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Macraes Phase 4 Fast-track

Avifauna Values Assessment

for: Oceana Gold (New Zealand) Limited

Job No: 68766BIO2

Version: Rev 0

Date of Issue: 21 August 2026

DOCUMENT APPROVAL AND REVISION HISTORY

Document title	Macraes Phase 4 Fast-track
	Avifauna Values Assessment
Prepared for	Oceana Gold (New Zealand) Limited
Version	Rev 0
Date	21 August 2026
Filename	E5_MP4Fast_Avifaunavaluesassessment_REV 0_020926

Author(s)	Michael Anderson Senior ecologist
Reviewer(s)	Chris Wedding Ecology Manager
	Michaela Scarrott Terrestrial Ecologist

Rev. no.	Date	Author(s)
Final	21 August 2026	Michael Anderson

Reference: Bioresearches (2026). Avifauna Values Assessment. Report for OceanaGold New Zealand Limited. 155 p.

Cover Illustration: New Zealand Falcon | Kārearea (*Falco novaeseelandiae*), Macraes, Otago. Photo by Michaela Scarrott

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List of Abbreviations

Abbreviation	Full Term
5MBC	Five-Minute Bird Count(s)
ARU	Autonomous Recording Unit
BRWRS	Back Road Waste Rock Stack
DOC	Department of Conservation
EcIA	Ecological Impact Assessment
EcIAG	Ecological Impact Assessment Guidelines
EIANZ	Environmental Institute of Australia and New Zealand
FTSF	Frasers Tailings Storage Facility
GBIF	Global Biodiversity Information Facility
MEEA	Murphy's Ecological Enhancement Area
MP4	Macraes Phase 4
NPSIB	National Policy Statement for Indigenous Biodiversity
PAM	Passive Acoustic Monitoring
RMA	Resource Management Act 1991
RPS	Regional Policy Statement
WRS	Waste Rock Stack

1 EXECUTIVE SUMMARY

This Avifauna Values Assessment has been prepared to inform the Macraes Phase 4 (MP4) Project. The assessment identifies bird species present within the Project Footprint and wider assessment area, assigns ecological values in accordance with the Ecological Impact Assessment Guidelines (EcIAG) for use in New Zealand, and identifies avifauna values relevant to the wider ecological impact assessment (EcIA).

Survey Methods

Avifauna presence and values were assessed using:

- Desktop review of GBIF, eBird, iNaturalist and other relevant datasets within a 10 km buffer;
- Five-Minute Bird Counts (5MBC) undertaken during spring / early summer 2025 and autumn 2026;
- Passive Acoustic Monitoring using Department of Conservation AR4 units;
- Targeted pond and waterfowl counts;
- Targeted fernbird playback surveys; and
- Incidental observations recorded during field visits.

Avifauna Assemblage

The avifauna assemblage within the MP4 Project area is typical of modified inland pastoral and mining environments in Central Otago. It is numerically dominated by introduced passerines and widespread indigenous open-country species.

Indigenous species confirmed within the Project area include open-country, wetland-associated, riparian, shrubland-associated, and generalist taxa. Overall indigenous species diversity is generally low to moderate and reflects the modified character of the Project area, with higher diversity associated with ponds, wetlands, riparian gullies, shrubland, and enhancement areas, including the Murphys Ecological Enhancement Area (MEEA) and Cranky Jims.

Threatened and At-Risk Species

The species listed in Table 1.1 were confirmed within the Project Footprint or wider MP4 assessment area and are the principal drivers of avifauna ecological value. For most species, records indicate foraging, movement or intermittent habitat use rather than confirmed breeding within the MP4 impact project area. Banded dotterel (*Anarhynchus bicinctus)*, South Island pied oystercatcher (SIPO) (*Haematopus finschi)* and New Zealand pipit (*Anthus novaeseelandiae*) were detected in open-country habitats that may provide potential breeding habitat. Eastern falcon (*Falco novaeseelandiae)* were recorded using the wider mining, pastoral and restoration landscape, but no nest sites were identified within the impact project area. Fernbird (*Poodytes punctatus*) was detected at low frequency, and current evidence indicates intermittent or transient use rather than confirmed resident occupancy.

Table 1.1. Summary of Threatened and At-Risk species detected during avifauna surveys for the Project.

Species	National threat status	Regional threat status	Locations detected	Recorded breeding / resident
Eastern falcon | kārearea	Nationally Vulnerable	Regionally Vulnerable	Camp Creek, Coal Creek, Coronation North, Central Mining Area, Golden Bar, GPUG / Golden Point, MEEA and Cranky Jims. Additional incidental observations were distributed across operational areas and proposed enhancement or restoration areas.	No nest sites were identified within the impact project area. Records indicate use of the wider mining, pastoral and restoration landscape for foraging, movement, calling and perching. A pair calling and flying together over MEEA may indicate territorial or pair-bonding behaviour, but breeding was not confirmed.
Banded dotterel | pohowera	At Risk – Declining	Regionally Vulnerable	Coronation North and Central Mining Area.	Detected during the breeding season and recorded using open, sparsely vegetated ground. Breeding within suitable open-country habitat is highly likely but was not confirmed.
South Island pied oystercatcher | tōrea	At Risk – Declining	Regionally Vulnerable	MEEA, Camp Creek, Coronation North, Golden Bar, GPUG and BRWRS, with incidental records from Coronation, Camp Creek, Macraes Central and Golden Bar.	Detected during the breeding season and recorded foraging, flying over, using roadside margins, sitting on rocky substrates and using short pasture. Breeding within suitable open-country habitat is highly likely but was not confirmed.
New Zealand pipit | pīhoihoi	At Risk – Declining	Regionally Not Threatened	Coal Creek, Coronation North, Central Mining Area, GPUG, BRWRS and MEEA.	Detected during breeding and non-breeding season surveys, indicating continued use of open-country habitat. Breeding behaviour not recorded, but nests are highly cryptic. Breeding highly likely. Resident use is likely in the broader open-country landscape.
Black shag | māpunga / kōau	At Risk – Relict	Regionally Endangered	Camp Creek and Coronation North in the values assessment detection table.	No breeding colony was identified. Records are interpreted as foraging or loafing use of ponds, pit lakes, open water and riparian habitats rather than resident breeding use. Not detected directly within the Project area.
Fernbird | mātātā	At Risk – Declining	Regionally Declining	Coronation North, GPUG / Golden Point and BRWRS, with anecdotal observations from wetland habitats associated with the BRWRS / GPUG extension area and nearby wetlands.	Not detected during targeted playback surveys. One acoustic detection and anecdotal observations indicate presence at Coronation North. Two anecdotal observations at GPUG/Golden Point, but outside impact areas. Current evidence suggests intermittent or transient use in impact areas rather than confirmed resident occupancy or breeding. Potentially resident within OGL Landholdings though.
Silvereye | tauhou	Not Threatened	Regionally Declining	MEEA, Camp Creek, Golden Bar, Golden Bar Haul Road, Cranky Jims and vegetated margins, with incidental observations associated with shrubland, gullies, pine forest margins and enhancement areas.	No breeding was recorded, but highly likely in suitable habitats. The species is associated with structurally diverse woody vegetation and enhancement areas. Very little suitable habitat within the Project area.

Ecological Value

Overall avifauna habitat values vary between Project components. Coronation North, Central Mining Area, Golden Bar, Golden Point Underground (GPUG), Back Road Waste Rock Stack (BRWRS), and the MEEA are assessed as having Moderate avifauna habitat value. Golden Bar Haul Road is assessed as having Low avifauna habitat value.

Species values were assigned using the higher of national or regional conservation status where relevant. Eastern falcon, banded dotterel, South Island pied oystercatcher (SIPO) and black shag are assigned Very High species value. New Zealand pipit, fernbird and silvereye are assigned High species value. Other indigenous

species recorded within the Project area are generally assigned Low species value. Introduced species dominate numerically but do not contribute ecological value under the EIANZ framework.

Overall, the avifauna ecological value of the MP4 Project Footprint is assessed as Moderate. This reflects the confirmed presence and habitat use of several Threatened, At Risk and regionally declining bird species within a predominantly modified pastoral and mining landscape. The Project area does not support extensive intact indigenous bird habitat or known breeding colonies of highly threatened taxa. However, it provides functional foraging, movement and potential breeding habitat for several indigenous bird species of conservation concern, particularly open-country ground-nesting species, mobile raptors, and locally occurring wetland, riparian and shrubland-associated taxa.

Conclusions

The MP4 Project area supports an avifauna assemblage typical of modified inland pastoral and mining environments in Central Otago. Although the area is substantially modified, it provides functional habitat for several indigenous species of conservation concern. The principal avifauna values are associated with eastern falcon use of the wider landscape, open-country habitats used by banded dotterel, South Island pied oystercatcher and New Zealand pipit, pond and riparian habitats used by black shag, and localised wetland, riparian and shrubland habitats used intermittently by fernbird and silvereye.

Overall avifauna ecological value is assessed as **Moderate**. This report addresses avifauna values only. The assessment of effects on avifauna, including avoidance, minimisation, remediation, monitoring, residual effects, and any offset or compensation requirements, is addressed in the wider Ecological Impact Assessment, Residual Effects Analysis Report: Terrestrial Ecology, and Avifauna Management and Monitoring Plan prepared for MP4.

2 INTRODUCTION

2.1 Macraes Phase 4 Project Description

OceanaGold (New Zealand) Limited ("**OGNZL**") currently undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes Flat, East Otago. As part of their ongoing operations, OGNZL continually review the remaining life of the Macraes Operation in light of updated knowledge of the gold resource and the economics of mining.

Reflecting recent exploration success and optimisation work, together with higher gold prices, the Macraes Phase Four Project ("**MP4**" or "**the Project**") seeks to extend the life of mining at the Macraes Operation until at least 2039. The Project, which will enable ongoing gold production at a rate of approximately 130,000 ounces per annum, is identified as a Listed Project in Schedule 2 of the Fast-track Approvals Act 2024 ("**FTAA**") as a project providing significant national or regional benefits.

To support the development of the substantive application for the Project, OGNZL has engaged Bioresearches to provide an assessment of the Project's effects on Avifauna Values and, to the extent required, identify any necessary management and operation measures to address any such effects.

This Avifauna Values Assessment (AVA) has been prepared to support the proposed MP4 Project (hereby referred to as 'the Project'). The Project involves the continuation and expansion of mining activities within five impact areas and three non-impact areas, as shown in Figure 2.3 and discussed in Section 2.3.2 (the 'Project areas'). The scope of this report is to:

- Characterise the avifauna assemblage present within the site, based on a combination of desktop review and field surveys.
- Identify species of conservation concern, including taxa classified as Threatened or At Risk under the New Zealand Threat Classification System (Robertson *et al.*, 2021), and where relevant, regional conservation status assessments (Jarvie *et al.*, 2025).
- Describe the habitats present and assess their functional role for avifauna, including breeding, foraging, roosting, and movement corridors.
- Assign ecological values to avifauna and associated habitats using the EIANZ EcIA framework for value assessment.

2.1.1 Site Location and Description

OGNZL owns and operates the Macraes Operation at Macraes, approximately 30 km northwest of Palmerston in the Otago Region. The Macraes Operation is the largest gold mine in New Zealand and, since commissioning in 1990, has produced more than 6 million ounces of gold.

Macraes Flat is situated on an elevated plateau at approximately 500 m above sea level. The plateau is flanked by the Taieri Ridge to the northwest, Shag Valley and Horse Range to the east, and the coastal hills and extinct volcanic cones of Palmerston and Waikouaiti to the southeast. Macraes Road provides access to Macraes Flat and the Macraes Operation, connecting to State Highway 85 to the east and State Highway 87 (SH87, the Middlemarch–Hyde Road) to the west.

The environment within and surrounding the Macraes Operation has been shaped by historic and current mining activities. Figure 2.1 shows the arrangement of the major mine features at the Macraes Operation. In summary, the current components of the Macraes Operation include:

- Numerous open pits (both operational and non-operational);
- Two underground mines (Frasers, now closed, and Golden Point, which is actively mined);
- Waste rock stacks at various stages of operation and rehabilitation;
- A network of haul roads and general mine service tracks;
- A Processing Plant;
- Five tailings storage facilities (three inactive, one active but nearing capacity, and one under construction and currently receiving tailings);
- An extensive network of water management infrastructure, including diversion drains, silt ponds, sumps, pit lakes, and freshwater storage reservoirs;
- Two consented but not yet constructed water storage reservoirs (Camp Creek Dam and Coal Creek Dam); and
- Associated infrastructure supporting ongoing operations, including district roads, powerlines, workshops, offices, and associated water and amenity facilities.

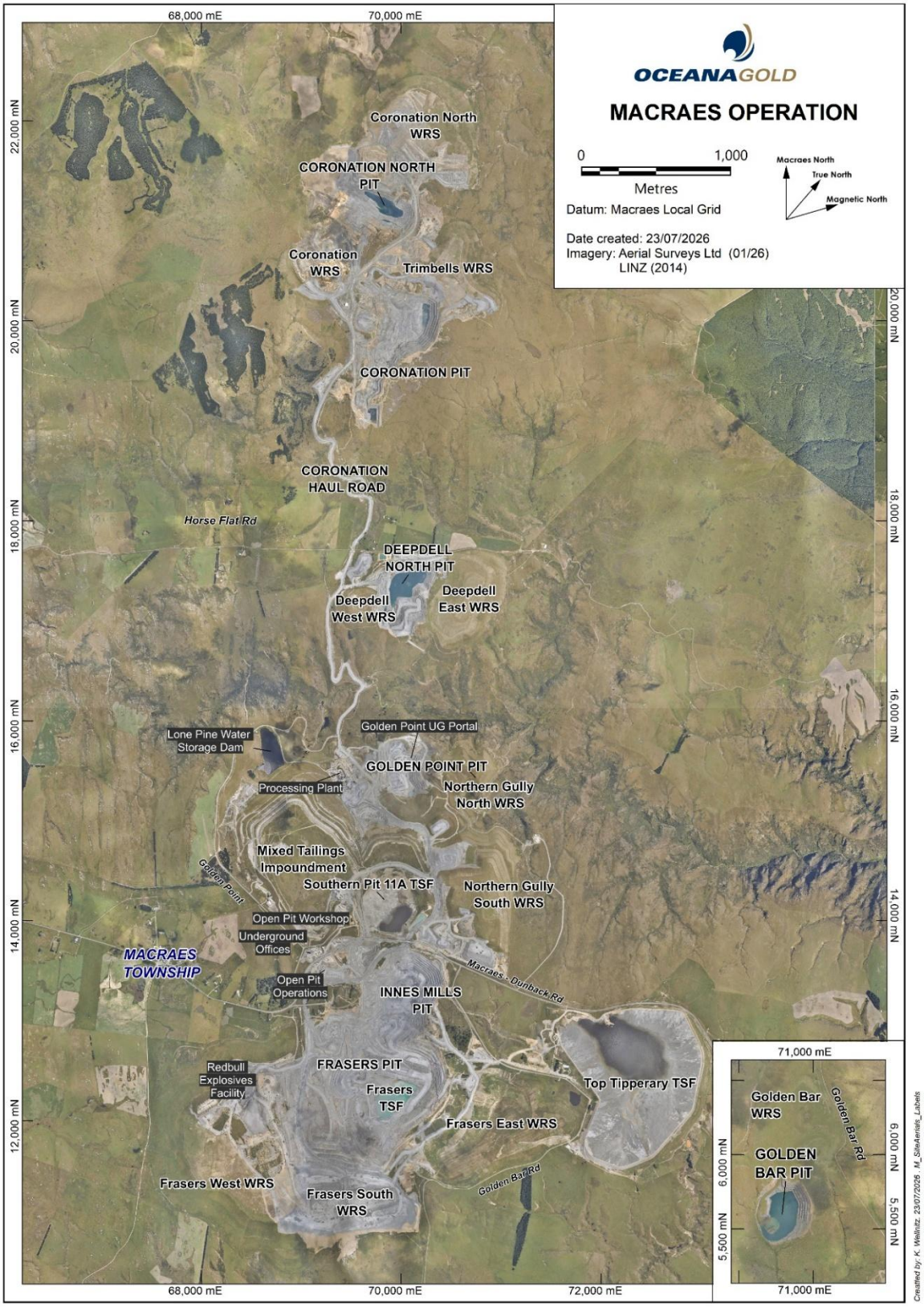


Figure 2.1. Existing site layout at the Macraes Operation (as of July 2026)

2.1.2 Project Overview

The Project is made up of the following proposed key activities:

- **Open pit extensions** at Coronation, Coronation North, Innes Mills, and Golden Bar.
- **Underground mine expansion** through further development of the Golden Point Underground mine ("**GPUG**").
- **Tailings management**, including:
    - Construction of the Frasers Tailings Storage Facility ("**FTSF**") Stage 3 to accommodate a total tailings storage of up to 153 Mt; and
    - Hydraulic mining and relocation of tailings from the Mixed Tailings Impoundment ("**MTI**"), Southern Pit Option 10 TSF ("**SP10**"), and Southern Pit Option 11A TSF ("**SP11**") to FTSF.
- **Waste rock disposal**, including increased storage capacity within open pits and at existing waste rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, and Frasers.
- **Water management infrastructure and operations**, including:
    - Construction of Camp Creek and Coal Creek water storage dams for flow and water quality management;
    - Construction, operation and maintenance of a Water Treatment Plant; and
    - Ongoing operation and maintenance of the Mine Water Management System ("**MWMS**").
- **Infrastructure and roading works**, including:
    - Realignment of Macraes Road in two stages; and
    - Relocation of the Open Pit Mining Workshop.
- **Ecological enhancements**, including establishment of:
    - Murphys Ecological Enhancement Area ("**MEEA**") near Murphys Creek, including predator fencing, access tracks, and site facilities;
    - Mt Highlay restoration area;
    - Cranky Jims Link shrubland enhancement area;
    - Murphys Link tussock protection area; and
    - Additional compensation measures for residual ecological impacts.
- **Mine closure and rehabilitation activities**, including rehabilitation of mining landforms, creation of pit lakes, dry capping of tailings storage facilities, and revegetation in accordance with closure objectives.

An overview of the proposed activities which make up the Project is shown in Figure 2.2 below.

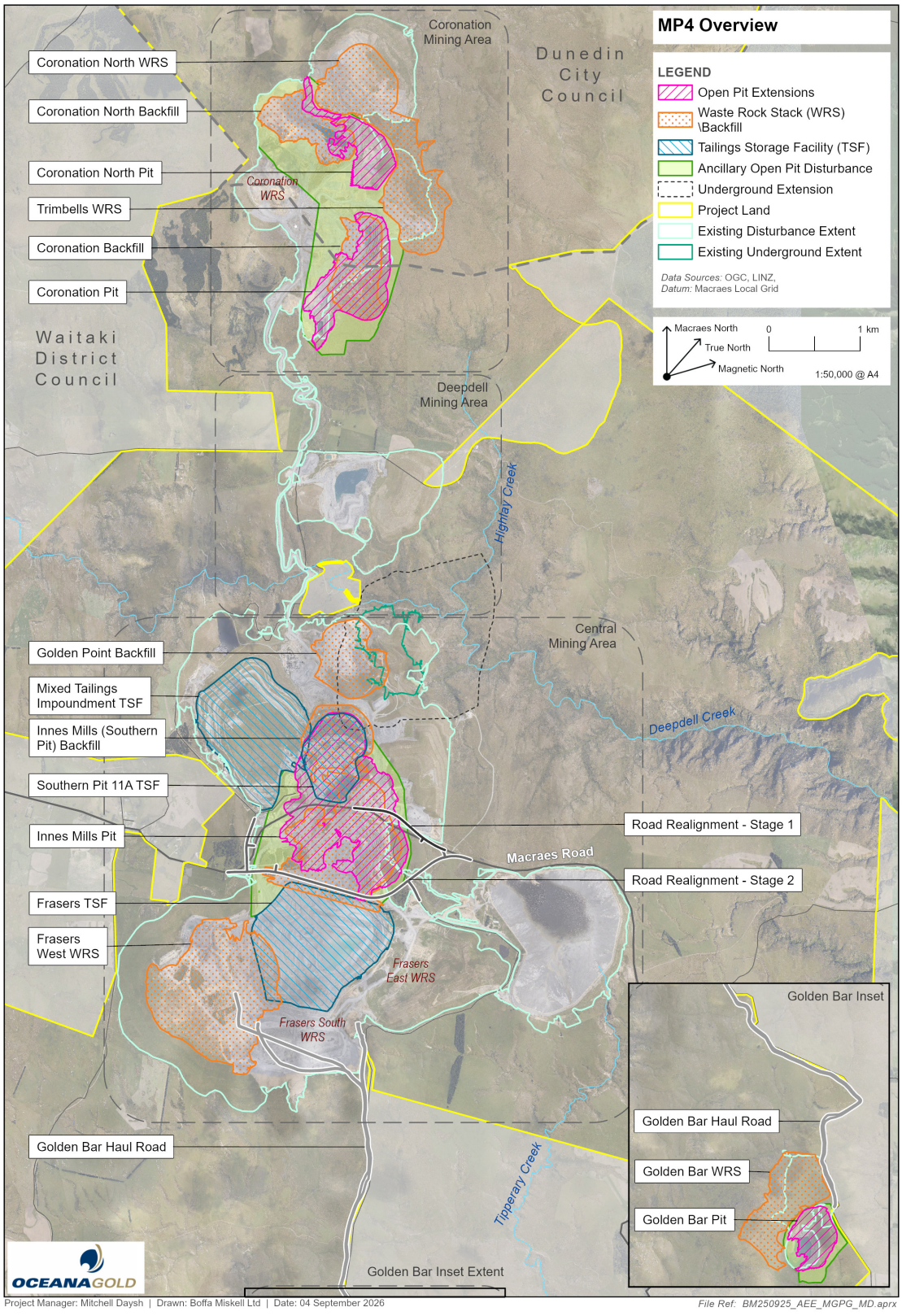


Figure 2.2. MP4 Overview Plan

2.2 Purpose and scope

This Avifauna Values Assessment Report has been prepared to identify and evaluate the ecological values associated with bird species present within the subject site and its zone of influence. The assessment forms part of a broader ecological evaluation to inform resource management decision-making (see Table 2.1 for the full list of reports) and is undertaken in accordance with the Ecological Impact Assessment Guidelines for use in New Zealand (Roper-Lindsay *et al.*, 2018).

Table 2.1. Ecology Documents prepared for the proposed Macraes Phase 4 Project. Current document highlighted

Document #	Document name	Aspects covered	Author
E1	Terrestrial and Wetland Ecology Summary		Bioresearches (2026a)
Ecological Assessments			
E2	Assessment of Vegetation and Wetland Values	Terrestrial vegetation and wetlands	Whirika (2026)
E3	Assessment of Invertebrate Values		Bioresearches (2026b)
E4	Assessment of Lizard Values		Bioresearches (2026c)
E5	Assessment of Avifauna Values		Bioresearches (2026d)
E6	Assessment of Bat Values		Bioresearches (2026e)
E7	Ecological Impact Assessment	Terrestrial and wetland ecosystems and fauna	Bioresearches (2026f)
Ecological Management			
E8	Vegetation and TAR Flora Management Plan	Indigenous vegetation and threatened plants (wetland and terrestrial)	Bioresearches (2026g)
E9	Wetland Management Plan	Management and monitoring of Wetlands and TAR wetland plants	Bioresearches (2026h)
E10	Invertebrate Management & Monitoring Plan	Effects management and monitoring for invertebrates	Bioresearches (2026i)
E11	Lizard Management & Monitoring Plan	Effects management and monitoring for lizards	Bioresearches (2026j)
E12	Avifauna Management & Monitoring Plan	Effects management and monitoring for birds	Bioresearches (2026k)
Residual Effects Analysis and Management			
E13	Residual Effects Analysis: Terrestrial Ecology	Residual effects analyses for vegetation and fauna	Bioresearches (2026l)
E14	Residual Effects Analysis: Wetlands	Residual effects analyses for wetlands	Bioresearches (2026m)
E15	Residual Effects Terrestrial Restoration Plan	Compensation planting and vegetation restoration	Bioresearches (2026n)
E16	Residual Effects Wetland Management Plan	Planting and restoration for wetlands	Bioresearches (2026o)
E17	Ecological Impact Assessment: Pest-proof Fence Construction	Terrestrial and wetland ecosystems and fauna	Bioresearches (2026p)
E18	Pest Control and Elimination Plan	Animal pest management	Alliance Ecology (2026)

2.3 Study Area

Ecological investigations were undertaken within the Project's zone of influence (ZOI) (see section 2.3.1, below) and extended into the surrounding landscape. This wider area encompassed approximately 13,000 ha of OceanaGold (New Zealand) (OGNZL) landholdings in the Macraes area, providing context for the assessments, including evaluation of local-scale proportional effects (e.g. Section 2.3.1.) and identification of opportunities for ecological restoration and enhancement.

2.3.1 Zone of Influence

For this assessment, ZOI includes the Project area and the wider OGNZL landholdings surrounding the proposed impact areas (shown in Figure 2.3). The use of the broader OGL landholdings as the primary local assessment context reflects the highly modified and operational nature of the Macraes mining environment, where indigenous fauna and habitats occur within a mosaic of active mining areas, rehabilitated landforms, pastoral grassland, tussock grassland, shrubland, wetlands, and other semi-natural habitats.

This approach recognises that many avifauna species recorded within the Project area are highly mobile and utilise habitats across the wider OGL landholdings rather than being confined to individual project components. Accordingly, assessment of localised habitat loss or modification and the magnitude of effect (as set out in the Ecological Impact Assessment report, E7; Bioresearches, 2026f) has been undertaken relative to the availability of comparable habitat within the wider OGL landholdings and surrounding Macraes landscape, rather than solely within the immediate Project Footprint.

For example, indirect effects, including disturbance, noise, vibration, dust deposition, lighting, edge effects, and potential hydrological changes, need to be considered within adjacent habitats where relevant. A precautionary approach has also been adopted for some ecological values by incorporating an additional 20 metre indirect effects buffer around direct impact areas where edge effects or disturbance may contribute to localised ecological degradation.

The ZOI therefore represents both the immediate area potentially affected by Project works and the broader ecological context within which avifauna populations utilise habitat across the operational Macraes landscape.

Table 2.2. The MP4 Project areas and components used for ecological assessments, and the specific MP4 elements each one contains.

Assessment Area	Project Component	Component Purpose
Coronation Mining Area	Coronation North Pit Extension (Stage 6) (CN6)	Open pit extension
	Coronation Pit Extension (Stages 6–8) (CO6–8)	Open pit extension
	Trimbells Waste Rock Stack Height Raise and Extension (TRWRS)	Waste rock storage
	Coronation North Waste Rock Stack Height Raise (CNWRS)	Waste rock storage
	Coronation Waste Rock Stack (COWRS)	Waste rock storage
	Coronation Pit Backfill (COBF)	Pit backfill/waste rock disposal
	Coronation North Pit Backfill (CNBF)	Pit backfill/waste rock disposal
Central Mining Area	Innes Mills Pit Extension (Stages 11–13) (IM11–13)	Open-pit extension
	Frasers Tailings Storage Facility Stage 3 (FTSF3)	Tailings storage facility
	Macraes Road Realignment Stage 1 (MRR1)	Road realignment/roading infrastructure
	Macraes Road Realignment Stage 2 (MRR2)	Road realignment/roading infrastructure
	Frasers West Waste Rock Stack Height Raise (FWWRS)	Waste rock storage
	Innes Mills Backfill (IMBF)	Pit backfill/waste rock disposal
	Southern Pit Backfill (SPBF)	Pit backfill/waste rock disposal
	Golden Point Backfill (GPBF)	Pit backfill/waste rock disposal
	Mixed Tailings Impoundment (MTI)	Tailings storage/tailings management
	SP10 and SP11 Tailings Storage Facilities (SP10 and SP11)	Tailings storage facilities
	Back Road Waste Rock Stack (BRWRS)	Waste rock storage (now avoided / consent surrender proposed)
	Top Tipperary Tailings Storage Facility (TTTSF)	Tailings storage facility
Golden Bar Mining Area	Golden Bar Pit Extension (Stages 2–3) (GB2–3)	Open-pit extension
	Golden Bar Waste Rock Stack Extension (GBWRS)	Waste rock storage
Golden Bar Haul Road	Golden Bar Haul Road / Golden Bar Road Realignment	Haul road and associated infrastructure
Golden Point Underground Area	Golden Point Underground Expansion (GPUG)	Underground mining extension. Surface ecological effects are expected to be limited, with potential indirect effects relating to vibration and hydrological change
Back Road Waste Rock Stack	Back Road Waste Rock Stack	A potential mining area that was identified as of important ecological value is now avoided
Biodiversity Offset / Compensation Area	Murphys Ecological Enhancement Area (MEEA)	Biodiversity offset and compensation area, including predator control, habitat restoration, revegetation, fencing, and potential lizard management
Biodiversity Offset / Compensation Area	Cranky Jims Shrubland Enhancement Area	Biodiversity offset and compensation area focused on grey shrubland restoration and enhancement
Biodiversity Offset / Compensation Area	Mount Highlay Station	Biodiversity offset and compensation area focused on averted loss (pine planting removal) and restoration and enhancement through tussock planting.
Project-wide Infrastructure	Mine Water Management System (MWMS)	Water management infrastructure

2.3.2 Assessment Areas

For the purposes of this assessment, the wider Project area has been divided into a series of smaller, discrete assessment areas (also referred to as 'sites') (see Table 2.2) to enable avifauna values to be assessed at a more localised and ecologically meaningful scale. This approach recognises that habitat composition, landscape context, degree of modification, and avifauna utilisation vary across the broader Macraes operational landscape. Defining smaller assessment areas allows ecological values, habitat function, and potential effects to be assigned more accurately in relation to the specific habitats and ecological characteristics present within each site.

The sites comprise the following impact and non-impact areas:

Impact areas

1. Coronation Mining Area;
2. Central Mining Area;
3. Golden Bar Mining Area;
4. Golden Bar Haul Road;
5. GPUG;

Non-impact areas

6. BRWRS
7. MEEA; and
8. Cranky Jims Shrubland Enhancement Area.

The mining assessment areas generally correspond to distinct operational or development components of MP4, while the MEEA and Cranky Jims areas represent biodiversity offset and compensation areas included within the broader ecological assessment framework.

Site assessments only include new impact areas and exclude previously consented mining activities that may be incorporated into the MP4 project. For example, several proposed pit and waste rock stack areas are mostly within previously consented areas. As such, only new impacts are considered for site assessments.

2.3.2.1 Impact Areas

All impact areas are considered as the direct impact area of the mining activity (pit, waste rock stack etc), plus a 20m buffer. Although the buffer will not be directly impacted, this is included as a conservative approach, as edges will be most indirectly affected. See the EcIA (E7; Bioresearches, 2026f) for further details about this approach.

A summary of the ecosystem and habitat types found within each site is provided here. Further details are provided in the Assessment of Vegetation and Wetland Values (E2; Whirika, 2026) and the EcIA (E7; Bioresearches, 2026f).

2.3.2.1.1 Coronation Mining Area

The Coronation Mining Area comprises the Coronation North Pit Extension (Stage 6), Coronation Pit Extensions (Stages 6–8), the Trimbells Waste Rock Stack Height Raise and Extension (TRWRS), Coronation North Waste Rock Stack Height Raise (CNWRS), Coronation Waste Rock Stack (COWRS), and associated pit

backfill areas (COBF and CNBF). These components will support the continuation and expansion of open-pit mining activities within an established operational mining landscape through the later stages of the MP4 Project. Activities within the area include open-pit mining, waste rock placement, pit backfilling, haul road use, and associated earthworks and operational disturbance.

Using the total new impact area plus 20m buffer, the Coronation Mining Area encompasses approximately 88.71 ha, the majority of which is dominated by indigenous tussock grassland, including approximately 59.75 ha of dense tussock grassland and 3.49 ha of moderately dense tussock grassland (approximately 63.24 ha combined). Additional indigenous habitats include approximately 2.7 ha of shrubland, 0.8 ha of riparian freshwater herbaceous vegetation, 1.2 ha of wetland habitat, and smaller areas of riparian sedgeland and seepage wetland. Modified habitats within the assessment area include approximately 9.8 ha of exotic grassland, 4.5 ha of mine-disturbed land, 5.8 ha of felled pine forest, and smaller areas of road, rock, pond, rehabilitated mine workings, and gorse. The Coronation Mining Area, therefore, contains some of the largest remaining areas of indigenous tussock habitat within the MP4 Project area and represents one of the principal terrestrial ecological impact areas within the Project.

2.3.2.1.2 Central Mining Area

The Central Mining Area comprises the Innes Mills Pit Extension (Stages 11–13), Frasers Tailings Storage Facility Stage 3 (FTSF3), Frasers West Waste Rock Stack Height Raise (FWWRS), Macraes Road Realignment Stages 1 and 2 (MRR1 and MRR2), Innes Mills Backfill (IMBF), Southern Pit Backfill (SPBF), Golden Point Backfill (GPBF), the Mixed Tailings Impoundment (MTI), SP10 and SP11 Tailings Storage Facilities, and associated operational infrastructure within the central portion of the Macraes Operation. The area also includes the BRWRS area, although this component is not proposed to be utilised by OGL and has not been considered further in this assessment. Activities within the Central Mining Area include open pit mining, tailings storage and relocation, waste rock placement, road realignment, pit backfilling, haul road use, and associated earthworks and operational activities.

Using the total new impact area plus a 20 m indirect effects buffer, the Central Mining Area encompasses approximately 119.4 ha. The assessment area is dominated by highly modified habitats, including approximately 64.7 ha of mine-disturbed land, 45.8 ha of exotic grassland, 3.3 ha of road corridor, and smaller areas of woody exotic vegetation, pine, ponds, and rehabilitated mine workings. Indigenous vegetation within the Central Mining Area is relatively limited compared with other MP4 assessment areas and comprises approximately 1.7 ha of dense tussock grassland, 0.7 ha of moderately dense tussock grassland (approximately 2.4 ha combined), 0.6 ha of ephemeral wetland, and minor areas of shrubland and wetland vegetation.

The Frasers West French Drain (FWFD) is a narrow, approximately 2 m-wide linear feature within a 5.52 ha component area along the toe of the Frasers West Waste Rock Stack. It occurs predominantly within short, grazed exotic grassland (Bioresearches, 2026b, 2026c). The FWFD has not been assessed as a separate avifauna area because the works are not expected to remove a complete bird territory or home range. Effects would be limited to temporary disturbance and a small, localised reduction in foraging or resting habitat within a much larger area of comparable open-country habitat. Applicable nesting checks and breeding-season controls would remain in place.

The Central Mining Area, therefore, represents a predominantly operational and previously modified component of the Project, with avifauna ecological values largely associated with avifauna use of modified open-country environments.

2.3.2.1.3 Golden Bar Haul Road

The Golden Bar Haul Road assessment area comprises the proposed haul road, and associated haul road infrastructure required to support ongoing mining activities, between the Central Mining Area and Golden Bar. Works within the area will involve the construction of a new road corridor across existing mining and pastoral landforms, including vegetation clearance, earthworks, cut and fill activities, culvert installation, stormwater management infrastructure, installation of a pipeline and pump stations for de-watering the Golden Bar pit and pumping water back to the Frasers Pit, and formation of a new road platform. The realignment is intended to maintain safe public and operational access while enabling continued mining activities at Golden Bar and adjacent operational areas.

Using the total new impact area plus a 20 m indirect effects buffer, the Golden Bar Haul Road assessment area encompasses approximately 32.7 ha. The area is dominated by modified habitats, including approximately 22.5 ha of exotic grassland, 5.8 ha of existing road corridor, and 0.7 ha of mine-disturbed land. Indigenous habitats within the assessment area include approximately 2.5 ha of dense tussock grassland, 1.0 ha of moderately dense tussock grassland (approximately 3.5 ha combined), 0.1 ha of ephemeral wetland, and very small areas of wetland vegetation, shrubland, and rock habitat. Ecological values for avifauna within the area are therefore primarily associated with the use of open-country environments by indigenous avifauna species characteristic of the wider Macraes landscape.

2.3.2.1.4 Golden Bar Mining Area

The Golden Bar Mining Area comprises the Golden Bar Pit Extension (Stages 2–3), the Golden Bar Waste Rock Stack Extension (GBWRS), associated ore stockpiling areas, haul road connections, and ancillary operational infrastructure required to support continued mining within the Golden Bar area. The pit extension involves lateral expansion of the existing open pit, primarily toward the east and northeast, to access additional ore reserves. Much of the proposed new impact area occurs within previously disturbed or rehabilitated mining landforms, although areas of indigenous tussock grassland and other semi-natural habitats will also be affected. The GBWRS will be expanded through both vertical raising and lateral extension to accommodate additional waste rock storage capacity associated with the pit expansion. Additional temporary operational infrastructure, including fuel storage, ablutions, and contractor facilities, will be established as required during active mining. Progressive rehabilitation, contouring, and revegetation will occur throughout the operational life of the area and following mine closure.

Using the total new impact area plus a 20 m indirect effects buffer, the Golden Bar Mining Area encompasses approximately 78.9 ha. The assessment area is dominated by modified habitats, including approximately 52.0 ha of exotic grassland and 2.7 ha of mine-disturbed land, together with smaller areas of road corridor, ponds, rehabilitated mine workings, and gorse. Indigenous vegetation within the assessment area includes approximately 14.9 ha of dense tussock grassland and 6.0 ha of moderately dense tussock grassland (approximately 20.9 ha combined), representing one of the larger remaining tussock grassland areas within the MP4 area outside the Coronation Mining Area. Additional indigenous habitats include approximately 0.2 ha of shrubland, 0.9 ha of wetland habitat, 0.4 ha of riparian sedgeland, and small areas of rock and riparian shrubland. Ecological values for avifauna within the Golden Bar Mining Area are therefore associated

primarily with indigenous tussock grassland habitat, open-country avifauna habitat, and localised wetland and riparian features within an otherwise highly modified mining and pastoral landscape.

2.3.2.1.5 Golden Point Underground (GPUG)

The GPUG assessment area comprises the proposed continuation and expansion of underground mining associated with the existing GPUG operation. GPUG forms part of the broader MP4 mining programme and involves underground extraction beneath and adjacent to previously underground-mined areas within the central Macraes operational landscape. Unlike the open-pit mining components of MP4, the GPUG component is largely subterranean and does not involve extensive new surface disturbance or major above-ground infrastructure expansion. The Golden Point Backfill (GPBF) will be the most significant above-ground disturbance, but occurs within currently mined or rehabilitated mine areas, and previously consented areas. Other surface activities associated with GPUG are expected to be limited primarily to existing access points, ventilation infrastructure, haulage connections, and operational support activities within the established mining environment.

Using the mapped assessment area, the total GPUG non-consented area is 172.03 ha and includes 46.5 ha of exotic grassland, 21.99 ha of Mine – disturbed, 90.74 ha of Dry Shrubland and 12.8 ha of rehabilitated mine workings (Figure H.6). The GPUG extension area encompasses approximately 47.7 ha at the surface, of which approximately 47.2 ha comprises indigenous shrubland habitat and approximately 0.5 ha comprises existing mine-disturbed land. The shrubland and wetland vegetation within the assessment area contributes to indigenous habitat continuity within the wider Macraes landscape and provides habitat for indigenous avifauna, lizards, and invertebrates associated with dry shrubland ecosystems. The GPBF will be 49.41 ha and consists predominantly of currently mined areas (31.13 ha), rehabilitated mine workings (17.09 ha) and exotic grassland (1.19 ha). The results of GPBF surveys are included within the CMA survey results (stations 48 and 49).

As GPUG activities are predominantly underground, potential ecological effects within this assessment area are expected to differ from those associated with surface mining components. Direct vegetation clearance and habitat loss are anticipated to be minimal. Potential effects are instead more likely to relate to indirect disturbance mechanisms, including vibration associated with underground blasting, localised noise, potential hydrological changes, and limited operational disturbance associated with existing surface infrastructure and access activities.

2.3.2.2 Non-impact Areas

As well as areas that are directly impacted, locations that are being avoided (BRWRS), and areas that are likely to be used as offset/compensation restoration areas have been assessed for avifauna values.

2.3.2.2.1 BRWRS

The BRWRS assessment area comprises land previously consented under the Macraes Phase III Project (MP3) for expansion of waste rock storage east of the Round Hill and Southern Pit operational areas. The BRWRS was initially considered as a potential component of MP4 to provide additional waste rock storage capacity. However, following ecological assessment and project refinement, OGL now proposes to surrender the existing consents associated with further BRWRS development, and the area will therefore not form part of the active MP4 Project area. As a result, no vegetation clearance, earthworks, waste rock placement, or associated operational disturbance is proposed within the BRWRS assessment area under MP4.

2.3.2.2.2 Murphy's Ecological Enhancement Area

The MEEA is a principal biodiversity offset and compensation area proposed as part of the MP4 residual effects management framework. The MEEA is situated within the Murphys Creek catchment, near the Golden Bar and Innes Mills operational areas. It has been selected due to its landscape context, ecological connectivity, existing indigenous habitat values, and potential to support long-term ecological restoration and fauna enhancement outcomes. The area forms a central component of the terrestrial residual effects management strategy described in the Residual Effects Analysis (E13; Bioresearches, 2026l) and Residual Effects Restoration Plan (E15; Bioresearches, 2026n) documents.

The MEEA will comprise approximately 250 ha enclosed within a predator-proof fence, together with an additional surrounding landscape-scale predator control buffer extending across approximately 1 km beyond the fenced area. The fenced area and surrounding management buffer are intended to provide long-term protection and enhancement of indigenous vegetation and fauna habitats through intensive pest mammal exclusion and control, stock exclusion, habitat restoration, revegetation, and ecological management. Proposed management actions include restoration and enhancement of tussock grassland and grey shrubland communities, establishment of indigenous revegetation areas, weed management, enhancement of avifauna breeding habitat, and protection and enhancement of indigenous lizard habitats and populations. The MEEA also includes management intended to protect and enhance a recently identified population of Otago skink (*Oligosoma otagense*), a nationally and regionally threatened species of very high conservation significance.

The MEEA is not an impact area, and no mining activities are proposed within the site. Instead, the area forms part of the broader biodiversity compensation package intended to address residual terrestrial ecological effects associated with MP4 following application of the effects management hierarchy. Long-term ecological management within the MEEA is proposed to be secured through covenanting, ongoing monitoring, adaptive management, and permanent ecological protection mechanisms to provide enduring biodiversity outcomes within the wider Macraes landscape.

2.3.2.2.3 Cranky Jims Enhancement Area

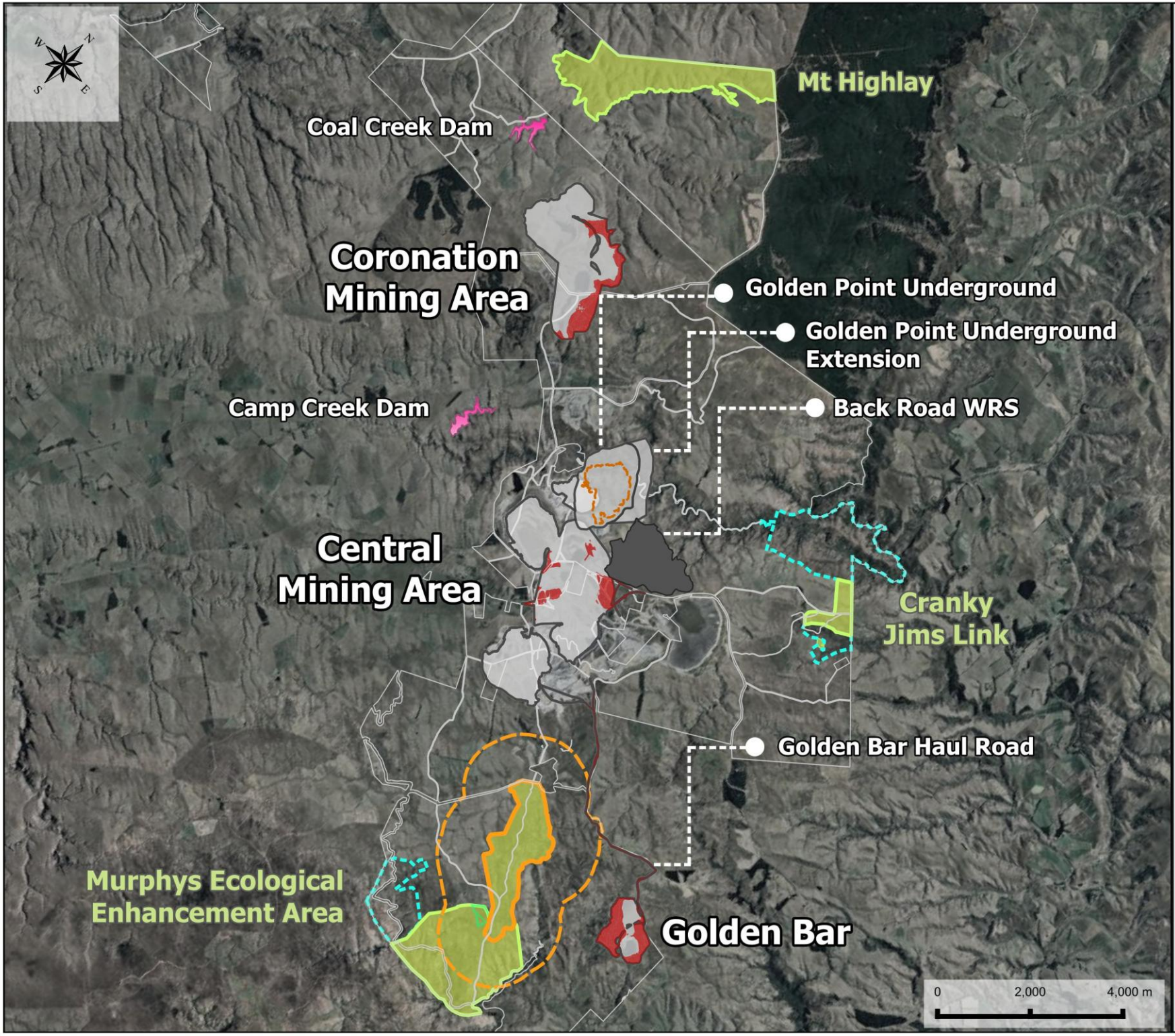
The Cranky Jims Shrubland Enhancement Area is a biodiversity offset and compensation area proposed as part of the MP4 terrestrial residual effects management framework. The area is located within the wider Macraes ED adjacent to existing indigenous shrubland remnants and covenant areas and has been selected due to its potential to support restoration and long-term enhancement of indigenous dry shrubland ecosystems. The site forms part of the broader ecological compensation package intended to address residual terrestrial ecological effects associated with MP4 following implementation of avoidance, minimisation, and remediation measures.

