Bioresearches
A Babbage Company

Macraes Phase 4 Fast-track

Ecological Impact Assessment: Murphys Ecological Enhancement Area Predator-Exclusion Fence

for: OceanaGold New Zealand Limited

Job No: 68766BIO2
Version: Final
Date of Issue: 3 September 2026

Document Approval and Revision History

Document title	Macraes Phase 4 Fast-track
	Ecological Impact Assessment: Murphys Ecological Enhancement Area Predator-Exclusion Fence
Prepared for	OceanaGold New Zealand Limited
Version	Final
Date	3 September 2026
Filename	68766BIO_MP4Fast_Predator_Exclusion_Fence_Ecia_

Author(s)	Micheal Anderson Senior Ecologist	Bella Burgess Ecologist
	Laura Dooley Senior Ecologist	Michaela Scarrott Ecologist
	Dylan van Winkel Senior Ecologist	
Reviewer(s)	Chris Wedding Ecology Manager	

Rev. no.	Date	Author(s)
Final	3 September 2026	BB, DvW, LD, MA, & MS

Reference: Bioresearches (2026). Ecological Impact Assessment: Murphys Ecological Enhancement Area Predator-Exclusion Fence. Report for OceanaGold New Zealand Limited. 62 p.

Cover Illustration: Murphys Ecological Enhancement Area (MEEA), Macraes, Otago.

Disclaimer:

This document has been produced for New Zealand consenting purposes only. Information contained herein must not be relied on for investment purposes.

Table of Contents

List of Tables

List of Figures

List of Appendices

1 Executive summary

1.1 Purpose and scope

This Ecological Impact Assessment assesses the potential ecological effects associated with the construction, operation and maintenance of the proposed predator-exclusion fence around the Murphys Ecological Enhancement Area (MEEA). The proposed fence will establish a 252 ha predator-excluded area within the upper Murphys Creek catchment and form part of the Macraes Phase 4 (MP4) terrestrial biodiversity compensation package.

This assessment identifies ecological effects on indigenous vegetation, 'Threatened' and 'At Risk' flora (TAR), rock habitat, indigenous lizards, avifauna, invertebrates, natural inland wetlands, and watercourses, resulting from the construction, ongoing operation and maintenance of the fence, whilst also assessing the positive biodiversity gains for flora and fauna over time as a result of the predator exclusion, and management within the MEEA.

1.2 Ecological Values

Construction of the fence is intended to protect a 252 ha area supporting significant ecological values, including habitat for approximately 32 TAR plant species, tussock and moderate to high value shrubland ecosystems, fauna values ranging from Moderate to Very High which includes a regionally significant population of Otago skink (*Oligosoma otagense*; Regionally Threatened – Endangered), and areas of Very High value rock habitat.

The assessment includes the extent of the fence alignment and a 5m buffer either side, totalling an area of approximately 4.64 ha. The footprint intersects a range of terrestrial and freshwater habitats with ecological values ranging from Low to Very High, as described below:

- 2.05 ha of **High** value snow tussock grassland;
- 0.08 ha of **Moderate** value dry shrubland;
- 0.07 ha of **Moderate** value wetland vegetation;
- 0.004 ha of **Moderate** value mānuka;
- 0.02 ha of **Very High** value rock habitat;
- 2.43 ha of **Low** value exotic grassland, gorse and existing road; and
- Several stream crossings within **moderate** value streams.

1.3 Effects management and residual effects

With ecological micro-siting, a minimum-width construction corridor, retention of vegetation where practicable, avoidance of occupied Otago skink habitat and very high value rock habitat, and appropriate wetland, flora and fauna management, the residual effects that can currently be assessed are expected to be **Low** or **Very Low**.

A Low residual effect remains for Otago skink due to the potential for the fence to reduce habitat connectivity for adults within the Murphys Creek catchment however this effect is expected to be outweighed by the long-term benefits of predator exclusion and habitat enhancement within the MEEA.

As residual effects are assessed as Very Low to Low, no ecological offsetting or compensation is required.

2 Introduction

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 of national or regional benefits significance.

As part of the Project, OGLNZ proposes to establish the Murphys Ecological Enhancement Area (MEEA) as a key component of the terrestrial biodiversity compensation package for the MP4 Project. OGNZL has engaged Bioresearches to provide an assessment of the effects on the MEEA establishment, and, to the extent required, identify any necessary management and operation measures to address any such effects.

The scope of this report aims to identify ecological effects on indigenous vegetation, 'Threatened' and 'At Risk' flora (TAR), rock habitat, indigenous lizards, avifauna, invertebrates, natural inland wetlands, and watercourses, resulting from the construction, ongoing operation and maintenance of the fence, whilst also assessing the positive biodiversity gains for flora and fauna over time as a result of the predator exclusion, and management within the MEEA.

2.1 Background and purpose

MEEA is intended to provide long-term protection and enhancement of indigenous habitats and fauna within the upper Murphys Creek catchment. A full-height pest-exclusion fence, referred to in this report as the predator-exclusion fence, forms a central component of the proposed management approach. The fence is intended to establish a predator-excluded refuge encompassing important indigenous lizard habitat, including habitat occupied by threatened Otago skinks, and to support associated pest management, habitat protection, restoration and ecological monitoring within the surrounding landscape (Bioresearches, 2026f; Alliance Ecology, 2026; Pestproof Fences Ltd, 2026).

A fence feasibility assessment was undertaken in June 2026 and evaluated the constructability of an indicative fence alignment intended to enclose 250 ha. The assessment concluded that the fence was technically feasible, subject to route alterations intended to avoid particularly difficult terrain and provide more suitable waterway crossings. The feasibility alignment, if maintained without further extension, will enclose approximately 235 ha. Input from ecologists and OGNZL resulted in minor extension to the fence perimeter at the southern end of the fenceline, increasing the total proposed predator-excluded area to approximately 252 ha. The final fence alignment and construction footprint remain subject to detailed survey, engineering design, and ecological micro-siting (Pestproof Fences Ltd, 2026).

This Ecological Impact Assessment (EcIA) assesses the actual and potential ecological effects arising from the construction, operation, and maintenance of the fence and its associated infrastructure. This includes the permanent fence platform and maintenance corridor, temporary construction areas, access requirements, gates, culverts, and waterway crossings. The assessment considers the adverse effects of the physical works separately from the intended long-term biodiversity benefits of predator exclusion.

This report does not assess the overall adequacy of the wider MP4 biodiversity compensation package and does not replace the MP4 terrestrial or wetland residual effects assessments (Bioresearches 2026f, l; Table 2.1). Its purpose is to identify the ecological values and effect pathways associated specifically with the fence proposal and to establish the information, design responses and ecological management measures required for a defensible assessment of its residual effects.

2.2 Relationship to the wider MP4 Project

The MP4 EcIA prepared by Bioresearches (Bioreseraches, 2026f) identifies values and assesses levels of adverse effects on indigenous vegetation and habitats, natural inland wetlands, TAR flora, indigenous lizards, birds, and terrestrial invertebrates. MEEA forms part of the integrated terrestrial biodiversity compensation package developed in response to those residual effects. The package includes an approximately 252 ha predator-exclusion area, pest animal management across the surrounding landscape, protection and management of existing indigenous habitats, ecological restoration, monitoring and the establishment of ecological connections with adjoining protected areas (Bioresearches, 2026a, 2026f, 2026l, 2026n; Alliance Ecology, 2026).

The fence will have two distinct ecological effects. By excluding mammalian predators and browsers over the long term, it will provide significant benefits for fauna and flora. However, its construction, operation and maintenance will also create a linear disturbance footprint and require multiple waterway crossings. These adverse effects therefore need to be assessed and managed separately.

This EcIA should be read alongside the wider MP4 EcIA (Bioresearches, 2026f), terrestrial and wetland residual effects assessments, terrestrial restoration plan and relevant ecological management and monitoring plans (Table 2.1). Those reports establish the landscape context, residual-effects strategy, and intended compensation outcomes. This report provides the more specific assessment of the fence construction and operational footprint.

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	Summary of documents E2 – E16	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)

Document #	Document name	Aspects covered	Author
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: Predator-exclusion fence Construction	Terrestrial and wetland ecosystems and fauna	Bioresearches (2026p)
E18	Pest Control and Elimination Plan	Animal pest management	Alliance Ecology (2026)

2.3 Scope of the assessment

2.3.1 Ecological components assessed

This EcIA considers the actual and potential ecological effects associated with construction, operation and maintenance of the predator-exclusion fence. The assessment addresses:

- permanent and temporary vegetation and habitat disturbance associated with the fence platform, maintenance corridor, gates, batters, access routes, work areas and spoil placement;
- effects on natural inland wetlands, wetland margins and wetland hydrology;
- potential injury, mortality, displacement or disturbance of indigenous lizards, birds and terrestrial invertebrates;
- potential effects on TAR flora and other notable plant species and communities;
- erosion, sedimentation, altered drainage, dust, weed establishment and other indirect effects.

Potential effects on permanent and ephemeral watercourses, aquatic connectivity arising from culverts, fill, temporary stream diversion and other crossing works are addresses separately (Viridis 2026). Effects on natural inland wetlands are addressed within this EcIA.

The available MP4 ecological reports provide landscape-scale information on vegetation, flora and fauna values within MEEA and the wider Murphys Creek catchment. They do not provide a complete inventory of ecological values within the final fence corridor. Terrestrial vegetation, flora and fauna are therefore assessed preliminarily in this draft. Route-specific field verification is required before final ecological values, magnitudes of effect and levels of effect can be assigned.

2.3.2 Matters Screened Out of Detailed Assessment

This report does not reassess the overall adequacy of the MP4 biodiversity compensation package or the operational methods for eradicating and excluding mammalian predators. The intended benefits of predator exclusion are considered to provide ecological context and to identify the positive outcomes enabled by the fence.

As landscape-scale acoustic surveys undertaken for MP4 did not detect long-tailed or short-tailed bats, and the Murphys Creek landscape generally lacks mature forest or trees with high roost potential (Bioresearches, 2026e), pekapeka have therefore, been excluded from this assessment.

Engineering feasibility, geotechnical design, archaeological and historic heritage effects, landscape and visual effects, and the detailed planning assessment of activity status are also outside the scope of this EcIA, except where those matters influence ecological effects or effects-management requirements.

2.4 Statutory and Policy Context

2.4.1 Fast-track Approvals Framework

MP4 is being progressed under the Fast-track Approvals Act 2024. The fence forms part of the ecological enhancement and residual-effects management components of the wider MP4 proposal. This EcIA provides ecological information relevant to the assessment of the fence under that approvals framework, including the identification of ecological values, actual and potential effects, effects-management requirements and information needed to support appropriate conditions.

2.4.2 Freshwater National Direction

The National Policy Statement for Freshwater Management 2020, consolidated as at 15 January 2026, is relevant to effects on natural inland wetlands and rivers. It requires the applicable effects management hierarchy to be followed where activities affect these freshwater environments (Ministry for the Environment, 2026a).

The Resource Management (National Environmental Standards for Freshwater) Regulations 2020 regulate specified vegetation clearance, earthworks, land disturbance, water takes, diversions, discharges and other activities in or near natural inland wetlands.

The Regional Plan: Water for Otago contains objectives, policies and rules relating to wetlands, river and lake beds, water takes and diversions, discharges and land-use activities that may affect water. The operative plan includes amendments current to 2 April 2026 (Otago Regional Council, 2026a).

2.4.3 Indigenous Biodiversity and Regional and District Planning

The National Policy Statement for Indigenous Biodiversity (NPS-IB) 2023, consolidated with amendments that came into force on 15 January 2026, is relevant to the management of indigenous vegetation and habitats of indigenous fauna. Its effects management provisions may apply where the fence affects significant indigenous vegetation or significant habitat of indigenous fauna (Ministry for the Environment, 2026b).

The Otago Regional Policy Statement 2021 became operative on 9 July 2026 and provides the current regional policy direction for ecosystems, indigenous biodiversity, land and freshwater, mana whenua values and integrated resource management. It replaced the Otago Regional Policy Statement 2019, which is no longer operative (Otago Regional Council, 2026b).

Relevant Waitaki District Plan provisions may apply to indigenous vegetation clearance, earthworks, waterbody margins and areas or habitats identified as ecologically significant. The applicable provisions and activity status will be confirmed by the project planner against the final alignment and disturbance footprint.

Indigenous lizards, most indigenous birds and other protected wildlife are subject to the Wildlife Act 1953. Where construction has the potential to disturb, capture, handle, relocate, injure or kill protected wildlife, the works must be undertaken in accordance with any applicable Wildlife Act approval and the relevant MP4 fauna management plans.

This section identifies the principal ecological statutory and policy instruments relevant to the assessment. It does not provide a legal or planning opinion. Final approval requirements and activity status will be confirmed by the project planning and legal teams following completion of the detailed design.

2.5 Information Sources, Assumptions and Limitations

This assessment is based principally on the June 2026 fence feasibility report, the current MP4 project description and the available MP4 ecological values assessments, EcIA, residual-effects assessments, management plans and restoration plans. These documents provide substantial information on the ecological character and values of MEEA and the surrounding Murphys Creek landscape. The fence feasibility assessment provides information on the indicative alignment, terrain, likely construction requirements and proposed waterway crossings (Pestproof Fences Ltd, 2026).

For this assessment, the proposal is taken to include the southern extension required to provide a total predator-excluded area of approximately 252 ha. The final surveyed alignment and fence length remain subject to confirmation through detailed design and ecological micro-siting.

The feasibility inspection was undertaken to assess constructability and was not a systematic ecological survey. It did not include wetland delineation, formal watercourse classification, targeted botanical survey, fauna habitat mapping, fish survey or an assessment of aquatic habitat at each proposed crossing. The ecological values recorded elsewhere within MEEA cannot be assumed to occur uniformly along the fence corridor.

At the time of this assessment, the following information was not available:

- a final surveyed fence alignment;
- permanent and temporary disturbance polygons;
- final maintenance-track widths;
- cut-and-fill extents, batter profiles and spoil-disposal locations;
- confirmed access routes, work pads and material-storage areas;
- route-specific wetland delineation[1] and watercourse classification;
- route-specific vegetation, TAR flora and fauna-habitat mapping;
- hydraulic and structural designs for culverts and the permanent-stream crossing;
- the temporary stream-diversion and fish-recovery methodology; and
- a fence-specific erosion and sediment control plan and construction programme.

The nominal 3 to 5 m construction and maintenance width provides an indicative design envelope only. It does not represent a confirmed ecological loss area because the actual footprint will vary with terrain, existing tracks, local narrowing or widening, batters, culvert approaches and temporary construction requirements.

Accordingly, this report identifies the principal ecological values, effect pathways and management requirements but does not assign final route-specific ecological values, effect magnitudes or residual levels of effect where the affected value or extent is unknown. Confidence is high that the principal construction and operational effect pathways have been identified. Confidence is moderate in the landscape-scale characterisation of ecological values and low in the current estimates of affected habitat extent and route-specific residual effects. The assessment will be updated following final alignment survey, ecological field verification and completion of the crossing and earthworks designs.

[1] High-level wetland surveys were undertaken outside the Otago Regions growing season

3 Predator-Exclusion Fence Proposal

3.1 Fence Design

3.1.1 Fence Alignment, Length and Enclosed Area

The proposed predator-exclusion fence will enclose 252 ha within the upper Murphys Creek catchment. The enclosed area includes important indigenous fauna habitat, including rock outcrops and associated habitat occupied by threatened lizards, while avoiding areas identified as potentially required for future mineral extraction.

