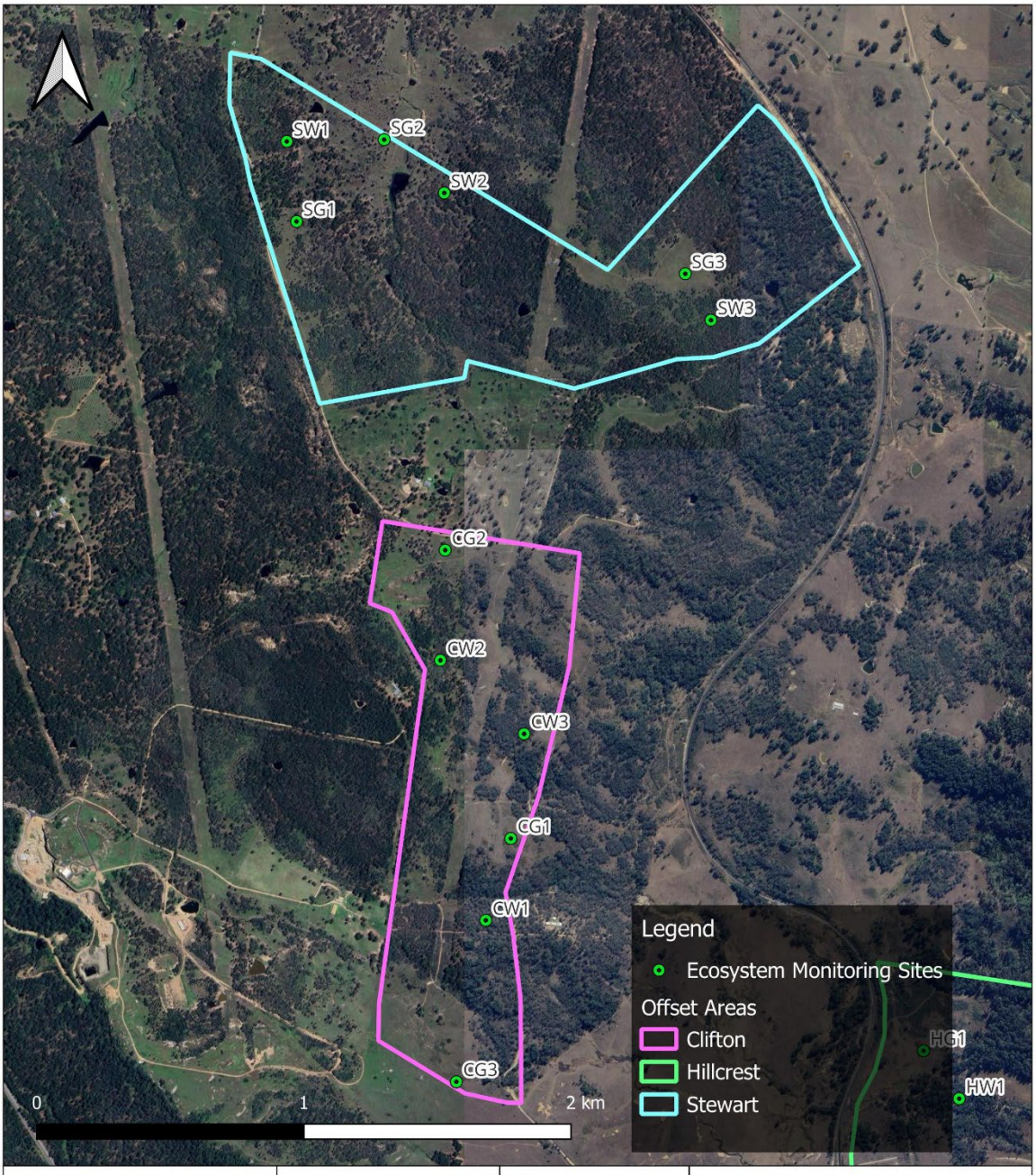

Figure Name: Monitoring Sites - Clifton and Stewart	Location: Ravensworth Offset Areas	Client: Ravensowrth Operations Pty Ltd	Biodiversity AUSTRALIA
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		Date: December 2024	Project Manager: LW / Drawn by: AB
		Scale: 1:22216	Spatial Reference: GDA2020

Figure 3: Monitoring point locations in Hillcrest

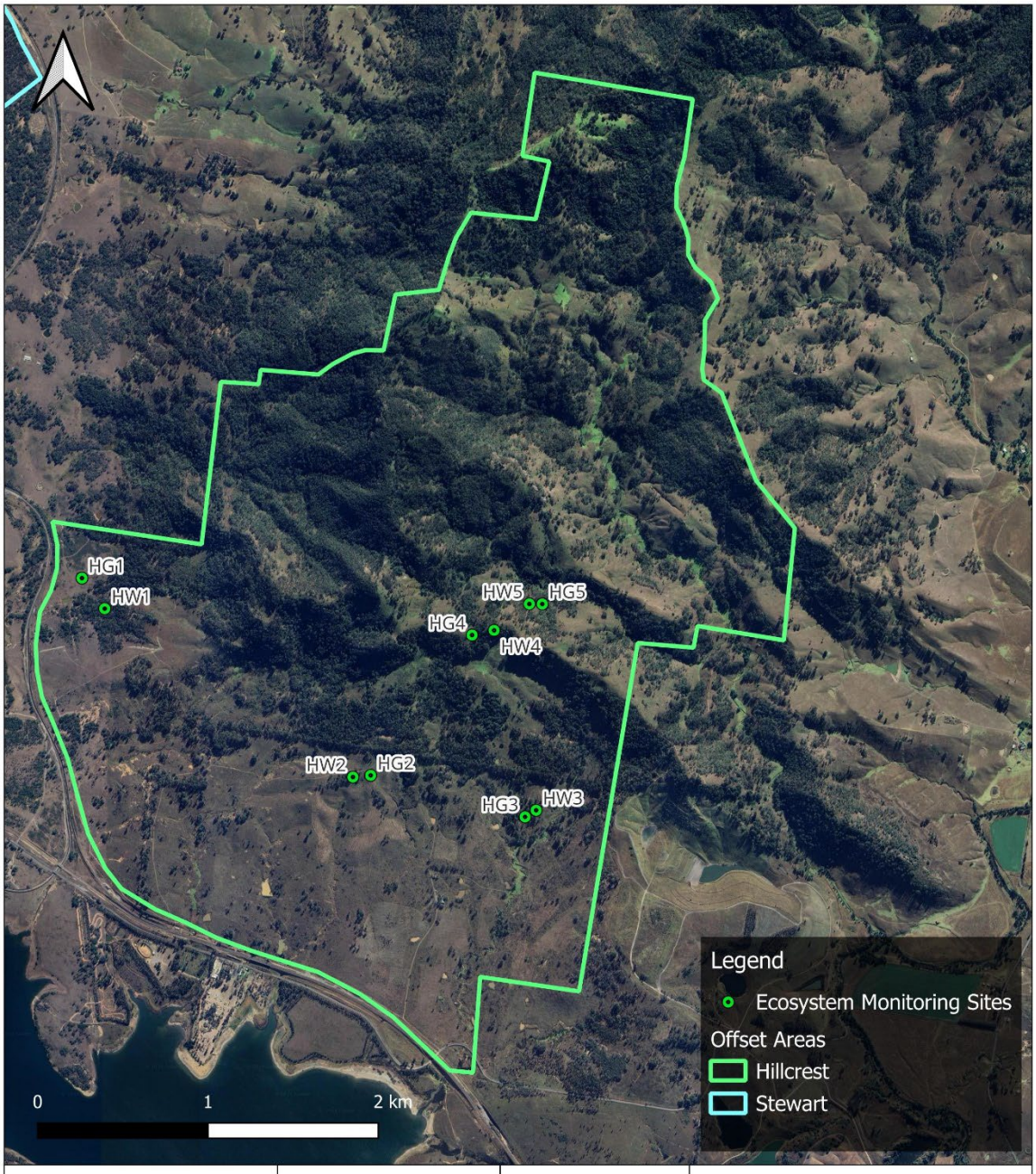

Figure Name: Monitoring Sites - Hillcrest	Location: Ravensworth Offset Areas	Client: Ravensowrth Operations Pty Ltd	Biodiversity AUSTRALIA
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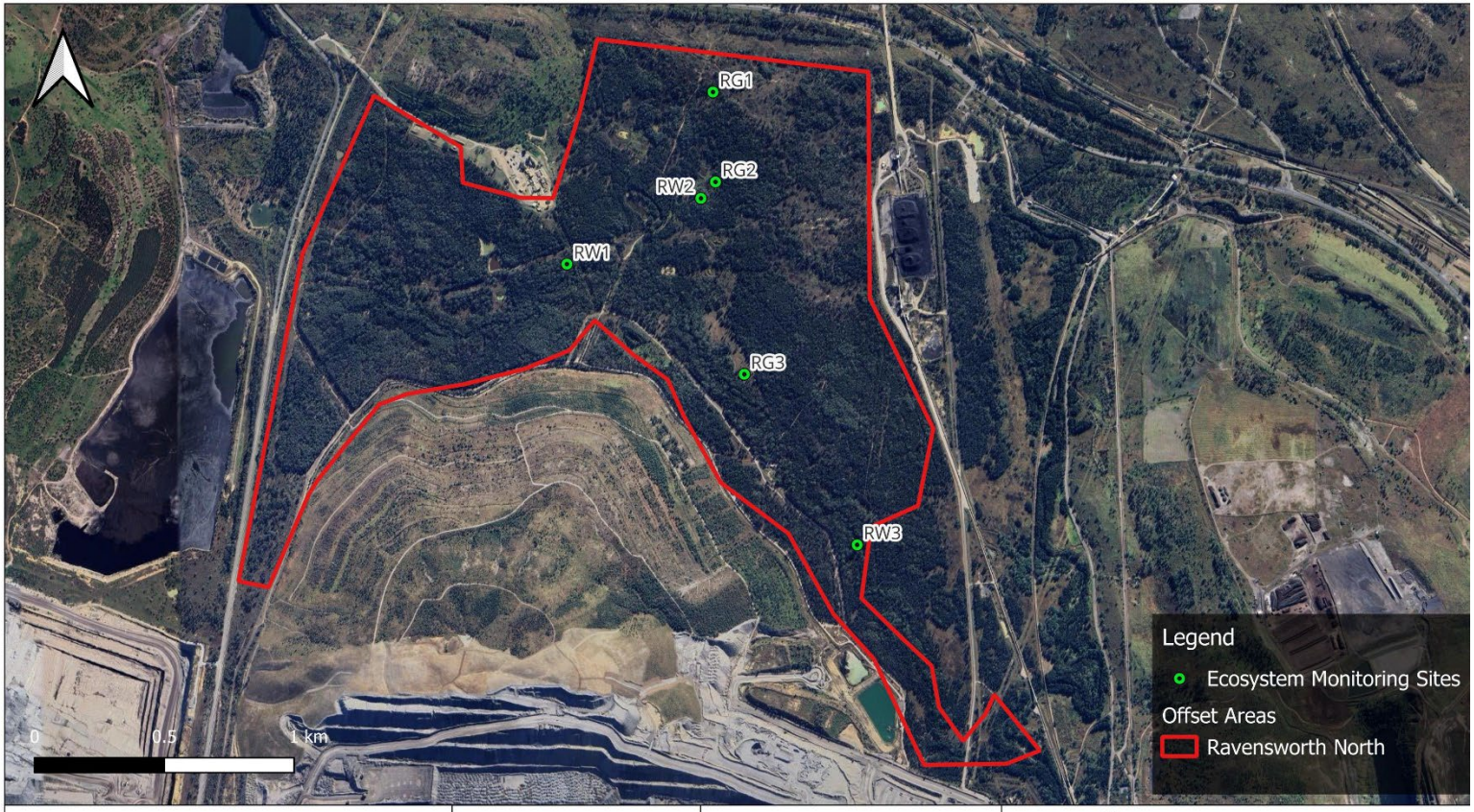
		Date: January 2025	Project Manager: LW / Drawn by: AB
		Scale: 1:34814	Spatial Reference: GDA2020

Figure 4: Monitoring point locations in RNOA



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Project Manager: LW	Figure Name: Monitoring Sites - Ravensworth North	Biodiversity AUSTRALIA	
Drawn by: AB	Location: Ravensworth Offset Areas		
Date: January 2025	Client: Ravensworth Operations Pty Ltd	Job Number: ENS6310	Spatial Reference: GDA2020
			Scale: 1:22676

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3.4 Information Sources

The following databases, reports, and Geographic Information System (GIS) layers were searched/obtained:

- Department of Climate Change, Energy, the Environment & Water, Protected Matters Search Tool (DCCEEW 2025)
- NSW Threatened Biodiversity Data Collection (NSW Government 2025a)
- NSW BioNet Atlas (NSW Government 2025b)
- Ravensworth Open Cut Biodiversity Offset Management Plan (Glencore 2024)
- Ravensworth Open Cut Offset Area Management Programme (Glencore 2019a)
- Offset and Green and Golden Bell Frog Management Plan for Ravensworth Mine Complex EPBC No. 2010/5389 (Xstrata Coal 2013)
- Ravensworth Open Cut Annual Review 2012-2021
- Ravensworth Operations Annual Biodiversity Offset Monitoring Reports 2015-2019 (Cumberland Ecology 2015 & 2017; EcoLogical Australia 2018; Biodiversity Australia 2019-2022).

4. Methods

Biodiversity Offset Monitoring surveys were conducted in accordance with those outlined in the OAMP. Surveys were carried out by two suitably qualified and experienced ecologists under Biodiversity Australia's Scientific Licence and Animal Ethics approval.

4.1 Survey Timing

The dates of the 2024 surveys and associated survey types conducted are presented in Table 3.

Table 3: Survey timing in 2024

OAMP Survey Timing	Dates	Required conditions	Survey Type
Winter	29th – 31st July 2024	When preferred eucalypt species are in flower	Targeted bird surveys
Spring	29th October – 1st November 2024	No requirements	Flora Survey, bird census monitoring
Summer	9th – 12th December 2024	Warm still nights within one week of rainfall >50 mm	Green and Golden Bell Frog Survey, Spotlighting, Hair tube survey

4.1.1 Weather Conditions

Rainfall over 2024 was typical average to below average, with slightly higher levels during the survey periods compared to 2023 and notably lower than the 2020-2023 La Nina event, BOM (2024), nearest monitoring station Bowmans Creek (Station no. 61270).

Highest rainfall periods were during the first half of the year, with June recording a total of 128mm. Monthly rainfall at Ravensworth from 2019 to the end of 2024 is presented in Figure 5. Rainfall overall was higher during 2024 when compared with 2023 though relatively similar in levels overall, noticeable differences show 2024 as having a wetter winter and drier summer periods compared to the previous year. Little to no rain was recorded during the exact survey dates (Figure 6)

For surveying purposes, as further described in Section 4.4.2, the summer survey period is required to be conducted immediately following a rainfall event that exceeds 50mm. The most recent heavy rainfall event occurred on 2nd June 2024, when a total of 54mm of rain fell. The month of September recorded 73.4mm overall with October and November recording less than 50mm at 42.6mm and 41.6mm respectively. Thus, survey conditions were not met for the Green & Golden Bell Frog (GGBF) during 2024. With annual surveys such as this it is notably difficult to guarantee meeting survey conditions as 50mm rainfall events are rare as observed in Figures 5 & 6, exceptions being demonstrated during 2020-2023 in which La Nina was currently active up until March 2023.

Figure 5: Recent years' rainfall compared to monthly averages.

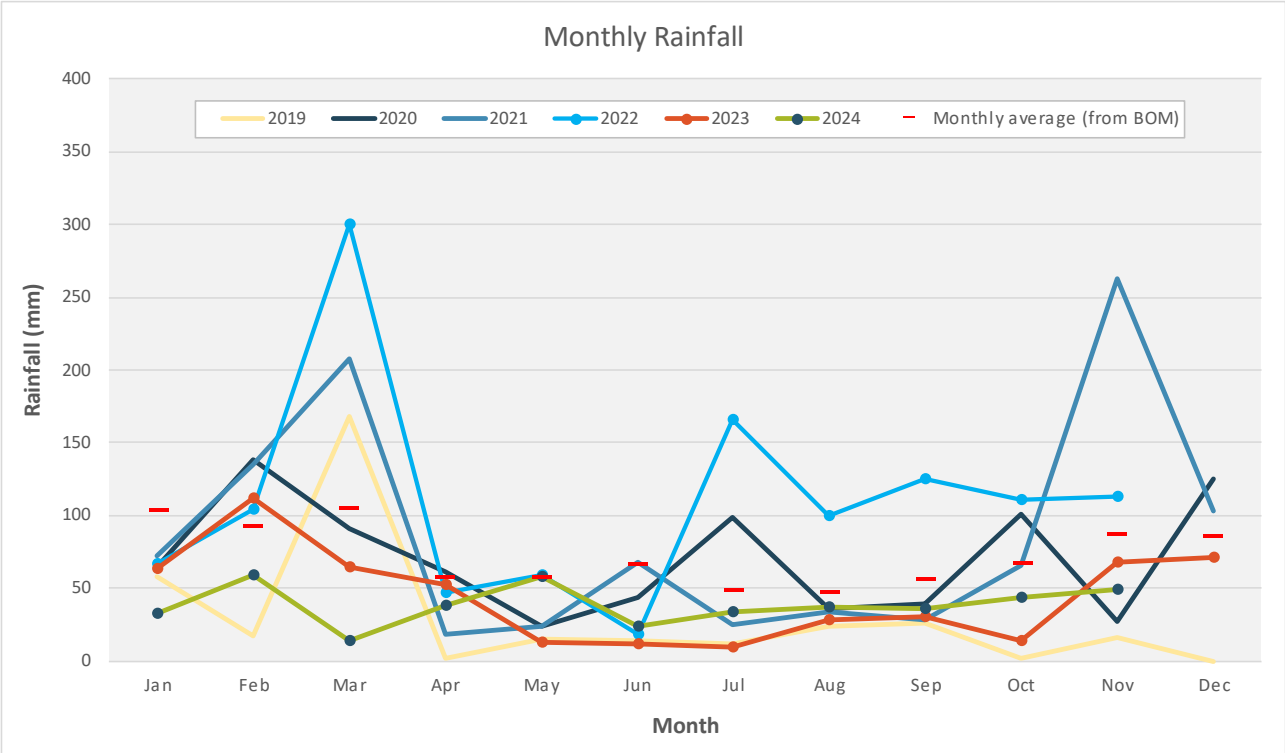
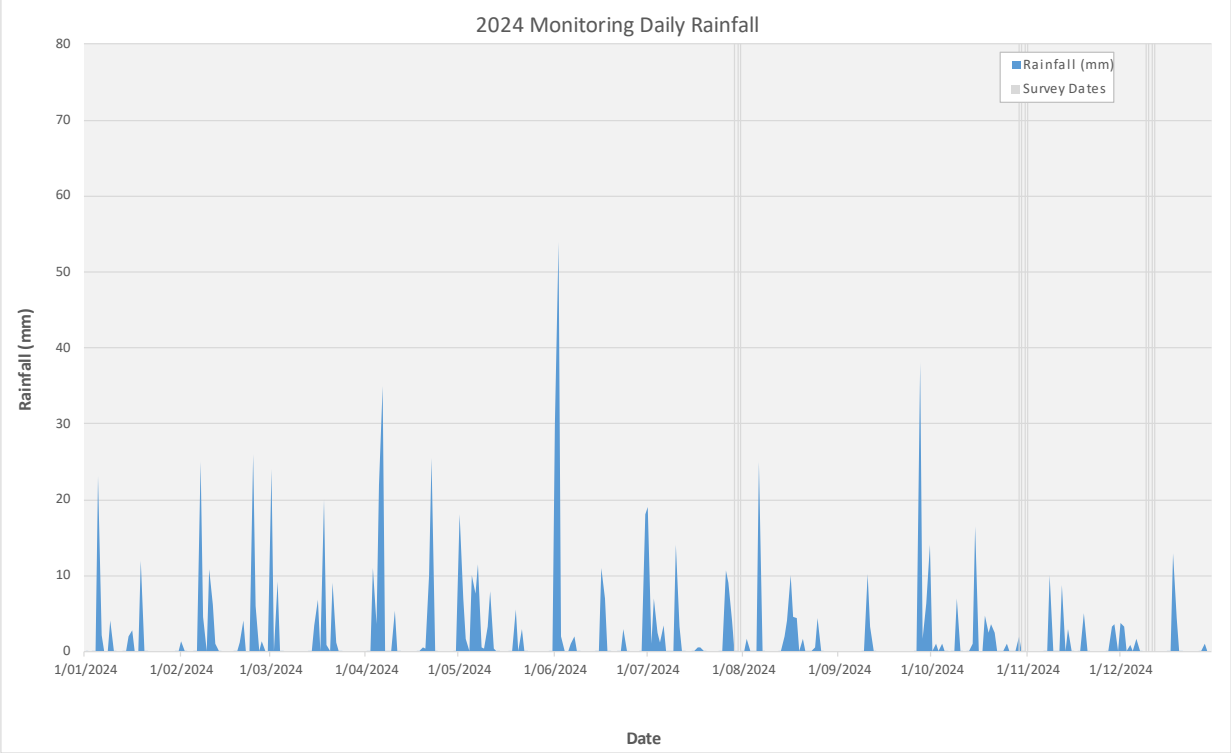


Figure 6: Daily rainfall during the 2024 monitoring period



4.2 Flora Survey

4.2.1 Vegetation Condition Assessment

A vegetation condition assessment was undertaken at each of the 28 permanent monitoring sites.

