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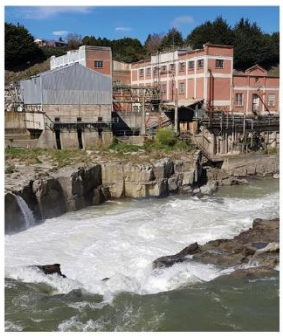

April 2023

Barrytown Mineral Sand Mine
Avian Management Plan

Submitted to:
TiGa Minerals and Metals Limited

water fauna flora land

Quality Assurance

This report has been prepared and reviewed by the following:

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Table of Contents

Index to Tables

Index to Figures

Appendices

1.0 Introduction

1.1 Overview

TiGa Minerals and Metals Limited ('TiGa') proposes a mineral sand mine located on farmland near Barrytown, approximately 30km north of Greymouth. The mining area adjoins artificially constructed wetlands which provide habitat for a range of indigenous bird species, some of which are considered to be threatened or at risk. The proposed mine is also located near the only known breeding colony of tāiko (Westland petrel, *Procellaria westlandica*).

This management plan has been prepared to address potential effects on 'threatened' and 'at risk' birds using the area to be mined and immediate surrounds. This plan provides for detection and monitoring of breeding birds within the mining area, protection of any nests from human disturbance and introduced predators, restrictions on lighting and traffic movements during darkness to avoid effects on tāiko, management of any grounded tāiko and monitoring of birds using the site and the adjoining lagoon area to inform operational decisions and species management.

The data collected will be compiled and presented in an annual bird management plan to be used in adaptively managing the operations to protect the birds at the site and provided to Greymouth District Council, Te Runanga o Ngāti Waewae and the Buller/Kawatiri Department of Conservation office in Westport.

1.2 Background

TiGa proposes to construct and operate a mineral sand mine located north of Canoe Creek and west of State Highway 6 on the Barrytown flats approximately 30 km north of Greymouth. The location of the proposed mine is shown in Figure 1.

The mine would be set back from State Highway 6 and the property at 3261 Coast Road. Barrytown JV Limited also proposes a setback of 20 m from Collins Creek, the property boundaries and the coastal lagoon. Vegetation throughout the area to be mined comprises farm pasture growing on land which has previously been 'humped and hollowed' to improve drainage for farming.

The proposal is to undertake progressive strip mining across the site moving from west to east and south to north. Each open strip would be approximately 75 m x 100 m wide and no more than 8 ha would be "open" at any one time[1]. The indicative mining approach is shown in Figure 2.

One year of seasonal bird surveys including five-minute counts and the use of acoustic recorders was undertaken at the site between April 2022 and January 2023 as reported in Ecological Solutions Limited (2023) and this was combined with database records in eBird to identify the species likely to be present at the site.

Species present were generally exotic or common native species. A total of 40 species were confirmed using the site including nine species of conservation concern as shown in Table 1.

[1] This includes rehabilitated areas.

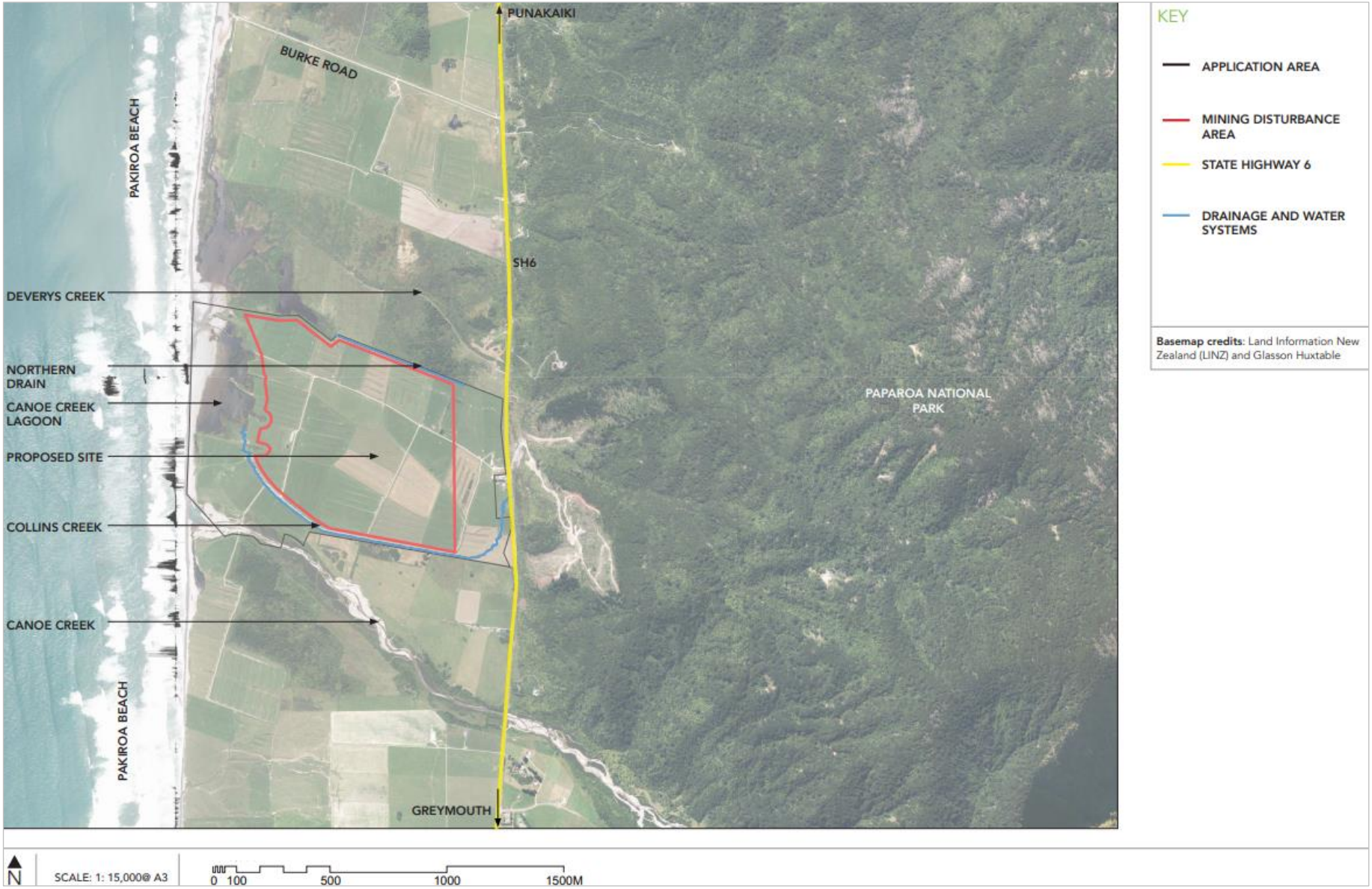

Figure 1: Location of the proposed mineral sand mine at Barrytown (from Glasson Huxtable Landscape Architects).