The Cranky Jims area is proposed to support restoration and enhancement of approximately 60 ha of grey shrubland revegetation, together with additional enhancement and buffering of existing indigenous vegetation. Proposed management actions include indigenous planting, weed management, stock exclusion, ongoing pest animal control, and long-term ecological management to improve indigenous vegetation cover, structural diversity, and habitat connectivity within the surrounding landscape. Restoration planting will focus primarily on grey shrubland species characteristic of the Macraes ED, including matagouri-dominated shrubland communities, while also incorporating enrichment planting with dryland podocarp and hardwood species over time to facilitate longer-term successional development toward more structurally complex woody vegetation communities.

The Cranky Jims area is not proposed for mining development, and no direct operational impacts are anticipated within the site. Instead, the area is intended to provide long-term biodiversity gains through

restoration and enhancement of indigenous shrubland habitat that is currently uncommon and fragmented within the wider Macraes landscape. The site also contributes to broader ecological connectivity and habitat diversification objectives within the MP4 residual effects management strategy. Long-term protection and ecological management of the area are proposed through covenanting, ongoing monitoring, adaptive management, and permanent ecological protection mechanisms to secure enduring biodiversity outcomes.

Figure 2.3 (following page). Locations of the sites used for this assessment. Further details are provided in additional maps for each site in Appendix H.



MP4 Project Areas

Date: 05/08/2026
Drawn By: MS
Client: OceanaGold New Zealand Ltd
Scale: 1:110,000

Legend

OGL landholdings

Mining Areas

- Mp4 Project Components
- Areas of habitat/vegetation loss within the MP4 Project
- Camp and Coal Creek Dams
- Backroad Waste Rock Stack
- GPUG Consented Boundary

Offset/Compensation Sites

- Sites of Protection/Restoration for Compensation Package
- Predator exclusion fence
- Predator exclusion fence buffer
- Existing Ecology Covenants
- OGL landholdings

SOURCES
LINZ Basemap aerial

MAP PROJECTION
NZGD2000 / New Zealand Transverse Mercator 2000

Bioresearches
A Babbage Company

2.4 Statutory Context

The Project is being progressed under the FTAA. This Avifauna Values Assessment has been prepared to inform the ecological assessment and approvals process for the Project and to support the wider terrestrial ecological reporting package prepared for MP4. The assessment has been undertaken within the context of relevant national, regional, and district-level statutory and policy frameworks relating to indigenous biodiversity, indigenous fauna, wetlands, and ecological effects management.

Relevant statutory and policy documents considered in this assessment include the Wildlife Act 1953, Resource Management Act 1991 (RMA), National Policy Statement for Indigenous Biodiversity 2023 (NPSIB), National Policy Statement for Freshwater Management 2020 (where relevant to wetland and riparian habitats), Otago Regional Policy Statement, and the Waitaki District Plan. Ecological values and effects have also been assessed with reference to the EcIAG for use in New Zealand (Roper-Lindsay *et al.*, 2018).

The statutory and policy framework is relevant to the assessment of avifauna values because the Project intersects with habitats used by indigenous bird species, including several Threatened and At-Risk taxa protected under the Wildlife Act 1953. This avifauna values assessment, therefore, considers both species-level values and the significance of habitats supporting indigenous avifauna within the wider Macraes operational landscape.

2.4.1 Legislation

2.4.1.1 Fast-track Approvals Act 2024

The Project is being advanced under the FTAA, which establishes an alternative approvals pathway for projects considered to provide significant regional or national benefits. Ecological assessments prepared for MP4 support the fast-track approvals process by identifying ecological values, assessing actual and potential ecological effects, and informing the application of the effects management hierarchy, including avoidance, minimisation, remediation, offsetting, and compensation where appropriate.

Although the Project is being considered under the FTAA framework, relevant provisions of associated environmental legislation, national policy statements, regional policy statements, and district planning instruments remain important considerations in the assessment of ecological effects and biodiversity values.

2.4.1.2 Wildlife Act 1953

The Wildlife Act 1953 provides statutory protection for most indigenous bird species in New Zealand, including all indigenous avifauna species recorded during surveys for MP4 unless specifically exempted under Schedule 5 of the Act.

Under the Wildlife Act 1953, it is an offence to kill, disturb, harass, capture, or otherwise harm protected wildlife without authorisation. The Act also provides protection for nests, eggs, and dependent young of protected species. This is particularly relevant to MP4 because several indigenous species recorded within the Project area are ground-nesting or may utilise habitats within or adjacent to active work areas during the breeding season. Vegetation clearance, earthworks, blasting, haul road operation, and associated disturbance activities therefore have the potential to affect breeding birds if not appropriately managed.

The Wildlife Act framework is particularly relevant to the management of seasonal works, pre-clearance surveys, nest protection measures, and adaptive management responses where protected avifauna species are identified within active disturbance areas.

2.4.1.3 Resource Management Act 1991

Although the MP4 Project is being progressed under the FTAA, the RMA remains relevant to the assessment of ecological effects and biodiversity values. The RMA establishes the statutory framework for sustainable management of natural and physical resources and provides the broader legislative basis for national policy statements, regional policy statements, regional plans, and district plans relevant to indigenous biodiversity management.

Section 6(c) of the RMA identifies the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna as a matter of national importance. This is directly relevant to the MP4 Project because several assessment areas contain indigenous tussock grassland, shrubland, wetland, riparian, and open-country habitats used by indigenous avifauna, including Threatened and At-Risk species. The assessment of avifauna values within MP4 therefore contributes to the identification and evaluation of habitats that may qualify as significant indigenous fauna habitat under relevant statutory frameworks.

Section 7 of the RMA also requires regard to be had to the maintenance and enhancement of amenity values, intrinsic values of ecosystems, maintenance and enhancement of environmental quality, and the finite characteristics of natural and physical resources. These matters are relevant to the assessment of ecological effects associated with habitat loss, fragmentation, disturbance, and cumulative ecological change within the wider Macraes operational landscape.

The avifauna values assessment has been undertaken in a manner consistent with the ecological effects management hierarchy and current EcIA practice in New Zealand. The assessment therefore supports consideration of actual and potential ecological effects associated with MP4 and informs the development of avoidance, mitigation, remediation, offsetting, compensation, and ecological management measures where required.

2.4.2 National Policy Statements

2.4.2.1 National Policy Statement for Indigenous Biodiversity 2023

The NPSIB provides national direction for the protection, maintenance, restoration, and enhancement of indigenous biodiversity under the Resource Management Act 1991. The NPSIB is directly relevant to avifauna values assessments because it establishes the framework for identifying and managing significant indigenous vegetation and significant habitats of indigenous fauna.

The NPSIB requires consideration of the ecological significance of habitats used by indigenous fauna, including habitats that support Threatened or At-Risk species, provide important ecological context or connectivity, or contribute to the representation and persistence of indigenous biodiversity within the wider landscape. The policy framework is therefore relevant to the identification and assessment of indigenous bird habitats associated with the MP4 Project area, including open-country habitats, wetlands, riparian habitats, shrubland, tussock grassland, and other habitats utilised by indigenous avifauna.

Appendix 1 of the NPSIB sets out criteria for determining whether areas qualify as significant indigenous vegetation or significant habitat of indigenous fauna. These criteria include representativeness, rarity and distinctiveness, diversity and pattern, ecological context, and characteristics of size and shape. Assessment against these criteria forms an important component of ecological values assessments and EcIA processes in New Zealand.

The NPSIB also promotes the application of the effects management hierarchy when adverse effects on indigenous biodiversity cannot be avoided. This includes consideration of avoidance, minimisation, remediation, offsetting, and compensation measures where relevant. The broader MP4 ecological assessment framework has been developed with reference to these principles.

2.4.2.2 National Policy Statement for Freshwater Management 2020

The NPS-FM is relevant to the avifauna assessment where indigenous bird habitat values are associated with wetlands, ephemeral wetlands, seepages, ponds, riparian margins, and other freshwater-associated habitats within the MP4 Project area.

The NPS-FM requires the protection of natural inland wetlands and promotes the maintenance or improvement of freshwater ecosystem health and indigenous biodiversity associated with freshwater environments. Freshwater and wetland habitats can provide important feeding, loafing, nesting, or movement habitat for indigenous avifauna and may contribute to ecological connectivity within modified landscapes.

The NPS-FM is therefore relevant to the identification and assessment of avifauna habitat values associated with freshwater ecosystems within the wider MP4 ecological assessment framework, particularly where wetland and riparian habitats intersect with terrestrial ecological values and indigenous fauna habitat.

2.4.3 Regional Policies, Plans and Acts

This project is situated within the Waitaki District Council (WDC) and Dunedin City Council (DCC) territorial boundaries. It is also within the jurisdictional boundaries of the Otago Regional Council (ORC) and Department of Conservation's Kā Moana Haehae/Alexandra Office.

2.4.3.1 Otago Regional Policy Statement (2021)

The Otago Regional Policy Statement (ORPS) is a new RPS that will implement the National Planning Standards and respond to a range of new national direction introduced in 2020, including the NPS-FM. It will set the direction for future management of Otago's natural and physical resources.

Ecological significance for avifauna is assessed against the criteria set out in Appendix 2 (APP2 – Significance criteria for indigenous biodiversity) of the PORPS.

2.4.3.2 Waitaki District Plan (2010)

The Waitaki District Plan (WDP) sets out the objectives, policies, and rules governing the use of land within the district to achieve integrated and sustainable management of the district's resources and achieve the purpose of the RMA.

Specifically, policy 16.9.3 lists criteria to identify areas with significant indigenous vegetation or significant habitats of indigenous fauna.

2.4.3.3 Dunedin City Council District Plan (2026)

The Dunedin City Council second-generation district plan (2GP) became operative on 17th of June 2026. Ecological significance for avifauna is assessed against the criteria set out in Appendix A1.2 (Schedule of Areas of Significant Biodiversity Value), which lists the criteria to identify areas with significant indigenous vegetation or significant habitats of indigenous fauna.

2.5 Taoka Species

Taoka, or taonga, species are indigenous species recognised as having cultural significance. For this assessment, Schedule 97 of the Ngāi Tahu Claims Settlement Act 1998[1] has been used to identify taoka Manu (bird) species relevant to the MP4 avifauna values assessment. The NPSIB requires ecological reports for relevant resource consent applications to identify any effects on identified taonga, and to include mātauranga Māori and tikanga Māori assessment methodology where relevant (Ministry for the Environment, 2025, cl. 3.24(2)(c), (f)). A summary of Schedule 97 taoka bird species recorded from desktop or field surveys for MP4 is provided in Appendix F.

[1] Ngāi Tahu Claims Settlement Act 1998, 1998 No 97 New Zealand Public Act (1998), https://www.legislation.govt.nz/act/public/1998/0097/latest/whole.html

3 AVIFAUNA SURVEYS

3.1 Assessment Standard

This assessment generally follows the EcIAG for use in New Zealand published by EIANZ[2] (Roper-Lindsay *et al.*, 2018). While the EcIAG provide the primary technical framework for this values assessment, they do not replace the need to consider the statutory and policy context relevant to the project. Accordingly, ecological values have been assessed with reference to both the EIANZ methodology and the applicable legislative, policy, and planning framework. Where relevant, professional judgement has been applied to ensure that conclusions regarding ecological significance are consistent with both ecological best practice and the matters that are relevant to decision making under the applicable regulatory framework.

3.1.1 Assigning Ecological Value

Ecological values for avifauna have been assigned using a structured approach consistent with the EcIAG for use in New Zealand (Roper-Lindsay *et al.*, 2018). Two complementary but distinct components are considered when assigning value:

1. The intrinsic value of the species, primarily determined by conservation status (Robertson *et al.*, 2021; Jarvie *et al.*, 2025) and ecological importance; and
2. The value of the site or habitat to that species, determined by habitat suitability, likelihood of use, and ecological function.

These components are related but not interchangeable. A species may be of very high conservation value nationally, but if the subject site provides negligible or unsuitable habitat, the ecological value of that species in the context of the site may be low.

3.1.1.1 Species Value

Species value is assigned in accordance with Table 5 of the EIANZ Ecological Impact Assessment Guidelines guidelines (Roper-Lindsay et al., 2018; Appendix A), which considers factors such as:

- National conservation status under the New Zealand Threat Classification System (Robertson *et al.*, 2021);
- Regional conservation status (Jarvie *et al.*, 2025);
- Endemism;
- Ecological role or keystone function; and
- Population size and distribution.

Threatened species (e.g., Nationally Critical, Nationally Endangered, Nationally Vulnerable) are typically assigned Very High species value. At-Risk species are generally assigned High species value, depending on their rarity and ecological significance. Not Threatened indigenous species are typically assigned Moderate or Low species value, depending on context.

[2] Environmental Institute of Australia and New Zealand

Note that where a species has a different regional or national threat status, the higher of the two has been used for assigning value. Typically, this occurs when a species may be nationally At-Risk but regionally Threatened. However, in this case, there are some circumstances where the regional threat status is lower than the national threat status. Regardless, the higher of the two has been applied to ensure a conservative approach.

3.1.1.2 Habitat Suitability and Site-Specific Value

The second component assesses the ecological value of the habitat within the subject site for each species. This assessment draws on the criteria outlined in the EIANZ guidelines and incorporates habitat suitability considerations as described by Baber *et al.* (2021) (Appendix B). Factors considered include:

- Availability of key habitat features (e.g., nesting substrates, prey resources, shelter, roosting sites);
- Habitat extent, quality, and condition;
- Connectivity to larger habitat networks;
- Presence of breeding evidence or regular use;
- Seasonal or transient use; and
- Likelihood of occurrence based on ecological district context.

Habitat suitability is typically categorised as High, Moderate, Low, or Negligible. This assessment determines how relevant a species' conservation value is in the specific site context.

3.1.1.3 Integrating Species Value and Habitat Suitability

The ecological value assigned to avifauna within the sites reflects a combination of species value and habitat suitability. Where a high-value species has a high likelihood of regular use (e.g., breeding or critical foraging habitat), the overall ecological value attributed to that species within the site will also be high or very high. Conversely, where a high-value species has only a low likelihood of occasional or incidental use, the site-specific ecological value may be moderate or low.

For example, the eastern falcon, classified as Threatened – Nationally Vulnerable, would typically be assigned a Very High species value. However, if the site comprises predominantly modified pasture with limited prey availability and no suitable nesting substrates such as cliffs or mature trees, and there are no records of regular use, the habitat suitability may be assessed as Low. In that case, while the species retains very high intrinsic conservation value, the site's ecological value for that species would be lower because the habitat does not support important life-cycle functions.

By contrast, if the site contained suitable nesting cliffs and open foraging habitat and supported confirmed breeding activity, the ecological value of the site for the eastern falcon would be high or very high.

This approach ensures that ecological value is not assigned solely based on species' presence and conservation status but instead reflects the functional importance of the site to avifauna. It also ensures transparency in distinguishing between nationally significant species and the actual ecological role of the subject site in supporting those species.

3.2 Survey Methods

3.2.1 Desktop Assessment

A desktop review was undertaken to identify indigenous and introduced bird species recorded within the wider environment surrounding the Project area, and to determine the likelihood of occurrence of species within impacted avifauna habitats.

The desktop survey focused exclusively on avifauna and encompassed a 10-kilometre buffer around all MP4 Project areas where habitat modification or disturbance has the potential to affect birds. The 10 km search radius was selected to capture species that may utilise the site intermittently, seasonally, or as part of larger home ranges, particularly highly mobile raptors, migratory species, and wide-ranging open-country birds.

The following data sources were reviewed:

- Global Biodiversity Information Facility (GBIF.org), accessed 12th of February 2026, for all avifauna occurrence records within 10 km of the MP4 impact areas;
- eBird New Zealand Bird Atlas (Birds New Zealand), accessed 12th of February 2026, including relevant grid squares intersecting the 10 km buffer;
- iNaturalist New Zealand, accessed 12th of February 2026, filtered for avifauna records within 10 km of the Project area;
- Department of Conservation species conservation status listings (New Zealand Threat Classification System); and
- Relevant published ecological assessments previously prepared for the Macraes Operation and surrounding areas.

GBIF records were used to supplement nationally curated datasets by aggregating verified occurrence records from multiple institutions, including museum collections, research datasets, and citizen science platforms. Records were screened to remove duplicates and obvious spatial inaccuracies. Particular attention was given to records of Threatened and At-Risk species, as well as species listed as regionally uncommon within Otago (Jarvie *et al.*, 2025).

The desktop review also considered habitat characteristics described in previous ecological assessments of the Macraes Operation, including tussock grassland, shrubland, ephemeral wetlands, riparian corridors, modified pasture and rehabilitated mine landforms, to assess habitat suitability for recorded species.

Species identified through the desktop review were categorised as:

- Confirmed present within the Project area or immediate vicinity;
- Recorded within 10 km and potentially present based on habitat suitability; or
- Recorded within 10 km but considered unlikely to occur due to habitat limitations.

This approach ensures that the avifauna values assessment reflects both documented records and ecologically plausible presence, particularly for highly mobile or seasonally variable species.

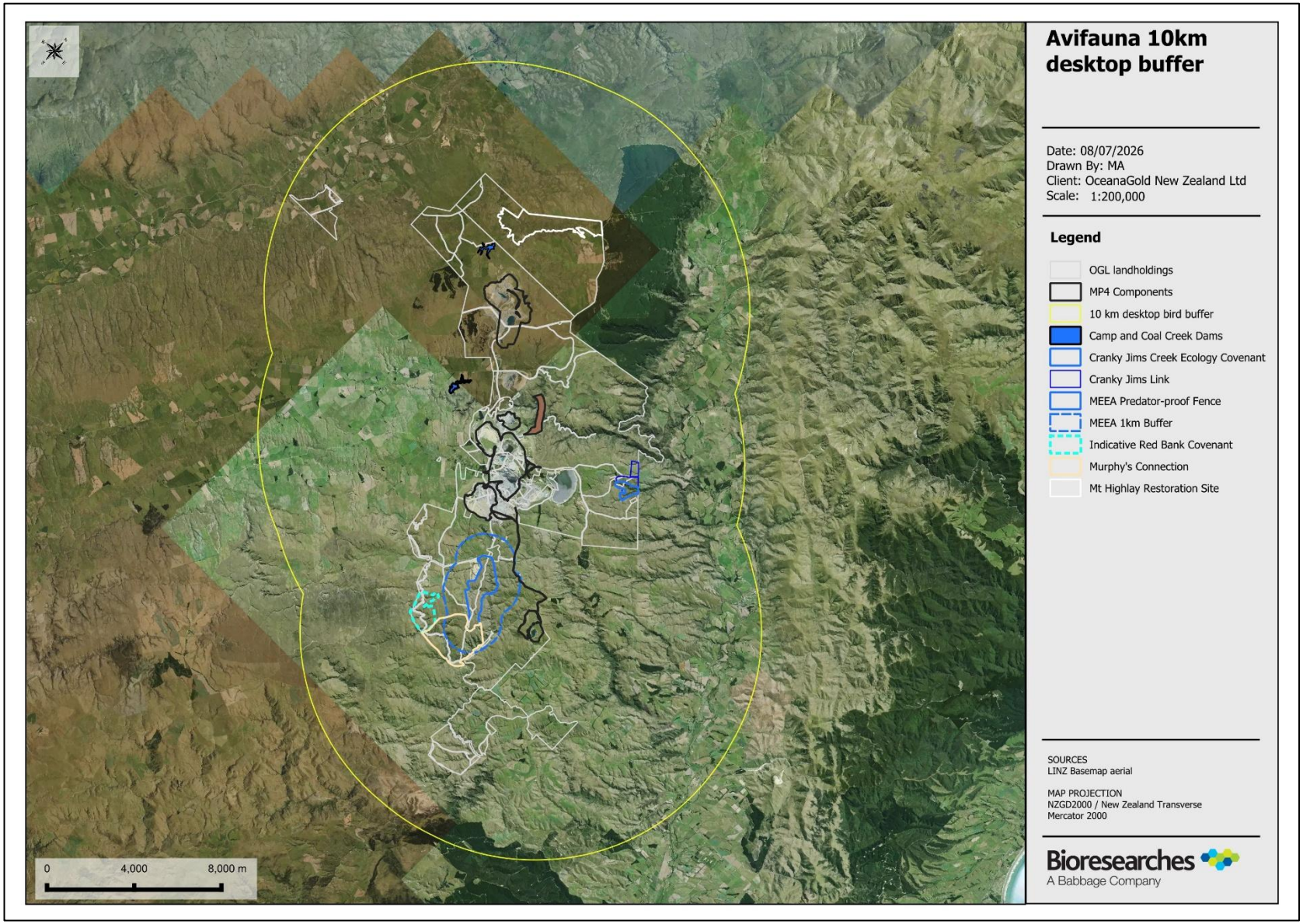


Figure 3.1. Extent of the 10 km buffer used for the avifauna desktop survey.

3.2.2 Field Survey Methods

3.2.2.1 Five-minute Bird Counts

Standard 5MBCs were undertaken in accordance with the Department of Conservation Inventory and Monitoring Toolbox protocol for birds (DOC, 2012). The method was used to obtain standardised, repeatable measures of avifauna presence and relative activity across the Project area and to complement Autonomous Recording Unit (ARU) data by improving the detection of visually conspicuous, less vocal, or highly mobile species.

Count stations were established across representative avifauna habitats within the wider MP4 assessment areas, including tussock grassland, shrubland, riparian margins, wetlands, exotic pasture, mine-disturbed land, rehabilitated mine landforms, and road corridors. Stations were generally co-located with, or positioned within approximately 50 m of, ARU deployment points to maintain spatial alignment between survey methods. Survey coverage included both active impact areas and selected reference or future restoration areas (biodiversity offset/compensation areas) within the wider OGL landholdings.

A total of 66 survey stations were established across the study area. Surveys were completed during two seasonal survey periods comprising a spring/early summer survey (November/December) round and an autumn survey round (March/April). Repeat seasonal surveys were undertaken to account for seasonal variation in bird detectability, breeding activity, and habitat use. Some variation occurred between repeated surveys, due to the evolution of the project and changes in bird presence and activity associated with seasonality.

At each station, a single experienced observer remained stationary and recorded all birds seen or heard during a five-minute count period within an approximate 200 m radius of the survey point. For each detection, observers recorded species identity, estimated number of individuals, and detection type (seen or heard). Additional observations relating to behaviour, habitat association, breeding activity, or notable indigenous species were also recorded where relevant.

The spring and early summer surveys (Survey 1) were generally undertaken between sunrise and approximately 10:00 am to coincide with peak morning bird activity. During the autumn survey round (Survey 2), survey timing was extended from dawn through to approximately midday to accommodate shorter daylight periods and operational survey logistics while maintaining suitable survey conditions. Surveys were undertaken during periods of suitable weather, generally avoiding persistent rainfall or strong wind conditions that could reduce detectability.

Survey data were used to compile a species inventory, identify species of conservation concern, assess habitat associations, and characterise avifauna assemblages across the different MP4 assessment areas. 5MBCs provide information on species presence and relative activity rather than absolute abundance and were interpreted alongside ARU data, targeted playback surveys, and incidental observations to improve confidence in species occurrence and habitat utilisation patterns across the wider Macraes landscape. Count station locations are mapped in Figure 3.2.

3.2.2.2 Passive Acoustic Monitoring

3.2.2.2.1 Overview of Passive Acoustic Monitoring

Passive Acoustic Monitoring (PAM) involves the deployment of ARUs to continuously or intermittently record environmental sound for subsequent analysis. In avifauna assessments, PAM enables detection of vocal species

without the need for continuous observer presence and is particularly valuable for cryptic, nocturnal, or intermittently vocal taxa (Sugai *et al.*, 2020; Wood *et al.*, 2023).

Compared with traditional observer-based surveys, PAM offers several advantages. These include extended temporal coverage, reduced observer bias, permanent archivable records, and improved detection of species vocalising outside standard survey periods (Sugai *et al.*, 2020). PAM is particularly well suited to forested or structurally complex environments where visual detection is limited and most species are detected aurally.

However, PAM also has recognised limitations. ARUs cannot detect silent individuals and cannot record visual observations that would otherwise be noted during point counts (Knight *et al.*, 2026). Detection probability varies with microphone sensitivity, habitat structure, weather conditions, and species-specific vocal behaviour (Sugai *et al.*, 2020). Automated classifiers may produce false positives and false negatives, and outputs require careful interpretation and validation (Wood & Kahl, 2024; Pérez-Granados, 2023). For these reasons, current best practice recommends combining PAM with observer-based methods where practicable (Sugai *et al.*, 2020). In this assessment, PAM was used to complement 5MBCs (Section 3.3), extend temporal sampling coverage, and improve detection probability for nocturnal and migratory species.

3.2.2.2.2 Field Deployment Methods

ARUs used in this study were Department of Conservation AR4 units. Each unit was fitted with a 32 GB memory card and configured to the "High" recording setting to maximise sensitivity and signal quality. Units were mounted on metal waratah stakes at approximately 1.5–2.0 m above ground level to minimise ground attenuation and reduce obstruction from vegetation.

Recorders were deployed across representative avifauna habitats within the Project area, including indigenous shrubland, riparian margins, pasture, and modified landforms. Deployment locations were selected to align spatially with 5MBC stations where possible to allow comparison between methods.

ARUs were programmed to record continuously for 23 hours and 55 minutes per day. Due to device constraints, a brief start and stop time was required daily. Units were left in the field for approximately one week. In practice, most units recorded continuously for five to six days before either memory capacity was reached or batteries were depleted. Continuous recording was selected to maximise detection probability for:

- Resident nocturnal species;
- Nocturnal migrants such as shorebirds; and
- Species exhibiting dawn or dusk vocal peaks, including long-tailed cuckoo.

Continuous 24-hour monitoring increases detection opportunity for species active outside conventional survey windows and is consistent with recommendations for optimising temporal sampling in PAM survey design (Sugai *et al.*, 2020). All recordings were stored in uncompressed WAV format to preserve acoustic fidelity for subsequent automated and manual analysis.

3.2.2.2.3 Acoustic Data Processing and BirdNET Analysis

3.2.2.2.3.1 Automated Detection

Recordings were processed using BirdNET-Analyzer (version 2.4)[3], a convolutional neural network-based classifier trained on a large global dataset of avian vocalisations (Kahl *et al.*, 2021). BirdNET analyses audio in 3-second segments and assigns a confidence score between 0 and 1 to each predicted species (Wood & Kahl, 2024).

An initial automated screening was conducted using a minimum confidence threshold of 0.5. Location filtering was applied using site-specific coordinates to restrict predictions to species known or likely to occur within the Otago region, thereby reducing spurious detections. Analysis was conducted using an overlap setting of 1.5 seconds to improve detection continuity across adjacent analysis windows. Consecutive detections of the same species were merged using the BirdNET-Analyzer merge function to reduce duplicate detections arising from overlapping analysis windows. As the objective of the survey was to determine species presence/absence rather than estimate call rates, merged detections were treated as a single detection event.

BirdNET confidence scores are not probabilities but unitless outputs derived from the neural network's internal classifier (Wood & Kahl, 2024). As recommended in best-practice guidance, performance calibration and manual validation were undertaken before final data filtering. Automated detections were reviewed and filtered using species-specific assessment of confidence scores, acoustic characteristics, known species distributions, habitat associations, and the likelihood of occurrence within the survey area. Only detections considered reliable following this review process were retained for ecological interpretation.

3.2.2.2.3.2 Manual Validation and Score Calibration

To assess classifier performance and calibrate detection thresholds, up to a 100 randomly selected automated detections per species, across a range of confidence scores were manually reviewed using spectrogram inspection and audio playback. Each detection was classified as correct or incorrect. Following guidance by Wood and Kahl (2024), confidence scores were converted to probabilistic estimates using logistic regression, modelling the probability of a true detection as a function of BirdNET score. Species-specific adjusted confidence thresholds corresponding to a 0.95 probability of correctness were then applied. Only detections exceeding this recalibrated threshold were retained in the final dataset. In practice, many species were either identified correctly 0% or 100% of the time. Where all the calls of a species were identified incorrectly that species was discarded. Where they were identified correctly, they were all retained for confidence scores above 0.5. A few exceptions occurred, where rare species were identified correctly with confidence scores < 0.5 (e.g. fernbird). All calls were retained in these cases where call numbers were low and identified correctly (e.g. fernbird only had two calls identified, both correctly, with confidence scores of 0.26 and 0.32).

This two-stage approach aligns with published recommendations for the appropriate use of BirdNET outputs (Wood & Kahl, 2024; Pérez-Granados, 2023). Validation and calibration procedures substantially reduce false positive rates, which is particularly important when outputs are used in ecological inference or occupancy modelling contexts (Wood *et al.*, 2023). All best-practice procedures for classifier interpretation, including transparent reporting of thresholds and manual verification of sensitive detections, were followed.

3.2.2.2.4 Methodological Considerations

[3] https://birdnet.cornell.edu/analyzer/

BirdNET has demonstrated strong performance in large-scale avian acoustic monitoring, achieving mean average precision of approximately 0.79 in focal recordings and robust performance in complex soundscapes (Kahl *et al.*, 2021). However, precision and recall vary among species and environments (Pérez-Granados, 2023). The use of higher confidence thresholds increases precision but may reduce recall, which is generally acceptable when presence detection rather than call-rate estimation is the primary objective.

Continuous multi-day deployment increases the likelihood of detecting infrequently vocal or low-density species, providing a robust basis for presence-based ecological value assessment.
Despite these advantages, limitations remain:

- Silent individuals are undetectable;
- Detection distance varies with habitat and signal amplitude;
- Weather conditions influence acoustic propagation;
- Automated classification requires manual oversight.

Accordingly, PAM results were interpreted alongside 5MBC data to ensure a comprehensive evaluation of avifauna values within the Project area.

3.2.2.3 Waterfowl counts

Targeted waterfowl pond counts were undertaken during the autumn 2026 avifauna survey programme to characterise the use of ponds, pit lakes, tailings waterbodies, sediment ponds, wetlands, and other open-water habitats by indigenous and introduced water-associated bird species within the wider Project area. These surveys supplemented broader avifauna survey methods and were undertaken in recognition of the number of artificial and semi-natural waterbodies distributed throughout the Macraes operational landscape.

In total, 30 waterfowl pond counts were undertaken during March and April 2026, at 22 locations (8 counts were repeated counts at the same location). Of these, 13 surveys were completed within the Project area across 12 survey sites, while the remaining surveys were completed outside the Project area at supplementary reference locations (Lone Pine and the Macraes Wetland Walk) or potential restoration areas (MEEA and Cranky Jims). Survey locations were identified using station numbers corresponding to individual waterbodies or survey areas. In several instances, multiple waterbodies were surveyed consecutively as part of a single survey event, indicated by shared survey dates and start times within the dataset.

Surveys were generally undertaken during daylight hours under suitable weather conditions. At each location, observers undertook visual counts from vantage points that enabled the waterbody, or as much of the waterbody as practicable, to be observed while minimising disturbance to birds present. Binoculars were used where required to aid species identification and counts.

For each survey event, observers recorded:

- survey date and start time;
- station number and associated waterbody location;
- habitat and waterbody characteristics;
- all water-associated bird species observed;
- the number of individuals of each species present; and

- any relevant behavioural observations, including feeding, loafing, breeding behaviour, or movement between adjacent waterbodies.

Survey effort generally involved a minimum observation period of approximately five minutes per waterbody, although survey duration varied depending on visibility, waterbody size, and bird activity. Repeat surveys were undertaken at some locations to provide additional temporal coverage of waterbird habitat use across the wider operational landscape.

3.2.2.4 Fernbird acoustic playbacks

Targeted playback surveys for mātātā | fernbird were undertaken during the autumn 2026 avifauna survey programme following anecdotal reports of fernbird vocalisations at two locations within OGL landholdings: one at GPUG, within the project area, and one at the Coronation Mining area, but outside the current Project area. The surveys were undertaken to assess whether fernbird may occur within suitable wetland and dense riparian habitats associated with the wider Macraes operational landscape.

A total of 17 targeted fernbird playback surveys were completed between 1 April and 29 April 2026. Fifteen of these survey points were selected beforehand, and an additional 2 were added during fieldwork, where potential habitats were observed. Surveys were generally undertaken during the morning period between approximately 9:00 am and 12:05 pm under suitable weather conditions (i.e. fine, calm).

Playback surveys focused on habitats considered potentially suitable for fernbird, including dense sedgeland, rushland, seepages, shrubland, wetland margins, riparian vegetation, and densely vegetated gullies. In addition to habitat suitability, survey locations were selected based on field observations, and proximity to areas where anecdotal fernbird detections had previously been reported.

At each survey location, observers initially completed a 2-minute passive listening period to detect spontaneous vocalisations or movement within dense vegetation. Standardised fernbird call playback recordings (calls from the Merlin app; Cornell University) were then broadcast using a portable speaker at 2-minute intervals, followed by another 2-minute listening period to detect delayed responses. This was repeated twice at each location. Any vocal or visual responses, behavioural observations, and habitat characteristics were recorded during surveys.

For each survey station, the following information was recorded:

- Survey date and time;
- Weather conditions;
- GPS location;
- Habitat type and vegetation structure;
- Responses to playback; and
- Incidental observations of other avifauna species.

3.2.2.5 Incidental Observations

Anecdotal observations of birds of interest were recorded during other ecological fieldwork and site visits undertaken across the Macraes Operational area. These records were not collected as part of a formal or standardised bird survey and were therefore not used to derive relative abundance, detection rates, or survey-

based comparisons between habitats or project components. However, they provide useful supplementary information on the presence, location, and behaviour of species observed outside formal survey periods.

For each anecdotal observation, the species, location, date, number of individuals, and relevant behaviour were recorded where practicable. Particular attention was given to Threatened, At-Risk, regionally uncommon, or otherwise ecologically relevant species, including observations indicative of breeding, territorial behaviour, foraging, or repeated habitat use.

Anecdotal records were used to support interpretation of species presence and habitat use, particularly for mobile species that may not be detected during fixed survey windows. These records were considered alongside the results of 5MBCs, passive acoustic monitoring, and desktop records. No additional species were recorded only through anecdotal observations that were not otherwise detected by the formal survey methods or desktop review. This provides confidence that the formal survey programme was sufficient to characterise the local avifauna assemblage, while recognising that anecdotal observations remain non-standardised and are not suitable for estimating abundance or detection probability.

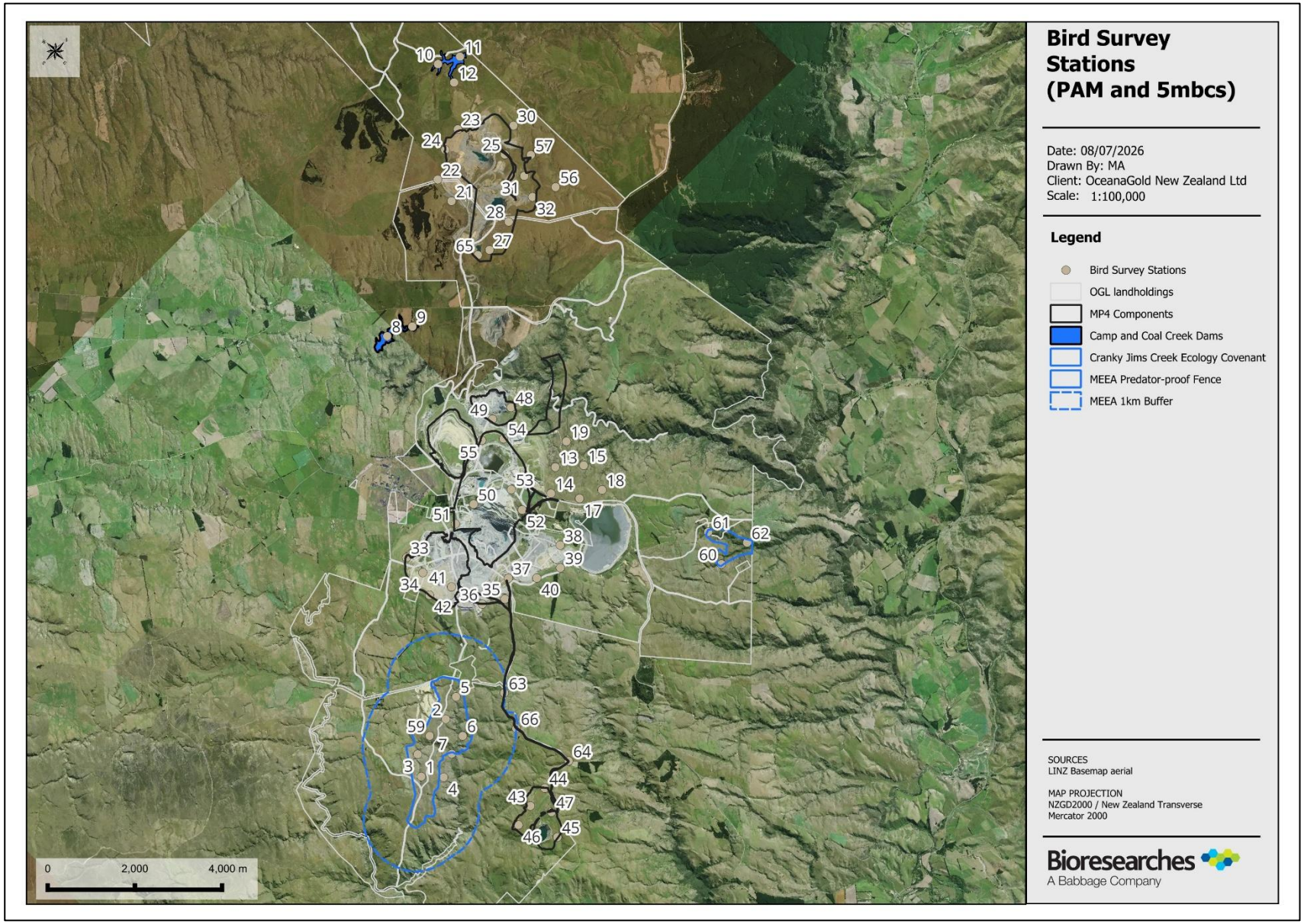


Figure 3.2. Locations of bird survey stations.

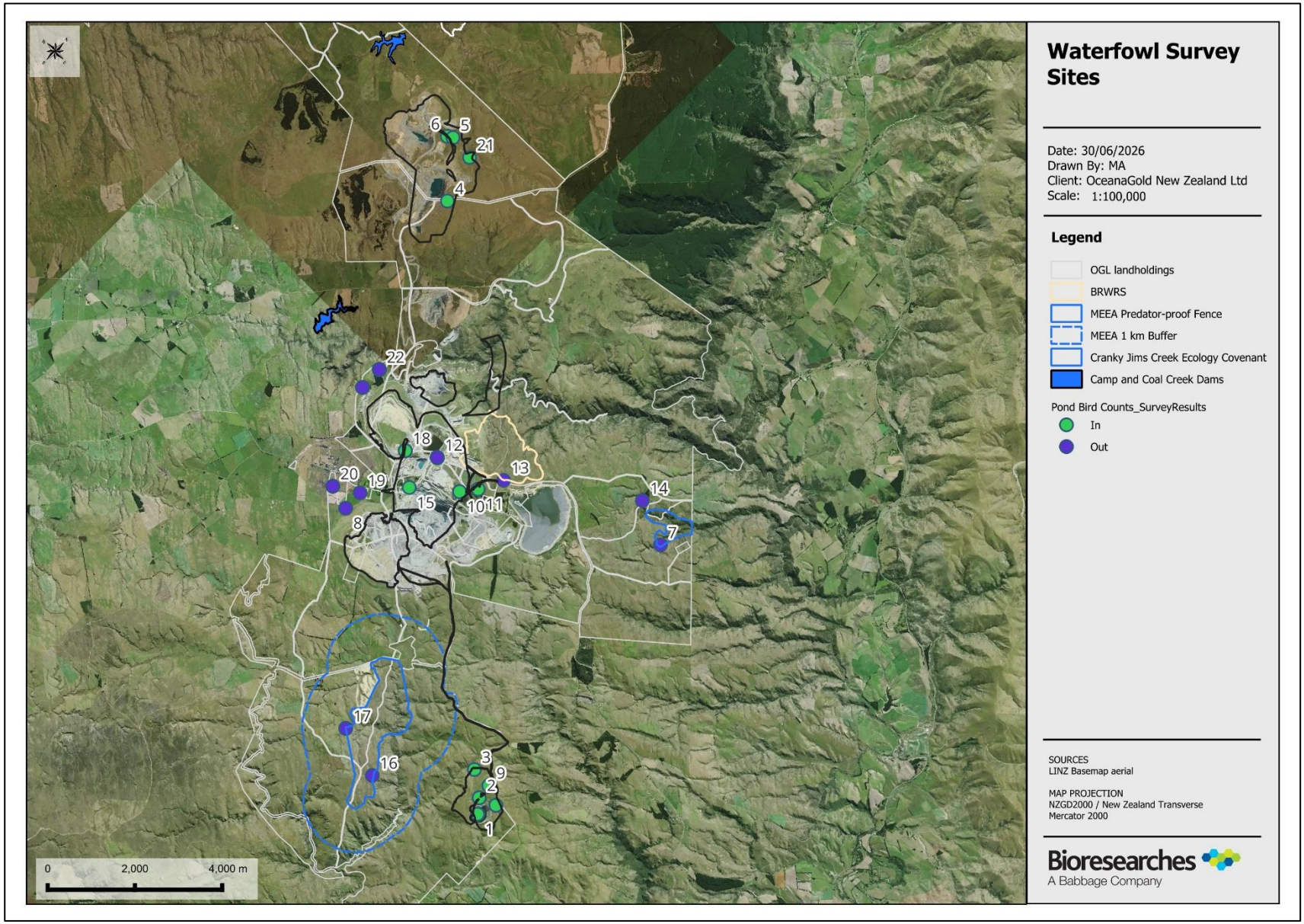


Figure 3.3. Locations of waterfowl survey sites.

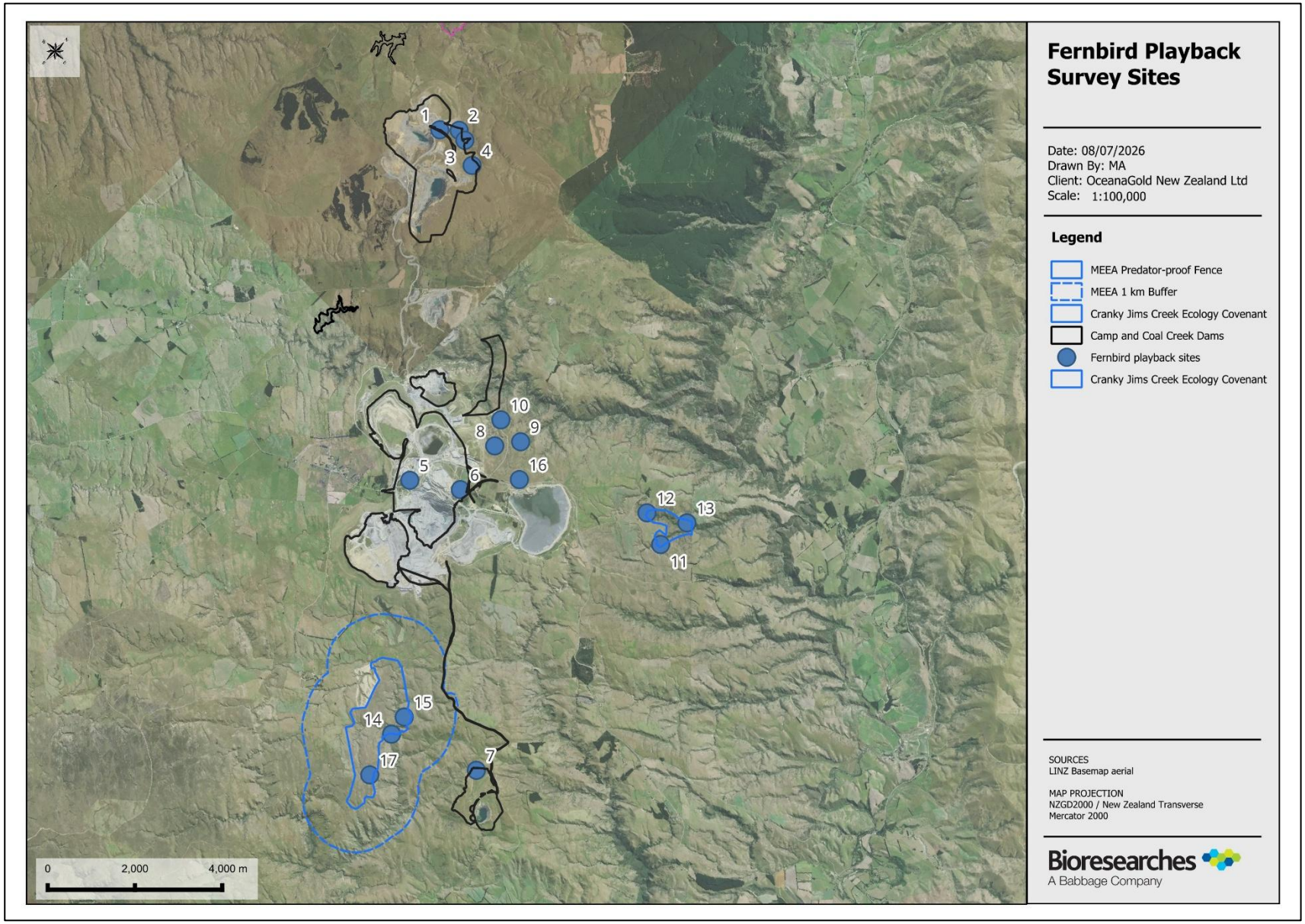


Figure 3.4. Locations of fernbird acoustic playback survey sites.

3.3 Survey Results

3.3.1 Avifauna desktop assessment

The desktop assessment (10 km buffer around all MP4 impacted avifauna habitat) identified a total of 53 bird species with records from the wider locality, of which 33 are native species (Table 3.1). Based on habitat availability within the Project area and confirmation from field surveys, 31 species are assessed as Confirmed Present, 16 as Likely Present, and 6 as Unlikely Present.

The assemblage is dominated by common indigenous and introduced species typical of modified dryland pastoral landscapes in Central Otago. However, seven species of elevated conservation concern (Threatened or At-Risk categories) are confirmed present within the Project area:

- Eastern falcon | Kārearea – Nationally Vulnerable, Regionally Vulnerable
- Banded dotterel | Pohowera – Nationally Declining, Regionally Vulnerable
- New Zealand pipit | Pīhoihoi – Nationally Declining, Regionally Not Threatened
- South Island pied oystercatcher | Tōrea – Nationally Declining, Regionally Vulnerable
- Black shag | Māpunga – Nationally Relict, Regionally Endangered
- Silvereye | Tahou – Nationally not threatened, Regionally Declining
- Fernbird | Mātātā – Nationally Declining, Regionally Declining

Of these, falcon, pipit and black shag are identified as Taoka species[1]. Other Threatened or At-Risk taxa were recorded in the desktop review but are assessed as either Likely Present (occasional/transient use but not observed) or Unlikely Present (records not representative of local habitat availability or very old/isolated records).