Pestproof Fences Ltd assessed the feasibility of constructing a full-height exclusion fence along an indicative alignment in June 2026. The assessed alignment included recommended deviations intended to avoid near-vertical terrain, large rock outcrops, the historic water race and other locations where construction or ongoing access would be particularly difficult. The feasibility alignment was estimated to be approximately 10,265 m long and, without further extension, would enclose approximately 235 ha (Pestproof Fences Ltd, 2026).

The current proposal includes an additional extension at the southern end of the enclosure, increasing the total proposed fenced area to approximately 252 ha. The June 2026 fence-length estimate does not necessarily include the full southern extension. The total fence length must therefore be confirmed from the final surveyed alignment.

The final alignment will be subject to detailed survey, engineering design and ecological micro-siting. Minor local adjustments may be required to avoid wetlands, TAR flora, important fauna habitat, unstable terrain, significant rock features and unsuitable waterway crossing locations.

Figure 3.1. Preliminary fence route assessed from map studies. This is not the final surveyed or ecologically micro-sited alignment. Source: Pestproof Fences Ltd (2026).

3.1.2 Fence Design

The proposal comprises a full-height pest-exclusion fence intended to exclude the target mammalian pest species identified in the wider MEEA pest-management programme. The detailed fence design has not yet been provided for the complete Macraes alignment.

For assessment purposes, the fence is assumed to be consistent with established Pestproof Fences designs. These typically comprise galvanised fine-aperture mesh supported by posts, an outward-facing ground skirt or buried mesh section to prevent animals digging beneath the fence, and a folded or rolled metal hood that prevents climbing animals passing over the fence. As mice are included among the target species, the mesh aperture will be sufficiently small to prevent adult and juvenile mice passing through it.

The final design must confirm:

- the height and physical dimensions of the fence;
- mesh type and aperture;
- the dimensions and installation method for the ground skirt or buried mesh;
- post type, spacing and foundation requirements;
- capping, hood and bracket specifications;
- corrosion protection and expected design life;
- gate types and locations;
- waterway crossing structures;
- automated surveillance or fence-breach detection systems; and
- biosecurity measures associated with access through the fence.

The Macraes feasibility assessment considers that a galvanised fence is suitable for the local environment and estimates a service life of at least 50–70 years, subject to appropriate construction, inspection and maintenance (Pestproof Fences Ltd 2026).

3.1.3 Gates and Access Points

The indicative feasibility estimate includes three vehicle gates, one framed closed-cell pedestrian gate and three single pedestrian gates. The vehicle gates are assumed to be approximately 3.6 m wide and founded on concrete. Gate numbers and positions remain indicative and may change following completion of the final alignment and operational-access design.

Gates and associated hardstand areas will create localised permanent disturbance beyond the normal fence platform. These areas must be included within the final permanent footprint and located to use existing disturbed access where practicable. Gate design must retain the exclusion standard of the adjoining fence and minimise the risk of pest incursions during routine access.

3.2 Construction and Operational Footprint

3.2.1 Construction and Maintenance Corridor

A corridor width of approximately 5 m has been assumed for preliminary assessment of fence construction and ongoing maintenance access. This width is not specified in the June 2026 Macraes feasibility report and remains subject to confirmation through detailed engineering and construction planning.

Applied to the 10,265 m feasibility alignment, a 3–5 m corridor will occupy a gross area of approximately 3.08–5.13 ha. This calculation does not include the additional southern extension and will not be treated as the final project footprint. It also does not represent the area of indigenous vegetation, wetland or other ecological habitat that will be affected.

The actual formation width is expected to vary with topography and construction requirements. Narrower formation may be achievable on level or gently sloping ground, while wider disturbance may be required for bench cuts, batters, retaining structures, culvert approaches, gates, passing areas and machinery operation. The final permanent and temporary disturbance areas must be calculated from a surveyed alignment and engineering design surface.

3.2.2 Permanent Operational Footprint

The fence platform is intended to provide motorbike access for routine inspection and maintenance. The maintained running surface will therefore be treated as a permanent operational footprint rather than temporary construction disturbance.

The permanent footprint will include:

- the fence and supporting posts;
- the maintained inspection and access platform;
- permanent cut-and-fill batters that cannot be restored without affecting fence stability or access;
- culverts and associated foundations;
- permanent streambank and channel protection;
- vehicle and pedestrian gates;
- localised hardstand and turning areas; and
- permanent drainage and erosion-control structures.

The permanent footprint must be distinguished from temporary disturbance when ecological losses and remediation opportunities are quantified.

3.2.3 Temporary Construction Footprint

Temporary construction areas may include machinery work areas, material-storage locations, passing points, temporary access, stream-isolation and diversion areas, temporary spoil storage and additional working space around culverts and gates.

These areas have not been mapped. They will be separately identified in the final construction drawings because they may be capable of remediation following works. Temporary areas will not be located within natural inland wetlands, watercourses, riparian margins, rock outcrops supporting important ecological values or other ecological no-go areas unless no practicable alternative is available and the effects have been specifically assessed.

3.2.4 Cut-and-Fill Batters and Spoil

The feasibility assessment identifies sections where extensive bench cutting will be required to establish a stable platform. Approximately 31% of the assessed alignment was categorised as steep or very steep, with a further 12% classified as medium terrain. Some gully crossings will require substantial quantities of fill, and a zig-zag formation is proposed on the steep ascent from the principal stream crossing to provide motorbike access (Pestproof Fences Ltd 2026).

The width and ecological footprint of these works may extend beyond the assumed 3–5 m corridor. Cut-and-fill volumes, batter profiles, retaining structures and spoil-disposal locations must be confirmed before the affected ecological areas can be calculated. Surplus material must not be placed within wetlands, watercourses, overland-flow paths, riparian margins or other identified ecological constraints.

3.3 Construction Methodology

3.3.1 Indicative Construction Sequence

A project-specific construction methodology has not yet been prepared. Based on construction information provided for comparable Pestproof Fences projects, the likely sequence is:

1. survey set out and confirmation of the approved disturbance limits;
2. ecological demarcation and establishment of no-go areas;
3. vegetation clearance and fence-platform earthworks where required;
4. installation of culverts, permanent drainage structures and access gates;
5. post driving or installation of post foundations;
6. excavation of the trench for the lower mesh or skirt;
7. attachment of fence mesh;
8. installation of capping, brackets and corner components;
9. backfilling of the mesh trench; and
10. stabilisation and revegetation of exposed soil and remediable construction areas.

This sequence is indicative and is derived from a comparable Pestproof Fences feasibility report rather than a confirmed Macraes construction plan (Pestproof Fences Ltd, 2026). The final methodology must be adapted to the Macraes terrain, ecological constraints, climate and construction programme.

3.3.2 Vegetation Clearance and Ground Preparation

Vegetation clearance is expected to be required across the fence platform and in localised areas needed for machinery access, gates and structures. Ground preparation will involve vegetation removal or scalping, topsoil stripping, excavation of soil and rock, bench cutting, fill placement and compaction.

The vegetation-clearance method has not been confirmed. The final construction plan will identify the machinery required, maximum clearance width, treatment of rock, handling of indigenous vegetation and topsoil, and the methods used to stabilise disturbed surfaces.

Route-specific ecological verification must be completed before clearance so that wetlands, TAR plants, important lizard habitat, nesting birds and notable invertebrate habitats can be avoided or appropriately managed. Ecological avoidance and salvage requirements will be incorporated into the construction methodology rather than being determined after earthworks have commenced.

3.3.3 Fence-Platform Formation

The platform will be formed to provide a stable fence foundation and access for construction and subsequent motorbike inspection. Much of the route occurs on favourable flat or undulating terrain, but significant sections cross steep, rocky slopes and deeply incised gullies. These locations may require bench cuts, localised retaining structures, additional drainage controls and placement of engineered fill.

The platform design will avoid creating continuous compacted berms that intercept or redirect surface water. Cross-drainage will maintain existing catchment and wetland inflows, particularly where the fence traverses headwater gullies, seepage areas or diffuse overland-flow paths.

3.3.4 Construction Access and Materials

Existing roads and tracks will be used for construction access where practicable. Any new access outside the permanent fence corridor must be shown on the construction drawings and included in the ecological footprint.

The locations of material storage, refuelling, equipment servicing and temporary spoil storage have not been identified. These facilities will be located away from wetlands and watercourses and managed to prevent sediment, fuel, concrete wash water or other contaminants entering the receiving environment.

3.3.5 Construction Programme and Staging

Pestproof Fences Ltd estimates that a four-person construction team will require approximately two years to construct the feasibility alignment (Pestproof Fences Ltd, 2026). The programme for the additional southern extension has not been provided.

Given the length of the fence and duration of construction, works are expected to proceed progressively. Construction staging will limit the length and duration of exposed earthworks, provide for progressive stabilisation and avoid leaving unstable or unvegetated formations through extended periods of wet

weather. Works within watercourses will be programmed for suitable low-flow periods, subject to seasonal ecological constraints and any applicable consent requirements.

3.4 Waterway Crossings

3.4.1 Crossing Inventory

As the indicative fence alignment crosses the permanent Murphys Creek watercourse and multiple ephemeral tributaries and gullies, supporting infrastructure will be required, which based on the current assessment includes:

- four small inflow culverts;
- three medium inflow culverts;
- four large inflow culverts; and
- one very large outflow culvert at the permanent stream crossing.

The final number, location and size of structures will be confirmed by survey, hydrological assessment and ecological classification of each affected feature.

3.4.2 South-Western Tributaries

The recommended alignment crosses four tributaries in the south-western corner of the enclosure which were described in the feasibility assessment as having ephemeral flows that may cease to flow during summer. Two small culverts with indicative pipe diameters of approximately 200–300 mm and two medium culverts of approximately 530–600 mm were identified, and an existing road culvert on the main tributary which will require replacement (Pestproof Fences Ltd, 2026).

To confirm whether natural inland wetlands are present within these areas, further assessments are required to inform finalised crossing locations and footprints.

3.4.3 Northern Gully Crossings

At least five inflow culverts are anticipated along the northern section of the enclosure, including several relatively large structures. Some gullies are broad and will require substantial fill on the culvert approaches. Extensive platform earthworks may also be required on steep gully sides.

The final design must maintain existing drainage patterns and provide sufficient capacity for debris and flood flows. Culvert approaches and overflow structures must not impound water upstream, drain adjacent wetland habitat or direct concentrated flow into erodible banks or wetland margins.

3.4.4 Permanent-Stream Crossing

The recommended alignment crosses the permanent stream at a comparatively narrow location. The feasibility assessment identifies the need for a large outflow structure founded on a concrete platform. Temporary stream diversion will be required during construction, and fish passage will be provided (Pestproof Fences Ltd, 2026).

The permanent-stream crossing is likely to comprise the largest individual freshwater construction footprint. Detailed design will confirm:

- structure dimensions and foundation requirements;
- the extent and duration of temporary stream diversion;
- the upstream and downstream work limits;
- channel and bank excavation;
- erosion and scour protection;
- flood and debris capacity;
- continuity of aquatic habitat and fish passage;
- construction access and concrete-management methods;
- fish recovery or relocation requirements; and
- post-construction inspection and monitoring criteria.

Fish passage design has been informed by the expected fish community and will be consistent with the New Zealand Fish Passage Guidelines (Franklin *et al.* 2024; Viridis 2026).

3.4.5 Culverts and Pest Exclusion

Culverts and waterway structures will provide effective pest exclusion under low-flow, normal-flow and flood conditions. Typical Pestproof Fences outflow structures use one or more hinged flap gates that rise as flow increases and close as water levels subside. Inflow and outflow structures may also require overflow features to protect the fence during extreme events (Pestproof Fences Ltd, 2026).

The final structures must balance pest-exclusion performance with hydraulic capacity, fish passage, debris conveyance and the maintenance of natural stream and wetland hydrology.

3.5 Operation and Maintenance

3.5.1 Routine Access

The fence platform will provide motorbike access for routine fence inspection and maintenance. Operational access will be limited to authorised fence-maintenance, biosecurity and ecological-management activities. Unnecessary vehicle use and off-track access will be avoided to reduce ecological impacts to the surrounding environment.

3.5.2 Fence Inspection and Repair

Routine inspection will be required to identify damage, corrosion, undermining, vegetation interference and potential routes of pest entry. The inspection programme will include additional checks after high winds, heavy rainfall, flooding, ground movement or other events capable of damaging the fence.

Detailed inspection frequencies, responsibilities, response times and repair methods will be established in a Pest Fence Construction and Maintenance Plan. The plan will also address automated breach alerts

or other surveillance systems, access and gate biosecurity, and procedures for responding to suspected pest incursions.

3.5.3 Culvert and Waterway Maintenance

Culverts, overflow structures and fence-waterway interfaces will require inspection following significant rainfall and flood events. Maintenance may include removal of debris, repair of scour or erosion, reinstatement of disturbed banks and repair or replacement of damaged gate components.

Maintenance must not result in progressive channel enlargement, repeated disturbance of wetlands, loss of fish passage or disposal of debris into downstream habitat. Works affecting a watercourse or wetland will be reviewed by a suitably qualified freshwater ecologist where there is potential for more than minor ecological disturbance.

3.5.4 Vegetation Management

Vegetation adjacent to the fence will require periodic management to maintain the structural integrity of the fence, enable inspection and prevent vegetation from providing a route for unwanted mammalian pests to cross the fence.

Vegetation control will be limited to the minimum width required for fence function and access. Repeated widening of the corridor and blanket herbicide application will be avoided. Vegetation-management methods near wetlands, watercourses, TAR plants and retained indigenous habitat will be specified in the Exclusion Fence Operational Management Procedures.

3.5.5 Drainage and Surface Maintenance

The permanent platform and associated drainage structures will require ongoing maintenance to prevent rutting, ponding, erosion and concentrated sediment discharge. Maintenance will retain the intended cross-drainage and avoid diverting water away from wetlands or increasing flows into sensitive receiving environments.

Any significant widening, reconstruction, replacement of waterway structures or establishment of new access will be treated as additional works and subject to additional ecological assessment/s before implementation.

4 Methods

4.1 Assessment Area and Zone of Influence

The direct assessment footprint comprises the indicative fence alignment and a 5 m buffer on either side, encompassing approximately 4.64 ha of terrestrial and freshwater habitat potentially subject to disturbance during construction, operation and maintenance. This area represents a precautionary assessment envelope rather than the anticipated extent of physical disturbance, which will be limited to the minimum area required.

Consistent with the wider MP4 EcIA, potential indirect effects on terrestrial vegetation and fauna have been considered within 20 m of the direct assessment footprint. This area captures retained habitat that could be affected by dust, weed spread, edge effects, accidental encroachment, noise or disturbance, and does not represent assumed habitat loss.

Natural inland wetlands within 100 m of proposed earthworks have been screened for potential hydrological effects. Where a plausible connection exists, the relevant zone of influence has been determined based on local topography, catchment boundaries, surface-water pathways, groundwater or seepage inputs, and the proposed earthworks.

For freshwater habitats, the zone of influence includes directly affected stream reaches, banks and riparian margins, together with downstream reaches potentially affected by sedimentation, altered flows, scour, impoundment, channel instability or fish-passage effects. The downstream extent has been determined on a site-specific basis.

The assessment footprint and relevant zones of influence will be confirmed and mapped following finalisation of the surveyed fence alignment and detailed design.