At the request of Glencore Group, vegetation condition assessments conducted for the 2024 monitoring survey were undertaken in line with the BioBanking Assessment Method (BBAM) methodology.

Vegetation quadrats consist of a 20x20 metre plot at each monitoring location in which floristic composition and structural attributes are collected, and a 20x50 metre plot at each monitoring location which collects ecosystem function attributes.

The following information was collected within the vegetation plot:

- Observer, location, and date
- Plot dimensions and orientation
- Photographic record of vegetation
- Vegetation Class and Plant Community Type (PCT)
- Physical features and disturbance history
- Full flora list
- Growth form, cover and abundance of each species
- Exotic and High Threat Exotic (HTE) plant cover
- Number of large trees
- Recruitment
- Presence of hollow-bearing trees
- Proportion of canopy species regenerating
- Length of logs
- Litter cover

Vegetation quadrat monitoring conducted during previous monitoring years were not collected in line with the BBAM methodology, instead these were collected in line with survey requirements outlined in the OAMP. The data obtained via the BBAM methodology was almost entirely comparable to data of previous methodology with the required addition of comments in relation to the regeneration of canopy species.

These surveys were conducted by a one suitably qualified and experienced ecologists and one BBAM accredited assessor during all survey periods as per the requirements of the OAMP. The results of the assessment are provided in Section 5.

4.3 Fauna Survey

4.3.1 Bird Census Monitoring

A bird census targeting all species was undertaken at each of the 28 permanent monitoring sites concurrently with the vegetation condition assessment. This consisted of fixed point and walking transect searches at each monitoring site for a minimum period of 30 minutes by two ecologists.

Due to the requirement for comparison between woodland and grassland sites, and the close proximity of some monitoring sites, only bird species observed or heard calling from within grassland sites were recorded during bird census monitoring of grassland sites. Bird species heard calling within nearby woodlands were recorded as opportunistic observations. Opportunistic observations were also taken whilst conducting other field activities during the summer survey.

4.3.2 Targeted Threatened Bird Survey

An avifauna survey targeting the Regent Honeyeater (*Anthochaera phrygia*) and Swift Parrot (*Lathamus discolor*) was undertaken at two locations within each Biodiversity Offset Area (8). These surveys were undertaken in the last week of August. The survey aims to coincide with flowering of the preferred winter flowering Eucalypt and Corymbia species, however it is noted that flowering was limited across each BOA. Each survey comprised a combination of a fixed point and walking transect survey with two observers for 30 minutes.

4.3.3 Green and Golden Bell Frog Survey

Surveys for the Green and Golden Bell Frog (*Litoria aurea*) were undertaken during the summer survey period. Habitat assessments were conducted at all dams within the BOAs with nocturnal surveys conducted at pre-identified target dams across the BOAs.

A habitat assessment was conducted at each location to determine the suitability for survey. This included visual inspections for presence of water, suitable aquatic plants and *Juncus acutus;* and dip net sampling for the presence of Mosquito Fish (*Gambusia holbrooki*). If habitat was deemed suitable, recorded calls of the Green and Golden Bell Frog were broadcast during a call playback survey and spotlighting was concurrently conducted. Call playback was immediately followed by a period of silence in which the ecologists listened for calls and undertook active searches in suitable habitat.

4.3.4 Spotlighting

Spotlighting was conducted concurrently with nocturnal Green and Golden Bell Frog surveys in HOA and RNOA. The procedure involved incidentally shining a handheld 1100 lumen LED spotlight, into the trunks and branches of canopy and understorey trees as well as along the ground, whilst walking or driving slowly through each BOA.

4.3.5 RNOA Fauna Monitoring

Hair tube surveys were carried out at all sites in RNOA in summer. At each site, this consisted of a transect of approximately 100 metres which contained ten hair tubes alternating between arboreal and ground deployed hair tubes. The hair tubes were baited with a standard bait mix of peanut butter, oats, honey and vanilla essence and were set for a total of three nights.

In addition to hair tube surveys, baited PIR cameras, incidental spotlighting and opportunistic herpetological surveys were conducted across RNOA. The data from these surveys were combined with that of the bird census monitoring to assess the continued use of habitat within RNOA by native fauna.

All opportunistic observations of fauna presence within the BOAs were recorded. This is inclusive of, but not limited to, bird sightings and calls, herp searches, and secondary evidence observations such as tracks, scratches, and scats.

4.4 Erosion Monitoring

18 erosion monitoring points were established during 2024, brief baseline flora observations were recorded to provide an initial indication of current vegetation within the areas of remediated erosion works. These are currently numbered at 18 sites. Plot bearings were not recorded as formal surveys were not undertaken, once the plots are further established during further flora surveys then orientations will be designated to them. Formal vegetation monitoring plots set up during 2025 to be survey annually to monitor the revegetation of these areas.

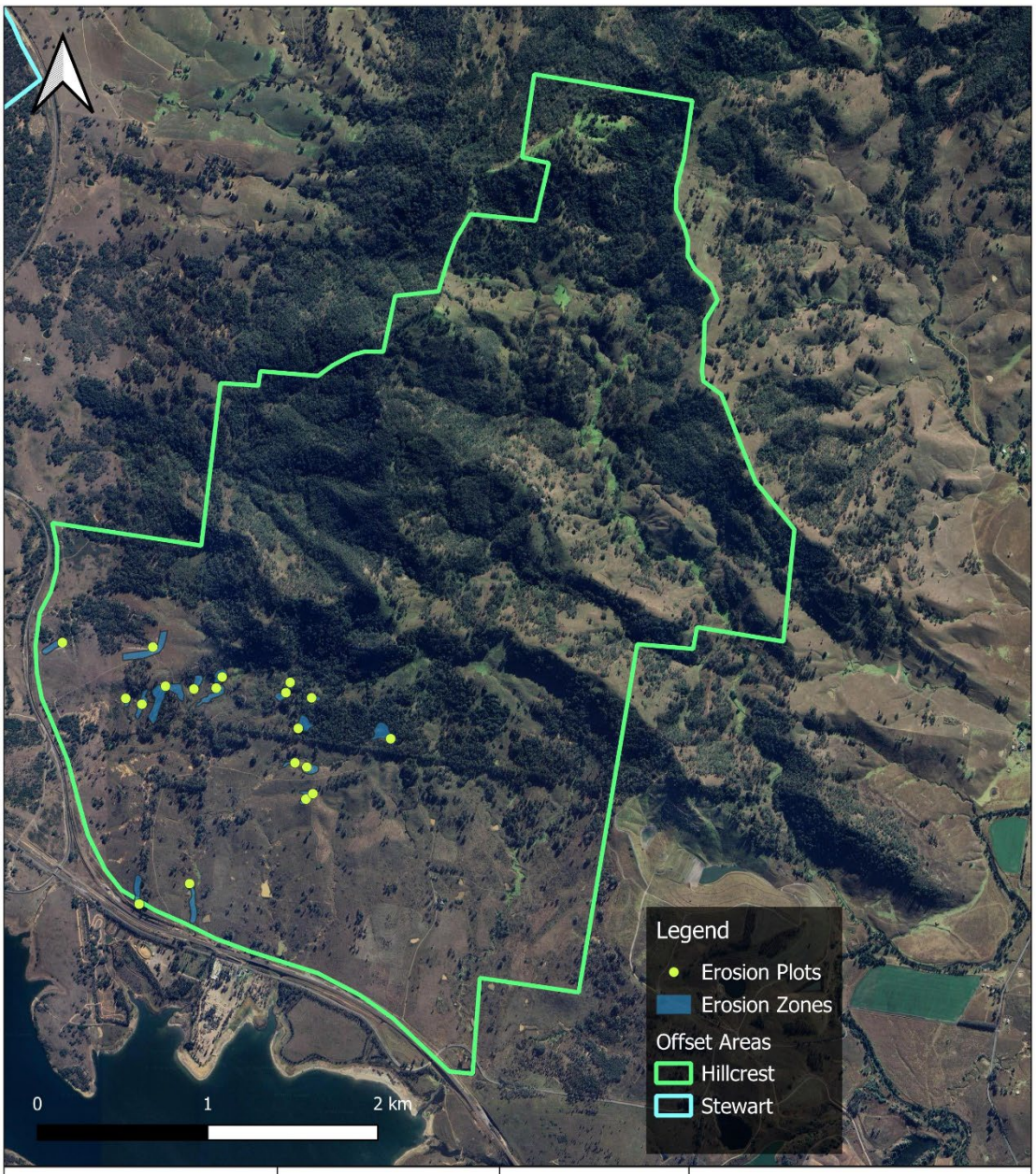


Figure Name: Erosion Monitoring Sites - Hillcrest	Location: Ravensworth Offset Areas	Client: Ravensowrth Operations Pty Ltd	Biodiversity AUSTRALIA
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		Scale: 1:34814	Spatial Reference: GDA2020

Figure 7: Preliminary Erosion Monitoring Sites

4.5 Survey Limitations

4.5.1 Flora Monitoring

There were no limitations to collection of plot-based data during the 2024 monitoring period. As the entirety of the site is not surveyed during random meanders there may be cryptic species or species outside their flowering period that may not be recorded.

4.5.2 Fauna Monitoring

Fauna detectability is limited by the seasonal, behavioural or lifecycle characteristics of each species, and by external factors including habitat variation (e.g., flowering periods) or climatic conditions (i.e. rainfall) which are at times variable and unpredictable. The surveys conducted in 2024 produced data which is indicative of fauna assemblages at the time of survey but cannot be not considered an exhaustive list of species occupying habitat in each BOA.

In 2024, the targeted threatened bird surveys were conducted during the prescribed time (i.e. winter) and this is aimed to coincide with flowering of the preferred winter flowering Eucalypt and Corymbia species. It should also be noted that a single 30-minute survey at two locations is considered insufficient effort to detect species that have extremely low abundances. Further recommendations are provided in the recommendations section of this report.

Green & Golden Bell Frog survey methods suggest carrying out aural-visual surveys for the species during warm weather and after rainfall. Most dams encountered did not contain water or water/vegetation in sufficient amounts to be suitable habitat for the GGBF, dams that did not meet these criteria were not surveyed.

Despite these limitations, the biodiversity offset monitoring surveys employed in 2024 were compliant with the BMP, OAMP and BOMP.

Figure 8: Targeted threatened bird survey locations in each BOA

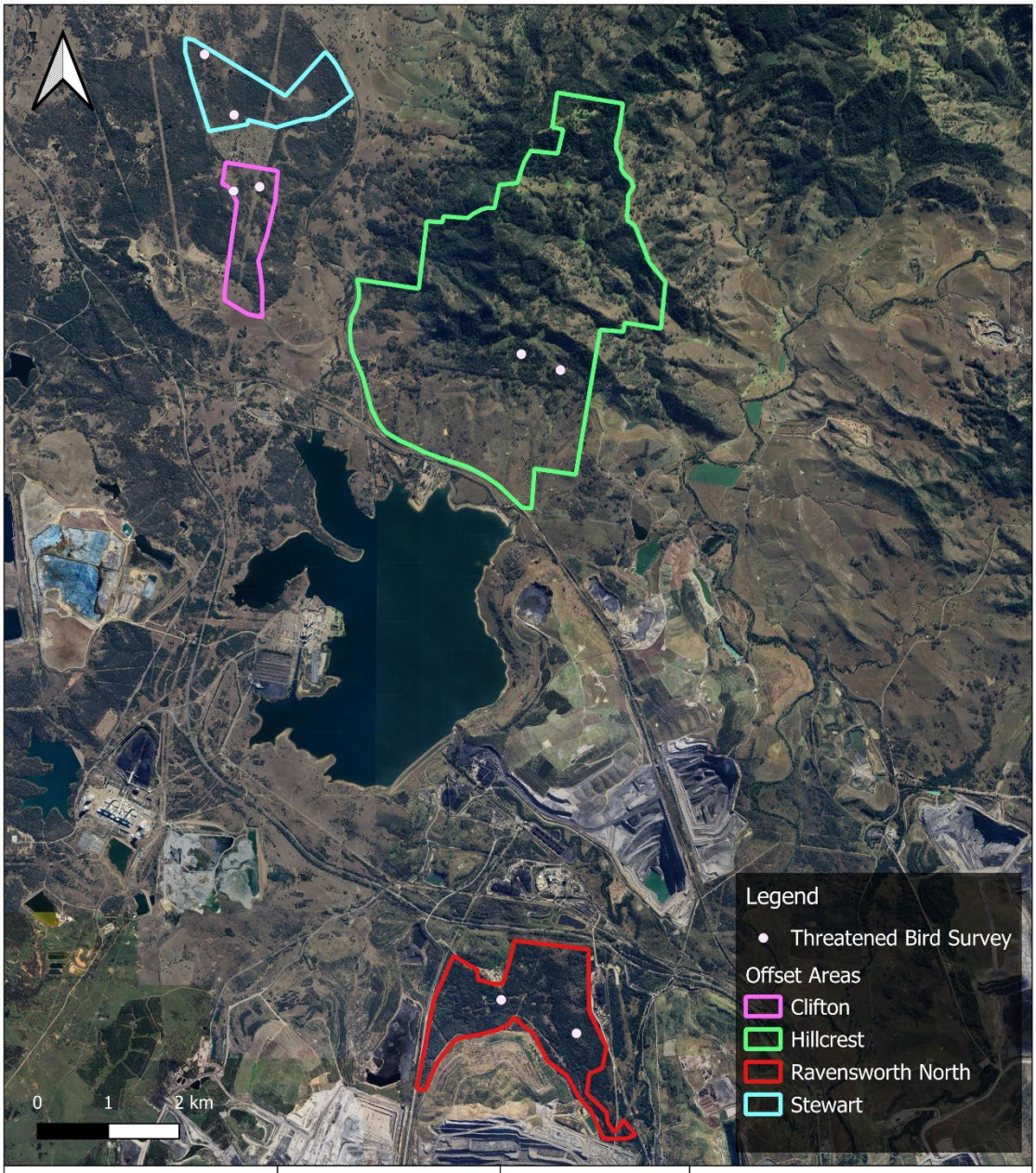

Figure Name: Location of Threatened Bird Surveys	Location: Ravensworth Offset Areas	Client: Ravensowrth Operations Pty Ltd	Biodiversity AUSTRALIA
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		Date: January 2025	Project Manager: LW / Drawn by: AB
		Scale: 1:83784	Spatial Reference: GDA2020

5. Flora Monitoring Results

5.1 Vegetation Condition Assessment

Vegetation condition assessment datasheets are provided in Appendix A-1.

5.1.1 Species Compositions

A comprehensive list of flora species recorded during the vegetation condition assessment is provided in Appendix A-2.

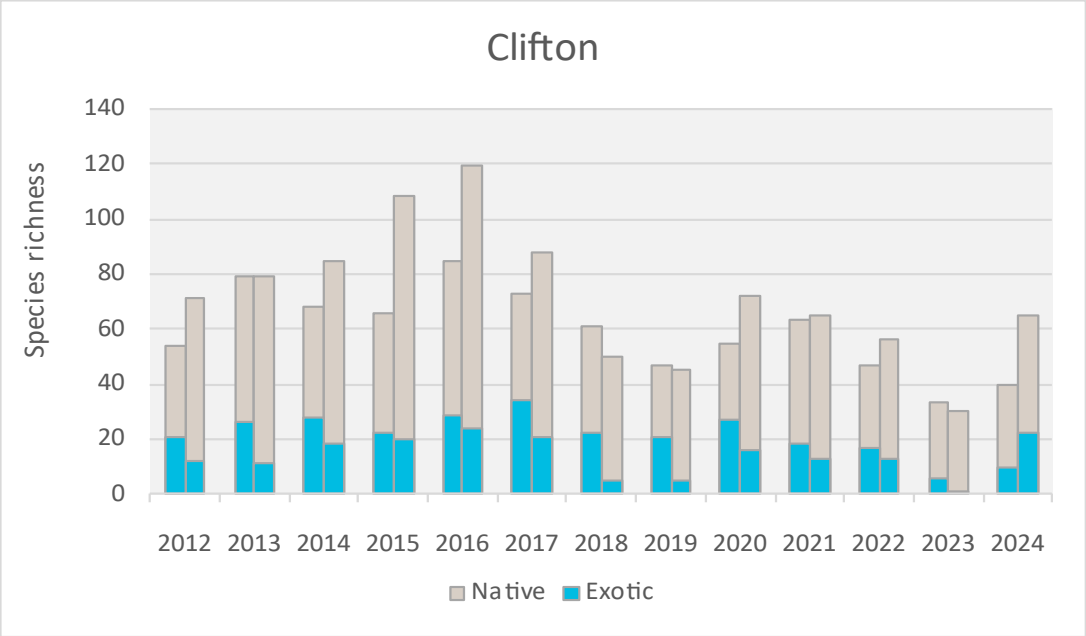
Assessments of Vegetation Condition have indicated some key trends which have remained consistent since monitoring began in 2012. The overall species richness increased progressively once monitoring commenced, however this reached a peak in 2016 where floral species richness has since, steadily declined. Through all monitoring years, grassland sites have recorded a higher abundance of exotic species than woodland sites. 2024 recorded a total of 225 species, of which 162 were exotics and 61 are native species. Species richness overall is higher in this monitoring year when compared to 2023.

5.1.1.1 Clifton Offset Area

A total of 81 flora species were recorded within Clifton during the 2023 vegetation condition assessment. Of these, 55 species were natives and 24 were exotics. A total of 30 native species were recorded at grassland sites, showing an increasing since the 2023 monitoring period and returning to a level similar to 2020-2022 (Figure 9). Woodland species has also seen an increasing in native species richness, reaching 43 species, the same number as 2022 and a notable improvement since 29 species being recorded in 2023 (Figure 9).

Since 2020 Clifton has maintained a higher species richness in woodland sites when compared to grassland in regard to native species, though grassland sites have a higher number of exotic species than the woodland sites. 2023 saw a noticeable decrease in species richness overall, which has since recovered to level similar to 2022. .

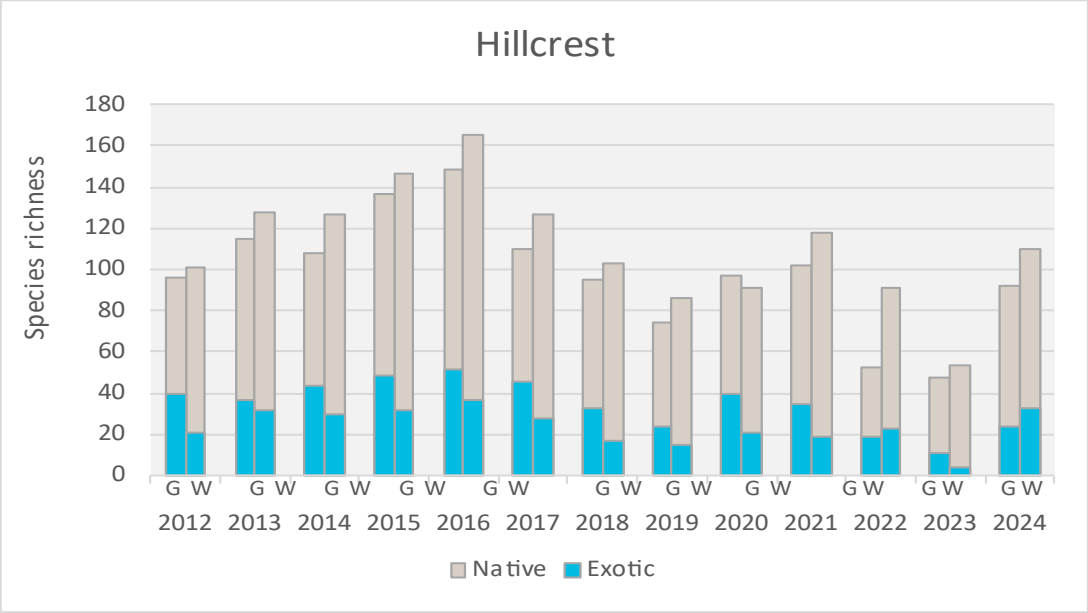
Figure 9: Native and exotic flora species richness by monitoring year at Clifton



5.1.1.2 Hillcrest Offset Area

For the 2024 monitoring event a total of 150 flora species were recorded, with 108 natives and 39 exotic species. Both woodland sites and grassland sites returned similar numbers of native species richness, at 77 and 68 respectively. Exotic species were high at woodland sites with 33 species recorded, grassland sites recorded 24 species. Hillcrest has had a notable increase overall since 2023, as well as surpassing results returned during the 2022 monitoring event which is illustrated in Figure 10. Historically HOA has recorded considerably more species than the other BOAs. These differences in species richness may be accounted for by the larger number of survey sites and diversity of habitats surveyed.