In summary, desktop assessment indicates the Project area supports a predominantly common avifauna assemblage typical of a modified dryland landscape, but with confirmed presence of five Threatened or At-Risk species. Of these, eastern falcon is the most sensitive and highest priority species for subsequent effects assessment, due to its Threatened status and its reliance on open habitats that occur widely within the MP4 Project area. New Zealand pipit and SIPO are also confirmed and associated with open habitats likely to be affected by earthworks and landform modification. Black shag is confirmed in association with the Golden Bar pit pond and river habitats.

Table 3.1. Summary assessment of the desktop survey of bird species within a 10-kilometre buffer of the entire MP4 Project area. Note that not all species are currently found within the Project area, as vagrants and historic records are recorded for completeness. See species descriptions for more details. Colours indicate species with the same threat status.

NZ Common Name	species name	Origin	Species group	National Threat status[4]	Regional Threat Status[5]	data source	number of observations	observation range	time of year present	mean number of birds observed	Confirmed present*	Likely present**	Unlikely present**
Australasian Bittern | Matuku-hūrepo	*Botaurus poiciloptilus*	Native	herons & allies	Nationally Critical	Regionally Critical	eBird	1	1999-1999	May	1.00 (n=1)			✓
Eastern falcon| Kārearea	*Falco novaeseelandiae novaeseelandiae*	Native	raptors & owls	Nationally Vulnerable	Regionally Vulnerable	eBird, iNaturalist	37	1959-2025	Jan-Jun and Aug-Dec	1.28 ± 0.10 (n=32)	✓		
Kākā | South Island kākā	*Nestor meridionalis meridionalis*	Native	parrots	Nationally Vulnerable	Regionally Endangered	eBird, iNaturalist	2	2000-2025	Jun and Sept	1.00 (n=1)			✓
Banded dotterel | Pohowera	*Anarhynchus bicinctus*	Native	waders	Declining	Regionally Vulnerable	eBird	2	2022-2023	Sept and Oct	1.00 (n = 2_	✓		
New Zealand pipit | Pīhoihoi	*Anthus novaeseelandiae*	Native	passerines	Declining	Regionally Not Threatened	eBird, iNaturalist	34	2001-2024	Jan-Dec	2.46 ± 0.45 (n=24)	✓		
South Island pied oystercatcher | Tōrea	*Haematopus finschi*	Native	waders	Declining	Regionally Vulnerable	Royal Ontario Museum, eBird, iNaturalist	28	1987-2023	Jan and Jun-Dec	9.00 ± 4.81 (n=24)	✓		
sooty shearwater | Tītī	*Puffinus griseus*	Native	seabirds	Declining	Regionally Vulnerable	Census of Marine Life Tagging of Pacific Predators	1	2005-2005	Feb	4.00 (n=1)			✓
broad-billed prion | Pararā	*Pachyptila vittata*	Native	seabirds	Relict	Regionally Migrant	iNaturalist	1	2018-2018	Dec				✓
Black shag | Māpunga	*Phalacrocorax carbo*	Native	seabirds	Relict	Regionally Endangered	eBird	6	2021-2023	Feb and Apr and Jun	1.00 ± 0.00 (n=5)	✓		
Australian coot	*Fulica atra*	Native	waterfowl	Naturally Uncommon	Regional Coloniser	eBird	9	2012-2023	Apr and Aug and Dec	2.44 ± 0.63 (n=9)		✓	
Wandering albatross | Toroa	*Diomedea exulans*	Native	seabirds	Migrant	Regional Vagrant		1	2010-2010	Jun				✓
Shining cuckoo| Pīpīwharauroa	*Chrysococcyx lucidus*	Native	passerines	Vagrant	Regionally Not Threatened	eBird	3	2023-2023	Oct and Dec	1.00 ± 0.00 (n=3)		✓	
Little shag | Kawaupaka	*Microcarbo melanoleucos*	Native	seabirds	Vagrant	Regionally Vulnerable	eBird	4	2019-2022	Apr and Nov-Dec	1.00 ± 0.00 (n=3)		✓	
Grey teal | Tētē-moroiti	*Anas gracilis*	Native	waterfowl	Not Threatened	Regionally Not Threatened	eBird, iNaturalist	13	2012-2025	Jan-Apr and Aug-Oct and Dec	1.42 ± 0.15 (n=12)		✓	
Bellbird | Korimako	*Anthornis melanura*	Native	passerines	Not Threatened	Regionally Not Threatened	Manaaki Whenua - Landcare Research, eBird	54	2014-2024	Feb-Aug and Nov-Dec	1.26 ± 0.07 (n=53)		✓	
New Zealand scaup | Pāpango	*Aythya novaeseelandiae*	Native	waterfowl	Not Threatened	Regionally Not Threatened	eBird	11	2001-2023	Apr and Aug and Oct-Nov	2.45 ± 0.34 (n=11)		✓	
Swamp harrier | Kāhu	*Circus approximans*	Native	raptors & owls	Not Threatened	Regionally Not Threatened	Manaaki Whenua - Landcare Research, eBird	150	2001-2024	Jan-Dec	1.61 ± 0.15 (n=143)	✓		
White-faced heron | Matuku moana	*Egretta novaehollandiae*	Native	herons & allies	Not Threatened	Regionally Not Threatened	eBird	19	2019-2024	Apr and Jun and Aug and Nov-Dec	1.16 ± 0.09 (n=19)	✓		
Grey warbler | Riroriro	*Gerygone igata*	Native	passerines	Not Threatened	Regionally Not Threatened	eBird	96	2001-2024	Jan-Jun and Aug and Oct-Dec	1.28 ± 0.06 (n=92)	✓		
Kererū | New Zealand pigeon	*Hemiphaga novaeseelandiae*	Native	pigeons & doves	Not Threatened	Regionally Not Threatened	Manaaki Whenua - Landcare Research, eBird	6	2020-2023	Feb and Jun-Jul and Nov	1.40 ± 0.24 (n=5)		✓	
Pied stilt | Poaka	*Himantopus leucocephalus*	Native	waders	Not Threatened	Regionally Not Threatened	eBird	9	2019-2023	Jan-Feb and Jun and Nov-Dec	3.56 ± 1.11 (n=9)	✓		
Welcome swallow | Warou	*Hirundo neoxena*	Native	passerines	Not Threatened	Regionally Not Threatened	Manaaki Whenua - Landcare Research, eBird	51	2001-2024	Jan-Aug and Oct-Dec	3.71 ± 0.53 (n=49)	✓		
Southern black-backed gull | Karoro	*Larus dominicanus*	Native	seabirds	Not Threatened	Regionally Not Threatened	eBird	105	2001-2024	Jan-Apr and Jun-Dec	4.36 ± 0.77 (n=100)	✓		
Brown creeper | Pīpipi	*Mohoua novaeseelandiae*	Native	passerines	Not Threatened	Regionally Declining	eBird, iNaturalist	5	2023-2025	Feb-Mar and Oct	1.00 ± 0.00 (n=3)		✓	
Tomtit | Miromiro	*Petroica macrocephala macrocephala*	Native	passerines	Not Threatened	Regionally Not Threatened	eBird, iNaturalist	7	2023-2024	Jan and Aug and Dec	1.50 ± 0.34 (n=6)		✓	
Pūkeko | Pukeko	*Porphyrio melanotus*	Native	rails	Not Threatened	Regionally Not Threatened	eBird	5	1998-2021	Jun-Jul and Nov	3.50 ± 0.50 (n=4)	✓		
Tūī|Tui	*Prosthemadera novaeseelandiae*	Native	passerines	Not Threatened	Regionally Not Threatened	Manaaki Whenua - Landcare Research, iNaturalist	4	2025-2025	Jun	2.33 ± 0.33 (n=3)		✓	
South Island fantail | Pīwakawaka	*Rhipidura fuliginosa fuliginosa*	Native	passerines	Not threatened	Regionally Not Threatened	Manaaki Whenua - Landcare Research, eBird, iNaturalist	73	2001-2025	Jan-Aug and Oct-Dec	1.32 ± 0.07 (n=69)	✓		
Australasian shoveler | Kuruwhengi	*Spatula rhynchotis*	Native	gamebirds	Not Threatened	Regionally Not Threatened	eBird	6	2019-2022	Jun and Oct-Nov	4.17 ± 1.28 (n=6)		✓	
Paradise shelduck | Pūtangitangi	*Tadorna variegata*	Native	gamebirds	Not Threatened	Regionally Not Threatened	eBird, iNaturalist	139	2001-2024	Jan-Aug and Oct-Dec	6.52 ± 0.94 (n=128)	✓		
Sacred kingfisher | Kōtare	*Todiramphus sanctus*	Native	passerines	Not Threatened	Regionally Not Threatened	eBird	8	1990-2023	May and Jul-Aug and Oct-Dec	1.00 ± 0.00 (n=8)	✓		
Spur-winged plover	*Vanellus miles*	Native	waders	Not Threatened	Regionally Not Threatened	eBird	99	2001-2024	Jan-Aug and Oct-Dec	6.50 ± 1.16 (n=96)	✓		
Silvereye | Tauhou	*Zosterops lateralis*	Native	passerines	Not Threatened	Regionally Declining	Manaaki Whenua - Landcare Research, eBird	56	2001-2024	Jan and Mar-Jun and Aug and Oct-Dec	4.63 ± 0.80 (n=54)	✓		
Redpoll	*Acanthis flammea*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	94	2001-2024	Jan-Dec	8.37 ± 2.13 (n=90)	✓		
Eurasian skylark | Kairaka	*Alauda arvensis*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	eBird, iNaturalist	112	2001-2024	Jan-Dec	2.33 ± 0.23 (n=104)	✓		
Mallard | Rakiraki	*Anas platyrhynchos*	Introduced	gamebirds	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	65	2001-2024	Jan-Feb and Apr-Aug and Oct-Dec	6.83 ± 1.17 (n=60)	✓		
Greylag goose | Kuihi	*Anser anser*	Introduced	waterfowl	Introduced	Regionally Introduced and Naturalised	eBird	9	2020-2023	Jul-Aug and Dec	5.11 ± 0.56 (n=9)		✓	
California quail | Tikaokao	*Callipepla californica*	Introduced	gamebirds	Introduced	Regionally Introduced and Naturalised	eBird, iNaturalist	9	2010-2024	Jan and Oct-Nov	1.62 ± 0.18 (n=8)		✓	

[4] Robertson *et al.*, 2021

[5] Jarvie *et al.*, 2025

European goldfinch | Kōurarini	*Carduelis carduelis*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird, iNaturalist	153	2001-2024	Jan-Dec	11.03 ± 5.56 (n=145)	✓		
European Greenfinch	*Chloris chloris*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	48	2001-2024	Jan and Apr-Aug and Oct-Dec	3.05 ± 0.97 (n=44)	✓		
Rock pigeon | Kererū aropari	*Columba livia*	Introduced	pigeons & doves	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	28	2010-2024	Jan-Jun and Oct and Dec	33.09 ± 13.45 (n=22)	✓		
rook	*Corvus frugilegus*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	eBird	3	1994-1998	Oct-Nov	28.67 ± 16.18 (n=3)		✓	
cirl bunting	*Emberiza cirlus*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	eBird	1	2018-2018	Jul	1.00 (n=1)		✓	
Yellowhammer |Hurukōwhai	*Emberiza citrinella*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	113	2001-2024	Jan-Dec	2.25 ± 0.33 (n=106)	✓		
Chaffinch | Pahirini	*Fringilla coelebs*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird, iNaturalist	166	2001-2025	Jan-Dec	4.28 ± 0.60 (n=163)	✓		
Australian magpie | Makipai	*Gymnorhina tibicen*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	187	2001-2024	Jan-Aug and Oct-Dec	2.60 ± 0.15 (n=181)	✓		
Wild turkey | Korukoru	*Meleagris gallopavo*	Introduced	gamebirds	Introduced	Regionally Introduced and Naturalised	eBird	5	2001-2016	Oct-Dec	3.25 ± 0.75 (n=4)		✓	
House sparrow | Tiu	*Passer domesticus*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	63	2001-2024	Jan-Feb and Apr-Aug and Oct-Dec	7.33 ± 1.34 (n=57)	✓		
Dunnock	*Prunella modularis*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	97	2001-2024	Jan-Aug and Oct-Dec	1.51 ± 0.08 (n=92)	✓		
Common starling | Tāringi	*Sturnus vulgaris*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	178	2001-2024	Jan-Aug and Oct-Dec	20.43 ± 4.53 (n=168)	✓		
Eurasian blackbird | Manu pango	*Turdus merula*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	149	2001-2024	Jan-Aug and Oct-Dec	2.25 ± 0.14 (n=142)	✓		
Song thrush | Manu-kai-hua-rakau	*Turdus philomelos*	Introduced	passerines	Introduced	Regionally Introduced and Naturalised	Manaaki Whenua - Landcare Research, eBird	142	2009-2024	Jan-Feb and Apr-Aug and Oct-Dec	2.38 ± 0.15 (n=140)	✓		
Red Junglefowl	*Gallus gallus*	Failed introduction	rails	Introduced	Regionally Introduced, Not Naturalised	eBird	1	2024-2024	Nov	2.00 (n=1)			✓

*Confirmed to be present within the project a or immediate vicinity, **Recorded within 10 km and potentially present based on habitat suitability, ***Recorded within 10 km but considered unlikely to occur due to habitat limitations.

3.3.2 Field Surveys

3.3.2.1 Five-minute bird counts

3.3.2.1.1 Five-Minute Bird Count Survey Results – Breeding Season 2025

5MBCs were undertaken at 49 of the 66 stations during the spring/early summer 2025 survey period. A total of 22 species were recorded during the surveys (Table C.1). The avifauna assemblage was dominated by introduced passerines characteristic of modified dryland pastoral and mining landscapes, particularly Eurasian skylark (*Alauda arvensis)*, European goldfinch (*Carduelis carduelis)*, redpoll (*Acanthis flammea*), yellowhammer (*Emberiza citronella)*, and Australian magpie (*Gymnorhina tibicen)*.

Eurasian skylark was the most widespread and abundant species recorded during the survey period, detected at 48 of 49 stations (97.96% detection rate), with 191 individuals recorded overall and a mean of 3.90 birds per count (SE 0.26). European goldfinch was also widespread and abundant, recorded at 21 stations (42.86% detection rate) with 115 individuals observed, while redpoll was recorded at 17 stations (34.69% detection rate) with 82 individuals observed. Yellowhammer, Australian magpie, and starling (*Sturnus vulgaris)* were also regularly recorded across open pastoral and mine-modified habitats.

Among larger-bodied species, southern black-backed gull (*Larus dominicanus*) and Australasian harrier (*Circus approximans*) were the most frequently recorded species, reflecting the availability of open foraging habitat and anthropogenic food resources within the wider operational landscape. SIPO was recorded at 11 stations (22.45% detection rate), with observations concentrated primarily within open grassland, mine-disturbed areas, and haul road environments within the active Project area.

Native passerines were recorded at comparatively low frequencies during the spring/early summer survey period. Grey warbler (*Gerygone igata)* was recorded at two stations, while South Island fantail (*Rhipidura fuliginosa fuliginosa*) and silvereye (*Zosterops lateralis*) were each recorded at a single station associated with shrubland or riparian vegetation. Banded dotterel were recorded at several open-country stations associated with sparsely vegetated mine-disturbed habitats and gravel substrates within the operational mining environment. The eastern falcon was not detected during the spring 5MBC surveys, although the species was subsequently recorded during autumn surveys and through other survey methods within both operational and offset areas.

Overall, the spring/early summer 5MBC results indicate that the Project area supports an avifauna assemblage characteristic of open, highly modified dryland habitats, with high representation of introduced granivorous and insectivorous passerines and moderate representation of indigenous open-country species associated with pastoral, wetland, and mine-modified habitats. This avifauna assemblage is likely to be typical of similar habitat types within the ED.

3.3.2.1.2 Five-Minute Bird Count Survey Results – Non-Breeding Season

5MBCs were undertaken at 49 of the 66 stations during the autumn 2026 survey period. A total of 20 species were recorded during the autumn 2026 surveys (Table C.2). Similar to the spring/early summer survey period, the avifauna assemblage was dominated by introduced passerines characteristic of modified dryland pastoral and mining landscapes, particularly European goldfinch, Eurasian skylark, redpoll, Australian magpie, and starling.

European goldfinch was the most frequently recorded species during the autumn surveys, followed by Eurasian skylark, Australian magpie, and redpoll, all of which were widespread across the survey area and characteristic of open pastoral, tussock, and mine-modified habitats. Starling was also recorded in relatively high numbers, particularly within more open pastoral and disturbed habitats. Australasian harrier remained the most widespread indigenous raptor species recorded during the autumn survey period, while paradise shelduck (*Tadorna variegata)* and spur-winged plover (*Vanellus miles*) were the most frequently recorded water-associated species.

Indigenous passerines continued to be recorded at relatively low frequencies compared with introduced species. Grey warbler was the most widespread native passerine detected during autumn surveys, while silvereye, bellbird (*Anthornis melanura)*, and South Island fantail were recorded at smaller numbers of stations, generally associated with shrubland, riparian vegetation, and offset or enhancement areas containing greater woody vegetation cover.

Eastern falcon was recorded at two survey stations during the autumn survey period. One detection occurred within the Macraes Central assessment area and a second detection occurred within the Cranky Jims enhancement area, indicating ongoing use of both operational and offset landscapes by this species within the wider Macraes environment.

Overall, the autumn 5MBC results indicate that the Project area supports an avifauna assemblage characteristic of similar habitats within the ED, characterised by open, highly modified dryland habitats dominated by introduced granivorous and insectivorous passerines, together with a smaller component of widespread indigenous open-country, shrubland-associated, and wetland-associated species. Seasonal differences between spring/summer and autumn surveys likely reflect post-breeding dispersal, flocking behaviour, seasonal movement patterns, and variation in detectability between survey periods.

3.3.2.1.3 Threatened or At-Risk Species Recorded

Several Threatened or At-Risk avifauna species were recorded during the spring and autumn 5MBC surveys, reflecting the ongoing use of the wider Macraes operational landscape by indigenous open-country bird species of elevated conservation concern.

SIPO (At Risk – Declining) was the most frequently recorded Threatened or At-Risk species during the surveys. During the spring 2025 survey period, the species was recorded at 11 of 49 stations (22.45% detection rate), with a total of 41 individuals observed. Records were concentrated primarily within the active Project area, including the Coronation Mining Area, Macraes Central, Golden Bar Mining Area, and Golden Bar Haul Road assessment areas. Observations were typically associated with open grassland, gravel, haul road, and mine-disturbed habitats, indicating regular use of modified open-country environments within the operational mining landscape.

Banded dotterel (At Risk – Declining) were recorded intermittently across several open-country survey stations, primarily within the Coronation Mining Area, Macraes Central, and Golden Bar Mining Area. Most observations were associated with sparsely vegetated ground, gravel surfaces, disturbed substrates, and open mine-modified habitats within the Project area. These habitats are consistent with known breeding and foraging habitat preferences for the species within inland Otago.

New Zealand pipit | pīhoihoi (At Risk – Declining) were recorded within open tussock grassland and pastoral habitats associated primarily with the Coronation Mining Area, Golden Bar Mining Area, and BRWRS assessment areas. The species was generally associated with indigenous tussock grassland, exotic grassland, and open rehabilitated mine landforms. Several records occurred outside the immediate active project area within the BRWRS and wider tussock grassland areas, indicating continued use of more extensive open-country habitats within the broader OGL landholdings.

Eastern falcon | kārearea (Threatened – Nationally Vulnerable) was not recorded during the spring 2025 5MBC surveys but was subsequently recorded during autumn 2026 surveys and additional survey methods. Autumn 5MBC detections occurred within the Macraes Central assessment area and within the Cranky Jims enhancement area outside the active Project area. Additional anecdotal observations were also recorded elsewhere within the wider operational landscape during the broader survey programme. These observations indicate ongoing use of both operational mining environments and offset/enhancement habitats by eastern falcon within the wider Macraes area.

Overall, records of Threatened and At-Risk avifauna species were concentrated primarily within open-country, tussock grassland, wetland, and mine-disturbed habitats characteristic of the wider Macraes landscape. Several species were recorded both within active Project areas and within adjacent offset or enhancement areas, indicating that indigenous avifauna utilise habitat mosaics extending beyond individual operational components.

3.3.2.2 Passive Acoustic Monitoring

3.3.2.2.1 Passive Acoustic Monitoring – Breeding Season

PAM was undertaken using Department of Conservation AR4 autonomous recording units during November to December 2025. ARUs were deployed across representative avifauna habitats within the MP4 assessment area and generally operated continuously for several days at each station.

A total of 32 species were detected during the breeding season PAM deployment, with 1,043,932 acoustic detections recorded following BirdNET processing and filtering (Table D.5). The acoustic dataset was strongly dominated by introduced passerines characteristic of modified dryland pastoral and mining landscapes. Eurasian skylark was the most frequently detected species, with 736,174 detections across 49 ARUs. Other abundant introduced species included yellowhammer, Eurasian blackbird (*Turdus merula)*, chaffinch (*Fringilla coelebs)*, European goldfinch, song thrush (*Turdus philomelos)*, European greenfinch (*Chloris chloris*) and common redpoll (*Acanthis flammea*).

Indigenous species were also widely detected, particularly open-country, wetland-associated and generalist taxa. SIPO was detected on 39 ARUs, with 1,372 detections, indicating widespread use of open pasture, short grassland and mine-modified habitats during the breeding season. Spur-winged plover was detected on 32 AR4 units, silvereye on 31 units, pied stilt (*Himantopus leucocephalus)* on 24 units, swamp harrier on 23 units, grey warbler on 17 units and paradise shelduck on 14 units.

Several Threatened or At-Risk species were detected during the breeding season deployment. New Zealand pipit was detected on 13 AR4 units, with 72 detections, consistent with use of open tussock grassland, pasture and sparsely vegetated ground. Banded dotterel was detected on six ARUs, with 1,337 detections, including a high concentration of detections at one station, indicating regular local use of open gravel or sparsely vegetated substrates during the survey period. Black shag was detected

at two ARUs, with two detections, consistent with occasional use of riparian or pond-associated habitats, although only outside the MP4 Project area. Black-fronted dotterel (*Charadrius melanops*) was detected at four ARUs, with four detections; however, given the low number of detections and potential for confusion with banded dotterel calls, this species is treated cautiously and is not confirmed as resident within the Project area.

Eastern falcon was not detected during the breeding season PAM deployment. This is consistent with the limitations of passive acoustic monitoring for this species, as falcon vocalisations are likely to be infrequent unless birds are calling close to a recorder. Absence of PAM detections therefore does not indicate absence from the wider Project area, and eastern falcon presence is assessed using visual and incidental records in combination with habitat suitability.

Overall, the breeding season PAM results confirm regular use of the MP4 Project area by indigenous open-country and wetland-associated species, including several species of conservation concern. The results are consistent with a modified dryland avifauna assemblage dominated numerically by introduced passerines, but with functional habitat use by At-Risk, open-country taxa.

3.3.2.2.2 Passive Acoustic Monitoring – Nonbreeding Season

A second PAM deployment was undertaken during autumn 2026 to provide seasonal comparison with the breeding season dataset and to improve detection of species using the Project area during the non-breeding period. Recorders were deployed across MP4 Project areas, including impact areas, avoided areas, and restoration or enhancement areas.

A total of 34 species were detected during the autumn deployment, with 77,303 acoustic detections recorded following BirdNET processing and filtering (see Table D.5). Total detections were substantially lower than during the breeding season deployment. This is consistent with reduced seasonal vocal activity by many species, particularly territorial and breeding birds, and with differences in survey station locations between seasons.

The autumn soundscape remained dominated by introduced passerines, although the relative contribution of species differed from the breeding season. Dunnock (*Prunella modularis*) was the most frequently detected species, with 32,050 detections across 48 AR4 units. European goldfinch, Australian magpie, Eurasian skylark, common starling, Eurasian blackbird and song thrush were also widely detected. Eurasian skylark detections were substantially lower in autumn than in the breeding season, consistent with reduced territorial song activity outside the breeding period.

Indigenous species detected during autumn included silvereye, paradise shelduck, spur-winged plover, grey warbler, New Zealand fantail, bellbird, Eurasian coot (*Fulica atra)*, tūī (*Prosthemadera novaeseelandiae)*, brown creeper (*Mohoua novaeseelandiae)*, tomtit (*Petroica macrocephala macrocephala)*, New Zealand pipit, southern black-backed gull, swamp harrier, pied stilt, SIPO, pūkeko (*Porphyrio melanotus)*, morepork (*Ninox novaeseelandiae*) and fernbird. Silvereye was the most frequently detected indigenous species, with 16,430 detections across 30 AR4 units. Paradise shelduck and spur-winged plover were also widespread, with 1,434 and 1,377 detections, respectively.

Several detections were associated with shrubland, riparian, wetland or enhancement habitats rather than the more open mine-modified habitats that dominated breeding season detections. Bellbird, brown creeper, fernbird, morepork, pūkeko, tomtit and tūī were detected only during the autumn deployment, due to the inclusion of additional shrubland and restoration sites, including Cranky Jims

and MEEA. These sites were not included in the earlier surveys, as they had not yet been determined to be future restoration sites.

Threatened or At-Risk species detected during autumn included New Zealand pipit, SIPO and fernbird. New Zealand pipit was detected on two AR4 units, with 10 detections, indicating continued but reduced acoustic activity during the non-breeding period. SIPO was detected on two ARUs, with two detections, substantially lower than during the breeding season and consistent with seasonal movement or reduced local vocal activity. Fernbird was detected on one ARU, with two calls recorded. Given the low number of calls, absence of repeat detections across other ARUs, and absence of responses during targeted playback surveys, this record is interpreted as evidence of presence but not as confirmation of resident occupancy or breeding within the Project area.

Morepork was detected on two ARUs during autumn, with two detections, in addition to the single breeding season detection. These records indicate possible use of the wider landscape by morepork, although the low number of detections does not confirm resident occupancy.

Overall, the non-breeding season PAM results indicate continued use of the wider Project area by a range of indigenous birds, with a shift toward greater detection of shrubland, riparian and enhancement-area species, and reduced detection of several open-country breeding season species. The results support the interpretation that avifauna use of the MP4 landscape is seasonal and habitat-specific, with open-country habitats important for At-Risk taxa during the breeding season and structurally diverse habitats contributing additional indigenous bird diversity during autumn.

3.3.2.2.3 General summary

Across both PAM deployments, a total of 35 bird species were detected, with 1,121,235 acoustic detections recorded following BirdNET processing and filtering (see Table D.4 to Table D.7 for details). Species richness was broadly similar between seasons, with 32 species detected during the breeding season deployment and 34 species detected during the non-breeding season deployment. Total detections were substantially higher during the breeding season, primarily due to high levels of territorial song activity by introduced passerines, particularly Eurasian skylark.

The acoustic soundscape was dominated by introduced passerines characteristic of modified dryland pastoral and mining landscapes. Eurasian skylark was the most frequently detected species during the breeding season, while dunnock, European goldfinch, Australian magpie, Eurasian skylark, common starling and Eurasian blackbird were prominent during the non-breeding season. This pattern is consistent with the predominance of open pasture, tussock grassland, mine-modified landforms and rehabilitated open-country habitats across much of the Project area.

Indigenous species were detected across both deployments, including open-country, wetland-associated, riparian, shrubland-associated and generalist taxa. The highest number of indigenous species detected was at Cranky Jims, followed by Coronation Mining Area. Very few species were detected at Golden Bar and GBHR (Figure 3.5). SIPO, New Zealand pipit, banded dotterel, pied stilt, spur-winged plover, paradise shelduck, swamp harrier, grey warbler, silvereye and welcome swallow (*Hirundo neoxena*) were among the indigenous species detected. Autumn detections also included species more closely associated with shrubland, riparian or enhancement habitats, including bellbird, brown creeper, tomtit and tūī, due to the inclusion of Cranky Jims in the survey.

PAM confirmed the presence of several species of conservation concern. During the breeding season, SIPO, banded dotterel, New Zealand pipit and black shag were detected. During the non-breeding season, New Zealand pipit, SIPO and fernbird were detected. Morepork was detected at low frequency across the combined dataset. Black-fronted dotterel was also detected at low frequency, but those detections are treated cautiously due to the potential for acoustic confusion with banded dotterel and the absence of corroborating visual observations.

Overall, the PAM results confirm that the Project area supports a modified open-country avifauna assemblage dominated numerically by introduced passerines, but with regular use by indigenous open-country and wetland-associated species. The results also demonstrate seasonal variation in acoustic activity and habitat use, with stronger detection of open-country breeding species during spring / early summer and greater representation of shrubland, riparian and enhancement-area species during autumn.

3.3.2.2.4 Threatened or At Risk species detected

The following Threatened or At Risk species were detected in the PAM surveys. Interpretation reflects both automated detections and ecological context, including habitat suitability and known species distributions within the Project area.

Eastern falcon | Kārearea (*Falco novaeseelandiae*) – Threatened – Nationally Vulnerable

Eastern falcon was not detected during the PAM survey. This is consistent with expectations, as falcon vocalisations are infrequent outside of territorial or breeding interactions and are unlikely to be reliably captured by passive acoustic monitoring unless birds vocalise near a recorder. The absence of acoustic detections does not indicate absence from the Project area. Presence is confirmed through desktop records and anecdotal observations.

New Zealand pipit | Pīhoihoi (*Anthus novaeseelandiae*) – At Risk – Declining

New Zealand pipit | pīhoihoi was detected during both ARU deployments. During the breeding season, it was detected on 13 ARU units, with 72 call detections recorded. Breeding season detections were recorded at Coal Creek (S10), Back Road WRS (S19), Coronation North (S22, S25, S27, S29, S30, S31 and S32), Frasers South Backfill (S35 and S37), Golden Point Backfill (S48), and Macraes Road Realignment Stage 2 (S52). During the non-breeding season, pipit was detected less frequently, with 10 call detections recorded from two ARU units at Coronation North (S21) and Frasers South Backfill (S36).
Across both deployments, pipit was detected on 15 ARU units, with 82 call detections recorded. Detections were associated with open habitats within the Project Footprint, including tussock grassland, pasture, rehabilitated mine landforms, waste rock stacks, backfill areas and sparsely vegetated ground. Lower detection totals relative to dominant introduced passerines likely reflect differences in vocal behaviour, call amplitude and detectability, rather than necessarily indicating low abundance. Overall, the ARU results confirm use of open-country habitats by pipit within the Project area, with strongest evidence of activity during the breeding season.

South Island pied oystercatcher | Tōrea (*Haematopus finschi*) – At Risk – Declining

South Island pied oystercatcher | tōrea was detected primarily during the breeding season ARU deployment. During the breeding season, it was detected on 39 ARU units, with 1,372 call detections recorded. Breeding season detections were widespread and recorded at MEEA (S01, S02, S04 and S05),

Camp Creek (S08 and S09), Coal Creek (S11 and S12), Back Road WRS (S13, S15, S17 and S18), Coronation North (S22, S23, S25, S28, S29, S30, S31 and S32), Central Mining Area (S33, S34, S35, S36, S37, S38, S39, S41, S42, S48, S49, S50, S51 and S52), and Golden Bar (S43, S44, S45, S46 and S47).

Detections were associated with open pasture, short grassland, rehabilitated mine landforms, waste rock stacks, backfill areas and sparsely vegetated ground. These habitats provide foraging habitat and potential breeding habitat for the species within the MP4 Project area. South Island pied oystercatcher breed within the wider Macraes landscape during spring and early summer, before migrating north, typically from January. This seasonal movement pattern explains the absence, or near absence, of detections during the autumn ARU deployment.

Overall, the ARU results confirm widespread breeding-season use of open-country habitats by South Island pied oystercatcher within the Project area. The results are consistent with regular seasonal use of the MP4 landscape for breeding, foraging and movement, rather than year-round occupancy.

Fernbird | mātātā (*Poodytes punctatus)* – At Risk - Declining

Fernbird | mātātā was only detected during the non-breeding season PAM deployment, with two calls recorded at one AR4 station within the Coronation North new impact area. Both calls were manually reviewed and retained as valid detections. No fernbird were detected during the breeding season PAM deployment.

The low number of detections, absence of repeat detections across other AR4 stations, and absence of responses during targeted playback surveys indicate that the Coronation North record is unlikely to represent confirmed resident occupancy or breeding activity. The record is more likely to reflect intermittent use, local movement, or a dispersing individual. However, because fernbird is classified as At Risk – Declining nationally and Regionally Declining in Otago, the detection is ecologically relevant and has been considered in the avifauna values assessment and subsequent effects assessment.

Suitable fernbird habitat within the Project area is limited and generally localised to dense wetland, seepage, rushland, sedgeland and riparian vegetation. These habitats are fragmented and were generally assessed as marginal or unsuitable across many of the targeted fernbird survey sites. On this basis, PAM results confirm presence within the wider Project area, but do not indicate regular occupancy of the Coronation North new impact area.

Black shag | Māpunga (*Phalacrocorax carbo*) – At Risk – Relict

Black shag was detected at two AR4 units (two detections) at Camp Creek (S09) and the western side of Coronation Waste Rock Stack (S22), both outside MP4 impacted areas. Low detection frequency is consistent with expectations for a largely water-associated species with relatively infrequent vocalisation outside breeding colonies. The detections likely relate to birds utilising riparian vegetation for foraging or loafing. PAM therefore provides additional confirmation of presence within the wider landscape, but not within the MP4 project area.

Banded dotterel | Pohowera (*Anarhynchus bicinctus*) – At Risk – Declining

Banded dotterel | pohowera was detected during the breeding season ARU deployment. It was detected on six ARU units, with 1,337 call detections recorded. Detections were recorded at Coronation North (S23 and S29), Frasers West WRS (S34, S41 and S42), and Frasers South Backfill (S37). Detections were associated with open gravel, sparsely vegetated ground, rehabilitated mine landforms, waste rock stacks and backfill areas. These habitats provide suitable foraging and potential

breeding habitat for banded dotterel within the MP4 Project area. The high number of calls recorded at Frasers West WRS, particularly at S41, indicates regular local use of this area during the breeding season and may be consistent with breeding activity or territorial behaviour.
Banded dotterel is a migratory species and is not expected to remain within the Macraes landscape year-round. The absence of detections during the autumn ARU deployment is consistent with seasonal movement away from inland breeding sites following the breeding season.

Overall, the ARU results confirm breeding-season use of open-country and mine-modified habitats by banded dotterel within the Project area. The results indicate seasonal use of the MP4 landscape for breeding, foraging and movement, rather than year-round occupancy.

Black-fronted dotterel (*Charadrius melanops*) – At Risk – Naturally Uncommon
Black-fronted dotterel was detected on four AR4 units, with a total of four detections: MEEA (S07), Coal Creek (S10), Coronation North Backfill (S24) and Frasers West WRS (S41). This species has not been recorded during desktop review or incidental field observations within the Project area. The very low number of detections at each location raises uncertainty regarding species identification.

There are two plausible explanations for these detections:

1. Misidentification by BirdNET. Calls of banded dotterel and black-fronted dotterel are similar in structure, and misclassification can occur where acoustic signatures overlap, particularly in open, reverberant environments.
2. Brief stopover use during dispersal. The detections occurred on:
    - 29/11/2025 at 12:38 PM and 4:04 PM
    - 4/12/2025 at 8:07 PM
    - 16/12/2025 at 7:00 AM

Three of the four detections were not co-located with AR4 units that recorded banded dotterel, suggesting the possibility of brief transient presence rather than misclassification at a single recorder. The 8:07 PM detection occurred at dusk, a period when post-breeding dispersal or local movements may occur. The very low call numbers at each site suggest that, if present, individuals were only briefly utilising the area.

Given the limited number of detections, absence of corroborating field observations, and potential for acoustic misclassification, black-fronted dotterel is considered Possibly Present on a transient basis only.

Overall, the PAM results confirm the regular presence of three At Risk – Declining species (New Zealand pipit, South Island pied oystercatcher, and banded dotterel) and the Relict black shag within the survey area. Eastern falcon remains confirmed through visual survey methods but was not detected acoustically. The black-fronted dotterel detections are treated with caution pending further seasonal survey effort. New Zealand fernbird are considered non-resident due to very low call numbers, likely indicating a transiting, rather than resident bird.

3.3.2.2.5 Interpretation

The ARU deployments substantially increased temporal survey coverage relative to observer-based counts and confirmed the occurrence of several indigenous open-country species within the Project area, including South Island pied oystercatcher, banded dotterel and New Zealand pipit. The breeding season deployment recorded substantially higher activity for South Island pied oystercatcher and banded dotterel, consistent with seasonal use of the Macraes landscape for breeding, foraging and movement before post-breeding migration. New Zealand pipit was detected in both seasons, indicating continued use of open-country habitats across the survey period.

The ARU results also confirmed black shag presence at low frequency, consistent with the species' relatively low vocal detectability outside breeding colonies and detected fernbird at low frequency during the non-breeding season. The fernbird result confirms presence within the wider Project area but does not indicate resident occupancy or breeding within the Coronation North Project area. Black-fronted dotterel was also detected at low frequency, although those records are treated cautiously due to potential acoustic confusion with banded dotterel and the absence of corroborating visual observations.

Overall, the ARU results show strong dominance of introduced passerines in the acoustic environment, reflecting the modified dryland character of the Project area. However, they also demonstrate that open-country, wetland-associated and riparian habitats within the OGL Landholdings provide seasonal or intermittent habitat for several indigenous species of conservation concern.

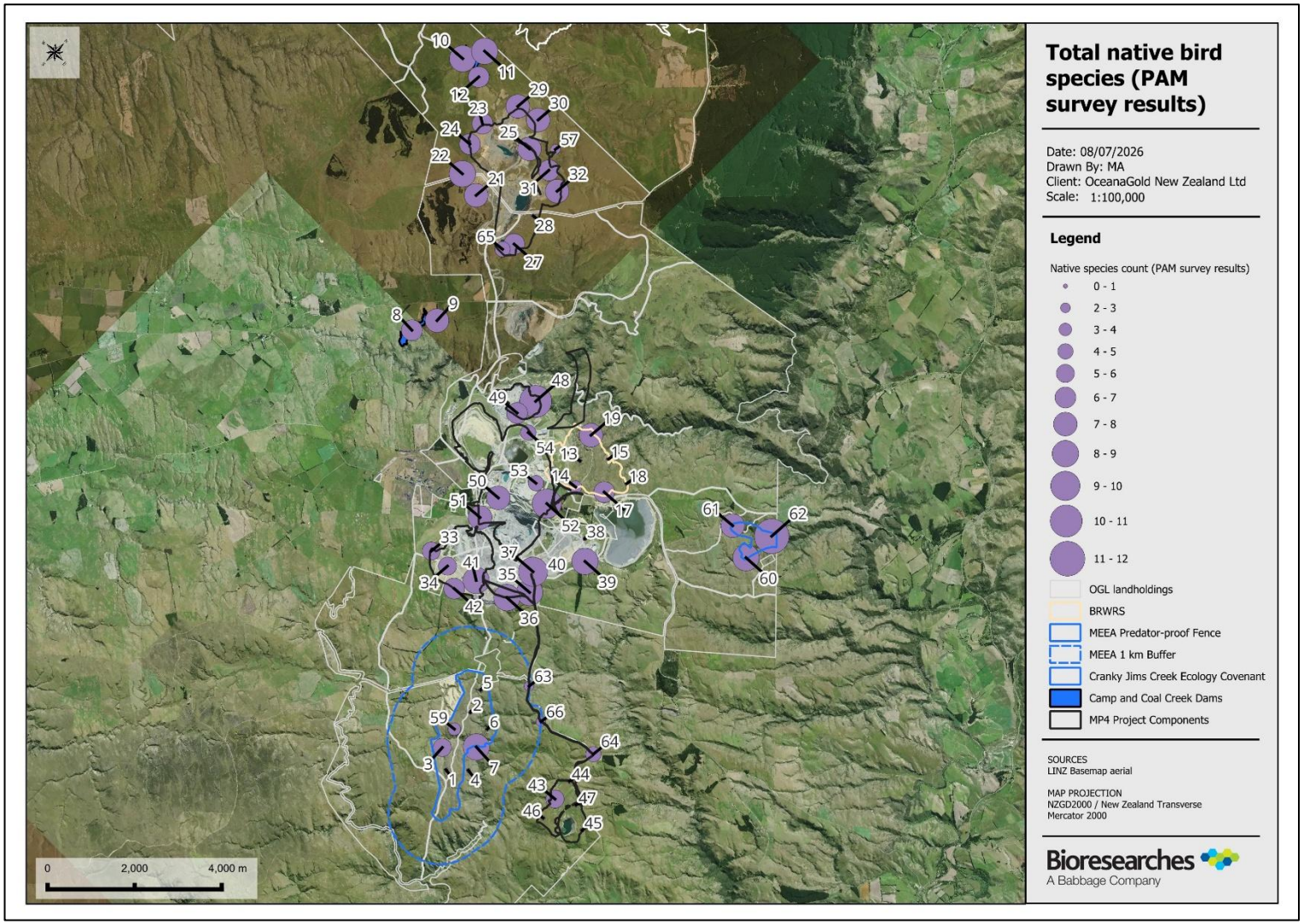


Figure 3.5. Locations of survey stations and the number of indigenous species detected at each one.

3.3.2.3 Waterfowl counts

Targeted pond and waterbody counts were undertaken between 1 April and 29 April 2026 to characterise the use of artificial ponds, farm dams, tailings ponds, and other open-water habitats by indigenous and introduced water-associated bird species within and adjacent to the Project area. In total, 22 pond survey stations were assessed, comprising 12 stations within the Project area and 10 stations outside the MP4 project area (see Table 3.2 below, and full data set in Table E.8). Survey locations included waterbodies associated with Golden Bar Road, Coronation, Macraes Central, Macraes Flat, Macraes Road, Murphys, Cranky Jims, Lone Pine Reservoir, and the Macraes Wetland Walkway.

An earlier opportunistic count undertaken on 22 January 2026 at the Golden Bar pit pond recorded 72 paradise shelduck and 19 mallards (*Anas platyrhynchos*), indicating that some larger operational waterbodies can support relatively high numbers of waterfowl. Southern black-backed gull were also present and observed breeding at the site at Golden Bar where a colony exists at the pit lake; however, these were not included in formal counts as the species is not protected under the Wildlife Act 1953. Note that this count is not included in the survey results data and not presented in results tables, due to potential differences in survey methods. However, the same site was included in the later formal counts, ensuring full survey coverage.

Within the Project area, paradise shelduck were the most widespread indigenous water-associated species recorded, occurring at eight pond survey stations. Counts were generally low to moderate, although larger aggregations were occasionally present at some operational ponds and tailings waterbodies. The highest count recorded within the Project area during the April survey period was 122 paradise shelduck at a Macraes Road / SP11 tailings pond survey station on 15 April 2026.

Grey teal (*Anas gracilis)*, New Zealand shoveler (*Spatula rhynchotis)*, and New Zealand scaup (*Aythya novaeseelandiae*) were recorded less frequently and were generally associated with larger ponds containing open water and more developed emergent vegetation. Grey teal were recorded at two pond stations within the MP4 project area, with a maximum count of six individuals. New Zealand shoveler were recorded at two within-MP4 project area ponds, with a maximum count of 11 individuals, while New Zealand scaup were recorded at a single pond within the MP4 project area, with a maximum count of three individuals. Spur-winged plover were recorded at two Golden Bar Road pond sites associated with grazed margins and open pastoral habitat adjacent to waterbodies, but again, this species is not protected under the Wildlife Act.
Several surveyed ponds within the Project area contained apparently suitable habitat, but no waterfowl were recorded during surveys. Habitat quality varied considerably between sites, with some ponds characterised by steep margins, limited emergent vegetation, low water levels, or reduced aquatic vegetation cover.

Additional surveys were undertaken at Lone Pine Reservoir and the Macraes Wetland Walkway, both of which are located outside the Project area and will not be directly affected by the proposed development. These sites were surveyed to provide additional context regarding local waterfowl diversity and abundance within the wider Macraes landscape. Compared with most ponds within the MP4 Project area, these offsite locations supported substantially greater diversity and abundance of indigenous water-associated bird species.

Lone Pine Reservoir supported the highest diversity and abundance of indigenous water-associated birds recorded during the survey programme, including paradise shelduck, grey teal, New Zealand shoveler, New Zealand scaup, Eurasian coot, and black swan (*Cygnus atratus*). Maximum counts recorded at this offsite location included 55 scaup, 30 shoveler, 24 grey teal, 22 Eurasian coot, and 34 paradise shelduck. The Macraes Wetland Walkway also supported indigenous water-associated species, including paradise shelduck and spur-winged plover associated with pond habitat containing emergent and floating vegetation.

Overall, pond count surveys indicate that while some artificial ponds and farm dams within the Project area provide locally suitable habitat for indigenous water-associated bird species, the highest diversity and abundance of waterfowl within the wider Macraes landscape were associated with larger offsite waterbodies and wetland habitats located outside the MP4 Project area.

Table 3.2. Summary of waterfowl survey counts. Note that ponds are separated by those that are inside the MP4 Project area (impact plus 20m buffer) and those outside. Where ponds were marginal, they were considered inside the MP4 project area.

Species	No. of ponds within Project area (n = 12)	No. of ponds outside Project area (n = 10)	Highest count recorded at a single pond	General habitat association
Paradise shelduck	8	5	122	Widely distributed across farm dams, tailings ponds, and larger artificial waterbodies
Mallard / grey hybrid	8	4	71	Common within artificial ponds, farm dams, and open water habitats
Grey teal	2	3	24	Primarily associated with larger ponds and reservoirs with open water and emergent vegetation
New Zealand shoveler	2	3	30	Recorded mainly from larger ponds and reservoir habitats
New Zealand scaup	1	3	55	Restricted to larger open-water habitats and reservoirs
Eurasian coot	0	2	22	Recorded only from large offsite reservoir habitats
Black swan	0	2	4	Recorded only from large offsite reservoir habitats
Spur-winged plover	2	1	6	Associated with grazed pond margins and open pastoral habitats adjacent to waterbodies

3.3.2.4 Fernbird Surveys

A total of 17 targeted fernbird playback surveys were undertaken between 1 April and 29 April 2026 across potentially suitable wetland, seepage, riparian, and densely vegetated habitats within the Coronation, Macraes Road, Macraes Central, Golden Bar, Cranky Jims, and MEEA assessment areas.

No fernbirds were detected during targeted playback surveys, with no visual observations or vocal responses recorded at any survey station (Table 3.3). Surveys were undertaken approximately two to six weeks following two anecdotal fernbird observations (recorded on 13 and 14 March 2026), which confirmed presence of fernbird within a wetland habitat associated with the GPUG extension area (see Section 3.3.2.5.2, and Figure 3.6).