4.2 Desktop Review

The desktop assessment reviewed the available project information relevant to ecological values and potential effect pathways, including:

- the MP4 Project Description;
- the June 2026 predator-exclusion fence feasibility assessment;
- the MP4 Assessment of Vegetation and Wetland Values;
- the MP4 Invertebrate Values Assessment;
- the MP4 Lizard Values Assessment;
- the MP4 Avifauna Values Assessment;
- the MP4 Bat Values Assessment;
- the wider MP4 EcIA;
- the terrestrial and wetland residual-effects assessments;
- the terrestrial restoration and wetland management plans; and
- the relevant flora and fauna management and monitoring plans.

These reports provide substantial information on ecological values within MEEA, the wider Murphys Creek catchment and the Macraes landscape. They include vegetation mapping, wetland surveys, targeted fauna investigations, avifauna surveys, invertebrate sampling and extensive lizard surveys undertaken between 2014 and 2026.

4.3 Fenceline Surveys

Preliminary field surveys of the proposed fence footprint were undertaken in August 2026 by two suitably qualified terrestrial and freshwater ecologists to inform this assessment and identify any ecological constraints associated with the proposal. Surveys identified and characterised ecosystem types, including wetlands, riparian vegetation, shrubland, tussockland and exotic grassland, and recorded TAR plants, fauna habitat and associated fauna values within the proposed fence footprint.

Natural inland wetlands were identified in accordance with the current wetland delineation protocols (Ministry for the Environment, 2022).

Existing tracks, disturbed ground and other locations where ecological effects could be reduced through micro-siting were also noted.

Following refinement of the fence design, additional targeted surveys will be undertaken where required to confirm ecological values. As the preliminary surveys did not encompass the full seasonal range of plant expression, rare, cryptic, seasonal or non-flowering species may remain undetected. Further botanical surveys will therefore be completed when the ground is free of snow and seasonal conditions maximise the likelihood of detecting TAR flora. Proposed permanent stream crossings will also be assessed for fish habitat and passage, macroinvertebrate habitat, channel condition, substrate, flow permanence and riparian values.

4.4 Ecological Assessment Method

The assessment of ecological effects has been undertaken primarily in general accordance with the Environmental Institute of Australia and New Zealand (EIANZ) Ecological Impact Assessment Guidelines (EcIAG) for terrestrial and freshwater ecosystems (Roper-Lindsay *et al*. 2018). These guidelines provide a nationally recognised and transparent framework for identifying ecological values, characterising potential effects, and evaluating their magnitude and significance.

While the EcIAG provide the primary technical framework for this assessment, they do not replace the need to consider the statutory and policy context relevant to the proposal. Ecological effects have therefore been evaluated against both the EIANZ methodology and the applicable regulatory framework, with professional judgement applied so that conclusions on effects, significance and management are consistent with ecological best practice and that framework.

This section focuses on assessing project-related effects on terrestrial and wetland ecological values, based upon the activities associated with the proposed works. The magnitude of these ecological effects and the consequent level of effects of each of these activities is described in the sections below.

4.4.1 Step 1: Assigning ecological value

Ecological values are assigned using the EcIAG framework (Roper-Lindsay *et al*. 2018), 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 EcIAG 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; Rolfe *et al.* 2022; de Lange *et al*. 2024; Grainger *et al*. 2018; Hitchmough *et al* 2026; Hoare *et al*. 2026; Robertson *et al.* 2021), or the relevant Otago regional conservation status (Jarvie *et al.* 2025; Jarvie *et al.* 2026).

4.4.2 Step 2: Assessing the magnitude of effects

The magnitude of an effect is a measure of the extent or degree of change that would occur to a value because of an activity. It requires consideration of the timescale and permanence of the effect, whereby temporary (< 25 years), long-term (substantial improvement after 25 years) and permanent (beyond the span of a human generation) effects are considered.

The magnitude of habitat loss was informed by ecosystem extent information at both the Macraes' ED and local OGNZL landholdings scales. The ED provides important landscape context, consistent with the NPS-IB, for assessing significant ecological values. However, the OGNZL landholdings scale was generally adopted as the primary basis for assessing proportional loss and magnitude of effect because it reflects site-specific mapping refined through aerial imagery and ground-truthing. This approach is also precautionary, as it generally produces higher proportional loss estimates than assessment at the broader ED scale.

4.4.3 Assessing Level of Effects

The level of an effect describes the overall severity of an effect, by combining the ecological values with the magnitude of the effect, as described in the matrix, Table 4-1.

Table 4-1. Criteria for describing the level of effects (EIANZ 2018). Where text is italicised, it indicates 'more than minor effects' where mitigation is required.

Magnitude of Effect	Ecological Value				
	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

The EcIAG specifies that:

a. The 'Level of Effect' is used to guide the extent and nature of measures to demonstrably offset and/or compensate for residual effects.
b. Offsetting or compensation measures are considered necessary where the level of effects is assessed as 'Moderate' or higher.

Residual effects are those remaining after avoidance, minimisation, and remediation. Benefits from predator exclusion are reported separately. They are not treated as an automatic offset for construction losses, and existing MP4 compensation gains are not counted twice.

5 Ecological Values

5.1 Landscape Context

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 MEEA is located within the upper Murphys Creek catchment in the Macraes Ecological District. The catchment forms part of a modified pastoral and mining landscape but retains an extensive and connected mosaic of indigenous and semi-natural dryland habitats. These include narrow-leaved snow tussock grassland (hereafter, snow tussock), dry shrubland, schist outcrops and tors, exotic and rank grassland, damp gullies, natural inland wetlands, riparian vegetation and permanent and ephemeral watercourses.

The proposed 252 ha predator-excluded area has been selected in part because it contains a diverse and connected habitat mosaic and supports high indigenous fauna values. Approximately 134.9 ha of tussock grassland, 10.5 ha of dry shrubland, and 7.8 ha of schist rock outcrops and tors have been identified within the predator exclusion area (Bioresearches 2026l), with forty-nine species of nationally or regionally TAR plants. The vegetation and rock systems within the MEEA provide particularly important habitat for indigenous lizards, including the only currently confirmed Otago skink population on OGNZL landholdings, as well as habitat for indigenous birds, and terrestrial invertebrates (Bioresearches, 2026b, 2026c, 2026d).

5.2 Vegetation

5.2.1 Indigenous Vegetation Types

The mapped 5 m permanent construction and maintenance footprint comprises the following vegetation and land-cover types (Whirika, 2026).

Table 5.1. Total area (ha) of vegetation/ecosystem types impacted by the predator-exclusion fence construction and maintenance corridor.

Ecosystem Type	Total Area (ha)
Exotic Grassland	2.4063
Gorse	0.0066
Manuka	0.0036
Riparian	0.036
Wetland	0.07
Road	0.0199
Rock	0.0169
Shrubland	0.0765
Snow Tussock	2.0517
Total	**4.6875**

Approximately 2.21 ha of the mapped footprint comprises indigenous or semi-natural tussock, shrubland, riparian, mānuka and rock habitats, while approximately 2.43 ha comprises exotic grassland, gorse or existing road. Natural inland wetlands are assessed separately in Section 5.4 and are not represented as a discrete vegetation class in the table above.

For consistency with the main MP4 EcIA, ecological values used for the fence assessment follow the corresponding MP4 vegetation and habitat values. Snow tussock grassland is treated as High ecological value, dry shrubland as Moderate, and rock outcrops and tors as Very High. Riparian habitat ranges from Moderate to High depending on vegetation type and condition. Exotic grassland, gorse and existing road are of Low ecological value at the vegetation-community level, although exotic grassland may still provide habitat for indigenous fauna, including At Risk species.

5.2.1.1 Dry Shrubland

Approximately 0.08 ha of dry shrubland occurs within the mapped 5 m footprint. Dry shrubland within the wider Macraes landscape commonly occurs in gullies, on rocky slopes and as patches within tussock and exotic grassland. Although generally modified by historic grazing, burning and pastoral land use, these communities increase structural diversity, support several species of TAR flora and provide habitat for indigenous, lizards, terrestrial invertebrates and shrubland-associated birds.

Dry shrubland is assigned **Moderate** ecological value for the fence assessment, consistent with the project-wide value applied in the MP4 EcIA. This recognises its ecological function and more restricted occurrence relative to grassland while acknowledging that condition, indigenous dominance and floristic diversity vary between individual shrubland patches.

The mapped footprint is small, and local adjustment of the fence alignment will allow higher-quality or structurally complex shrubland patches to be avoided where practicable.

5.2.1.2 Tussock

Tussock grassland is the principal indigenous vegetation type intersected by the fence. The mapped footprint contains approximately 1.61 ha of dense tussock and 0.44 ha of moderately dense tussock, giving a combined mapped area of approximately 2.05 ha.

Snow tussock grassland is widespread within MEEA and the wider Macraes landscape but remains ecologically important as the dominant indigenous dryland vegetation community. It provides habitat for indigenous plants, lizards, terrestrial invertebrates and open-country birds and contributes to habitat continuity across the upper Murphys Creek catchment.

Snow tussock grassland is assigned **High** ecological value for the fence assessment, consistent with the value used in the MP4 EcIA. Condition varies locally, particularly in response to grazing and the abundance of exotic inter-tussock vegetation, but the habitat remains functionally important for several indigenous fauna species.

The full 2.05 ha is conservatively treated as permanent clearance for effects assessment. In practice, complete vegetation removal is not expected throughout this area. Fence installation can occur through retained tussock vegetation in suitable terrain, and the maintenance requirement is principally to retain sufficient vehicle access for inspection and repair rather than to construct a continuously formed road. The ecological effects assessment therefore retain the full mapped area as the conservative quantitative envelope while recognising the likely lower intensity of disturbance within parts of that envelope.

5.2.1.3 Mānuka

Approximately 0.004 ha of mānuka vegetation occurs within the mapped footprint. This is a very small component of the overall corridor, but it contributes to woody indigenous vegetation and local habitat diversity within the tussock and pasture grass-dominated MEEA landscape.

Mānuka is not treated as a separate project-wide ecosystem category in the main MP4 EcIA. For the purposes of this fence assessment, it is considered within the indigenous shrubland value framework and assigned **Moderate** ecological value.

5.2.1.4 Riparian and Wetland Vegetation

Approximately 0.036 ha of mapped riparian vegetation, and 0.07 ha of wetland vegetation occurs within the 5 m fence footprint. Riparian communities occur principally along gullies and watercourses and contribute to bank stability, sediment retention, habitat diversity and ecological connectivity between terrestrial and freshwater environments.

The main MP4 EcIA assigns **Moderate** to **High** ecological values to riparian and wetland vegetation depending on community composition. Sedgeland is generally **Moderate** value, while indigenous freshwater herbaceous vegetation is **Low** to **High value**. Within the fenceline, the broad vegetation mapping has been refined to ‘wetland’ and ‘riparian’ following high-level field verification at the mapped footprint scale. A **Moderate** value has been assigned to riparian and wetland habitats following the high-level field verification as the habitats are relatively low indigenous dominance, with high mammalian browsing degrading the habitat.

The ecological importance of riparian and wetland vegetation is not determined solely by its small, mapped area. These areas can provide disproportionately important habitat and movement connections through otherwise open grassland and can support indigenous flora, lizards, invertebrates and wetland-

associated birds. The final fence position at gully crossings will therefore preferentially minimise disturbance to intact indigenous riparian vegetation.

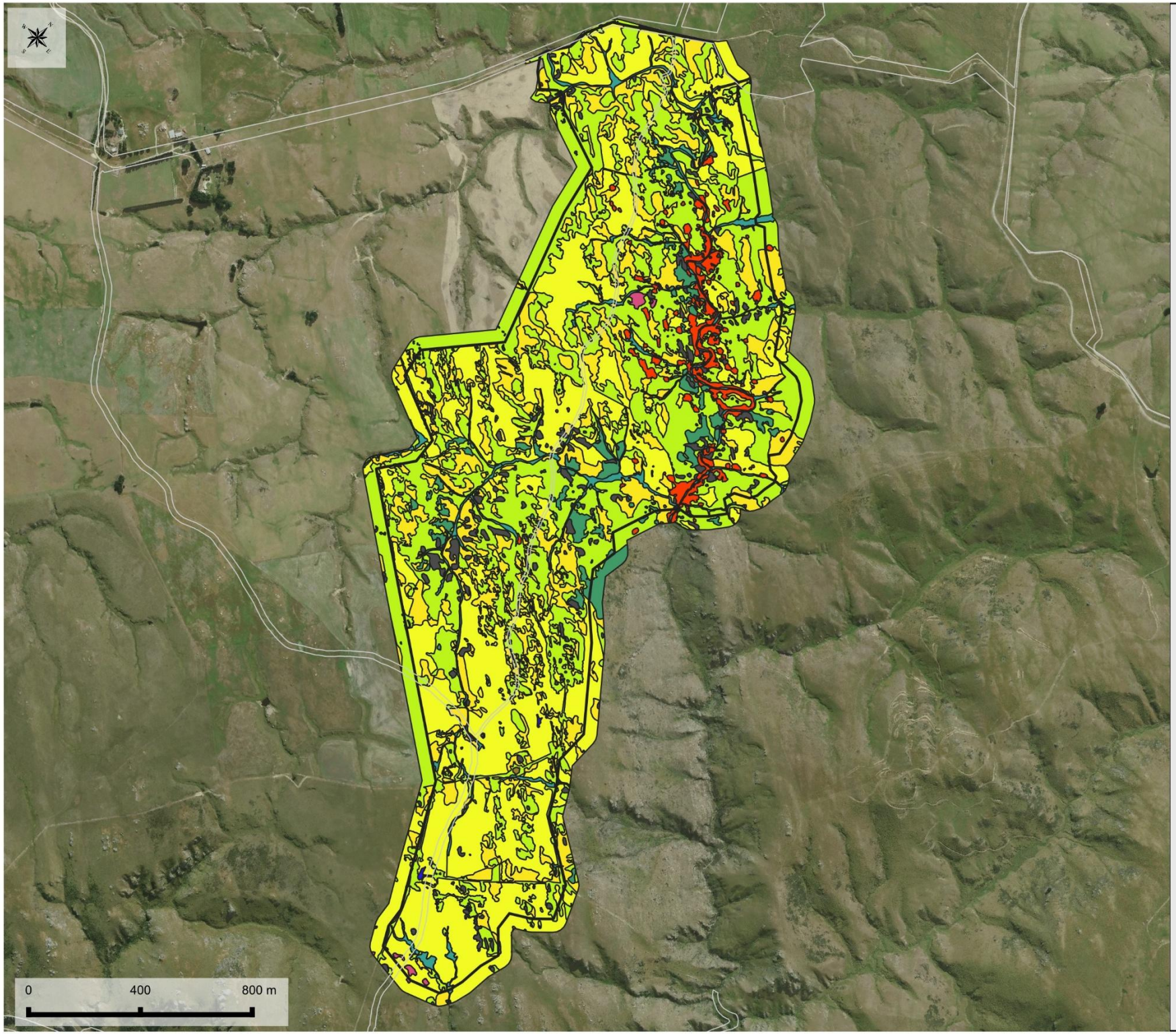
5.2.1.5 Rock outcrops and tors

Approximately 0.02 ha of mapped rock habitat falls within the 5 m assessment footprint. Schist outcrops and tors are distinctive features of the Macraes landscape and provide specialised shallow-soil and crevice habitat for indigenous plants, lizards and terrestrial invertebrates. They cannot be recreated following physical removal.

Rock habitat is assigned a **Very High** ecological value, consistent with the main MP4 EcIA. This value reflects its irreplaceability as a physical habitat feature and its importance for specialist flora and fauna.

Following pages:

Figure 5.1. Vegetation types within and immediately surrounding (+50 m) the predator-exclusion fence.
Figure 5.2. Vegetation types within the anticipated predator-exclusion fence direct impact footprint required for construction and maintenance.