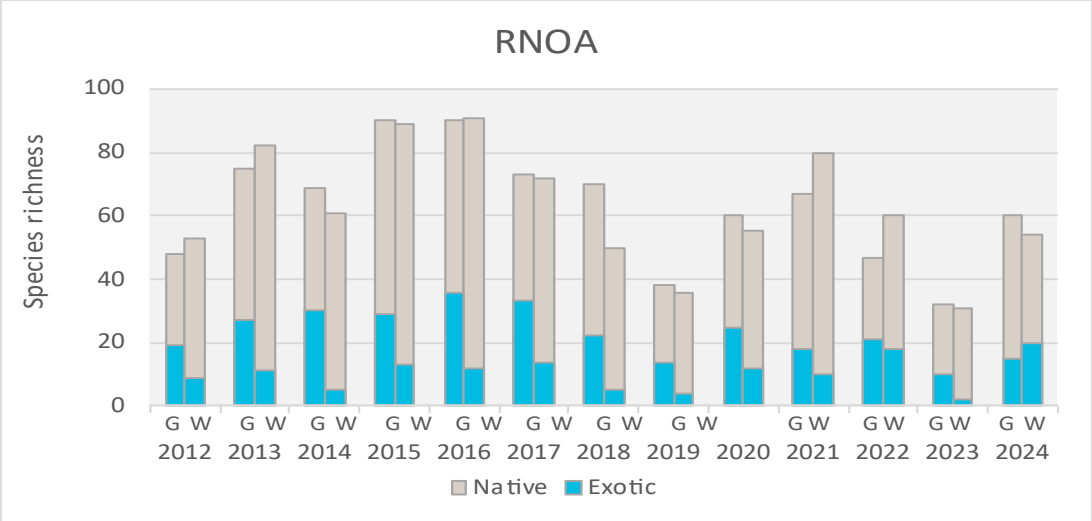
Figure 10: Native and exotic flora species richness by monitoring year at Hillcrest



5.1.1.3 Ravensworth Offset Area

A total of 86 species, 59 natives and 21 exotics were recorded. Of these, 34 natives occurred at woodland sites and 45 natives at grassland sites. 2024 continues a similar trend in previous years where unlike the other BOAs, RNOA observed higher native species richness in the grassland sites when compared to woodland sites (Figure 11), as RNOA has many woodland sites where the canopy is dominated by *Allocasuarina*, this is not unusual due to the generally low species richness in the ground layer found within *Allocasuarina* woodland. Species richness overall has returned to levels similar to 2022 but also fails to reach levels seen is 2016, as with other BOAs. Unlike previous years which generally saw lower levels of exotic species in woodland sites, 2024 is the first year in which exotic species was higher in woodland sites compared to grassland sites.

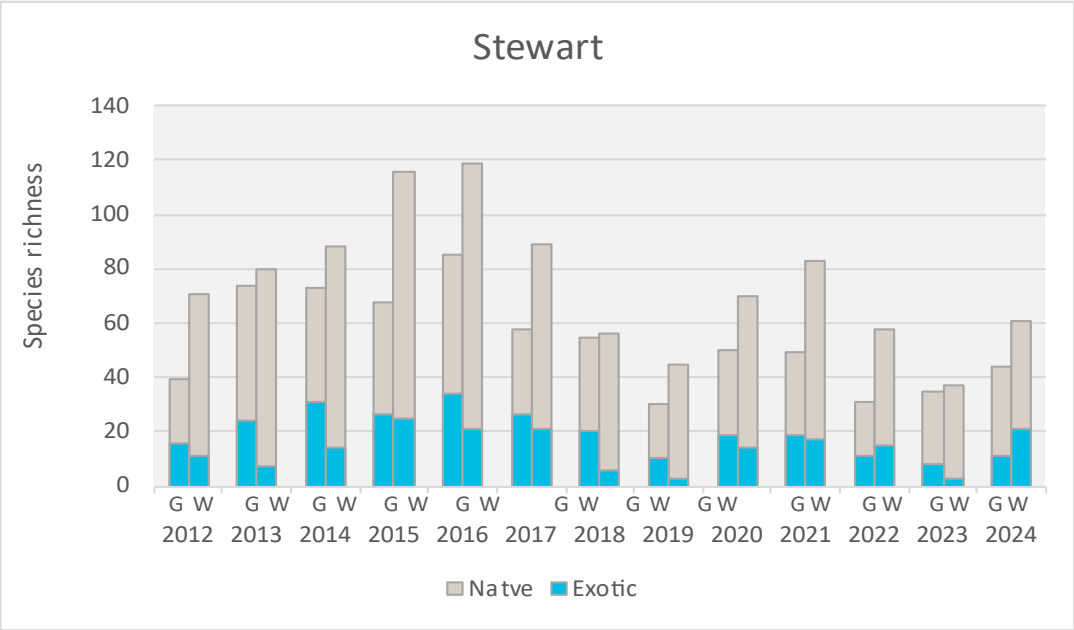
Figure 11: Native and exotic flora species richness by monitoring year at RNOA



5.1.1.4 Stewart Offset Area

A total of 79 flora species were recorded within Stewart in 2023, comprising of 54 native species and 24 exotic species(Figure 12). Stewart has not seen such a marked increase in species richness compared to 2023 as with the other BOAs during 2024, however it has shown an increase in both grassland and woodland sites. Exotic species observed in woodland sites has also increased considerably since 2023 with exotic cover being similar to high overall number seen in 2020 and 2021

Figure 12: Native and exotic flora species richness by monitoring year at Stewart



5.1.1.5 Species Composition Summary

Across all BOAs a decline in species richness is evident since 2016 monitoring. This may be attributed to impact of the 2017-2019 drought and all of the BOAs may still be recovering. When comparing more recent surveys (2019-2023), species richness is somewhat comparable. Richness increased during the 2024 monitoring event, overall experiencing average rainfall with some slightly wetter periods in the months prior to surveys when compared to 2023 (Figure 6).

Exotic species richness has increased overall throughout each BOA, generally attaining high number similar to totals seen in 2016 prior to the decrease in overall species richness post 2019.

Species richness at woodland plots was higher at almost all BOAs during the current monitoring period, RNOA being an exception. Similarly exotic richness was also higher at all grassland plots, again excluding RNOA which had higher exotics species within woodland sites.

Richness is still lower at all BOAs than the peak observed in 2016. Despite the slight decrease in richness of the current monitoring year there appears to be an overall trend of increasing richness since the peak of the drought in 2019. When considering the data set as a whole it is clear that the climatic conditions in the months that precede surveys has an impact on species richness across all BOAs and species richness may not be the most appropriate predictor of condition when considering BOA improvements. Canopy and shrub percent cover may represent a more appropriate metric to discuss improvements in condition of BOAs and be less sensitive to climatic influences.

5.1.2 Exotic Species

During the 2024 vegetation condition assessments, exotic species comprised generally of 25-40% of all species observed, which is similar to previous years though higher in some areas when compared to previous years. The number of exotic species recorded in grassland and woodland sites within each BOA is presented in Table 4. The average number of exotic species has been presented to allow comparisons between BOAs with a different number of survey sites.

Table 4: Number of exotic species in each BOA in 2024

	COA		HOA		RNOA		SOA	
	Mean	Total	Mean	Total	Mean	Total	Mean	Total
Grassland sites	5.3	10	8.7	24	7.3	15	5.7	11
Woodland sites	13.3	22	6.7	33	10.3	20	9.3	21
Total	18.6	32	16.3	57	17.7	35	15	32

As with previous years, exotic species richness was higher in grassland sites than in woodland sites, with the exception of RNOA. Across all BOAs, the mean number of exotic species recorded in woodland and grass land sites was comparable to previous monitoring years. Some values were higher than 2023 which is likely due to slightly increased rainfall in 2024.

Exotic species cover remains high in some areas across the BOAs, and management of weeds should remain a priority to ensure spread is kept to a minimum, and natural regeneration can be further encouraged. As mentioned in the monitoring report for 2023, weed cover would be likely to increase due to improved rainfall conditions which has been observed in 2024 with coverage returning to number seen previous throughout 2020-2022.

5.1.2.1 Target Weed Species

The OAMP lists out 130 weed species which are identified as target species and includes priority weeds listed under the NSW *Biosecurity Act 2015.* Some of these species have been previously detected on Ravensworth properties. Of the weeds encountered on site, 12 are listed as target weeds according to the OAMP. These species are listed in Table 5.

Fireweed (*Senecio madagascariensis*) was recorded in grassland sites across all BOAs and woodland habitat in SOA. Common prickly pear (*Opuntia stricta*) and Galenia (*Galenia pubescens*) were the next most frequently recorded. The remaining target weeds were recorded infrequently throughout the BOAs, but on occasion were dominant.

Thistles have previously been of note within this report. For the current monitoring year, thistle species were present but did not dominate. Hillcrest has previously been of note in regard to the abundance of thistles however cover was noted to be low likely due to dry conditions.

The OAMP also lists several priority weeds for the Hunter Region which are to be subject to weed management techniques. Table 6 details which of these species were identified in the BOAs during the 2023 monitoring and their priority in the Hunter Region. One of these species fall within the State Priority Weed Objective (fireweed).

Table 5: Target weed species recorded across grassland and woodland sites

Common Name	Scientific Name	COA		HOA		RNOA		SOA	
		G	W	G	W	G	W	G	W
Lantana	*Lantana camara*					X	X		
Trailing Lantana	*Lantana montevidensis*				X				
Formosan Lily	*Lilium formosanum*				X				
Galenia	*Galenia pubescens*			X	X	X			
Common Prickly Pear	*Opuntia stricta*	X	X	X	X	X			
Fireweed	*Senecio madagascariensis*	X	X	X	X	X		X	X
Coolatai Grass	*Hyparrhenia hirta*	X			X	X	X		

Table 6: Weed species recorded in 2023 which are listed as priority weeds in the Hunter Region

Common Name	Scientific Name	COA		HOA		RNOA		SOA		Document listed
		G	W	G	W	G	W	G	W	
Galenia	*Galenia pubescens*			X	X	X				Regional Recommended Measure – Regional Priority - Containment
Lantana	*Lantana camara*					X	X			Regional Priority Weed Objective - ASSET PROTECTION
Coolatai Grass	*Hyparrhenia hirta*	X			X	X	X			Regional Priority Weed Objective - ASSET PROTECTION
Common Prickly Pear	*Opuntia stricta*	X	X	X	X	X				Regional Priority Weed Objective - ASSET PROTECTION
Fireweed	*Senecio madagascariensis*	X	X	X	X	X		X	X	State Priority Weed Objective – ASSET PROTECTION, Additional Species of Concern

5.1.3 Canopy Regeneration Assessment

One key objective outlined in the OAMP, is the establishment of native vegetation to increase canopy cover. An assessment of the current canopy species compared to the juvenile canopy species growing at each site was undertaken to determine the success of natural regeneration within each BOA. Table 7 details the findings of this assessment in 2024.

Overall there has been some increases in regeneration though most sites remain at similar levels of regeneration as seen in 2023, results such as this could suggest that sites that are yet to observe any canopy regeneration likely require assistance with active planting as they have yet to produce evidence over multiple years. HG1 and SG3 are the only notable sites that has not had any canopy regeneration observed within the plot, HW2 has existing canopy species though lacks a regenerating level. COA received some tubestock planting throughout the offset in 2024.

Photo 1 shows poor regeneration at COA and Photo 2 and Photo 3 good regeneration occurring at sites throughout the BOAs.

Table 7: Regeneration of canopy species at each 20 x 50 metre plot

Site	Species in canopy	Species regenerating
Clifton		
CG1	-	Pioneer species *Acacia paradoxa* and *Acacia falcata* present
CG2	-	*Eucalytpus tereticornis* and *Eucalyptus crebra* present
CG3	-	*Eucalyptus crebra* and *Acacia paradoxa* present
CW1	*Corymbia maculata, Eucalyptus crebra*	*Allocasuarina luehmannii, Eucalyptus crebra*
CW2	*Eucalyptus crebra, Acacia falcata*	*Eucalyptus crebra*
CW3	*Eucalyptus crebra*	*Eucalyptus crebra, Allocasuarina luehmannii, Eucalyptus tereticornis, Acaca falcata*
Hillcrest		
HG1	-	-
HG2	-	*Eucalyptus crebra*
HG3	-	*Corymbia maculata, Eucalyptus crebra*
HG4	-	*Corymbia maculata*
HG5	-	*Corymbia maculata, Eucalyptus crebra, Eucalyptus tereticornis*
HW1	*Corymbia maculata, Eucalyptus crebra*	*Corymbia maculata, Eucalyptus crebra, Eucalyptus tereticornis*
HW2	*Corymbia maculata, Eucalyptus crebra*	-
HW3	*Corymbia maculata, Eucalyptus crebra*	*Brachychiton populneus*
HW4	*Angophora floribunda, Corymbia maculata, Eucalyptus tereticornis*	*Brachychiton populneus, Eucalyptus tereticornis*
HW5	*Corymbia maculata, Eucalyptus crebra, Eucalyptus tereticornis*	*Corymbia maculata, Eucalyptus crebra, Eucalyptus tereticornis*
RNOA		
RG1	-	*Allocasuarina luehmannii, Acacia salicina*
RG2	-	*Allocasuarina luehmannii, Acacia salicina*
RG3	*Eucalyptus tereticornis*	*Acacia salicina, Allocasuarina luehmannii, Eucalyptus tereticornis*
RW1	*Eucalyptus tereticornis*	*Eucalyptus tereticornis, Allocasuarina luehmannii*
RW2	*Allocasuarina luehmannii, Eucalyptus crebra*	*Allocasuarina luehmannii, Eucalyptus crebra*
RW3	*Allocasuarina luehmannii, Eucalyptus moluccana, Eucalyptus tereticornis*	*Eucalyptus moluccana*
Stewart		
SG1	-	*Eucalyptus crebra, Eucalyptus moluccana*
SG2	-	*Eucalyptus tereticornis, Eucalyptus crebra*
SG3	-	-
SW1	*Corymbia maculata, Eucalyptus crebra, Eucalyptus moluccana*	*Corymbia maculata, Eucalyptus crebra*
SW2	*Eucalyptus moluccana, Eucalyptus tereticornis*	*Allocasuarina luehmannii, Eucalyptus moluccana, Eucalyptus tereticornis*
SW3	*Eucalyptus crebra*	*Eucalyptus crebra*

Photo 1: High grass cover but very little to no regeneration at Stewart.

Photo 2: Some small amounts of regeneration present at Clifton grassland site CG3

Photo 3: Revegetation at HG1.

6. Fauna Monitoring Results

The following sections outline the results of the fauna surveys in 2024. A full list of fauna species recorded in each BOA during the 2024 monitoring surveys is provided in Appendix A-3.

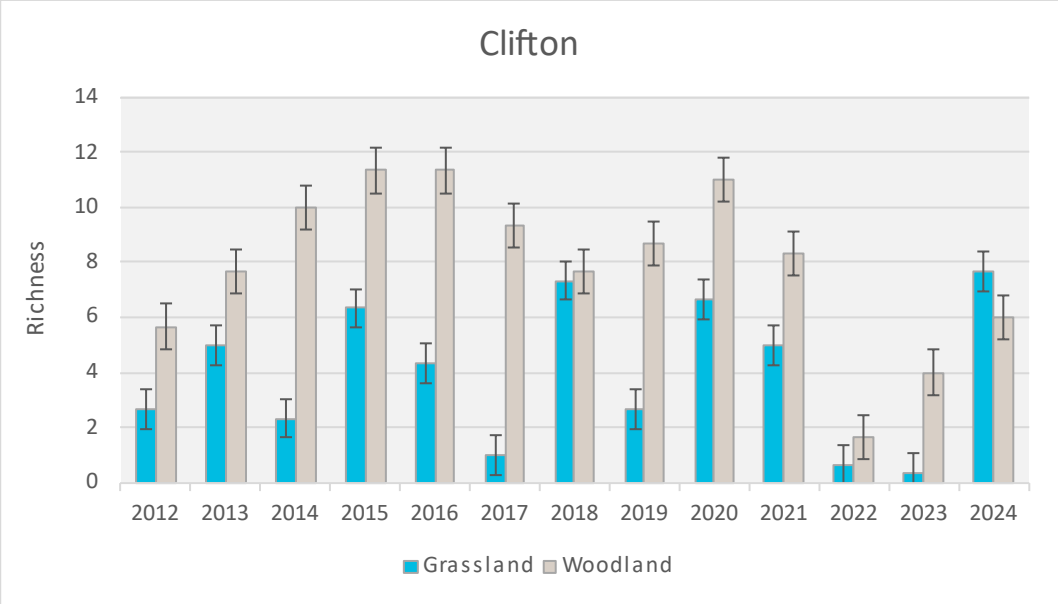
6.1 Bird Census Monitoring

6.1.1 General Bird Census

6.1.1.1 Clifton Offset Area

At the COA, a total of 35 species of birds were encountered across the grassland and woodland sites during the 2024 bird census monitoring. The average species richness recorded during COA bird census monitoring is displayed in Figure 13. Average species richness in both woodland and grassland sites has declined since 2020, but during the 2024 monitoring period there has been a considerable improvement. Rainfall throughout 2024, mixed with dry periods may be a cause for a notable improvement. A trend has occurred in which throughout all BOAs grassland sites have observed a higher number of species when compared with woodland sites which is a noticeable deviation from previous monitoring years.

Figure 13: Average bird species richness over each monitoring year in Clifton, with standard error

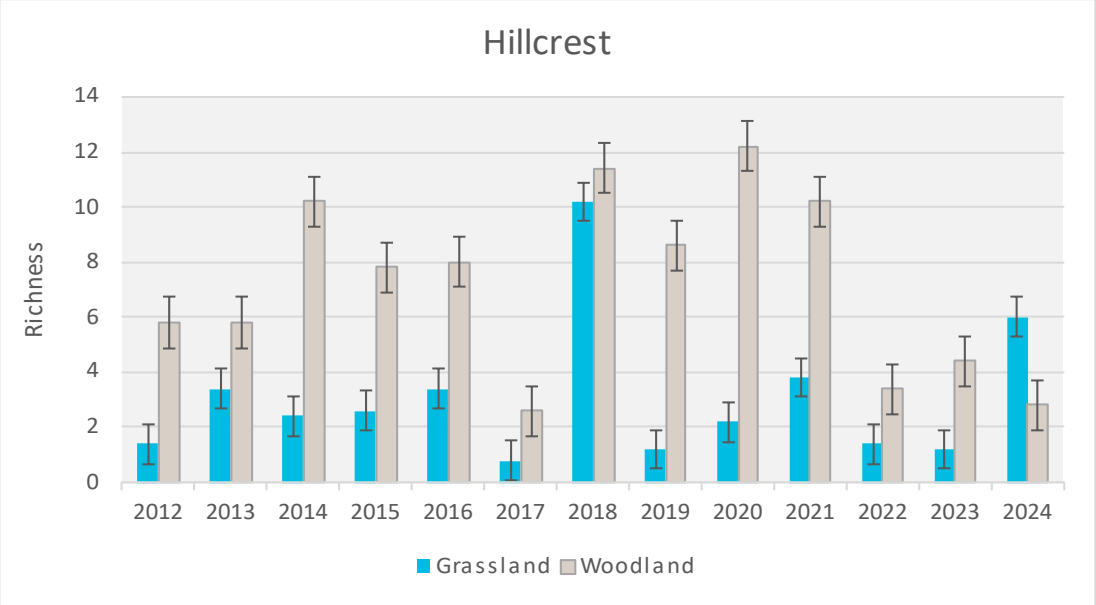


6.1.1.2 Hillcrest Offset Area

At Hillcrest, 44 bird species were recorded across the BOA during 2024 monitoring.

As with other BOAs grassland sites have observed a higher number of species when compared with woodland sites which is a noticeable deviation from previous monitoring years with Hillcrest being considerably higher, potential reasons for this difference are woodland species traversing from patches of vegetation and being recorded whilst at grassland sites. Differences throughout the years show a decline since 2021 (Figure 14).

Figure 14: Average bird species richness over each monitoring year in Hillcrest, with standard error

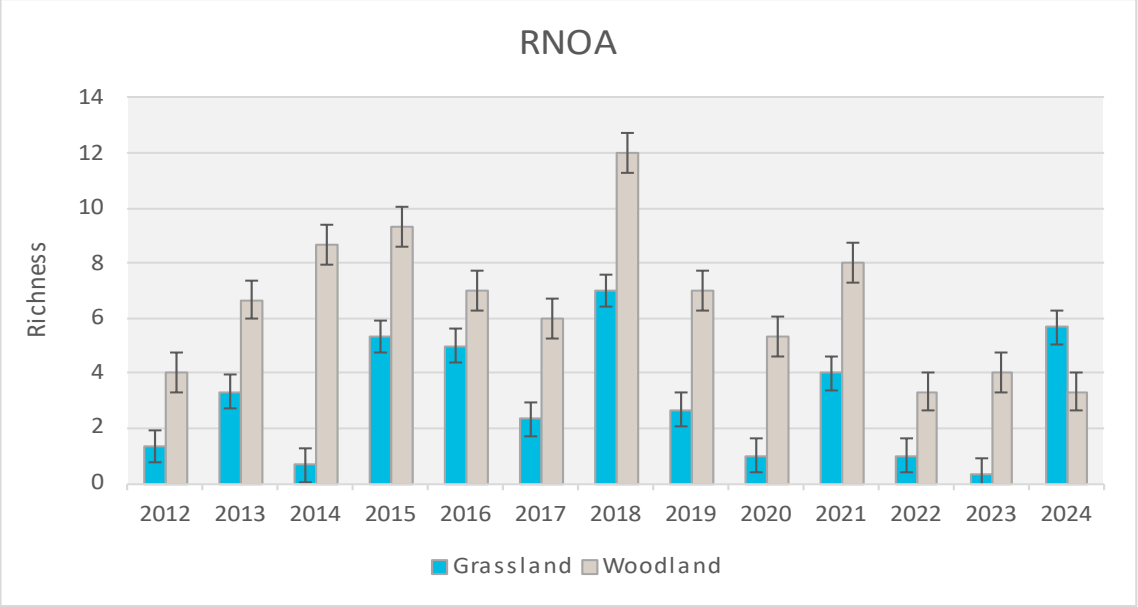


6.1.1.3 Ravensworth North Offset Area

The 2024 bird census observed 27 bird species within RNOA. Eight of these were recorded within grassland and woodland sites with the remaining recorded opportunistically. One threatened bird species Grey-crowed Babbler (*Pomatostomus temporalis*), being recorded within woodland areas.