Field notes recorded during surveys indicate that many surveyed locations within the Project area provided only marginal or low-quality habitat for fernbird. Several sites comprised dry gullies, exotic grassland, matagouri shrubland, roadside vegetation, grazed damp depressions, or areas with little or no standing water and limited dense wetland vegetation. Some sites contained localised *Carex secta*, rushes, seepages, or damp gully vegetation; however, many lacked the extensive dense emergent wetland vegetation typically associated with persistent fernbird occupancy. Several sites were specifically noted in field comments as having limited or unsuitable habitat characteristics for fernbird.

Higher-quality habitat was generally restricted to isolated gullies, wet seepages, Carex- and rush-dominated drainage features, and small wetland pockets mostly outside of the Project area, within the MEEA, Cranky Jims, and Macraes Road areas. One observation is within the GPUG area, but this is not going to be directly affected at the surface level, although indirect effects may still be relevant (noise, vibration etc.). Several of these habitats were heavily fragmented, narrow, or surrounded by modified pastoral or mine-disturbed environments.

The absence of detections during targeted surveys may partly reflect seasonal variability in calling behaviour and detectability, as surveys were undertaken during the autumn non-breeding period when vocal activity is generally reduced relative to the spring breeding season. The cryptic behaviour of fernbird and dense vegetation structure within occupied habitats may also reduce detectability during short-duration playback surveys. However, the generally limited extent and quality of suitable wetland habitat across many surveyed sites likely also contributed to the absence of detections. Accordingly, while targeted surveys did not confirm current occupancy, the earlier anecdotal observations and PAM survey results indicate that fernbird may occur intermittently within isolated suitable habitats in the wider Macraes landscape, but they are unlikely to be regularly present within the MP4 Project areas that are directly impacted.

Table 3.3. Summary of fernbird survey results.

Station number	Date	Easting	Northing	General location	Start time (24 hr clock)	Seen/ Heard
Fernbird Site 1	29/04/2026	1394948	4978651	Coronation	9:00	0
Fernbird Site 2	2/04/2026	1395278	4978981	Coronation	10:36	0
Fernbird Site 3	2/04/2026	1395494	4978904	Coronation	10:56	0

Fernbird Site 4	29/04/2026	1396050	4978597	Coronation	10:04	0
Fernbird Site 5	13/04/2026	1400142	4972485	Macraes Central	10:05	0
Fernbird Site 6	13/04/2026	1401114	4973153	Macraes Central	11:13	0
Fernbird Site 7	22/04/2026	1405920	4968864	Golden Bar	9:07	0
Fernbird site 8	1/04/2026	1400954	4974427	BRWRS	12:04	0
Fernbird Site 9	1/04/2026	1401328	4974907	BRWRS	10:26	0
Fernbird Site 10	1/04/2026	1400645	4974946	BRWRS	9:25	0
Fernbird Site 11	9/04/2026	1405253	4975511	Cranky Jims	11:38	0
Fernbird Site 12	9/04/2026	1404531	4975821	Cranky Jims	10:08	0
Fernbird site 13	9/04/2026	1401315	4974905	Cranky Jims	9:15	0
Fernbird Site 14	14/04/2026	1403959	4968074	MEEA	9:47	0
Fernbird site 15	14/04/2026	1403888	4968558	MEEA	9:06	0
Additional Site 1 (16)	1/04/2026	1401907	4974272	Macraes Road	11:05	0
Additional site 2 (17	14/04/2026	1404267	4967062	MEEA	11:27	0

3.3.2.5 Anecdotal observations

3.3.2.5.1 Anecdotal Observations – Breeding Season

In addition to formal survey methods, incidental observations of avifauna were recorded during routine site visits in early to mid-December 2025. These records are summarised in Table G.10 and Figure 3.6, and provide supplementary confirmation of species presence and habitat use within the Project area.

Notably, a single eastern falcon was observed on 2 December 2025 flying across an access track within Project area. This record provides important confirmation of falcon presence during the spring survey period. The observation supports the conclusion that eastern falcon utilise the wider Project area at least intermittently.

SIPO was recorded on multiple occasions at several locations (refer Table G.10), including individuals flying overhead, sitting on rocky substrates, using roadside margins, and foraging on short pasture. One observation involved a group of 21 individuals foraging on short sward, indicating that the Project area provides regularly utilised open-country habitat for this At Risk – Declining species. No strong nest defence behaviour was observed during these incidental encounters.

Two banded dotterels were observed at Site 41 (Table G.10), confirming field presence of this At-Risk – Declining species within the Project area and supporting acoustic detections recorded during PAM. Observations were consistent with use of open, sparsely vegetated ground.

Two white-faced herons (*Egretta novaehollandiae*) were recorded flushed from a soak (Table G.10), demonstrating use of small ephemeral or artificial wetland features within the Project area.

A single New Zealand pipit was observed in open habitat (Table G.10), further confirming presence of this At Risk – Declining species within the Project area and aligning with PAM detections.

Overall, anecdotal observations reinforce findings from formal surveys and provide additional confirmation of eastern falcon, SIPO, banded dotterel, and New Zealand pipit within the Project area.

These incidental records strengthen confidence in species presence and habitat use patterns identified through structured survey efforts.

3.3.2.5.2 Anecdotal Observations – Non-breeding Season

During the non-breeding season, eastern falcon was the most frequently recorded Threatened species during incidental observations, with 13 separate observations recorded across the wider study area between 9 March and 29 April 2026 (see in Table G.10 and Figure 3.6). Eastern falcon observations were distributed across both active Project areas and offset or enhancement areas, including Coronation, Macraes Central, GPUG, Camp Creek, Cranky Jims, MEEA, and Golden Bar. Several observations involved birds flying overhead, hunting, calling, perching on rock outcrops or fenceposts, or moving through gullies and shrubland habitats. Multiple records from Cranky Jims and MEEA indicate ongoing use of proposed offset and enhancement areas by eastern falcon within the wider Macraes landscape. One observation of a pair calling and flying together over MEEA may indicate territorial or pair-bonding behaviour outside the breeding season.

SIPO was recorded on multiple occasions during the breeding season within Coronation, Camp Creek, Macraes Central, and Golden Bar. Records included birds foraging on short pasture, using roadside margins, sitting on rocky substrates, and flying across operational areas. The largest observation comprised a flock of 21 individuals foraging on short sward habitat within the Golden Bar area, indicating regular use of open pastoral and mine-modified habitats within the Project area.

New Zealand pipit was recorded only once during the non-breeding season incidental observations from the Coronation area. Additional indigenous species recorded during incidental observations included South Island fantail, tomtit, and silvereye. Several observations of silvereye, fantail, and tomtit were associated with shrubland, gullies, pine forest margins, and enhancement areas such as Cranky Jims and MEEA, indicating use of structurally diverse woody vegetation habitats outside the more intensively modified operational areas.

A single fernbird observation was recorded on 13 March 2026 within wetland habitat associated with the GPUG extension area, with a second observation recorded on 14 March 2026 from the same wetland. These observations prompted targeted fernbird playback surveys within potentially suitable wetland habitats across the wider study area.

Overall, incidental observations complemented formal survey methods by confirming continued use of both operational mining areas and offset or enhancement habitats by indigenous avifauna species during the non-breeding season, including ongoing use of the wider landscape by eastern falcon.

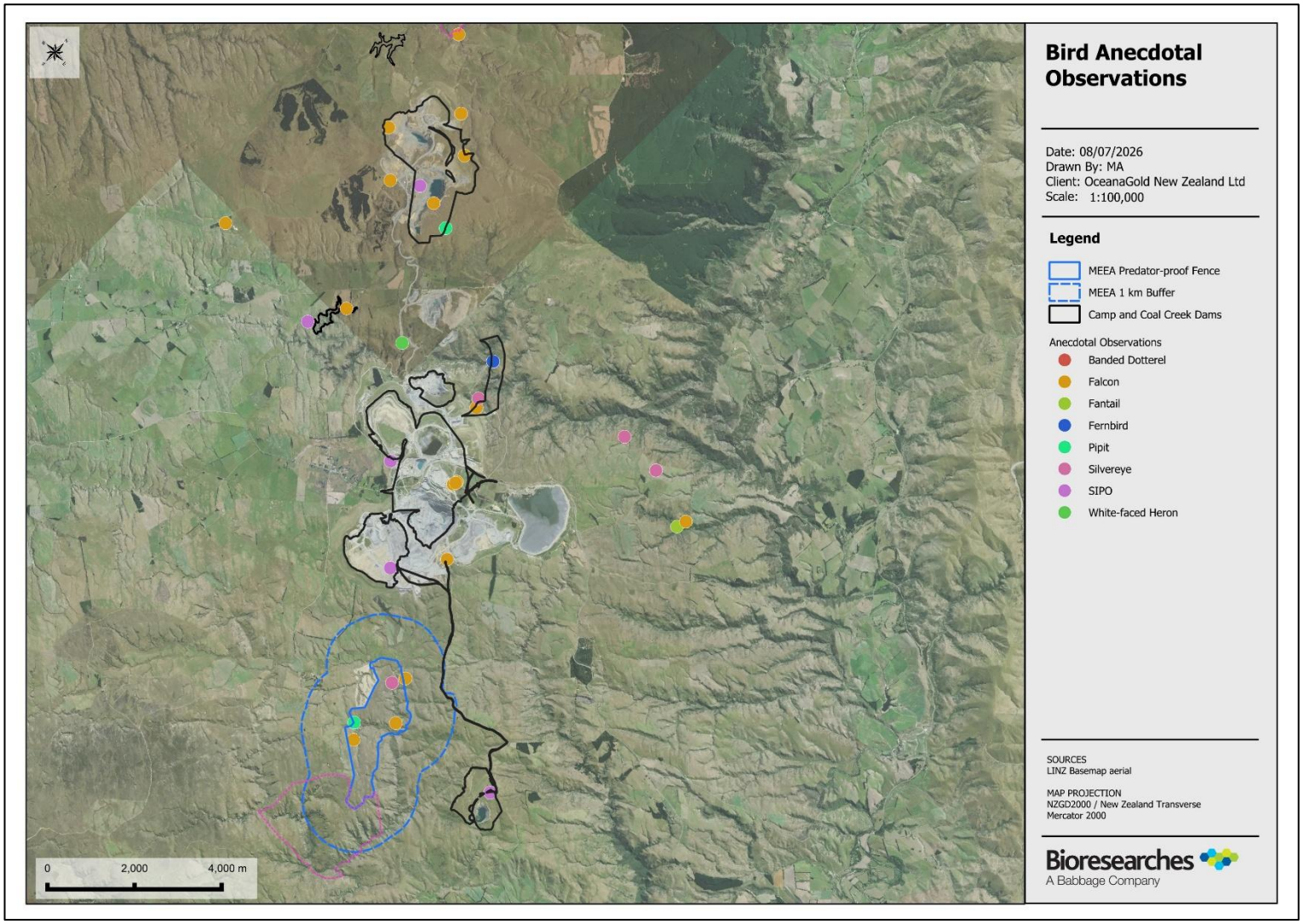


Figure 3.6. Locations of anecdotal observations.

4 ASSESSMENT OF ECOLOGICAL VALUES

4.1 Summary of Avian Values

Ecological values are assigned using the EIANZ (2018) framework, which considers species conservation status, habitat importance, ecological context, and distinctiveness. Values are assigned using the scale: Very High, High, Moderate, Low, or Negligible (Appendix A).

Under the EIANZ (2018) framework, ecological value reflects both the intrinsic value of species and the importance of the site in supporting those species. Intrinsic species value has been assessed using threat classifications, adopting the higher of either the national threat status (New Zealand Threat Classification System; Robertson *et al.*, 2021), or the relevant Otago regional conservation status.

For each site, the value is supported by:

- Confirmed presence of species across multiple monitoring stations, and multiple detection methods;
- Repeated detections, supported by incidental observations where possible; and
- Habitat characteristics aligned with breeding and foraging requirements of ground-nesting, open-country species.

4.1.1 Habitat values

4.1.1.1 Coronation North

4.1.1.1.1 Habitat description and ecological context

Coronation North comprises a modified open-country landscape associated with currently consented mining operations and proposed pit extension. The habitat is dominated by short pasture, tussock grassland, exposed substrates, sparsely vegetated ground, haul tracks and disturbed surfaces. There are no extensive indigenous shrublands or forest systems within the Coronation North project area, and wetland features are limited or absent.

Despite its modified character, this habitat type is functionally analogous to inland Otago pastoral grassland and disturbed gravel substrates, which are known to support several indigenous open-country bird species, including nationally At-Risk taxa.

Coronation North (Northern end)

Coronation North (Southern end)

Figure 4.1. Habitats within the Coronation North area. The top image includes tussock grassland and pasture with the existing Trimbells WRS on the left. Lower image is of tussock on the eastern side of the proposed coronation backfill.

4.1.1.1.2 Avifauna survey results – Coronation North

Avifauna data for Coronation North were derived from 5MBC, ARU surveys, pond count data where relevant, and anecdotal observations. The survey results indicate that Coronation North supports a modified open-country avifauna assemblage, with use by several indigenous species associated with tussock grassland, short pasture, sparsely vegetated ground, wetlands, ponds and mine-modified habitats.

Indigenous species detected within Coronation North include: banded dotterel, eastern falcon, black shag, fernbird, grey warbler, New Zealand pipit, morepork, paradise shelduck, pied stilt, silvereye, SIPO, southern black-backed gull, spur-winged plover, swamp harrier and welcome swallow. Additional acoustic detections included black-fronted dotterel and morepork, although these records are treated

cautiously due to low detection numbers, low confidence scores and limited corroborating evidence. Tomtit was also detected acoustically within the Coronation North dataset.

Threatened and At-Risk species recorded within Coronation North include banded dotterel, SIPO, New Zealand pipit, eastern falcon, black shag, silvereye, morepork and fernbird. Banded dotterel and SIPO were detected during the breeding season, consistent with seasonal use of open-country habitats for breeding, foraging and movement. New Zealand pipit was detected during both breeding and non-breeding season ARU deployments, indicating continued use of open-country habitat. Fernbird was detected at low frequency, with two calls recorded at one ARU station. This confirms presence but does not indicate resident occupancy or breeding within the Coronation North project area.

Anecdotal observations also indicate the use of the Coronation area by eastern falcon. While no nest sites have been identified within the Coronation North project area, the presence of suitable breeding habitat indicates there is potential for eastern falcon to breed within the Project area. Overall, Coronation North supports a low to moderate diversity indigenous avifauna assemblage, with ecological value primarily driven by repeated use of open-country habitats by Threatened and At-Risk species. The updated survey results support retaining Coronation North as a Moderate avifauna habitat value area.

4.1.1.1.3 Conservation status and intrinsic species value

Threat classifications have been applied using the higher of national (NZTCS; Robertson *et al.*, 2021) and relevant Otago regional conservation status, where regional status elevates risk.

The following statuses are relevant to species recorded onsite:

- Eastern falcon (Nationally: Vulnerable; Regionally Vulnerable);
- SIPO (Nationally: At Risk – Declining; Regionally: Vulnerable);
- Banded dotterel (Nationally: At Risk – Declining; Regionally: Vulnerable);
- New Zealand pipit (Nationally: At Risk – Declining; Regionally: Not Threatened);
- Fernbird | Mātātā (Nationally: At Risk – Declining; Regionally: Declining);
- Morepork (Nationally: Not Threatened; Regionally: Vulnerable); and
- Silvereye (Nationally: Not Threatened; Regionally: Declining).

Banded dotterel and SIPO are ground-nesting species associated with open gravel, sparsely vegetated substrates and short pasture. The high call counts for banded dotterel at S22 and S40 survey stations (noting S22 is within Coronation North) indicate meaningful use of this habitat type. Desktop records include banded dotterel breeding being observed at this location, which this data would support. New Zealand pipits were also recorded within Coronation North surveys, confirming the suitability of short sward grassland as pipit habitat. Although it is difficult to confirm whether New Zealand pipit are breeding on site due to their cryptic nesting behaviour, their presence, together with the availability of suitable breeding habitat, indicates that breeding may occur. Fernbird were detected only in the autumn PAM surveys at one location (S27) with 2 calls. Given the small number of calls at one location, this was likely a non-resident bird, potentially dispersing to a new territory.

Morepork are considered not threatened nationally but are regionally vulnerable. Though there was only one call recorded by an ARU, they may be present where there are trees available, most likely large pines, that would provide suitable cavities for nesting/roosting.

4.1.1.1.4 Habitat function

Coronation North provides:

- Open-country foraging habitat for multiple Threatened and At Risk species.
- Potential breeding habitat for banded dotterel, SIPO, eastern falcon and New Zealand pipit
- Occasional or opportunistic use by non-threatened indigenous species, including foraging, flightpaths and roosting.

Although the habitat is modified and not naturally rare, it replicates structural conditions preferred by several ground-nesting taxa. The repeated detection of Threatened and At-Risk species across multiple stations indicates that use is not incidental but reflects consistent habitat suitability.

4.1.1.1.5 Ecological value assessment

Although no evidence of breeding colonies, significant congregation sites, or regionally rare habitat types was identified, the intrinsic value of the avifauna assemblage is elevated by the presence of seven species with elevated regional and/or national threat classifications. The habitat itself is common within inland Otago pastoral landscapes and is neither regionally scarce nor nationally significant; however, its value reflects its importance in supporting several Threatened and At Risk species and providing functional open-country foraging and movement habitat within the broader mining landscape.

The overall avifauna habitat value of Coronation North is therefore assessed as **Moderate**.

Table 4.1. Summary of the assessment of each of the four matters for determining habitat value birds at the Coronation North area.

Matter	Assessment	Score	Rationale
Representativeness	Indigenous open-country bird assemblage typical of modified inland Otago grassland systems. Threatened and At Risk species present across multiple guilds expected for open-country habitat (ground-nesting, aerial foragers, grassland insectivores).	Moderate	Habitat supports species assemblages typical of inland open-country systems, including multiple indigenous guilds. However, habitat is modified and common regionally, limiting score to Moderate.
Rarity / Distinctiveness	Habitat supports seven Threatened and At-Risk species (eastern falcon, SIPO, banded dotterel, pipit, fernbird, silvereye, morepork), three of which are Regionally Threatened Vulnerable. Habitat type itself is not rare.	High	Presence of four Regionally Threatened species and two Regionally At-Risk species elevates rarity/distinctiveness under species-based criteria.
Diversity and Pattern	Between 2 and 7 native species recorded per station. Multiple indigenous guilds present (ground-nesting, aerial raptors, passerines). Repeated detections across stations.	Low	Indigenous diversity is consistent but not exceptional. Habitat supports expected open-country guilds but does not show unusually high richness or complex assemblage patterns.

Ecological Context	Site forms part of a broader open-country ecological network within MP4 landscape. Provides foraging and potential breeding habitat for ground-nesting taxa. Functionally connected to surrounding pastoral matrix.	Moderate	Site contributes meaningfully to ecological networks for At Risk ground-nesting species within a largely modified mining landscape. Functional habitat role elevates score.
Overall Value		**Moderate**	

4.1.1.2 Central Mining Areas

4.1.1.2.1 Habitat description and ecological context

The Central Mining area comprises a mosaic of modified open-country habitat associated with historic and ongoing mining activity. The landscape includes short pasture, tussock grassland, sparsely vegetated ground, exposed substrates, haul tracks, rehabilitated landforms and roadside margins. Compared with Coronation North, this area exhibits slightly greater structural heterogeneity, with transitional edges between disturbed substrates and regenerating vegetation.

There are no extensive indigenous forest systems within the Central Mining area, and wetland habitat is limited. However, the combination of open gravelly substrates, low vegetation and pastoral grassland provides habitat conditions that are functionally analogous to inland Otago pastoral and braided river margin environments. These structural characteristics are known to support ground-nesting and open-country indigenous bird species, including Nationally At-Risk taxa, and Regionally Vulnerable taxa.

Central Mining area (workshop relocation site)

Central Mining area (Innes Mills Pit and Frasers Backfill)

Figure 4.2. Habitats within the Central Mining area. The top image includes exotic scrub, exotic grassland and pine trees. Lower image is of parts of the proposed Innes Mills Pit and Frasers Backfill.

4.1.1.2.2 Avifauna survey results – Central Mining area

Avifauna data for the Central Mining Area were derived from 5MBCs, ARU surveys, pond counts and anecdotal observations. Survey coverage included ARU stations S33 to S39, S41, S42 and S48 to S54, and 5MBC stations S33, S34, S35, S37 to S41, S48 to S51, and S53 to S55. Pond count data were also available for waterbodies associated with Macraes Central and Macraes Road.

The Central Mining Area supported a moderate diversity indigenous avifauna assemblage associated with open pasture, tussock grassland, sparsely vegetated ground, rehabilitated mine landforms, roadsides, ponds and mine-modified habitats. Indigenous species detected included banded dotterel, eastern falcon, New Zealand pipit, SIPO, grey warbler, silvereye, paradise shelduck, pied stilt, spur-winged plover, swamp harrier and welcome swallow. Pond counts added records of grey teal, New Zealand scaup, New Zealand shoveler and pūkeko. Bellbird and New Zealand fantail were also detected in more structurally diverse habitats.

Threatened and At-Risk species recorded within the Central Mining Area were eastern falcon, banded dotterel, South Island pied oystercatcher and New Zealand pipit. Banded dotterel and SIPO were detected primarily during the breeding season, consistent with seasonal use of open-country habitats for breeding, foraging and movement. New Zealand pipit was detected during both ARU deployments, indicating continued use of open-country habitat. Eastern falcon was recorded during 5MBCs and anecdotal observations, indicating use of the wider Central Mining Area for hunting or movement. No falcon nest sites were identified within the Project area.

Overall, the updated survey results support retaining the Central Mining Area as a Moderate avifauna habitat value area. This rating is primarily driven by confirmed use of open-country habitats by Threatened and At-Risk species, together with localised use of artificial ponds and wetland margins by indigenous water-associated species.

4.1.1.2.3 Conservation status and intrinsic species value

The following statuses are relevant to species recorded onsite:

- Eastern falcon (Nationally: Vulnerable; Regionally Vulnerable);
- SIPO (Nationally: At Risk – Declining; Regionally: Regionally Vulnerable);
- Banded dotterel (Nationally: At Risk – Declining; Regionally: Regionally Vulnerable);
- New Zealand pipit (Nationally: At Risk – Declining; Regionally: Not Threatened);
- Silvereye (Nationally: Not Threatened; Regionally: At-Risk Declining).

Banded dotterel and SIPO are ground-nesting species associated with open gravel, sparsely vegetated substrates and short pasture. Their confirmed presence at Site 41 and across multiple survey stations indicates that habitat conditions within the Central Mining Area are suitable for foraging and potentially breeding. While overt nest defence behaviour was not observed, the structural characteristics of the habitat are consistent with breeding requirements.

New Zealand pipits were also recorded across Central Mining Area survey stations. Their presence in short sward and disturbed habitats is considered indicative of potential breeding activity, although direct confirmation is inherently difficult because of the species' cryptic nesting behaviour.

Silvereye, a regionally At Risk species, was recorded at ARU stations (S38 and S39) within the Central Mining Area. The species is widespread throughout New Zealand and typically occupies shrubland, woodland and modified habitats. Its occurrence within the Central Mining Area is consistent with the availability of scattered woody vegetation and shrubland but does not indicate a concentration of regionally important habitat.

Incidental observations of eastern falcon were recorded within the Central Mining Area, indicating occasional use of the area for hunting or movement. No nest sites were identified during targeted surveys, and there was no evidence that the area supports regular breeding by the species.

4.1.1.2.4 Habitat function

Central Mining area provides:

- Open-country foraging habitat for six Threatened and/or At-Risk species.
- Potential breeding habitat for eastern falcon, banded dotterel, SIPO, and New Zealand pipit.
- Foraging habitat for New Zealand pipit within short pasture and disturbed ground, and foraging habitat for eastern falcon;
- Freshwater habitats for Not Threatened species including pied stilt and paradise shelduck.
- Edge and regenerating vegetation habitat supporting At-Risk species such as morepork and silvereye, and Not Threatened species such as grey warbler and fantail.

Although the habitat is modified and not naturally rare, it replicates structural conditions preferred by inland ground-nesting taxa. The repeated detection of Threatened and At-Risk species across numerous stations, together with incidental records confirming field presence on multiple dates, indicates sustained habitat suitability.

Compared with Coronation North, the Central Mining area exhibits slightly greater structural diversity and higher native species richness, which strengthens its functional ecological role within the wider MP4 landscape.

4.1.1.2.5 Ecological value assessment

The Central Mining Area supports a consistently utilised open-country assemblage that includes six Threatened or At-Risk species, four which are Regionally Vulnerable. The site provides suitable habitat for potential breeding and foraging within a modified mining landscape and shows a slightly higher native species richness and structural heterogeneity compared with Coronation North. However, no evidence of breeding colonies or regionally rare habitat types was identified and the habitat type remains common within inland Otago pastoral landscapes.

The Avifauna Habitat Value within the Central Mining area is therefore considered to be **Moderate**.

Table 4.2. Summary of the assessment of each of the four matters for determining habitat value birds at the Central Mining area .

Matter	Assessment	Score	Rationale
Representativeness	Indigenous open-country bird assemblage typical of modified inland Otago grassland systems, with additional edge-associated passerines (fantail, grey warbler) reflecting slightly greater structural heterogeneity than Coronation North. At Risk species present across multiple expected open-country guilds (ground-nesting, aerial foragers, grassland insectivores).	Moderate	Habitat supports species assemblages typical of inland open-country systems and includes multiple indigenous guilds. Although slightly more structurally diverse than Coronation North, the habitat remains modified and regionally common, limiting score to Moderate.
Rarity / Distinctiveness	Habitat supports four Threatened Vulnerable species and two At Risk – Declining species. Repeated detections and incidental observations confirm consistent use. Habitat type itself is not rare and generally of a highly modified nature.	High	Presence of four threatened and two At Risk species elevates rarity/distinctiveness under species-based criteria. Confirmed repeated detections and incidental observations strengthen this score.
Diversity and Pattern	Between 5 and 9 native species recorded per station. Multiple indigenous guilds present including ground-nesting, aerial raptors, grassland passerines and edge-associated species. Repeated detections across numerous stations and incidental records.	Moderate	Indigenous diversity is consistently higher than Coronation North and includes additional guild representation. While not exceptional at a regional scale, assemblage diversity and repeated detections justify a Moderate score rather than Low.
Ecological Context	Site forms part of the broader MP4 open-country network and contains slightly greater habitat heterogeneity, supporting both open-ground and edge-associated species. Provides foraging and potential breeding habitat for ground-nesting taxa and contributes to movement pathways within the modified mining landscape.	Moderate	Site contributes meaningfully to ecological networks for Threatened and At Risk ground-nesting species and supports consistent indigenous use. Habitat remains modified and common regionally, limiting score to Moderate rather than High.
Overall Value		Moderate	

4.1.1.3 Golden Bar Haul Road

4.1.1.3.1 Habitat description and ecological context

The Golden Bar Haul Road corridor comprises predominantly modified pasture associated with an existing small gravel access road (Figure 4.3). The proposed works involve expansion and upgrading of this existing road alignment, with effects largely confined to short sward pasture and road margins.

The habitat is structurally simple and highly modified, consisting primarily of grazed grassland with limited vegetative complexity. There are no wetlands, shrublands or forested habitats within the proposed project area. The corridor forms part of the wider open-country matrix within the MP4 landscape.

Figure 4.3. An example of the Golden Bar Haul Road and the surrounding simple, highly modified landscape comprising grazed grassland with limited vegetative complexity. The proposed haul road will run alongside (left) of the existing road seen in the right of the photo.

4.1.1.3.2 Avifauna survey results – Golden Bar Haul Road

Avifauna data for the Golden Bar Haul Road were derived from ARU surveys, 5MBCs and pond counts. Survey coverage included ARU stations S63, S64 and S66 along the road corridor. Additional data for the northern portion of the haul road are derived from stations S35, S36, S37 and S41. These stations overlap with the Central Mining Area dataset but are relevant to the northern end of the Golden Bar Haul Road because they occur near the proposed haul road alignment and associated open-country habitats.

The northern haul road stations recorded typical open-country indigenous species, including SIPO, banded dotterel and New Zealand pipit, together with non-threatened taxa such as swamp harrier, and welcome swallow. The southern road corridor stations recorded a lower-diversity assemblage, including grey warbler, silvereye, paradise shelduck, and swamp harrier. Pond count data from Golden Bar Haul Road also recorded New Zealand shoveler, indicating localised use of pond habitat adjacent to the road corridor.

SIPO and New Zealand pipit are likely to occur more widely along the haul road alignment where open pasture, short grassland and disturbed ground are present. Banded dotterel is more likely to be associated with the northern portion of the haul road, where flat, open and sparsely vegetated ground is more common. Overall, the updated survey results support retaining the Golden Bar Haul Road as a Low avifauna habitat value area, reflecting its modified condition, limited habitat diversity, and the more localised occurrence of At-Risk species within the northern portion of the alignment.

4.1.1.3.3 Conservation status and intrinsic species value

The only following nationally At-Risk species confirmed within surveyed portions of the haul road are:

- SIPO (Nationally: At Risk – Declining; Regionally: Regionally Vulnerable);
- Banded dotterel (Nationally: At Risk – Declining; Regionally: Regionally Vulnerable);
- New Zealand pipit (Nationally: At Risk – Declining; Regionally: Not Threatened); and
- Silvereye (Nationally: Not Threatened; Regionally: At-Risk Declining).

4.1.1.3.4 Habitat function

The Golden Bar Haul Road provides:

- Open-country foraging and breeding habitat for SIPO and banded dotterel;
- Foraging and movement habitat for non-threatened indigenous open-country species.

The habitat is common, highly modified pasture and lacks structural diversity. It does not contain breeding colonies, congregation sites or wetland features suitable for wetland birds. Its ecological function is primarily as part of the broader pastoral matrix rather than as a focal habitat area.

4.1.1.3.5 Ecological value assessment

The Golden Bar Haul Road supports **Low** indigenous avifauna habitat value within a highly modified pastoral landscape. While four Threatened or At-Risk species were recorded, the site provides only limited habitat, primarily functioning as open-country foraging and movement habitat within the wider mining landscape with some limited breeding opportunities for SIPO and banded dotterel. The habitat is common within inland Otago pastoral landscapes, is not regionally scarce or nationally significant, and does not support breeding colonies, significant congregation sites, or other habitat features that would increase its ecological importance.

Overall, the Avifauna Habitat Value at Golden Bar Haul Road is assessed as **Low.**

Table 4.3. Summary of the assessment of each of the four matters for determining habitat value birds at the Golden Bar Haul Road Area.

Matter	Assessment	Score	Rationale
Representativeness	Indigenous open-country assemblage typical of modified pasture. Common waterfowl species utilise ponds nearby.	Low	Habitat is highly modified within the project area and structurally simple, supporting expected open-country species and common species of waterfowl adjacent to the road corridor.
Rarity / Distinctiveness	Two Threatened and two At-Risk species recorded on site	Moderate	Presence of four Threatened or At Risk species elevates score above Low.
Diversity and Pattern	Limited indigenous species were recorded within surveyed stations.	Low	Indigenous diversity is low and typical of a modified pasture and previously impacted by mining activity.
Ecological Context	Forms part of broader MP4 open-country network but provides no unique habitat features.	Low	Contributes to habitat continuity but lacks structural or functional distinctiveness.
Overall Value		Low	

4.1.1.4 Golden Bar

4.1.1.4.1 Habitat description and ecological context

The Golden Bar area comprises a modified open-country environment associated with a previous open pit mining site. The habitat is dominated by short pasture, low tussock grassland, exposed rock and gravel substrates, haul roads and disturbed ground. Areas of low vegetation and sparsely vegetated surfaces are interspersed with operational infrastructure and transitional margins.

There are no indigenous forest systems within the Golden Bar project area, and wetland habitat is limited. However, the combination of open substrates and short sward grassland creates habitat conditions analogous to inland Otago pastoral systems and disturbed gravel environments, which are known to support open-country indigenous bird species such as SIPO.

Golden Bar pit and lake

Golden Bar WRS expansion

Figure 4.4. Habitats within the Golden Bar area. The top images include the existing pit and pit lake, which will be expanded. The WRS expansion area includes several smaller waterbodies, including man-made ponds (top) and induced ephemeral wetlands (bottom right). The WRS will expand into new gullies (bottom left), as well as include the previously restored WRS that is currently pasture (bottom right).

4.1.1.4.2 Avifauna survey results – Golden Bar

Avifauna data for Golden Bar were derived from 5MBCs, ARU surveys, pond counts and anecdotal observations. Survey coverage included ARU stations S43 to S47 and 5MBC stations S43 to S47. Pond count data were also available for waterbodies associated with Golden Bar.

Golden Bar supported an indigenous avifauna assemblage associated with open pasture, tussock grassland, sparsely vegetated ground, ponds, pit lake habitat and mine-modified landforms. Indigenous species detected included New Zealand fantail, paradise shelduck, pied stilt, silvereye, SIPO, southern black-backed gull, spur-winged plover, swamp harrier and welcome swallow. Eurasian coot was also detected acoustically, likely associated with localised pond or open-water habitat.

SIPO and silvereye were the only Threatened or At-Risk species confirmed within the Golden Bar survey area. Records included ARU and 5MBC detections, as well as anecdotal observations of birds foraging on short pasture. One anecdotal observation recorded a group of 21 SIPO foraging on short sward habitat, indicating periodic local congregation within the Golden Bar area.

A breeding colony of southern black-backed gull (karoro) was recorded on the existing Golden Bar pit lake. The colony is associated with the artificial pit lake created by previous mining activities and is considered likely to have established following the displacement of the former Deepdell South colony after pit expansion in 2020/2021. Karoro is classified as Not Threatened under the New Zealand Threat Classification System and is also Not Threatened regionally in Otago, although it is recognised as a taoka species under the Ngāi Tahu Claims Settlement Act 1998. The colony demonstrates that mine-modified habitats can provide suitable breeding habitat for this adaptable species, but its presence does not increase the ecological value of the Golden Bar area because the species is widespread and readily utilises both natural and artificial habitats.

Overall, the updated survey results support retaining Golden Bar as a **Moderate** avifauna habitat value area. This rating is primarily driven by confirmed use of open-country habitat by SIPO, including local congregation behaviour, together with use of ponds and mine-modified habitats by a broader suite of indigenous species. Although the Golden Bar pit lake supports a breeding colony of karoro, the species' widespread distribution, favourable conservation status and demonstrated capacity to relocate to suitable habitats mean that the colony does not materially increase the overall avifauna value of the area.

4.1.1.4.3 Conservation status and intrinsic species value

Within the Golden Bar area, two species were recorded with a Threatened or At-Risk status:

- SIPO (Nationally: At Risk – Declining; Regionally: Regionally Vulnerable); and
- Silvereye (Nationally: Not Threatened; Regionally: At-Risk Declining).

No other Threatened or At-Risk indigenous species were confirmed within Golden Bar based on the survey results.

4.1.1.4.4 Habitat function

In terms of habitat function, Golden Bar provides:

- Open-country foraging habitat for SIPO, with confirmed congregation behaviour indicating locally important foraging conditions;
- Open water habitat within the previous Golden Bar open pit, which is currently used by waterfowl (e.g. paradise shelduck) and supports breeding habitat for the southern black-backed gull;
- Foraging and loafing habitat for other open-country indigenous species, including spur-winged plover and southern black-backed gull;
- Limited wetland-associated foraging habitat indicated by pied stilt detections, likely reflecting use of nearby damp features or ponded margins rather than extensive wetland habitat;
- Foraging and movement habitat for mobile aerial insectivores (welcome swallow), passerines (fantail, silvereye) and common raptors (swamp harrier).

Although the habitat is modified and not naturally rare, the confirmed aggregation of SIPO indicates that Golden Bar functions as an important habitat within the wider Macraes landscape, at least periodically.

4.1.1.4.5 Ecological value assessment

Intrinsic value is elevated by the presence of two Threatened or At Risk species; SIPO and silvereye. Overall the Avifauna Habitat Value at Golden Bar is **Moderate** (Table 4.4) This rating reflects the confirmed presence of one Threatened and one At-Risk species, and evidence of local congregation behaviour indicating periodic high functional value, while recognising that the indigenous assemblage recorded includes relatively few species of conservation concern and occurs within a common, modified habitat type.

Table 4.4. Summary of the assessment of each of the four matters for determining habitat value birds at the Golden Bar area.

Matter	Assessment	Score	Rationale
Representativeness	Indigenous open-country bird assemblage typical of modified inland Otago grassland systems. Species recorded represent expected guilds for short pasture and disturbed open substrates (ground-foraging waders, aerial insectivores, generalist raptors, passerines).	Moderate	Habitat supports species assemblages typical of inland open-country systems. Assemblage composition is expected for this habitat type and does not represent an unusual or particularly intact example, limiting score to Moderate.
Rarity / Distinctiveness	Habitat supports SIPO (Nationally: At Risk – Declining; Regionally Vulnerable). Confirmed aggregation of 21 individuals foraging within the area. Habitat type itself is not rare.	High	Presence of a nationally At-Risk species elevates distinctiveness under species-based criteria. Confirmed congregation behaviour strengthens site-level importance.
Diversity and Pattern	Ten native species recorded. Indigenous guilds include ground-foraging waders, aerial insectivores, passerines and raptors. However, only two Threatened and At-Risk species were confirmed within this area.	Low	Indigenous diversity is present but not high relative to other MP4 areas. Assemblage is functionally typical of modified pasture landscapes, with limited conservation-significant richness.
Ecological Context	Site forms part of the broader MP4 open-country network. Provides foraging habitat for SIPO and generalist indigenous species. Confirmed aggregation indicates functional importance at a local scale within the mining landscape.	Moderate	Golden Bar contributes to habitat availability for Threatened and At-Risk species within a largely modified environment. Functional importance is evident but not regionally unique.
Overall Value		**Moderate**	

4.1.1.5 GPUG Extension

4.1.1.5.1 Habitat description and ecological context

The Golden Point Underground (GPUG) assessment area includes the proposed underground mine extension and the associated Golden Point Backfill (GPBF). The GPUG extension is predominantly beneath indigenous dry shrubland associated with the Deepdell Creek catchment, together with tussock-shrubland, rocky slopes and tors, densely vegetated gullies, and localised wetland and riparian

habitat (Figure 4.5). In contrast, the GPBF is predominantly within existing or rehabilitated mine workings and exotic grassland.

The mapped GPUG assessment area contains approximately 90.74 ha of dry shrubland, 46.5 ha of exotic grassland, 21.99 ha of mine-disturbed land and 12.8 ha of rehabilitated mine workings. The GPUG extension itself encompasses approximately 47.7 ha at the surface and is dominated by indigenous shrubland. The GPBF encompasses approximately 49.41 ha and is predominantly currently mined or rehabilitated land, with smaller areas of exotic grassland.

Formal avifauna survey coverage associated with GPUG was concentrated within the GPBF. Autonomous recording units (ARUs) and five-minute bird counts were undertaken at stations S48 and S49 within the GPBF.

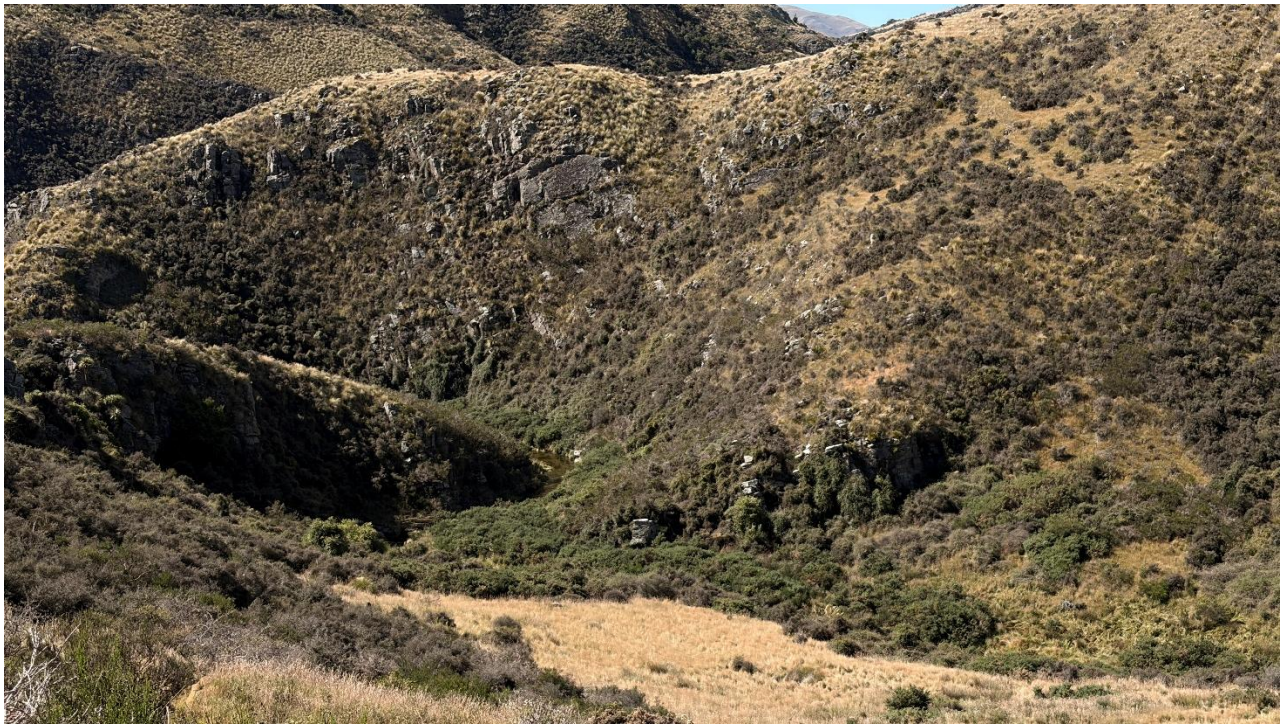
ARU station S48 recorded 12 indigenous bird species across the survey programme and S49 recorded six. New Zealand pipit | pīhoihoi (*Anthus novaeseelandiae*) was recorded at S48 during the breeding-season ARU survey, while South Island pied oystercatcher | tōrea (*Haematopus finschi*) was recorded at both S48 and S49. These records confirm use of the modified grassland and rehabilitated mine habitats within the GPBF by indigenous open-country birds.

Eastern falcon | kārearea (*Falco novaeseelandiae*) has also been recorded within the GPUG/Golden Point area through incidental observations. The species is widely recorded across the Macraes landscape and uses a range of open, shrubland and operational mine habitats for movement and foraging.

Fernbird | mātātā (*Poodytes punctatus*) was observed on 13 and 14 March 2026 within the same wetland at the northern extent of the GPUG extension, associated with Deepdell Creek (Figure 4.6). Although breeding was not confirmed, the repeated observations confirm use of this wetland by fernbird. Targeted fernbird playback surveys were not undertaken within the GPUG extension, so the extent of fernbird use of the wider Deepdell Creek wetland and shrubland habitats is uncertain. However, targeted surveys are planned for late 2026 to better understand the ecological value of the GPUG area, the potential impacts on avifauna and subsequent management measures further.

Although direct surface habitat loss is expected to be limited due to the proposed works predominantly being underground, potential subsidence and the resultant dewatering of Deepdell Creek and its adjacent wetland habitats has been identified by PSM (PSM, 2026). If this were to occur, it would likely result in reductions in wetland extent and quality through the loss of hydrological drivers. It is understood further investigations are to be undertaken on the degree of subsidence to further understand the impacts.

GPUG extension looking east



Looking south-west towards the Central Mining Area

Figure 4.5. Habitat examples within the GPUG extension areas, note the wetland habitat is shown in the bottom right of each image, where two observations of fernbird were recorded.

Figure 4.6. Fernbird observed within the wetland in GPUG (Photo taken 14/03/2026, by M.Scarrott)

4.1.1.5.2 Conservation status

Four Threatened or At Risk indigenous bird species have been recorded within the GPUG assessment area, including records from the GPBF:

- eastern falcon | kārearea, Threatened – Nationally Vulnerable and Threatened – Regionally Vulnerable;
- South Island pied oystercatcher | tōrea, At Risk – Declining and Threatened – Regionally Vulnerable;
- New Zealand pipit | pīhoihoi, At Risk – Declining and Regionally Not Threatened; and
- fernbird | mātātā, At Risk – Declining and At Risk – Regionally Declining.

No breeding sites for these species have been confirmed within GPUG. However, the repeated fernbird observations and breeding-season records of New Zealand pipit and South Island pied oystercatcher show that the GPUG assessment area provides habitat for several species of conservation interest.

4.1.1.5.3 Habitat function

The GPUG area contains a broader range of avifauna habitats than many of the more modified MP4 Project areas. Indigenous shrubland, tussock-shrubland, rocky gullies and riparian vegetation occur through the Deepdell Creek catchment, while localised wetlands provide habitat for fernbird. Open grassland and rehabilitated mine areas within the GPBF are used by New Zealand pipit and South Island pied oystercatcher, and the wider area is used by eastern falcon.

The indigenous habitats within the GPUG extension are contiguous with similar vegetation along Deepdell Creek and the surrounding catchment. They therefore provide local habitat continuity for indigenous birds. This contrasts with the GPBF, where habitat is more modified and predominantly supports open-country species.

4.1.1.6 Ecological value assessment

Overall, the GPUG assessment area is assigned **Moderate ecological value for avifauna**. This is consistent with the Moderate avifauna value assigned to GPUG in the MP4 Ecological Impact Assessment. The EcIA assigns higher overall ecological values to some GPUG habitats when vegetation, invertebrates and lizards are considered, but this does not alter the Moderate value assigned specifically to avifauna. The assessment of avifauna habitat value for GPUG is summarised in Table 4.5.

Table 4.5. Summary of the assessment of each of the four matters for determining habitat value birds at the GPUG area.