MEEA Pest-proof fence - existing vegetation

Date: 05/08/2026
Drawn By: MA
Client: OceanaGold New Zealand Ltd
Scale: 1:18,168

Legend

- OGL landholdings
- Pest-proof Fence

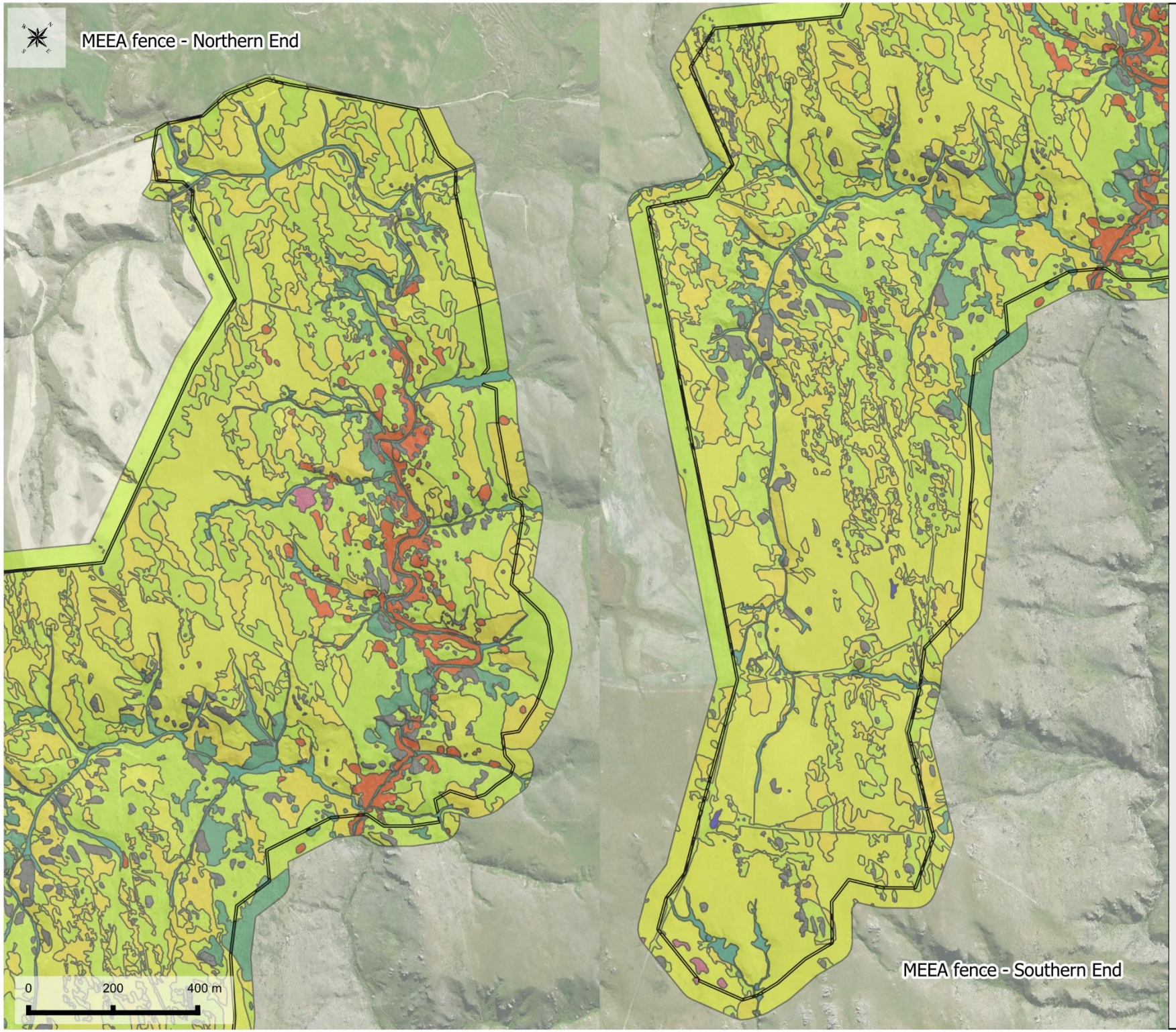
Vegetation types
(Pest-proof fence plus 50m buffer)

- Exotic Grassland
- Gorse
- Pond
- Riparian - Shrubland
- Rock
- Shrubland
- Tussock - Dense
- Tussock - Moderately Dense
- Ephemeral wetland
- Flaxland
- Kanuka
- Macrocarpa
- Manuka
- Riparian

SOURCES
LINZ Basemap aerial

MAP PROJECTION
NZGD2000 / New Zealand Transverse Mercator 2000

Bioresearches
A Babbage Company



MEEA Pest-proof fence - existing vegetation

Date: 05/08/2026
Drawn By: MA
Client: OceanaGold New Zealand Ltd
Scale: 1:12,000

Legend

OGL landholdings

Pest-proof Fence footprint
(Vegetation types)

- Exotic Grassland
- Gorse
- Road
- Rock
- Shrubland
- Tussock - Dense
- Tussock - Moderately Dense

Vegetation types
(Pest-proof fence plus 50m buffer)

- Exotic Grassland
- Gorse
- Pond
- Riparian - Shrubland
- Rock
- Shrubland
- Tussock - Dense
- Tussock - Moderately Dense
- Ephemeral wetland
- Flaxland
- Kanuka
- Macrocarpa
- Manuka
- Riparian

SOURCES
LINZ Basemap aerial

MAP PROJECTION
NZGD2000 / New Zealand Transverse Mercator 2000

Bioresearches
A Babbage Company

5.2.2 TAR Flora

Botanical surveys within the 252 ha predator-exclusion area recorded 370 plant observations representing 162 taxa. Of these, 49 species are classified nationally or regionally as Threatened, At Risk or Data Deficient, or are recognised as locally uncommon within the Macraes ED (Appendix B). Conservation status and ecological value have been assessed in a manner consistent with the wider MP4 vegetation and ecological effects assessments (Whirika, 2026; Bioresearches, 2026f).

The MEEA supports a diverse assemblage of regionally significant flora. Sixteen species are Regionally Threatened, comprising seven Regionally Endangered and nine Regionally Vulnerable species. A further nine species are Regionally At Risk – Declining, 14 are Regionally At Risk – Naturally Uncommon and seven are Regionally Data Deficient. Three species are Regionally Not Threatened but are included because of their national Data Deficient status or local ecological significance.

Ecological values range from Moderate to Very High. Sixteen species are assigned Very High ecological value, reflecting their Regionally Threatened status. Eleven species are assigned High value because they are nationally or regionally Declining, while 22 species are assigned Moderate value, including Naturally Uncommon, Data Deficient and locally uncommon taxa.

The botanical records were spatially compared with the mapped 5 m construction and maintenance corridor and a 20 m precautionary area surrounding it. Three TAR records occur within the 5m buffer footprint (Table 5.2):

- *Rytidosperma pumilum*, nationally Not Threatened but regionally At Risk – Declining and assigned High ecological value;
- *Shawia bullata,* nationally Not Threatened but regionally At Risk – Naturally Uncommon and assigned Moderate ecological value; and
- *Melicytus aff. alpinus* (d) (CHR 541567; "dark"), nationally and regionally Data Deficient and assigned Moderate ecological value.

Four additional conservation-significant records occur within 20 m of the corridor. *Lagenophora barkeri*, a Very High value Regionally Endangered species, occurs approximately 5.6 m from the footprint. *Anthosachne falcis*, a High value Regionally Declining species, occurs approximately 6.0 m from the footprint. *Brachyscome longiscapa*, a Moderate value Regionally Naturally Uncommon species, occurs approximately 13.4 m from the footprint. A second *Melicytus aff. alpinus* (d) record occurs approximately 2.7 m from the footprint.

The remaining conservation-significant records occur more than 20 m from the proposed construction corridor. These records are not expected to be affected by fence construction but are important in characterising the ecological value of the MEEA and the biodiversity that will be protected within the predator-exclusion area.

The botanical records include both targeted sightings and vegetation plot records and do not provide a consistent measure of population abundance for all species. The proportion of individual local populations represented by records within or near the fence corridor cannot therefore be quantified with sufficient

confidence to support population-level effect calculations. This does not constrain avoidance because the known locations can be incorporated into construction constraints mapping and micro-siting.

The existing surveys were conducted across the wider MEEA and were not designed to be a complete census of the final 5 m construction corridor. Additional plants may therefore occur within suitable habitats along the fence route. A pre-construction botanical inspection of the final established corridor is required to confirm the presence or absence of additional Threatened, At Risk, Data Deficient or locally uncommon plants before clearance or earthworks commence.

Table 5.2. Conservation-significant flora recorded within or within 20 m of the 5 m fence construction and maintenance corridor.

Species	National conservation status	Regional conservation status	Ecological value	Relationship to fence corridor
Rytidosperma pumilum	Not Threatened	Regionally At Risk – Declining	High	One record within 5 m footprint
Shawia bullata	Not Threatened	Regionally At Risk – Naturally Uncommon	Moderate	One record within 5 m footprint
Melicytus aff. alpinus (d) (CHR 541567; "dark")	Data Deficient	Regionally Data Deficient	Moderate	One record within footprint and one record approximately 2.7 m outside
Lagenophora barkeri	At Risk – Declining	Threatened – Regionally Endangered	Very High	Nearest record approximately 5.6 m outside footprint
Anthosachne falcis	At Risk – Declining	Regionally At Risk – Declining	High	Nearest record approximately 6.0 m outside footprint
Brachyscome longiscapa	At Risk – Naturally Uncommon	Regionally At Risk – Naturally Uncommon	Moderate	Nearest record approximately 13.4 m outside footprint

5.2.3 Flora values protected within the predator-exclusion area

The conservation-significant flora recorded within MEEA represents an important additional biodiversity value protected by establishment of the predator-exclusion area. All 49 species listed in Appendix B have one or more known records within the 252 ha enclosure.

The Pest Control and Elimination Plan provides for elimination of target mammalian pest species from within the enclosure, including possums, rabbits, hares, deer, pigs and other browsing mammals, followed by ongoing surveillance, fence maintenance and incursion response (Alliance Ecology, 2026). Removal and continued exclusion of browsing mammals is expected to reduce browsing pressure on indigenous vegetation, support natural recruitment and improve the long-term condition and resilience of habitats supporting conservation-significant flora.

The degree of response will vary between species and has not been quantified individually. However, the protection of diverse Threatened, At Risk, Data Deficient and locally uncommon flora within the MEEA represents an anticipated ecological benefit of the fenced area beyond its primary lizard-conservation function. The fence will provide long-term protection to a botanical assemblage that includes 16 Regionally Threatened species and a further 30 Regionally At Risk or Data Deficient species.

5.3 Fauna

5.3.1 Indigenous Lizards

The Murphys Creek catchment supports extensive high-quality lizard habitat comprising tussock grassland, dry shrubland, dense grassland, damp gullies and abundant schist rock outcrops. Surveys undertaken between 2014 and 2026 confirmed four indigenous lizard species within the catchment: McCann's skink (*Oligosoma maccanni*), southern grass skink (*Oligosoma chionochloescens*), kōrero gecko (*Woodworthia* "Otago/Southland large") and Otago skink (*Oligosoma otagense*) (Bioresearches, 2026c).

McCann's skink is nationally and regionally Not Threatened and is assigned **Low** ecological value. It is widespread and abundant within Murphys Creek and occurs across grassland, tussock and rocky habitats.

Southern grass skink is classified At Risk – Declining nationally and At Risk – Regionally Declining in Otago and is assigned High ecological value. The species is abundant within the Murphys Creek landscape, particularly in tussock grassland, dense grassland and damp gully habitats.

Kōrero gecko is also classified At Risk – Declining nationally and At Risk – Regionally Declining in Otago and is assigned High ecological value. Within Macraes, it is strongly associated with schist outcrops, rocky slopes and rock features with suitable cracks and crevices.

Otago skink is classified Threatened – Nationally Increasing and Threatened – Regionally Endangered and is assigned a Very High ecological value. Surveys in February 2026 recorded at least 10 Otago skinks on rock outcrops within Murphys Creek, including different age classes, confirming a viable population. This is the only currently confirmed Otago skink population on OGNZL landholdings and represents an important local conservation value.

The fence footprint crosses extensive habitat suitable for McCann's skink and southern grass skink and includes a small, mapped area of rock habitat potentially suitable for kōrero gecko. The relationship between the final construction line and rocky outcrops requires particular attention during set-out, especially rock habitat occupied Otago skink. The mapped 5 m footprint will not be interpreted as requiring the removal of all rock features within it. Rather, avoidance as far as practicable of all rock features and complete avoidance of occupied Otago skink habitat through local micro-siting will occur and is consistent with the flexible linear nature of the fence proposal.

Overall, lizard value for the fence corridor is assessed as **Very high**.

5.3.2 Avifauna

MEEA supports an avifauna assemblage typical of the modified inland pastoral and dryland landscapes of the Macraes Ecological District, with additional habitat diversity provided by tussock grassland, shrubland, riparian gullies, wetlands and rock outcrops. The MEEA has been assigned Moderate avifauna habitat value in the MP4 Avifauna Values Assessment (Bioresearches, 2026d).

Indigenous species recorded within MEEA include kārearea or eastern falcon (*Falco novaeseelandiae*), South Island pied oystercatcher or tōrea (*Haematopus finschi*) and New Zealand pipit or pīhoihoi (*Anthus*

novaeseelandiae), together with a range of widespread open-country, wetland-associated and shrubland-associated species. The ecological values of individual species are higher than the overall habitat value, where their national or regional conservation status warrants this.

Kārearea and South Island pied oystercatcher are assigned Very High species value under the MP4 assessment, while New Zealand pipit is assigned High value. Other widespread indigenous species are generally of Low species value unless elevated by regional conservation status.

Overall, avifauna habitat value for the fence corridor is therefore assessed as **Moderate**, consistent with the wider MEEA assessment.

The 5 m fence footprint is narrow relative to the habitat available throughout MEEA and largely follows open grassland and tussock habitats. As these habitats provide nesting and foraging habitat for open-country birds, appropriate management measures are proposed to avoid or minimise potential construction-related effects.

5.3.3 Terrestrial Invertebrates

Murphys Creek supports a diverse dryland invertebrate assemblage associated with tussock, dry shrubland, rock outcrops, grassland, riparian habitat and freshwater systems. Notable taxa recorded within MEEA or the wider Murphys Creek catchment include the following, with conservation status for moths following Hoare et al (2026):

- *Patagoniodes farinaria* (a moth), classified At Risk - Declining (Hoare *et al.* 2026);
- *Asaphodes recta* (a moth), classified At Risk - Declining (Hoare *et al*. 2026);
- *Bityla sericea* (a moth), classified At Risk - Naturally Uncommon (Hoare *et al.* 2026);
- *Wiseana mimica* (a porina moth), classified Data Deficient (Hoare *et al.* 2026);
- *Zelandobius uniramus* (a stonefly), classified Data Deficient (Grainger *et al.* 2018); and
- *Hemiandrus maia* (the Otago ground wētā), classified Not Threatened (Trewick *et al.* 2022).

Hemiandrus maia was recorded in relatively high numbers during lizard trapping within Murphys Creek. *Bityla sericea*, *Patagoniodes farinaria*, and *Wiseana mimica* were recorded as individual moths, and *Zelandobius uniramus* was detected through environmental DNA sampling in the wider catchment (Bioresearches, 2026b).