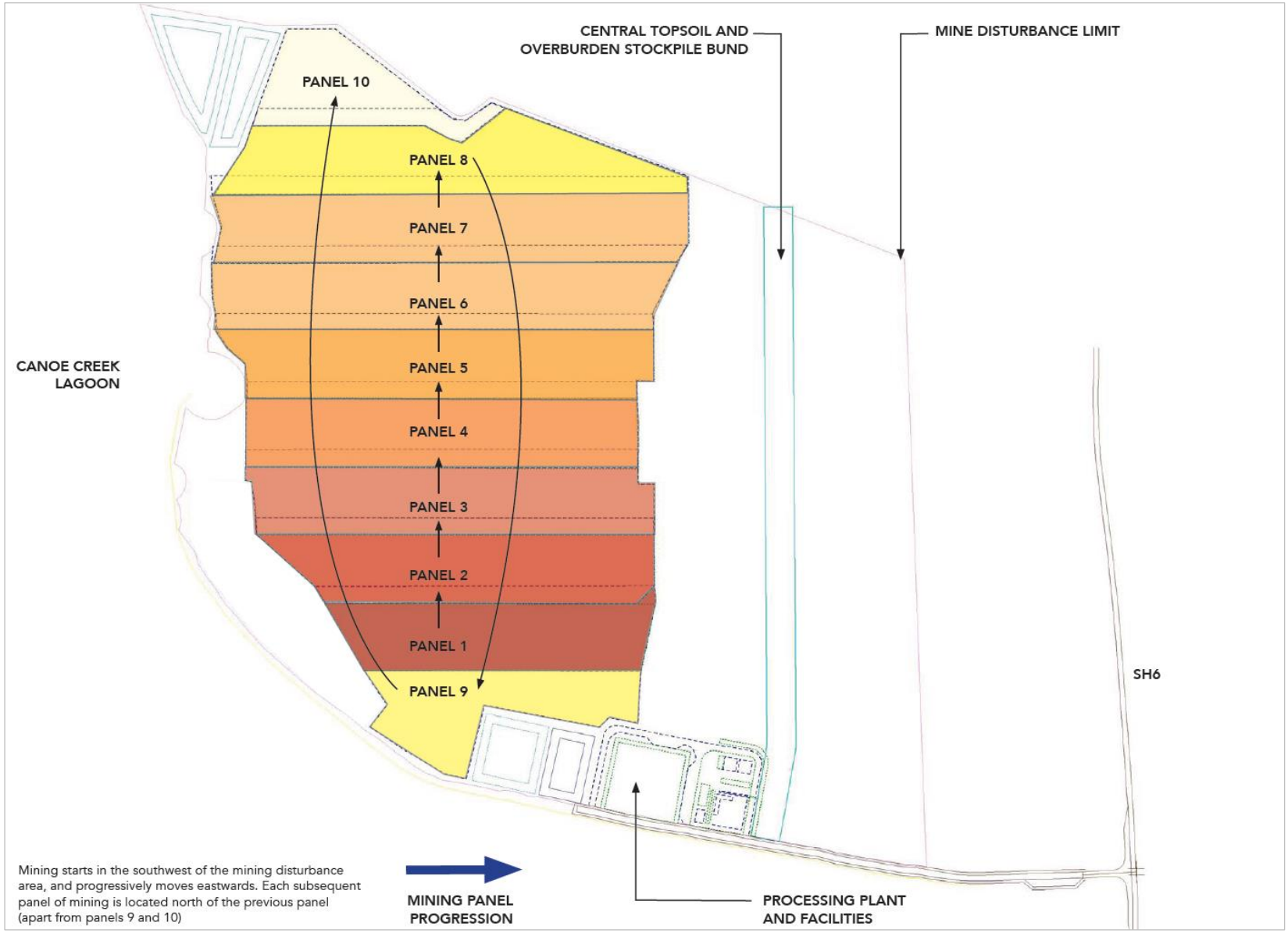

Figure 2: Indicative mining approach at TiGa mineral sand mine, Barrytown (From Glasson Huxtable Landscape Architects).

Table 1: Birds of Conservation Interest confirmed within or near the proposed mining area.

Common name	Scientific name	Conservation status
Black Shag	*Phalacrocorax carbo*	At Risk (Relict)
Black-billed gull	*Chroicocephalus bulleri*	At Risk (Declining)
Caspian Tern	*Hydroprogne caspia*	Threatened (Nationally Vulnerable)
Grey duck	*Anas superciliosa*	Threatened (Nationally Vulnerable)
Pacific Reef heron	*Egretta sancta*	Threatened (Nationally Endangered)
Red-billed Gull	*Chroicocephalus novaehollandiae*	At Risk (Declining)
South Island Pied Oystercatcher	*Haematopus finschi*	At Risk (Declining)
Tāiko/Westland Petrel	Procellaria westlandica	At Risk (Naturally Uncommon)
Variable Oystercatcher	*Haematopus unicolor*	At Risk (Recovering)
White fronted tern	Sterna striata	At Risk (Declining)

Birds identified as being present within 10 km of the site, but not confirmed as present during the surveys of the site include rōroa (*Apteryx haastii*), tūturiwhatu (banded dotterel, *Charadrius bicinctus*), mātātā/South Island fernbird (*Poodytes punctatus*), little penguin (*Eudyptula minor*) and Australasian bittern (*Botaurus poiciloptilus*).

Of the species listed in Table 1, none are likely to rely on the pasture habitat within the site, but some species (such as gulls and oystercatchers) may visit pasture areas (particularly where soils have been turned over) for feeding or loafing. Tāiko will fly past the site and could be affected by lighting or other activities there.

Grey District Council and West Coast Regional Council have granted TiGa resource consents (NUMBER) to construct and operate the mine subject to conditions, which includes the following conditions associated with the land use consents from the Grey District Council:

18.0 Avian Management	
18.1	The consent holder shall conduct activities on site in general accordance with the Avian Management Plan (AMP) prepared by Ecological Solutions Ltd dated April 2023. *Advice Note: All Management Plans are required to adhere to the requirements of Condition 6.0.* *Advice Note: Threatened or at-risk bird species refers to the Conservation Status according to the Department of Conservation's Threatened Classification System*
18.2	The AMP must be reviewed annually and may be amended at any time by the Consent Holder. Any amendments to the AMP must be submitted to Council and must: ○ achieve the AMP purpose of avoiding effects on any threatened or at-risk indigenous bird species (including specifically the Tāiko); ○ comply with the conditions of this resource consent; and ○ have been reviewed by an appropriately qualified and experienced ecologist/ornithologist;

	○ follow the certification process set out in Condition 6.0. *Advice note: any disturbance or relocation of avifauna may require a permit from the Department of Conservation under the Wildlife Act (1953).*
18.3	An annual bird management report shall be provided to Environmental Planning Team Leader Grey District Council, Te Runanga o Ngāti Waewae and the Buller/Kawatiri office of the Department of Conservation in Westport, no later than June each year which includes: site inspection summaries, record of presence of any at risk and threatened bird species, and the avoidance and mitigation measures undertaken on the Site.

1.3 Purpose, Scope and Objectives

The purpose of this Avian Management Plan ('**AMP**') is to ensure adverse effects on the threatened and at risk birds present at the site including those listed in Table 1 are avoided. This will be achieved by operating so as to avoid effects on birds, monitoring of birds to inform operational decisions and species management and regular review of monitoring data to inform any operational changes required to address any unanticipated effects.

This AMP also sets out the monitoring that will be undertaken to detect threatened and at-risk species at the site, actions to be taken to protect those birds as well as record keeping and reporting.

1.4 Updates

This plan will be updated annually by a suitably qualified and experienced ecologist/ornithologist taking into account the mining proposed for the coming year, as well as the results of the previous year's avian monitoring and the outcome of any management actions undertaken to protect birds in the preceding year.

2.0 Background

2.1 Important Habitats

The site adjoins an area identified by Boffa Miskell (2006) on behalf of the Grey District Council as a potential Significant Natural Area ('**SNA**', Site PUN-W034) as shown in Figure 3. This area is the location of the most important bird habitats in the immediate vicinity of the site.

