Appendix M Terrestrial Ecology – Fauna Assessment

Fauna Ecological Assessment

Taharoa Ironsands Central and Southern Blocks Mining Project

Taharoa Ironsands Limited

Prepared by:

SLR Consulting New Zealand

SLR Project No.: 850.V15262.00001

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Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	6 June 2021	Daniel Ahern	Hannah Mueller	Keren Bennett
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3.0	8 September 2025	Hannah Mueller	Pete Wilson	Pete Wilson
	Click to enter a date.			

Basis of Report

This report has been prepared by SLR Consulting New Zealand (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Taharoa Ironsands Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report has been prepared for Taharoa Ironsands Limited in respect of its application for all approvals under the Fast-track Approvals Act 2024 for the Central and Southern Blocks of the Taharoa Ironsand Mine. The Panel appointed to consider the application for the Central and Southern Blocks Mining Project may rely on this report for the purpose of making its decision under the Fast-track Approvals Act 2024.

This report has been prepared in accordance with the Environment Court's Code of Conduct for expert witnesses, contained in the Environment Court's Practice Note 2023. The authors of this report agree to comply with the Code of Conduct, and confirm that unless otherwise stated, the issues addressed in this report are within the area of expertise of the authors. No material facts have been omitted that might alter or detracted from the opinions expressed in this report. SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Executive Summary

Taharoa Ironsands Ltd (TIL) operates an ironsand mining operation at the Taharoa Mine (Mine) on the west coast of the North Island, south of Kawhia Harbour. TIL is seeking new resource consents to continue the existing ironsand mining operation at the Central and Southern Blocks at Taharoa C Block (the Site), including the concentration and processing of ironsand to enable the export of titanomagnetite from the Port of Taharoa.

This fauna assessment report has been prepared by SLR Consulting to inform TIL's application for all necessary approvals for the Central and Southern Blocks Mining Project under the Fast-track Approvals Act.

This report provides an ecological assessment of fauna values of bats, avifauna, herpetofauna and terrestrial arthropods forming part of the 'existing environment' based on on-site faunal surveys appropriate to the habitats present in and around the proposed area of works at the Site. It identifies ecological values, assesses potential ecological effects of the proposed mining works, and makes recommendations on how those effects can be mitigated in accordance with the Ecological Impacts Assessment Guidelines (EcIA)[1].

The "existing environment" for the purpose of this assessment assumes that existing mining activities have ceased, all rehabilitation activities required under the existing consents have been completed and the existing dam infrastructure has been removed.

From a terrestrial ecology perspective, the 'existing environment' at the Site includes:

- Open grassland habitat that is used by bird species such as New Zealand pipit, and could be used by skinks;
- Pine plantation forest that is used by long-tailed bats for foraging and potentially roosting;
- Wetland and lake margin areas (located largely outside the mining area) that is used by wetland species including Australasian bittern;
- Stream margins that are used by long-tailed bats for foraging, and potentially roosting in mature trees along the streambanks;
- Dune vegetation that is used by bird species such as New Zealand dotterel, and could provide habitat for skinks and katipō.

The potential adverse effects of TIL's proposed mining activities on these species and habitats include the following:

- Loss of nesting/foraging/commuting habitat or fragmentation through vegetation clearance, loss of 4.25 ha of wetlands and land disturbance;
- Potential for injury and/or death during vegetation clearance or during maintenance or emergency pipeline works required in dune/beach habitat during breeding season; and
- Potential adverse effects of dust, lighting, noise and vibration associated with mining operations.

Key mitigation measures focus on minimisation of disturbance through the provision of buffers to sensitive ecological features, minimising direct harm to fauna species (bats, birds and lizards) during vegetation removal, animal pest control, and rehabilitation following cessation of mining activities.

[1] 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 edition.

While avoidance of certain areas at the Site is not possible due to functional requirements of the activity (i.e. location of the mining resource), high value areas such as lake and stream fringing wetlands and coastal foredune environments are recommended to be avoided and a buffer implemented to minimise effects on these key fauna habitats.

The implementation of the recommended effects management package, including pest control and habitat restoration, along with the adoption of all appropriate protocols to minimise direct effects on fauna is considered appropriate to adequately manage the anticipated adverse effects on indigenous fauna associated with the Central and Southern Block Mining Project.

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1.0 Introduction

1.1 Background

Taharoa Ironsands Ltd (TIL) operates an ironsand mining operation at the Taharoa Mine (Mine) on the west coast of the North Island, south of Kawhia Harbour. TIL is seeking new resource consents to continue the existing ironsand mining operation on the Central and Southern Blocks at Taharoa C Block (the Site), including the concentration and processing of ironsand to enable the export of titanomagnetite from the Port of Taharoa.

This fauna assessment report has been prepared by SLR Consulting to inform TIL's application for all necessary approvals for the Central and Southern Blocks Mining Project under the Fast-track Approvals Act.