Again, grassland sites have observed a higher number of species when compared with woodland sites which is a noticeable deviation from previous monitoring years. RNOA is heavily wooded with *Allocasuarina* woodland, so it is likely the bird species recorded as grassland sites are also occurring within woodland sites though are more difficult to detect. Numbers remain relatively steady since 2022, though low compared with some previous years (Figure 15).

Figure 15: Average bird species richness over each monitoring year in RNOA, with standard error

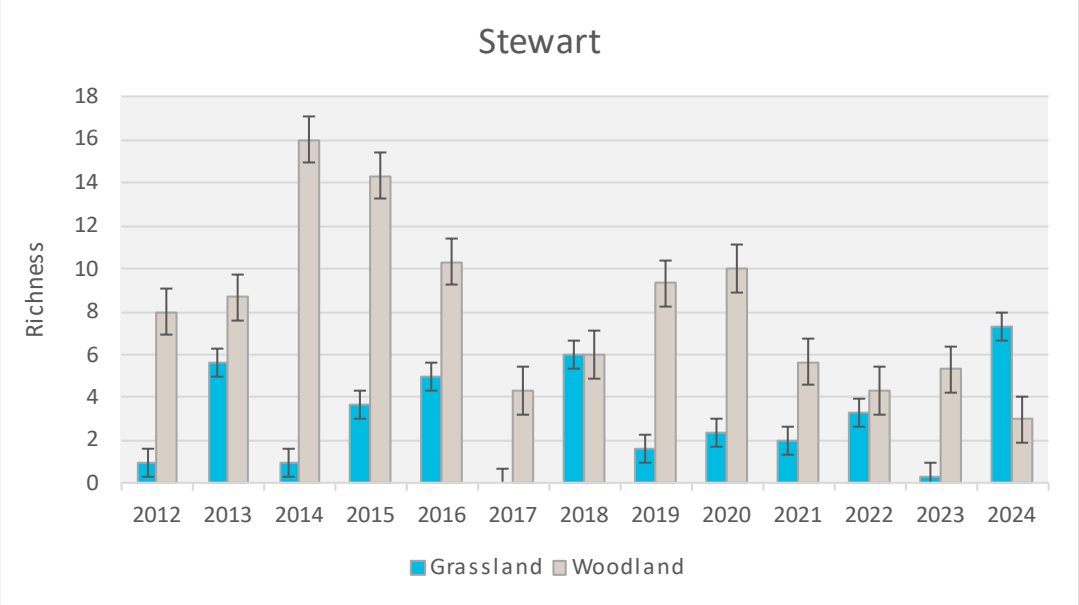


6.1.1.4 Stewart Offset Area

At SOA, 31 bird species were recorded across the BOA. Of these 31 species, 22 species were recorded at grassland sites, whilst 9 species were observed utilising woodland habitat. Species richness has remained steady in woodland sites though has increased dramatically in grassland sites (Figure 16).

As the trend in average species richness is similar across all BOAs it is likely that lower species richness is a function of larger time scale population dynamics rather than declining condition of BOAs in general.

Figure 16: Average bird species richness over each monitoring year in Stewart, with standard error



6.1.2 Targeted Threatened Birds

As discussed in previous years, the 2024 monitoring program provided little opportunity to observe the targeted threatened bird species at the BOAs, primarily due to the current methodology. Threatened birds frequently require higher survey effort for detection, which is not supported with the current methods. An alternative method may be more reliable, and this is discussed further in the recommendations.

The regent honeyeater (*Anthochaera phrygia)* or swift parrot (*Lathamus discolor*) were not detected during the 2024 bird census. These species are listed under both the *BC Act* and *EPBC Act.* The Swift Parrot is classified as Endangered with the Regent Honeyeater listed as Critically Endangered under the *BC Act*. Both species are listed as Critically Endangered under the *EPBC Act.* Both species are winter migrants to the Upper Hunter and are known to occur in areas where eucalypts are flowering profusely or where there is an abundance of lerp infestations (Menkhorst et al. 2019). Although potentially suitable habitat occurs within the BOAs, at the time of survey, minimal eucalypts were in flower. Limited flowering noted in all BOA's makes the occurrence of both threatened species unlikely.

One occurrence of the Swift Parrot was recorded in the Stewart offset area in 2012. This species was observed foraging on heavily flowering Corymbia species' and feeding on lerps in eucalypts (Glencore 2017). The Swift Parrot has not been observed utilising the area since its initial record in 2012

The Regent Honeyeater has not previously been recorded during target threatened bird surveys of the BOAs. The nearest record of a Regent Honeyeater is approximately 18 kilometres south of the Ravensworth Mine Complex, where it was recorded foraging in 2002.

6.1.3 Other Threatened Birds

The following table (Table 8) displays the threatened bird species which have been recorded in each BOA since the commencement of biodiversity offset monitoring surveys. This table is inclusive of birds recorded opportunistically as well as those recorded during bird census monitoring and during targeted threatened bird surveys.

Table 8: Threatened bird species recorded by monitoring year at each BOA

Common Name	Scientific Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Clifton														
Speckled Warbler	*Chthonicola sagittata*					X			X	X				
Varied Sittella	*Daphoenositta chrysoptera*	X					X							
Little Lorikeet	*Glossopsitta pusilla*	X												
Grey-crowned Babbler	*Pomatostomus temporalis*			X	X	X	X	X	X	X	X			x
Hillcrest														
Speckled Warbler	*Chthonicola sagittata*	X												

Common Name	Scientific Name	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Spotted Harrier	*Circus assimilis*		X											
Varied Sittella	*Daphoenositta chrysoptera*		X							X				
White-bellied Sea-eagle	*Haliaeetus leucogaster*												X	
White-throated Needletail	*Hirundapus caudacutus*											X		
Little Lorikeet	*Glossopsitta pusilla*						X	X						
Scarlet Robin	*Petroica boodang*				X									
RNOA														
Speckled Warbler	*Chthonicola sagittata*		X	X	X	X	X	X	X					
Varied Sittella	*Daphoenositta chrysoptera*					X		X					X	
Black Falcon	*Falco subniger*							X						
Blue-billed Duck	*Oxyura australis*			X										
Flame Robin	*Petroica phoenicea*												X	
Grey-crowned Babbler	*Pomatostomus temporalis*	X	X	X	X	X	X	X		X	X		X	X
Stewart														
Speckled Warbler	*Chthonicola sagittata*					X	X		X					
Varied Sittella	*Daphoenositta chrysoptera*								X			X		
Little Lorikeet	*Glossopsitta pusilla*	X												
Swift Parrot	*Lathamus discolor*	X												
Scarlet Robin	*Petroica boodang*								X					
Grey-crowned Babbler	*Pomatostomus temporalis*	X	X			X		X	X	X		X		

One threatened bird species was recorded across the BOA's during the 2024 monitoring year. This included the Grey-crowned Babbler (*Pomatostomus temporalis*) within Ravensworth North and Clifton Offset Areas.

This is a decrease overall in the amount detected when compared with 2023. Ongoing monitoring will be useful in identifying whether threatened species presence is an annually fluctuating phenomenon, or part of a larger event that may involve declines of certain species within their range and habitat. The use of song meters in conjunction with field observations would improve chances of detecting threatened bird species utilising the BOAs. This is particularly relevant to targeted threatened species Swift Parrot and

Regent Honeyeater as both species are local migratory species and are not present in the region throughout the entire year.

Figure 17: Location of threatened birds recorded during the survey period

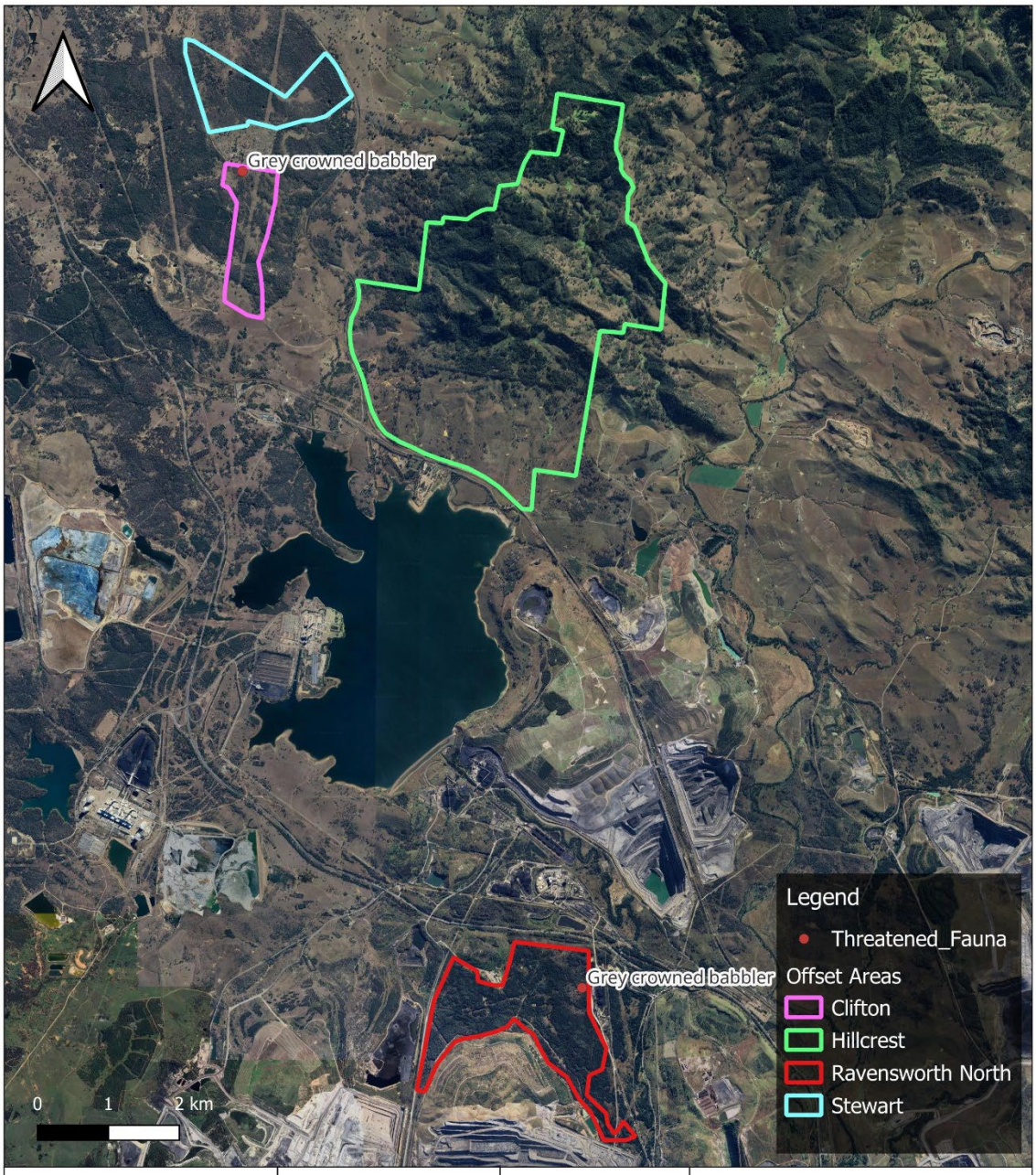


Figure Name: Threatened Fauna Locations	Location: Ravensworth Offset Areas	Client: Ravensowrth Operations Pty Ltd	Biodiversity AUSTRALIA
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ENS6310	
		Date: January 2025	Project Manager: LW / Drawn by: AB
		Scale: 1:83784	Spatial Reference: GDA2020

6.2 Green and Golden Bell Frog

During the 2024 monitoring period, habitat assessments were conducted at the target dams within RNOA and HOA BOAs. Rainfall has been steady throughout 2024 which is an improvement since 2023(Figure 6). However, most dams were still dry or did not have sufficient water or vegetation to conform to what is classified as Green and Golden Bell Frog habitat

Compared to 2023, more dams contained water that were sufficient enough to be assessed. Though not strictly suitable habitat, moderately suitable dams were assessed within this BOA.

Within HOA most dams were also found to be not suitable, one dam marked HC Dam 3 was previously labelled as suitable and has since been marked as not suitable due to a considerable decrease in emergent vegetation possibly due to grazing. HC Dam 20 was the only other dam found to be suitable for assessment.

The following table provides the results of the habitat assessments of surveyed dams within each BOA.

Table 9: Suitability of dams in each BOA for the GGBF

Dam Name	Wet/ Dry	Vegetation suitability	Presence of *J. acutus* / *G. holbrooki*	Suitability for GGBF	Surveyed nocturnally?
Ravensworth Offset Area					
RN-New1	Wet	Contains patches of aquatic vegetation around dam perimeter.	No	Not Suitable	Yes
RN-New2	Not surveyed due to accessibility issues				No
RN-New3	Dry	Contains suitable aquatic vegetation.	No	Not Suitable	No
RN-New4	Dry	Contains suitable aquatic vegetation.	No	Not Suitable	No
RN-New5	Wet	Contains suitable aquatic vegetation. Unsuitable water level.	No	Not Suitable	No
RN-New6	Dry	Contains some areas of dense aquatic vegetation.	No	Not Suitable	Yes
RN-New7	Dry	Contains suitable aquatic vegetation.	No	Not Suitable	No
RN-New8	Dry	Extensive *Typha orientalis* present.	No	Not Suitable	No
RN-New9	Dry	Contains suitable aquatic vegetation.	No	Not Suitable	No
RN-New10	Dry	Contains suitable aquatic vegetation.	No	Not Suitable	No
RN-Extra 1	Wet	Contains suitable aquatic vegetation. Unsuitable water level	No	Not Suitable	No
RN-Extra 2	Wet	Contains limited patch of suitable aquatic vegetation.	No	Not Suitable	Yes
RN-Extra 3	Wet	No aquatic vegetation.	No	Not Suitable	Yes
RN-Extra 4	Wet	No aquatic vegetation	No	Not Suitable	Yes
Hillcrest Offset Area					

Dam Name	Wet/ Dry	Vegetation suitability	Presence of *J. acutus* / *G. holbrooki*	Suitability for GGBF	Surveyed nocturnally?
HC Dam 1	Dry	Contains very sparse aquatic vegetation around dam perimeter	No	Not suitable	No
HC Dam 2	Dry	Contains very sparse aquatic vegetation	No	Not suitable	No
HC Dam 3	Wet	Contains very sparse aquatic vegetation	No	Not Suitable	Yes
HC Dam 4	Dry	Lack of emergent vegetation. Sparse *Juncus sp.* present.	No	Not suitable	No
HC Dam 5	Dry	Contains sparse aquatic vegetation around dam perimeter.	No	Not suitable	No
HC Dam 6	Dry	Contains sparse aquatic vegetation around dam perimeter.	No	Not suitable	No
HC Dam 7	Dry	Contains sparse aquatic vegetation around dam perimeter.	No	Not suitable	No
HC Dam 8	Dry	Contains sparse aquatic vegetation around dam perimeter.	No	Not suitable	No
HC Dam 9	Dry	No aquatic vegetation.	No	Not suitable	No
HC Dam 10	Dry	No aquatic vegetation.	No	Not suitable	No
HC Dam 11	Dry	Contains sparse aquatic vegetation.	No	Not suitable	No
HC Dam 12	Dry	No aquatic vegetation.	No	Not suitable	No
HC Dam 13	Dry	Contains limited aquatic vegetation around dam perimeter.	No	Not suitable	No
HC Dam 14	Dry	Contains limited aquatic vegetation around dam perimeter.	No	Not suitable	No
HC Dam 15	Dry	Contains a small extent of suitable aquatic vegetation, not likely to be dense enough to support the GGBF.	No	Not suitable	No
HC Dam 16	Dry	No aquatic vegetation.	No	Not suitable	No
HC Dam 17	Dry	Contains limited aquatic vegetation around dam perimeter.	No	Not suitable	No
HC Dam 18	Dry	No aquatic vegetation.	No	Not suitable	No
HC Dam 19	Dry	Contains some aquatic vegetation.	No	Not suitable	No
HC Dam 20	Wet	Contains suitable aquatic vegetation.	No	Not suitable	Yes

All dams within the BOA's that were identified as containing suitable or moderately suitable GGBF habitat were subsequently surveyed nocturnally via call playback and spotlighting surveys. The location of these dams and their suitability classification is mapped in

Figure 17 to Figure 19.Nocturnal surveys did not identify the GGBF within the BOAs. Five non-threatened amphibians were identified utilising these aquatic habitats. The five species were recorded at all dams surveyed during 2024. A full fauna list recorded is provided in Appendix A-3.

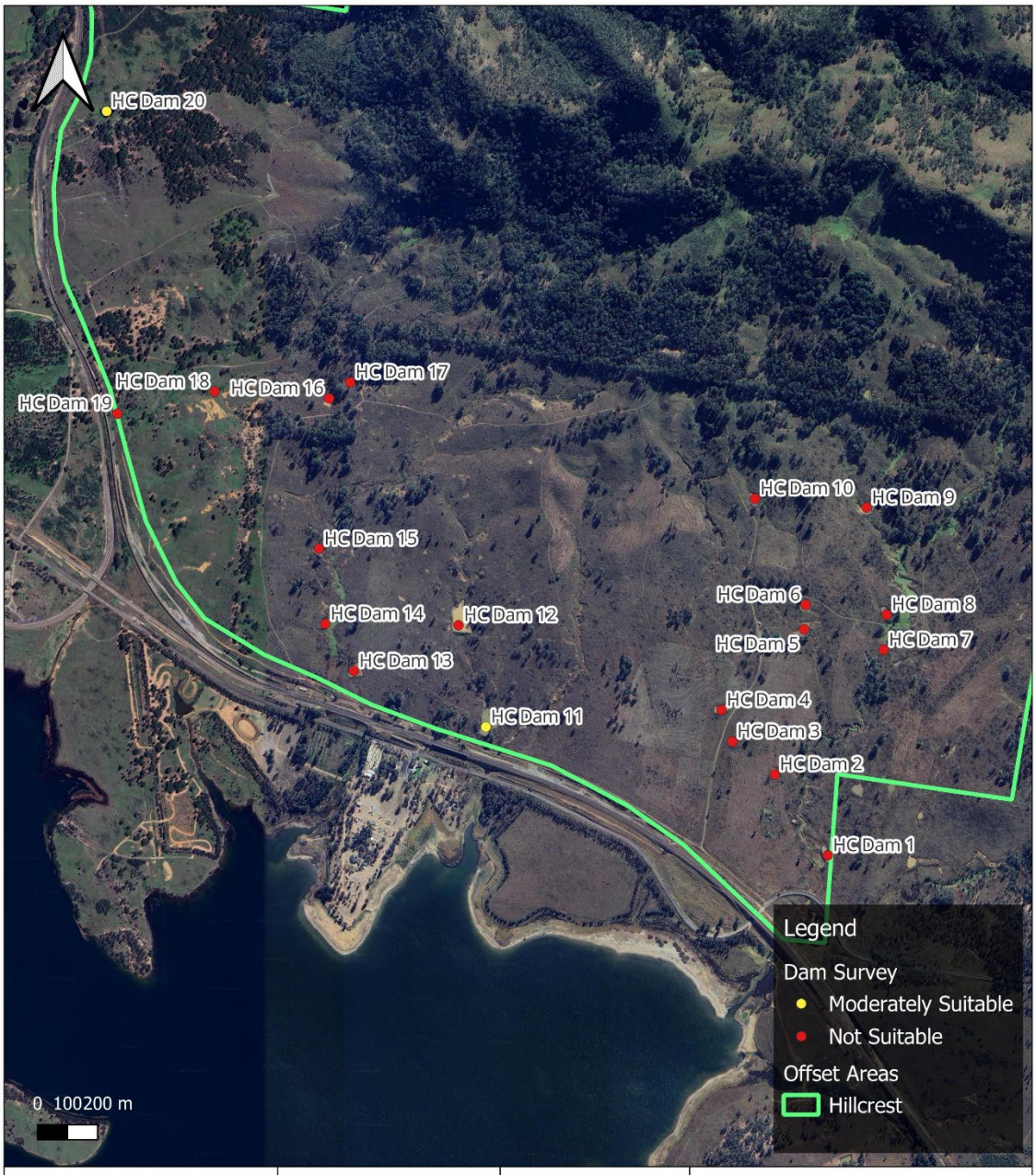


Figure Name: GGBF Dam Suitability: Hillcrest	Location: Ravensworth Offset Areas	Client: Ravensowrth Operations Pty Ltd	Biodiversity Australia
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ENS6310	
		Date: January 2025	Project Manager: LW / Drawn by: AB
		Scale: 1:19748	Spatial Reference: GDA2020

Figure 18: Hillcrest Dams assessed for Green and Golden Bell Frog habitat suitability.