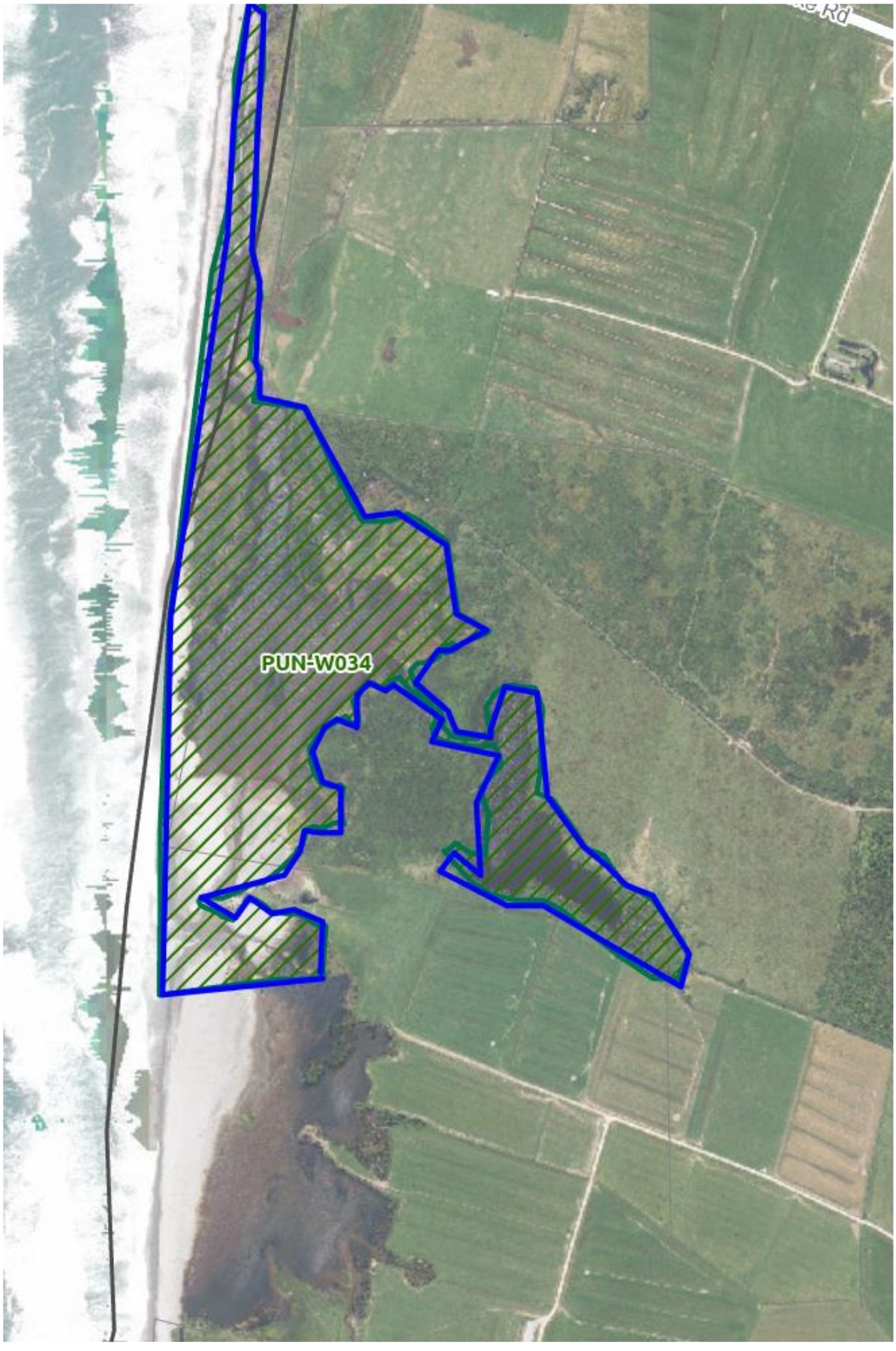

Figure 3: Location of the potential SNA PUN-W034 at Barrytown.

2.2 Threatened and at-risk Birds Likely to be Present

The species of birds which are considered to be "threatened" or "at risk" and have been confirmed using the site and the adjoining SNA during the ecological assessments for the resource consent application are shown in Table 1. Of the birds listed in Table 1, different species are expected to be affected by different activities. The majority of them would not use habitats within the site, rather using the adjoining beach, lagoon or wetland habitats and would therefore be affected by noise, human activities and vehicle movements near their habitats, particularly during the breeding season. For these species the following management actions are proposed:

- Commencement of mining at least 100 m from the edge of the site and monitoring of birds during the initial stages of mining to inform later management.
- Maintenance of a 20 m buffer from the edge of mining to the lagoon area. This boundary is to be permanently marked so as to avoid crossing it inadvertently.
- Planting of parts of that buffer with flax and other native species set out in the planting plan for the site (required by *Condition 19*) so as to visually screen the mining activities from the lagoon and contribute to reducing noise levels.
- Avoidance of mining the parts of the strips closest to the highest quality habitats (the lagoon and provisional SNA area, strips 5-7 and 10) between the months of September and December (inclusive) in order to provide separation from activities. The purpose of this avoidance is to provide spatial separation of at least 95 m for breeding birds from the mining activities.

Monitoring for these birds is described in Section 3.0.

2.3 Bird Species to be Managed

2.3.1 Introduction

For a small subset of the birds known to occur in the area, i.e., those which are known to occur there or are likely to visit the mining area and may attempt to nest there in future, specific management activities are proposed. The three species for which specific management actions will be provided are shown in Table 2. Specific management actions are set out in Section 3.0 (for tūturiwhatu, kororā, and tōrea if they are detected at the site during ongoing monitoring) and Section 4.0 for tāiko.

Table 2: Threatened and at-risk birds to be managed at the Barrytown Site.

Common name	Scientific name	Threat classification
tūturiwhatu, banded dotterel	*Charadrius bicinctus bicinctus*	Threatened – Nationally Vulnerable
kororā, little blue penguin	*Eudyptula minor*	At Risk – Declining
tōrea, South Island pied oystercatcher	*Haematopus finschi*	At Risk – Declining

2.3.2 Tūturiwhatu/New Zealand Banded Dotterel

Tūturiwhatu (banded dotterel) are the most common small plover of New Zealand

seashores, estuaries and riverbeds. Their plumage varies seasonally, but they are readily identified by their brown upperparts and complete or partial chestnut breast band, which is quite obvious in breeding plumage. Like other plovers, the body is held erect and they have a characteristic run-stop-peck-run foraging behaviour in their pursuit of small invertebrates.

Typical breeding habitat for banded dotterels comprises lightly vegetated riverbeds, outwash fans, herb fields, beaches and farmland. The composition of vegetation varies regionally and particularly with altitude. Banded dotterels are often attracted to earth worked areas for breeding.

Banded dotterel pairs are solitary and territorial, but there can be high concentrations of birds in good habitat. Birds begin to arrive on the breeding grounds and set up territories in July. First eggs are laid in August to early November, in shallow scrapes in gravel, sand or soil, usually lined with tiny stones, occasionally shell. The clutch-size is nearly always three eggs, which are coloured grey to pale-green or olive with small dark spots. Incubation is performed by both adults for c. 4 weeks and chicks fledge after another 5–6 weeks.