The assessment in this report is informed by surveys undertaken in 2021, as part of TIL's application for a similar proposal under the RMA standard resource consenting process (which is to be discontinued). No new surveys have been conducted in preparation of this report, but the effects assessment has been reviewed and updated to align with TIL's current proposal. Recent aerial imagery has been reviewed prior to revising the assessment, and it was determined that the overall character of the site and ecological features have not changed since the survey work was undertaken informing this assessment, and findings of previous reports were found to remain valid.

1.2 Scope

In particular this report:

- Describes the existing terrestrial environment and ecology of the Site and immediate surrounds based on on-site faunal surveys appropriate to the habitats present in and around the proposed area of works at the Site;
- Provides an ecological assessment of fauna values of bats, avifauna, herpetofauna and terrestrial arthropods forming part of the 'existing environment' based on the on-site faunal surveys;
- Assesses potential ecological effects of the proposed mining works and harvesting of the pine forest, and
- Makes recommendations on how those effects can be avoided, remedied, mitigated, offset, or compensated in accordance with the Ecological Impacts Assessment Guidelines (EcIA)[2].

1.3 Existing environment

As advised by TIL's legal advisors, this assessment was conducted on a high-level understanding of the existing environment which includes an environment where the existing regional resource consents that TIL is seeking to replace will expire and the relevant activities will not continue. The existing environment includes the effects of past mining activities but assumes that all rehabilitation requirements under the conditions of the existing consents have been complied with. The existing environment also includes TIL's other mining areas (being the Te Mania Extension and the Eastern Block).

[2] 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 edition.

This fauna assessment has therefore considered the impact of the Applicant's proposed activities on ecological values that would exist immediately after mining activities cease and rehabilitation works are completed. This assumption also includes a land and water form modified by the presence of the dam over the years and the removal of the dam. However, in this scenario the ecological systems would not (yet) have adapted to the new water levels resulting from the removal of the dam.

The assessment assumes that the state of the environment at the expiry of the resource consents is as follows: The area to be mined as part of the application has previously been mined and now includes open pasture (grasslands), vegetation, and an potentially an area of newly established pine planation forest. There would likely be limited to no stock management in this environment. Although the Central and Southern Block would include greater ground cover from rehabilitation activities, it is assumed that the ecological values would be of a similar nature to what they are currently, as determined by ecological surveys:

(a) This is because there would not be a substantial change in terrestrial ecosystem values established before the replacement resource consents are approved and implemented; and

(b) The rehabilitated areas in the "existing environment" are similar to the unmined or previously mined and rehabilitated parts of the Site and are therefore likely to provide habitat for terrestrial fauna, including bats, birds and lizards, as determined by the completed ecological surveys (which are based on the current condition of the land).

The recommendations made in relation to mitigation seek to avoid, minimise and mitigate any effects that would alter ecological values compared to the condition of the 'existing environment'. In the context of the existing environment assumptions explained above, the mitigation measures which have been proposed exceed the rehabilitation measures contained in the existing consent conditions.

In practice, this means that areas mined under the existing consents which have not yet been rehabilitated will be restored to higher value ecological systems over time, achieving a better outcome than required under the existing consent conditions.

1.4 Assessment of effects methodology

The assessment of ecological effects is informed by the Ecological Impact Assessment (EcIA) guidelines of the Environment Institute of Australia and New Zealand (Roper-Lindsay et al. 2018), identifying ecological values, magnitude of effect, and overall level of effect. Waikato Regional Council significance criteria are also used for this assessment (Appendix 11A of the Waikato Regional Policy Statement).

The following steps were used for this assessment:

- Ecological values are assigned based on assessing the values of species, communities and habitats identified against criteria set out in the EcIA guidelines. Ecological values are assigned on a scale of 'negligible' to 'very high'.
- The magnitude of effect of the site works on ecological values is evaluated. The 'Magnitude of Effect' is based on:
    - The scale of the unmitigated effect per se (i.e. the proposed mining operations and changes to the ecological landscape, impacts on fauna and habitat values);
    - The proportion of habitat loss versus local availability;
    - The expected duration of effect (e.g. permanent versus temporary); and
    - The intensity of the effect (i.e. the extent to which habitat loss within the site is complete or partial).

- The overall level of effect in the absence of mitigation is determined using a matrix that is based on the ecological values and the magnitude of effects on these values in the absence of any efforts to avoid, remedy and mitigate for potential effects.

2.0 Terrestrial ecology survey methodology

2.1 Bats

To assess the presence or absence of bats within the Site, a bioacoustics survey was conducted during the summer months in 2021. For the survey, 10 omni-directional Frequency Compression (FC) automated bat monitors (ABM) (AR4 model, manufactured by the Department of Conservation (DOC)) were deployed from 28 September – 5 November 2021, and again from 30 November – 20 January 2021, for a total deployment time of 59 nights. Recorded data was analysed using BatSearch (v3.12) software (developed by DOC, 2016) in accordance with protocols described by Lloyd (2017)[3]. ABMs begin recording when a noise is detected but can be sensitive to wind exposure and insect noises. As a result, some ABMs did not record for the same duration as others that were potentially more sheltered or had fewer insect interactions. Standard deployment time over a period of good weather is two weeks[4].