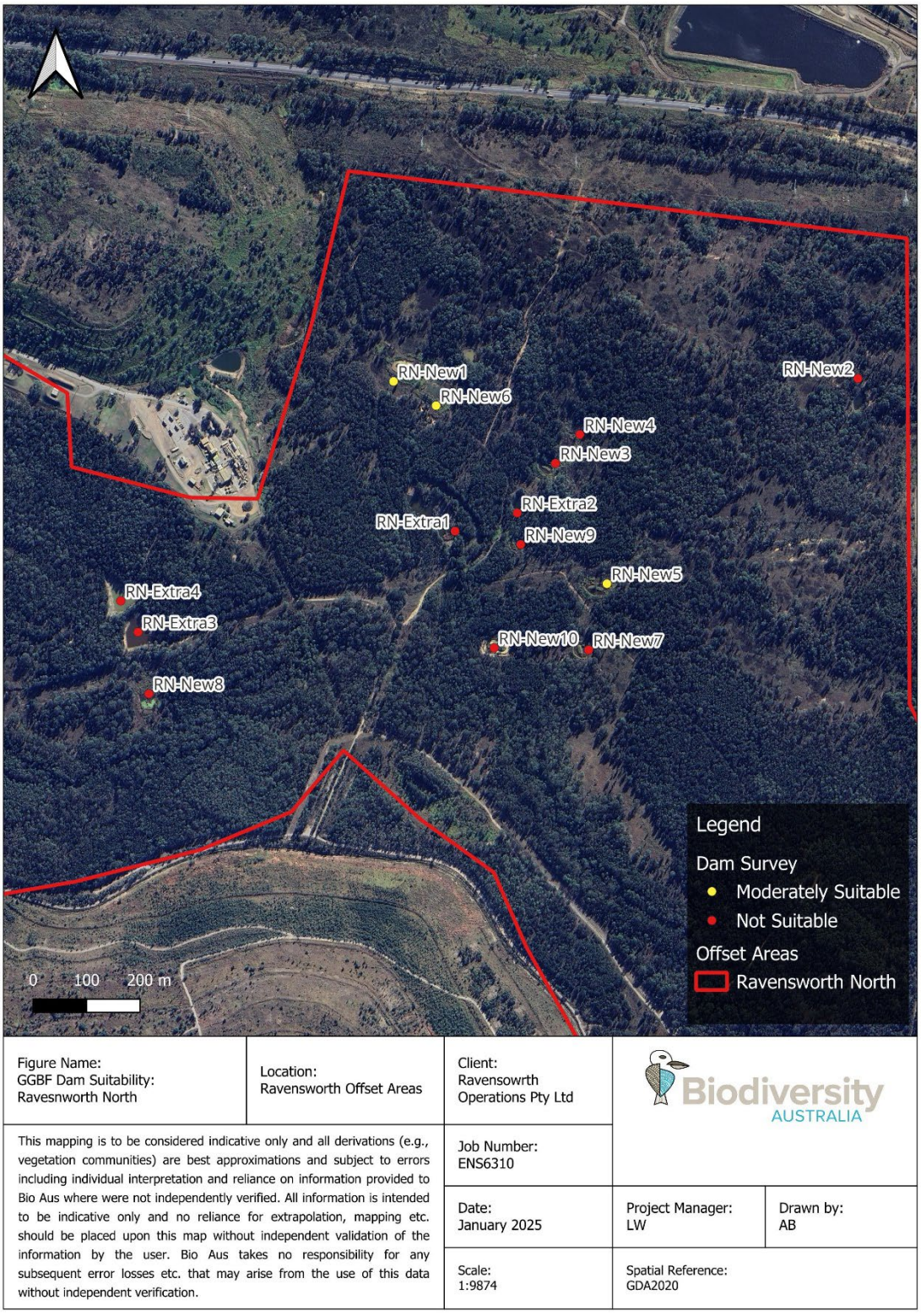


Figure 19: RNOA Dams assessed for Green and Golden Bell Frog habitat suitability

6.3 RNOA Fauna Monitoring

Appendix A-4 provides a comprehensive list of fauna species recorded in RNOA since the commencement of the monitoring programme (Cumberland Ecology 2017, Biodiversity Australia 2019-2021).

Monitoring in 2024 did not record any new faunal species previously unrecorded within this offset area. However the total number of faunal species recorded has decreased considerably since the previous round of monitoring.

The number of fauna species recorded at RNOA during 2024 was 44. An overall decrease in faunal species recorded across the BOA's and the lowest since monitoring began. Species richness has not changed significantly over the seven years over monitoring with slight differences likely being a result of natural variation in populations and climatic conditions rather than a decrease in habitat availability.

Table 10 below shows the total number of fauna species recorded in each monitoring year at all BOA's.

Table 10: Number of fauna species recorded at RNOAs during monitoring surveys

Pre-2016	2016	2018	2019	2020	2021	2022	2023	2024
89	67	57	53	59	51	72	58	44

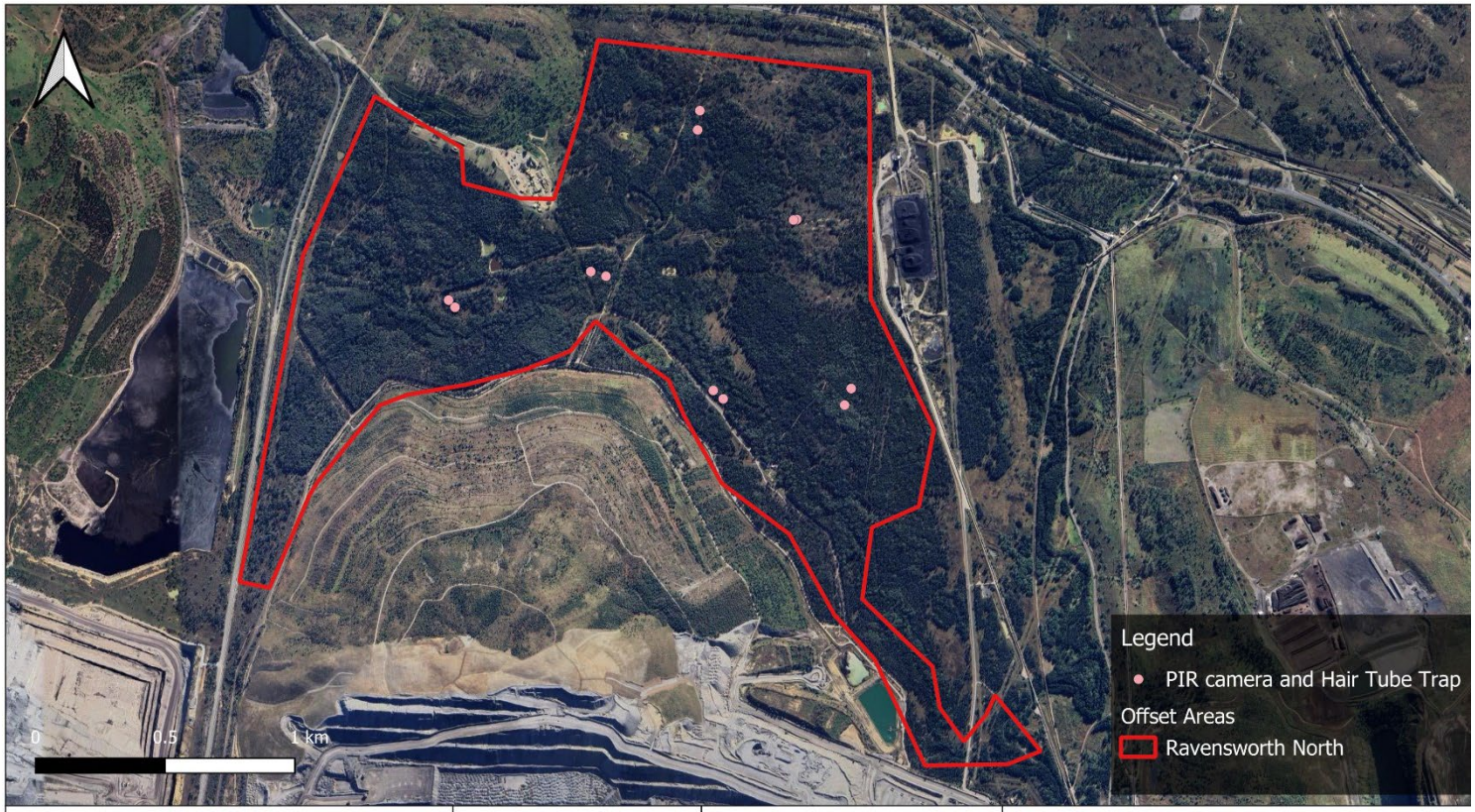
6.4 Spotlighting/Opportunistic Fauna Observations

Spotlighting detected two (2) fauna species during the 2024 monitoring period, eastern grey kangaroo (*Macropus giganteus)* and rabbit (*Oryctolagus cuniculus*). No herpetofauna were detected during these surveys.

6.5 Hair Tube Traps

Hair tube trapping was conducted during 2024 monitoring as a result of there being a lack of analytical expertise available in 2022. 20 hair tube traps were set in conjunction with PIR cameras, with some traps visible on each PIR camera, alternating between a terrestrial set trap and an arboreal set trap (Figure 20). Hair tubes were baited with a mixture of peanut butter, honey oats and vanilla essence. Traps were left in situ for 5 nights from 8th December – 12th December 2024. No traps returned hair and thus no samples were needed to be analysed.

Figure 20: PIR Camera and Hair Tube Trap Locations



This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.	Project Manager: LW	Figure Name: PIR camera and Hair Tube Trap locations	Biodiversity AUSTRALIA	
	Drawn by: AB	Location: Ravensworth Offset Areas		
	Date: January 2025	Client: Ravensworth Operations Pty Ltd	Job Number: ENS6310	Spatial Reference: GDA2020 Scale: 1:22676

6.6 Feral Species

Feral species were recorded in only Hillcrest Areas during the 2024 monitoring programme. These included:

- European rabbit (*Oryctolagus cuniculus*) – Hillcrest
- Wild pig (*Sus scrofa*) - Hillcrest.

Targeted surveys for these species were not undertaken and hence densities are not able to be measured. No evidence was collected that suggests that influences from these pests are having a significant impact on the restoration of the BOA's. Observations suggest that abundances are slightly lower during 2024. This was particularly evident with Feral Pigs and a notably decreased extent of their impact.

European rabbits were observed frequently throughout southern Hillcrest during nighttime GBBF surveys, the relatively higher rainfall throughout the year compared with 2023, mixed with drier periods would suggest a large increase in food availability for rabbits.

6.7 Threatened Species

Four threatened species were recorded during the 2024 monitoring period, namely:

- Grey-crowned Babbler (*Pomatostomus temporalis*)

This species was all recorded visually within the BOA's. This is a decrease on 2023 monitoring records. The lower number of threatened species recorded is likely explained by natural fluctuation in fauna populations across landscapes in response to habitat conditions.

7. Recommendations

The following recommendations pertain to the methods used for annual flora and fauna monitoring.

- The previous offset area monitoring report recommended changes to fauna monitoring methods. These recommendations are as detailed below and are still valid in the current round of monitoring. The fauna survey methodologies may require adjustment to allow more appropriate targeting of green and golden bell frogs and threatened wintering birds. These species are yet to be recorded during the survey periods, possibly due to the design of the monitoring programme (rather than purely their absence). The current methods only allow for surveying during a snapshot of time within each year and further limited by the species response to rainfall episodes which surveys may not be able to capture during December to target these species, which are threatened and require monitoring as per the OAMP/BOMP, we propose deploying song meters as part of the monitoring programme. Firstly, deploying at dams in November and December will target GGBFs, as this time of year tends to be optimal with frequent rainfall events. Secondly, deploying song meters across the BOAs in areas of dense, heavily flowering eucalypts during winter (especially late winter) will target birds such as the regent honeyeater and swift parrot. By incorporating song meters, a greater range and scale of data can be collected, outside the current monitoring periods. This may improve the overall efficacy of the program and will provide a much higher chance of detection.
- As suggested in previous years, given the large amount of baseline data for the vegetation points, it would be advisable to cease monitoring at some select sites. This would be to improve field efficiency, and to incorporate additional field points that facilitate ongoing management of the BOAs. Ideally, points that are showing effective regeneration, are at suitable maturity, and no longer require active management could be 'retired'. These points could then be replaced with new grassland points not yet monitored. This would help identify other areas that may require assisted regeneration.
- We recommend in the Conservation Agreement 2021 monitoring report [EC4475-BEC-REP-RavensworthOffset-CAMonitoring_2021-rev1.0] that some monitoring points across the annual offset monitoring and CA monitoring could be merged. This is because many points being monitored across the BOAs are within very close proximity. These points could be consolidated, so one monitoring event for vegetation surveys can occur in spring, for both the annual offset monitoring and the CA monitoring. This is discussed in the aforementioned document, as well as recommendations for the points that could be consolidated.

The following discussed recommendations for improving site condition.

- Revegetation works are recommended to continue as a priority. It was noted that many areas across all BOAs have been prepped to receive plantings when conditions improve. If the prepared areas can be planted during 2025 this would be aid in improving large portions of all BOAs. When dry conditions do arise the use of direct seeding may avoid loss of tubestock during dry conditions and also take advantage of rainfall when it occurs.
- Eastern grey kangaroos were again recorded in large numbers within HOA. These are likely hampering recruitment and regeneration efforts. It will be important to ensure appropriate tree guards are established around plantings and natural regeneration to restrict macropod grazing. A macropod management program may also be beneficial, by providing a framework by which high density macropod populations can be controlled. Within a macropod management program only eastern grey kangaroos (*Macropus giganteus*) should be targeted, and other locally present species including wallabies should not be controlled.

- European rabbits and wild pigs were again recorded at Hillcrest. Continued management of these species is recommended. Although no feral cats or red foxes were observed in 2024, their presence within the BOAs is likely and thus should continue to be controlled when necessary.

7.1 Recommended revegetation methods

The continued use of amelioration methods such as direct seeding, brush-matting, planting of fast-growing pioneer species and soil amelioration are recommended (where possible) to speed up the recovery of vegetation communities within the BOAs and enhance regeneration success of grassland areas. Recommendations from the Ravensworth Offset Area Revegetation Management Plan (Bio. Aust. 2022) should be considered.

- Generally, areas that show a lack of natural regeneration and aren't suitable for assisted regeneration i.e. grassland areas
- Brush-matting is a regenerative technique in which seed-laden branches of trees and vegetation with woody fruits are placed within open areas. This technique aids seed dispersal as well as provides a level of soil protection, as the seed-laden brush can slow overland water flow, allowing it to infiltrate the soil, therefore generating ideal germination conditions (OEH 2011). The execution of this however, does require the seed to be ripe and the ground surface to be suitable (i.e., not weedy or compacted). This technique would aid grassland areas that show little natural regeneration to date that do not receive seed naturally from surrounding vegetation.
- Fast-growing pioneer species, such as peas and wattles (Fabaceae family), establish quicker than other natives and are nitrogen-fixing, in which they add nitrogen to the soil which is required by most plants to establish. By establishing these species in grassland areas, the soil conditions will improve and increase the success rate of seed establishment. Consideration should be given to these species when undertaking planting activities.
- The use of fire in grassland areas may encourage the germination of seed bank in areas that have historically shown little regrowth. This should be undertaken under the guidance of a bushfire management plan.

8. Objectives, Target Criteria and Corrective Actions

The OAMP recommends objectives and target criteria for assessing the progress and effectiveness of management actions of the BOAs. Table 10 outlines the compliance of the 2024 monitoring results with the biodiversity objectives and target criteria outlined within the OAMP. Additional corrective actions are recommended for any targets not yet achieved.

Table 11: Compliance with Objectives and Target Criteria

OAMP Reference	Objective	Target Criteria to be Achieved	2024 Monitoring Results	Corrective Actions
Table 6.4	Augment existing vegetation communities in areas zoned natural regeneration.	Evidence of natural regeneration (tree seedlings), decrease in target weeds or target weeds <10% (see weed management plan), no evidence that feral animals are significantly affecting regeneration (visual assessment).	Regeneration recorded across all BOAs. Tubestock planting undertaken throughout Clifton, varying degrees of success overall; Limited regeneration in Clifton grassland sites. Richness of weed species is higher than 2023 levels. A number of priority target weeds are still present across the BOAs Impacts to regrowth from feral species was not considerable in 2024.	Additional assisted regeneration in open grassland areas, noting most grassland areas have been prepared for planting. Continue to implement management actions outlined in OAMP. Undertake brush-matting (where resources permit) in grassland areas (as per Recommendations). Continue feral animal management within all BOAs.
	Re-establish regionally significant vegetation communities consistent with remnant vegetation in areas zoned assisted regeneration and remediation.	Assisted regeneration and remediation areas within the Offset Areas contain flora species assemblage characteristic of the vegetation communities that are being created.	Data was collected from established monitoring sites to allow for timeline comparisons. Grassland canopy regeneration assistance may be required as limited natural regeneration exists particularly in COA, HOA and RNOA.	Focus assisted regeneration efforts in grassland areas. Continue to undertake scheduled seeding/planting works. Undertake brush-matting and soil amelioration measures in grassland areas (as per Recommendations).
	Re-establish or augment fauna habitats for native and threatened fauna (woodland/forest).	Regeneration and remediation areas contain flora species that provide food, shelter, and refuge opportunities for native and threatened fauna. Evidence of a range of vegetation structural habitats exists (e.g., canopy species, shrubs, ground cover, developing litter layer etc.) that are commensurate with native and threatened fauna that occur within the area. Native/threatened woodland fauna are utilising offset areas.	Regenerating species were noted to be appropriate to provide threatened species with habitat when mature. Differences in floristics between woodland and grassland sites remain. Regeneration of canopy species that provide habitat to fauna species is advancing in HOA and SOAs. Assistance in RNOA and COA is likely needed. Shrub regeneration is lacking across grassland areas in all BOAs. One threatened species was recorded during 2024,	Assistance in grassland regeneration and shrub regeneration may be beneficial. Continue to implement management and monitoring actions as per the OAMP.
	Re-establish and augment habitat for the GGBF (wetland and open grassland areas).	Green and Golden Bell Frog habitat reestablishment and augmentation areas contain flora species that are commensurate	A number of dams across RNOA have undergone habitat augmentation prior to the survey period. This included planting of sedges and rushes, the addition habitat structures including logs and rock	Continue to implement management actions as per the OAMP.

OAMP Reference	Objective	Target Criteria to be Achieved	2024 Monitoring Results	Corrective Actions
		with those known to provide habitat for this species.	piles. The majority of dams were dry during monitoring. No GGBF were recorded in 2024	HOA has the highest number of dams however the vast majority still lack suitable habitat. Augmentation at these dams likely beneficial. Consider alternate monitoring methods (as per Recommendations). More robust survey for *Gambusia holbrooki* necessary.
Table 7.3	Targeted weed removal across all offset properties to remove noxious and perennial weed species.	Decrease in abundance of all target weed species in first ten years.	Cover of target weed species has increased in 2024.	Continue weed mapping and focus on management plan priorities. Continue to implement management actions as per the OAMP with focus on areas described in this report.
		Weed infestations considered negligible across all four offset properties within 15 years.	Data was collected from established monitoring sites to allow for timeline comparisons and future analysis. Exotic species richness/density overall is lower across the BOA's however, some grassland sties carry large areas of exotic species.	
	Primary, secondary and maintenance weeding within areas zoned assisted regeneration and remediation, to prepare the sites for planting and maintain them so that weed infestation does not compromise the survival of planted seedlings.	Assisted regeneration and remediation areas within the Offset Areas are dominated by native species in all strata (trees, shrubs, groundcover).	Monitoring did not cover any areas with assisted regeneration. Some plots did exhibit areas of preparation to undertake assisted regeneration.	Continue to implement management actions as per the OAMP.
Table 8.1	To minimise browsing/disturbance of regeneration areas.	Minimal level of browsing observed (<10% of plants showing evidence of rabbit browsing in permanent plots).	Rabbits and Eastern Grey Kangaroos observed within the Hillcrest during the 2024 monitoring programme.	Continue feral rabbit management at RNOA and Hillcrest. Continue to implement management actions as per the OAMP.