The wider MP4 assessment assigns High ecological value to the terrestrial invertebrate community whilst species-specific values vary with High values for *Patagoniodes farinaria* and *Asaphodes recta*, Moderate values for *Bityla sericea*, *Wiseana mimica* and *Zelandobius uniramus*, and Low value for *Hemiandrus maia*.

The 5 m fence footprint contains tussock, shrubland, riparian vegetation, rock and exotic grassland, all of which can support indigenous invertebrates. For assessment of the broader habitat function of the corridor, terrestrial invertebrate habitat is assigned a **High** ecological value, consistent with the project-wide MP4 assessment.

5.4 Natural Inland Wetlands

A fence-specific wetland assessment identified natural inland wetlands intersected by the current fence alignment. The affected wetlands comprise freshwater herbaceous wetland and sedgeland wetland. Both vegetation types are assigned **Moderate** ecological value for the predator-exclusion fence assessment, consistent with the values applied to these particular wetlands in the current MP4 wetland assessment.

No ephemeral wetland has been identified within the current fence impact footprint. The available information provides Moderate to High confidence in the ecological value assigned to the directly affected freshwater herbaceous and sedgeland wetlands and in the approximate scale of the mapped interaction. Final construction set-out will nevertheless continue to minimise wetland disturbance where practicable.

5.5 Streams and Watercourses

The fence crosses the Murphys Creek drainage network, including one permanent watercourse and several ephemeral or intermittently flowing gullies. These features form part of the ecological connectivity of the catchment and may provide aquatic habitat, riparian habitat and movement pathways between the upper catchment and downstream receiving environments.

The existing MP4 terrestrial and wetland investigations provide useful catchment context but do not provide sufficient fence-specific information to assign an EIANZ ecological value to aquatic habitat at each proposed crossing. However, MP4 Aquatic Environment Effects report has assessed the values and effects of the predator-exclusion fence on Murphys Creek. Based on this assessment the ecological value of Murphys Creek is considered to be **Moderate** (Viridis 2026). Where crossing design requires bed or bank disturbance, the relevant freshwater values will be confirmed before the effects assessment is finalised.

5.6 Summary of Ecological Values

The ecological values relevant to the predator-exclusion fence are summarised below (Table 5.3). Vegetation and habitat values have been aligned with the values used in the main MP4 EcIA, while the fence-specific wetland values reflect the current wetland assessment.

Table 5.3. Ecological value assigned to each ecological component and the estimated area for the proposed fence corridor.

Ecological component	Area within conservative footprint (where available)	Ecological value
Terrestrial Vegetation		
Narrow-leaved snow tussock grassland	2.0517 ha	High
Dry shrubland	0.0765 ha	Moderate
Mānuka	0.0036 ha	Moderate
Rock outcrops and tors	0.0169 ha	Very High
Riparian vegetation	0.036 ha	Moderate to High
Exotic grassland, gorse and road	2.4328 ha	Low vegetation value
Threatened and At Risk flora	Not quantified	High to Very High, species-specific
Fauna		
Lizard habitat/community	Throughout suitable terrestrial habitat	Very high

Ecological component	Area within conservative footprint (where available)	Ecological value
Otago skink	Occupied habitat to be avoided through micro-siting	Very High
Southern grass skink	Habitat widespread within corridor	High
Kōrero gecko	Principally associated with rock habitat	High
McCann's skink	Habitat widespread within corridor	Low
Terrestrial invertebrate habitat/community	Throughout suitable terrestrial habitat	High
Avifauna habitat	Throughout corridor	Moderate
Freshwater components		
Freshwater herbaceous wetland	Part of 0.07 ha temporary disturbance and 0.041 ha permanent vegetation clearance	Moderate
Sedgeland wetland	Part of 0.07 ha temporary disturbance and 0.041 ha permanent vegetation clearance	Moderate
Permanent stream and other watercourses	Crossing locations identified	Moderate[A]

[A] Ecological value assessment provided by Viridis (2026).

The highest ecological values relevant to fence design are associated with rock habitat, Otago skink and Threatened or At Risk flora. Tussock grassland and terrestrial invertebrate habitats are also of High value, although these habitats are extensive within MEEA and the wider Macraes landscape. Wetlands directly intersected by the current alignment comprise Moderate-value freshwater herbaceous and sedgeland communities, and aquatic environments have Moderate value (Viridis 2026).

The 4.64 ha terrestrial footprint used in this assessment is deliberately conservative. It assumes permanent clearance across the full 5 m corridor for quantitative assessment purposes, notwithstanding that actual vegetation removal will be less in parts of the alignment because fence construction does not require continuous ground stripping, and local micro-siting will be used to avoid discrete high-value features. This distinction is considered when assessing the magnitude of ecological effects in Section 6.

6 Assessment of Ecological Effects

This section assesses the magnitude and resulting level of ecological effects arising from construction, operation and maintenance of the predator-exclusion fence. Ecological values are described in Section 5 and are combined with the magnitude of effect using the EIANZ EcIA framework described in Section 4. Subsequent avoidance, minimisation, remediation, salvage or other ecological management measures and the resulting residual levels of effect, are addressed in Section 7.

The intended ecological benefits of predator exclusion are also not used to reduce the adverse-effect ratings in this section. Those benefits form part of the wider MP4 biodiversity compensation package and are considered separately from the physical effects of constructing and maintaining the fence.

6.1 Precautionary approach

The proposed permanent construction and maintenance corridor has been mapped at a width of 5 m, giving a terrestrial assessment footprint of 4.64 ha. For assessment purposes, the full 5 m corridor is treated as permanently affected; however, this is conservative, and detailed design will incorporate avoidance measures for sensitive ecological features where opportunities provide. In many places, fence construction will involve driving posts and installing mesh through existing vegetation without clearing the full corridor. Similarly, operational access is required to inspect and repair the fence but does not necessarily require a continuously formed vehicle track. The full mapped corridor has nevertheless been used so that potential effects are not underestimated.

The same approach has been applied to the 0.02 ha of mapped rock habitat within the corridor. The full mapped overlap is treated as potentially affected before management, even though individual rock outcrops and other rock features will subsequently be avoided through local adjustment of the fence alignment.

The final fence alignment can be adjusted locally during detailed set-out. No allowance for this micro-siting has been made in the pre-management assessment. The full mapped overlap with tussock grassland, shrubland, riparian vegetation, mānuka and rock habitat is therefore treated as affected. The benefit of subsequent micro-siting is addressed in Section 7.

For wetlands, the assessment uses the fence-specific estimates of 0.029 ha of temporary disturbance and 0.014 ha of permanent vegetation clearance. The permanent effect is treated as vegetation clearance rather than loss of wetland extent because the available assessment indicates that wetland hydrology and other wetland processes will be retained.

Positive ecological effects associated with predator exclusion are considered separately and are not offset against adverse effects when determining the magnitude or level of effect.

6.2 Limitations and Constraints

No botanical survey can guarantee detection of all species present, particularly rare, cryptic, seasonal or non-flowering taxa. As surveys did not encompass the full seasonal range of plant expression, some species, including spring-flowering TAR flora, may have remained undetected. Accordingly, the presence

and distribution of TAR flora within the full 5 m corridor are not yet completely defined and will require confirmation through additional targeted botanical surveys, proposed over spring and summer 2026/2027.

Similarly, the distribution of individual lizard species within the corridor has not been comprehensively assessed but is well understood based on survey work in the general vicinity of the fence alignment over the past five years. Similarly, while the current distribution of the Murphys Creek Otago skink population is relatively well known, further survey work over spring and summer 2026/2027 will be undertaken to improve confidence that the final fence alignment is appropriate for protection of this population.

Notable terrestrial invertebrates have been recorded within MEEA and the wider Murphys Creek catchment, but their distribution, and that of important host plants or specialised microhabitats, is not known at the scale of the proposed fence corridor.

The aquatic assessment of the Murphys Creek crossing and the other watercourse crossings has been provided by Viridis (2026), and we rely on their assessment for the assignment of aquatic ecological values and quantification of effects on fish, aquatic macroinvertebrates, and aquatic habitats.

Confidence is High for the mapped terrestrial vegetation footprint and Moderate to High for the identified wetland effects. Confidence is Moderate for general fauna habitat effects. Confidence is lower for species-specific flora and fauna effects where occurrence within the corridor has not been confirmed. However, it is emphasised that pre-construction verification will be undertaken to support final micro-siting and confirm that conservation-significant flora and fauna are avoided.

6.3 Magnitude and level of effect

6.3.1 Summary of pre-management effects

Table 6.1 summarises the pre-management magnitude and level of effect associated with construction of the predator-exclusion fence. Detailed descriptions of the magnitude of effects assignments and justifications are provided in the sections that follow, and avoidance, minimisation, remediation, and other management measures are addressed in Section 7.

Moderate pre-management effects are associated with the potential loss of Very High-value rock habitat and effects on lizard communities, including possible disruption to habitat connectivity for Otago skink. Pre-management effects on all other ecological components are assessed as Very Low to Low.

This assessment conservatively assumes the complete loss of approximately 0.02 ha of rock (not occupied by Otago skink) and does not account for changes to the alignment to avoid rock features or important lizard habitats.

Table 6.1. The pre-management magnitude and level of effect associated with construction the predator-exclusion fence for each of the assessed ecological components.

Ecological component	Ecological value	Assessed effect	Pre-management magnitude	Pre-management level of effect
Tussock grassland	High	2.0517 ha permanent loss/modification	Low	Low
Dry shrubland	Moderate	0.0765 ha permanent loss/modification	Low	Low
Mānuka	Moderate	0.0036 ha permanent loss/modification	Negligible	Very Low
Rock habitat	Very High	0.0169 ha permanent assessed interaction	Low	Moderate
Riparian vegetation	Moderate to High	0.0565 ha permanent loss/modification	Low	Low
Exotic grassland, gorse and road	Negligible vegetation value	2.4328 ha permanent modification	Low	Very Low
Threatened, At Risk, Data Deficient and locally uncommon flora	Very High	Three records in fence 5m corridor	Low	Moderate
Lizard habitat/community	Very High	Loss of 4.64 ha of potentially suitable habitat and potential mortality	Low	Moderate
McCann's skink	Low	Habitat loss and potential mortality	Low	Very Low
Southern grass skink	High	Habitat loss and potential mortality	Low	Low
Kōrero gecko	High	Potential rock-habitat loss and mortality	Low	Low
Otago skink	Very High	Potential disruption to habitat connectivity	Low	Moderate
Avifauna habitat	Moderate	Habitat loss and construction disturbance	Low	Low
Terrestrial invertebrate habitat/ community	High	Habitat loss and potential mortality	Low	Low
Freshwater herbaceous wetland	Moderate	Part of 0.102 ha temporary disturbance and 0.059 ha permanent vegetation clearance	Low	Low
Sedgeland wetland	Moderate	Part of 0.102 ha temporary disturbance and 0.059 ha permanent vegetation clearance	Low	Low
Murphys Creek and ephemeral/ intermittent watercourses[A]	Moderate	Permanent crossing and temporary construction disturbance	Refer to Viridis (2026)	Refer to Viridis (2026)

[A] Assessment undertaken by Viridis (2026). Refer to that report for details.

6.3.2 Terrestrial vegetation and habitat

The permanent terrestrial assessment footprint is 4.64 ha. Approximately 2.21 ha comprises tussock grassland, shrubland, riparian vegetation, mānuka and rock habitat. The remaining approximately 2.43 ha comprises exotic grassland, gorse and existing road.

The principal effect is permanent loss or modification of vegetation and habitat within the 5 m corridor. Other effects may include local soil disturbance, increased edge exposure, weed establishment, altered surface drainage and repeated disturbance associated with maintenance access. These effects are expected to remain largely within or immediately adjacent to the permanent corridor and have not been assigned a separate spatial footprint.

6.3.2.1 Snow Tussock

The corridor contains 1.61 ha of dense tussock and 0.44 ha of moderately dense tussock, giving a total affected area of 2.05 ha. Approximately 134.9 ha of tussock grassland occurs within the wider MEEA. The assessed footprint, therefore, represents approximately 1.5% of the tussock grassland within the proposed enclosure.

The affected area is narrow and linear and is not expected to materially alter the distribution or connectivity of tussock grassland within MEEA. The magnitude of effect is therefore assessed as Low. When considered against the High ecological value of the snow tussock grassland, this results in a **Low** pre-management level of effect.

6.3.2.2 Dry shrubland

Approximately 0.08 ha of dry shrubland occurs within the permanent footprint. Approximately 10.5 ha occurs within MEEA, so the assessed loss represents less than 1% of the shrubland within the enclosure. The affected area is small and is not expected to materially alter the extent or connectivity of shrubland within MEEA.

The magnitude of effect is assessed as Low. Given the Moderate ecological value of the dry shrubland, the resulting pre-management level of effect is **Low**.

6.3.2.3 Mānuka

Approximately 0.004 ha of mānuka occurs within the mapped corridor. This is a very small area, and its loss is not expected to result in a measurable change in the distribution or ecological function of indigenous woody vegetation within MEEA.

The magnitude of effect is assessed as Negligible. Given with Moderate ecological value of mānuka, the pre-management level of effect is **Very Low**.

6.3.2.4 Rock habitat

Approximately 0.02 ha of mapped rock habitat occurs within the 5 m corridor. Approximately 7.8 ha of rock habitat occurs within MEEA, so the mapped overlap represents about 0.2% of the rock habitat within the enclosure.

Rock habitat warrants separate consideration because schist tors and outcrops are effectively irreplaceable physical features and provide specialised habitat for plants, lizards and terrestrial invertebrates. The pre-management assessment assumes that the full 0.02 ha mapped overlap may be affected.

Although the proportional loss is small, physical loss or modification of rock habitat is permanent. The magnitude of effect is assessed as Low, though as the rock habitat has Very High ecological value, the resulting pre-management level of effect is **Moderate**.

6.3.2.5 Riparian vegetation

Approximately 0.036 ha of riparian vegetation occurs within the mapped footprint, principally where the fence crosses gullies and watercourses. Potential effects include vegetation removal, local soil disturbance and modification of bank margins.

The affected extent is small and distributed among discrete crossing locations. The broader riparian network within the Murphys Creek catchment will remain intact. The magnitude of effect is assessed as Low. Riparian vegetation within the corridor ranges from Moderate ecological value. In either case, the resulting pre-management level of effect is **Low**.

6.3.2.6 Exotic grassland, gorse and existing road

Approximately 2.43 ha of the permanent footprint comprises exotic grassland, gorse and existing road. These land-cover types have Low vegetation-community value, although some areas provide habitat for indigenous fauna.

The magnitude of effect within this vegetation type is Low and the resulting level of effect is **Very Low**.

6.3.3 Threatened, At Risk, Data Deficient and locally uncommon flora

Construction of the predator-exclusion fence could affect conservation-significant flora through direct clearance or ground disturbance within the 5 m construction corridor and through accidental disturbance immediately outside the approved footprint. This may be from excavation, fence-skirt installation, post installation, machinery movement, vehicle access, spoil placement, local drainage modification, sediment deposition and maintenance activities.

Three known conservation-significant plant records occur within the mapped construction footprint (Figure 6.1). These are: *Rytidosperma pumilum*, assigned High ecological value, *Shawia bullata*, assigned Moderate ecological value, and *Melicytus aff. alpinus* (d), assigned Moderate ecological value. Four additional conservation-significant records occur within 20 m of the footprint, including the Very High-value *Lagenophora barkeri*.

The available records are sufficient to identify locations requiring avoidance for TAR flora but are insufficient to reliably estimate locations of unsurveyed or cryptic species, as well as the proportion of the relevant local populations potentially represented by these individual records.