ABMs were deployed in areas considered to be suitable habitat for bats and where potential habitat was close to the proposed works. This included landscape features such as streams, pine forest edge, lake margins and wetlands.

The ABM deployment locations, and the levels of bat movements detection at each site, are presented in Figure 1 below. Note that the location of ABM4 was changed between deployment round 1 and 2, with both locations shown in the aerial map below. Weather data for the Site was supplied by TIL from the Mine's weather station and is provided in Appendix A. Weather conditions were generally suitable for bat emergence during the survey period. Table 2 provides details of the recorded nights.

2.2 Avifauna

To determine which bird species are potentially present at the Site, a combination of five-minute bird counts, dawn and dusk call-backs, and opportunistic observations were conducted by a team of four ecologists across the Site. Bird observations covered the range of habitats on the Site such as wetlands, grasslands, and the coastland margin.

Dawn and dusk surveys were carried out around wetland habitats located in the east and south of the Site to target areas most likely to support cryptic species. These included the mouth of the Wainui Stream as it flows from Lake Taharoa, wetlands adjacent to the southern end of Lake Taharoa and Lake Numiti, the edges of Lakes Piopio and Rototapu, and three unnamed wetlands (Wetlands 5, 7 and 17, see Figure 23). These locations are illustrated in Figure 2. Vocalisations from wetland bird species were used as audio call-backs played through a small hand-held speaker, including spotless crake, marsh crake, banded rail, Australasian bittern, and fernbird. A total of seven surveys were carried out with the details summarised in Table 1 below.

A total of 24 five-minute bird counts were conducted following standard data collection and field methods provided by DOC. Sixteen of the five-minute bird counts were counts

[3] Lloyd, B. 2017. Bat call identification manual for DOC's spectral bat detectors. (Ed. by The Department of Conservation). Wellington, New Zealand.

[4] Sedgeley, J. 2012. Bats: counting away from roosts–automatic bat detectors. Department of Conservation.

undertaken between 14 and 15 October 2021 and five between 29 and 30 October 2021. The location of where each five-minute bird count was carried out is shown in Figure 2.

Table 1: Summary of the date, time and type of survey carried out at each dawn and dusk survey site.

Location	Date	Time	Survey Type
Site 1	15 October	0553–0635hrs	Dawn
Site 2	15 October	0553–0635hrs	Dawn
Site 3	29 October	1900–1920hrs	Dusk
Site 4	29 October	1900–1920hrs	Dusk
Site 5	14 October	1805–1850hrs	Dusk
Site 6	29 October	0655–0720hrs	Dawn
Site 7	29 October	0655–0730hrs	Dawn

Figure 1: Aerial map illustrating the locations where automated bat monitors were deployed on the Site and levels of detection at each site.

Figure 2: Aerial map illustrating all avifauna survey locations.

2.3 Herpetofauna

To assess for the potential presence of native skinks, artificial cover objects (ACOs) were installed on site on 28 September 2021. ACO sites were selected covering all areas of potential habitat available across the Site, with large areas subject to active mining deemed unsuitable, and areas currently grazed avoided due to the potential for stock impacting ACOs.

A total of 20 tri-layered ACOs were installed in various habitat types considered suitable for native skinks, including pine slash piles, back dune vegetation and forest edges. The ACOs were deployed for 63 days before being surveyed, and another 56 days before a second round of surveys. The locations of the ACOs are presented in Figure 3.

Manual hand searches of suitable habitat were also carried out by four ecologists in close proximity to the ACO deployment sites and along the coastal foredunes. The foredune sampling methodology was carried out in conjunction with the katipō surveys and is described in Section 3.4 below.

A preliminary investigation of the entire Mine and the Site was undertaken during the initial fieldwork carried out on 14–15 September 2021. The habitat types were deemed unsuitable for supporting native arboreal gecko populations, therefore, no targeted gecko surveys were undertaken as part of this assessment.

2.4 Terrestrial arthropods

The extensive dunelands along the western side of the Site were considered potential habitat suitable for the native katipō spider. To assess for the presence of a local population at the Site, intensive manual hand searches were carried out of all areas that potentially offer suitable habitat for this species by a team of four ecologists. A 750 m section of duneland located north of the Wainui Stream was selected as the most representative sampling site of the sand dune environment at Taharoa (Figure 4).

Survey plots were established along the landward side of the foredunes closest to the coast at 100 m intervals. Each plot measured 15 x 15 m and was surveyed. Sheltered areas of dense dune vegetation and structures such as logs and woody debris were prioritised.

Searches for katipō were also included in the ACO surveys and the habitat surrounding them.

Figure 3: Aerial map illustrating the locations where artificial cover objects were deployed on the Site and where manual hand searching was conducted in the dunes.

Figure 4: Aerial map illustrating locations where katipō searches were conducted on the Site.

3.0 Results

3.1 Bats

Of the 10 ABMs deployed across the site (see Figure 1 for their locations), six had confirmed long-tailed bat (*Chalinolobus tuberculatus*) recordings. A summary of the results showing the number of detections at each hour after sunset, total detections, number of nights surveyed, and mean number of detections per night are presented in Table 2. A map illustrating the locations and frequency of bat detections at each site is presented in Figure 5. Plots of the mean number of bat recordings detected at each hour of the night are presented in Figure 6.