OAMP Reference	Objective	Target Criteria to be Achieved	2024 Monitoring Results	Corrective Actions
		Disturbance by feral pigs (i.e. digging) is minimal (visual assessment).	Evidence feral pigs were recorded within Hillcrest areas during the 2024 monitoring programme. Though not recent.	Continue to implement management actions as per the OAMP.
	To minimise predation of, or competition with, native species by feral pest species.	Evidence of foxes/feral cats/wild dogs (including scats, dens, signs of predation) is minimal (Visual assessment).	No wild dogs were observed during the survey period.	Continue to implement management actions for feral animals as per the OAMP. Ensure monitoring of feral animals is conducted.
		Regular monitoring by PIR cameras show only occasional use of the site by feral predators.	PIR cameras were utilised during 2024 monitoring, no feral animals were observed on the images.	
Table 11.1	Increase habitat linkages between Davis and Bayswater Creeks in RNOA through augmenting /creating a series of dams.	A series of 10 dams with habitat specific to the GGBF have been created /augmented between Davis and Bayswater Creeks.	6 dams were considered to hold suitable habitat for the GGBF during 2024. This is due to the lack of water as a result of below average rainfall. Despite the lack of water a considerably higher number of dams would be considered suitable for the species in improved conditions due to management efforts	Continue to implement management actions as per the OAMP and OMP.
	Removal of Mosquito Fish from dams on all four properties.	Dams and waterways are free of Mosquito Fish.	No evidence of Mosquito Fish in dams surveyed. Mostly due to lack of water.	Continue monitoring for Mosquito Fish as per the OAMP. More detailed survey may be necessary to confidently confirm he species presence of absence.
	Maintain/augment GGBF habitat on RNOA and HOA.	All dams to include native emergent and fringing plant species, surrounding shelter sites and unshaded areas within three years.	The potential habitat for the GGBF increased during 2024, due to habitat augmentation. However was unlikely to be utilised during survey due to a lack of rainfall and dams being dry. This is expected to improve when average or above average rainfall returns.	Focus assisted plantings of suitable aquatic vegetation at dams identified as limited or not suitable habitat for the GGBF. Assisted plantings should aim to create dense patches of vegetation rather than sparse plantings. Continue to implement management actions as per the OAMP.
	Conduct ongoing annual Green and GGBF surveys on RNOA and HOA to provide a better understanding of the local population.	Increased understanding of the Hunter Catchment GGBF population.	No records of the GGBF during the 2024 monitoring programme.	Continue to implement management and monitoring actions as described in the OAMP. Implement other survey methods as discussed in Recommendations.

9. Conclusion

The 2024 monitoring programme has completed all monitoring actions required under the BMP, OM and OAMP for the Biodiversity Offset Areas. The results from this monitoring programme form the tenth consecutive year of flora and fauna surveys after the 2012 baseline surveys.

Vegetation condition assessments conducted in 2024 indicate an overall increase in species diversity across the BOAs. Diversity of exotic species increased considerably and are at similar levels to 2016-2019. Species richness for all BOAs still remains lower than the peak records of 2016 similarly to 2023 results though is not in decline. The increase in species richness in the current monitoring programme may be explained by the above average rainfall in the first half of 2024 allowing germination of species in the soil seed bank. Grassland and woodland sites have had an increase in exotic species diversity. Natural regeneration was apparent in many of the surveyed grassland plots. Some areas within COA and HOA do however lack evidence of regeneration. It is likely these areas will require assistance to encourage recruitment of canopy and shrub species. It is noted that many of these areas have been prepared to receive tube stock however supply and climatic conditions delayed planting. Control of species that actively graze (i.e. Kangaroos & Rabbits) natural regeneration is recommended to improve likelihood of success.

Bird census monitoring showed increased species richness in grassland plots across all BOAs. Bird richness in grassland plots was slightly higher when compared with woodland. This deviation however, is still unusual and should be noted for monitoring in following years. One threatened bird species was observed in 2024, the grey-crowned babbler. As in previous years, targeted surveys were unsuccessful for the regent honeyeater and swift parrot. It was noted that there was limited flowering of *Corymbia* at the time monitoring was conducted. As this is an important factor in determining the likelihood of the species presence recommendations have been made on survey timing and use of song meters to increase the likelihood of detection. Suitable habitat for these species remains present in all BOAs.

Hair tube survey did not detect any threatened fauna in 2024, nor did they collect any hair to be able to be analysed. Surveys for the Green and Golden Bell Frog was unsuccessful in 2024. Though suitable rainfall had not been recorded in the locality since July 2024. Conditions across the majority of dams was not suitable in 2024. Changes the survey method for the species may be of benefit if to detect the GGBF across the BOA's as discussed in the recommendations. These methods would also be able to be utilised to detect the Regent Honeyeater and Swift Parrot.

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11. Appendices

A-1 Flora List for each monitoring plot 2024

Common Name	Scientific Name	Native/exotic	CG1	CG2	CG3		CW1	CW2	CW3		All Clifton	HG1	HG2	HG3	HG4	HG5		HW1	HW2	HW3	HW4	HW5		All Hillcrest	RG1	RG2	RG3		RW1	RW2	RW3		All RNOA	SG1	SG2	SG3		SW1	SW2	SW3		All Stewart
Fan Wattle	*Acacia amblygona*	N																												x	x	x	x								
Hickory Wattle	*Acacia falcata*	N	x			x		x	x	x	x										x		x	x										x			x			x	x
Kangaroo Thorn	*Acacia paradoxa*	N	x		x	x	x	x		x	x	x					x							x																	
Native Willow	*Acacia salicina*	N																							x	x	x	x						x								
-	*Acacia sp.*	N										x					x					x	x	x																		
-	*Acaena ovina*	N													x									x																		
Common Maidenhair	*Adiantum aethiopicum*	N																				x		x	x																	
Bulloak	*Allocasuarina luehmannii*	N					x		x	x	x							x						x	x	x			x	x	x	x	x	x	x			x			x
Red Ash	*Alphitonia excelsa*																					x	x	x																		
Mistletoe	*Amyema miquelii*	N																																								
Rough-barked Apple	*Angophora floribunda*	N																				x		x	x																	
Wheatgrass	*Anthosachne scabra*	N											x			x	x		x					x																		
Purple Wiregrass	*Aristida ramosa*	N	x			x					x																			x		x	x					x		x	x
Threeawn Speargrass	*Aristida vagans*	N		x		x	x			x	x		x	x	x	x	x	x					x	x	x		x	x					x					x		x	x
Nodding Chocolate Lily	*Arthropodium fimbriatum*	N	x		x	x			x	x	x															x		x	x					x	x			x		x	x
Pale Vanilla-lily	*Arthropodium milleflorum*	N							x	x	x									x	x		x	x																	
Common Woodruff	*Asperula conferta*	N											x				x							x						x		x	x							
Speargrass	*Austrostipa scabra*	N	x			x		x		x	x					x	x			x		x	x	x	x			x	x	x		x	x				x			x	x
Slender Bamboo Grass	*Austrostipa verticillata*	N	x			x	x		x	x	x	x	x		x		x	x	x	x	x	x	x	x	x			x	x	x	x	x	x							
-	*Bossiaea rhombifolia*	N																																				x		x	x
Red Grass	*Bothriochloa macra*	N											x				x							x	x																
Kurrajong	*Brachychiton populneus*	N																				x	x	x	x						x	x	x							
Coffee Bush	*Breynia oblongifolia*	N					x	x	x	x	x					x	x					x	x	x	x			x	x									x		x	x
Blue Pincushion	*Brunonia australis*	N																												x			x	x							
Blue Trumpet	*Brunoniella australis*	N																													x	x	x	x				x			x	x
Blackthorn	*Bursaria spinosa*	N												x			x							x																		
Purple Burr-daisy	*Calotis cuneifolia*	N																	x					x	x																	
Yellow Burr-daisy	*Calotis lappulacea*	N					x			x	x			x			x	x	x		x		x	x	x			x				x	x					x		x	x
Scented-top Grass	*Capillipedium spicigerum*	N																																			x		x		x	x
Tall Sedge	*Carex appressa*	N																				x		x	x																	
-	*Carex inversa*	N										x	x		x		x				x			x	x																	
Cunninghams Everlasting	*Cassinia cunninghamii*	N																												x			x	x							
-	*Cassinia quinquefaria*	N					x		x	x	x																												x		x	x
Native Grape	*Cayratia clematidea*	N																				x		x	x																	
-	*Centaurium tenuiflorum*	N		x		x					x		x	x	x	x	x									x			x		x		x	x								
Indian Pennywort	*Centella asiatica*	N							x	x	x																										x			x			x
Bristly Cloak Fern	*Cheilanthes distans*	N	x	x		x		x	x	x	x			x	x	x	x						x	x	x	x	x		x	x	x		x	x	x		x	x	x	x	x	x
-	*Cheilanthes sieberi*	N														x	x																									
Plumb Windmill Grass	*Chloris ventricosa*	N						x		x	x		x			x	x							x																		
Common Everlasting	*Chrysocephalum apiculatum*	N					x	x	x	x	x			x			x	x	x				x	x	x			x		x		x	x			x			x	x	x
Headache Vine	*Clematis glycinoides*	N																				x		x	x						x		x	x							
-	*Commelina cyanea*	N													x		x					x		x	x																	
Blushing Bindweed	*Convolvulus erubescens*	N																													x		x	x							
Spotted Gum	*Corymbia maculata*	N					x			x	x			x	x	x	x	x	x	x	x	x	x	x	x													x			x	x
Carrot Weed	*Cotula australis*	N																			x			x	x																	
Iron Weed	*Cyanthillium cinereum*	N																																				x		x	x

Common Name	Scientific Name	Native/exotic	CG1	CG2	CG3		CW1	CW2	CW3		All Clifton	HG1	HG2	HG3	HG4	HG5		HW1	HW2	HW3	HW4	HW5		All Hillcrest	RG1	RG2	RG3		RW1	RW2	RW3		All RNOA	SG1	SG2	SG3		SW1	SW2	SW3		All Stewart
Barbed Wire Grass	*Cymbopogon refractus*	N	x	x	x	x		x	x	x	x	x		x		x	x					x	x	x	x		x	x					x	x			x	x	x	x	x	x
Couch	*Cynodon dactylon*	N																	x				x	x																		
Slender Flat-sedge	*Cyperus gracilis*	N																	x		x		x	x																		
-	*Daucus spp.*	N												x	x		x						x	x																		
Gorse Bitter Pea	*Daviesia ulicifolia*	N							x	x	x							x					x	x																x		x	x
-	*Desmodium spp.*	N													x		x							x																		
Slender Tick-trefoil	*Desmodium varians*	N					x	x	x	x	x			x	x	x	x	x				x	x	x	x			x	x	x		x	x		x		x	x		x	x	x
Blue Flax-lily	*Dianella caerulea*	N		x		x	x	x	x	x	x							x			x	x	x	x						x		x	x		x		x	x	x		x	x
-	*Dichanthium spp.*	N																							x			x		x		x	x									
Shorthair Plumegrass	*Dichelachne micrantha*	N	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x		x	x	x	x	x	x					x	x	x	x	x	x		x	x	X
-	*Dichelachne spp.*	N																																		x	x					x
Kidney Weed	*Dichondra repens*	N					x	x	x	x	x	x		x	x	x	x			x	x		x	x			x	x	x	x	x	x	x					x			x	x
-	*Digitaria spp.*	N																											x	x		x	X									
Bushy Hedgehog-grass	*Echinopogon caespitosus*	N						x	x	x	x										x		x	x															x		x	x
Forest Hedgehog Grass	*Echinopogon ovatus*	N							x	x	x				x		x				x		x	x																		
Berry Saltbush	*Einadia hastata*	N																	x				x	x					x			x	X									
Climbing Saltbush	*Einadia nutans*	N						x		x	x					x	x							X																		
Bordered Panic	*Entolasia marginata*	N																											x			x	x									
Wiry Panic	*Entolasia stricta*	N					x			x	x																												x	x	x	x
Ruby Saltbush	*Epaltes australis*	N																																								
Bordered Panic	*Eragrostis brownii*	N	x	x	x	x		x	x	x	x	x	x			x	x			x		x	x	x			x	x					x		x		x	x			x	x
Paddock Lovegrass	*Eragrostis leptostachya*	N																																		x	x					x
Winter Apple	*Eremophila debilis*	N																		x			x	x						x	x	x	x					x			x	x
Narrow-leaved Ironbark	*Eucalyptus crebra*	N		x	x	x	x	x	x	x	x		x	x		x	x	x	x	x		x	x	x						x		x	x	x	x		x	x		x	x	X
Grey Box	*Eucalyptus moluccana*	N																													x	x	x					x	x		x	x
Forest Red Gum	*Eucalyptus tereticornis*	N		x		x		x		x	x							x			x	x	x	x			x	x	x			x	x	x	x		x		x		x	x
-	*Euchiton sphaericus*	N						x	x	x	x			x			x							x	x		x	x	x			x	x									
Wombat Berry	*Eustrephus latifolius*	N																			x		x	x																		
Common Fringe-sedge	*Fimbristylis dichotoma*	N										x					x							x																		
-	*Galium leptogonium*	N																			x		x	x																		
-	*Geranium homeanum*	N												x			x							x																		
Native Geranium	*Geranium solanderi*	N										x	x	x	x		x			x	x		x	x	x			x					x									
Cobbler's Tack	*Glossocardia bidens*																													x		x	x									
-	*Glycine clandestina*	N					x			x	x	x				x	x							x						x		x	x							x	x	x
-	*Glycine tabacina*	N						x		x	x		x		x		x	x	x	x	x	x	x	x		x		x			x	x	x									
Forest Goodenia	*Goodenia hederacea*	N					x			x	x							x					x	x						x	x	x	x						x		x	x
Hoary Guinea Flower	*Hibbertia obtusifolia*	N	x			x		x	x	x	x					x	x	x				x	x	x														x			x	x
Stinking Pennywort	*Hydrocotyle laxiflora*	N					x			x	x															x		x														
Small St. John's Wort	*Hypericum gramineum*	N					x		x	x	x	x					x							x	x	x		x		x		x	x	x			x	x		x	x	x
Golden Weather-grass	*Hypoxis hygrometrica*	N																																x			x			x	x	x

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Common Name	Scientific Name	Native/exotic	CG1	CG2	CG3		CW1	CW2	CW3		All Clifton	HG1	HG2	HG3	HG4	HG5		HW1	HW2	HW3	HW4	HW5		All Hillcrest	RG1	RG2	RG3		RW1	RW2	RW3		All RNOA	SG1	SG2	SG3		SW1	SW2	SW3		All Stewart
Blady Grass	*Imperata cylindrica*	N																x					x	x																	
Stiff Jasmine	*Jasminum volubile*	N																			x		x	x																	
-	*Juncus continuus*	N					x		x	x	x		x				x							x																	
-	*Juncus usitatus*	N										x					x							x										x	x		x				x
Blowngrass	*Lachnagrostis aemula*	N		x		x			x	x	x																														
-	*Lachnagrostis filiformis*	N																																				x	x	x
Slender Wire Lily	*Laxmannia gracilis*	N							x	x	x																													
-	*Lepidium spp.*	N																	x				x	x																
Peach Heath	*Lissanthe strigosa*	N		x		x	x		x	x	x							x					x	x												x		x		x	x
Whiteroot	*Lobelia purpurascens*	N					x	x	x	x	x			x			x				x		x	x												x		x	x	x	x
Mat-rush	*Lomandra confertifolia*	N	x	x		x	x	x	x	x	x				x		x				x		x	x	x	x		x	x	x		x	x			x				x
-	*Lomandra confertifolia subsp. leptostachya*	N																										x	x						x						
Wattle Mat-rush	*Lomandra filiformis*	N					x			x	x			x		x	x	x				x	x	x											x		x	x	x	x	x
Many-flowered Mat-rush	*Lomandra multiflora*	N																x				x	x	x	x			x										x	x		x	x
Small-leaf Bluebush	*Maireana microphylla*	N																	x	x			x	X																	
Urn-heath	*Melichrus urceolatus*	N	x			x					x																														
Creeping Mint	*Mentha satureioides*	N										x					x							x																	
Weeping Grass	*Microlaena stipoides*	N						x	x	x	x		x	x	x		x		x	x	x	x	x	x	x		x	x	x			x	x		x	x	x	x	x	x
Slender Onion Orchid	*Microtis parviflora*	N	x	x		x					x																									x					x
-	*Microtis spp.*	N			x	x			x	x	x																x	x					x			x			x	x
Common Onion Orchid	*Microtis unifolia*	N																																x		x					x
Western Boobialla	*Myoporum montanum*	N																				x		x	x																
Large-mock Olive	*Notelaea longifolia*	N																					x	x	x									x	x	x						
Native Olive	*Notelaea microcarpa*	N					x	x		x	x											x		x	x													x			x	x
-	*Notelaea ovata*	N																				x		x	x																
-	*Opercularia diphylla**	N					x	x		x	x													x	x													x	x		x	x
-	*Oxalis spp.*	N						x		x	x				x	x	x		x	x			x	x	x	x			x							x					
Rice Flower	*Ozothamnus diosmifolius*	N																x					x																		
Thyme Spurge	*Phyllanthus hirtellus*	N												x			x					x		x	x																
	Phyllanthus virgatus	N						x		x	x																														
Native Daphne	*Pittosporum undulatum*	N																				x	x	x	x																
Narrow plantain	*Plantago gaudichaudii*	N																								x		x													
-	*Plantago spp.*	N					x		x	x	x																														
Cockspur Flower	*Plectranthus parviflorus*	N													x		x					x		x	x																
Tussock	*Poa labillardierei*	N										x	x		x	x	x					x	x	x	x																
-	*Poa sieberiana*	N																		x				x	x														x		x	X
-	*Poa spp.*	N												x			x								x																
Shiny-leaved Canthium	*Psydrax odorata*	N																				x		x	X																
Notched Bush-pea	*Pultenaea retusa*	N																																				x		x	x
Native Raspberry	*Rubus parvifolius*	N																				x		x	x																
Swamp Dock	*Rumex brownii*	N													x	x			x			x		x	X																
Ringed Wallaby Grass	*Rytidosperma caespitosum*	N							x	x	x		x				x								x					x			x	x						

Common Name	Scientific Name	Native/exotic	CG1	CG2	CG3		CW1	CW2	CW3		All Clifton	HG1	HG2	HG3	HG4	HG5		HW1	HW2	HW3	HW4	HW5		All Hillcrest	RG1	RG2	RG3		RW1	RW2	RW3		All RNOA	SG1	SG2	SG3		SW1	SW2	SW3		All Stewart
Silvertop Wallaby Grass	*Rytidosperma pallidum*	N																			x		x	x																	
-	*Rytidosperma racemosum*	N											x				x							x														x		x	x
Wallaby Grass	*Rytidosperma bipartitum*	N																																							
Spike Centaury	*Schenkia australis*	N																																	x	x	x				X
Common Bog-rush	*Schoenus apogon*	N																											x	x		x	x						x	x	x
Cotton Fireweed	*Senecio quadridentatus*	N																			x		x	x					x			x	x								
Corrugated Sida	*Sida corrugata*	N											x				x			x			x	x						x		x	x								
Golden Rod	*Sida hackettiana*	N												x		x	x	x					x	x																	
Indian Weed	*Sigesbeckia orientalis*	N						x		x	x	x	x	x	x	x	x					x	x	x															x	x	x
Narrawa Burr	*Solanum cinereum*	N													x		x		x	x				x	x																
Forest Nightshade	*Solanum prinophyllum*	N																										x	x	x		x	x					x		x	x
Devil's Needles	*Solanum stelligerum*	N											x		x		x				x		x	x	x																
Western Rat-tail Grass	*Sporobolus creber*	N			x	x				x	x	x				x	x						x	x	x																
Spreading-nut heads	*Spaeromorphaea australis*	N							x	x	x																								x		x				x
Western Stackhousia	*Stackhousia muricata*	N										x					x							x	x			x		x		x	x	x	x			x	x	x
Slender Stackhousia	*Stackhousia viminea*	N																																					x		x	X
Smooth Darling-pea	*Swainsona galegifolia*	N																				x		x	x																
Kangaroo Grass	*Themeda triandra*	N					x		x	x	x			x			x						x	x						x		x	x					x	x	x	x
Native Peach	*Trema tomentosa*	N						x		x	x											x	x	x	x																
Yellow Autumn-lily	*Tricoryne elatior*	N																									x	x	x	x	x		x	x					x	x	x
-	*Verbena spp.*	N										x			x		x								x																
Trailing Speedwell	*Veronica plebeia*	N					x			x	x			x	x		x		x	x			x	x	x			x	x			x	x			x				x
-	*Vittadinia spp.*	N																	x				x	x																	
-	*Vittadinia sulcata*	N																				x	x	x																	
Tufted Bluebell	*Wahlenbergia communis*	N						x	x	x	x								x		x		x	x				x	x			x	x			x				
Sprawling Bluebell	*Wahlenbergia gracilis*	N					x	x		x	x			x			x			x		x	x	x					x			x								
Narrow-leaved Carpet Grass**	*Axonopus fissifolius***	HTE																																							
Green Cestrum**	*Cestrum parqui***	HTE																																							
Rhodes Grass**	*Chloris gayana***	HTE		x		x					x																														
Galenia**	*Galenia pubescens***	HTE											x	x			x			x	x			x	x																x
Blue Heliotrope**	*Heliotropium amplexicaule***	HTE	x		x	x		x		x	x						x	x						x												x	x	x	x	x
Coolatai Grass**	*Hyparrhenia hirta***	HTE	x			x					x												x	x	x	x	x	x	x		x		x	x						
Common Olive**	*Olea europaea***	HTE																										x	x					x						
Common Prickly Pear**	*Opuntia stricta***	HTE	x			x		x		x	x						x	x					x	x	x			x	x					x						
Paspalum**	*Paspalum dilatatum***	HTE			x	x					x	x	x					x						x	x											x	x	x	x		x
Onion Grass**	*Romulea rosea***	HTE											x	x				x						x	x																
Fireweed**	*Senecio madagascariensis***	HTE	x		x	x		x	x	x	x		x		x	x	x		x	x	x	x	x	x	x	x	x	x						x	x	x	x	x		x	x	x
Golden Wreath Wattle	*Acacia saligna*	E																							x			x	x					x						
Mexican Poppy	*Argemone ochroleuca*	E													x		x								x																