Known conservation-significant plant locations will be treated as ecological constraints during final fence set-out. Minor local adjustment of the fence alignment is practicable and is expected to avoid direct loss of the three known records within the current footprint. Plants occurring within 20 m will also be protected from construction encroachment where they could reasonably be affected.

A pre-construction botanical inspection will be undertaken along the final set-out corridor to identify any additional conservation-significant plants. Any additional records will be incorporated into the ecological constraints mapping before clearance or earthworks commence.

On this basis, avoidance rather than salvage is the primary effects-management response. If all known and newly identified conservation-significant plants are avoided, there will be no direct loss of recorded Threatened, At Risk, Data Deficient or locally uncommon plants from construction of the fence. The residual effect on these species is therefore expected to be **Negligible**. Confidence in this conclusion is High provided the pre-construction botanical inspection and micro-siting requirements are implemented.

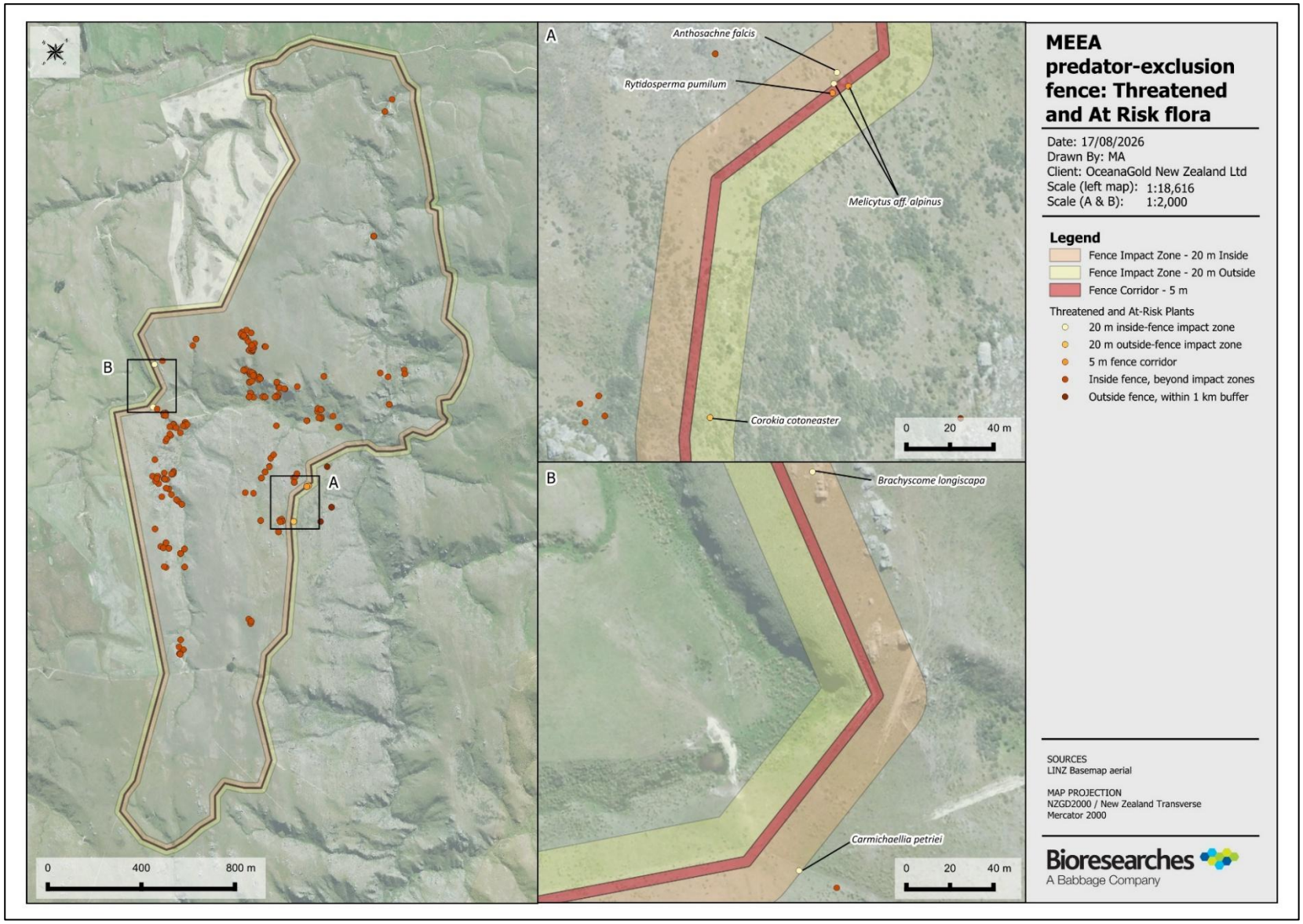


Figure 6.1. Threatened and At Risk flora records within MEEA and potential predator-exclusion fence impacts. Note that one Not Threatened species (*Corokia cotoneaster*) is shown within the buffer area.

6.3.4 Indigenous Fauna

6.3.4.1 Indigenous lizards

Fence construction may affect lizards through habitat loss or modification, direct injury or mortality during vegetation clearance and earthworks, and disturbance or destruction of occupied refugia.

6.3.4.1.1 McCann's skink

McCann's skink is widespread and abundant within Murphys Creek and uses a broad range of grassland, tussock and rocky habitats. The fence footprint affects a small proportion of the available habitat. Individual animals could be injured or killed during unmanaged vegetation clearance or earthworks, but the affected area is not expected to result in a material reduction in the local population or available habitat. At the local population scale, the magnitude of habitat loss and potential mortality is assessed as Low. McCann's skink has Low ecological value, resulting in a **Very Low** pre-management level of effect.

6.3.4.1.2 Southern grass skink

Southern grass skink is abundant within Murphys Creek and occurs in tussock grassland, dense grass, damp gullies and wetland margins. These habitats occur within the fence footprint. The proposed corridor will modify a small proportion of the available habitat. Individual animals could be injured or killed during unmanaged vegetation clearance or earthworks, but the affected area is not expected to result in a material reduction in the local population or available habitat.

The magnitude of effect is assessed as Low. Southern grass skink has **High** ecological value, resulting in a **Low** pre-management level of effect.

6.3.4.1.3 Kōrero gecko

Kōrero gecko is strongly (but not exclusively) associated with schist outcrops and creviced rock habitat. The affected rock represents a small proportion of the rock habitat retained within MEEA. Individual animals could be injured or killed during unmanaged vegetation clearance or earthworks, but the affected area is not expected to result in a material reduction in the local population or available habitat. The magnitude of effect is assessed as **Low**. Kōrero gecko has **High** ecological value, giving a **Low** pre-management level of effect.

6.3.4.1.4 Otago skink

Otago skink is of **Very High** ecological value. Murphys Creek supports the only confirmed population currently known on OGNZL landholdings, and records include multiple age classes consistent with an established breeding population.

The proposed fenceline avoids the rock outcrop habitat currently occupied by Otago skink (Figure 6.2). The primary ecological effect considered is potential disruption to habitat connectivity downstream within the Murphys Creek catchment. It is not known whether Otago skink occur downstream of the known population; if they do, there is potential for reduced gene flow within the wider catchment population. However, a large area of unoccupied, high-quality Otago skink habitat exists upstream and within surrounding tributaries inside the predator-exclusion fence, providing long-term population viability for the species. The fence construction is therefore considered to have only a **Low** magnitude of effect on Otago skink, resulting in a **Moderate** pre-management level of effect.

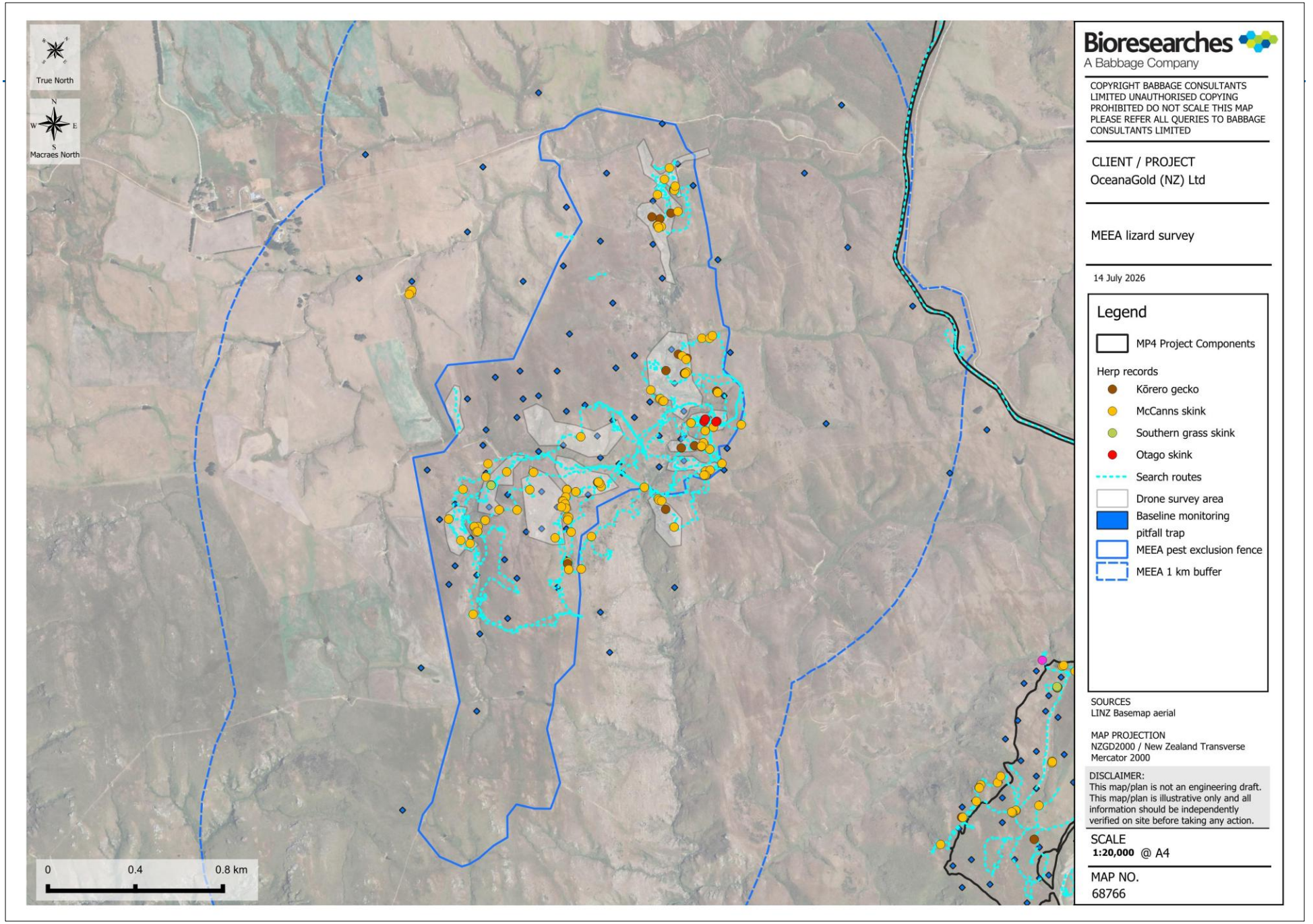


Figure 6.2. Lizard records from the survey undertaken as part of MP4, showing the location of Otago skinks in relation to the MEEA predator-exclusion fence alignment.

6.3.4.2 Avifauna

MEEA has Moderate overall avifauna habitat value. The fence corridor affects a narrow strip of tussock, exotic grassland, shrubland and riparian habitat that may be used for feeding, movement or breeding. Permanent habitat loss is small relative to the approximately 252 ha enclosed area and is not expected to materially reduce habitat availability for mobile bird species. The magnitude of habitat loss is assessed as Low, resulting in a **Low** pre-management level of effect.

Construction during the breeding season presents a separate risk. Ground-nesting and low-nesting indigenous birds may establish nests within grassland, tussock, shrubland or riparian vegetation within the works area. Destruction or disturbance of an active nest could have a greater ecological consequence than habitat loss alone, particularly for species with elevated ecological value.

Because nest locations vary between seasons and cannot be reliably predicted before construction, a separate species-specific pre-management rating has not been assigned to breeding effects.

6.3.4.3 Terrestrial invertebrates

Construction could result in permanent loss or modification of invertebrate habitat and direct mortality of ground-active, soil-dwelling and vegetation-associated invertebrates. Relevant habitats include tussock grassland, shrubland, rock, riparian vegetation and exotic grassland. The permanent fence corridor is small relative to the connected habitat available within wider MEEA. At the community scale, the effect is not expected to materially alter habitat availability, connectivity or persistence of the wider indigenous invertebrate assemblage.

The magnitude of effect on the High-value terrestrial invertebrate community is assessed as **Low**. The resulting pre-management level of effect is **Low**.

Several invertebrates of conservation interest have been recorded within MEEA or the wider Murphys Creek catchment, including *Bityla sericea*, *Asaphodes recta*, *Wiseana mimica*, and *Zelandobius uniramus*. *Hemiandrus maia* (Not Threatened) has also been recorded in relatively high numbers within Murphys Creek. The presence and distribution of these species within the fence corridor have not been specifically determined; species-specific levels of effect have therefore not been assessed, and the magnitude of effect on these species has instead been incorporated into the invertebrate community/habitat assessment.

6.3.5 Natural inland wetlands

The fence-specific wetland assessment identifies nine natural inland wetlands crossed by the proposed fence. The affected communities comprise freshwater herbaceous wetland and sedgeland, both assigned Moderate ecological value.

6.3.5.1 Temporary construction effects

Using a conservative earthworks allowance extending approximately 5 m either side of the fence alignment, approximately 0.029 ha of natural inland wetland may be temporarily disturbed. Potential effects include vegetation disturbance, local soil disturbance and short-term alteration of surface-water

pathways. These earthworks will be temporary in nature, with the ground will be re-levelled to form a consistent base of wetland extent. The affected areas are expected to retain their underlying wetland hydrology and processes once construction is complete.

During earthworks, a minor diversion in surface water flows may occur, however these will also be temporary in nature. The predator-exclusion fence construction includes a skirt underground to prevent burrowing pests from infiltrating the fence. These wetlands are likely to predominantly surface water fed due to their position with the catchment and gully contours, with some groundwater inputs. While the skirts may present a minor dam to groundwater flows, the surface water catchment will be sufficient to retain wetland features. The fencing material is mesh which will allow surface water flows to continue through the mesh fence material, and no decreases in surface water volume, flow regularity or saturation are expected to occur.

The fence-specific wetland assessment assigns a Low magnitude of effect. Combined with Moderate ecological value, the pre-management level of effect is **Low**.

6.3.5.2 Permanent vegetation clearance

The 5 m operational corridor will result in permanent vegetation clearance within nine wetlands. Individual affected areas range from approximately 8 m² to 118 m², with a cumulative area of approximately 0.041 ha of wetland extent. This is approximately 0.8% of the wetland vegetation mapped within the predator-exclusion fence area. The effect is permanent in relation to vegetation cover but is not assessed as loss of wetland extent. Wetland hydrology, soils and associated wetland processes are expected to remain.

The magnitude of effect is assigned as Low. Combined with Moderate ecological value, the pre-management level of effect is **Low**.

6.3.6 Streams and ephemeral watercourses

The fence crosses Murphys Creek and several ephemeral or intermittent tributaries and gullies and specifically designed culverts will be required to accommodate the fence. Viridis (2026) provides an ecological assessment of aquatic effects, assigning a magnitude of **Moderate** to the effect of the proposed predator-exclusion fence construction on Murphys Creek, and indicating that this can be mitigated to **Low**.