Key bat habitat areas are presented in Figure 7.

Table 2: Summary of nights of ABM recordings and bat interactions detected for each deployment.

Hours After Sunset	4S1	4S2	4S4	4S6	4S8	4S9	4S10	4S14	4S15	4S16
0.00	0	1	0	0	0	4	11	0	7	0
1.00	2	0	0	0	0	84	2	35	66	0
2.00	0	1	0	0	0	30	0	66	55	0
3.00	0	0	0	0	0	2	0	1	19	0
4.00	0	0	0	0	0	13	0	3	23	0
5.00	1	0	0	0	0	8	2	6	43	0
6.00	0	0	0	0	0	5	1	8	39	0
7.00	0	0	0	0	0	5	6	9	6	0
8.00	0	0	0	0	0	0	38	3	50	0
9.00	0	0	0	0	0	0	53	0	0	0
10.00	0	0	0	0	0	0	1	0	0	0
Total Detections	3	2	0	0	0	151	114	131	308	0
Nights	81	66	0	66	33	86	72	79	74	15
Mean Detections /Night	0.037	0.030	0.000	0.000	0.000	1.756	1.583	1.658	4.162	0.000

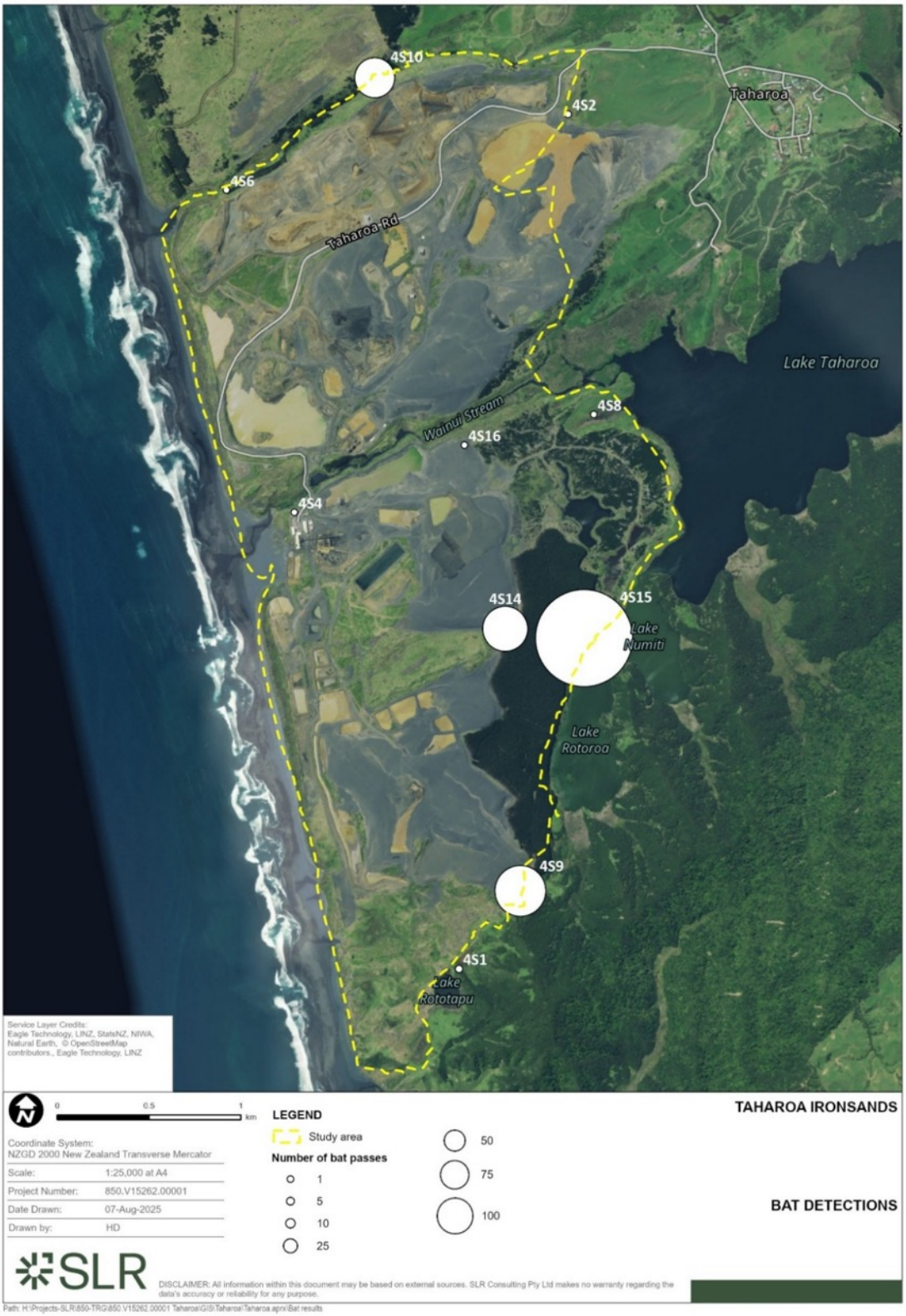


Figure 5: Aerial map with locations and frequency of bat detections around the proposed reconsenting footprint.