Matter	Assessment	Value
Representativeness	The GPUG area supports an indigenous bird assemblage associated with shrubland, wetland, rocky habitats and modified open-country environments. The assemblage includes open-country species, eastern falcon and fernbird. Formal survey coverage was concentrated within the modified GPBF rather than the indigenous shrubland and wetland habitats of the GPUG extension.	Low
Rarity/distinctiveness	Four Threatened or At Risk species have been recorded within the GPUG assessment area: eastern falcon, South Island pied oystercatcher, New Zealand pipit and fernbird. Fernbird was repeatedly recorded within a wetland associated with Deepdell Creek, providing an additional wetland-associated value that is not widely represented across the MP4 impact areas.	High
Diversity and pattern	Up to 10 indigenous species were recorded at individual GPBF survey stations, with additional records of eastern falcon and fernbird from the wider GPUG area. The combination of open grassland, indigenous shrubland, rocky gullies, riparian vegetation and wetlands supports several avifauna habitat guilds. Survey coverage of the GPUG extension was limited, which reduces confidence in the full species richness of this area.	Moderate
Ecological context	Indigenous shrubland, gullies, wetland and riparian habitats within the GPUG extension are connected to similar habitats through the Deepdell Creek catchment and provide local habitat continuity. This ecological context is partly offset by the highly modified condition of much of the GPBF.	Moderate

Overall ecological value	The GPUG area supports a moderately diverse indigenous avifauna assemblage and confirmed habitat use by several Threatened or At Risk species. The combination of indigenous shrubland, wetland and open-country habitat elevates the area above Low value. However, the absence of targeted survey across much of the GPUG extension and the modified condition of the GPBF constrain the overall assessment.	**Moderate**

4.1.1.7 Back Road Waste Rock Stack (BRWRS)

4.1.1.7.1 Habitat description and ecological context

The Back Road Waste Rock Stack (BRWRS) comprises an engineered landform associated with historical waste rock deposition and ongoing mine operations. The habitat consists of exposed rock substrates, tussock grassland, low grassland and rehabilitated margins.

There are no extensive indigenous forest systems or significant wetland habitats within this footprint. However, small ponded or damp features may occur locally, and the overall structure of open substrates and low vegetation provides habitat conditions broadly analogous to inland Otago disturbed gravel and pastoral environments. These conditions can support open-country indigenous birds, particularly ground-foraging and generalist species, within the wider MP4 modified landscape.

4.1.1.7.2 Avifauna survey results – Back Road Waste Rock Stack

Avifauna data for the Back Road Waste Rock Stack were derived from five-minute bird counts, ABM surveys and anecdotal observations. Survey coverage included ABM stations S13, S14, S15 and S17 to S19, and 5MBC stations S13 to S15, S17 and S18.

BRWRS supported an indigenous avifauna assemblage associated with open pasture, tussock grassland, sparsely vegetated ground, wet margins and mine-modified habitats. Indigenous species detected included New Zealand pipit, paradise shelduck, pied stilt, silvereye, South Island pied oystercatcher, southern black-backed gull, spur-winged plover and swamp harrier. Eurasian coot and grey warbler were also detected, reflecting localised use of ponded, wet-margin or vegetated edge habitats.

Threatened and At Risk species recorded within BRWRS include New Zealand pipit and South Island pied oystercatcher. Both species were detected acoustically, with pipit associated with open-country habitats and South Island pied oystercatcher associated with open pasture, short grassland and modified ground. Anecdotal fernbird observations were also recorded from wetland habitat associated with the BRWRS / GPUG extension area. These records confirm fernbird presence in the wider BRWRS context, although targeted playback surveys did not detect fernbird and regular occupancy has not been confirmed.

Overall, the updated survey results support retaining BRWRS as a Moderate avifauna habitat value area. This rating reflects use of the area by At Risk open-country species, the presence of localised wetland or riparian habitat, and the wider ecological value of BRWRS as an avoided area within the MP4 Project.

4.1.1.7.3 Conservation status and intrinsic species value

The following status is relevant to species recorded within BRWRS:

- South Island pied oystercatcher (Nationally: At Risk – Declining; Regionally: Regionally Vulnerable).
- New Zealand pipit (Nationally: At Risk – Declining; Regionally: Not Threatened).

No other nationally Threatened or At Risk indigenous species were confirmed within BRWRS based on the survey results.

4.1.1.7.4 Habitat function

Back Road Waste Rock Stack provides:

- Open-country foraging habitat for South Island pied oystercatcher.
- Foraging and loafing habitat for generalist open-country species including spur-winged plover and southern black-backed gull.
- Hunting habitat for swamp harrier.
- Localised wet-margin or ponded-feature habitat indicated by pied stilt and Eurasian coot detections.
- Limited passerine habitat along vegetated margins (grey warbler, silvereye).

Although the habitat is engineered and highly modified, it provides a consistent suite of open-country and edge-associated functions for indigenous birds. There is no evidence of breeding colonies or significant aggregations within this footprint based on the available data.

4.1.1.7.5 Ecological value assessment

Under the EIANZ (2018) EcIA framework, ecological value reflects intrinsic species value and the importance of the site to those species. Intrinsic value is elevated by the presence of South Island pied oystercatcher and New Zealand pipit.

Site value is supported by:

- Confirmed presence of South Island pied oystercatcher within BRWRS (PAM).
- Consistent indigenous avifauna use of the footprint across multiple open-country guilds.
- Evidence of localised wet-margin use (pied stilt and Eurasian coot), increasing functional diversity within the engineered landform.
- Contribution to the broader MP4 open-country ecological network.

However:

- Only one At Risk species was recorded within this footprint.
- No aggregation or breeding behaviour was observed.
- Habitat is engineered, modified and regionally common in form.

Balancing these factors, BRWRS supports an indigenous open-country assemblage including two At Risk – Declining species, with moderate functional habitat value in the context of the wider MP4 landscape.

Overall Avifauna Habitat Value – Back Road Waste Rock Stack: **Moderate**

Table 4.6. Summary of the assessment of each of the four matters for determining habitat value birds at the BRWRS area.

Matter	Assessment	Score	Rationale
Representativeness	Indigenous open-country bird assemblage typical of modified inland Otago grassland and disturbed substrates. Guilds include ground-foraging waders, raptors, passerines and wet-margin users.	Moderate	Assemblage composition is typical of modified open-country environments and includes expected indigenous guilds. Habitat remains engineered and common regionally.
Rarity / Distinctiveness	Habitat supports South Island pied oystercatcher (Nationally: At Risk – Declining; Regionally: Regionally Vulnerable). No other At Risk or Threatened species recorded.	Moderate	Presence of one nationally At Risk species elevates score above Low. Absence of additional At Risk taxa, breeding evidence or congregation behaviour limits score to Moderate.
Diversity and Pattern	Nine native species were recorded across the BRWRS footprint, including wet-margin species (pied stilt, Eurasian coot) and generalist open-country taxa.	Low–Moderate	Indigenous diversity and guild spread are evident, but conservation-significant richness is limited (one At Risk species), so diversity/pattern is not high.
Ecological Context	Site forms part of the broader MP4 open-country network. Provides foraging habitat within a modified mining landscape and includes localised wet-margin functionality.	Moderate	Contributes functionally to habitat availability for an At Risk species and supports multiple guilds, but is not structurally unique or regionally scarce.
Overall Value		**Moderate**	

4.1.1.8 Murphy's Ecological Enhancement Area

4.1.1.8.1 Habitat description and ecological context

MEEA comprises a modified open-country environment with pasture and tussock grassland, rock tors and gullies containing riparian vegetation (Figure 4.7). Although the habitat is modified, the combination of open grassland, tussock land and riparian vegetation provides structurally diverse conditions, increasing diversity and abundance of indigenous bird species. This structural diversity increases ecological functionality relative to more engineered or sparsely vegetated landforms elsewhere in the MP4 project area.

Importantly, MEEA is not proposed to be directly impacted by mining activities. Rather, it is proposed as an enhancement area for ecological offsetting, with future pest control and installation of a predator-proof fence. This planned management intervention has direct implications for long-term habitat quality and sustainability.

MEEA (main gully, north end)

MEEA (lower end of main gully)

Figure 4.7. Habitats within the MEEA. The top images includes the main gully at the northern end of the proposed restoration area, as viewed from the north-east boundary. Lower image includes the lower extent of the gully in top image, and the main valley to the east of proposed MEEA area.

4.1.1.8.2 Avifauna survey results – Murphy's Ecological Enhancement Area

Avifauna data for MEEA were derived from 5MBCs, ARU surveys, pond counts, targeted fernbird playback surveys at suitable wetland and riparian habitats, and anecdotal observations. Survey coverage included ARU stations S01 to S07 and S59, and 5MBC stations S01, S03 to S07 and S59.

MEEA supported a relatively diverse indigenous avifauna assemblage associated with open pasture, tussock grassland, shrubland, gullies, riparian margins, ponds and wetland habitats. Threatened and At Risk species recorded within or near MEEA include:

- eastern falcon (Nationally: Threatened – Vulnerable; Regionally Vulnerable);
- SIPO (Nationally: At Risk – Declining; Regionally Vulnerable);
- New Zealand pipit (Nationally: At Risk – Declining; Regionally: Not Threatned); and
- Black-fronted dotterel (Nationally: At-Risk – Naturally Uncommon; Regional vagrant).

Eastern falcon was recorded during anecdotal observations, indicating use of the area for hunting or movement. No falcon nest sites were identified during the survey programme. SIPO were detected by ARU and 5MBC surveys, consistent with use of open-country habitat during the breeding season. New Zealand pipit was recorded anecdotally, indicating use of open grassland or tussock habitat within the enhancement area.

Black-fronted dotterels were detected acoustically at low occurrence levels. These detections are treated cautiously due to the potential for acoustic confusion with banded dotterel and the absence of corroborating visual observations. As such, are not treated as a confirmed resident within the MEEA but are acknowledged as potentially present.

Targeted fernbird playback surveys did not detect fernbird within MEEA. Although the area contains some localised wetland and riparian habitat, current survey results do not confirm fernbird presence within MEEA.

Indigenous species detected included grey warbler, New Zealand fantail, New Zealand pipit, paradise shelduck, pied stilt, silvereye, SIPO, southern black-backed gull, spur-winged plover, swamp harrier and welcome swallow. Eurasian coot and morepork were also detected acoustically, although the morepork record is treated cautiously due to low detection numbers and low confidence scores.

Overall, the survey results support retaining MEEA as a Moderate avifauna habitat value area. This rating reflects its relatively diverse indigenous bird assemblage, confirmed use by Threatened and At Risk species, and the presence of structurally diverse open-country, riparian, wetland and shrubland habitats within a proposed restoration area.

4.1.1.8.3 Conservation status and intrinsic species value

SIPO are ground-nesting species associated with open gravel, sparsely vegetated substrates and short pasture, of which there is suitable habitat within the MEEA. The MEEA also supports habitat for eastern falcon, both for foraging and breeding. They were detected through anecdotal observations, and it is anticipated that with ongoing restoration and pest control, they will utilise this area more, potentially even for breeding, due to an abundance of suitable nesting habitat (rock tors).

New Zealand pipits were recorded during the MEEA surveys, confirming that the short-sward grassland within the site provides suitable habitat for the species. Although breeding could not be confirmed due to the species' cryptic ground-nesting behaviour, the presence of pipits and the availability of suitable breeding habitat indicate that the site has the potential to support breeding.

4.1.1.8.4 Habitat function

Murphy's Ecological Enhancement Area provides:

- Open-country foraging and breeding habitat for Threatened and At-Risk species, including eastern falcon, SIPO, New Zealand pipit, and black-fronted dotterel;
- Foraging and loafing habitat for spur-winged plover and southern black-backed gull;
- Shrub-edge and vegetated margin habitat for grey warbler and fantail; and
- Hunting habitat for swamp harrier.

Compared with other MP4 areas, MEEA supports a broader range of ecological functions due to the presence of riparian features and greater vegetative structure. The proposed future pest control and predator-proof fencing are likely to enhance breeding success and survivorship of ground-nesting and wetland-associated taxa. These measures would increase habitat security and long-term ecological resilience, particularly for SIPO and other ground-nesting species vulnerable to predation. As MEEA is not proposed to be directly impacted and is intended as an enhancement area, its ecological trajectory is expected to be positive under managed conditions.

4.1.1.8.5 Ecological value assessment

Intrinsic value is elevated by the confirmed presence of three Threatened or At Risk species, and the unconfirmed presence of a fourth. Overall Avifauna Habitat Value – Murphy's Ecological Enhancement Area: **Moderate** (Table 4.7).

Table 4.7. Summary of the assessment of each of the four matters for determining the habitat value for birds at the MEEA area.

Matter	Assessment	Score	Rationale
Representativeness	Indigenous assemblage representing both open-country and wetland/riparian associated guilds within a modified inland Otago landscape. Species include ground-foraging waders, shrub-edge passerines, aerial insectivores and raptors.	Moderate	Habitat supports a broader range of indigenous guilds than more structurally simple MP4 areas. However, it remains modified and not representative of intact indigenous ecosystems, limiting score to Moderate.
Rarity / Distinctiveness	Habitat supports breeding habitat for confirmed presence of three Threatened or At-Risk species: eastern falcon, New Zealand pipit, SIPO and the unconfirmed presence of a fourth: black-fronted dotterel.	High	Presence of a nationally At Risk species elevates distinctiveness under species-based criteria. Functional riparian habitat adds local distinctiveness.
Diversity and Pattern	Twelve native species recorded, including wetland-associated taxa (Eurasian coot, pied stilt, black-fronted dotterel), open-country waders, passerines and raptors. Multiple guild representation confirmed through PAM and 5MBC.	Moderate	Indigenous diversity and guild representation are higher than most other MP4 areas. However, conservation-significant richness remains limited to one At Risk species, so score remains Moderate rather than High.
Ecological Context	Site forms part of the broader MP4 ecological network and includes wetland and riparian features uncommon within other MP4 areas. Proposed pest control and predator-proof fencing will enhance breeding security and long-term sustainability.	Moderate	MEEA provides important functional habitat and is proposed as an enhancement and offset area. Future management interventions will increase ecological resilience and site value.
Overall Value		**Moderate**	

4.1.1.9 Summary of habitat values

Table 4.8. Summary of the assessment of each of the four matters for determining the habitat value for birds for all sites within the MP4 expansion.

Site	Representativeness	Rarity / Distinctiveness	Diversity and pattern	Ecological context	Overall Score
Coronation North	Moderate	High	Low	Moderate	**Moderate**
Central Mining Area	Moderate	High	Moderate	Moderate	**Moderate**
Golden Bar haul Road	Low	Moderate	Low	Low	**Low**
Golden Bar	Moderate	High	Low	Moderate	**Moderate**
GPUG	Low	High	Moderate	Moderate	**Moderate**
BRWRS	Moderate	Moderate	Low-Moderate	Moderate	**Moderate**
MEEA	Moderate	High	Moderate	Moderate	**Moderate**

Table 4.9. Summary of number of native bird species detected at each location and the method of detection.

Location	ARU stations	5MBC stations	ARU native spp. (n)	5MBC native spp. (n)	Native species recorded (method of detection)
MEEA	S01, S02, S03, S04, S05, S06, S07, S59	S01, S03, S04, S05, S06, S07, S59	13	7	Black-fronted dotterel | tūturiwhatu (ARU); Eurasian coot | pūkeko-pango (ARU); grey warbler | riroriro (Both); New Zealand fantail | pīwakawaka (ARU); paradise shelduck | pūtangitangi (Both); pied stilt | poaka (ARU); ruru | morepork (ARU); silvereye | tauhou (ARU); South Island pied oystercatcher | tōrea (Both); southern black-backed gull | karoro (Both); spur-winged plover (Both); swamp harrier | kāhu (Both); welcome swallow | warou (Both).
Camp Creek	S08, S09	S08, S09	8	5	Black shag | kawau (ARU); grey warbler | riroriro (ARU); New Zealand fantail | pīwakawaka (Both); pied stilt | poaka (ARU); silvereye | tauhou (Both); South Island pied oystercatcher | tōrea (ARU); southern black-backed gull | karoro (5MBC); spur-winged plover (Both); swamp harrier | kāhu (ARU); welcome swallow | warou (5MBC).
Coal Creek	S10, S11, S12	S12	11	2	Black-fronted dotterel | tūturiwhatu (ARU); grey warbler | riroriro (ARU); New Zealand pipit | pīhoihoi (ARU); paradise shelduck | pūtangitangi (ARU); pied stilt | poaka (ARU); silvereye | tauhou (ARU); South Island pied oystercatcher | tōrea (Both); southern black-backed gull | karoro (Both); spur-winged plover (ARU); swamp harrier | kāhu (ARU); welcome swallow | warou (ARU).
Back Road WRS	S13, S14, S15, S17, S18, S19	S13, S14, S15, S17, S18	10	4	Eurasian coot | pūkeko-pango (ARU); grey warbler | riroriro (Both); New Zealand pipit | pīhoihoi (ARU); paradise shelduck | pūtangitangi (ARU); pied stilt | poaka (ARU); silvereye | tauhou (ARU); South Island pied oystercatcher | tōrea (ARU); southern black-backed gull | karoro (Both); spur-winged plover (Both); swamp harrier | kāhu (Both).

Coronation North	S21, S22, S23, S24, S25, S27, S28, S29, S30, S31, S32, S57, S65	S22, S23, S24, S29, S30	17	5	Banded dotterel | tūturiwhatu (ARU); black shag | kawau (ARU); black-fronted dotterel | tūturiwhatu (ARU); Eurasian coot | pūkeko-pango (ARU); fernbird | mātātā (ARU); grey warbler | riroriro (Both); New Zealand pipit | pīhoihoi (ARU); paradise shelduck | pūtangitangi (Both); pied stilt | poaka (ARU); ruru | morepork (ARU); silvereye | tauhou (Both); South Island pied oystercatcher | tōrea (ARU); southern black-backed gull | karoro (Both); spur-winged plover (Both); swamp harrier | kāhu (ARU); tomtit | miromiro (ARU); welcome swallow | warou (ARU).
Central Mining Area	S33, S34, S35, S36, S37, S38, S39, S41, S42, S48, S49, S50, S51, S52, S53, S54	S33, S34, S34A, S35, S37, S38, S39, S40, S41, S48, S49, S50, S51, S53, S54, S55, S57	16	8	Banded dotterel | tūturiwhatu (ARU); bellbird | korimako (ARU); black-fronted dotterel | tūturiwhatu (ARU); eastern falcon | kārearea (5MBC); Eurasian coot | pūkeko-pango (ARU); grey warbler | riroriro (Both); New Zealand fantail | pīwakawaka (ARU); New Zealand pipit | pīhoihoi (ARU); paradise shelduck | pūtangitangi (Both); pied stilt | poaka (ARU); pūkeko (ARU); silvereye | tauhou (ARU); South Island pied oystercatcher | tōrea (Both); southern black-backed gull | karoro (Both); spur-winged plover (Both); swamp harrier | kāhu (Both); welcome swallow | warou (Both).
Golden Bar	S43, S44, S45, S46, S47	S43, S44, S45, S46, S47	9	6	Eurasian coot | pūkeko-pango (ARU); New Zealand fantail | pīwakawaka (ARU); paradise shelduck | pūtangitangi (Both); pied stilt | poaka (ARU); silvereye | tauhou (ARU); South Island pied oystercatcher | tōrea (Both); southern black-backed gull | karoro (Both); spur-winged plover (Both); swamp harrier | kāhu (5MBC); welcome swallow | warou (Both).
Golden Bar Haul Road	S63, S64, S66	S66	5	1	Eurasian coot | pūkeko-pango (ARU); grey warbler | riroriro (ARU); paradise shelduck | pūtangitangi (ARU); silvereye | tauhou (ARU); spur-winged plover (ARU); swamp harrier | kāhu (5MBC).

GPUG	S48, S49	S48, S49	12	2	New Zealand pipit | pīhoihoi (ARU); Eurasian coot | pūkeko-pango (ARU); grey warbler | riroriro (ARU); paradise shelduck | pūtangitangi (ARU); pied stilt | poaka (ARU); pūkeko (ARU); silvereye | tauhou (ARU); South Island pied oystercatcher | tōrea (ARU); southern black-backed gull | karoro (Both); spur-winged plover (ARU); swamp harrier | kāhu (Both); welcome swallow | warou (ARU).
Cranky Jim's	S60, S61, S62	S60, S61, S62	11	4	Bellbird | korimako (Both); brown creeper | pīpipi (ARU); eastern falcon | kārearea (5MBC); Eurasian coot | pūkeko-pango (ARU); grey warbler | riroriro (Both); New Zealand fantail | pīwakawaka (ARU); paradise shelduck | pūtangitangi (ARU); pied stilt | poaka (ARU); silvereye | tauhou (Both); spur-winged plover (ARU); tomtit | miromiro (ARU); tūī (ARU).

Table 4.10. Summary of indigenous bird species detected within each MP4 project area. Records include detections from ARU surveys, five-minute bird counts, pond counts within MP4 project areas, and anecdotal observations.

Category	MP4 project area							Avoided area	Restoration area	
Species	Camp Creek	Coal Creek	Coronation North	Central Mining Area	Golden Bar	Golden Bar Haul Road	GPUG / Golden Point	Back Road WRS	MEEA	Cranky Jim's
Banded dotterel | pohowera	x	x	✓	✓	x	x	x	x	x	x
Bellbird | korimako	x	x	x	✓	x	x	x	x	x	✓
Black-fronted dotterel	x	✓	✓	✓	x	x	x	x	✓	x
Black shag | māpunga	✓	x	✓	x	x	x	x	x	x	x
Brown creeper | pīpipi	x	x	x	x	x	x	x	x	x	✓
Eastern falcon | kārearea	✓	✓	✓	✓	✓	x	✓	x	✓	✓
Eurasian coot	x	x	✓	✓	✓	✓	✓	✓	✓	✓
Fernbird | mātātā	x	x	✓	x	x	x	✓	✓	x	x
Grey teal | tētē-moroiti	x	x	x	✓	x	x	X	x	x	x
Grey warbler | riroriro	✓	✓	✓	✓	x	✓	✓	✓	✓	✓
Morepork | ruru	x	x	✓	x	x	x	X	x	✓	x
New Zealand fantail | pīwakawaka	✓	x	x	✓	✓	x	X	x	✓	✓
New Zealand pipit | pīhoihoi	x	✓	✓	✓	x	x	✓	✓	✓	x
New Zealand scaup | pāpango	x	x	x	✓	x	x	X	x	x	x
New Zealand shoveler | kuruwhengu	x	x	x	✓	x	✓	X	x	x	x
Paradise shelduck | pūtangitangi	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pied stilt | poaka	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Pūkeko	x	x	x	✓	x	x	✓	x	x	x
Silvereye | tauhou	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
South Island pied oystercatcher | tōrea	✓	✓	✓	✓	✓	x	✓	✓	✓	x
Southern black-backed gull | karoro	✓	✓	✓	✓	✓	x	✓	✓	✓	x
Spur-winged plover	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Swamp harrier | kāhu	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
Tomtit | miromiro	x	x	✓	x	x	x	X	x	x	✓
Tūī	x	x	x	x	x	x	X	x	x	✓
Welcome swallow | warou	✓	✓	✓	✓	✓	x	✓	x	✓	x
White-faced heron | matuku moana	x	x	x	x	x	x	✓	x	x	x

4.1.2 Key Threatened or At-Risk Species Confirmed Present in the Project Footprint

The following species are the key Threatened or At-Risk taxa confirmed within the Project area. These species are therefore central to the avifauna values assessment and subsequent effects evaluation.

4.1.2.1 Eastern falcon | Kārearea

Eastern falcon | kārearea (*Falco novaeseelandiae*) is classified as Threatened – Nationally Vulnerable and Threatened – Regionally Vulnerable in Otago and is assigned Very High species value in this assessment. Kārearea are confirmed within the wider MP4 landscape through desktop records, five-minute bird counts and incidental observations. Records occur across the mining areas and surrounding landscape, including Coronation, the Central Mining Area, Golden Bar, GPUG, MEEA, Camp Creek and Cranky Jims. No active nest was identified within the MP4 Project footprint during the surveys undertaken for this assessment.

Kārearea are highly mobile and use extensive areas of open-country habitat for hunting, movement and resting. Within the Macraes landscape, suitable habitat includes tussock grassland, dry shrubland, exotic grassland, pasture and modified mining landforms. These habitats collectively provide a broad foraging landscape rather than being uniformly suitable for breeding. Potential nesting habitat is more restricted and includes rock outcrops, tors, bluffs, steep slopes and other elevated or structurally suitable features within the wider landscape.

The spatial arrangement of the MP4 Project areas is relevant when considering how kārearea are likely to use the landscape. The principal surface Project areas are distributed between Coronation North in the north-west, the Central Mining Area, the Golden Bar Haul Road and Golden Bar in the south-east. Collectively, these areas extend across an approximate north-west to south-east envelope of 12.2 km by 11.2 km, with a maximum diagonal extent of approximately 16.6 km. Coronation North is separated from the Central Mining Area by approximately 3.3 km at the nearest point, while Golden Bar and the Golden Bar Haul Road are functionally part of the same south-eastern habitat area. The separation between Coronation North and Golden Bar is considerably greater, at approximately 12.1 km between their nearest edges.

Available information indicates that eastern kārearea occur at relatively low densities and occupy large territories or home ranges in open-country South Island landscapes. Fox (1977, 1978a) estimated pair hunting ranges of approximately 14–15 km² in Marlborough and North Canterbury. More recent work in Central Otago reported a coarse landscape-scale estimate equivalent to approximately one pair per 2,080 ha, or 21 km², based on confirmed and possible pairs and territorial birds across the wider survey landscape (Parker et al., 2024). These estimates are not directly equivalent because of differences in methods and the spatial and temporal definition of territory or home range, but they provide relevant context for interpreting the scale at which kārearea use the MP4 landscape.

On this basis, the spatial distribution of the MP4 Project areas is unlikely to fall entirely within the range of a single breeding pair. Conversely, the number of individual Project areas should not be interpreted as representing an equivalent number of separate kārearea territories. In particular, Golden Bar and the Golden Bar Haul Road are spatially and functionally connected and are more appropriately considered together for this purpose. In the absence of site-specific territory mapping or confirmed nests, the available spatial information indicates that the principal MP4 Project areas

could overlap parts of approximately two to three kārearea territories or year-round home ranges. Three territories represents the more precautionary interpretation for the breeding season, broadly corresponding to Coronation North, the Central Mining Area, and the Golden Bar/Golden Bar Haul Road area. This is an indicative landscape-scale interpretation rather than an estimate of the number of breeding pairs present or directly affected by the Project.

Kārearea may range more widely outside the breeding season, and consequently fewer year-round home ranges could encompass the same spatial area. Published non-breeding and annual home-range estimates are primarily derived from bush falcon populations in plantation forest and indicate substantially larger and highly variable ranges (Holland & McCutcheon, 2007; Horikoshi et al., 2017; Thomas et al., 2010). These studies provide useful context but are not considered directly transferable to eastern kārearea occupying the open-country landscapes of Central Otago.

Overall, the MP4 landscape provides extensive functional foraging and movement habitat for kārearea, together with more localised potential nesting habitat associated with rock outcrops, tors, steep slopes and other suitable elevated features. The species' large home-range requirements and mobility mean that ecological value is most appropriately considered at the wider landscape scale rather than by individual Project component. The available evidence confirms regular use of the wider Macraes landscape but does not establish the number or location of breeding territories. For subsequent effects assessment, an indicative overlap with two to three territories provides a reasonable and precautionary interpretation of the available spatial information, subject to the uncertainty associated with the absence of site-specific territory mapping.

At the species level, eastern falcon is of Very High ecological value due to its Threatened status. At the site scale, the Project area is considered to provide meaningful foraging habitat and may contribute to wider territory use. Nest sites have been observed within the 10 km buffer area, so there is potential nesting habitat that may be impacted, but none was identified within the impact areas. The ecological value of eastern falcon is **Very High**.

Table 4.11. Summary of New Zealand falcon (*Falco novaeseelandiae*) breeding and non-breeding territory or home-range estimates reported in selected studies

Study	Location	Study period	Falcon form/population	Habitat	Breeding territory / home-range estimate	Non-breeding territory / home-range estimate	Basis of estimate
Fox (1977, 1978a)	Marlborough and North Canterbury	1970s	Eastern falcon	Open farm country / open hill country	Territories averaged c. **3.80 km** apart in Marlborough and **3.95 km** apart in North Canterbury. Pair hunting range estimated at c. 14–15 km².	Not quantified in the available summary.	Territory spacing and inferred pair hunting range.

Parker et al. (2024)	Cardrona Valley, greater Wānaka area and Upper Clutha Basin, Central Otago	2019–2024	Eastern falcon	South Island high-country farmland, snow tussock, dry shrubland, river margins, peri-urban areas and small plantation patches	Coarse density-derived estimate of one pair per c. 2,080 ha, equivalent to c. **21 km²** per pair, based on 14 confirmed pairs, 10 possible pairs and six apparently unpaired territorial birds within a gross survey area of c. 52,000 ha.	Not quantified directly. The study notes that the kārearea radius of activity changes through the year and is smaller during the breeding season.	Field survey, pair mapping and landscape-scale pair-density estimate.
Seaton et al. (2013)	Kaingaroa Forest, Central North Island	2004/2005 and 2005/2006 breeding seasons	Bush falcon / plantation-forest population	Exotic radiata pine plantation, comprising a mosaic of discrete stand age classes and clear-cut edges	Mean 95% MCP breeding-season home range was 9.2 ± 4.2 km² for males (n = 8) and 6.2 ± 3.2 km² for females (n = 5). Individual breeding-season ranges were **5.7–17.8 km²** for males and **1.5–10.6 km²** for females.	Not assessed.	VHF radio-tracking of adult falcons over 12 weeks during the breeding season; 95% MCP home ranges calculated monthly and over the breeding season.
Horikoshi et al. (2017)	Kaingaroa Forest, Central North Island	Winters 2012–2014	Bush falcon / plantation-forest population	Intensively managed exotic radiata pine plantation and adjoining farmland margins.	Breeding-season estimates not newly measured; study compares winter results with Seaton et al. (2013), which reported c. 9 km² for males and c. 6 km² for females.	Winter home ranges were larger than breeding-season ranges. Reported values include c. **32 km²** for females and c. **15 km²** for males using 95% KDE; the discussion also reports comparable MCP estimates of c. 29 ± 5 km² for females and 17 ± 3 km² for males.	VHF radio-tracking of adult falcons during the non-breeding season, combined with habitat-use and prey-availability surveys.
Holland and McCutcheon (2007)	Kaingaroa Forest, east of Lake Taupō, Central North Island	February 2002 to December 2004	Bush falcon, adult female	Commercial exotic pine plantation with clear-felled areas, young pine stands, mature pine, roads and skid sites	Breeding-period 95% isopleth estimates varied widely: **20.4 km²** from February to June 2002 and **11.7 km²** from June to December 2004. The authors note that some small estimates may reflect limited data points.	Non-breeding 95% isopleth estimates were **109.4 km²** in 2002 and **162.5 km²** in 2003. The 2004 non-breeding range could not be calculated because only one acceptable location was received.	Argos satellite telemetry of one adult female over approximately three years.
Thomas et al. (2010)	Kaingaroa Forest, Central North Island	2002–2008	Bush falcon, adults and juveniles	Exotic radiata pine plantation	Adult female breeding-season 95% kernel home ranges were **78 km²** and **33 km²** in two breeding seasons. Adult male breeding-season 95% kernel home ranges were **10 km²** and **6 km²** in two breeding seasons.	Adult female non-breeding 95% kernel home ranges were **52 km² and 41 km².** Adult male non-breeding 95% kernel home ranges were **13 km² and 6 km²**.	Argos satellite telemetry of two adults and three juveniles.

4.1.2.2 Banded dotterel

Banded dotterel | pohowera (*Anarhynchus bicinctus*) is classified as At Risk – Declining nationally and Threatened – Regionally Vulnerable in Otago. The regional classification results in a Very High species value under the EIANZ assessment framework.

Banded dotterel were confirmed within the MP4 Project area during the spring and early summer survey period through passive acoustic monitoring and incidental observations. The species was detected at six ARU stations, with 1,337 calls recorded. These comprised two stations at Coronation North (S23 and S29) and four within the Central Mining Area at Frasers West WRS and Frasers South Backfill (S34, S37, S41 and S42). Two birds were also observed incidentally at S41. The concentration of acoustic activity at Frasers West WRS, particularly at S41, indicates regular local use during the breeding season and may be consistent with breeding or territorial behaviour, although breeding was not directly confirmed.

Banded dotterel use open and lightly vegetated habitats, including gravel surfaces, riverbeds, outwash surfaces, herbfields, pasture and other areas where vegetation remains short or sparse (Pierce, 2013). Within the Macraes landscape, comparable habitat occurs on open pasture, sparsely vegetated ground, rehabilitated mine landforms, waste rock stacks and backfill areas. These modified habitats can provide suitable conditions for foraging and potentially breeding where ground visibility remains high and vegetation cover is sufficiently low.

The survey results indicate that breeding-season use is concentrated within the Coronation and Central Mining areas. No breeding-season detections were recorded from the Golden Bar Mining Area or Golden Bar Haul Road in the current survey dataset. Several occupied locations are associated with previously rehabilitated mine landforms rather than new MP4 impact areas, demonstrating that banded dotterel can use suitable open habitat created through mine rehabilitation as well as less-modified open-country habitat.

For interpretation of breeding-season habitat use, the six occupied survey locations provide a conservative station-based index of potential breeding territories or pairs. This should not be interpreted as six confirmed nests or breeding pairs. No systematic nest search was undertaken, and nest defence, eggs, chicks or successful breeding were not confirmed at each occupied station. Individual birds may also move between nearby open habitats during the breeding season. Nevertheless, the timing of detections, habitat associations and high calling activity at some stations provide reasonable evidence that these areas form part of the local breeding-season habitat used by banded dotterel.

The species is migratory and is not expected to occupy the Macraes landscape throughout the year. Its absence during the autumn acoustic survey is consistent with seasonal movement away from inland breeding areas following the breeding season.

Overall, the MP4 landscape provides functional breeding-season habitat for banded dotterel, particularly where open gravel, sparsely vegetated ground, short pasture and rehabilitated mine surfaces occur. Habitat use is seasonal and appears concentrated within parts of the Coronation and Central Mining areas. The Project area is therefore considered to provide Moderate habitat value for banded dotterel, while the species itself is assigned **Very High** ecological value.

4.1.2.3 South Island pied oystercatcher | Tōrea

South Island pied oystercatcher | tōrea (*Haematopus finschi*; SIPO) is classified as At Risk – Declining nationally and Threatened – Regionally Vulnerable in Otago. The regional classification results in a Very High species value under the EIANZ assessment framework.

SIPO was widely recorded across the MP4 assessment area, including MEEA, Camp Creek, Coronation, the Central Mining Area, Golden Bar, GPUG and BRWRS. Records included birds foraging, flying over survey locations, using roadside margins, sitting on rocky substrates and using short pasture and other open-country habitats. The species was detected predominantly during the spring and early summer breeding-season survey, although some detections also occurred during the autumn survey. The survey results confirm regular use of the wider Macraes landscape, particularly its open pastoral and mine-modified habitats. Breeding within suitable open-country habitat is considered highly likely, although no systematic nest search was undertaken and breeding was not directly confirmed at individual survey locations.

Within the areas affected by MP4, SIPO was recorded at 27 unique breeding-season survey locations. These comprised eight locations in the Coronation Mining Area at stations S22, S23, S25 and S28 to S32; 14 locations in the Central Mining Area at stations S33 to S39, S41, S42 and S48 to S52; and five locations in the Golden Bar Mining Area at stations S43 to S47. Several Central Mining Area stations, particularly S35, S36, S37 and S41, are also relevant to the northern Golden Bar Haul Road area. These locations have been counted only once to avoid double-counting overlapping survey evidence.

The 5MBC and passive acoustic monitoring surveys were spatially aligned, with 5MBC stations generally co-located with or close to ARU stations. Detections from the two methods are therefore not additive and are likely, in some cases, to represent the same local birds. For interpretation of breeding-season habitat use, the number of occupied survey locations provides a more appropriate measure than the total number of calls or observations recorded across survey methods.

SIPO breeds inland throughout the South Island and uses a range of open habitats, including braided riverbeds, farmland, pasture and high-country grasslands. Within the Macraes landscape, suitable habitat includes short pasture, open grassland, sparsely vegetated ground, rehabilitated mine landforms, waste rock stacks, backfill areas, road margins and other areas where vegetation remains sufficiently open to provide ground visibility. More open areas of tussock grassland may also provide suitable breeding or foraging habitat, although suitability is expected to decline where vegetation becomes tall or dense. The species' widespread occurrence within both pastoral and mine-modified environments demonstrates that ecological function is associated primarily with open habitat structure rather than vegetation origin.

SIPO generally nests as dispersed territorial pairs rather than in colonies. Published observations from braided river systems indicate separation between neighbouring nests of approximately 330 to 440 m (Marchant & Higgins, 1993). These distances are not directly transferable to pastoral or mine-modified habitats, where territory size and spacing may vary with habitat structure, food availability and disturbance. However, the approximately 500 m spacing between MP4 bird survey stations provides a reasonable basis for treating individual occupied stations as a conservative index of potentially separate breeding territories.

On this basis, the 27 occupied breeding-season survey locations are considered to represent up to approximately 27 potential breeding territories or pairs within the affected MP4 areas. This is a precautionary station-based estimate rather than a confirmed count of breeding pairs, nests or individual birds. No systematic nest search was undertaken, and the survey data do not confirm eggs, chicks or successful breeding at each occupied location. SIPO are also mobile and vocal, and some detections may represent birds moving between nearby habitats, foraging or calling over survey locations rather than nesting immediately adjacent to each station.

Despite this uncertainty, the number and spatial distribution of breeding-season detections provide strong evidence that open pasture, grassland and mine-modified habitats within the MP4 landscape provide functional breeding-season habitat for SIPO. The species is therefore an important contributor to the ecological value of these otherwise highly modified open-country habitats.

Overall, SIPO is assigned **Very High** species value, and the open-country habitats used by the species provide important breeding-season, foraging and movement functions. The 27 occupied breeding-season survey locations provide a precautionary basis for subsequent assessment of the potential scale of Project effects, subject to the limitations described above.

4.1.2.4 Black shag | Māpunga

Black shag is confirmed present within the wider OGL landholding with desktop records (2021–2023) but was not detected within the Project area by field surveys. They were detected outside the MP4 project area at Camp Creek and just outside the Coronation North mining area. However, there are habitats with open water within the Project area that may be associated with Black Shags, particularly the Golden Bar pit pond. While the species is primarily a freshwater forager, it generally requires suitable roosting sites and access to fish or other aquatic prey. No evidence of breeding colonies within the MP4 project area is indicated by the desktop dataset.

At the site scale, the Project area provides limited, localised habitat (primarily foraging/loafing at an artificial pond). At the species level, this taxon is of **Very High** ecological value. Although the species has a national threat status of At Risk – Relict, it is considered Regionally Endangered. The higher threat status is used for assigning species value.

4.1.2.5 New Zealand pipit | Pīhoihoi

New Zealand pipit is confirmed present, with frequent desktop records (34 records; 2001–2024) and consistency with habitat availability in the project area. This species is strongly associated with open ground, tussock grassland, sparsely vegetated slopes, and gravelly or short-sward areas. These habitat types are widespread across the MP4 project area, including within modified mine environments where open ground and low vegetation structure can provide foraging opportunities.

At the species level, pipit is of High ecological value due to its national threat status of At Risk – Declining. However, it is acknowledged that this species is considered Regionally Not Threatened. At the site scale, the Project area provides regular foraging and breeding habitat. The ecological value of New Zealand pipit is **High.**

4.1.2.6 Silvereye | Tauhou

Silvereye | tauhou is confirmed present, with frequent desktop records and detection in on site surveys. This species occurs throughout New Zealand and is found in indigenous and exotic forests and shrublands but is less common in grassland areas of Otago. As such, they are typically only detected in gullies with riparian vegetation or other shrubland, where sufficient trees/shrubs are present to provide suitable habitat. These habitat types are infrequent across the MP4 project area, predominantly only occurring in gullies.

At the species level, silvereye is of High ecological value due to its regional threat status of Regionally Declining. However, it is acknowledged that this species is considered Not Threatened at a national level. At the site scale, the Project area provides some remnant pockets of vegetation for foraging and breeding. The ecological value of silvereye is **High.**

4.1.2.7 Fernbird | Mātātā

Fernbird is confirmed present in the wider Macraes landscape, with anecdotal observations recorded within the GPUG project area and two acoustic detections recorded within the Coronation North project area at survey station 27. No fernbird were detected during targeted playback surveys, and the two acoustic detections were not supported by repeat detections or visual observations.

Fernbird is classified as At Risk – Declining nationally and Regionally Declining in Otago (Robertson *et al.*, 2021; Jarvie *et al.*, 2025). The species is typically associated with dense wetland, rushland, sedgeland, shrubland, and wetland margins and densely vegetated riparian habitat. These habitats are localised and fragmented within the MP4 project area, and surveyed sites provided marginal or unsuitable habitat.

At the site scale, the limited number of detections suggests that the Coronation North record may represent a transient, dispersing, or non-resident bird rather than established occupancy. The anecdotal observation at GPUG may represent resident birds, but further survey effort is required for confirmation. Given the species' conservation status and the presence of localised wetland and riparian habitats, fernbird should be considered cautiously in the effects assessment and relevant management measures.

At the species level, fernbird is of **High** ecological value due to its national At Risk – Declining status. At the site scale, the Project area is assessed as providing Low habitat value for fernbird, based on the limited detections, lack of repeat survey confirmation, and restricted extent of suitable habitat.

4.1.3 Threatened or At Risk Species Not Confirmed in the Footprint

4.1.3.1 Australasian bittern | Matuku-hūrepo (*Botaurus poiciloptilus*) – Nationally Critical

A single record was identified from 1999. No subsequent records are documented in the desktop dataset. Bittern are strongly associated with extensive, permanent freshwater wetlands, typically with tall emergent vegetation and low disturbance. The MP4 project area does not contain extensive wetlands of this type, and the artificial pond environment present (Golden Bar pit pond) does not provide the dense emergent reedland habitat typically required for sustained occupancy. On that basis, and given the isolated historic nature of the record, the species is assessed as Unlikely Present.

4.1.3.2 South Island kākā (*Nestor meridionalis*) – Nationally Vulnerable

Two records (2000–2025) were identified within the 10 km buffer. Kākā are closely associated with large tracts of indigenous forest and mature exotic forests that provide suitable foraging substrates and nest cavities. The MP4 project area is dominated by open tussock grassland, shrubland, pasture, and mined or rehabilitated landforms, and does not provide the extensive forest habitat typically required for regular use. While occasional dispersal movements through the wider landscape cannot be ruled out, the MP4 project area is assessed as Unlikely to support regular kākā use.

4.1.3.3 Pelagic seabirds: sooty shearwater | tītī (*Puffinus griseus*) – Declining; broad-billed prion | pararā (*Pachyptila vittata*) – Relict; wandering albatross | toroa (*Diomedea exulans*) – Migrant

These taxa were each represented by isolated records. The MP4 project area is inland and lacks coastal habitats, estuaries, or large natural lakes typically associated with seabird use. In this context, inland records are most plausibly attributable to storm-driven displacement events or incidental occurrences, rather than sustained habitat use. Accordingly, these species are assessed as Unlikely Present within the MP4 project area.

4.1.3.4 Australian coot (*Fulica atra*) – Naturally Uncommon

The desktop review identified multiple records within the broader locality, and the Golden Bar pit pond provides open water habitat that could be used for opportunistic foraging or loafing. The species was not confirmed by field surveys to be within the MP4 project area, and the pond habitat is limited in extent. They were detected in pond surveys outside of the project area, so are present in the landscape. The species is therefore assessed as Likely Present on an occasional basis, particularly when water levels are suitable.

4.1.3.5 Shining cuckoo | pīpīwharauroa (*Chrysococcyx lucidus*) – Vagrant

Three records were identified in 2023. Shining cuckoo occurrence is seasonal and influenced by the presence of suitable breeding host species and structurally complex shrubland/forest habitats. Habitat within the MP4 project area is largely open and modified, and the species was not confirmed by field surveys. Shining cuckoo is therefore assessed as Likely Present, but only as an occasional visitor.

4.1.3.6 Little shag | kawaupaka (*Microcarbo melanoleucos*) – Vagrant

Four records (2019–2022) were identified. While the pit pond could provide limited foraging habitat, there is no suitable breeding habitat, and the species was not confirmed during field surveys. It is assessed as Likely Present on an occasional basis only.

4.1.3.7 Ruru | Morepork (*Ninox novaeseelandiae*) – Regionally Vulnerable

Ruru | morepork (Ninox novaeseelandiae) was not recorded in the desktop survey but was detected at very low frequency during ARU surveys. Calls were recorded in both the breeding and non-breeding season deployments; however, the total number of detections was low, and the associated BirdNET confidence scores were also low. No morepork were recorded during observer-based surveys or incidental observations.

The low number of calls, absence of corroborating visual or incidental records, and lack of nearby desktop records indicate that these detections should be treated cautiously. Morepork are typically resident within territories where suitable habitat is present, and repeated vocal activity would be expected if a resident bird were occupying the immediate survey area. The nearest eBird record is approximately 42 km from the acoustic detection location.

On this basis, morepork is not considered a confirmed resident within the MP4 project area. The ARU detections may represent either occasional movement through the wider landscape or acoustic misclassification. Without further evidence, morepork is considered unlikely to be regularly present within the Project area.

4.1.3.8 Black-fronted dotterel (*Charadrius melanops*)

Black-fronted Dotterels were detected acoustically at low occurrence levels. However, it has not been recorded during desktop review or through visual field observations. Given the small number of detections and similarity of vocalisations with banded dotterel, these records may represent either brief transient use during dispersal or acoustic misclassification. Pending further confirmation, black-fronted dotterel is not treated as a confirmed resident within the MP4 project area but is acknowledged as potentially present.

4.1.4 Indigenous (Not Threatened) Species Confirmed Present

The following indigenous species classified as Not Threatened are confirmed present:

- Swamp harrier | Kāhu (*Circus approximans*)

- White-faced heron | Matuku moana (*Egretta novaehollandiae*)
- Grey warbler | Riroriro (*Gerygone igata*)
- Kererū | New Zealand pigeon (*Hemiphaga novaeseelandiae*)
- Pied stilt | Poaka (*Himantopus leucocephalus*)
- Welcome swallow | Warou (*Hirundo neoxena*)
- Southern black-backed gull | Karoro (*Larus dominicanus*)
- Pūkeko (*Porphyrio melanotus*)
- Tūī (*Prosthemadera novaeseelandiae*)
- South Island fantail | Pīwakawaka (*Rhipidura fuliginosa*)
- Australasian shoveler | Kuruwhengi (*Spatula rhynchotis*)
- Paradise shelduck | Pūtangitangi (*Tadorna variegata*)
- Sacred kingfisher | Kōtare (*Todiramphus sanctus*)
- Spur-winged plover (*Vanellus miles*)
- Grey teal | Tētē-moroiti (*Anas gracilis*)
- New Zealand scaup | Pāpango (*Aythya novaeseelandiae*)

These species are typical of open-country, wetland margins, and modified pastoral environments. Most are widespread and regionally common within Central Otago. Their presence reflects the mosaic of open pasture, artificial water bodies, rehabilitated mine landforms, and limited shrubland habitat within the Project area.