The assessment of effects on aquatic ecological features, including appropriate effects management, is described in section 5.3.8 of the Aquatic Environmental Effects Assessment produced by Viridis (2026) and is not discussed further in this report.

6.3.7 Other direct and indirect effects

Construction and maintenance may also result in erosion and sediment generation, dust deposition, weed establishment, local alteration of surface drainage, repeated vehicle disturbance, rutting, herbicide exposure and disturbance of fauna. Provided ongoing maintenance remains within the assessed 5 m

corridor, these effects are unlikely to materially increase the spatial extent of habitat loss. Their ecological consequences are therefore largely captured within the receptor-specific assessments above.

The fence may also affect the free movement of certain life stages of some fauna (e.g., adults of some lizard and terrestrial invertebrate species and potentially some fish). This is due to the small fence mesh aperture size required to exclude mice as well as the design of waterway structures (culverts). Smaller sized lizards, including juvenile Otago skinks, and juvenile Otago ground wēta will be able to pass freely through the fence.

6.3.8 Cumulative effects

The predator-exclusion fence forms part of the wider MP4 compensation package but also has a physical ecological footprint. Potential adverse effects associated with its construction are additional and cumulative and need to be assessed alongside the ecological effects expected from other impacts associated with the MP4 Project. Importantly, the effects cannot be offset against the ecological benefits of the predator exclusion fence itself because the fence specifically provides compensation for residual MP4 Project effects.

At the vegetation-community scale, the additional losses associated with the fence are small relative to the wider MP4 effects and are not expected to materially change the project-wide magnitude categories assigned to tussock grassland, shrubland or rock habitat under the MP4 Project. The 0.059 ha of permanent wetland vegetation clearance has been identified as a permanent vegetation effect, with Low to Moderate levels of pre-management effect.

Effects on indigenous lizards and terrestrial invertebrates are anticipated as part of the fence construction, with Low to Moderate levels of pre-management effects over and above the ecological effects expected from other impacts associated with the MP4 Project.

These cumulative effects, and the magnitude of these effects, will be addressed independently through the application of avoidance, minimisation and remediation measures as outlined in subsequent sections of this report.

7 Effects Management and Residual Effects

The ecological effects identified in Section 6 will be managed through avoidance, minimisation and remediation, applied in that order. Residual effects are assessed after these measures have been taken into account. Offsetting or compensation is only relevant where an adverse residual effect remains that warrants further management.

The fence differs from most MP4 construction activities because there is considerable flexibility to adjust the alignment over short distances without materially changing the area enclosed or the ecological function of the predator-exclusion fence. This provides an important opportunity to avoid discrete ecological features such as rock tors, occupied lizard habitat, TAR flora and localised wetland or riparian values.

The full 5 m corridor has been treated as permanently affected in Section 6 to provide a conservative pre-management assessment. This does not mean that the entire corridor will be physically cleared. Fence construction will often involve installation of posts and mesh through retained vegetation, while maintenance requires sufficient access to inspect and repair the fence rather than a continuously formed road. Minimising actual ground disturbance within this 5 m envelope is therefore an important part of effects management.

The ecological benefits provided by predator exclusion are not treated as avoidance, minimisation or remediation of the fence construction effects. Those benefits are already part of the wider MP4 compensation package and are considered separately when accounting for the overall ecological outcomes of MP4.

7.1 Design integration

Suitably qualified terrestrial and freshwater ecologists will review any subsequent fence alignment, associated construction areas and proposed waterway crossings before finalisation to identify areas of ecological constraints, inform the design and minimise and/or avoid effects on identified ecological values. The review will incorporate all ecological information available for the MEEA, including mapped vegetation and wetlands, rock outcrops and tors, known lizard records and habitat, records of TAR flora and any localised habitat or host plants important for notable terrestrial invertebrates.

Additional botanical surveys will be undertaken by a suitably qualified botanist prior to finalised plans and construction to confirm the location of TAR flora within the final fence corridor and associated infrastructure areas. Survey findings will inform any required micro-siting, with no-go areas established where necessary to prevent accidental disturbance.

Existing management plans prepared for the wider MP4 project including the Vegetation and TAR Flora Management Plan, Lizard Management and Monitoring Plan, Avifauna Management and Monitoring Plan, Invertebrate Management and Monitoring Plan and Wetland management documents will be applied to the predator-exclusion fence and associated works where relevant. For TAR flora the primary response will be avoidance through micro-siting, with salvage, propagation or relocation methodologies outlined

within the Vegetation and TAR Flora Management Plan used only where avoidance is demonstrated to be impracticable.

7.2 Avoidance

TAR flora and other high-value ecological features will be treated as constraints during final fence set-out, with micro-siting used to avoid them wherever practicable. Key avoidance measures include:

- TAR flora: Known Threatened, At Risk, Data Deficient and locally uncommon plants, together with immediately supporting habitat, will be avoided. A pre-construction botanical inspection will identify any additional plants within or near the works, and protective no-go areas will be established where required.
- Otago skink habitat: The final alignment will be checked against current Otago skink records and occupied habitat within Murphys Creek. Occupied rock habitat will be avoided through localised alignment adjustments.
- Rock habitat: Substantial schist tors and deeply creviced rock will be avoided where practicable due to their high ecological value, limited replaceability, and importance as habitat for indigenous plants, lizards and terrestrial invertebrates.
- Wetlands and riparian habitat: Wetlands, intact riparian vegetation and other discrete high-value habitats will be avoided through micro-siting where practicable.

Disturbance boundaries and ecological no-go areas will be clearly demarcated before works commence to avoid accidental encroachment.

Where complete avoidance is not practicable, effects will be minimised and managed through the measures described in Sections 7.3 and 7.4 and the relevant MP4 ecological management plans.

7.3 Minimisation

Where ecological effects cannot be completely avoided, the extent and intensity of disturbance will be minimised through detailed design, construction controls and application of species-specific management plans.

The full 5 m corridor has been used as a conservative permanent assessment footprint, but complete clearance or formation is not expected throughout this width. Vegetation and ground disturbance will be limited to the minimum area necessary to construct, inspect and maintain the fence. Existing tracks, exotic grassland and previously disturbed ground will be used where practicable, and indigenous vegetation will be retained within the corridor where it does not interfere with fence construction, operation or maintenance. Temporary work areas will be located outside wetlands, rock habitat, TAR plant locations and other identified ecological constraints.

Disturbance of rock habitat will be limited to the minimum necessary where complete avoidance is not practicable. Smaller loose rock displaced during construction will be retained locally where suitable for reinstatement, while substantial tors, deeply creviced rock and other important refugia will be avoided in accordance with Section 7.2.

Potential effects on lizards and terrestrial invertebrates will be managed in accordance with the Lizard Management and Monitoring Plan and Invertebrate Management and Monitoring Plan. This will include the Project ecologist/ herpetologist walking the fence alignment and searching vegetation and habitat features for lizards and invertebrates, as well as relocating in smaller refuges (e.g., small rocks or other debris that are manageable by hand) outside of the potential impact footprint (i.e., outside of the 5 m footprint but within 20–30 m of where the feature was found). The Project ecologist will also supervise any machine clearance of established vegetation (e.g., tussock clumps, shrubs) and will implement salvage and relocation protocols where lizards or invertebrates are encountered. Vegetation or host plants of known notable invertebrates will be retained where practicable or managed in conjunction with the relevant flora relocation and re-establishment procedures as outlined in the Vegetation and TAR Flora Management and Residual Effects Terrestrial Restoration Plans (Bioresearches 2026g, n).

Where works are undertaken during the bird breeding season, pre-works nest surveys will be completed in accordance with the Avifauna Management and Monitoring Plan. Active nests will be avoided using the species-specific buffers and management procedures set out in that plan.

Wetland and riparian effects will be minimised by limiting disturbance at crossings, retaining natural hydrological connections and surface-water pathways, and confining works to the approved footprint. Vegetation clearance will be restricted to the minimum width required for fence construction and operation, with erosion and sediment controls implemented throughout works. Fence mesh will maintain surface-water movement across the alignment, and earthworks will avoid intercepting or concentrating runoff. Temporarily disturbed areas will be reinstated promptly, including restoration of local ground levels and drainage pathways and, where practicable, salvage and replanting of suitable indigenous wetland vegetation.

Watercourse crossings will be designed to minimise bed, bank and riparian disturbance. Culverts will maintain flow continuity, accommodate sediment and debris, avoid upstream impoundment and outlet scour, and provide fish passage where required. Refer to the section 5.3.8 of the Aquatic Environmental Effects Assessment (Viridis 2026) for more detail.

7.4 Remediation

Temporary construction areas, access routes, construction margins and remediable batters will be reinstated as soon as practicable following completion of works within areas that are not required for the permanent operation and maintenance of the fence. Remediation measures will include, where applicable:

- removal of temporary construction materials and access controls;
- reinstatement of stable landform and natural surface-water pathways;
- replacement of salvaged topsoil or suitable growth media;
- remediation of indigenous vegetation;
- stabilisation of exposed soil;
- weed management; and
- monitoring until the required establishment and stability outcomes have been achieved.

Topsoil, vegetation sods, rock material and other suitable ecological substrates will be salvaged separately where they can be effectively reused. Vegetation direct transfer may be appropriate in localised areas of

tussock, wetland-margin vegetation or other intact indigenous cover, subject to confirmation by the project botanist and identification of suitable receiving areas. Material will not be transferred where doing so will introduce weeds or cause additional ecological disturbance.

For TAR flora, remediation is not relied upon as the primary effects-management response and known TAR plants will be avoided through fence micro-siting wherever practicable. If avoidance of an identified plant is subsequently demonstrated to be impracticable, species-specific salvage, propagation, relocation and monitoring will be undertaken in accordance with methodologies outlined in the Vegetation and TAR Flora Management Plan and under the direction of a suitably qualified botanist. These measures will be treated as a contingency response rather than as a substitute for practicable avoidance.

Temporary disturbance to wetland or riparian vegetation will be reinstated using salvaged vegetation, substrate or appropriate indigenous planting where practicable, while maintaining the hydrological processes necessary to sustain the affected wetland. Remediation will not alter the permanent requirement to maintain vegetation clearance immediately adjacent to the fence where this is necessary for pest exclusion and inspection.

Remediation will not be attributed to the maintained fence platform, permanent batters, gates, culverts or other areas required for long-term fence operation. These areas form part of the permanent ecological footprint and are accounted for as residual effects.

Remediation performance will be assessed against the following outcomes:

- stable landform with no active construction-related erosion;
- maintenance of intended drainage and no construction-related wetland impoundment or drying;
- no ongoing sediment discharge from remediated areas;
- establishment of the intended indigenous vegetation or demonstrated natural recovery;
- control of environmental weeds;
- stable waterway margins and crossing approaches where affected; and
- no unresolved construction-related damage to adjoining ecological features.

7.5 Residual effects

Residual effects are assessed after the avoidance, minimisation, and remediation measures described above have been applied. Table 7.1 sets out how the pre-management level of effect responds to the application of management measures, resulting in the overall residual level of effect for each ecological component.

Table 7.1. Summary of residual effects for each ecological component assessed.

Ecological component	Pre-management level of effect	Management response	Residual level of effect
Snow tussock grassland	Low	Retain vegetation where practicable and minimise physical clearance through detailed design	Low
Dry shrubland	Low	Micro-site around higher-quality patches and minimise clearance	Low
Mānuka	Very Low	Avoidance and retention through micro-siting	Very Low
Rock habitat	Moderate	Avoidance and retention through micro-siting	Very Low

Ecological component	Pre-management level of effect	Management response	Residual level of effect
Riparian vegetation	Low	Minimise crossing width and retain or reinstate vegetation	Low
Exotic grassland, gorse and road	Very Low	Restrict disturbance to approved corridor	Very Low
Threatened and At Risk flora	Moderate	Targeted survey and avoidance; species-specific management where unavoidable	Very Low
Lizard habitat/community	Moderate	Habitat avoidance as far as practicable, pre-clearance management (search-salvage-relocation), habitat reinstatement where practicable	Low
McCann's skink	Very Low	Habitat avoidance as far as practicable, pre-clearance management (search-salvage-relocation), habitat reinstatement where practicable	Very Low
Southern grass skink	Low	Habitat avoidance as far as practicable, pre-clearance management (search-salvage-relocation), habitat reinstatement where practicable	Very Low
Kōrero gecko	Low	Avoid occupied rock habitat, pre-clearance management (search-salvage-relocation), habitat reinstatement where practicable	Very Low
Otago skink	Moderate	Avoid all occupied habitat	Low
Avifauna habitat	Low	Nest checks, nest avoidance and habitat-footprint minimisation	Low
Terrestrial invertebrate habitat/ community	Low	Habitat avoidance as far as practicable, pre-clearance management (search-salvage-relocation), habitat reinstatement where practicable, species or host-plant management as required	Very Low
Freshwater herbaceous wetland	Low	Minimise disturbance, maintain hydrology and reinstate temporary areas	Low
Sedgeland wetland	Low	Minimise disturbance, maintain hydrology and reinstate temporary areas	Low
Murphys Creek and ephemeral/ intermittent watercourses[A]	Refer to Viridis (2026)	Refer to Viridis (2026)	Refer to Viridis (2026)

[A] Assessment undertaken by Viridis (2026). Refer to that report for details.

After management is applied, residual effects may remain but micrositing and localised management will ensure that potential effects are no higher than Low across all ecological components. Accordingly, no biodiversity offsetting or compensation package specific to the fence construction is considered necessary.

8 Monitoring and adaptive management

8.1 Construction monitoring

Ecological monitoring before and during construction will verify implementation of the avoidance and minimisation measures identified in this assessment and confirm that:

- works remain within the approved disturbance footprint;
- ecological exclusion areas are maintained;
- fauna management procedures are implemented;
- erosion and sediment controls remain effective;
- natural surface-water pathways are maintained; and
- temporarily disturbed areas are progressively stabilised.

If previously unidentified TAR flora or other significant ecological values (i.e., Otago skinks) are encountered, works will cease in the immediate area until the feature has been assessed by a suitably qualified ecologist. Appropriate measures will then be implemented, which may include localised adjustment of the fence alignment and implementation of management protocols (such as establishment of exclusion areas) as outlined in the relevant MP4 management plans.

8.2 Wetland and watercourse monitoring

The nine affected wetlands will be inspected following construction to confirm that surface-water pathways have been retained, temporary disturbance has been reinstated, and no unintended ponding, drainage, erosion or sediment deposition has occurred.

Watercourse structures will be inspected following commissioning and after significant flood events. Monitoring will identify blockage, erosion, scour, bank instability, upstream impoundment and any indication that flow continuity or fish passage has been compromised.

Where construction-related adverse effects are identified, appropriate corrective measures will be implemented, including drainage or crossing modifications, erosion repair and stabilisation, weed control, or revegetation, as required.

8.3 Remediation monitoring

Temporarily disturbed areas will be monitored until landform stability, drainage, and vegetation recovery are established. Monitoring will assess erosion, bare ground, indigenous vegetation recovery, weed establishment, and whether vehicle use is extending beyond the intended maintenance corridor. Wetland remediation will also confirm that hydrological conditions and wetland vegetation are recovering as intended. Monitoring duration will follow the relevant MP4 management plans (Table 2.1) and continue where performance criteria have not been achieved.

8.4 Operational monitoring

Routine fence inspections will identify ecological effects associated with ongoing maintenance. Inspections will check for progressive widening of the access corridor, rutting, erosion, sediment discharge, altered drainage, weed spread and repeated disturbance of sensitive habitat. Culverts and other waterway structures will be monitored and maintained to remain clear and stable and continue to pass flows, debris and aquatic fauna as intended.