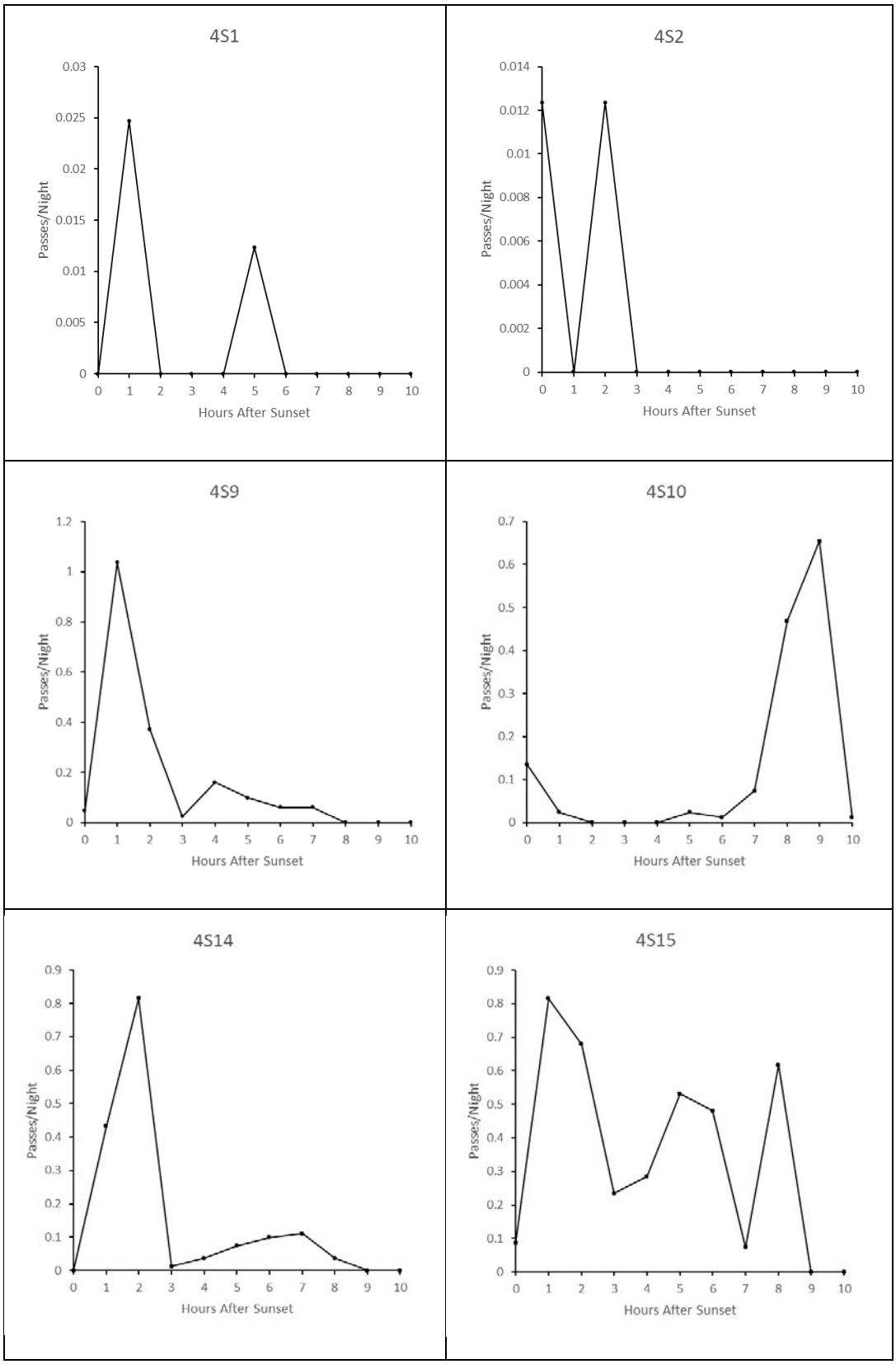


Figure 6: Graphs displaying mean number of bat recordings per night of deployment and the hour after sunset they were detected (note different scales).