Management of tūturiwhatu is discussed in more detail in Section 3.0 below.

2.3.3 Kororā/Little Blue Penguin

Kororā occur throughout New Zealand and are thought to have a large, but declining population. No kororā have been detected at Barrytown, but suitable nesting habitat is present and it is possible they visit or use the area or may come to use it in future.

Kororā typically breed in small colonies numbering from a few up to 20-30 pairs, sometimes semi-colonially, or sometimes as isolated pairs. Birds can be found nesting some distance inland, and in a variety of habitats (Marchant and Higgins 1990). Birds nest in a burrow, sometimes digging their own, sometimes adopting burrows of other birds, and sometimes making use of small crevices or gaps in the substrate. They also make use of small spaces under buildings and dense vegetation and nest boxes where these are provided. Penguin burrows are used throughout the year and the same site is often used for nesting over many years.

During moult, the bird will stay in or close to the burrow and is not able to enter the water to feed because they are not waterproof. Activities after moulting are uncertain, some birds continue to use burrows, but many disappear for weeks or months until the next breeding season.

Management of kororā is discussed in more detail in Section 3.0 below.

2.3.4 Oystercatchers

Tōrea (South Island pied oystercatchers) and tōrea tai (variable oystercatchers) have both been recorded using the coastal area adjoining the site. Tōrea have conspicuous black and white plumage whilst mature tōrea tai's plumage is black. Both species have a long red bill. Tōrea are found on most estuaries and many coastal locations, with numbers greatest during the period December to July. Fewer tōrea remain in coastal areas during the rest of the year, with most of the population moving to inland South Island riverbeds and farmland to breed. Tōrea tai are site attached in coastal areas throughout the year.

Tōrea and tōrea tai breed in spring and summer. Nests are unlined scrapes on a mound or raised area of sand, gravel or soil with good visibility all around. Both members of the pair incubate the 1-3 eggs and care for the young. Incubation takes 24-28 days, and the young fledge 28–42 days after hatching. Both species have a conservation status of At Risk (Declining).

There is a possibility that oystercatchers of either species may choose to nest within the mining area on newly excavated soils or stockpiles. Management of oystercatchers will

focus on monitoring and then deterrence from nesting in areas to be mined within the breeding season.

Management of tōrea and tōrea tai is discussed in more detail in Section 3.0 below.

3.0 Species Management

3.1 Detecting Breeding

The breeding season for most seasonally breeding birds in New Zealand starts between June and September with most breeding being undertaken between September and December. Some birds will attempt second clutches and breeding can extend through until February or March. Site works and other activity is likely to deter birds (except dotterel) from establishing nests near that activity, forcing them nest elsewhere.

In advance of each breeding season, a general detection route will be devised across the area to be mined and adjoining areas (within 50 m) which will be used to detect birds using the site.

Fortnightly detection surveys are proposed between 1 August and the onset of breeding (or the 14th September, whichever is the earlier) and weekly detection surveys between the commencement of breeding and 31 December.

During these detection surveys, observers will walk over the predetermined route which will cover areas intended to be mined within the forthcoming breeding season and adjoining areas in order to detect breeding behaviour or nesting that indicates species management should begin. Species management comprises discouraging nesting and managing any established nests once they are discovered. Each of these actions is discussed further below.

This frequency of detection survey was chosen so that:

(i) There is a high probability that birds will be detected soon after their arrival at the site.

(ii) The behaviour of birds can be observed regularly, and if necessary, they can be discouraged from nesting where the presence of nests or dependent young would either put them at risk or obstruct mining activity.

(iii) The probability of detecting nest attempts (at least those that persist two weeks or more) is increased.

(iv) Nests which are abandoned or vacated (and isolated from other nests) will be detected quickly so as to minimise disruption to mining.

(v) The fate of nesting attempts and nestlings can be monitored so as to determine whether this management plan is effective at protecting the target species.

During detection surveys all birds seen or heard will be recorded, and their approximate location will be marked using a GPS. The number of birds observed and their behaviour will be recorded, and if behaviours are consistent with breeding (e.g., calling, displaying, defending areas or other behaviour), then individuals will be observed from a distance for a period of at least five minutes to see if a nest can be located. All nest attempts, including locations, date and time of nest observations and the outcome (where known) will be recorded.

3.2 Discouraging Nesting

To reduce the need to disrupt mining activities by having to place a 50 m buffer around any

nests identified during monitoring, nesting birds will be discouraged from settling each prospecting season using one or more of the following methods:

(i) Completing a disruptive site walkover regularly between the 1st August and the onset of breeding.

(ii) Installing streamers/tapes that flutter in breeding habitats to deter birds from nesting. Note that this method is effective over the short term (up to 3 weeks) but decreases over time as birds become accustomed to it.

(iii) Parking earthworks machinery in future stage locations, starting the engine from time to time, but not moving equipment.

3.3 Management of Nest Sites

Any nests of threatened or at-risk species located will be subject to management and protection until such time as the chicks have successfully fledged.

A minimum separation distance of 50 m will be maintained between any works and existing nest sites so as to minimise the risk of nest abandonment.

If a nest of any threatened or at-risk species (including those listed in Table 1) is discovered within the area to be mined, the following plan would be implemented:

(i) Minimise time spent near the nest to avoid attracting ground predators such as rats and stoats and aerial predators such as gulls.

(ii) Establish a “no go” zone approximately 50 m around the nest using tape and markers.

(iii) If it is the first nest of the season, alert the appropriate supervisor to initiate a predator control plan immediately.

(iv) If a predator control plan is in place, adapt it as required to ensure bait stations or baited traps are located just outside the “no go” zone.

(v) Monitor the area at least twice weekly from outside the “no go” area in order to assist in estimating the time of fledging. Maintain the “no go” zone until after the chicks have fledged. This monitoring is described in more detail in Section 5.0 below.

3.4 Pest Control

Predator control will consist of a ring of traps and/or bait stations targeting rats and mustelids placed around the perimeter of the property and the lagoon. This network of traps will be installed prior to mining commencing and serviced at least 12 times per year.

In addition, if nest attempts are recorded, a second ring of traps and/or bait stations will be installed around the 50 m “no go” zone associated with a particular nest. The exact layout of traps and/or bait stations will be determined by the project ecologist at the time the predator control is initiated and will be in accordance with recognised best practice, including with respect to design and construction. In addition, traps and bait stations must be designed and deployed so as to exclude weka.

4.0 Tāiko, Westland Petrel

4.1 Potential Effects on Tāiko

4.1.1 Background

The area to be mined is located approximately 3.6 km south of the only known colony of

tāiko/Westland petrel. Tāiko breeding occurs between March and November. Adult birds entering and departing the colony, and at sea close to shore, are known to be disoriented and attracted by artificial lighting and can be grounded. Young tāiko are known to be disoriented by lights when leaving the breeding colony and this can also result in birds being grounded. Groundings are most likely to occur between November and January, with a peak in early December as shown in Figure 4.