In accordance with the EIANZ (2018) framework, nationally common indigenous species are generally assigned Low ecological value at the species level. At the site scale, habitats utilised by these species are of Low value unless they provide locally rare or regionally significant ecological functions, which is not indicated within the current project area.

Table 4.12. Threat status, species value, habitat value and overall ecological value for native species that have been confirmed to be on site. Species value has been assigned according to the EIANZ guidelines (Appendix A, Table 5) and assigned based on either the National or Regional threat status, depending on whichever was higher.

Common Name	Scientific Name	National Threat Status[6]	Regional Threat status[7]	**Taoka Species[1]**	Species Value
Eastern falcon	*Falco novaeseelandiae*	Nationally Vulnerable	Regionally Vulnerable	Y	Very High
Banded dotterel	*Anarhynchus bicinctus*	Declining	Regionally Vulnerable		Very High
South Island pied oystercatcher	*Haematopus finschi*	Declining	Regionally Vulnerable		Very High
Black shag	*Phalacrocorax carbo*	Relict	Regionally Endangered	Y	Very High
New Zealand fernbird	*Poodytes punctatus*	Declining	Regionally Declining	Y	High
New Zealand pipit	*Anthus novaeseelandiae*	Declining	Regionally Not Threatened	Y	High
Silvereye	*Zosterops lateralis*	Not Threatened	Regionally Declining		High
Australasian shoveler	*Spatula rhynchotis*	Not Threatened	Regionally Not Threatened	Y	Low
Grey teal	*Anas gracilis*	Not Threatened	Regionally Not Threatened	Y	Low
Grey warbler	*Gerygone igata*	Not Threatened	Regionally Not Threatened	Y	Low
Kererū	*Hemiphaga novaeseelandiae*	Not Threatened	Regionally Not Threatened	Y	Low
New Zealand scaup	*Aythya novaeseelandiae*	Not Threatened	Regionally Not Threatened		Low
Paradise shelduck	*Tadorna variegata*	Not Threatened	Regionally Not Threatened	Y	Low
Pied stilt	*Himantopus leucocephalus*	Not Threatened	Regionally Not Threatened	Y	Low
Pūkeko	*Porphyrio melanotus*	Not Threatened	Regionally Not Threatened	Y	Low
Sacred kingfisher	*Todiramphus sanctus*	Not Threatened	Regionally Not Threatened	Y	Low
South Island fantail	*Rhipidura fuliginosa*	Not Threatened	Regionally Not Threatened	Y	Low
Southern black-backed gull	*Larus dominicanus*	Not Threatened	Regionally Not Threatened	Y	Low
Spur-winged plover	*Vanellus miles*	Not Threatened	Regionally Not Threatened		Low
Swamp harrier	*Circus approximans*	Not Threatened	Regionally Not Threatened	Y	Low

[6] Robertson *et al.*, 2021

[7] Jarvie *et al.*, 2025

Tūī	*Prosthemadera novaeseelandiae*	Not Threatened	Regionally Not Threatened	Y	Low
Welcome swallow	*Hirundo neoxena*	Not Threatened	Regionally Not Threatened		Low
White-faced heron	*Egretta novaehollandiae*	Not Threatened	Regionally Not Threatened		Low

4.2 Significance criteria under the policy framework

Avifauna values within the MP4 Project area were assessed against the significance criteria in the NPSIB, the PORPS, and the WDP. Table 4.13 of this report provides a summary of the assessment against the NPSIB significance criteria, Table 4.14 provides a summary of the assessment against the PORPS and Table 4.15 provides a summary of the assessment against WDP criteria.

The assessment indicates that Coronation North and Golden Bar meet multiple significance criteria for indigenous avifauna. These areas support habitats used by Threatened or At-Risk species and contribute to the wider open-country, wetland, riparian, tussock grassland, and shrubland habitat network within the Macraes landscape. The relevant species include eastern falcon | kārearea, banded dotterel | pohowera, South Island pied oystercatcher | tōrea, New Zealand pipit | pīhoihoi, and fernbird | mātātā, where suitable habitat or confirmed records occur.

The Central Mining Area and the Golden Bar Haul Road meet the rarity and distinctiveness criteria because they support, or provide habitat for, At-Risk indigenous bird species. However, these areas do not meet all other criteria because the habitats are generally modified, common within inland Otago, and support lower indigenous avifauna diversity and a more limited ecological context than Coronation North and Golden Bar.

Overall, significance is driven primarily by the presence and habitat use of Threatened and At Risk species, rather than by intact habitat condition or high indigenous bird diversity. Although much of the Project area has been modified by pastoral land use and mining activity, several project components retain functional habitat for the indigenous avifauna of conservation concern.

Table 4.13. Assessment of avifauna values in each PC against the National Policy Statement for Indigenous Biodiversity 2023 ("NPSIB") significance criteria. Project Components: CN = Coronation North; CMA = Central Mining Area; GB HR= Golden Bar Haul Road; GB = Golden Bar and GPUG = Golden Point Underground.

NPSIB criteria	Significance assessment	CN	CMA	GB HR	GB	GPUG
Representativeness	The habitats for avifauna are typical or characteristic of the indigenous diversity of the ecological district, though some habitats are degraded examples of their type (e.g., tussockland, shrubland). Indigenous vegetation and habitats are representative of the full range and extent of ecological diversity across all environmental gradients in an ecological district. The fauna habitat supports a typical suite of indigenous avifauna that would occur in the present-day environment.	Yes	No	No	Yes	No
Diversity and pattern	The area supports an expected range of diversity and patterns of indigenous avifauna and/ or avifauna habitats, similar to the diversity at the level of the Ecological District.	No	No	No	Yes	Yes
Rarity and distinctiveness	The area supports species, or habitats used by species, that are 'At Risk' (e.g. banded dotterel, black shag, New Zealand pipit, South Island pied oystercatcher) and/ or threatened (e.g., eastern falcon).	Yes	Yes	Yes	Yes	Yes
Ecological context	The terrestrial ecological features in the area, as they pertain to indigenous avifauna, provide some connectivity between the site and adjoining sites, and provide resources (e.g., food, refuge, breeding sites) for avifauna.	Yes	No	No	Yes	Yes

Table 4.14. Assessment of avifauna values in each PC against the Otago Regional Policy Statements (ORPS) significance criteria. Project Components: CN = Coronation North; CMA = Central Mining Area; GBHR = Golden Bar Haul Road; GB = Golden Bar; GPUG = Golden Point Underground.

PORPS criteria	Significance assessment	CN	CMA	GB HR	GB	GPUG
Representativeness	The habitats for avifauna are typical or characteristic of the indigenous diversity of the ecological district, though some habitats are degraded examples of their type (e.g., tussockland, shrubland). Indigenous vegetation and habitats are representative of the full range and extent of ecological diversity across all environmental gradients in an ecological district. The fauna habitat supports a typical suite of indigenous avifauna that would occur in the present-day environment.	Yes	No	No	Yes	No
Rarity	The area supports species, or habitats used by species, that are 'At Risk' (e.g. Banded Dotterel, Black Shag, New Zealand pipit, South Island pied Oystercatcher) and/ or threatened (e.g., New Zealand falcon).	Yes	Yes	Yes	Yes	Yes
Diversity	The area supports an expected range of diversity of indigenous avifauna and/ or avifauna habitats, similar to the diversity at the level of the Ecological District.	Yes	No	No	Yes	Yes
Distinctiveness	Avifauna species in the area do not occur at their distribution limits and are not endemic to the Otago region. Some of the At Risk species are migratory and do not occur year-round (e.g. SIPO and Banded Dotterel). New Zealand Falcon habitat relies on Rock Tors for breeding, which is a distinctive feature of the landscape.	Yes	No	No	Yes	Yes
Ecological Context	The terrestrial ecological features in the area, as they pertain to indigenous avifauna, provide some connectivity between the site and adjoining sites, and provide resources (e.g., food, refuge, breeding sites) for avifauna.	Yes	No	No	Yes	Yes
Coastal Environment	N/A	N/A	N/A	N/A	N/A	N/A

Table 4.15. Assessment of avifauna values in each PC against the Waitaki District Plan significance criteria. Project Components: CN = Coronation North; CMA = Central Mining Area; GBHR = Golden Bar Haul Road; GB = Golden Bar; GPUG = Golden Point Underground.

Waitaki District Plan criteria	Significance assessment	CN	CMA	GBHR	GB	GPUG
Representativeness	The area supports habitats and ecological processes (e.g., avifauna community contributions to the environment) that are typical of the ecological district relative to the pre-European baseline and contribute to maintaining an appropriate proportional representation of these features.	Yes	No	No	Yes	No
Rarity and Distinctiveness	The area supports species, or habitats used by species, that are At Risk and/ or Threatened. The area supports avifauna habitats (e.g., rock tors, tussock grasslands) that are important in the lifecycle of protected or threatened avifauna.	Yes	Yes	Yes	Yes	Yes
Diversity and Pattern	The area supports an expected range of diversity and patterns of indigenous avifauna and/ or avifauna habitats, similar to the diversity at the level of the Ecological District.	No	No	No	Yes	Yes
Ecological Context, Size and Shape	The terrestrial ecological features in the area, as they pertain to indigenous avifauna, provide some connectivity between the site and adjoining sites, and provide resources (e.g., food, refuge, breeding sites) for avifauna.	Yes	No	No	Yes	Yes

Table 4.16. Assessment of avifauna values in each PC against the Dunedin City Council (DCC) District Plan significance criteria. Project Components: CN = Coronation North; CMA = Central Mining Area; GBHR= Golden Bar Haul Road; GB = Golden Bar; GPUG = Golden Point Underground.

DCC District Plan criteria	Significance assessment	CN	CMA	GBHR	GB	GPUG
Protected Areas	No protected areas	No	No	No	NO	No
Recognised Areas	No Recognised Areas	No	No	No	No	Nos
Rarity	The area supports species, or habitats used by species, that are 'At Risk' (e.g. Banded Dotterel, Black Shag, New Zealand pipit, South Island pied Oystercatcher) and/ or threatened (e.g., New Zealand falcon).	Yes	Yes	Yes	Yes	Yes
Distinctiveness	Avifauna species in the area do not occur at their distribution limits and are not endemic to the Otago region. Some of the At Risk species are migratory and do not occur year-round (e.g. SIPO and Banded Dotterel). New Zealand Falcon habitat relies on Rock Tors for breeding, which is a distinctive feature of the landscape.	Yes	No	No	Yes	Yes
Representativeness	The habitats for avifauna are typical or characteristic of the indigenous diversity of the ecological district, though some habitats are degraded examples of their type (e.g., tussockland, shrubland). Indigenous vegetation and habitats are representative of the full range and extent of ecological diversity across all environmental gradients in an ecological district. The fauna habitat supports a typical suite of indigenous avifauna that would occur in the present-day environment.	Yes	No	No	Yes	No
Ecological Context	The terrestrial ecological features in the area, as they pertain to indigenous avifauna, provide some connectivity between the site and adjoining sites, and provide resources (e.g., food, refuge, breeding sites) for avifauna.	Yes	No	No	Yes	Yes
Diversity and Pattern	The area supports an expected range of diversity of indigenous avifauna and/ or avifauna habitats, similar to the diversity at the level of the Ecological District.	No	No	No	Yes	Yes
Size	Impacted area accounts for <5% of habitat within the Zone of Influence and the ED.	Yes	No	No	Yes	No

5 CONCLUSION

This Avifauna Values Assessment has identified a bird assemblage within the MP4 project area that is typical of modified inland pastoral and mining environments in Central Otago. Survey methods, including desktop review, 5MBC, PAM, and incidental observations, confirm that the avifauna community is numerically dominated by introduced passerines and common indigenous open-country species.

Notwithstanding this, several species of elevated conservation status are confirmed to be present within the Project area. These include eastern falcon (Nationally Vulnerable), New Zealand pipit (At Risk – Declining), SIPO (At Risk – Declining), black shag (At Risk – Relict), fernbird (At Risk – Declining), silvereye (Regionally Declining) and banded dotterel (At Risk – Declining). Under the EIANZ (2018) framework, these taxa are the primary drivers of ecological value within the site.

Eastern falcon represents the species of highest ecological value recorded, reflecting its Threatened status and confirmed use of the wider mining landscape for foraging. While no nesting sites have been identified within the new impact areas, the Project area forms part of a broader open-habitat mosaic that contributes to territory use. New Zealand pipit, South Island pied oystercatcher, and banded dotterel utilise open ground and short-sward habitats within the MP4 Project area, particularly sparsely vegetated or gravel substrates. Black shag utilises pond and riparian habitats for foraging and loafing, although no breeding colonies are present.

The remaining indigenous species confirmed are classified as Not Threatened and are widespread within the region. Consistent with EIANZ guidance, these species are assigned **Low** ecological value at the species level and do not substantially elevate overall avifauna value at the site scale. Introduced species dominate numerically but do not contribute ecological value under the assessment framework.

Overall, the avifauna ecological value of the MP4 project area is best described as **Moderate**, driven primarily by the confirmed presence and habitat use of Threatened and At Risk open-country species within a largely modified landscape. The site does not contain extensive indigenous habitats, regionally rare ecosystems, or known breeding colonies of highly Threatened taxa. However, it provides functional foraging and potential breeding habitat for several At Risk species and contributes to the broader ecological network of open habitats within the district.

This report addresses avifauna values only. Application of the mitigation hierarchy, avoidance and timing measures, monitoring requirements, and any biodiversity offset or compensation considerations will be addressed separately within the full Ecological Impact Assessment (E7; Bioresearches, 2026f), Residual Effects Analysis Report: Terrestrial Ecology (E13; Bioresearches, 2026l) and the Avifauna Management Plan (E12; Bioresearches, 2026k) prepared for the MP4 proposal.

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APPLICABILITY AND LIMITATIONS

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of Oceana Gold (New Zealand) Limited as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such party's sole risk. Babbage/Bioresearches acknowledges that this report will be relied on by a Panel appointed under the Fast Track Approvals Act 2024 and these disclaimers do not prevent that reliance.

Legal Interpretation

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal opinions. Where opinions or judgements are to be relied on, they should be independently verified with appropriate legal advice.

Maps and Images

All maps, plans, and figures included in this report are indicative only and are not to be used or interpreted as engineering drafts. Do not scale any of the maps, plans or figures in this report. Any information shown here on maps, plans and figures should be independently verified on site before taking any action. Sources for map and plan compositions include LINZ Data and Map Services and local council GIS services. For further details regarding any maps, plans or figures in this report, please contact Babbage Consultants Limited.

Reliability of Investigation

Babbage/ Bioresearches has performed the services for this project in accordance with the standard agreement for consulting services and current professional standards for environmental site assessment. No guarantees are either expressed or implied.

Recommendations and opinions in this report are based on discrete sampling data. The nature and continuity of matrix sampled away from the sampling points are inferred and it must be appreciated that actual conditions could vary from the assumed model.

There is no investigation that is thorough enough to preclude the presence of materials at the site that presently, or in the future, may be considered hazardous. Because regulatory evaluation criteria are constantly changing, concentrations of contaminants present and considered to be acceptable may in the future become subject to different regulatory standards, which cause them to become unacceptable and require further remediation for this site to be suitable for the existing or proposed land use activities.

Appendix A

EIANZ key tables for assessing level of effect

Table 4 Attributes to be considered when assigning ecological value or importance to a site or area of vegetation/habitat/community.

Matters	Attributes to be considered
Representativeness	Criteria for representative vegetation and aquatic habitats: • Typical structure and composition • Indigenous species dominate • Expected species and tiers are present • Thresholds may need to be lowered where all examples of a type are strongly modified Criteria for representative species and species assemblages: • Species assemblages that are typical of the habitat • Indigenous species that occur in most of the guilds expected for the habitat type
Rarity/distinctiveness	Criteria for rare/distinctive vegetation and habitats: • Naturally uncommon, or induced scarcity • Amount of habitat or vegetation remaining • Distinctive ecological features • National priority for protection Criteria for rare/distinctive species or species assemblages: • Habitat supporting nationally Threatened or At Risk species, or locally[19] uncommon species • Regional or national distribution limits of species or communities • Unusual species or assemblages • Endemism
Diversity and Pattern	• Level of natural diversity, abundance and distribution • Biodiversity reflecting underlying diversity • Biogeographical considerations – pattern, complexity • Temporal considerations, considerations of lifecycles, daily or seasonal cycles of habitat availability and utilisation
Ecological context	• Site history, and local environmental conditions which have influenced the development of habitats and communities • The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (from "intrinsic value" as defined in RMA) • Size, shape and buffering • Condition and sensitivity to change • Contribution of the site to ecological networks, linkages, pathways and the protection and exchange of genetic material • Species role in ecosystem functioning – high level, key species identification, habitat as proxy

Table 5 Factors to consider in assigning value to terrestrial species for EcIA

Determining factors	
Nationally Threatened species, found in the ZOI either permanently or seasonally	Very High
Species listed as At Risk – Declining, found in the ZOI, either permanently or seasonally	High
Species listed as any other category of At Risk, found in the ZOI either permanently or seasonally	Moderate
Locally (ED) uncommon or distinctive species	Moderate
Nationally and locally common indigenous species	Low
Exotic species, including pests, species having recreational value	Negligible

Table 6. Scoring for sites or areas combining values for four matters in Table 4.

Value	Description
Very High	Area rates High for 3 or all of the four assessment matters listed in **Table 4**. Likely to be nationally important and recognised as such.
High	Area rates High for 2 of the assessment matters, Moderate and Low for the remainder, or Area rates High for 1 of the assessment maters, Moderate for the remainder. Likely to be regionally important and recognised as such.
Moderate	Area rates High for one matter, Moderate and Low for the remainder, or Area rates Moderate for 2 or more assessment matters Low or Very Low for the remainder Likely to be important at the level of the Ecological District.
Low	Area rates Low or Very Low for majority of assessment matters and Moderate for one. Limited ecological value other than as local habitat for tolerant native species.
Negligible	Area rates Very Low for 3 matters and Moderate, Low or Very Low for remainder.

Table 8. Criteria for describing magnitude of effect (Adapted from Regini (2000) and Boffa Miskell (2011))

Magnitude	Description
Very high	Total loss of, or very major alteration to, key elements/features/ of the existing baseline conditions, such that the post-development character, composition and/or attributes will be fundamentally changed and may be lost from the site altogether; AND/OR Loss of a very high proportion of the known population or range of the element/feature
High	Major loss or major alteration to key elements/features of the existing baseline conditions such that the post-development character, composition and/or attributes will be fundamentally changed; AND/OR Loss of a high proportion of the known population or range of the element/feature
Moderate	Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed; AND/OR Loss of a moderate proportion of the known population or range of the element/feature
Low	Minor shift away from existing baseline conditions. Change arising from the loss/alteration will be discernible, but underlying character, composition and/or attributes of the existing baseline condition will be similar to pre-development circumstances or patterns; AND/OR Having a minor effect on the known population or range of the element/feature
Negligible	Very slight change from the existing baseline condition. Change barely distinguishable, approximating to the 'no change' situation; AND/OR Having negligible effect on the known population or range of the element/feature

Table 10. Criteria for describing level of effects (Adapted from Regini (2000) and Boffa Miskell (2011))

Ecological Value ▶ Magnitude ▼	Very high	High	Moderate	Low	Negligible
Very high	Very high	Very high	High	Moderate	Low
High	Very high	Very high	Moderate	Low	Very low
Moderate	High	High	Moderate	Low	Very low
Low	Moderate	Low	Low	Very low	Very low
Negligible	Low	Very Low	Very low	Very low	Very low
Positive	Net gain	Net gain	Net gain	Net gain	Net gain

Appendix B

Proposed set of criteria for assessing habitat suitability of a species (Baber *et al.* 2021).

Habitat suitability value score	Description
Negligible	Habitat not suitable.
Very low	Marginal habitat that may be used but is not important for any part of the species or species assemblage life cycle(s).
Low	Habitat that provides some, but not all, of a species or species assemblages life-history requirements and/or the habitat is of low quality and the relative abundance within the habitat is low compared to other habitat types.
Moderate	Habitat that provides for most, if not all, of a species or species assemblage's life-history requirements and/or the habitat quality is of moderate quality and the relative abundance within the habitat is moderate compared to other habitat types.
High	Habitat that would typically provide for all species or species assemblage life-history requirements and/or provides a critical resource or resource(s) for life-history requirements. The habitat quality is high and the relative abundance within the habitat is, or is likely to be, high compared to other habitat types.
Very high	Habitat that provides for all species or species assemblage life-history requirements and/or provides a critical resource or resource(s) needed for life-history requirements. The habitat quality is very high and the relative abundance within the habitat is or is likely to be very high compared to other habitat types. Likely to be a local or regional hotspot for that species assemblage or benchmark with the species or species assemblage at carrying capacity.

Appendix C
Five-minute bird count data

Table C.1. Five-minute bird count data, Spring survey 2025.

Species	Total number of counts	Sites detected	Detection rate percent	Total individuals	Mean per count	SE
Blackbird	49	11	22.45	20	0.41	0.13
Chaffinch	49	8	16.33	10	0.20	0.07
Duck, Mallard	49	1	2.04	2	0.04	0.04
Dunnock (Hedge Sparrow)	49	4	8.16	5	0.10	0.05
Fantail, Sth Is	49	1	2.04	1	0.02	0.02
Goldfinch	49	21	42.86	115	2.35	0.56
Gull, Southern Black-backed	49	19	38.78	31	0.63	0.14
Harrier, Australasian	49	14	28.57	24	0.49	0.13
Magpie, Australian (magpie sp.)	49	17	34.69	24	0.49	0.11
Oystercatcher, Sth Is Pied	49	11	22.45	41	0.84	0.44
Pigeon, Feral	49	1	2.04	20	0.41	0.41
Plover, Spur-winged	49	9	18.37	19	0.39	0.15
Redpoll	49	17	34.69	82	1.67	0.66
Shelduck, Paradise	49	2	4.08	10	0.20	0.17
Silvereye	49	1	2.04	2	0.04	0.04
Skylark	49	48	97.96	191	3.90	0.26
Starling	49	14	28.57	44	0.90	0.27
Swallow, Welcome	49	6	12.24	11	0.22	0.10
Thrush, Song	49	7	14.29	16	0.33	0.15
Turkey	49	3	6.12	4	0.08	0.05
Warbler, Grey	49	2	4.08	2	0.04	0.03
Yellowhammer	49	16	32.65	22	0.45	0.11

Table C.2. Five-minute bird count data, Autumn survey 2025.

Species	Total number of counts	Sites detected	Detection rate percent	Total individuals	Mean per count	SE
Bellbird, (mainland)	49	3	6.12	7	0.143	0.092
Blackbird	49	4	8.16	5	0.102	0.053
Chaffinch	49	3	6.12	6	0.122	0.075
Dunnock (Hedge Sparrow)	49	2	4.08	3	0.061	0.045
Falcon, NZ	49	2	4.08	2	0.041	0.029
Fantail, Sth Is	49	1	2.04	4	0.082	0.082
Goldfinch	49	30	61.22	126	2.571	0.614
Greenfinch	49	3	6.12	3	0.061	0.035
Gull, Southern Black-backed	49	1	2.04	1	0.02	0.02
Harrier, Australasian	49	11	22.45	11	0.224	0.06
Magpie, Australian (magpie sp.)	49	27	55.1	62	1.265	0.435
Plover, Spur-winged	49	6	12.24	19	0.388	0.233
Redpoll	49	24	48.98	101	2.061	0.627
Shelduck, Paradise	49	7	14.29	27	0.551	0.253
Silvereye	49	4	8.16	17	0.347	0.192
Skylark	49	29	59.18	86	1.755	0.333
Starling	49	11	22.45	113	2.306	1.194
Turkey	49	1	2.04	4	0.082	0.082
Warbler, Grey	49	10	20.41	17	0.347	0.111
Yellowhammer	49	9	18.37	12	0.245	0.08

Table C.3. Five-minute bird count raw data. (Note that table continues over two pages)

Season	Species	Native/Exotic	MEEA							Camp Creek		Coal Creek			BRWS						Coronation										
	Station Number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	18	19	21	22	23	24	25	27	28	29	30	31	32
Summer	Blackbird	Exotic	0	0	3	1	1	2	0	4	0	2	0	0	2	0	1	0	0	2	0	0			0				0		0
	Chaffinch	Exotic	0	0	0	1	0	1	1	0	0	2	0	0	0	0	0	0	0	0	2	1			0				0		0
	Duck, Mallard	Exotic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0				0		0
	Dunnock (Hedge Sparrow)	Exotic	0	0	1	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0			0				0		0
	Fantail, Sth Is	Native	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0			0				0		0
	Goldfinch	Exotic	0	0	11	0	5	15	4	3	6	2	3	2	0	0	0	0	0	0	6	16			0				0		0
	Gull, Southern Black-backed	Native	0	0	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0			0				1		0
	Harrier, Australasian	Native	0	0	0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0			0				0		0
	Magpie, Australian (magpie sp.)	Exotic	0	2	1	0	0	0	0	0	1	0	1	0	0	0	0	1	0	1	1	0			0				1		0
	Oystercatcher, Sth Is Pied	Native	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0			0				0		0
	Pigeon, Feral	Exotic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0				0		0
	Plover, Spur-winged	Native	0	0	0	0	0	0	0	0	2	0	0	0	0	3	0	2	0	0	0	0			0				0		0
	Redpoll	Exotic	0	0	3	0	2	3	6	7	10	0	0	0	3	0	0	1	0	3	3	2			0				0		0
	Shelduck, Paradise	Native	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0				0		0
	Silvereye	Native	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0			0				0		0
	Skylark	Exotic	3	5	4	4	4	2	2	1	0	4	4	2	4	5	2	4	4	3	3	3			6				10		7
	Starling	Exotic	0	0	0	0	0	4	0	0	0	2	0	0	0	5	0	0	0	0	1	0			2				0		3
	Swallow, Welcome	Native	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0			0				0		0
	Thrush, Song	Exotic	0	0	0	0	0	0	0	6	3	0	2	0	0	0	0	0	0	0	0	1			0				0		0
	Turkey	Exotic	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0				0		0
	Warbler, Grey	Native	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1			0				0		0
	Yellowhammer	Exotic	2	3	1	1	1	2	1	2	0	1	0	1	1	0	1	1	0	0	0	0			2				0		0
	Summer species count		**2**	**4**	**9**	**5**	**6**	**10**	**5**	**8**	**8**	**6**	**4**	**5**	**5**	**5**	**3**	**5**	**1**	**4**	**6**	**6**	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**0**	**2**
	Summer Native species count		**0**	**0**	**1**	**0**	**1**	**2**	**0**	**1**	**4**	**0**	**0**	**2**	**1**	**3**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
Autumn	Bellbird, (mainland)	Native	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blackbird	Exotic	0	0	0	0	0	0	0						0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Chaffinch	Exotic	0	0	0	0	0	0	0						1	0	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0
	Dunnock (Hedge Sparrow)	Exotic	0	0	0	0	0	0	0						2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	Falcon, NZ	Native	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fantail, Sth Is	Native	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Goldfinch	Exotic	0	2	0	4	0	3	5						4	2	0	0	0	4	0	0	6	4	0	1	1	6	0	0	0
	Greenfinch	Exotic	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gull, Southern Black-backed	Native	0	0	0	0	0	0	0						0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Harrier, Australasian	Native	1	0	0	1	0	0	1						0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Magpie, Australian (magpie sp.)	Exotic	0	1	0	1	2	0	0						2	1	1	2	4	0	0	0	4	1	0	1	0	1	1	0	0
	Plover, Spur-winged	Native	0	0	0	0	2	0	0						0	0	0	11	1	0	0	0	2	0	0	0	0	0	0	0	0
	Redpoll	Exotic	2	3	1	2	0	2	1						0	0	2	7	0	0	22	20	4	2	0	3	0	0	0	0	0
	Shelduck, Paradise	Native	0	0	0	0	2	1	0						0	0	0	0	0	0	0	0	4	10	0	0	0	0	0	0	0
	Silvereye	Native	0	0	0	0	0	0	0						0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
	Skylark	Exotic	2	3	2	0	1	2	1						0	3	0	4	1	1	0	0	0	0	2	0	2	0	0	4	7
	Starling	Exotic	0	0	0	0	0	4	0						1	3	20	12	0	0	1	0	0	0	0	0	0	0	0	0	0
	Turkey	Exotic	0	0	0	0	0	0	4						0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Warbler, Grey	Native	0	0	3	0	1	0	1						0	0	3	0	0	0	0	2	0	0	0	0	0	1	0	0	0
	Yellowhammer	Exotic	0	0	1	0	0	0	2						0	0	0	0	0	0	2	0	0	1	0	0	0	0	1	0	0
	Autumn species count		**3**	**4**	**4**	**4**	**5**	**5**	**7**	**0**	**0**	**0**	**0**	**0**	**5**	**4**	**5**	**5**	**4**	**5**	**3**	**3**	**5**	**6**	**1**	**3**	**2**	**3**	**2**	**1**	**1**
	Autumn Native species count		**1**	**0**	**1**	**1**	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**2**	**0**	**0**	**1**	**2**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
	Total species count		**5**	**8**	**13**	**9**	**11**	**15**	**12**	**8**	**8**	**6**	**4**	**5**	**10**	**9**	**8**	**10**	**5**	**9**	**9**	**9**	**5**	**6**	**4**	**3**	**2**	**3**	**5**	**1**	**3**
	Total native species count		**1**	**0**	**2**	**1**	**4**	**3**	**2**	**1**	**4**	**0**	**0**	**2**	**1**	**3**	**2**	**1**	**2**	**0**	**0**	**1**	**2**	**2**	**0**	**0**	**0**	**1**	**1**	**0**	**0**

Season	Species	Native/Exotic	Macraes Central											Golden Bar					Macraes Central												MEEA	Cranky Jim's			GBH R		Coronation	GBHR	
	Station Number		33	34	34A	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	59	60	61	62	63	64	65	66	Total
Summer	Blackbird	Exotic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1								20
	Chaffinch	Exotic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0								10
	Duck, Mallard	Exotic	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								2
	Dunnock (Hedge Sparrow)	Exotic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								5
	Fantail, Sth Is	Native	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								1
	Goldfinch	Exotic	0	2	1	0	0	0	3	8	5	0	0	0	0	0	0	0	0	0	8	3	10	1	0	1	0	0	0								115
	Gull, Southern Black-backed	Native	0	3	0	1	0	0	0	0	0	1	0	1	2	3	3	2	1	0	3	1	0	1	1	2	0	0	1								31
	Harrier, Australasian	Native	0	2	4	2	0	2	0	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	3	2	0	0	0								24
	Magpie, Australian (magpie sp.)	Exotic	1	1	0	0	1	0	0	0	3	2	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	1								24
	Oystercatcher, Sth Is Pied	Native	1	5	2	0	0	0	2	2	0	4	0	0	0	0	0	0	21	0	0	0	1	0	0	0	1	0	0								41
	Pigeon, Feral	Exotic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0								20
	Plover, Spur-winged	Native	0	0	0	0	0	0	6	0	0	2	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0								19
	Redpoll	Exotic	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	2	0	30	0	0	0	1	4	0								82
	Shelduck, Paradise	Native	0	0	0	0	0	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								10
	Silvereye	Native	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								2
	Skylark	Exotic	6	7	6	4	6	4	4	2	3	3	7	4	3	3	3	3	6	2	3	1	4	3	2	5	2	3	6								191
	Starling	Exotic	0	0	2	0	0	9	0	1	0	1	2	0	0	0	0	0	0	0	0	6	0	4	0	2	0	0	0								44
	Swallow, Welcome	Native	0	0	0	0	0	0	1	0	0	0	0	0	4	0	0	2	0	0	0	0	0	0	0	2	0	0	0								11
	Thrush, Song	Exotic	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0								16
	Turkey	Exotic	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								4
	Warbler, Grey	Native	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								2
	Yellowhammer	Exotic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0								22
	Summer species count		**3**	**6**	**5**	**3**	**2**	**4**	**8**	**6**	**4**	**6**	**4**	**3**	**3**	**5**	**3**	**4**	**3**	**3**	**7**	**7**	**4**	**4**	**3**	**8**	**4**	**3**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**22**
	Native species count		**1**	**3**	**2**	**2**	**0**	**2**	**4**	**2**	**1**	**3**	**0**	**2**	**2**	**2**	**1**	**3**	**2**	**1**	**2**	**3**	**0**	**1**	**2**	**5**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**
Autumn	Bellbird, (mainland)	Native				0	0	0				0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	2	1	4	0	0	0	0	7
	Blackbird	Exotic				0	0	0				0		0	0	0	0	0	0	0	0	0	2	0	0			0	0	1	0	1	0	0	0	0	5
	Chaffinch	Exotic				0	0	0				0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	6
	Dunnock (Hedge Sparrow)	Exotic				0	0	0				0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	3
	Falcon, NZ	Native				0	0	1				0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	1	0	0	0	0	2
	Fantail, Sth Is	Native				0	0	0				0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	4	0	0	0	0	0	4
	Goldfinch	Exotic				0	6	27				2		0	0	1	1	0	2	1	4	2	8	4	4			1	0	0	4	4	1	10	2	0	126
	Greenfinch	Exotic				0	0	1				0		0	0	0	0	0	0	0	1	0	0	0	1			0	0	0	0	0	0	0	0	0	3
	Gull, Southern Black-backed	Native				0	0	0				0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	1
	Harrier, Australasian	Native				0	0	0				0		0	0	0	0	0	1	0	1	0	0	1	1			1	1	0	0	0	0	0	0	1	11
	Magpie, Australian (magpie sp.)	Exotic				2	1	1				2		2	0	1	2	1	0	0	0	0	0	0	1			0	2	0	0	0	1	2	1	21	62
	Plover, Spur-winged	Native				0	0	0				2		0	0	1	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	19
	Redpoll	Exotic				0	0	0				0		0	1	2	0	0	0	0	0	0	2	2	0			2	1	9	0	6	2	1	0	2	101
	Shelduck, Paradise	Native				0	0	0				0		0	0	2	6	0	0	0	0	2	0	0	0			0	0	0	0	0	0	0	0	0	27
	Silvereye	Native				0	0	0				0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	8	4	3	0	0	0	0	17
	Skylark	Exotic				6	11	8				4		0	2	0	1	0	2	2	0	0	2	1	2			1	2	0	0	0	3	4	0	0	86
	Starling	Exotic				0	0	0				1		0	0	0	0	0	0	0	2	1	0	0	0			0	0	0	0	0	0	15	0	53	113
	Turkey	Exotic				0	0	0				0		0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0	0	0	0	4
	Warbler, Grey	Native				0	0	0				0		0	0	0	0	0	0	0	0	1	0	0	0			0	0	2	2	1	0	0	0	0	17
	Yellowhammer	Exotic				0	0	0				0		0	0	0	0	0	0	0	0	0	0	0	0			1	0	1	2	0	0	0	1	0	12
	Autumn species count		**0**	**0**	**0**	**2**	**3**	**5**	**0**	**0**	**0**	**5**	**0**	**1**	**2**	**5**	**4**	**1**	**3**	**2**	**4**	**4**	**4**	**4**	**5**	**0**	**0**	**5**	**4**	**6**	**6**	**7**	**4**	**5**	**3**	**4**	**20**
	Native species count		**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**1**	**0**	**1**	**0**	**1**	**2**	**0**	**1**	**1**	**0**	**0**	**1**	**1**	**3**	**3**	**4**	**0**	**0**	**0**	**1**	**8**
	Total species count		**3**	**6**	**5**	**5**	**5**	**9**	**8**	**6**	**4**	**11**	**4**	**4**	**5**	**10**	**7**	**5**	**6**	**5**	**11**	**11**	**8**	**8**	**8**	**8**	**4**	**8**	**8**	**6**	**6**	**7**	**4**	**5**	**3**	**4**	**25**
	Total native species count		**1**	**3**	**2**	**2**	**0**	**3**	**4**	**2**	**1**	**3**	**0**	**2**	**2**	**4**	**2**	**3**	**2**	**1**	**3**	**5**	**0**	**2**	**2**	**5**	**0**	**1**	**2**	**3**	**3**	**4**	**0**	**0**	**0**	**1**	**11**

Appendix D

Passive acoustic monitoring data

Table D.4. Summary of AR4 acoustic recorder durations during surveys. Survey 1 was Nov/Dec 2025, survey 2 was March-April 2026.

Survey	Recorder ID	Start time	Stop time	Recording duration	Duration (minutes)
Survey 1	S01	12/12/2025 11:59	17/12/2025 13:01	121 h 02 min	7,262
Survey 1	S02	12/12/2025 10:38	17/12/2025 12:09	121 h 31 min	7,291
Survey 1	S03	12/12/2025 12:00	17/12/2025 12:46	120 h 46 min	7,246
Survey 1	S04	12/12/2025 12:20	17/12/2025 04:31	112 h 11 min	6,731
Survey 1	S05	12/12/2025 10:17	17/12/2025 00:45	110 h 28 min	6,628
Survey 1	S06	12/12/2025 11:12	17/12/2025 14:15	123 h 03 min	7,383
Survey 1	S07	12/12/2025 11:10	17/12/2025 14:00	122 h 50 min	7,370
Survey 1	S08	26/11/2025 14:03	02/12/2025 08:31	138 h 28 min	8,308
Survey 1	S09	26/11/2025 14:05	01/12/2025 18:22	124 h 17 min	7,457
Survey 1	S10	26/11/2025 09:07	01/12/2025 03:09	114 h 02 min	6,842
Survey 1	S11	26/11/2025 08:33	02/12/2025 03:03	138 h 30 min	8,310
Survey 1	S12	26/11/2025 09:28	30/11/2025 17:01	103 h 33 min	6,213
Survey 1	S13	04/12/2025 11:24	07/12/2025 23:55	84 h 31 min	5,071
Survey 1	S14	04/12/2025 11:16	04/12/2025 11:43	0 h 27 min	27
Survey 1	S15	11/12/2025 13:23	17/12/2025 10:16	140 h 53 min	8,453
Survey 1	S17	04/12/2025 12:06	09/12/2025 12:37	120 h 31 min	7,231
Survey 1	S18	11/12/2025 12:50	17/12/2025 09:46	140 h 56 min	8,456
Survey 1	S19	04/12/2025 11:43	09/12/2025 12:16	120 h 33 min	7,233
Survey 1	S21	26/11/2025 13:23	01/12/2025 16:55	123 h 32 min	7,412
Survey 1	S22	26/11/2025 13:27	01/12/2025 18:16	124 h 49 min	7,489
Survey 1	S23	26/11/2025 11:39	01/12/2025 01:21	109 h 42 min	6,582
Survey 1	S24	26/11/2025 11:50	02/12/2025 06:16	138 h 26 min	8,306
Survey 1	S25	26/11/2025 12:06	01/12/2025 15:22	123 h 16 min	7,396
Survey 1	S27	26/11/2025 12:50	01/12/2025 14:53	122 h 03 min	7,323
Survey 1	S28	26/11/2025 12:26	02/12/2025 06:57	138 h 31 min	8,311
Survey 1	S29	26/11/2025 11:10	30/11/2025 20:06	104 h 56 min	6,296
Survey 1	S30	26/11/2025 10:57	02/12/2025 05:17	138 h 20 min	8,300
Survey 1	S31	26/11/2025 10:02	02/12/2025 04:18	138 h 16 min	8,296
Survey 1	S32	26/11/2025 12:29	30/11/2025 23:59	107 h 30 min	6,450
Survey 1	S33	04/12/2025 09:09	09/12/2025 14:30	125 h 21 min	7,521
Survey 1	S34	04/12/2025 08:31	09/12/2025 07:34	119 h 03 min	7,143
Survey 1	S35	04/12/2025 10:14	08/12/2025 11:45	97 h 31 min	5,851
Survey 1	S36	04/12/2025 10:29	09/12/2025 11:31	121 h 02 min	7,262
Survey 1	S37	04/12/2025 10:02	09/12/2025 11:49	121 h 47 min	7,307
Survey 1	S38	26/11/2025 15:25	02/12/2025 20:01	148 h 36 min	8,916
Survey 1	S39	26/11/2025 15:25	02/12/2025 09:58	138 h 33 min	8,313
Survey 1	S40	04/12/2025 09:55	04/12/2025 10:24	0 h 29 min	29
Survey 1	S41	04/12/2025 08:37	09/12/2025 14:38	126 h 01 min	7,561
Survey 1	S42	04/12/2025 08:52	09/12/2025 14:25	125 h 33 min	7,533
Survey 1	S43	12/12/2025 14:36	17/12/2025 10:52	116 h 16 min	6,976
Survey 1	S44	12/12/2025 14:10	17/12/2025 07:10	112 h 60 min	6,780
Survey 1	S45	12/12/2025 13:50	17/12/2025 04:49	110 h 59 min	6,659

Survey 1	S46	12/12/2025 14:31	15/12/2025 09:31	67 h 00 min	4,020
Survey 1	S47	12/12/2025 14:02	17/12/2025 11:17	117 h 15 min	7,035
Survey 1	S48	04/12/2025 07:51	09/12/2025 13:37	125 h 46 min	7,546
Survey 1	S49	04/12/2025 07:35	09/12/2025 13:22	125 h 47 min	7,547
Survey 1	S50	04/12/2025 08:05	09/12/2025 14:06	126 h 01 min	7,561
Survey 1	S51	04/12/2025 09:24	09/12/2025 15:15	125 h 51 min	7,551
Survey 1	S52	04/12/2025 10:47	09/12/2025 11:18	120 h 31 min	7,231
Survey 1	S53	04/12/2025 11:01	09/12/2025 11:18	120 h 17 min	7,217
Survey 1	S54	04/12/2025 07:29	08/12/2025 23:59	112 h 30 min	6,750
Survey 1	S55	04/12/2025 07:19	09/12/2025 13:06	125 h 47 min	7,547
Survey 1	S56	26/11/2025 10:02	02/12/2025 04:30	138 h 28 min	8,308
Survey 1	S57	26/11/2025 10:11	02/12/2025 01:10	134 h 59 min	8,099
Survey 1	S59	12/12/2025 10:47	17/12/2025 12:18	121 h 31 min	7,291
Survey 2	S01	30/03/2026 09:54	05/04/2026 18:15	152 h 21 min	9,141
Survey 2	S02	31/03/2026 11:44	06/04/2026 06:11	138 h 27 min	8,307
Survey 2	S03	31/03/2026 13:01	06/04/2026 07:30	138 h 29 min	8,309
Survey 2	S04	31/03/2026 14:01	02/04/2026 15:23	49 h 22 min	2,962
Survey 2	S05	31/03/2026 11:28	07/04/2026 12:00	168 h 32 min	10,112
Survey 2	S06	31/03/2026 12:25	03/04/2026 08:40	68 h 15 min	4,095
Survey 2	S07	31/03/2026 11:58	06/04/2026 13:19	145 h 21 min	8,721
Survey 2	S13	01/04/2026 08:02	04/04/2026 09:17	73 h 15 min	4,395
Survey 2	S14	01/04/2026 08:30	07/04/2026 02:58	138 h 28 min	8,308
Survey 2	S15	01/04/2026 10:10	07/04/2026 04:32	138 h 22 min	8,302
Survey 2	S17	30/03/2026 07:13	05/04/2026 01:01	137 h 48 min	8,268
Survey 2	S18	01/04/2026 11:31	04/04/2026 09:46	70 h 15 min	4,215
Survey 2	S19	01/04/2026 09:36	06/04/2026 00:21	110 h 45 min	6,645
Survey 2	S21	09/04/2026 09:15	12/04/2026 13:49	76 h 34 min	4,594
Survey 2	S22	09/04/2026 09:36	12/04/2026 03:28	65 h 52 min	3,952
Survey 2	S23	09/04/2026 10:26	12/04/2026 23:15	84 h 49 min	5,089
Survey 2	S24	09/04/2026 10:39	12/04/2026 22:45	84 h 06 min	5,046
Survey 2	S25	09/04/2026 10:06	12/04/2026 14:36	76 h 30 min	4,590
Survey 2	S27	09/04/2026 14:35	13/04/2026 04:21	85 h 46 min	5,146
Survey 2	S28	09/04/2026 14:22	10/04/2026 22:08	31 h 46 min	1,906
Survey 2	S30	09/04/2026 11:00	14/04/2026 18:32	127 h 32 min	7,652
Survey 2	S31	09/04/2026 12:33	14/04/2026 21:20	128 h 47 min	7,727
Survey 2	S32	09/04/2026 12:19	11/04/2026 07:59	43 h 40 min	2,620
Survey 2	S35	01/04/2026 09:00	02/04/2026 20:22	35 h 22 min	2,122
Survey 2	S36	01/04/2026 13:50	05/04/2026 05:51	88 h 01 min	5,281
Survey 2	S37	01/04/2026 08:48	04/04/2026 23:04	86 h 16 min	5,176
Survey 2	S41	10/04/2026 10:09	11/04/2026 16:32	30 h 23 min	1,823
Survey 2	S43	30/03/2026 09:58	05/04/2026 14:02	148 h 04 min	8,884
Survey 2	S44	30/03/2026 08:29	05/04/2026 06:45	142 h 16 min	8,536
Survey 2	S45	30/03/2026 10:06	06/04/2026 09:34	167 h 28 min	10,048
Survey 2	S46	31/03/2026 15:35	05/04/2026 23:52	128 h 17 min	7,697
Survey 2	S47	31/03/2026 15:11	04/04/2026 19:31	100 h 20 min	6,020
Survey 2	S48	10/04/2026 11:08	15/04/2026 19:15	128 h 07 min	7,687

Survey 2	S49	10/04/2026 11:36	14/04/2026 15:30	99 h 54 min	5,994
Survey 2	S50	09/04/2026 15:42	12/04/2026 05:45	62 h 03 min	3,723
Survey 2	S51	01/04/2026 14:31	05/04/2026 11:21	92 h 50 min	5,570
Survey 2	S52	01/04/2026 08:29	07/04/2026 02:57	138 h 28 min	8,308
Survey 2	S53	01/04/2026 14:02	04/04/2026 00:34	58 h 32 min	3,512
Survey 2	S54	10/04/2026 10:49	14/04/2026 00:51	86 h 02 min	5,162
Survey 2	S57	09/04/2026 13:37	15/04/2026 00:39	131 h 02 min	7,862
Survey 2	S59	31/03/2026 12:45	06/04/2026 06:31	137 h 46 min	8,266
Survey 2	S63	01/04/2026 13:26	05/04/2026 17:15	99 h 49 min	5,989
Survey 2	S64	01/04/2026 12:50	05/04/2026 16:30	99 h 40 min	5,980
Survey 2	S65	09/04/2026 14:54	13/04/2026 05:09	86 h 15 min	5,175
Survey 2	S66	01/04/2026 13:13	07/04/2026 07:43	138 h 30 min	8,310
Survey 2	S60	09/04/2026 09:36	15/04/2026 04:04	138 h 28 min	8,308
Survey 2	S61	09/04/2026 12:01	13/04/2026 04:01	88 h 00 min	5,280
Survey 2	S62	09/04/2026 11:01	14/04/2026 04:33	113 h 32 min	6,812
Total	**103**			**11414 h 14 min**	**684,854 m**

Table D.5. Summary of species detected by AR4s, number of locations detected and total number of detections (i.e. songs). Note that for some species (e.g. bellbird, brown creeper) differences may be due to changes in recorder locations, e.g. Cranky Jim's survey stations were only used in the Autumn survey.