Common Name	Scientific Name	Native/exotic	CG1	CG2	CG3		CW1	CW2	CW3		All Clifton	HG1	HG2	HG3	HG4	HG5		HW1	HW2	HW3	HW4	HW5		All Hillcrest	RG1	RG2	RG3		RW1	RW2	RW3		All RNOA	SG1	SG2	SG3		SW1	SW2	SW3		All Stewart
Onion Weed	*Asphodelus fistulosus*	E			x	x					x																														
Cobblers Pegs*	*Bidens pilosa**	E													x	x	x		x		x		x	x		x		x	x			x	x								
Quaking Grass	*Briza maxima*	E													x	x	x							x																	
Shivery Grass*	*Briza minor**	E	x	x	x	x					x	x		x	x		x							x			x	x					x	x	x	x	x		x	x	x
-	*Briza subaristata*	E		x	x	x		x		x	x	x					x							x										x	x	x				x
Prairie Grass	*Bromus catharticus*	E																	x				x	x																	
Soft Brome	*Bromus hordeaceus*	E										x	x	x	x		x		x				x	x																	
Spear Thistle*	*Cirsium vulgare**	E											x				x		x			x	x	x																	
Flaxleaf Fleabane*	*Conyza bonariensis**	E																							x			x	x			x	x							x
Slender Celery	*Cyclospermum leptophyllum*	E										x	x		x	x	x							x	x	x		x											x	x
-	*Dichondra micrantha*	E																	x				x	x																
Annual Trampweed*	*Facelis retusa**	E		x		x					x							x					x	x	x		x	x						x						
-	*Gamochaeta coarctata*	E		x		x		x	x	x	x			x			x							x			x	x	x		x	x							
Narrow-leaved Cotton Bush*	*Gomphocarpus fruticosus**	E										x	x		x		x							x																
Balloon Cotton Bush	*Gomphocarpus physocarpus*	E																							x	x		x					x			x				x
Catsear*	*Hypochaeris radicata**	E		x	x	x			x	x	x																x	x					x	x	x	x	x		x	x
Prickly Lettuce	*Lactuca serriola*	E																																			x		x	x
West-Indian Lantana	*Lantana camara*	E																							x			x					x							
Trailing Lantana	*Lantana montevidensis*	E																	x				x	x																
Formosan Lily	*Lilium formosanum*	E																			x		x	x																
Pelisser's Toadflax	*Linaria pelisseriana*	E	x			x					x			x	x		x							x				x								x	x				x
French Flax*	*Linum trigynum**	E	x		x	x					x	x				x	x							x	x	x		x		x			x							
Wimmera Ryegrass	*Lolium rigidum*	E												x			x							x																
Scarlet Pimpernel*	*Lysimachia arvensis**	E	x	x		x		x		x	x				x		x		x	x		x	x	x	x	x		x					x	x			x	x		x	x
Small-flowered Mallow	*Malva parviflora*	E																	x				x	x																
Burr Medic*	*Medicago polymorpha**	E													x		x							x																
-	*Medicago sp.**	E																																						
Red Natal Grass*	*Melinis repens**	E		x	x	x	x	x		x	x					x	x	x				x	x	x													x		x	x
Lesser Snapdragon	*Misopates orontium*	E										x			x		x							x								x		x	x					
Red-flowered Mallow*	*Modiola caroliniana**	E											x				x							x																
Large Tick-trefoil	*Oxytes brachypoda*	E												x			x							x																
-	*Petrorhagia dubia**	E			x	x					x	x		x		x	x					x	x	x																
Lamb's Tongues*	*Plantago lanceolata**	E			x	x					x	x	x		x		x							x		x		x					x			x	x		x	x
South African Pigeon Grass	*Setaria sphacelata*	E																								x		x	x			x	x							
Paddy's Lucerne*	*Sida rhombifolia**	E										x		x			x		x	x	x		x	x	x			x					x							
French Catchfly	*Silene gallica*	E										x	x	x	x	x	x							x																	
Scourweed	*Sisyrinchium rosulatum*	E																								x		x							x						x
Hedge Mustard*	*Sisymbrium officinale**	E																																						
Black-berry Nightshade	*Solanum nigrum*	E																	x	x	x		x	x									x			x	x			

Common Name	Scientific Name	Native/exotic	CG1	CG2	CG3		CW1	CW2	CW3		All Clifton	HG1	HG2	HG3	HG4	HG5		HW1	HW2	HW3	HW4	HW5		All Hillcrest	RG1	RG2	RG3		RW1	RW2	RW3		All RNOA	SG1	SG2	SG3		SW1	SW2	SW3		All Stewart
Common Sowthistle*	*Sonchus oleraceus**	E																	x	x		x	x	x																	
Giant Paramatta Grass	*Sporobolus fertilis*	E																																							
Stagger Weed*	*Stachys arvensis**	E											x				x						x	x										x			x			x	x
Stinking Roger*	*Tagetes minuta**	E																	x				x	x																	
-	*Teucrium junceum*	E																				x		x	x			x	x	x	x	x	x								
Yellow Hawkweed*	*Tolpis barbata**	E		x	x	x												x						x	x																
Haresfoot Clover	*Trifolium arvense*	E												x		x	x																								
Hop Clover	*Trifolium campestre*	E																	x				x	x																	
Clustered Clover	*Trifolium glomeratum*	E											x		x	x	x							x	x	x			x												
-	*Trifolium spp.*	E																					x	x	x																
Twiggy Mullein*	*Verbascum virgatum**	E																																							
Purpletop*	*Verbena bonariensis**	E										x	x				x								x	x	x		x					x		x	x	x			x

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A-2 Flora Species List

Table 12: Full flora list derived from vegetation condition assessments conducted in 2024

Common Name	Scientific Name	Native/Exotic	Clifton		Hillcrest		RNOA		Stewart	
			Grass	Wood	Grass	Wood	Grass	Wood	Grass	Wood
Fan Wattle	*Acacia amblygona*	N						x		
Hickory Wattle	*Acacia falcata*	N	x	x		x			x	x
Kangaroo Thorn	*Acacia paradoxa*	N	x	x	x					
Native Willow	*Acacia salicina*	N					x			
-	*Acacia sp.*	N			x					
-	*Acaena ovina*	N			x					
Common Maidenhair	*Adiantum aethiopicum*	N				x				
Bulloak	*Allocasuarina luehmannii*	N		x		x	x	x	x	
Red Ash	*Alphitonia excelsa*	N				x				
Rough-barked Apple	*Angophora floribunda*	N				x				
Wheatgrass	*Anthosachne scabra*	N			x	x				
Purple Wiregrass	*Aristida ramosa*	N	x					x		x
Threeawn Speargrass	*Aristida vagans*	N	x	x	x	x	x			x
Nodding Chocolate Lily	*Arthropodium fimbriatum*	N	x	x			x		x	x
Pale Vanilla-lily	*Arthropodium milleflorum*	N		x		x				
Common Woodruff	*Asperula conferta*	N			x			x		
Speargrass	*Austrostipa scabra*	N	x	x	x	x	x	x		x
Slender Bamboo Grass	*Austrostipa verticillata*	N	x	x	x	x	x	x		
-	*Bossiaea rhombifolia*	N								x
Red Grass	*Bothriochloa macra*	N			x					
Kurrajong	*Brachychiton populneus*	N				x	x			x
Coffee Bush	*Breynia oblongifolia*	N		x	x	x	x			x
Blue Pincushion	*Brunonia australis*	N						x		x
Blue Trumpet	*Brunoniella australis*	N						x		x
Blackthorn	*Bursaria spinosa*	N			x					
Purple Burr-daisy	*Calotis cuneifolia*	N				x				
Yellow Burr-daisy	*Calotis lappulacea*	N		x	x	x	x	x		x
Scented-top Grass	*Capillipedium spicigerum*	N							x	x
Tall Sedge	*Carex appressa*	N				x				
-	*Carex inversa*	N			x	x				
Cunninghams Everlasting	*Cassinia cunninghamii*	N						x		
-	*Cassinia quinquefaria*	N		x						x

Common Name	Scientific Name	Native/Exotic	Clifton		Hillcrest		RNOA		Stewart	
			Grass	Wood	Grass	Wood	Grass	Wood	Grass	Wood
Native Grape	*Cayratia clematidea*	N						x		
-	*Centaurium tenuiflorum*	N	x		x		x	x		
Indian Pennywort	*Centella asiatica*	N		x					x	
Bristly Cloak Fern	*Cheilanthes distans*	N	x	x	x	x	x	x	x	x
-	*Cheilanthes sieberi*	N				x				
Plumb Windmill Grass	*Chloris ventricosa*	N		x	x					
Common Everlasting	*Chrysocephalum apiculatum*	N		x	x	x	x	x	x	x
Headache Vine	*Clematis glycinoides*	N				x		x		
-	*Commelina cyanea*	N			x	x				
Blushing Bindweed	*Convolvulus erubescens*	N						x		
Spotted Gum	*Corymbia maculata*	N		x	x	x				x
Carrot Weed	*Cotula australis*	N				x				
Iron Weed	*Cyanthillium cinereum*	N								x
Barbed Wire Grass	*Cymbopogon refractus*	N	x	x	x	x	x		x	x
Couch	*Cynodon dactylon*	N				x				
Slender Flat-sedge	*Cyperus gracilis*	N				x				
-	*Daucus spp.*	N			x					
Gorse Bitter Pea	*Daviesia ulicifolia*	N		x		x				x
-	*Desmodium spp.*	N			x					
Slender Tick-trefoil	*Desmodium varians*	N		x		x	x	x	x	x
Blue Flax-lily	*Dianella caerulea*	N	x	x		x		x	x	x
-	*Dichanthium spp.*	N					x	x		
Shorthair Plumegrass	*Dichelachne micrantha*	N	x	x	x	x	x		x	x
-	*Dichelachne spp.*	N							x	
Kidney Weed	*Dichondra repens*	N		x	x	x	x	x		x
-	*Digitaria spp.*	N						x		
Bushy Hedgehog-grass	*Echinopogon caespitosus*	N		x		x				x
Forest Hedgehog Grass	*Echinopogon ovatus*	N		x	x	x				
Berry Saltbush	*Einadia hastata*	N				x		x		
Climbing Saltbush	*Einadia nutans*	N		x	x					
Bordered Panic	*Entolasia marginata*	N						x		
Wiry Panic	*Entolasia stricta*	N		x						x
Bordered Panic	*Eragrostis brownii*	N	x	x	x	x	x		x	x
Paddock Lovegrass	*Eragrostis leptostachya*	N							x	
Winter Apple	*Eremophila debilis*	N				x		x		x
Narrow-leaved Ironbark	*Eucalyptus crebra*	N	x	x	x	x		x	x	x
Grey Box	*Eucalyptus moluccana*	N						x		x

Common Name	Scientific Name	Native/Exotic	Clifton		Hillcrest		RNOA		Stewart	
			Grass	Wood	Grass	Wood	Grass	Wood	Grass	Wood
Forest Red Gum	*Eucalyptus tereticornis*	N	x	x		x	x	x	x	x
-	*Euchiton sphaericus*	N		x	x		x	x		
Wombat Berry	*Eustrephus latifolius*	N				x				
Common Fringe-sedge	*Fimbristylis dichotoma*	N			x					
-	*Galium leptogonium*	N				x				
-	*Geranium homeanum*	N			x					
Native Geranium	*Geranium solanderi*	N			x	x	x			
Cobbler's Tack	*Glossocardia bidens*	N						x		
-	*Glycine clandestina*	N		x	x			x		x
-	*Glycine tabacina*	N		x	x	x	x	x		
Forest Goodenia	*Goodenia hederacea*	N		x		x		x		
Hoary Guinea Flower	*Hibbertia obtusifolia*	N	x	x	x	x				x
Stinking Pennywort	*Hydrocotyle laxiflora*	N		x			x			
Small St. John's Wort	*Hypericum gramineum*	N		x	x		x	x	x	x
Golden Weather-grass	*Hypoxis hygrometrica*	N							x	x
Blady Grass	*Imperata cylindrica*	N				x				
Stiff Jasmine	*Jasminum volubile*	N				x				
-	*Juncus continuus*	N		x	x					
-	*Juncus usitatus*	N			x				x	
Blowngrass	*Lachnagrostis aemula*	N	x	x						
-	*Lachnagrostis filiformis*	N								x
Slender Wire Lily	*Laxmannia gracilis*	N		x						
-	*Lepidium spp.*	N					x			
Peach Heath	*Lissanthe strigosa*	N	x	x		x			x	x
Whiteroot	*Lobelia purpurascens*	N		x	x	x			x	x
Mat-rush	*Lomandra confertifolia*	N	x	x	x	x	x	x	x	
-	*Lomandra confertifolia subsp. leptostachya*	N					x			
Wattle Mat-rush	*Lomandra filiformis*	N		x	x	x			x	x
Many-flowered Mat-rush	*Lomandra multiflora*	N				x	x			x
Small-leaf Bluebush	*Maireana microphylla*	N					x			
Urn-heath	*Melichrus urceolatus*	N	x							
Creeping Mint	*Mentha satureioides*	N			x					
Weeping Grass	*Microlaena stipoides*	N		x	x	x	x	x	x	x
Slender Onion Orchid	*Microtis parviflora*	N	x						x	
-	*Microtis spp.*	N	x	x			x		x	x
Common Onion Orchid	*Microtis unifolia*	N							x	
Western Boobialla	*Myoporum montanum*	N				x				

Common Name	Scientific Name	Native/Exotic	Clifton		Hillcrest		RNOA		Stewart	
			Grass	Wood	Grass	Wood	Grass	Wood	Grass	Wood
Large-mock Olive	*Notelaea longifolia*	N				x		x		
Native Olive	*Notelaea microcarpa*	N		x		x				x
-	*Notelaea ovata*	N				x				
-	*Opercularia diphylla**	N		x						x
-	*Oxalis spp.*	N		x	x	x	x			
Rice Flower	*Ozothamnus diosmifolius*	N				x				
Thyme Spurge	*Phyllanthus hirtellus*	N			x	x				
	Phyllanthus virgatus	N		x						
Native Daphne	*Pittosporum undulatum*	N				x				
Narrow plantain	*Plantago gaudichaudii*	N					x			
-	*Plantago spp.*	N		x						
Cockspur Flower	*Plectranthus parviflorus*	N			x	x				
Tussock	*Poa labillardierei*	N			x	x				
-	*Poa sieberiana*	N				x				x
-	*Poa spp.*	N			x					
Shiny-leaved Canthium	*Psydrax odorata*	N				x				
Notched Bush-pea	*Pultenaea retusa*	N								x
Native Raspberry	*Rubus parvifolius*	N				x				
Swamp Dock	*Rumex brownii*	N			x	x				
Ringed Wallaby Grass	*Rytidosperma caespitosum*	N		x	x			x		
Silvertop Wallaby Grass	*Rytidosperma pallidum*	N				x				
-	*Rytidosperma racemosum*	N			x					x
Spike Centaury	*Schenkia australis*	N							x	
Common Bog-rush	*Schoenus apogon*	N						x		x
Cotton Fireweed	*Senecio quadridentatus*	N						x		
Corrugated Sida	*Sida corrugata*	N			x	x		x		
Golden Rod	*Sida hackettiana*	N			x	x				
Indian Weed	*Sigesbeckia orientalis*	N		x	x	x				
Narrawa Burr	*Solanum cinereum*	N			x	x				
Forest Nightshade	*Solanum prinophyllum*	N					x	x		
Devil's Needles	*Solanum stelligerum*	N			x	x				
Western Rat-tail Grass	*Sporobolus creber*	N	x		x	x				
Spreading-nut heads	*Spaeromorphaea australis*	N		x					x	
Western Stackhousia	*Stackhousia muricata*	N			x		x	x	x	x
Slender Stackhousia	*Stackhousia viminea*	N								x
Smooth Darling-pea	*Swainsona galegifolia*	N				x				
Kangaroo Grass	*Themeda triandra*	N		x	x			x		x

Common Name	Scientific Name	Native/Exotic	Clifton		Hillcrest		RNOA		Stewart	
			Grass	Wood	Grass	Wood	Grass	Wood	Grass	Wood
Native Peach	*Trema tomentosa*	N		x		x				
Yellow Autumn-lily	*Tricoryne elatior*	N					x	x		x
-	*Verbena spp.*	N			x					
Trailing Speedwell	*Veronica plebeia*	N		x	x	x	x	x	x	
-	*Vittadinia spp.*	N				x				
-	*Vittadinia sulcata*	N				x				
Tufted Bluebell	*Wahlenbergia communis*	N		x		x	x	x		
Sprawling Bluebell	*Wahlenbergia gracilis*	N		x	x	x	x			
Rhodes Grass**	*Chloris gayana***	HTE	x							
Galenia**	*Galenia pubescens***	HTE			x	x	x			
Blue Heliotrope**	*Heliotropium amplexicaule***	HTE	x	x	x				x	x
Coolatai Grass**	*Hyparrhenia hirta***	HTE	x			x	x	x		
Common Olive**	*Olea europaea***	HTE					x			
Common Prickly Pear**	*Opuntia stricta***	HTE	x	x	x	x	x			
Paspalum**	*Paspalum dilatatum***	HTE	x		x				x	
Onion Grass**	*Romulea rosea***	HTE			x					
Fireweed**	*Senecio madagascariensis***	HTE	x	x	x	x	x		x	x
Golden Wreath Wattle	*Acacia saligna*	E					x			
Mexican Poppy	*Argemone ochroleuca*	E			x					
Onion Weed	*Asphodelus fistulosus*	E	x							
Cobblers Pegs*	*Bidens pilosa**	E			x	x	x	x		
Quaking Grass	*Briza maxima*	E			x					
Shivery Grass*	*Briza minor**	E	x		x		x		x	x
-	*Briza subaristata*	E	x	x	x				x	x
Prairie Grass	*Bromus catharticus*	E					x			
Soft Brome	*Bromus hordeaceus*	E			x	x				
Spear Thistle*	*Cirsium vulgare**	E			x	x				
Flaxleaf Fleabane*	*Conyza bonariensis**	E					x	x	x	
Slender Celery	*Cyclospermum leptophyllum*	E			x		x		x	
-	*Dichondra micrantha*	E				x				
Annual Trampweed*	*Facelis retusa**	E	x			x	x			
-	*Gamochaeta coarctata*	E	x	x	x		x	x		
Narrow-leaved Cotton Bush*	*Gomphocarpus fruticosus**	E			x					
Balloon Cotton Bush	*Gomphocarpus physocarpus*	E						x	x	
Catsear*	*Hypochaeris radicata**	E	x	x			x		x	x
Prickly Lettuce	*Lactuca serriola*	E								x
West-Indian Lantana	*Lantana camara*	E					x			

Common Name	Scientific Name	Native/Exotic	Clifton		Hillcrest		RNOA		Stewart	
			Grass	Wood	Grass	Wood	Grass	Wood	Grass	Wood
Trailing Lantana	*Lantana montevidensis*	E				x				
Formosan Lily	*Lilium formosanum*	E				x				
Pelisser's Toadflax	*Linaria pelisseriana*	E	x		x		x		x	
French Flax*	*Linum trigynum**	E	x		x		x	x		
Wimmera Ryegrass	*Lolium rigidum*	E			x		x	x		
Scarlet Pimpernel*	*Lysimachia arvensis**	E	x	x	x	x	x		x	x
Small-flowered Mallow	*Malva parviflora*	E				x				
Burr Medic*	*Medicago polymorpha**	E			x					
Red Natal Grass*	*Melinis repens**	E	x	x	x	x				x
Lesser Snapdragon	*Misopates orontium*	E			x			x		
Red-flowered Mallow*	*Modiola caroliniana**	E			x					
Large Tick-trefoil	*Oxytes brachypoda*	E			x					
-	*Petrorhagia dubia**	E	x		x	x				
Lamb's Tongues*	*Plantago lanceolata**	E	x		x		x		x	x
South African Pigeon Grass	*Setaria sphacelata*	E					x	x		
Paddy's Lucerne*	*Sida rhombifolia**	E			x	x	x			
French Catchfly	*Silene gallica*	E			x					
Scourweed	*Sisyrinchium rosulatum*	E					x		x	
Black-berry Nightshade	*Solanum nigrum*	E				x		x		
Common Sowthistle*	*Sonchus oleraceus**	E				x	x	x		
Stagger Weed*	*Stachys arvensis**	E			x				x	
Stinking Roger*	*Tagetes minuta**	E				x				
-	*Teucrium junceum*	E				x	x	x		
Yellow Hawkweed*	*Tolpis barbata**	E	x			x				
Haresfoot Clover	*Trifolium arvense*	E			x					
Hop Clover	*Trifolium campestre*	E				x				
Clustered Clover	*Trifolium glomeratum*	E			x		x			
-	*Trifolium spp.*	E				x				
Purpletop*	*Verbena bonariensis**	E			x		x		x	