Maintenance requiring disturbance outside the approved footprint, substantial modification of a waterway structure or additional clearance of high-value habitat will be subject to ecological review before works proceed, except where immediate action is required to address an emergency.

8.5 Reporting

Following construction, an ecological completion report will document the final fence alignment and disturbance footprint, ecological features affected or avoided, any TAR flora or notable fauna encountered, salvage or remediation undertaken, and any outstanding monitoring or corrective actions.

The ecological completion report will be prepared within six months of completion of fence construction to document construction outcomes and identify any residual issues requiring corrective action or further ecological management where necessary.

9 Summary

The proposed predator-exclusion fence will establish an approximately 252 ha predator-excluded area within MEEA and forms part of the wider MP4 biodiversity compensation package. Though the fence will establish a permanent linear disturbance corridor through a range of indigenous habitats, including tussock grassland, shrubland, riparian vegetation, wetlands, rock habitat and areas used by indigenous fauna, predator exclusion is expected to provide substantial long-term ecological benefits. Reduced predation pressure across the 252 ha enclosed area will improve the survival and recruitment of indigenous fauna, including Otago skink, and support the recovery and resilience of associated habitats and ecological communities.

The use of a 5 m permanent assessment corridor provides a conservative basis for assessing the effects of construction and maintenance with the actual vegetation and ground disturbance expected to be lower in parts of the alignment.

Based on the assessment, Very Low to Moderate levels of pre-management effects can be demonstrably reduced through avoidance, minimisation and remediation measures, resulting in Very Low to Low residual effects across all ecological components. Accordingly, no biodiversity offsetting or compensation package specific to the fence construction is considered necessary.

10 References

Alliance Ecology. (2026). Pest control and elimination plan. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026a). *Terrestrial and wetland ecology summary*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026b). *Assessment of invertebrate values*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026c). *Assessment of lizard values*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026d). *Assessment of avifauna values*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026e). *Assessment of bat values*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026f). *Ecological impact assessment*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026g). *Vegetation and TAR flora management plan*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026h). *Wetland management plan*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026i). *Invertebrate management and monitoring plan*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026j). *Lizard management and monitoring plan*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026k). *Avifauna management and monitoring plan*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026l). *Residual effects analysis: Terrestrial ecology*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026m). *Residual effects analysis: Wetlands*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026n). *Residual effects terrestrial restoration plan*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026o). *Residual effects wetland management plan*. Report prepared for OceanaGold (New Zealand) Limited.

Bioresearches. (2026p). *Ecological impact assessment: Murphys Ecological Enhancement Area predator-exclusion fence*. Report prepared for OceanaGold (New Zealand) Limited.

de Lange, P. J., Gosden, J., Courtney, S. P., Fergus, A. J., Barkla, J. W., Beadel, S. M., Champion, P. D., Hindmarsh-Walls, R., Makan, T., & Michel, P. (2024). *Conservation status of vascular plants in Aotearoa New Zealand, 2023*. New Zealand Threat Classification Series 43. Department of Conservation.

***Fast-track Approvals Act 2024*,** Public Act 2024 No 56 (NZ) (as at 1 July 2026).

Franklin, P., Baker, C., Gee, E., Bowie, S., Melchior, M., Egan, E., Aghazadegan, L., & Vodjansky, E. (2024). *New Zealand fish passage guidelines* (2nd ed., Version 2.01). National Institute of Water and Atmospheric Research.

Grainger, N., Harding, J., Drinan, T., Collier, K., Smith, B., Death, R., Makan, T., & Rolfe, J. (2018). *Conservation status of New Zealand freshwater invertebrates, 2018.* New Zealand Threat Classification Series 28. Department of Conservation.

Hitchmough, R., Barr, B., Knox, C., Lettink, M., Monks, J. M., Patterson, G. B., Reardon, J. T., van Winkel, D., Makan, T., & Michel, P. (2026). *Conservation status of reptiles in Aotearoa New Zealand, 2025*. New Zealand Threat Classification Series 50. Department of Conservation.

Hoare, R. J. B., Edwards, E. D., Knox, C., Frost, W. T., & Michel, P. (2026). *Conservation status of Lepidoptera (moths and butterflies) in Aotearoa New Zealand, 2025*. New Zealand Threat Classification Series 51. Department of Conservation.

Jarvie, S., Knox, C., Monks, J. M., Purdie, S., Reardon, J., & Campbell, C. (2025). *Regional conservation status of reptile species in Otago*. Otago Regional Council, Otago Threat Classification Series 2024/5.

Jarvie, S., McKinlay, B., Palmer, D., Rawlence, N. J., Thomas O. (2026). Regional conservation status of birds in Otago. Otago Regional Council, Otago Threat Classification Series, 2026/2

Ministry for the Environment. (2022). *Wetland delineation protocols* (ME 1713).

Ministry for the Environment. (2026a). *National Policy Statement for Freshwater Management 2020* (consolidated as at 15 January 2026).

Ministry for the Environment. (2026b). *National Policy Statement for Indigenous Biodiversity 2023* (consolidated as at 15 January 2026).

OceanaGold (New Zealand) Limited. (2026). *Macraes Phase Four Project description: Fast-track Approvals Act 2024*.

Otago Regional Council. (2026a). *Regional Plan: Water for Otago* (updated to 2 April 2026).

Otago Regional Council. (2026b). *Otago Regional Policy Statement 2021*.

Pestproof Fences Ltd. (2026). *Pest exclusion fencing feasibility report #2: Macraes, Waitaki District, Otago*. Report prepared for Alliance Ecology.

Resource Management (National Environmental Standards for Freshwater) Regulations 2020, LI 2020/174 (NZ) (as at 15 January 2026).

Robertson, H. A., Baird, K. A., Elliott, G. P., Hitchmough, R. A., McArthur, N. J., Makan, T. D., Miskelly, C. M., O'Donnell, C. F. J., Sagar, P. M., Scofield, R. P., Taylor, G. A., & Michel, P. (2021). *Conservation status of birds in Aotearoa New Zealand, 2021*. New Zealand Threat Classification Series 36. Department of Conservation.

Rolfe, J. R., Hitchmough, R., Michel, P., Makan, T., Cooper, J. A., De Lange, P. J., ... & Molloy, J. (2022). New Zealand threat classification system manual 2022. Department of Conservation Te Papa Atawhai.

Roper-Lindsay, J., Fuller, S. A., Hooson, S., Sanders, M. D., & Ussher, G. T. (2018). *Ecological impact assessment: EIANZ guidelines for use in New Zealand: Terrestrial and freshwater ecosystems* (2nd ed.). Environment Institute of Australia and New Zealand.

Trewick, S., Hegg, D., Morgan-Richards, M., Murray, T., Watts, C., Johns, P., Michel, P. (2022). Conservation status of Orthoptera (wētā, crickets and grasshoppers) in Aotearoa New Zealand, 2022. New Zealand Threat Classification Series 39. Department of Conservation, Wellington. 28 p.

Viridis (2026). Aquatic Environmental Effects Assessment. Report prepared for OceanaGold (New Zealand) Limited. 73 p.

Whirika. (2026). *Vegetation and wetland values assessment: Macraes Phase 4 Fast-track Project*. Report prepared for OceanaGold New Zealand Limited.

***Wildlife Act 1953*,** Public Act 1953 No 31 (NZ) (as at 25 June 2026).

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
CONSERVATION-SIGNIFICANT FLORA RECORDED WITHIN THE MEEA PREDATOR EXCLUSION AREA

Table D.1 summarises all plant species recorded within the approximately 252 ha MEEA predator-exclusion area that are nationally or regionally Threatened, At Risk or Data Deficient, or locally uncommon. Ecological values follow the approach applied in the wider MP4 EcIA, with the higher national or regional conservation significance used to inform species value.

The table contains 49 species represented by 123 botanical records. The number of records is an occurrence count and will not be interpreted as an estimate of plant abundance or population size. Distances are calculated from the nearest recorded location to the mapped 5 m fence construction and maintenance footprint.

All species in Table D.1 occur within the proposed predator-exclusion area and will therefore be within the area managed for elimination and ongoing exclusion of target mammalian pest species. The expected degree of benefit will differ among species and has not been quantified individually.

Table C.1. Threatened, At Risk, Data Deficient and locally uncommon flora recorded within the approximately 252 ha MEEA predator-exclusion area

Species	National conservation status	Regional conservation status	Ecological value	Records in MEEA	Relationship to 5 m fence footprint
Aciphylla subflabellata	At Risk – Declining	Threatened – Regionally Vulnerable	Very High	2	>20 m; nearest 78.6 m
Anthosachne falcis	At Risk – Declining	At Risk – Regionally Declining	High	8	Within 20 m; nearest 6.0 m
Brachyscome longiscapa	At Risk – Naturally Uncommon	At Risk – Regionally Naturally Uncommon	Moderate	2	Within 20 m; nearest 13.4 m
Cardamine grandiscapa	At Risk – Naturally Uncommon	Regionally Data Deficient	Moderate	6	>20 m; nearest 186.3 m
Carex aff. testacea (CHR 282870; "mountain")	At Risk – Naturally Uncommon	Regionally Data Deficient	Moderate	1	>20 m; nearest 157.0 m
Carex buchananii	At Risk – Declining	Threatened – Regionally Vulnerable	Very High	1	>20 m; nearest 133.3 m
Carex colensoi	Not Threatened	At Risk – Regionally Declining	High	1	>20 m; nearest 186.3 m
Carex subtilis	Data Deficient	Threatened – Regionally Endangered	Very High	1	>20 m; nearest 217.1 m
Carex tenuiculmis	At Risk – Declining	Threatened – Regionally Endangered	Very High	1	>20 m; nearest 161.2 m
Carmichaelia petriei	At Risk – Declining	At Risk – Regionally Declining	High	9	>20 m; nearest 21.5 m
Celmisia hookeri	At Risk – Naturally Uncommon	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 152.4 m
Chaerophyllum ramosum	Data Deficient	Regionally Not Threatened	Moderate	2	>20 m; nearest 217.4 m
Colobanthus apetalus	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 271.5 m
Colobanthus strictus	Not Threatened	At Risk – Regionally Declining	High	2	>20 m; nearest 161.1 m
Coprosma intertexta	At Risk – Declining	Threatened – Regionally Vulnerable	Very High	3	>20 m; nearest 205.1 m
Coprosma virescens	At Risk – Declining	Threatened – Regionally Vulnerable	Very High	1	>20 m; nearest 175.0 m

Species	National conservation status	Regional conservation status	Ecological value	Records in MEEA	Relationship to 5 m fence footprint
Cystopteris tasmanica	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	2	>20 m; nearest 162.8 m
Dracophyllum frondosum	At Risk – Naturally Uncommon	Threatened – Regionally Vulnerable	Very High	3	>20 m; nearest 135.8 m
Epilobium billardiereanum	At Risk – Declining	Regionally Data Deficient	High	2	>20 m; nearest 222.0 m
Epilobium cinereum	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 271.5 m
Epilobium insulare	At Risk – Declining	Threatened – Regionally Vulnerable	Very High	4	>20 m; nearest 153.3 m
Gingidia grisea	At Risk – Naturally Uncommon	At Risk – Regionally Declining	High	19	>20 m; nearest 46.5 m
Isolepis basilaris	At Risk – Naturally Uncommon	Threatened – Regionally Endangered	Very High	1	>20 m; nearest 55.3 m
Isolepis inundata	Not Threatened	Regionally Data Deficient	Moderate	2	>20 m; nearest 162.0 m
Isolepis reticularis	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 160.4 m
Juncus distegus	Not Threatened	At Risk – Regionally Declining	High	2	>20 m; nearest 160.8 m
Juncus pusillus	At Risk – Naturally Uncommon	Threatened – Regionally Vulnerable	Very High	1	>20 m; nearest 147.4 m
Lagenophora barkeri	At Risk – Declining	Threatened – Regionally Endangered	Very High	8	Within 20 m; nearest 5.6 m
Lemna disperma	Not Threatened	Regionally Data Deficient	Moderate	1	>20 m; nearest 159.5 m
Leptinella pusilla	At Risk – Declining	Threatened – Regionally Endangered	Very High	2	>20 m; nearest 177.3 m
Lilaeopsis ruthiana	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 146.0 m
Lobelia ionantha	At Risk – Declining	Threatened – Regionally Endangered	Very High	1	>20 m; nearest 55.3 m
Luzula picta var. *limosa*	Not Threatened	Regionally Data Deficient	Moderate	2	>20 m; nearest 227.2 m
Melicytus aff. alpinus (d) (CHR 541567; "dark")	Data Deficient	Regionally Data Deficient	Moderate	4	One record within 5 m footprint; another approximately 2.7 m outside
Mentha cunninghamii	At Risk – Declining	At Risk – Regionally Declining	High	3	>20 m; nearest 135.8 m
Shawia bullata	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	2	One recorded within 5 m footprint
Shawia lineata	At Risk – Declining	At Risk – Regionally Declining	High	1	>20 m; nearest 159.5 m
Pellaea calidirupium	At Risk – Naturally Uncommon	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 166.0 m

Species	National conservation status	Regional conservation status	Ecological value	Records in MEEA	Relationship to 5 m fence footprint
Poa pusilla	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 166.0 m
Pterostylis tristis	At Risk – Declining	Threatened – Regionally Vulnerable	Very High	1	>20 m; nearest 84.0 m
Ranunculus aff. reflexus (CHR 394270; Mt Peel)	At Risk – Declining	At Risk – Regionally Naturally Uncommon	High	1	>20 m; nearest 379.5 m
Ranunculus royi	Data Deficient	Threatened – Regionally Vulnerable	Very High	1	>20 m; nearest 172.4 m
Rytidosperma corinum	Data Deficient	Regionally Not Threatened	Moderate	2	>20 m; nearest 127.1 m
Rytidosperma pumilum	Not Threatened	At Risk – Regionally Declining	High	1	One record within 5 m footprint
Senecio dunedinensis	Threatened – Nationally Endangered	Threatened – Regionally Endangered	Very High	1	>20 m; nearest 152.4 m
Sophora microphylla	Not Threatened	Regionally Not Threatened; locally uncommon	Moderate	4	>20 m; nearest 121.4 m
Stackhousia minima	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	3	>20 m; nearest 88.1 m
Veronica rakaiensis	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 191.7 m
Vittadinia australis	Not Threatened	At Risk – Regionally Naturally Uncommon	Moderate	1	>20 m; nearest 325.6 m

APPENDIX C
PRELIMINARY WETLAND AND WATERWAY CROSSING SCHEDULE

Table 10.1. Preliminary crossing information derived from the feasibility report.

Route area	Indicative crossing	Available information	Required confirmation
South-western corner	Four inflow culverts	Two small and two medium; ephemeral flows; one existing road culvert replaced.	Coordinates, wetland status, catchment, hydraulic design and footprint.
Main stream	One very large outflow structure	Permanent stream; concrete foundation; temporary diversion and fish passage required.	Fish values, hydraulic design, diversion, bed and bank footprint and monitoring criteria.
Left bank ascent	One small inflow culvert	Small gully west of main stream crossing.	Coordinates, watercourse/wetland classification and design.
Northern section	At least five inflow culverts	Some relatively large; wide gullies may require substantial fill.	Final number, ecological classification, fill footprint and scour protection.
Overall cost schedule	12 structures	Four small, three medium, four large inflow culverts and one very large outflow structure.	Reconcile with surveyed crossing schedule and final alignment.

Applicability and Limitations

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of OceanaGold New Zealand Limited as our client with respect to the brief.

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.

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