Species (English | Māori)	Native/Exotic	Spring AR4s Detected	Spring Total Detections	Autumn AR4s Detected	Autumn Total Detections	Combined Total Detections
Australasian Pipit | Pīhoihoi	Native	13	72	2	10	82
Australian Magpie | Makipai	Exotic	32	2,832	44	4,623	7,455
Banded Dotterel | Tūturiwhatu	Native	6	1,337			1,337
Bellbird | Korimako	Native			4	1,466	1,466
Black Shag | Kawau	Native	2	2			2
Black-fronted Dotterel | Tūturiwhatu	Native	4	4			4
Brown Creeper | Pīpipi	Native			2	27	27
California Quail | Koroā	Exotic	8	204	4	155	359
Canada Goose | Kuihi	Exotic	20	257			257
Chaffinch | Pīnati	Exotic	36	39,069	13	53	39,122
Coot	Native	10	19	25	94	113
Common Starling | Tāringi	Exotic	18	742	17	1,733	2,475
Dunnock | Tātaihore	Exotic	46	28,115	48	32,050	60,165
Eurasian Blackbird | Manu pango	Exotic	34	42,409	35	1,643	44,052
European Goldfinch | Kōwhiti	Exotic	47	20,785	48	10,046	30,831
European Greenfinch | Pākura-kākāriki	Exotic	46	10,804	41	535	11,339
Eurasian Skylark | Kairaka	Exotic	49	736,174	43	2,184	738,358
Fernbird | Mātātā	Native			1	2	2
Grey Warbler | Riroriro	Native	17	966	14	335	1,301
House Sparrow | Tiu	Exotic	12	2,205	16	108	2,313
Lesser Redpoll | Pātītī	Exotic	32	8,448	25	82	8,530
Little Owl | Ruru nohinohi	Exotic	8	8	26	52	60
Mallard | Rakiraki	Exotic	25	213	34	292	505
Morepork | Ruru	Native	1	1	2	2	3
New Zealand Fantail | Pīwakawaka	Native	4	125	6	487	612

Paradise Shelduck | Pūtangitangi	Native	14	176	29	1,434	1,610
Pied Stilt | Poaka	Native	24	413	2	2	415
Pūkeko	Native			1	2	2
Silvereye | Tauhou	Native	31	6,954	30	16,430	23,384
Song Thrush | Tātai	Exotic	37	10,986	47	1,404	12,390
South Island Pied Oystercatcher | Tōrea	Native	39	1,372	2	2	1,374
Southern Black-backed Gull | Karoro	Native	18	117	3	6	123
Spur-winged Plover	Native	32	1,840	40	1,377	3,217
Swamp Harrier | Kāhu	Native	23	102	3	3	105
Tomtit | Miromiro	Native			4	22	22
Tūī	Native			3	125	125
Welcome Swallow | Warou	Native	9	51			51
Wild Turkey	Exotic			14	328	328
Yellowhammer | Hama kōwhai	Exotic	43	127,130	32	189	127,319
Total		**32**	**1,043,932**	**34**	**77,303**	**1,121,235**

Table D.6. Recording information for each survey station, including location, category (MP4 project area or restoration site), primary and secondary ecosystem type, and recording information (duration, species detected etc).

Site	Location	Sub-Location	Category	Primary Ecosystem	Secondary Ecosystem	Survey 1 (Spring) Start	End	Rec. Days	Total Detections	Unique Species	Native Species	Survey 2 (Autumn) Start	End	Rec. Days	Total Detections	Unique Species	Native Species	Total Unique Species	Native Species
S01	MEAA	MEAA	Restoration	Tussock	Exotic Grassland	12/12/2025	17/12/2025	6	35,174	13	3	01/04/2026	05/04/2026	5	311	10	1	17	4
S02	MEAA	MEAA	Restoration	Shrubland	Exotic Grassland	12/12/2025	17/12/2025	6	28,809	14	3	31/03/2026	05/04/2026	6	1,185	12	3	16	5
S03	MEAA	MEAA	Restoration	Shrubland	Exotic Grassland	12/12/2025	17/12/2025	6	45,363	16	4	31/03/2026	05/04/2026	6	2,200	13	3	18	5
S04	MEAA	MEAA	Restoration	Shrubland	Exotic Grassland	12/12/2025	17/12/2025	6	30,038	18	7	31/03/2026	02/04/2026	3	1,022	15	3	21	8
S05	MEAA	MEAA	Restoration	Exotic Grassland	Riparian	13/12/2025	16/12/2025	4	11,919	18	5	31/03/2026	08/04/2026	9	1,867	15	4	20	6
S06	MEAA	MEAA	Restoration	Riparian	Exotic Grassland	12/12/2025	17/12/2025	6	40,921	18	4	31/03/2026	03/04/2026	4	3,019	14	3	19	4
S07	MEAA	MEAA	Restoration	Riparian	Exotic Grassland	12/12/2025	17/12/2025	6	22,874	21	8	31/03/2026	06/04/2026	7	2,623	14	4	22	8
S08	Camp Creek	Camp Creek	MP4 Footprint	Riparian	Exotic Grassland	26/11/2025	02/12/2025	7	18,287	19	6							19	6
S09	Camp Creek	Camp Creek	MP4 Footprint	Riparian	Shrubland	26/11/2025	01/12/2025	6	13,099	21	7							21	7
S10	Coal Creek	Coal Creek	MP4 Footprint	Exotic Grassland	Tussock	26/11/2025	01/12/2025	6	14,667	22	8							22	8
S11	Coal Creek	Coal Creek	MP4 Footprint	Shrubland	Rock Tor	26/11/2025	01/12/2025	6	22,028	22	8							22	8
S12	Coal Creek	Coal Creek	MP4 Footprint	Tussock	Exotic Grassland	26/11/2025	30/11/2025	5	17,148	17	6							17	6
S13	Back Road WRS	Back Road WRS	MP4 Footprint	Tussock	Exotic Grassland	04/12/2025	09/12/2025	6	15,035	16	5	01/04/2026	04/04/2026	4	386	13	2	20	6
S14	Back Road WRS	Back Road WRS	MP4 Footprint	Tussock	Exotic Grassland	04/12/2025	04/12/2025	1	66	1	0	01/04/2026	07/04/2026	7	369	14	3	14	3
S15	Back Road WRS	Back Road WRS	MP4 Footprint	Tussock	Exotic Grassland	11/12/2025	17/12/2025	6	13,091	13	3	01/04/2026	06/04/2026	6	697	13	3	17	5
S17	Back Road WRS	Back Road WRS	MP4 Footprint	Tussock	Exotic Grassland	04/12/2025	09/12/2025	6	25,377	16	5	01/04/2026	04/04/2026	4	325	15	4	20	6
S18	Back Road WRS	Back Road WRS	MP4 Footprint	Tussock	Exotic Grassland	13/12/2025	17/12/2025	5	24,660	13	4	01/04/2026	04/04/2026	4	274	11	3	17	6
S19	Back Road WRS	Back Road WRS	MP4 Footprint	Tussock	Shrubland	04/12/2025	09/12/2025	6	10,192	15	4	01/04/2026	05/04/2026	5	556	17	6	21	7
S21	Coronation North	Coronation WRS	MP4 Footprint	Exotic Grassland	Felled Pine	26/11/2025	01/12/2025	6	8,181	16	5	09/04/2026	12/04/2026	4	401	14	3	20	7
S22	Coronation North	Coronation WRS	MP4 Footprint	Exotic Grassland	Tussock	27/11/2025	01/12/2025	5	6,140	17	7	09/04/2026	11/04/2026	3	1,323	14	3	21	8
S23	Coronation North	Coronation North Backfill	MP4 Footprint	Tussock	Exotic Grassland	26/11/2025	01/12/2025	6	23,507	13	4	09/04/2026	12/04/2026	4	839	12	3	17	6
S24	Coronation North	Coronation North Backfill	MP4 Footprint	Tussock	Exotic Grassland	26/11/2025	02/12/2025	7	12,901	16	2	09/04/2026	12/04/2026	4	1,754	17	5	22	6
S25	Coronation North	Coronation North Pit	MP4 Footprint	Tussock		26/11/2025	01/12/2025	6	16,503	11	4	09/04/2026	12/04/2026	4	161	12	4	18	7
S27	Coronation North	Coronation North Pit	MP4 Footprint	Tussock	Exotic Grassland	26/11/2025	01/12/2025	6	26,661	14	3	09/04/2026	13/04/2026	5	288	13	3	20	6
S28	Coronation North	Coronation North Pit	MP4 Footprint	Felled Pine	Tussock	26/11/2025	02/12/2025	7	29,414	15	6	09/04/2026	10/04/2026	2	636	13	2	19	6
S29	Coronation North	Coronation North WRS	MP4 Footprint	Exotic Grassland	Tussock	26/11/2025	30/11/2025	5	19,103	13	7							13	7

S30	Coronation North	Coronation North WRS	MP4 Footprint	Exotic Grassland	Tussock	26/11/2025	02/12/2025	7	53,223	11	5	09/04/2026	14/04/2026	6	744	13	3	19	7
S31	Coronation North	Trimbells WRS	MP4 Footprint	Tussock	Exotic Grassland	26/11/2025	01/12/2025	6	12,235	13	5	09/04/2026	14/04/2026	6	525	10	2	16	6
S32	Coronation North	Trimbells WRS	MP4 Footprint	Tussock	Exotic Grassland	26/11/2025	03/12/2025	6	15,058	13	5	10/04/2026	11/04/2026	2	200	12	4	18	7
S33	Central Mining Area	Frasers West WRS	MP4 Footprint	Exotic Grassland	Mine - Disturbed	04/12/2025	09/12/2025	6	17,661	14	5							14	5
S34	Central Mining Area	Frasers West WRS	MP4 Footprint	Exotic Grassland	Mine - Disturbed	04/12/2025	09/12/2025	6	13,644	14	5							14	5
S35	Central Mining Area	Frasers South Backfill	MP4 Footprint	Exotic Grassland	Mine - Disturbed	04/12/2025	09/12/2025	6	23,100	17	7	01/04/2026	02/04/2026	2	385	10	3	18	8
S36	Central Mining Area	Frasers South Backfill	MP4 Footprint	Exotic Grassland	Mine - Disturbed	04/12/2025	09/12/2025	6	36,439	13	5	01/04/2026	05/04/2026	5	2,640	17	5	21	8
S37	Central Mining Area	Frasers South Backfill	MP4 Footprint	Exotic Grassland	Mine - Disturbed	04/12/2025	09/12/2025	6	45,518	19	9	01/04/2026	04/04/2026	4	1,562	14	2	23	9
S38	Central Mining Area	Frasers East WRS	Existing Mining Area	Exotic Grassland	Mine - Disturbed	26/11/2025	02/12/2025	6	38,427	19	7							19	7
S39	Central Mining Area	Frasers East WRS	Existing Mining Area	Exotic Grassland	Tussock	26/11/2025	02/12/2025	7	14,549	22	8							22	8
S40	Central Mining Area	Frasers East WRS	Existing Mining Area	Exotic Grassland		04/12/2025	04/12/2025	1	22	1	0							1	0
S41	Central Mining Area	Frasers West WRS	MP4 Footprint	Exotic Grassland		04/12/2025	09/12/2025	6	20,112	14	6	10/04/2026	11/04/2026	2	214	12	3	17	8
S42	Central Mining Area	Frasers West WRS	MP4 Footprint	Exotic Grassland		04/12/2025	09/12/2025	6	37,265	15	6							15	6
S43	Golden Bar	Golden Bar WRS	MP4 Footprint	Exotic Grassland	Tussock	12/12/2025	17/12/2025	6	36,178	12	3	01/04/2026	05/04/2026	5	623	13	3	17	5
S44	Golden Bar	Golden Bar WRS	MP4 Footprint	Exotic Grassland	Tussock	12/12/2025	17/12/2025	6	28,355	15	3	01/04/2026	05/04/2026	5	209	11	2	18	4
S45	Golden Bar	Golden Bar Pit	MP4 Footprint	Exotic Grassland	Tussock	12/12/2025	17/12/2025	6	26,066	13	5	31/03/2026	06/04/2026	7	1,603	14	4	18	6
S46	Golden Bar	Golden Bar WRS	MP4 Footprint	Tussock	Exotic Grassland	12/12/2025	15/12/2025	4	18,842	10	2	01/04/2026	05/04/2026	5	282	11	2	15	4
S47	Golden Bar	Golden Bar WRS	MP4 Footprint	Exotic Grassland	Tussock	12/12/2025	17/12/2025	6	9,234	13	4	31/03/2026	04/04/2026	5	804	12	3	17	5
S48	Central Mining Area	Golden Point Backfill	MP4 Footprint	Exotic Grassland	Rehabilitated Mine Workings	04/12/2025	09/12/2025	6	28,742	19	7	10/04/2026	15/04/2026	6	1,853	19	5	26	10
S49	Central Mining Area	Golden Point Backfill	MP4 Footprint	Exotic Grassland	Rehabilitated Mine Workings	04/12/2025	09/12/2025	6	9,648	15	4	10/04/2026	14/04/2026	5	919	9	2	17	6
S50	Central Mining Area	Innes Mill Pit	MP4 Footprint	Exotic Grassland	Mine - Disturbed	04/12/2025	09/12/2025	6	9,804	17	6	09/04/2026	12/04/2026	4	1,458	12	4	19	7
S51	Central Mining Area	Frasers West Pit	MP4 Footprint	Exotic Grassland	Mine - Disturbed	04/12/2025	09/12/2025	6	11,927	16	5	01/04/2026	05/04/2026	5	1,245	18	5	21	7
S52	Central Mining Area	Macraes Road Realignment Stage 2	MP4 Footprint	Exotic Grassland	Tussock	04/12/2025	07/12/2025	4	6,748	17	7	01/04/2026	06/04/2026	6	7,851	18	5	23	9

S53	Central Mining Area	Innes Mill Pit extension (Stages 11-13)	MP4 Footprint	Exotic Grassland	Tussock			01/04/2026	04/04/2026	4	622	16	4	16	4
S54	Central Mining Area	Innes Mill Backfill	MP4 Footprint	Exotic Grassland	Tussock			10/04/2026	13/04/2026	4	463	15	4	15	4
S57	Coronation North	Trimbells WRS	MP4 Footprint	Shrubland	Tussock			09/04/2026	14/04/2026	6	2,476	10	2	10	2
S59	MEEA	MEEA	Restoration	Tussock	Exotic Grassland			31/03/2026	05/04/2026	6	349	11	3	11	3
S60	Cranky Jim's Covenant	Cranky Jim's Covenant	Restoration	Shrubland	Exotic Grassland			09/04/2026	14/04/2026	6	13,786	20	8	20	8
S61	Cranky Jim's Covenant	Cranky Jim's Covenant	Restoration	Shrubland	Exotic Grassland			09/04/2026	13/04/2026	5	3,716	17	7	17	7
S62	Cranky Jim's Covenant	Cranky Jim's Covenant	Restoration	Shrubland	Exotic Grassland			09/04/2026	13/04/2026	5	8,037	24	11	24	11
S63	Golden Bar Haul Road	Golden Bar Haul Road	MP4 Footprint	Exotic Grassland	Tussock			01/04/2026	05/04/2026	5	756	12	2	12	2
S64	Golden Bar Haul Road	Golden Bar Haul Road	MP4 Footprint	Exotic Grassland	Tussock			02/04/2026	05/04/2026	4	821	13	4	13	4
S65	Coronation North	Coronation North Pit Disturbance	MP4 Footprint	Tussock	Riparian - Freshwater Herbaceous			09/04/2026	13/04/2026	5	1,755	12	4	12	4
S66	Golden Bar Haul Road	Golden Bar Haul Road	MP4 Footprint	Exotic Grassland	Tussock			01/04/2026	07/04/2026	7	1,169	14	2	14	2
Total						**279**	**1,043,955**			**233**	**77,303**			39	22

Table D.7. Passive acoustic monitoring avifauna survey. Individual ARU devices are labelled S01-S66, and the number within each cell refers to the number of calls recorded for that species (row) at that station. See Table D.6 for further details about each survey station. Note that the table is continued on the following pages.

Species (English | Māori)	Native/Exotic	S01		S02		S03		S04		S05		S06	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native	-	-	-	-	-	-	-	-	-	-	-	-
Australian Magpie | Makipai	Exotic	9	24	1,208	16	21	11	-	10	5	33	10	14
Banded Dotterel | Tūturiwhatu	Native	-		-		-		-		-		-	
Bellbird | Korimako	Native		-		-		-		-		-		-
Black Shag | Kawau	Native	-		-		-		-		-		-	
Black-fronted Dotterel | Tūturiwhatu	Native	-		-		-		-		-		-	
Brown Creeper | Pīpipi	Native		-		-		-		-		-		-
California Quail | Koroā	Exotic	-	-	-	-	-	-	12	-	-	-	48	9
Canada Goose | Kuihi	Exotic	3		-		-		-		-		-	
Chaffinch | Pīnati	Exotic	61	-	958	-	3,863	-	8,046	1	1,148	-	12,673	-
Coot	Native	-	-	-	-	2	-	-	-	-	-	-	-
Common Starling | Tāringi	Exotic	-	-	28	2	21	29	-	-	1	-	1	-
Dunnock | Tātaihore	Exotic	4	4	76	1,047	4,078	1,948	68	921	866	1,325	2,821	2,301
Eurasian Blackbird | Manu pango	Exotic	45	1	144	1	9,358	27	1,689	1	1,172	166	1,528	57
European Goldfinch | Kōwhiti	Exotic	10	21	11	26	96	4	59	41	17	14	18	6
European Greenfinch | Pākura-kākāriki	Exotic	3	3	85	6	21	5	23	1	8	2	281	7
Eurasian Skylark | Kairaka	Exotic	34,969	29	19,409	38	1,343	3	15,839	1	4,623	44	2,265	-
Fernbird | Mātātā	Native		-		-		-		-		-		-
Grey Warbler | Riroriro	Native	-	-	-	-	164	2	13	12	8	46	230	74
House Sparrow | Tiu	Exotic	-	-	-	-	-	-	-	-	149	-	619	17
Lesser Redpoll | Pātītī	Exotic	1	-	4	-	207	-	28	1	45	2	1,600	4
Little Owl | Ruru nohinohi	Exotic	-	8	-	-	-	-	-	-	1	2	-	-
Mallard | Rakiraki	Exotic	-	-	-	-	1	-	2	3	-	2	9	-
Morepork | Ruru	Native	-	-	-	1	-	-	-	-	-	-	-	-
New Zealand Fantail | Pīwakawaka	Native	-	-	-	-	-	-	-	-	-	-	-	-
Paradise Shelduck | Pūtangitangi	Native	-	-	-	-	-	-	-	-	-	16	-	-
Pied Stilt | Poaka	Native	-	-	-	-	-	-	3	-	4	-	-	-
Pūkeko	Native		-		-		-		-		-		-
Silvereye | Tauhou	Native	1	-	243	19	2	1	1	1	18	155	300	262
Song Thrush | Tātai	Exotic	-	3	40	14	156	123	14	4	562	45	3,138	43
South Island Pied Oystercatcher | Tōrea	Native	28	-	4	-	-	-	2	-	4	-	-	-
Southern Black-backed Gull | Karoro	Native	-	-	-	-	-	-	7	-	-	-	-	-
Spur-winged Plover	Native	-	193	-	14	-	20	-	4	1	10	1	5
Swamp Harrier | Kāhu	Native	2	-	-	-	2	-	22	-	-	-	3	-
Tomtit | Miromiro	Native		-		-		-		-		-		-
Tūī	Native		-		-		-		-		-		-
Welcome Swallow | Warou	Native	-		3		-		1		-		-	
Wild Turkey	Exotic		25		-		25		2		-		203
Yellowhammer | Hama kōwhai	Exotic	38	-	6,596	1	26,028	2	4,209	19	3,287	5	15,376	17
Total		**35,174**	**311**	**28,809**	**1,185**	**45,363**	**2,200**	**30,038**	**1,022**	**11,919**	**1,867**	**40,921**	**3,019**

Species (English | Māori)	Native/Exotic	S07		S08		S09		S10		S11		S12	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native	-	-	-		-		2		-		-	
Australian Magpie | Makipai	Exotic	5	4	100		31		43		74		181	
Banded Dotterel | Tūturiwhatu	Native	-		-		-		-		-		-	
Bellbird | Korimako	Native		-										
Black Shag | Kawau	Native	-		-		1		-		-		-	
Black-fronted Dotterel | Tūturiwhatu	Native	1		-		-		1		-		-	
Brown Creeper | Pīpipi	Native		-										
California Quail | Koroā	Exotic	89	-	8		39		-		3		-	
Canada Goose | Kuihi	Exotic	-		-		3		-		-		-	
Chaffinch | Pīnati	Exotic	4,024	4	274		782		9		401		741	
Coot	Native	-	-	-		-		-		-		-	
Common Starling | Tāringi	Exotic	-	-	-		2		1		7		9	
Dunnock | Tātaihore	Exotic	3,517	2,005	1,417		1,410		179		2,951		166	
Eurasian Blackbird | Manu pango	Exotic	8,171	235	6,451		2,939		201		689		48	
European Goldfinch | Kōwhiti	Exotic	126	4	1,093		2,443		846		871		335	
European Greenfinch | Pākura-kākāriki	Exotic	120	1	185		557		30		16		30	
Eurasian Skylark | Kairaka	Exotic	36	-	7		3		6,594		1,013		9,890	
Fernbird | Mātātā	Native		-										
Grey Warbler | Riroriro	Native	166	18	234		1		12		105		-	
House Sparrow | Tiu	Exotic	37	-	2		1,328		1		8		13	
Lesser Redpoll | Pātītī	Exotic	1,600	2	1,220		1,241		7		1,411		-	
Little Owl | Ruru nohinohi	Exotic	-	-	-		-		1		-		-	
Mallard | Rakiraki	Exotic	26	4	3		-		2		2		-	
Morepork | Ruru	Native	-	-	-		-		-		-		-	
New Zealand Fantail | Pīwakawaka	Native	1	-	4		119		-		-		-	
Paradise Shelduck | Pūtangitangi	Native	2	4	-		-		1		3		9	
Pied Stilt | Poaka	Native	-	-	1		-		1		5		1	
Pūkeko	Native		-										
Silvereye | Tauhou	Native	1,549	129	2,029		279		3		2,226		5	
Song Thrush | Tātai	Exotic	437	198	3,676		1,052		98		681		9	
South Island Pied Oystercatcher | Tōrea	Native	-	-	2		3		-		1		31	
Southern Black-backed Gull | Karoro	Native	2	-	-		-		-		-		1	
Spur-winged Plover	Native	17	6	2		287		29		37		233	
Swamp Harrier | Kāhu	Native	7	-	-		4		-		5		-	
Tomtit | Miromiro	Native		-										
Tūī	Native		-										
Welcome Swallow | Warou	Native	-		-		-		1		10		-	
Wild Turkey	Exotic		9										
Yellowhammer | Hama kōwhai	Exotic	2,941	-	1,579		575		6,605		11,509		5,446	
Total		**22,874**	**2,623**	**18,287**	**-**	**13,099**	**-**	**14,667**	**-**	**22,028**	**-**	**17,148**	**-**

Species (English | Māori)	Native/Exotic	S13		S14		S15		S17		S18		S19		S21	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native	-	-	-	-	-	-	-	-	-	-	4	-	-	1
Australian Magpie | Makipai	Exotic	4	20	-	26	33	96	40	160	33	18	-	24	53	43
Banded Dotterel | Tūturiwhatu	Native	-		-		-		-		-		-		-	
Bellbird | Korimako	Native		-		-		-		-		-		-		-
Black Shag | Kawau	Native	-		-		-		-		-		-		-	
Black-fronted Dotterel | Tūturiwhatu	Native	-		-		-		-		-		-		-	
Brown Creeper | Pīpipi	Native		-		-		-		-		-		-		-
California Quail | Koroā	Exotic	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Canada Goose | Kuihi	Exotic	23		-		-		33		-		-		-	
Chaffinch | Pīnati	Exotic	1,925	-	-	-	17	-	18	1	2	-	449	-	938	-
Coot	Native	-	-	-	3	-	-	4	3	-	-	-	3	-	-
Common Starling | Tāringi	Exotic	-	2	-	-	-	-	-	-	-	-	-	-	2	-
Dunnock | Tātaihore	Exotic	247	145	-	1	111	447	192	31	1	20	221	285	2,769	105
Eurasian Blackbird | Manu pango	Exotic	762	103	-	-	684	38	11	2	8	30	316	27	595	2
European Goldfinch | Kōwhiti	Exotic	9	27	-	46	6	24	5	53	5	7	10	76	370	213
European Greenfinch | Pākura-kākāriki	Exotic	1	4	-	4	10	9	10	2	5	-	26	12	34	3
Eurasian Skylark | Kairaka	Exotic	7,039	34	66	167	11,308	16	20,140	21	22,818	19	4,992	19	2,498	9
Fernbird | Mātātā	Native		-		-		-		-		-		-		-
Grey Warbler | Riroriro	Native	1	-	-	-	-	1	-	-	-	-	1	21	-	-
House Sparrow | Tiu	Exotic	-	1	-	1	-	-	10	-	-	-	-	-	-	-
Lesser Redpoll | Pātītī	Exotic	26	-	-	4	31	-	10	2	7	1	25	3	433	1
Little Owl | Ruru nohinohi	Exotic	-	-	-	2	-	-	-	1	-	-	1	-	-	1
Mallard | Rakiraki	Exotic	-	1	-	3	-	4	-	10	-	2	-	1	-	1
Morepork | Ruru	Native	-	-	-	-	-	-	-	-	-	-	-	-	1	-
New Zealand Fantail | Pīwakawaka	Native	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paradise Shelduck | Pūtangitangi	Native	-	-	-	8	-	-	-	-	-	2	-	2	11	-
Pied Stilt | Poaka	Native	48	-	-	-	-	-	137	-	1	-	-	-	-	1
Pūkeko	Native		-		-		-		-		-		-		-
Silvereye | Tauhou	Native	4	4	-	-	2	32	-	3	-	144	7	13	4	11
Song Thrush | Tātai	Exotic	51	7	-	23	6	7	-	4	-	5	544	26	13	8
South Island Pied Oystercatcher | Tōrea	Native	9	-	-	-	8	-	38	-	19	-	-	-	-	-
Southern Black-backed Gull | Karoro	Native	-	-	-	-	-	-	3	1	22	-	-	-	2	-
Spur-winged Plover	Native	-	35	-	80	-	20	38	31	25	26	-	29	-	-
Swamp Harrier | Kāhu	Native	1	-	-	-	3	-	-	-	-	-	12	1	2	-
Tomtit | Miromiro	Native		-		-		-		-		-		-		-
Tūī	Native		-		-		-		-		-		-		-
Welcome Swallow | Warou	Native	-		-		-		-		-		-		-	
Wild Turkey	Exotic		-		-		2		-		-		11		-
Yellowhammer | Hama kōwhai	Exotic	4,885	3	-	1	872	1	4,688	-	1,714	-	3,583	3	456	2
Total		**15,035**	**386**	**66**	**369**	**13,091**	**697**	**25,377**	**325**	**24,660**	**274**	**10,192**	**556**	**8,181**	**401**

Species (English | Māori)	Native/Exotic	S22		S23		S24		S25		S27		S28		S29	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native	1	-	-	-	-	-	2	-	4	-	-	-	1	
Australian Magpie | Makipai	Exotic	67	70	84	270	45	629	-	-	-	46	3	8	12	
Banded Dotterel | Tūturiwhatu	Native	-		9		-		-		-		-		3	
Bellbird | Korimako	Native		-		-		-		-		-		-		
Black Shag | Kawau	Native	1		-		-		-		-		-		-	
Black-fronted Dotterel | Tūturiwhatu	Native	-		-		1		-		-		-		-	
Brown Creeper | Pīpipi	Native		-		-		-		-		-		-		
California Quail | Koroā	Exotic	-	1	-	-	4	-	-	-	-	-	-	-	-	
Canada Goose | Kuihi	Exotic	-		-		20		-		-		1		6	
Chaffinch | Pīnati	Exotic	473	-	24	-	168	-	-	-	481	1	80	-	-	
Coot	Native	-	-	-	10	-	7	-	1	-	3	-	-	2	
Common Starling | Tāringi	Exotic	-	-	1	-	238	10	-	-	2	1	-	2	-	
Dunnock | Tātaihore	Exotic	42	209	33	86	153	660	18	29	58	118	3,048	507	3	
Eurasian Blackbird | Manu pango	Exotic	49	5	-	-	-	3	-	1	5	-	-	1	-	
European Goldfinch | Kōwhiti	Exotic	3,645	934	77	216	358	364	17	26	22	23	20	12	6	
European Greenfinch | Pākura-kākāriki	Exotic	488	3	17	1	375	7	10	-	34	-	14	1	2	
Eurasian Skylark | Kairaka	Exotic	975	10	22,994	88	9,589	12	15,332	76	26,016	81	24,743	22	18,748	
Fernbird | Mātātā	Native		-		-		-		-		2		-		
Grey Warbler | Riroriro	Native	4	1	-	-	-	-	-	-	-	-	-	-	-	
House Sparrow | Tiu	Exotic	-	2	-	-	-	3	-	1	-	-	-	-	-	
Lesser Redpoll | Pātītī	Exotic	24	-	-	-	1	1	-	1	6	-	49	5	-	
Little Owl | Ruru nohinohi	Exotic	-	1	-	1	1	-	-	2	-	2	-	-	-	
Mallard | Rakiraki	Exotic	-	-	2	84	2	7	3	-	2	2	-	5	-	
Morepork | Ruru	Native	-	-	-	-	-	-	-	-	-	-	-	-	-	
New Zealand Fantail | Pīwakawaka	Native	-	-	-	-	-	-	-	-	-	-	-	-	-	
Paradise Shelduck | Pūtangitangi	Native	9	-	-	61	-	11	-	8	-	-	1	70	9	
Pied Stilt | Poaka	Native	-	-	-	-	-	-	29	-	-	-	-	-	35	
Pūkeko	Native		-		-		-		-		-		-		
Silvereye | Tauhou	Native	2	77	-	-	-	7	1	2	-	2	19	1	-	
Song Thrush | Tātai	Exotic	40	3	-	7	1	24	6	12	1	6	-	1	-	
South Island Pied Oystercatcher | Tōrea	Native	1	-	2	-	-	1	11	-	-	-	6	-	186	
Southern Black-backed Gull | Karoro	Native	-	-	-	-	-	-	-	-	1	-	9	-	-	
Spur-winged Plover	Native	-	-	42	14	2	5	-	2	-	-	2	-	90	
Swamp Harrier | Kāhu	Native	3	-	2	-	-	-	-	-	3	-	-	-	-	
Tomtit | Miromiro	Native		1		-		-		-		-		-		
Tūī	Native		-		-		-		-		-		-		
Welcome Swallow | Warou	Native	-		-		-		-		-		31		-	
Wild Turkey	Exotic		-		-		-		-		1		-		
Yellowhammer | Hama kōwhai	Exotic	316	6	220	1	1,943	3	1,074	-	26	-	1,388	1	-	
Total		**6,140**	**1,323**	**23,507**	**839**	**12,901**	**1,754**	**16,503**	**161**	**26,661**	**288**	**29,414**	**636**	**19,103**	**-**

Species (English | Māori)	Native/Exotic	S30		S31		S32		S33		S34		S35		S36	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native	1	-	4	-	42	-	-		-		1	-	-	9
Australian Magpie | Makipai	Exotic	-	35	8	86	13	56	29		-		15	39	18	106
Banded Dotterel | Tūturiwhatu	Native	-		-		-		-		2		-		-	
Bellbird | Korimako	Native		-		-		-						-		-
Black Shag | Kawau	Native	-		-		-		-		-		-		-	
Black-fronted Dotterel | Tūturiwhatu	Native	-		-		-		-		-		-		-	
Brown Creeper | Pīpipi	Native		-		-		-						-		-
California Quail | Koroā	Exotic	-	-	-	-	-	-	-		-		-	-	-	-
Canada Goose | Kuihi	Exotic	-		-		-		1		-		2		1	
Chaffinch | Pīnati	Exotic	-	-	6	-	-	-	401		28		1	-	-	-
Coot	Native	-	5	-	15	-	3	1		2		-	4	-	2
Common Starling | Tāringi	Exotic	8	-	-	-	-	-	-		-		-	-	-	-
Dunnock | Tātaihore	Exotic	46	5	3	80	13	51	63		65		16	4	57	299
Eurasian Blackbird | Manu pango	Exotic	-	1	-	-	-	1	-		14		-	-	-	1
European Goldfinch | Kōwhiti	Exotic	6	311	17	95	8	20	72		26		35	114	43	1,973
European Greenfinch | Pākura-kākāriki	Exotic	1	4	16	2	19	-	43		10		3	35	1	1
Eurasian Skylark | Kairaka	Exotic	53,047	341	11,061	43	14,737	47	16,845		13,150		22,631	112	36,098	153
Fernbird | Mātātā	Native		-		-		-						-		-
Grey Warbler | Riroriro	Native	-	-	-	-	-	-	-		-		-	-	-	-
House Sparrow | Tiu	Exotic	-	-	-	-	-	-	-		-		-	-	-	1
Lesser Redpoll | Pātītī	Exotic	-	1	-	-	1	-	-		7		-	-	-	1
Little Owl | Ruru nohinohi	Exotic	-	2	-	1	-	1	-		-		-	-	-	2
Mallard | Rakiraki	Exotic	-	5	-	6	-	2	18		19		16	13	-	6
Morepork | Ruru	Native	-	-	-	-	-	-	-		-		-	-	-	-
New Zealand Fantail | Pīwakawaka	Native	-	-	-	-	-	-	-		-		-	-	-	-
Paradise Shelduck | Pūtangitangi	Native	-	26	69	192	7	8	-		-		1	6	-	18
Pied Stilt | Poaka	Native	-	-	-	-	-	-	1		12		3	-	31	-
Pūkeko	Native		-		-		-						-		-
Silvereye | Tauhou	Native	-	-	4	-	2	7	-		-		7	-	6	16
Song Thrush | Tātai	Exotic	-	1	6	5	2	3	-		5		4	3	3	6
South Island Pied Oystercatcher | Tōrea	Native	88	-	1	-	5	-	33		73		137	-	76	-
Southern Black-backed Gull | Karoro	Native	4	-	-	-	1	-	-		-		1	-	-	-
Spur-winged Plover	Native	19	7	-	-	-	1	143		231		222	55	35	45
Swamp Harrier | Kāhu	Native	1	-	3	-	-	-	8		-		-	-	-	-
Tomtit | Miromiro	Native		-		-		-						-		-
Tūī	Native		-		-		-						-		-
Welcome Swallow | Warou	Native	-		-		-		-		-		-		1	
Wild Turkey	Exotic		-		-		-						-		-
Yellowhammer | Hama kōwhai	Exotic	2	-	1,037	-	208	-	3		-		5	-	69	1
Total		**53,223**	**744**	**12,235**	**525**	**15,058**	**200**	**17,661**	**-**	**13,644**	**-**	**23,100**	**385**	**36,439**	**2,640**

Species (English | Māori)	Native/Exotic	S37		S38		S39		S40		S41		S42		S43	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native	2	-	-		-		-		-	-	-		-	-
Australian Magpie | Makipai	Exotic	-	2	64		535		-		-	17	-		1	142
Banded Dotterel | Tūturiwhatu	Native	17		-		-		-		1,305		1		-	
Bellbird | Korimako	Native		-								-				-
Black Shag | Kawau	Native	-		-		-		-		-		-		-	
Black-fronted Dotterel | Tūturiwhatu	Native	-		-		-		-		1		-		-	
Brown Creeper | Pīpipi	Native		-								-				-
California Quail | Koroā	Exotic	-	-	-		-		-		-	-	-		-	-
Canada Goose | Kuihi	Exotic	19		112		7		-		-		2		5	
Chaffinch | Pīnati	Exotic	93	2	25		87		-		-	-	-		-	-
Coot	Native	1	1	-		-		-		-	3	4		-	1
Common Starling | Tāringi	Exotic	1	-	-		286		-		-	-	-		-	-
Dunnock | Tātaihore	Exotic	27	181	135		20		-		11	1	44		28	303
Eurasian Blackbird | Manu pango	Exotic	-	2	181		280		-		1	2	4		-	-
European Goldfinch | Kōwhiti	Exotic	119	1,048	1,573		5,284		-		13	62	47		21	27
European Greenfinch | Pākura-kākāriki	Exotic	17	73	20		377		-		7	3	4		8	3
Eurasian Skylark | Kairaka	Exotic	44,938	139	36,121		6,955		22		18,663	76	37,031		35,904	20
Fernbird | Mātātā	Native		-								-				-
Grey Warbler | Riroriro	Native	1	-	-		4		-		-	-	-		-	-
House Sparrow | Tiu	Exotic	-	18	-		1		-		-	-	-		-	-
Lesser Redpoll | Pātītī	Exotic	-	1	1		7		-		-	-	-		1	-
Little Owl | Ruru nohinohi	Exotic	-	-	-		-		-		1	2	1		-	3
Mallard | Rakiraki	Exotic	8	14	49		6		-		3	3	5		-	1
Morepork | Ruru	Native	-	-	-		-		-		-	-	-		-	-
New Zealand Fantail | Pīwakawaka	Native	-	-	-		-		-		-	-	-		-	-
Paradise Shelduck | Pūtangitangi	Native	3	-	46		5		-		-	7	-		-	97
Pied Stilt | Poaka	Native	25	-	9		16		-		6	-	5		-	-
Pūkeko	Native		-								-				-
Silvereye | Tauhou	Native	-	-	27		21		-		-	-	-		-	-
Song Thrush | Tātai	Exotic	24	52	22		26		-		6	1	1		2	2
South Island Pied Oystercatcher | Tōrea	Native	5	-	32		57		-		56	-	74		9	-
Southern Black-backed Gull | Karoro	Native	-	-	2		38		-		3	-	-		1	-
Spur-winged Plover	Native	51	16	3		107		-		36	37	41		1	21
Swamp Harrier | Kāhu	Native	1	-	1		13		-		-	-	1		-	-
Tomtit | Miromiro	Native		-								-				-
Tūī	Native		-								-				-
Welcome Swallow | Warou	Native	-		-		-		-		-		-		-	
Wild Turkey	Exotic		-								-				2
Yellowhammer | Hama kōwhai	Exotic	166	13	4		417		-		-	-	-		197	1
Total		**45,518**	**1,562**	**38,427**	**-**	**14,549**	**-**	**22**	**-**	**20,112**	**214**	**37,265**	**-**	**36,178**	**623**

Species (English | Māori)	Native/Exotic	S44		S45		S46		S47		S48		S49		S50	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native	-	-	-	-	-	-	-	-	7	-	-	-	-	-
Australian Magpie | Makipai	Exotic	-	29	75	391	4	71	9	81	-	1	-	-	-	14
Banded Dotterel | Tūturiwhatu	Native	-		-		-		-		-		-		-	
Bellbird | Korimako	Native		-		-		-		-		-		-		-
Black Shag | Kawau	Native	-		-		-		-		-		-		-	
Black-fronted Dotterel | Tūturiwhatu	Native	-		-		-		-		-		-		-	
Brown Creeper | Pīpipi	Native		-		-		-		-		-		-		-
California Quail | Koroā	Exotic	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Canada Goose | Kuihi	Exotic	6		-		-		7		3		1		-	
Chaffinch | Pīnati	Exotic	6	-	119	-	-	-	-	-	2	-	-	-	254	2
Coot	Native	-	-	-	-	-	-	-	-	-	4	-	3	1	2
Common Starling | Tāringi	Exotic	-	-	-	-	-	-	-	-	10	1,268	115	34	-	-
Dunnock | Tātaihore	Exotic	8	11	600	927	12	77	-	8	443	61	472	556	552	1,065
Eurasian Blackbird | Manu pango	Exotic	10	-	5,672	10	6	-	12	-	3	5	131	22	7	-
European Goldfinch | Kōwhiti	Exotic	50	31	4	15	3	8	7	32	126	297	12	11	956	154
European Greenfinch | Pākura-kākāriki	Exotic	6	1	-	1	1	3	10	2	29	7	3	11	7,590	133
Eurasian Skylark | Kairaka	Exotic	26,160	8	12,322	6	18,811	106	8,846	48	27,556	102	2	-	3	-
Fernbird | Mātātā	Native		-		-		-		-		-		-		-
Grey Warbler | Riroriro	Native	-	-	-	-	-	-	-	-	-	-	2	-	4	-
House Sparrow | Tiu	Exotic	-	-	-	-	-	-	-	-	-	28	20	23	17	3
Lesser Redpoll | Pātītī	Exotic	2	-	34	-	-	1	-	2	4	2	-	-	134	-
Little Owl | Ruru nohinohi	Exotic	1	-	-	4	1	2	-	3	-	2	-	-	-	-
Mallard | Rakiraki	Exotic	1	1	-	9	-	-	3	9	8	27	3	-	2	-
Morepork | Ruru	Native	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Zealand Fantail | Pīwakawaka	Native	-	-	1	1	-	-	-	-	-	-	-	-	-	2
Paradise Shelduck | Pūtangitangi	Native	-	101	-	220	-	10	-	508	-	6	-	-	-	-
Pied Stilt | Poaka	Native	-	-	-	-	-	-	1	-	17	-	-	-	5	-
Pūkeko	Native		-		-		-		-		2		-		-
Silvereye | Tauhou	Native	1	-	9	2	-	-	-	-	3	13	16	-	96	3
Song Thrush | Tātai	Exotic	2	8	-	8	-	2	63	-	15	21	114	253	134	58
South Island Pied Oystercatcher | Tōrea	Native	125	-	47	-	2	-	174	-	1	1	1	-	7	-
Southern Black-backed Gull | Karoro	Native	-	-	10	-	-	-	6	3	-	-	4	-	-	-
Spur-winged Plover	Native	5	16	1	6	-	1	93	107	1	-	-	6	29	19
Swamp Harrier | Kāhu	Native	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Tomtit | Miromiro	Native		-		-		-		-		-		-		-
Tūī	Native		-		-		-		-		-		-		-
Welcome Swallow | Warou	Native	-		-		1		-		2		-		-	
Wild Turkey	Exotic		2		-		1		-		-		-		-
Yellowhammer | Hama kōwhai	Exotic	1,972	1	7,172	3	1	-	3	1	510	5	8,752	-	13	3
Total		**28,355**	**209**	**26,066**	**1,603**	**18,842**	**282**	**9,234**	**804**	**28,742**	**1,853**	**9,648**	**919**	**9,804**	**1,458**

Species (English | Māori)	Native/Exotic	S51		S52		S53		S54		S57		S59		S60	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native	-	-	1	-		-		-		-		-		-
Australian Magpie | Makipai	Exotic	-	3	-	95		-		-		407		284		9
Banded Dotterel | Tūturiwhatu	Native	-		-											
Bellbird | Korimako	Native		-		-		-		1		-		-		574
Black Shag | Kawau	Native	-		-											
Black-fronted Dotterel | Tūturiwhatu	Native	-		-											
Brown Creeper | Pīpipi	Native		-		-		-		-		-		-		23
California Quail | Koroā	Exotic	-	-	-	-		-		-		-		-		-
Canada Goose | Kuihi	Exotic	-		2											
Chaffinch | Pīnati	Exotic	8	1	484	2		3		-		-		-		2
Coot	Native	1	3	1	-		4		9		-		1		-
Common Starling | Tāringi	Exotic	9	10	-	2		82		179		-		-		5
Dunnock | Tātaihore	Exotic	858	510	193	6,346		226		3		1,996		4		2,074
Eurasian Blackbird | Manu pango	Exotic	2	2	1,221	58		3		10		7		-		385
European Goldfinch | Kōwhiti	Exotic	728	619	1,160	969		155		151		8		4		541
European Greenfinch | Pākura-kākāriki	Exotic	77	11	177	58		43		9		-		2		13
Eurasian Skylark | Kairaka	Exotic	10,147	8	1,898	61		16		12		-		23		4
Fernbird | Mātātā	Native		-		-		-		-		-		-		-
Grey Warbler | Riroriro	Native	-	3	16	3		-		-		-		-		45
House Sparrow | Tiu	Exotic	-	2	-	2		4		1		-		-		-
Lesser Redpoll | Pātītī	Exotic	3	-	278	15		3		-		17		-		2
Little Owl | Ruru nohinohi	Exotic	-	1	-	-		-		4		1		1		-
Mallard | Rakiraki	Exotic	18	3	-	5		6		7		-		-		2
Morepork | Ruru	Native	-	-	-	-		-		-		-		1		-
New Zealand Fantail | Pīwakawaka	Native	-	-	-	2		-		-		-		-		167
Paradise Shelduck | Pūtangitangi	Native	-	-	-	6		1		3		15		-		-
Pied Stilt | Poaka	Native	17	-	-	-		-		-		-		-		-
Pūkeko	Native		-		-		-		-		-		-		-
Silvereye | Tauhou	Native	-	-	67	134		4		-		3		-		9,702
Song Thrush | Tātai	Exotic	12	21	20	25		48		23		6		12		171
South Island Pied Oystercatcher | Tōrea	Native	8	-	6	-		-		-		-		-		-
Southern Black-backed Gull | Karoro	Native	-	2	-	-		-		-		-		-		-
Spur-winged Plover	Native	14	43	2	28		22		50		-		8		9
Swamp Harrier | Kāhu	Native	1	1	-	-		-		-		-		-		-
Tomtit | Miromiro	Native		-		-		-		-		-		-		12
Tūī	Native		-		-		-		-		-		-		44
Welcome Swallow | Warou	Native	-		1											
Wild Turkey	Exotic		-		-		-		-		-		9		-
Yellowhammer | Hama kōwhai	Exotic	24	2	1,221	40		2		1		16		-		2
Total		**11,927**	**1,245**	**6,748**	**7,851**	**-**	**622**	**-**	**463**	**-**	**2,476**	**-**	**349**	**-**	**13,786**

Species (English | Māori)	Native/Exotic	S61		S62		S63		S64		S65		S66	
		Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Australasian Pipit | Pīhoihoi	Native		-		-		-		-		-		-
Australian Magpie | Makipai	Exotic		104		371		323		102		4		329
Banded Dotterel | Tūturiwhatu	Native												
Bellbird | Korimako	Native		21		870		-		-		-		-
Black Shag | Kawau	Native												
Black-fronted Dotterel | Tūturiwhatu	Native												
Brown Creeper | Pīpipi	Native		-		4		-		-		-		-
California Quail | Koroā	Exotic		-		144		-		-		-		-
Canada Goose | Kuihi	Exotic												
Chaffinch | Pīnati	Exotic		25		5		-		4		-		-
Coot	Native		-		1		1		-		-		2
Common Starling | Tāringi	Exotic		-		62		42		2		-		1
Dunnock | Tātaihore	Exotic		1,055		2,073		75		99		1,619		147
Eurasian Blackbird | Manu pango	Exotic		206		226		1		-		-		1
European Goldfinch | Kōwhiti	Exotic		25		222		30		455		72		460
European Greenfinch | Pākura-kākāriki	Exotic		-		1		4		10		-		34
Eurasian Skylark | Kairaka	Exotic		9		3		68		18		15		57
Fernbird | Mātātā	Native		-		-		-		-		-		-
Grey Warbler | Riroriro	Native		32		75		-		2		-		-
House Sparrow | Tiu	Exotic		-		-		-		-		1		-
Lesser Redpoll | Pātītī	Exotic		7		2		-		-		-		1
Little Owl | Ruru nohinohi	Exotic		-		1		-		-		1		1
Mallard | Rakiraki	Exotic		41		-		1		-		2		-
Morepork | Ruru	Native		-		-		-		-		-		-
New Zealand Fantail | Pīwakawaka	Native		195		120		-		-		-		-
Paradise Shelduck | Pūtangitangi	Native		2		10		-		12		4		-
Pied Stilt | Poaka	Native		-		1		-		-		-		-
Pūkeko	Native		-		-		-		-		-		-
Silvereye | Tauhou	Native		1,932		3,688		-		36		27		-
Song Thrush | Tātai	Exotic		32		37		8		19		8		8
South Island Pied Oystercatcher | Tōrea	Native		-		-		-		-		-		-
Southern Black-backed Gull | Karoro	Native		-		-		-		-		-		-
Spur-winged Plover	Native		18		19		197		54		-		98
Swamp Harrier | Kāhu	Native		-		-		-		-		1		-
Tomtit | Miromiro	Native		-		8		-		-		1		-
Tūī	Native		1		80		-		-		-		-
Welcome Swallow | Warou	Native												
Wild Turkey	Exotic		-		-		-		8		-		28
Yellowhammer | Hama kōwhai	Exotic		11		14		6		-		-		2
Total		**-**	**3,716**	**-**	**8,037**	**-**	**756**	**-**	**821**	**-**	**1,755**	**-**	**1,169**

Species (English | Māori)	Native/Exotic	Season Totals		
		Spring Total	Autumn Total	Combined
Australasian Pipit | Pīhoihoi	Native	72	10	82
Australian Magpie | Makipai	Exotic	2,832	4,623	7,455
Banded Dotterel | Tūturiwhatu	Native	1,337	-	1,337
Bellbird | Korimako	Native	-	1,466	1,466
Black Shag | Kawau	Native	2	-	2
Black-fronted Dotterel | Tūturiwhatu	Native	4	-	4
Brown Creeper | Pīpipi	Native	-	27	27
California Quail | Koroā	Exotic	204	155	359
Canada Goose | Kuihi	Exotic	257	-	257
Chaffinch | Pīnati	Exotic	39,069	53	39,122
Coot	Native	19	94	113
Common Starling | Tāringi	Exotic	742	1,733	2,475
Dunnock | Tātaihore	Exotic	28,115	32,050	60,165
Eurasian Blackbird | Manu pango	Exotic	42,409	1,643	44,052
European Goldfinch | Kōwhiti	Exotic	20,785	10,046	30,831
European Greenfinch | Pākura-kākāriki	Exotic	10,804	535	11,339
Eurasian Skylark | Kairaka	Exotic	736,197	2,184	738,381
Fernbird | Mātātā	Native	-	2	2
Grey Warbler | Riroriro	Native	966	335	1,301
House Sparrow | Tiu	Exotic	2,205	108	2,313
Lesser Redpoll | Pātītī	Exotic	8,448	82	8,530
Little Owl | Ruru nohinohi	Exotic	8	52	60
Mallard | Rakiraki	Exotic	213	292	505
Morepork | Ruru	Native	1	2	3
New Zealand Fantail | Pīwakawaka	Native	125	487	612
Paradise Shelduck | Pūtangitangi	Native	176	1,434	1,610
Pied Stilt | Poaka	Native	413	2	415
Pūkeko	Native	-	2	2
Silvereye | Tauhou	Native	6,954	16,430	23,384
Song Thrush | Tātai	Exotic	10,986	1,404	12,390
South Island Pied Oystercatcher | Tōrea	Native	1,372	2	1,374
Southern Black-backed Gull | Karoro	Native	117	6	123
Spur-winged Plover	Native	1,840	1,377	3,217
Swamp Harrier | Kāhu	Native	102	3	105
Tomtit | Miromiro	Native	-	22	22
Tūī	Native	-	125	125
Welcome Swallow | Warou	Native	51	-	51
Wild Turkey	Exotic	-	328	328
Yellowhammer | Hama kōwhai	Exotic	127,130	189	127,319
Total		**1,043,955**	**77,303**	**1,121,258**

Appendix E
Waterfowl pond count data

Table E.8. Summary of waterfowl pond count data, including pond location and if ponds are in or out of the MP4 Project area (including 20m buffer).