A-3 Fauna Species List

Table 13: Full faunal list derived from all biodiversity monitoring surveys conducted in 2023

Class	Common Name	Species	Clifton	Hillcrest	Rav North	Stewart
Amphibia	Common Eastern Froglet	*Crinia signifera*		x	x	
	Eastern Dwarf Tree Frog	*Litoria fallax*		x	x	
	Broad-palmed Rocket Frog	*Litoria latopalmata*			x	
	Emerald-spotted Tree Frog	*Litoria peronii*		x	x	
	Striped Rocket Frog	*Litoria nasuta*			x	
	Striped Marsh Frog	*Limnodynasted peronii*			x	
Aves	Quail sp.	-	x	x		
	Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*				
	Yellow Thornbill	*Acanthiza nana*				
	Brown Thornbill	*Acanthiza pusilla*	x	x	x	x
	Buff-rumped Thornbill	*Acanthiza reguloides*				
	King Parrot	*Alistreus scapularis*		x		
	Pacific Black Duck	*Anas superciliosa*	x	x	x	x
	Red Wattlebird	*Anthochaera carunculata*				
	Little Wattlebird	*Anthochaera chrysoptera*				
	Australasian Pipit	*Anthus australis*	x	x	x	x
	Wedge-tailed Eagle	*Aquila audax*	x	x		
	Sulphur-crested Cockatoo	*Cacatua galerita*	x	x	x	x
	Little Corella	*Cacatua sanguinea*	x	x	x	x
	Fan-tailed Cuckoo	*Cacomantis flabelliformis*		x		
	Pallid Cuckoo	*Cacomantis pallidus*				
	Horsfield's Bronze-Cuckoo	*Chalcites basalis*				
	Australian Wood Duck	*Chenonetta jubata*	x	x	x	x
	Brown Songlark	*Cincloramphus cruralis*		x	x	
	Golden-headed Cisticola	*Cisticola exilis*	x	x		x
	Grey Shrike-thrush	*Colluricincla harmonica*		x		
	Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	x	x		x
	White-winged Chough	*Corcorax melanorhamphos*	x	x	x	x
	White-throated Treecreeper	*Cormobates leucophaea*				
	Australian Raven	*Corvus coronoides*	x	x	x	x
	Torresian Crow	*Corvus orru*				
	Stubble Quail	*Coturnix pectoralis*				

Class	Common Name	Species	Clifton	Hillcrest	Rav North	Stewart
	Pied Butcherbird	*Cracticus nigrogularis*		x	x	
	Australian Magpie	*Cracticus tibicen*	x		x	x
	Grey Butcherbird	*Cracticus torquatus*	x			
	Laughing Kookaburra	*Dacelo novaeguineae*	x			x
	Varied Sitella	*Daphoenositta chrysoptera*				
	White-faced Heron	*Egretta novaehollandiae*		x		
	Blue-faced Honeyeater	*Entomyzon cyanotis*	x			x
	Galah	*Eolophus roseicapilla*				x
	Eastern Koel	*Eudynamis orientalis*	x	x	x	x
	Brown Falcon	*Falco berigora*				
	Nankeen Kestrel	*Falco cenchroides*	x	x		x
	Eurasian Coot	*Fulica atra*	x	x	x	x
	Bar-shouldered Dove	*Geopelia humeralis*	x	x	x	x
	White-throated Gerygone	*Gerygone albogularis*	x	x		x
	Brown Gerygone	*Gerygone mouki*				
	Musk Lorikeet	*Glossopsitta concinna*				
	Magpie Lark	*Grallina cyanoleuca*	x		x	x
	White-bellied Sea-eagle	*Haliaeetus leucogaster*				
	Welcome Swallow	*Hirundo neoXena*	x	x	x	x
	Yellow-faced Honeyeater	*Lichenostomus chrysops*		x		
	Superb Fairywren	*Malurus cyaneus*	x	x	x	x
	Variegated Fairy-wren	*Malurus lamberti*				
	Noisy Miner	*Manorina melanocephala*	x	x	x	x
	Tawny Grassbird	*Megalurus timoriensis*				
	Lewin's Honeyeater	*Meliphaga lewinii*		x		
	Brown-headed Honeyeater	*Melithreptus brevirostris*	x			x
	Jacky Winter	*Microeca fascinans*				
	Plum-headed Finch	*Neochmia modesta*				
	Red-browed finch	*Neochmia temporalis*		x		
	White-eared Honeyeater	*Nesoptilotis leucotis*				
	Crested Pigeon	*Ocyphaps lophotes*	x		x	x
	Olive-backed Oriole	*Oriolus sagittatus*		x		
	Golden Whistler	*Pachycephala pectoralis*				
	Rufous Whistler	*Pachycephala rufiventris*		x		x
	Spotted Pardalote	*Pardalotus punctatus*				
	Striated Pardalote	*Pardalotus striatus*	x	x		
	Fairy Martin	*Petrochelidon ariel*	x	x	x	x

Class	Common Name	Species	Clifton	Hillcrest	Rav North	Stewart
	Flame Robin	*Petroica phoenica*				
	Pied Cormorant	*Phalacrocorax varius*		x	x	
	Common Bronzewing	*Phaps chalcoptera*				
	Noisy Friarbird	*Philemon corniculatus*		x		x
	Crimson Rosella	*Platycercus elegans*		x		
	Eastern Rosella	*Platycercus eximius*	x	x	x	x
	Grey-crowed Babbler	*Pomatostomus temporalis*			x	
	Red-rumped Parrot	*Psephotus haematonotus*				
	Satin Bowerbird	*Ptilonorhynchus violaceus*				
	Grey Fantail	*Rhipidura albiscapa*	x	x	x	x
	Willie Wagtail	*Rhipidura leucophrys*	x	x	x	x
	Rufous Fantail	*Rhipidura rufufrons*		x		
	Channel-billed Cuckoo	*Scythrops novaehollandiae*		x		
	White-browed Scrubwren	*Sericornis frontalis*				
	Weebill	*Smicrornis brevirostris*				
	Australasian Figbird	*Sphecotheres vielloti*				
	Pied Currawong	*Strepera graculina*	x	x	x	
	Australasian Grebe	*Tachybaptus novahollandiae*		x		
	Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*				
	Rainbow Lorikeet	*Trichoglossus haematodus*	x	x		
	Masked Lapwing	*Vanellus miles*	x		x	
	Silvereye	*Zosterops lateralis*				
	Eastern Grey Kangaroo	*Macropus giganteus*	x	x	x	x
	Red-necked Wallaby	*Macropus rufogriseus*	x	x		
	European Rabbit*	*Oryctolagus cuniculus**		x	x	
	Wild Pig*	*Sus scrofa**		x	x	
	Common Brushtail Possum	*Trichosurus vulpecula*			x	
Reptilia	Lace Monitor	*Varanus varius*	x	x	x	x
	Tree Skink	*Egernia striolata*			x	
	Bearded Dragon	*Pogona vitticeps*		x		

Key: invasive species (*); species listed as threatened under the BC Act and/or EPBC Act (bold);

A-4 RNOA Cumulative Fauna Species List

Table 14: Full faunal list derived from all monitoring surveys in RNOA

Common Name	Scientific Name	Pre 2016	2016	2018	2019	2020	2021	2022	2023	2024
Amphibia										
Common Eastern Froglet	*Crinia signifera*	VIS	VIS	VIS		VIS	VIS		VIS	VIS
Eastern Banjo Frog	*Limnodynastes dumerilii*	VIS								
Long-thumbed Frog	*Limnodynastes fletcheri*	VIS								
Brown-striped Frog	*Limnodynastes peronii*	VIS								VIS
Spotted Marsh Frog	*Limnodynastes tasmaniensis*	VIS	VIS	VIS		VIS			VIS	
Green and Golden Bell Frog	*Litoria aurea*	VIS								
Eastern Dwarf Tree Frog	*Litoria fallax*	VIS	VIS	VIS		VIS	VIS	VIS	VIS	VIS
Broad-palmed Rocket Frog	*Litoria latopalmata*	VIS	VIS		VIS	VIS	VIS	VIS	VIS	
Striped Rocket Frog	*Litoria nasuta*			VIS		VIS				VIS
Peron's Tree Frog	*Litoria peronii*	VIS	VIS	VIS		VIS	VIS	VIS		VIS
Whistling Tree Frog	*Litoria verreauxii*		VIS							
Brown Broodfrog	*Pseudophryne bibronii*						VIS			
Dusky Toadlet	*Uperoleia fusca*			VIS			VIS			
Eastern Toadlet	*Uperoleia laevigata*		VIS			VIS				
Aves										
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	VIS	VIS	VIS	VIS					
Yellow Thornbill	*Acanthiza nana*	VIS	VIS	VIS	VIS		VIS		VIS	
Brown Thornbill	*Acanthiza pusilla*					VIS	VIS			VIS
Buff-rumped Thornbill	*Acanthiza reguloides*	VIS	VIS	VIS		VIS			VIS	
Collared Sparrowhawk	*Accipiter cirrocephalus*			VIS						
Australian Reed-warlber	*Acrocephalus australis*					VIS				
King Parrot	*Alisterus scapularis*								VIS	

Common Name	Scientific Name	Pre 2016	2016	2018	2019	2020	2021	2022	2023	2024
Pacific Black Duck	*Anas superciliosa*			VIS	VIS				VIS	VIS
Red Wattlebird	*Anthochaera carunculata*	VIS								
Little Wattlebird	*Anthochaera chrysoptera*									
Australasian Pipit	*Anthus australis*						VIS		VIS	VIS
Wedge-tailed Eagle	*Aquila auda*		VIS	VIS	VIS		VIS		VIS	
Hardhead	*Aythya australis*			VIS						
Sulphur-crested Cockatoo	*Cacatua galerita*									VIS
Little Corella	*Cacatua sanguinea*			VIS						VIS
Pallid Cuckoo	*Cacomantis pallidus*			VIS	VIS		VIS	VIS	VIS	
Fan-tailed Cuckoo	Cacomantis flabelliformis								VIS	
Horsfield's Bronze-Cuckoo	*Chalcites basalis*						VIS			
Australian Wood Duck	*Chenonetta jubata*		VIS		VIS	VIS		VIS	VIS	VIS
Speckled Warbler	*Chthonicola sagittata*	VIS	VIS	VIS	VIS					
Brown Songlark	*Cincloramphus cruralis*						VIS		VIS	VIS
Golden-headed Cisticola	*Cisticola exilis*							Vis	VIS	
Brown Treecreeper	*Climacteris picumnus victoriae*	VIS								
Grey Shrike-thrush	*Colluricincla harmonica*	VIS		VIS	VIS			VIS		
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS	
White-winged Chough	*Corcorax melanorhamphos*	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS
White-throated Treecreeper	*Cormobates leucophaea*	VIS						**VIS**		
Australian Raven	*Corvus coronoides*	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS
Little Raven	*Corvus mellori*	VIS								
Torresian Crow	*Corvus orru*			VIS			VIS			
Quail sp.	*Coturnix sp.*					VIS				
Stubble quail	*Coturnix pectoralis*									
Pied Butcherbird	*Cracticus nigrogularis*	VIS	VIS		VIS	VIS	VIS		VIS	VIS

Common Name	Scientific Name	Pre 2016	2016	2018	2019	2020	2021	2022	2023	2024
Australian Magpie	*Cracticus tibicen*	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS
Grey Butcherbird	*Cracticus torquatus*	VIS	VIS		VIS	VIS	VIS		VIS	
Laughing Kookaburra	*Dacelo novaeguineae*			VIS	VIS	VIS	VIS	VIS	VIS	
Varied Sittella	***Daphoenositta chrysoptera***		**VIS**	**VIS**				**Vis**	VIS	
Mistletoebird	*Dicaeum hirundinaceum*	VIS	VIS							
White-faced Heron	*Egretta novaehollandiae*		VIS							
Galah	*Eolophus roseicapilla*					VIS				
Eastern Koel	*Eudynamis orientalis*									VIS
Dollarbird	*Eurystomus orientalis*	VIS								
Black Falcon	*Falco subniger*			VIS						
Eurasian Coot	*Fulica cenchroides*									VIS
Bar-shouldered Dove	*Geopelia humeralis*			VIS	VIS	VIS				VIS
White-throated Gerygone	*Gerygone albogularis*			VIS	VIS					
Musk Lorikeet	*Glossopsitta concinna*		VIS							
Magpie Lark	*Grallina cyanoleuca*			VIS		VIS	VIS		VIS	VIS
White-bellied Sea-eagle	***Haliaeetus leucogaster***								**VIS**	
White-throated Needle-tail	***Hirundapus caudacutus***							**VIS**		
Welcome Swallow	*Hirundo neoxena*	VIS		VIS	VIS	VIS	VIS		VIS	VIS
Yellow-faced Honeyeater	*Lichenostomus chrysops*				VIS			*VIS*	VIS	
Superb Fairy-wren	*Malurus cyaneus*	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS
Variegated Fairy-wren	*Malurus lamberti*	VIS					VIS			
Noisy Miner	*Manorina melanocephala*	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS
Tawny Grassbird	*Megalurus timoriensis*					VIS				
Lewin's Honeyeater	*Meliphaga lewinii*						VIS			
Brown-headed Honeyeater	*Melithreptus brevirostris*			VIS		VIS		VIS		
Rainbow Bee-eater	*Merops ornatus*	VIS								

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Little Pied Cormorant	*Microcarbo melanoleucos*		VIS							
Jacky Winter	*Microeca fascinans*	VIS			VIS		VIS		VIS	
Satin Flycatcher	*Myiagra cyanoleuca*	VIS								
Scarlet Honeyeater	*Myzomela sanguinolenta*					VIS				
Southern Boobook	*Ninox novaeseelandiae*		VIS							
Crested Pigeon	*Ocyphaps lophotes*					VIS	VIS			VIS
Olive-backed Oriole	*Oriolus sagittatus*	VIS				VIS	VIS	VIS	VIS	
Golden Whistler	*Pachycephala pectoralis*		VIS	VIS	VIS	VIS			VIS	
Rufous Whistler	*Pachycephala rufiventris*	VIS	VIS	VIS	VIS	VIS				
Spotted Pardalote	*Pardalotus punctatus*	VIS	VIS	VIS	VIS					
Striated Pardalote	*Pardalotus striatus*	VIS	VIS		VIS	VIS	VIS	VIS	VIS	
Fairy Martin	*Petrochelidon ariel*					VIS				VIS
Pied Cormorant	*Phalacrocoracids varius*						VIS			VIS
Scarlet Robin	*Petroica boodang*	VIS								
Flame Robin	***Petroica phoenicea***								**VIS**	
Red-capped Robin	*Petroica goodenovii*	VIS	VIS	VIS		VIS				
Common Bronzewing	*Phaps chalcoptera*		VIS		VIS	VIS	VIS			
Noisy Friarbird	*Philemon corniculatus*		VIS	VIS	VIS	VIS	VIS	VIS	VIS	
Crimson Rosella	*Platycercus elegans*								VIS	
Eastern Rosella	*Platycercus eximius*		VIS	VIS					VIS	VIS
Striped Honeyeater	*Plectorhyncha lanceolata*	VIS								
Grey-crowned Babbler	***Pomatostomus temporalis***	**VIS**	**VIS**	**VIS**		**VIS**	**VIS**	**VIS**	**VIS**	**VIS**
Satin Bowerbird	*Ptilonorhynchus violaceus*		VIS				VIS	VIS		
White-plumed Honeyeater	*Ptilotula penicillata*	VIS		VIS						
Grey Fantail	*Rhipidura albiscapa*	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS
Willie Wagtail	*Rhipidura leucophrys*	VIS	VIS	VIS	VIS		VIS	VIS	VIS	VIS

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Rufous Fantail	*Rhipidura rufufrons*			VIS			VIS			
Channel-billed Cuckoo	*Scythrops novaehollandiae*	VIS		VIS		VIS		VIS	VIS	
White-browed Scrubwren	*Sericornis frontalis*		VIS						VIS	
Weebill	*Smicrornis brevirostris*	VIS	VIS		VIS	VIS	VIS	VIS	VIS	
Pied Currawong	*Strepera graculina*	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS	VIS
Australasian Grebe	*Tachybaptus novaehollandiae*		VIS			VIS		VIS	VIS	
Double-barred Finch	*Taeniopygia bichenovii*	VIS	VIS		VIS	VIS				
Forest Kingfisher	*Todiramphus macleayii*	VIS								
Sacred Kingfisher	*Todiramphus sanctus*	VIS		VIS						
Rainbow Lorikeet	*Trichoglossus haematodus*						VIS			
Masked Lapwing	*Vanellus miles*			VIS	VIS		VIS		VIS	VIS
Silvereye	*Zosterops lateralis*						VIS		VIS	
Mammalia										
Yellow-footed Antechinus	*Antechinus flavipes*	VIS								
Brown Antechinus	*Antechinus stuartii*	VIS								
White-striped Free-tailed Bat	*Austronomus australis*	VIS	VIS	VIS	VIS	VIS		Ana		
Wild Dog*	*Canis lupus familiaris**	VIS	VIS	VIS	VIS				Pers. Comms.	
Wild Goat*	*Capra hircus**				VIS					
Gould's Wattled Bat	*Chalinolobus gouldii*	VIS	VIS	VIS	VIS			Ana		
Chocolate Wattled Bat	*Chalinolobus morio*	VIS			VIS	VIS		Ana		
Feral Cat*	*Felis catus**	VIS	VIS			VIS				VIS
Northern Brown Bandicoot	*Isoodon macrourus*						VIS			
Brown Hare*	*Lepus capensis**	VIS	VIS	VIS	VIS	VIS			VIS	VIS
Eastern Grey Kangaroo	*Macropus giganteus*	VIS	VIS	VIS	VIS	VIS	VIS		VIS	VIS
Common Wallaroo	*Macropus robustus*	VIS						VIS	VIS	VIS

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Red-necked Wallaby	*Macropus rufogriseus*	VIS	VIS		VIS	VIS	VIS	VIS	VIS	VIS
Little Bent-wing Bat	*Miniopterus australis*	VIS								
Large Bent-winged Bat	*Miniopterus orianae oceanensis*	VIS	VIS	VIS	VIS			Ana		
Eastern Free-tail Bat	*Mormopterus norfolkensis*	VIS	VIS							
House Mouse	*Mus musculus*	VIS								
Lesser Long-eared Bat	*Nyctophilus geoffroyi*	VIS								
European Rabbit*	*Oryctolagus cuniculus**	VIS	VIS	VIS	VIS	VIS	VIS		VIS	VIS
Southern Free-tailed Bat	*Ozimops planiceps*	VIS	VIS	VIS	VIS			Ana		
Eastern Free-tailed Bat	*Ozimops ridei*				VIS			Ana		
Long-nosed Bandicoot	*Perameles nasuta*					VIS				
Brush-tailed Phascogale	*Phascogale tapoatafa*					VIS				
Grey-headed Flying-fox	*Pteropus poliocephalus*	VIS				VIS				
Little Red Flying Fox	*Pteropus scapulatus*					VIS				
Black Rat	*Rattus rattus*	VIS								
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*		VIS							
Greater Broad-nosed Bat	***Scoteanax rueppellii***							**Ana**		
Inland Broad-nosed Bat	*Scotorepens balstoni*	VIS	VIS					Ana		
Eastern Broad-nosed Bat	*Scotorepens orion*	VIS						Ana		
Common Dunnart	*Sminthopsis murina*	VIS								
Wild Pig*	*Sus scrofa**						VIS	Track	Track	
Short-beaked Echidna	*Tachyglossus aculeatus*	VIS	VIS			VIS				
Common Brushtail Possum	*Trichosurus vulpecula*		VIS	VIS	VIS	VIS	VIS		Hair	VIS
Southern Forest Bat	*Vespadelus regulus*	VIS								
Little Forest Bat	*Vespadelus vulturnus*	VIS			VIS			Ana		
Common Wombat	*Vombatus ursinus*	VIS							VIS	
Red Fox*	*Vulpes vulpes**	VIS	VIS		VIS	VIS				

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Swamp Wallaby	*Wallabia bicolor*	VIS								
Reptilia										
Southern Rainbow-skink	*Carlia tetradactyla*	VIS								
Eastern Long-necked Turtle	*Chelodina longicollis*				VIS					
Robust Ctenotus	*Ctenotus robustus*	VIS	VIS							
Copper-tailed Skink	*Ctenotus taeniolatus*	VIS								
Wood Gecko	*Diplodactylus vittatus*	VIS								
Tree Skink	*Egernia striolata*	VIS	VIS						VIS	VIS
Eastern Water Dragon	*Intellagama lesueurii*		VIS	VIS	VIS				VIS	VIS
Dark-flecked Garden Sunskink	*Lampropholis delicata*	VIS	VIS							
Pale-flecked Garden Sunskink	*Lampropholis guichenoti*	VIS	VIS							
Bearded Dragon	*Pogona barbata*	VIS							VIS	VIS
Lace Monitor	*Varanus varius*	VIS	VIS		VIS	VIS	VIS		VIS	VIS
Key: invasive species (*); species listed as threatened under the BC Act and/or EPBC Act (**bold**).										