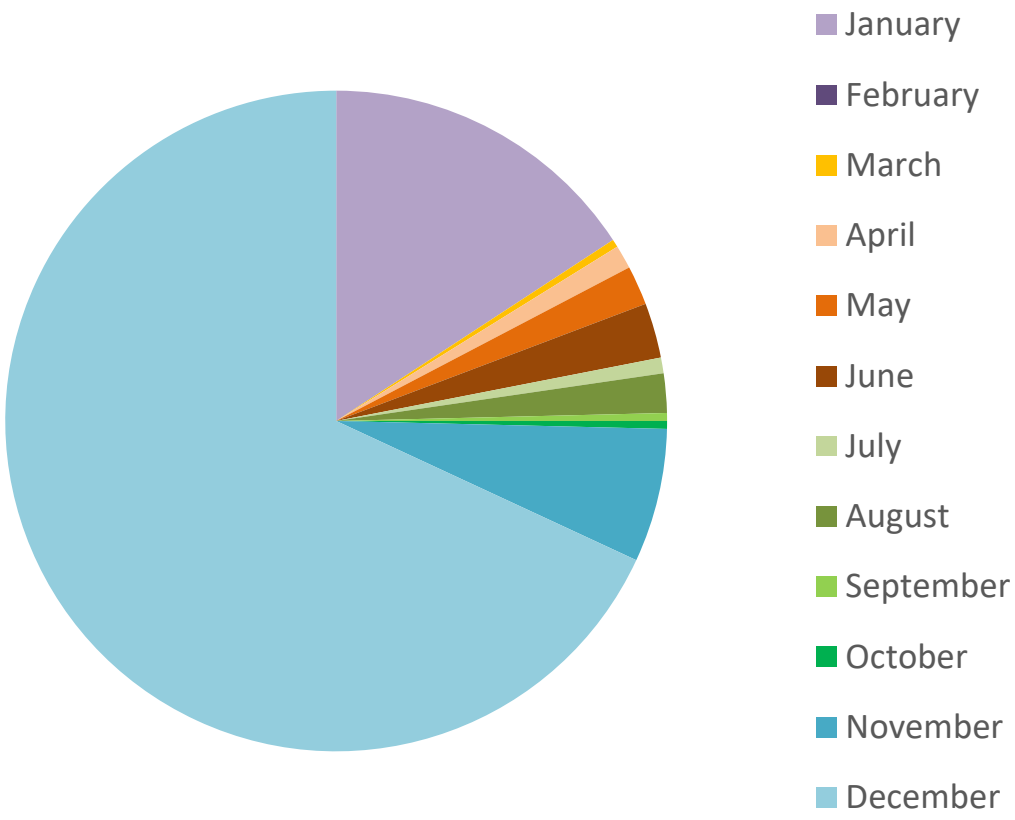

Figure 4: Records of grounded tāiko recorded between 2007 and 2022 categorised by month of occurrence (Data from Department of Conservation).

4.1.2 Fixed Lighting

In order to reduce the effects of lighting at the mine during night time operations, *Conditions 16* (particularly 16.2) of the Greymouth District Council land use consents require minimisation of the amount of light at the site. This is to be achieved at the processing plant and loadout area via adherence to the Australian Government's National Light Pollution Guidelines for Wildlife January 2020 (or subsequent revision), including but not limited to pointing all fixed lighting downward, shielding to avoid light spill and use of the yellow-orange spectrum. In addition, lights should only illuminate the object or area intended and be mounted as close to the ground as possible. External lighting will be minimised on the seaward side of buildings to minimise light spill toward the coast.

The buildings at the processing plant and loadout area have been designed to avoid light spill by, for example, having no windows and locating all doors on the eastern and southern sides. Furthermore, the processing plant site will be bunded on the eastern and part of the northern sides with a 4.5 m bund, the top of which will be planted with trees.

Loading of trucks will be undertaken on the eastern side of the building via roller doors which can be closed when not loading. These actions are expected to reduce visible light

from the processing plant. In addition, the following actions will be deployed as appropriate at the site[2]:

- Consideration will be given to using motion detectors, timing switches or similar methods to limit lighting to when it is required;
- Lighting will be used to light only the object or area intended;
- Lights will be deployed close to the ground, directed and shielded to avoid light spill as required;
- The lowest intensity lighting appropriate for the task will be used; and
- Non-reflective, dark-coloured surfaces will be used in preference to light or reflective surfaces.

Random lighting audits will be undertaken at least annually making reference to the Australian Government Lighting Guidelines for Wildlife.

Nonetheless, the possibility remains that tāiko might be grounded by lighting at the processing plant. This risk is considered to be low.

4.1.3 Pit Lighting

Mining will take place between 0700 and 2200 hrs between 01 February and 30 November and between 0630 hrs and 2130 hrs between 01 December and 31 January. Lighting will be required at the pit at certain times of the year to achieve these hours, which have been modified to reduce the need for lighting in December and January since these are peak months for tāiko groundings. The excavator, and any lighting, would be located below ground level because removal of topsoil and overburden is restricted to daylight hours by *Condition 12.2*. This is expected to reduce light spill. In addition, the following actions will be deployed as required by *Condition 16.2*:

- Lighting to used only when and where it is required;
- Lighting will be used to light only the object or area intended;
- Lights will be deployed close to the ground, directed and shielded to avoid light spill as required;
- The lowest intensity lighting appropriate for the task will be used;
- Non-reflective, dark-coloured surfaces will be used in preference to light or reflective surfaces; and
- Light in the yellow-orange spectrum only to be used.

Nonetheless, the possibility remains that tāiko might also be grounded by lighting at the pit. This risk is considered to be low.

4.1.4 Vehicle Headlights

Vehicles using State Highway 6

The headlights of trucks and other vehicles arriving or leaving the site via State Highway 6 during the hours of darkness could affect tāiko.

The mean number of nightly vehicle movements on State Highway near the site is lowest in

[2] These are based on best practice lighting design, Appendix A of the Australian Government Light Pollution Guidelines available at http://www.environment.gov.au/system/files/resources/2eb379de-931b-4547-8bcc-f96c73065f54/files/national-light-pollution-guidelines-wildlife.pdf

the November to January period (approximately 61 vehicle movements per night) and highest in the May – July period (approximately 159 movements per night). This difference is likely due, at least in part, to the longer night length in winter. The total number of vehicle movements during darkness (defined as half an hour after sunset to half an hour before sunrise, conservatively rounded to the nearest hour) during approximately fortnightly periods is shown in Figure 5.

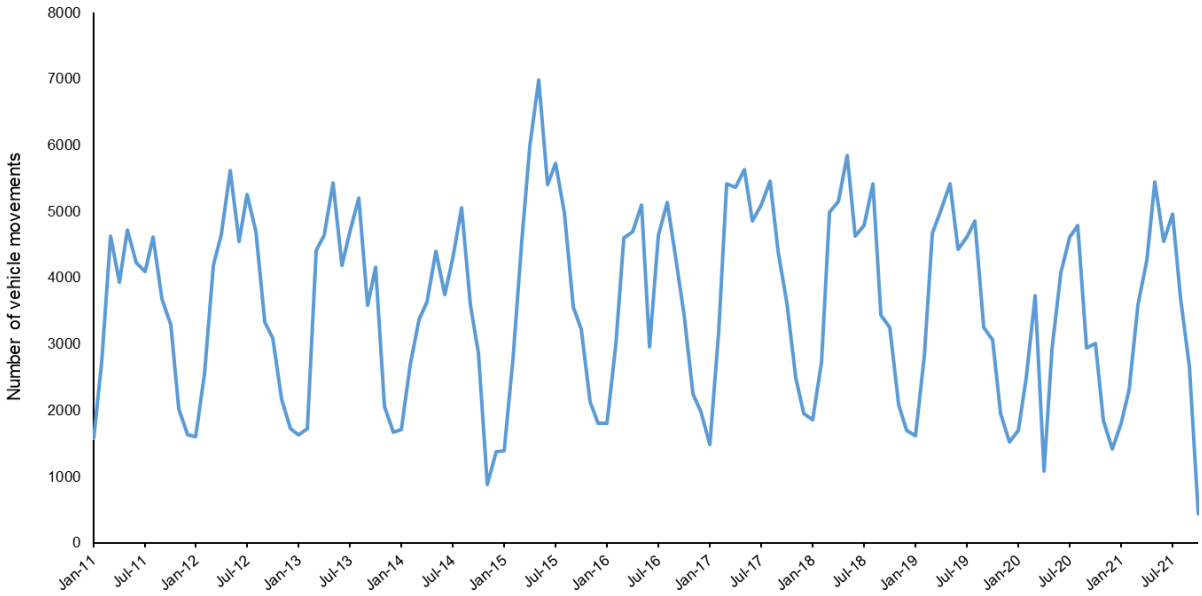

Figure 5: Vehicle movements recorded during the hours of darkness from just north of Canoe Creek, Barrytown 2011 – 2021 (Data from Waka Kotahi, New Zealand Transport Agency).