Survey station	General location	Footprint status	Date	Paradise shelduck	Mallard / grey hybrid	Grey teal	NZ shoveler	NZ scaup	Eurasian coot	Black swan	Spur-winged plover	Indigenous species richness	Total species richness
1	Golden Bar Road	In	22/04/2026	0	0	0	2	0	0	0	6	3	4
2	Golden Bar Road	In	22/04/2026	2	0	0	0	0	0	0	6	2	2
3	Golden Bar Road	In	22/04/2026	0	1	0	0	0	0	0	0	0	1
4	Coronation	In	29/04/2026	0	0	0	0	0	0	0	0	0	0
5	Macraes Central	In	02/04/2026	0	1	0	0	0	0	0	0	0	1
6	Macraes Central	In	02/04/2026	0	0	0	0	0	0	0	0	0	0
7	Crankie Jims	Out	09/04/2026	0	0	0	0	0	0	0	0	0	0
8	Macraes Flat	Out	22/04/2026	0	3	0	0	0	0	0	0	0	1
9	Golden Bar Road	In	22/04/2026	2	0	0	0	0	0	0	0	1	1
10	Macraes Central	In	13/04/2026	0	0	0	0	0	0	0	0	0	3
11	Golden Bar	In	29/04/2026	0	0	0	0	0	0	0	0	0	0
12	Macraes Road	Out	01/04/2026	49	71	0	0	0	0	0	0	4	7
12	Macraes Road/SP11 Tailings	Out	14/04/2026	0	28	0	0	0	0	0	0	0	1
12	Macraes Road/SP11 Tailings	Out	15/04/2026	122	0	0	0	0	0	0	0	1	1
12	Macraes Road/SP11 Tailings	Out	16/04/2026	0	0	3	0	0	0	0	0	1	1
13	Macraes Road	Out	01/04/2026	0	0	0	0	0	0	0	0	1	1
14	Crankie Jims	Out	09/04/2026	0	1	0	0	0	0	0	0	0	1
15	Macraes Central	In	13/04/2026	0	0	0	0	0	0	0	0	0	0
16	MEEA	Out	14/04/2026	0	0	0	0	0	0	0	0	0	0
17	MEEA	Out	14/04/2026	0	0	0	0	0	0	0	0	0	1
17	Golden Bar Road	Out	14/04/2026	2	0	0	0	0	0	0	0	1	1
17	Golden Bar Road	Out	22/04/2026	2	17	0	2	0	0	0	0	2	6
18	Macraes Central	In	14/04/2026	2	25	6	11	3	0	0	0	4	5
18	Golden Bar Road	In	22/04/2026	0	2	0	0	0	0	0	0	0	1
19	Macraes Flat	Out	22/04/2026	4	0	0	0	0	0	0	0	1	1
20	Macraes Flat	Out	22/04/2026	18	0	0	0	0	0	0	2	2	2
21	Coronation	In	29/04/2026	0	0	0	0	0	0	0	0	0	0
22	Lone Pine Reservoir	Out	02/04/2026	34	0	22	24	2	0	4	0	6	7
22	Lone Pine Reservoir	Out	14/04/2026	2	42	21	30	27	22	4	0	8	9
22	Lone Pine Reservoir	Out	22/04/2026	3	2	24	4	55	10	0	0	6	8

Appendix F
Taoka Species Identified in Surveys

Table F.9. Summary of taonga bird species identified in project area through desktop or field surveys.

Schedule 97 taonga name	English name in Schedule 97	Record basis in MP4 assessment	Notes	Recorded within Project area
Kāhu	Australasian harrier	Field surveys	Recorded across all MP4 project areas (Table 4.10)	Yes
Kārearea	New Zealand falcon	Desktop and field surveys	37 desktop records from 1959 to 2025. Recorded in several Project area areas through 5mbc and anecdotal observations.	Yes
Karoro	Black-backed gull	Field surveys	Recorded across all MP4 project areas in (Table 4.10)	Yes
Kōau	Black shag	Desktop and field surveys	Recorded at Coronation North but outside Project area (Table 4.10)	No
Kōtare	Kingfisher	Desktop Survey	Desktop records only	No
Kūkupa / Kererū	New Zealand wood pigeon	Desktop Survey	Desktop records only	No
Pākura / Pūkeko	Swamp hen / Pūkeko	Desktop Survey	Desktop records only	No
Pīhoihoi	New Zealand pipit	Desktop and field surveys	Recorded at Back Road WRS, Coal Creek, Coronation North, GPUG and the Central Mining Area in (Table 4.10)	Yes
Pīwakawaka	South Island fantail	Desktop and field surveys	Recorded at Camp Creek, Golden Bar and MEEA (Table 4.10).	Yes
Poaka	Pied stilt	Desktop and field surveys	Recorded across all MP4 project areas (Table 4.10).	Yes
Pūtakitaki	Paradise shelduck	Desktop and field surveys	Recorded at Coal Creek, Coronation North, Central Mining Area and MEEA(Table 4.10).	Yes
Riroriro	Grey warbler	Desktop and field surveys	Recorded at Back Road WRS, Camp Creek, Coal Creek, Coronation North, Central Mining Area and MEEA in (Table 4.10).	Yes
Ruru koukou	Morepork	Desktop and field surveys	Recorded at Coronation North in (Table 4.10).	Yes
Tete	Grey teal	Desktop and field surveys	Recorded at 2 ponds within Project area.	Yer
Tūī	Tūī	Desktop survey	Desktop records only	No

Appendix G
Anecdotal observation data

Table G.10. Summary of anecdotal observations of species detected outside of survey periods while on site.

Date	Time	Species	Number	Location N	Location E	Project Area	Comments
2/12/2025	6:03	Falcon	1	1392982.99	4973687.55	Outside (~3km West of trout hatchery)	Flew across track in front of truck
2/12/2025	8:40	SIPO	1	1395535.52	4977451.59	Coronation North	Flew overhead
2/12/2025	11:20	SIPO	2	1395918.15	4973423.11	Camp Creek	Sitting on rocks
5/12/2025	7:00	W F Heron	2	1397796	4974612	Golden Point	Flushed from soak.
4/12/2025		Dotterels	2			Frasers/Innes Mill	Site 41
11/12/2025	5:45	SIPO	2	1399526.48	4972505.19	Frasers/Innes Mill	On the side of the road
16/12/2025	6:35	SIPO	6	1401257.14	4970764.61	Frasers/Innes Mill	Site 41 On low vegetation No real nest defence
16/12/2025	9:20	SIPO	21	1406527.66	4968739.59	Golden Bar	Station 47 Foraging on short sward
11/12/2025	7:33	Pipit	1	1403179.55	4967669.62	MEEA	Sitting on a rock
9/03/2026	9:00	Falcon	2	1400941	4973246	CCP2	Flew overhead, hunting small birds
9/03/2026	13:00	Falcon	1	1400941	4973246	CCP2	Flew overhead, hunting small birds
10/03/2026	10:00	Falcon	1			Camp Creek	Hunting small birds in the gully
11/03/2026	13:30	Falcon	1			Murphys EEA	Flew overhead, perched on a tree and then rocks
13/03/2026	14:00	Fernbird	1			GPUG Extension	Calling in the wetland
14/03/2026	15:30	Fernbird	1			GPUG Extension	Calling in the wetland
13/03/2026	9:00	Falcon	1			GPUG	
13/03/2026	9-2pm	Silvereye	6+			GPUG	Calling constantly during entire search period, were in lower section of valley
4/03/2026	5:30	Fantail	2			Cranky Jims	In bush near stream

19/03/2026	16:30	Falcon	2	1393704.37	4980537.61	Cranky Jims	Flew through gully, calling to each other, landed on rocks on opposite side of gully
26/03/2026	10:14	Falcon	1			Coronation	Flew over Coronation area
24/03/2026	2:42	Pipit	1			Coronation	Flew away from car on approach
25/03/2026	2:07	Falcon	2			Murphys EEA	Pair calling and flying together over Murphey's offset area
19/03/2026	11:30	Fantail	1			Top office	Was stuck inside office until we ushered it outside
9/03/2026	10:15	Tomtit	1			Pine forestry near highlay	Calling in pine forestry
9/03/2026	10:15	Fantail	1			Pine forestry near highlay	Foraging at edge of forestry
20/03/2026	12:30	Falcon	1			Highlay Hill	Flew away from car on approach
18/03/2026	9:30	Fantail	2			Cranky Jims	Calling/ foraging in gulley
29/03/2026	2:30	Karearea	1			Central mining lizard salvage area (top of Golden Bar road)	Perched on windrow edge, flew off
29/03/2026	17:00	Silvereye	6			Control lizard release site	Flock moving through coprosmas
30/03/2026	9:50	Karearea	1			Central mining lizard salvage area (top of Golden Bar road)	Slow, low cruise over ground then flew off in chase of small bird
10/04/2026	8:10	Karearea	1			Murphys (veg plot 8)	Preening on fencepost
10/04/2026	10:00	silvereye	3			Murphys (veg plot 9)	Feeding in shrubs
11/04/2026	9:00	fantail	1			Cranky Jims shrubland (plot 2)	Flying through shrubs

11/04/2026	9:40	silvereyes	5			Cranky Jims shrubland (plot 2)	Flying through shrubs
2/04/2026	8:10	Falcon	1	1394964.03	4977058.51		Flew by
2/04/2026	8:53	Falcon	1	1394079.09	4977890.57		Flew by
2/04/2026	9:45	Falcon	1	1395029.42	4979291.61		Seen away to the North
9/04/2026	9:37	Falcon	1	1405305.08	4976315.82		Call heard away to the south
13/04/2026	9:04	Falcon	1	1402039.39	4971828.96		Flew into a flock of Redpolls. Captures in 5MBC.
29/04/2026	10:42	Falcon	1	1396038.02	4977392.59		Sitting on a rock pile enjoying the view over the coronation pit.

Appendix H
Detailed Site Maps

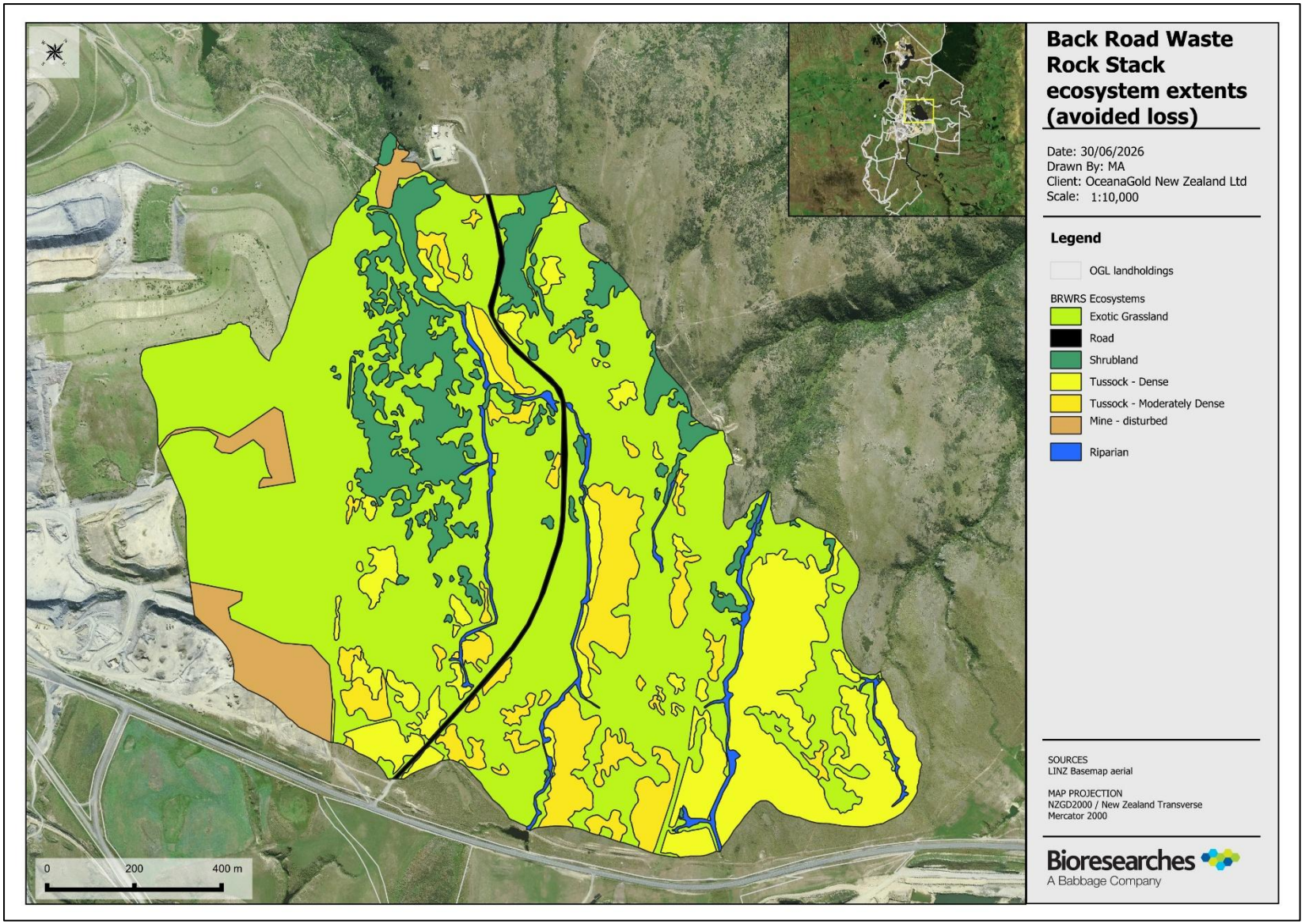

Figure H.1. BRWRS extent.

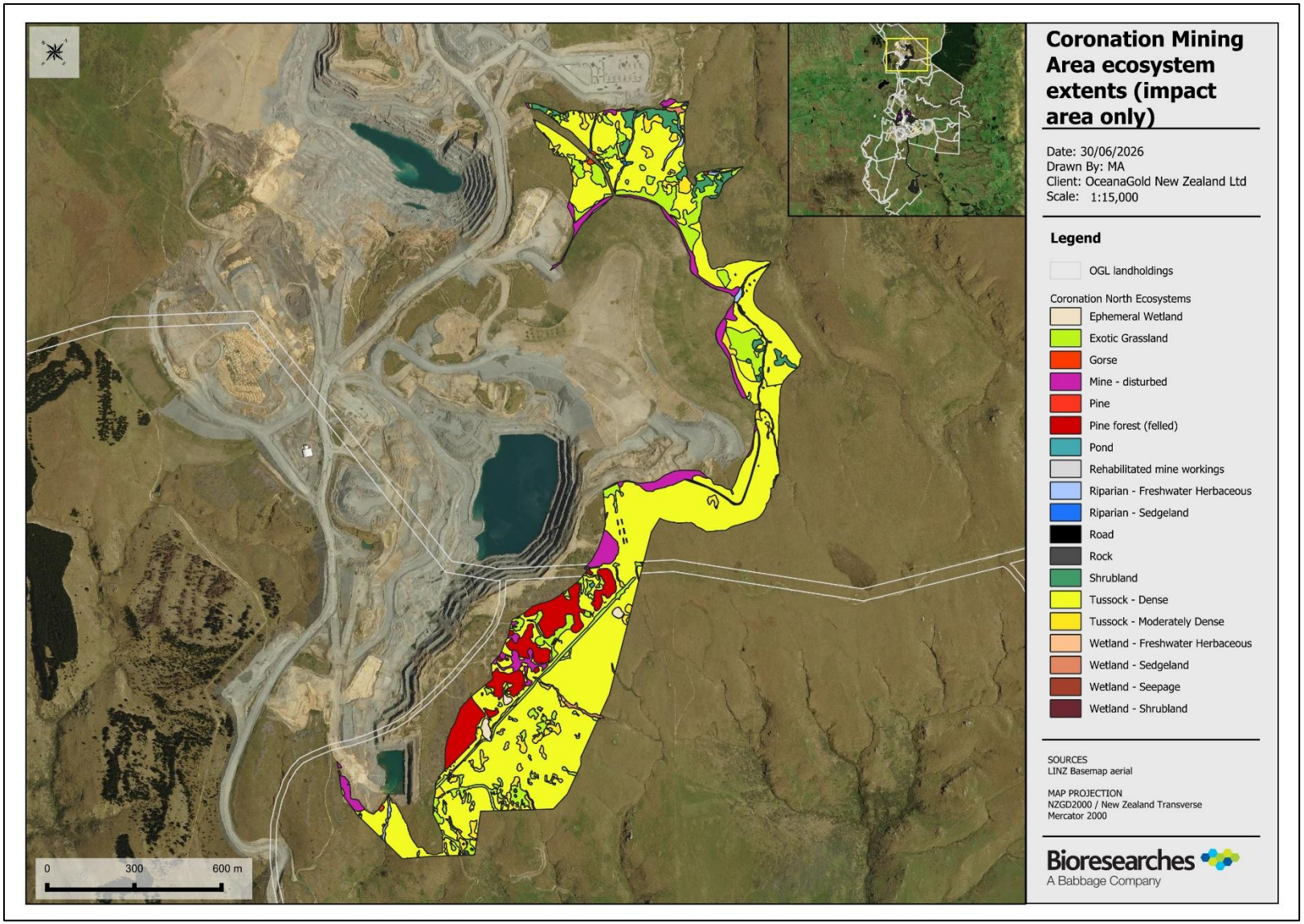

Figure H.2. Unconsented impact sites within the Coronation North area.

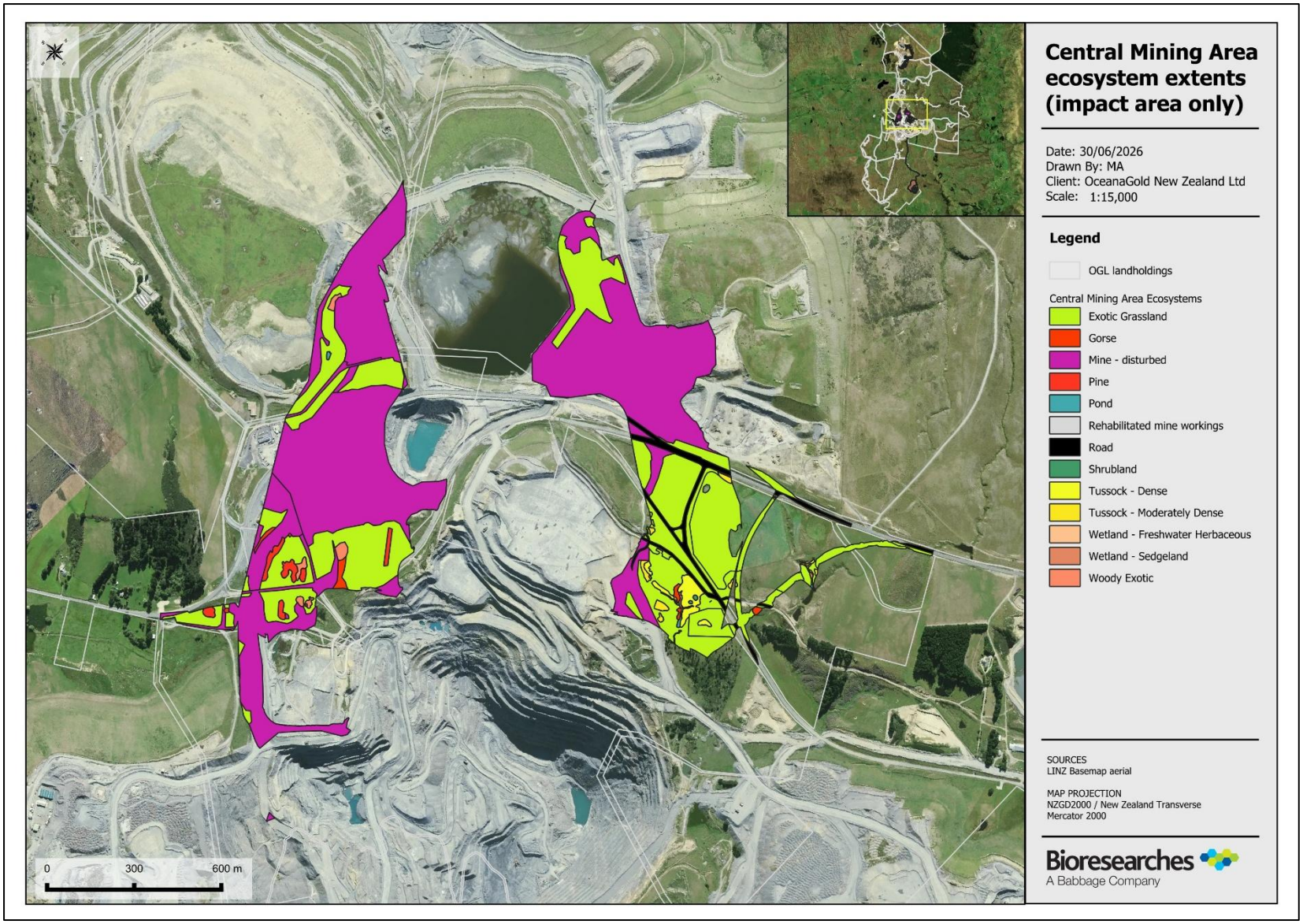

Figure H.3. Unconsented impact sites within the Central Mining area.

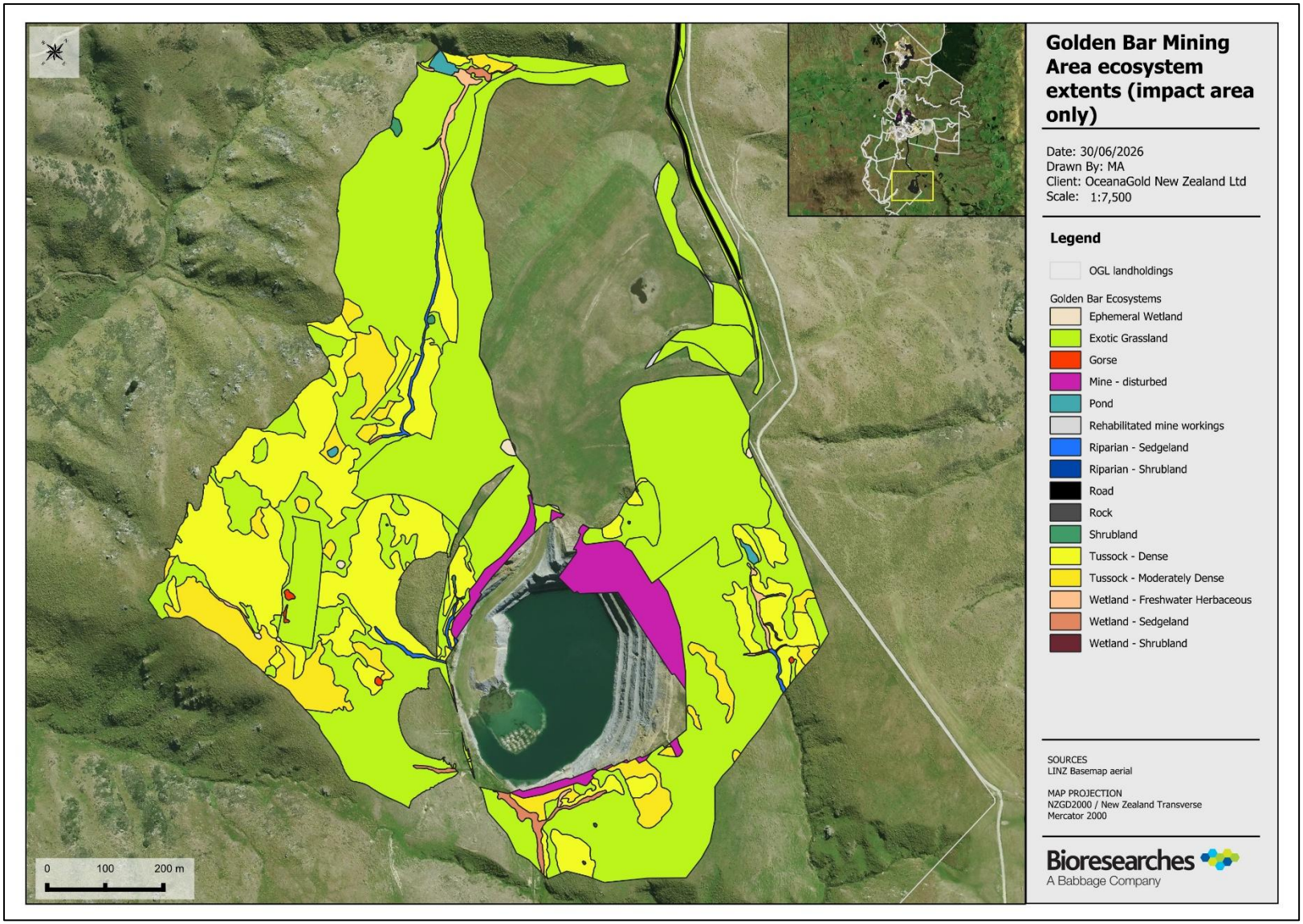

Figure H.4. Unconsented impact sites within the Golden Bar pit and waste rock stack area.

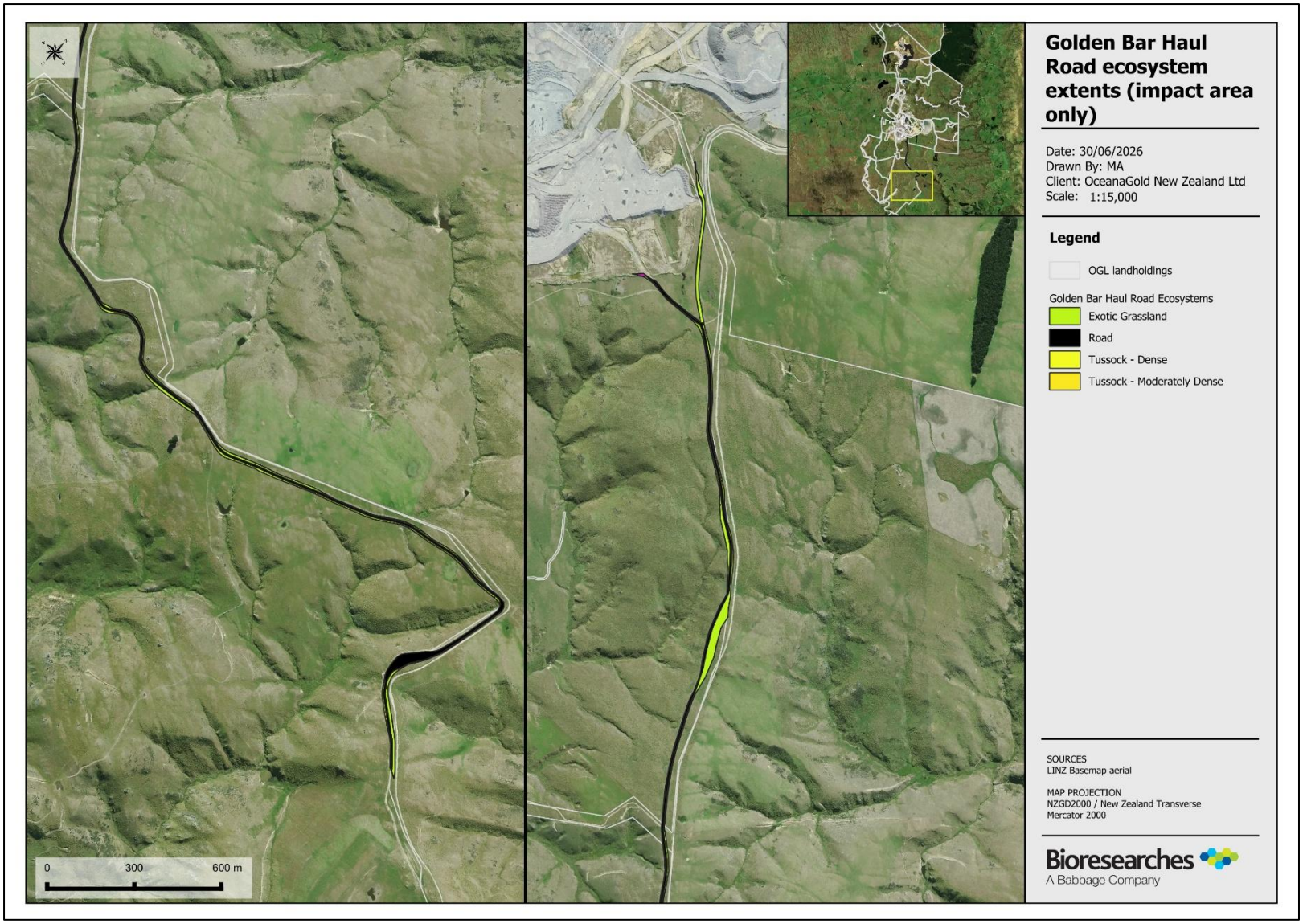

Figure H.5. Unconsented impact sites included within the Golden Bar Haul Road area.

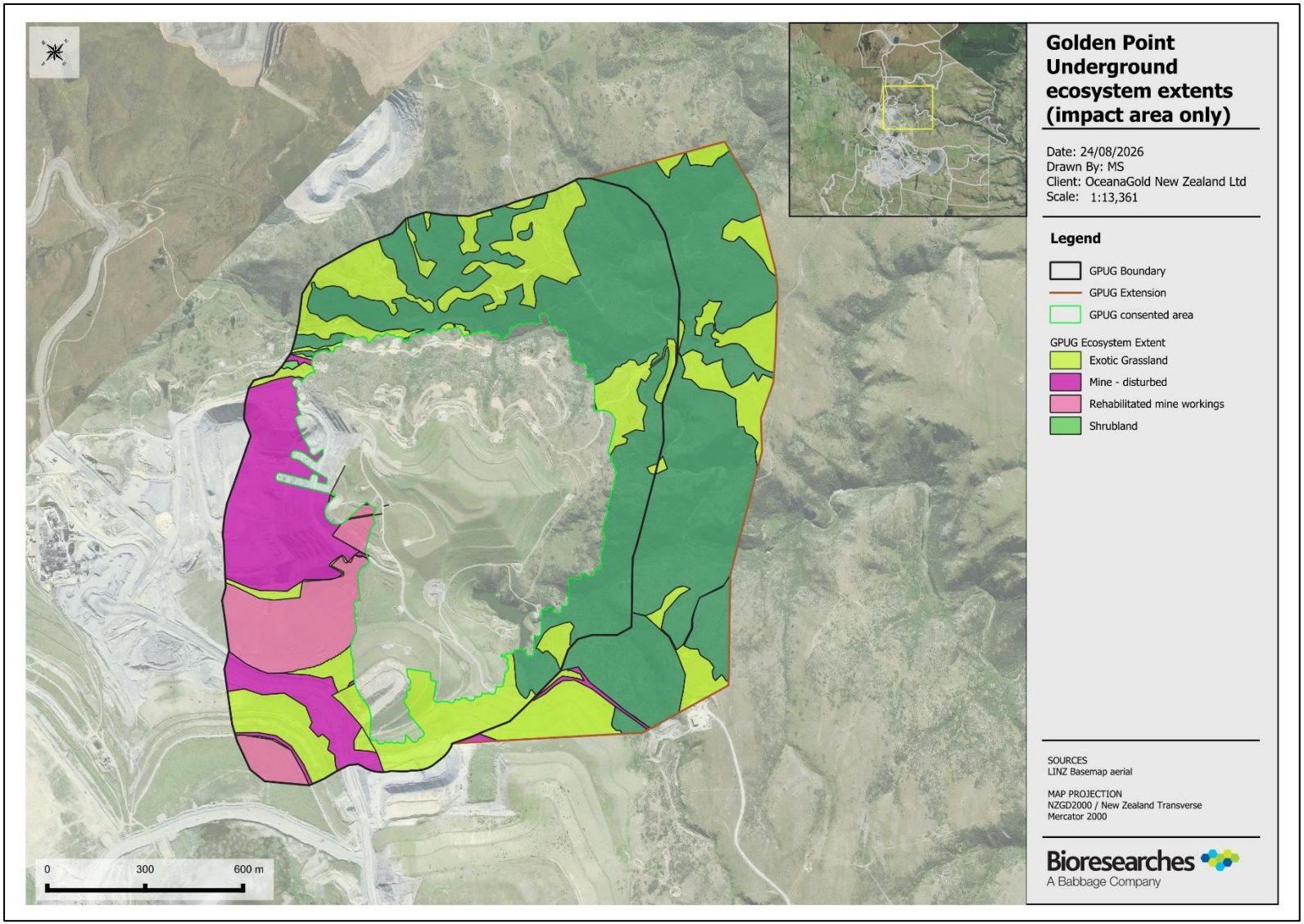

Figure H.6. Ecosystem types within the GPUG and GPUG extension areas (above-ground area indicated, potential impact areas only). Note: ecosystem types (mine disturbed, and rehabilitated mine workings) were sourced from Whirika, 260422 Vegetation Maps.

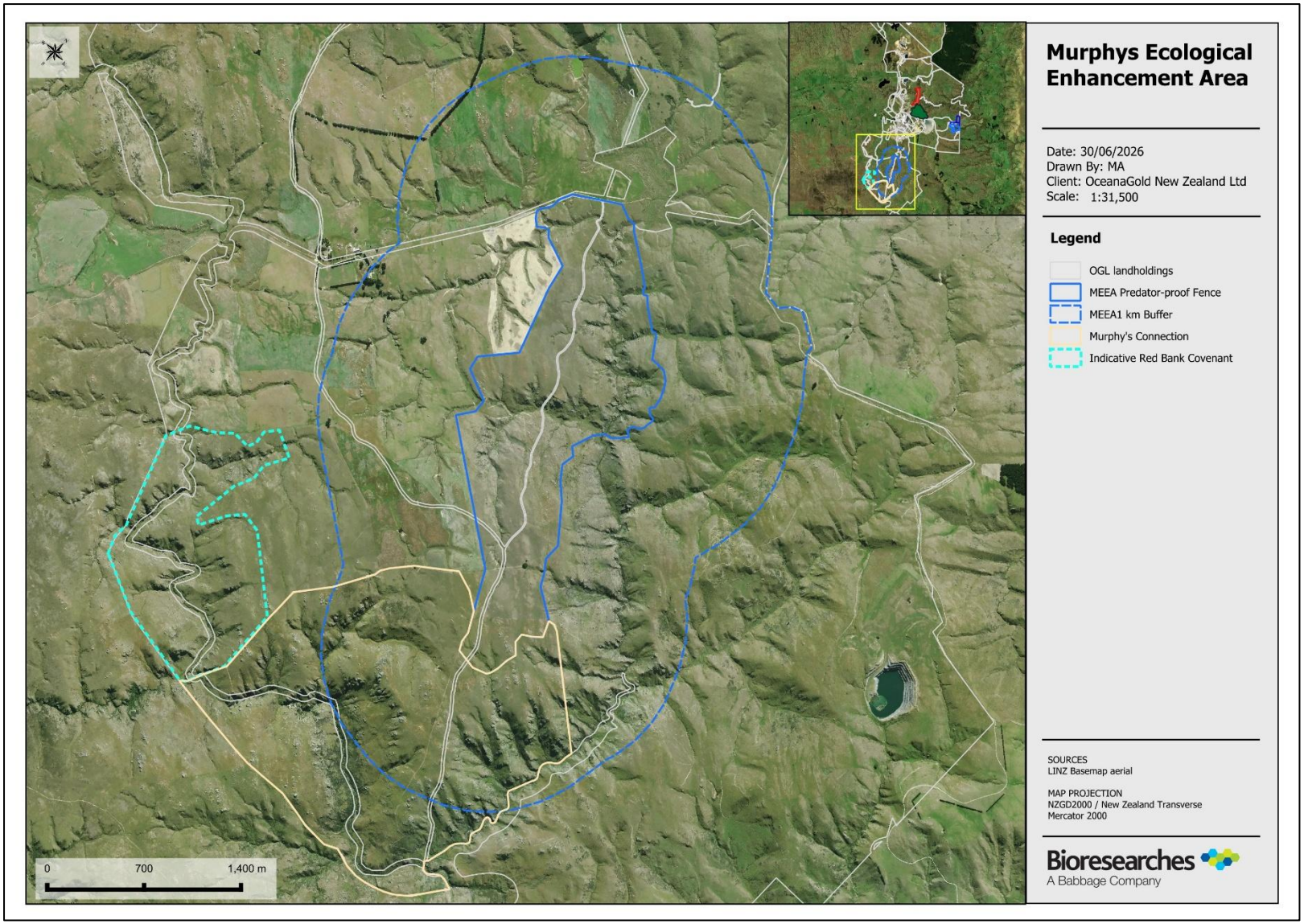

Figure H.7. The extent of the proposed Murphy's Ecological Enhancement Area.

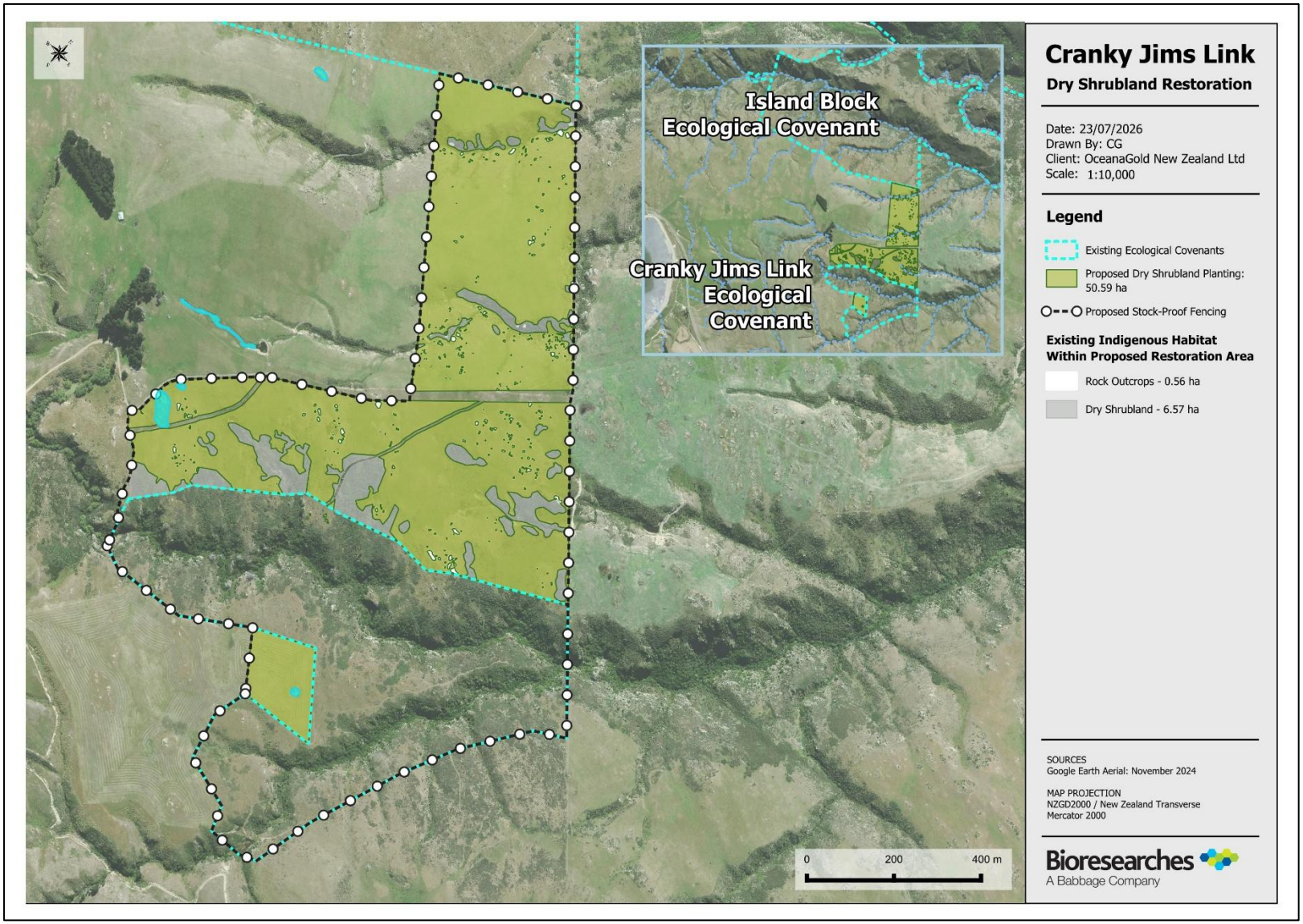

Figure H.8. The extent of the Cranky Jim's Covenanted Area.

Auckland

Address | Level 4, 68 Beach Road, Auckland 1010

Post | PO Box 2027, Shortland Street, Auckland 1140, New Zealand

Ph | 64 9 379 9980

Fax | +64 9 377 1170

Email | contact-us@babbage.co.nz

Hamilton

Address | Unit 1, 85 Church Road, Pukete, Hamilton 3200

Post | PO Box 20068, Te Rapa, Hamilton 3241, New Zealand

Ph | +64 7 850 7010

Fax | +64 9 377 1170

Email | contact-us@babbage.co.nz

Christchurch

Address | 128 Montreal Street, Sydenham, Christchurch 8023

Post | PO Box 2373, Christchurch 8140, New Zealand

Ph | +64 3 379 2734

Fax | +64 3 379 1642

Email | solutions@babbage.co.nz

Babbage Consultants Australia Pty Ltd – Australia

Address | Suite 4, Level 2, 1 Yarra Street, Geelong,

Victoria 3220, Australia

Ph | +61 3 8539 4805

Email | contact-us@babbage.co.nz

www.bioresearches.co.nz

www.babbage.co.nz

www.babbageconsultants.com.au