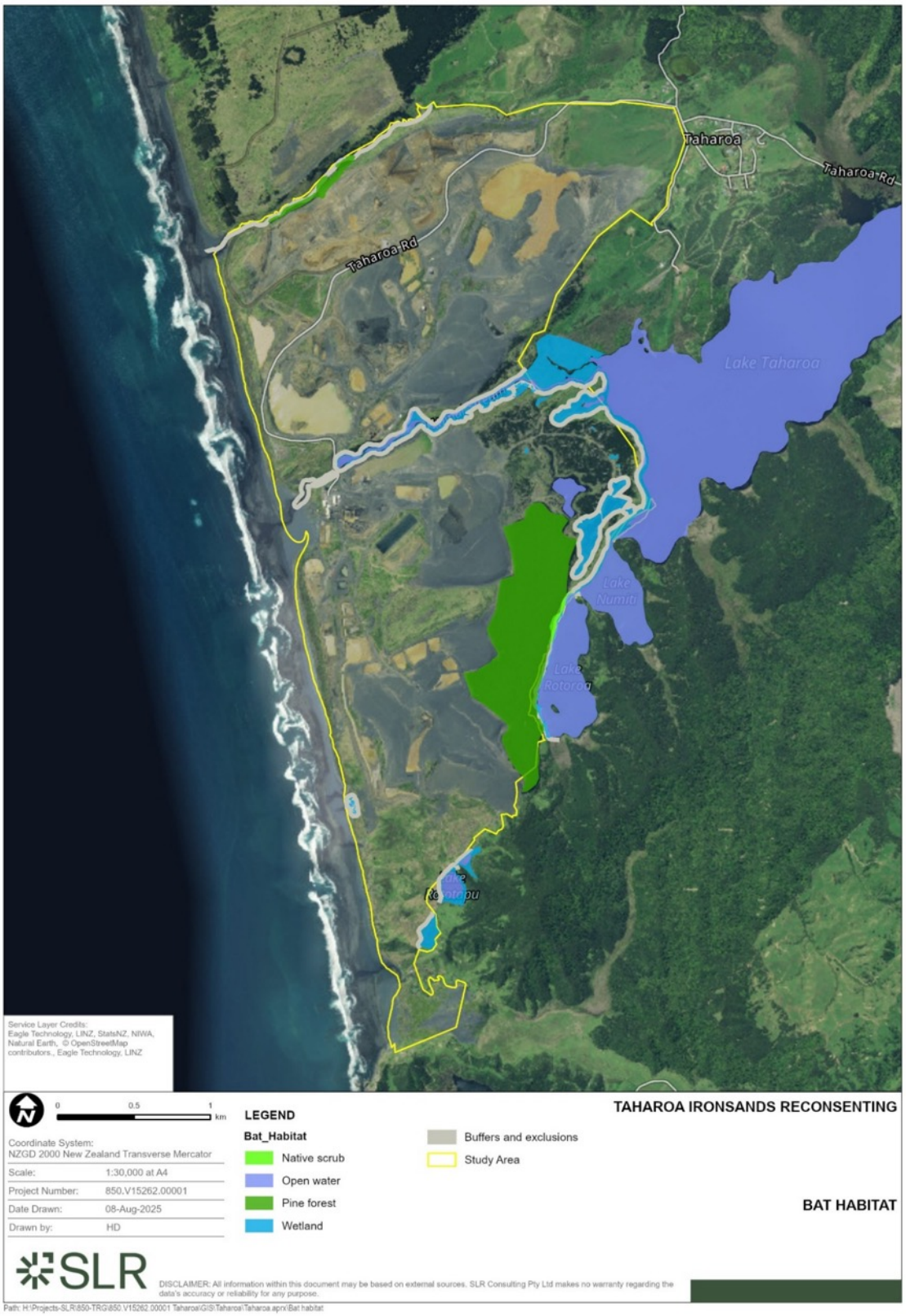


Figure 7: Key bat habitat areas

ABM 4S1 was located to the south of the Site adjacent to Lake Piopio, which is partially connected to a dense stand of manuka vegetation (Figure 8). The lake was considered

potential feeding habitat and the manuka vegetation would provide some connection with older native forest stands located further to the east. A total of three recordings were detected over three separate nights, with two detected one hour after sunset and one detected five hours after sunset.

Figure 8: Views looking north of Lake Piopio and the immediate surroundings showing low intensity grazing to the west and manuka vegetation to the east (left), and a close up of the lake and wetland vegetation (right).

4S2 was located in the northeast of the Site adjacent to active consented mining (Figure 9). It is considered marginal bat habitat, with few clusters of box thorn and gorse vegetation in an otherwise open pastoral landscape. This area was selected to provide coverage of all extremes of the Site and potentially detect bats moving across the Site's boundary where the habitat transitions into pasture and eventually connects with native forest in the north. One bat was detected on a single night 2 hours after sunset.

Figure 9: Limited vegetation growing in exposed area close to active mining areas to the south (left), and open pasture to the north (right).

4S9 was located towards the south of the Site near the southernmost extent of the remnant pines (Figure 10). Remnant pines are north of the location, regenerating manuka stands to the south and east, and a tailings/slurry field to the west. The area was selected due to its connection to native forest further east and the forest edge of the remnant pines. 4S9 had

the second highest number of bat detections with a total of 151 recordings over 86 nights, 84 of which were recorded within 1 hour after sunset, indicating that bat roosts could be nearby.

Figure 10: View looking north and east over the tailings/slurry field where it borders the remnant pines (left). Connection with native forest further east can be seen in the distance (right).