The November to January period coincides with the time when most tāiko deaths are recorded as shown in Figure 3. Most vehicle related deaths of tāiko between 2007 and 2020 occurred in the same period as shown in Figure 6.

This data should be interpreted with care because they are only birds that were reported and/or found, and the cause of death was estimated, but nonetheless, they strongly indicate that most (approximately 75%) groundings resulting in death occur in November, December and January, with more than 50% of deaths (including vehicle related deaths) occurring in December.

Actions intended to protect tāiko from accidental death due to collision with vehicles on the State Highway include:

- No night time[3] truck movements will occur to the north (past the colony).
- Monitoring and reporting of all encounters with tāiko by all mine related vehicles throughout the year. In the event that a taiko collides with a mine related vehicle this management plan will be reviewed (including consideration of extending the ban on night time vehicle movements) with a view to avoiding any further mortality.

[3] Night time movements are those between 30 minutes after local sunset and 30 minutes prior to local sunrise.

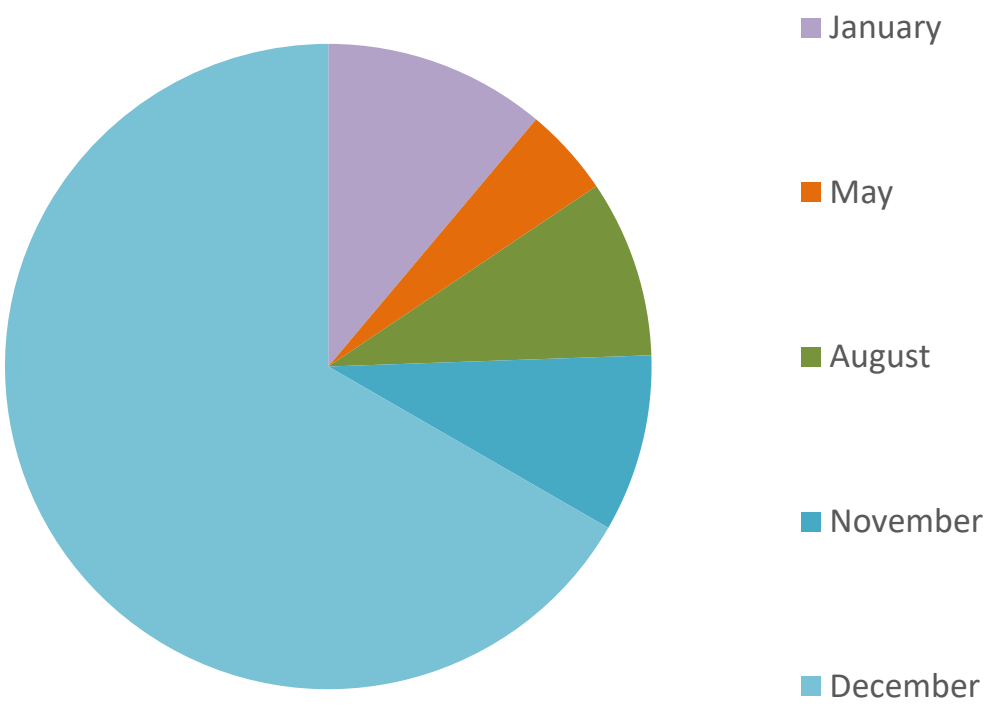

Figure 6: Deaths of tāiko (found dead or euthanised) thought to be due to vehicles recorded between 2007 and 2022 categorised by month of occurrence (Data from Department of Conservation).

Moving vehicles within the site

In addition, the lights of vehicles travelling around the site at night, such as from the highway to the loadout, might also affect tāiko. Given that mining will not occur for most of the night and trucking movements from the site would only occur between 0500 and 2200 (to the south), transport movements between the processing plant and pit would be extremely limited. Actions intended to protect tāiko from accidental death due to collision with vehicles within the site include:

- Limiting the speed of vehicles to 15 km per hour while on site as required by *Condition 27.2* of the West Coast Regional Council consents.
- Requiring headlights to be dipped at all times within the site. The effectiveness of this action in avoiding tāiko remains unknown, but it may assist. This practice will be trialled for at three months. In the event that it proves unhelpful (e.g., if it becomes difficult to see tāiko) this practice will be discontinued.
- Monitoring and reporting of all encounters with tāiko by all site vehicles throughout the year. In the event that a taiko collides with a vehicle within the site this management plan will be reviewed (including consideration of banning night time vehicle movements) with a view to avoiding any further mortality.

4.2 Detecting Grounded Tāiko

Mining will take place between 0700 hrs and 2200 hrs for most of the year and between

0630 and 2130 between 01 December and 31 January. During the late spring and summer, this period is mostly during daylight and on that basis, lighting will be less of an issue within the mining area at that time. The most likely location for tāiko to be grounded is near any area where lights are being used (the pit during winter, the processing plant and load out area, the internal road within the site and along State Highway 6).

It is the responsibility of TiGa to provide training so as to ensure staff are appropriately informed and able to implement the accidental discovery protocol set out below. It is the responsibility of all employees based at the site to be alert to the possibility that they might encounter a grounded tāiko and to know how to respond appropriately. In addition, the specific location, date and time any grounded birds are detected is to be recorded by the personnel who discover the bird(s), and this information is to be provided to the Mine Manager.

[NOTE an authority under the Wildlife Act 1953 will be required to handle absolutely protected wildlife (tāiko) if any are recovered. This is a separate process administered by the Department of Conservation and can take some months to work through. A copy of the permit should be attached to this plan as Appendix A.

All trucking and other contractors and staff leaving the site at night (including those travelling to and from work past the colony) are required to report any vehicle strike of birds, as well as near misses, to the Mine Manager as soon as practicable after they occur.

Reports are to include the date, time, approximate location and number of birds (if known). The Mine Manager will be responsible for maintaining an incident log and upon receiving a report of a bird strike will notify the Department of Conservation as soon as practicable.

Data relating to near misses will be reviewed annually in order to determine whether any changes to operations are required for the coming season.

Live birds seen on the road at any time of day/night, should be reported to 0800 DOC HOT as soon as possible.

4.3 Accidental Discovery

4.3.1 Equipment required to be kept on site

A sturdy net suitable for catching grounded birds, leather gloves for handling birds and a suitable enclosure (lined box, crate or cage) will be held on site and all staff will be informed of their location and trained in their safe use to ensure bird welfare.