4S10 was located along the Mitiwai Stream in the north, which forms the northernmost boundary of the proposed reconsenting area (Figure 11). The stream is set in a deep gully with steep-sided banks that rise to roughly 30–40m and is lined with a mixed stand of remnant pines, duneland vegetation and pasture grasses. The ABM was hung from a large pine along the true left bank of the Mitiwai Stream. This area was identified as having favourable characteristics for bats, such as the sheltered gully system, large pines with crevassed bark, a clear flyway along the stream, and a connection with more extensive stand of remnant pines further north of the Site. 4S10 had a total of 114 recordings of bats over 72 nights, 91 of which were between 4am and 6am.

Figure 11: View from the top of the true left bank of the Mitiwai Stream looking west (left), and a view looking upstream with remnant pines, flaxes, pampas and wiwi lining the true right bank (right).

4S14 was located along the western edge of the large stand of remnant pines in the southeast of the operations facilities (Figure 12). The area was selected for its position along the pine forest edge and proximity to operational mining areas. There were a total of 131 recordings of bats over 79 nights, 101 of which were recorded between 1–3 hours after sunset.

Figure 12: View of the monoculture pine forest and its lack of understory and ground cover (left), and a view across the site looking east to the remnant pine edge where ABM 14 was located (right).

4S15 was located in the east of the Site between the edge of the remnant pines and Lakes Numiti and Rotoroa (Figure 13). The area was identified as having favourable characteristics for bats, such as the large pines with crevassed bark that formed a forest edge, relatively small, sheltered lakes for foraging, and a connection with more extensive native forest further east of the Site. 4S15 had the most bat detections of any of the sites during the survey, with a total of 308 recordings over 74 nights. Recordings were most common between 1–3hrs, 6hrs, and 8hrs after sunset.

Figure 13: View looking east (left) and west (right) around the lake edges with the remnant pine block forming a forest edge where 4S15 was located.

3.2 Avifauna

A total of 46 bird species were identified throughout the duration of the avifauna surveys (Table 4). Two species were Nationally Critical, one Nationally Vulnerable, five At Risk - Declining and three At Risk - Recovering[5]. Of the 46 species, 18 were native, 10 were endemic, and 18 were Introduced and Naturalised. The results of the dawn and dusk surveys, and the five-minute bird counts are presented below. A list of all species identified on the Site is presented at the end of this section in Table 4.

Of the recorded species, coastal species are likely to be found outside the Site. Fernbird, pied shag, grey duck, grey teal and New Zealand dabchick and wetland bird species (bittern, marsh crake, spotless crake) are the most notable species that, while found generally outside the Site, could be impacted by the proposal through the effect of noise, light and vibration.

NZ pipit were found in grassland areas on the Site.

3.2.1 Dawn and dusk surveys

3.2.1.1 Site 1 / Wetland 18 (-38.198599, 174.715556)

Site 1 was located at the southernmost extent of the Site (referred to as Wetland 18 in the vegetation and wetlands assessment, see Figure 23). It is a wetland of approximately 1.3 ha that supports a mature and complex assemblage of wetland plant species. Survey conditions were cool and overcast with a constant westerly breeze and no additional noise. A total of 10 bird species were identified of which spotless crake (*Porzana tabuensis*, At Risk – Declining), fernbird (*Bowdleria punctata,* At Risk – Declining), paradise shelduck (*Tadorna variegate*), pied shag (*Phalacrocorax varius,* At Risk – Recovering), fantail (*Rhipidura fuliginosa*), and grey warbler (*Gerygone igata*) were native or endemic.

[5] 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 p.

Figure 14: View of wetland surveyed at Site 1 located at the southernmost extent of the Site.

3.2.1.2 Site 2 (-38.1950403, 174.7129216)

Site 2 was located just outside the south-eastern extent of the Site. The dawn and dusk surveys were conducted on a slight rise close to Lake Piopio immediately to the north, and Lake Rototapu immediately south. Both lakes are open bodies of water surrounded by diverse assemblages of wetland plant species and were fenced to prevent access by livestock. Survey conditions were cool and overcast with a constant westerly breeze and no additional noise. A total of three species of bird were identified including marsh crake (*Porzana pusilla*, At Risk – Declining), fernbird, and dabchick (*Poliocephalus rufopectus,* At Risk – Recovering).

Figure 15: View of Lake Rototapu looking south from close to Site 2.

3.2.1.3 Site 3 (-38.19755068, 174.7137798)

Site 3 was located inside the Southern Block. The dawn and dusk surveys were conducted 200m back from the coastal foredunes in a slight depression at the base of a sloping hillside used for low-intensity livestock grazing. The depression contained two small areas of surface water totalling about 0.2 ha that supported aquatic flora and around which grew a mixed assemblage of low growing wetland plant species. Survey conditions were cool and rainy with light drizzle, a constant westerly breeze and no additional noise. Song thrush and skylark were the only bird species identified at this location.

Figure 16: Site 3 was located around the two small wetland areas visible in the foreground, with Lake Rototapu to the right in the background.