4.3.2 Discovery of a live Tāiko

In the event that a live grounded tāiko is discovered within the site, the bird will be caught with the minimum of disturbance and placed in the suitable enclosure in a warm dark place and transferred as quickly as practicable to the local Department of Conservation. The Department of Conservation will determine if it is fit for release and will undertake the release and inform the Mine Manager of the outcome. If injured the local Department of Conservation office will take responsibility for the bird and keep the Mine Manager up to date with progress.

In the event that a live tāiko is recovered from within 50 m of the pit or the processing plant and loadout area, the following steps will be instigated:

- An attempt to identify the potential reason for grounding should be undertaken immediately. If the likely cause can be identified and the reason can be modified or eliminated immediately, this will be done.
- The incident must be logged, the rationale behind the identification of the likely

cause and steps taken to reduce/eliminate the risk must be documented and authorised by the Mine Manager. These steps and the outcomes should be included in the annual monitoring report.

- If the cause of grounding is identified as a light source which cannot be modified or eliminated, TiGa will seek advice from a suitably qualified and experienced ecologist and the Buller/Kawatiri office of the Department of Conservation in Westport.
- A lighting audit will be undertaken to ensure lighting at the site complies with the requirements set out in this Avian Management Plan and the latest version of the Australian Government National Light Pollution Guidelines for Wildlife including marine turtles, seabirds and migratory shore birds.
- This management plan will be reviewed by a suitably qualified and experienced ecologist in consultation with the Buller/Kawatiri office of Department of Conservation and any other changes to management protocols including, but not limited to, changes to light colour, intensity or timing, additional bunding or planting, the use of black out curtains, tinted windows or other methods to reduce light spill and the risk of grounding will be considered with a view to implementing them as required.
- Any potential management protocol changes identified as likely to contribute to reducing the risk of grounding during the review of this management plan will be implemented as soon as practicable.

4.3.3 Discovery of a dead Tāiko

In the event of any dead birds (including tāiko) being located at the site the Buller/Kawatiri Department of Conservation office in Westport and Te Rūnanga o Ngāti Waewae will be informed and collection by or delivery to the Department of Conservation will be arranged.

In the event that a dead tāiko is discovered within 50 m of the pit or processing plant and load out area the following steps will be taken:

- An attempt to identify the potential reason for grounding should be undertaken immediately. If the likely cause can be identified and the reason can be modified or eliminated immediately, this will be done.
- The incident must be logged, the rationale behind the identification of the likely cause and steps taken to reduce/eliminate the risk must be documented and authorised by the Mine Manager. These steps and the outcomes should be included in the annual monitoring report.
- If the cause of grounding is identified as a light source which cannot be modified or eliminated, Barrytown JV Limited will seek advice from a suitably qualified and experienced ecologist and the Buller/Kawatiri office of the Department of Conservation in Westport.
- A lighting audit will be undertaken to ensure lighting at the site complies with the requirements set out in this Avian Management Plan and the latest version of the Australian Government National Light Pollution Guidelines for Wildlife including marine turtles, seabirds and migratory shore birds.
- This management plan will be reviewed by a suitably qualified and experienced ecologist in consultation with the Buller/Kawatiri office of Department of Conservation and any other changes to management including, but not limited to, changes to light colour, intensity or timing, additional bunding or planting, the use of black out curtains, tinted windows or other methods to reduce light spill and the risk of grounding will be considered with a view to implementing them as required.
- Any potential management changes identified as likely to contribute to reducing the

risk of grounding during the review of this management plan will be implemented as soon as practicable.

If, after any necessary amendments to site management and this management plan are implemented, a second bird (alive or dead) is found within 50 m of the pit or processing and load out area within four weeks of the first finding, operations and use of external lights at the pit and processing plant will cease between 4 am and dawn. Interior lighting and operations can continue during the hours of darkness, provided any lights are not visible from the exterior.

Operations between 4 am and dawn will remain suspended until such time as a plan to prevent any additional mortality is prepared, agreed with the Department of Conservation and implemented, or until the 15 January following the discovery, whichever is sooner.

5.0 Monitoring

5.1 Monitoring Proposed

As set out above, detection of “threatened” and “at risk” species using the site, particularly birds using the current mining area, will rely on fortnightly and/or weekly detection surveys and close (twice weekly) monitoring of any nesting attempts. The number, location and outcome of all nesting attempts will be recorded, along with the number, dates and times of monitoring visits. This information will be compiled into an annual bird monitoring report at the conclusion of the breeding season (March) as discussed in Section 5.2.

For tāiko, the location, date and time of any groundings will be recorded, along with any vehicle strikes and near misses. This information will be included in the annual bird monitoring report.

In order to monitor species using the lagoon and other adjoining habitats, seasonal bird surveys will be undertaken four times each year, once each in spring, summer, autumn and winter using five-minute bird counts and acoustic recorders at the locations shown in Figure 7.

Call playbacks and other methods as appropriate (e.g., O’Donnell and Williams 2015) will be used in an effort to detect Australasian bittern and South Island fernbird during the appropriate time of the year. Monitoring of birds using the lagoon area will begin prior to the commencement of mining and continue until mining is completed.

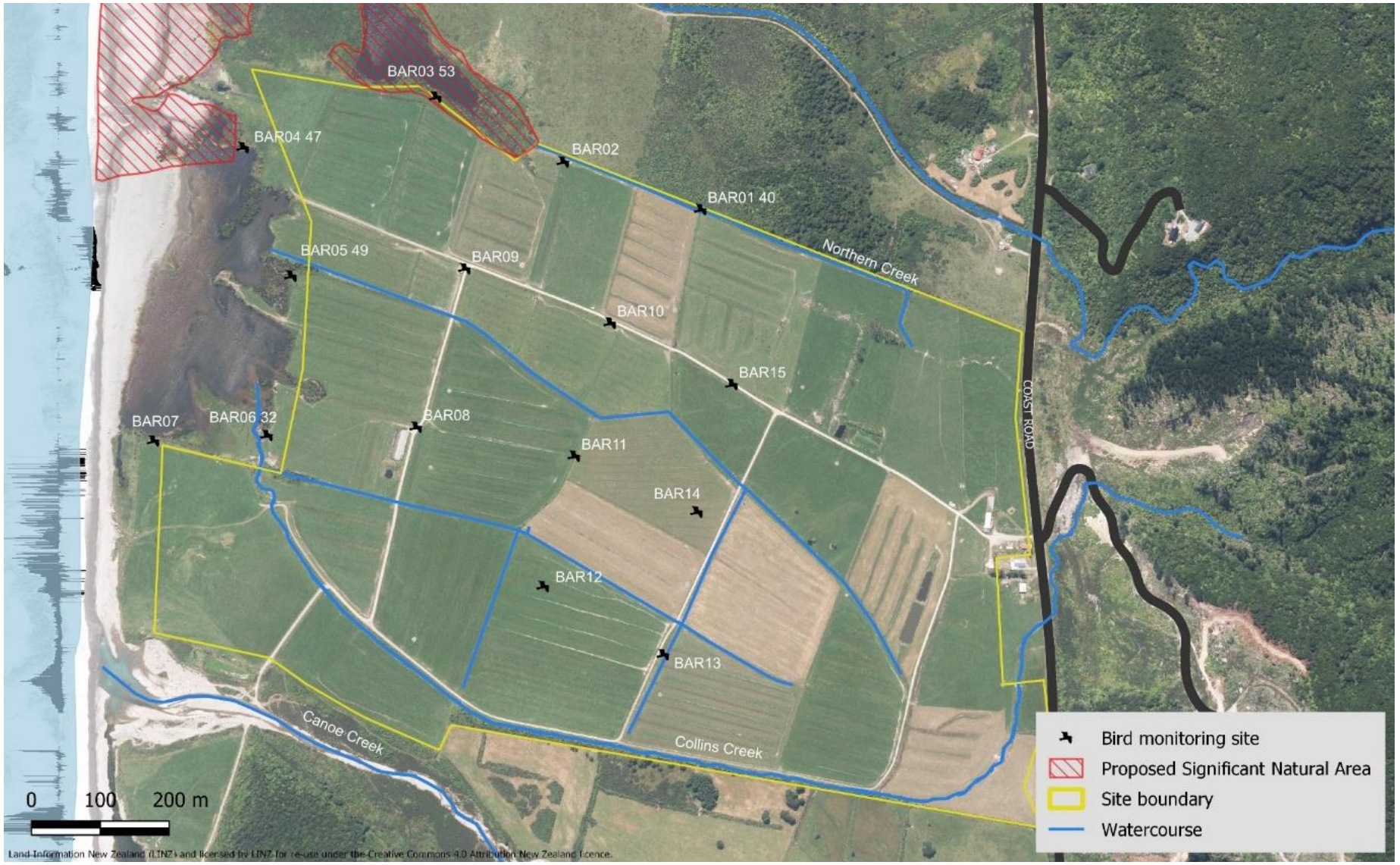

Figure 7: Location of bird monitoring sites at Barrytown.

5.2 Annual Bird Management Report

An annual bird management report will be prepared which details the following matters:

- Timing of nest detection surveys and observations relating to nesting or other behaviours observed within the area to be mined;
- Efforts to deter nesting within the area to be mined and the outcome of those efforts;
- Date of first nesting attempts (if any) within the area to be mined;
- Number and location of nesting attempts within the area to be mined;
- Species attempting to nest within the area to be mined;
- Date any predator control commenced, the location of traps and bait stations, the number of captures, the amount of bait consumed and any relevant observations;
- Outcome of individual nesting attempts within the area to be mined;
- Number and location of any grounded tāiko;
- Management undertaken and the outcome for any grounded tāiko collected;
- Autopsy outcomes for any dead tāiko collected;
- The number, dates and location of any near misses with vehicles;
- The findings of any lighting audits undertaken during the year and steps taken to resolve any issues identified.
- A summary of any revisions made to this management plan and the reasons for the changes;
- The date and duration of any operational shut-downs;
- The results of the twice annual walk-through surveys of birds using the lagoon area.

The annual bird management report will summarise the above information, identify any trends or patterns and compile any relevant maps. This report will be reviewed by a suitably qualified and experienced independent ecologist/ornithologist who will evaluate the findings and provide any recommendations considered necessary to improve bird management at the site.

The annual bird management report and any updates to this management plan will be provided to the Grey District Council, Te Runanga o Ngāti Waewae and the Buller/Kawatiri office of the Department of Conservation in Westport no later than June each year.

6.0 Summary

TiGa proposes a mineral sand mine located on farmland near Barrytown, approximately 30km north of Greymouth. The mining area adjoins artificially constructed wetlands which provide habitat for a range of indigenous bird species, some of which are considered to be threatened or at risk. The proposed mine is also located near the only known breeding colony of tāiko (Westland petrel, *Procellaria westlandica*).

A number of threatened and at-risk bird species have been identified in the SNA adjoining the site. The majority of these species would not use habitats within the site, but would be affected by noise, human activities and vehicle movements near their habitats, particularly during the breeding season. A number of management activities (e.g., maintaining buffers from key areas of habitat, planting, avoidance of mining strips adjacent to high quality

habitat during breeding season) will be undertaken to minimise impacts on these species.

Specific management actions for threatened species (e.g., tūturiwhatu, kororā, and tōrea) if they are detected at the site during ongoing monitoring include: detection surveys during breeding, discouraging birds from establishing nests in the work site, managing nests sites (including establishing no-go zones within 50 m and initiating predator control) and monitoring identified nests twice weekly.

The area to be mined is located approximately 3.6 km south of the only known colony of tāiko/Westland petrel. Both adult and young birds are known to be disoriented and attracted by artificial lighting and can be grounded. In order to reduce the effects of lighting at the mine during night time operations a number of techniques will be used to minimise the amount of light at the site. This will be achieved via adherence to the Australian Government's National Light Pollution Guidelines or Wildlife, January 2020 (or subsequent revision). Minimisation techniques will include (but not limited to) pointing all fixed lighting downward, shielding to avoid light spill and use of the yellow-orange spectrum. In addition, lights should only illuminate the object or area intended and be mounted as close to the ground as possible. External lighting will be minimised on the seaward side of buildings to minimise light spill toward the coast. A number of actions will also be taken to avoid accidental death of tāiko by vehicles entering or leaving the site at night, including limits on where night time truck movements can occur, speed and headlight settings, monitoring of encounters with tāiko by all mine related vehicles, and initiation of other methods in consultation with the Department of Conservation should more than one bird be killed on the road by mine related vehicles within a calendar year.

TiGa will also provide training so as to ensure staff are appropriately informed and able to implement an 'accidental discovery protocol' in the event a grounded tāiko is identified.

In the event any dead bird is identified within the site, the Department of Conservation office in Westport and Te Rūnanga o Ngāti Waewae will be informed, and collection or delivery of the bird arranged. In the event the dead bird is a tāiko and it is discovered within 50 m of the pit or processing plant, a detailed information gathering and logging process will be followed.

Bird monitoring will include detection of "threatened" and "at risk" species using the site, particularly birds using the current mining area, via fortnightly and/or weekly detection surveys and close (twice weekly) monitoring of any nesting attempts. Monitoring of birds using the lagoon and other adjoining habitats will be undertaken during seasonal bird surveys (four times each year in spring, summer, autumn and winter) using five-minute bird counts and acoustic recorders at several locations.

The data collected will be compiled and presented in an annual bird management plan to be used in adaptively managing the operations to protect the birds at the site and provided to Greymouth District Council, Te Runanga o Ngāti Waewae and the Buller/Kawatiri Department of Conservation office in Westport.

7.0 References

Boffa Miskell. 2006. Grey District Significant Natural Area Assessment. *Significant Natural Areas Programme.* Prepared for Grey District Council.

Holzapfel, S., Robertson, H. A., McLennan, J. A., Sporle, W., Hackwell, K., & Impey, M. (2008). Kiwi (Apteryx spp.) recovery plan. Threatened species recovery plan, 60.

Marchant S. and Higgins P.J. 1990: Handbook of Australian, New Zealand & Antarctic birds. Vol. 1, Ratites to ducks, P. AB. Oxford University Press.

National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and

Migratory Shorebirds, Commonwealth of Australia. 2020.

O'Donnell, C.F.J., Williams, E.M. 2015. Protocols for the inventory and monitoring of populations of the endangered Australasian bittern in New Zealand. Department of Conservation Technical Series No 38. Department of Conservation, Wellington.

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, Wellington. 43 pp.

Stark, J. D., Boothroyd, I. K. G., Harding, J. S., Maxted, J. R., Scarsbrook, M. R. 2001. Protocols for sampling macroinvertebrates in wadeable streams. Prepared for the Ministry for the Environment. November 2001.

APPENDIX A

Wildlife Act (1953) Authority to Handle Absolutely Protected Wildlife