3.2.1.4 Site 4 (-38.19599703, 174.7134122)

Site 4 was located just inside the southwestern extent of the Southern Block. The dawn and dusk surveys were conducted 130 m back from the coastal foredunes in a small basin surrounded by sandy slopes seeded with pasture grasses and naturally established wiwi and gorse. The bottom of the basin comprised approximately 0.53 ha of flat land that was heavily grazed and pugged by livestock and a shallow standing body of water. Survey conditions were cool and rainy with light drizzle, a constant westerly breeze and no additional noise. Song thrush was the only bird species identified.

Figure 17: Site 4 was the most coastal wetland and was heavily pugged and damaged by livestock.

3.2.1.5 Site 5 (-38.1772436, 174.7268455)

Site 5 was located to the east (but outside) of the Central Block. The dawn and dusk surveys were conducted next to a 2.53 ha wetland located between Lakes Taharoa and Numiti and a remnant stand of pines. The wetland had an assemblage of wetland plant species dominated by raupo and giant rush, some fringe willow trees, and areas of large open bodies of water. Survey conditions were cool and slightly overcast with no wind, rain or additional noise. A total of 14 bird species were identified, of which spotless crake, grey teal (*Anas gracilis*) (native), grey duck (*Anas superciliosa*, native and Nationally Critical), Australasian bittern (*Botaurus poiciloptilus*, native and Nationally Critical), dabchick, scaup (*Aythya novaeseelandiae*, endemic), grey warbler, paradise shelduck, pukeko (*Porphyrio melanotus*, native), shoveler (*Anas rhynchotis*), and black swan (*Cygnus atratus*) are native or endemic.

Figure 18: View of the surveyed wetland from Site 5 looking east.

3.2.1.6 Site 6 (-38.16678103, 174.7202044)

Site 6 was located on the true right bank of the Wainui Stream, within the site boundary. The dawn and dusk surveys were conducted at the bottom of a steep-sided bank at the base of which was a strip of diverse wetland plant species that supported a stand of raupo along the stream edge. On the true left bank, a more expansive area of wetland supported an assemblage of flaxes, carex, rush species as well as cabbage tree. The stream edge was dominated by a dense stand of raupo. Survey conditions were cold and overcast, but calm with no wind, rain or additional noise. A total of seven species of bird were identified, including spotless crake, paradise shelduck, and fernbird.

Figure 19: View from above Site 6 looking down over the Wainui Stream and the survey area.

3.2.1.7 Site 7 (-38.16565054, 174.7223237)

Site 7 was located north of the Wainui Stream channel (within the site boundary). The dawn and dusk surveys were conducted on the edge of a large expanse of continuous wetland covering a total area of 21.3 ha. The survey site included the area of wetland where Lake Taharoa begins to transition into the defined channel of the Wainui Stream. The wetland itself encroaches up to 200 m into the lake from the banks and comprises a complex assemblage of larger wetland plant species adapted to the deeper water of the lake edge, such as raupo, flaxes, and grey willow. Survey conditions were cold and overcast, but calm with no wind, rain or additional noise. A total of 14 bird species were identified, of which black swan (*Cygnus atratus*) and welcome swallow were native, and grey warbler, dabchick, paradise shelduck, fantail, and fernbird were endemic.

Figure 20: View of the early formation of the Wainui Stream and the expansive wetland with survey Site 5 located on the far bank.

3.2.2 Five-minute bird counts

A total of 42 bird species were identified across the Central and Southern Blocks during the five-minute bird count surveys, of which 22 species were native or endemic. Of these 22 species, seven were 'At-Risk', and two were 'Threatened'.

The 'At-Risk' species detected included red-billed gull (Declining), pied shag (Recovering), fernbird (Declining), New Zealand pipit (Declining), New Zealand dabchick (Recovering), variable oystercatcher (Recovering), and New Zealand dotterel (Recovering). The coastal species (i.e., Red-billed gull, variable oyster catcher and New Zealand dotterel) were only identified at survey locations on the coastal margin outside of the proposed reconsenting boundary, although New Zealand dotterel were observed in one of the tailings cells. Fernbird, pied shag and New Zealand dabchick were identified at survey locations around wetlands and lakes, specifically at sites B1 and B4 in the south and B14, B15 and B16 to the east. A single New Zealand pipit was observed at each of sites B3 in the south and at B17 in the north.

The 'Threatened' species included grey duck (Nationally Critical) and Caspian tern (Nationally Vulnerable). Grey duck were identified at survey locations B12, B13 and B15, all of which were positioned along the margins of Lake Rotoroa, Numiti and Taharoa. All observations were outside of the proposed reconsenting boundary. Caspian tern were observed at survey locations B9, B11 and B23, all of which were positioned along the coastal margin to the west, outside of the Site boundary.

The range of weather and environmental conditions experienced during the surveys and their relevant score ranges are provided in Table 3 below.

Table 3: Environmental parameters and the range of scores for each group of five-minute bird counts.

Conditions	Survey dates	
	14–15 October 2021	29–30 October 2021
Temperature (1-6)	3-4	4-5
Wind (0-3)	1-3	1
Other noise (0-2)	0-2	0-1
Sun (minutes)	0-4	0-5
Precipitation type (N,M,R,H,S)	N, R	N,R
Precipitation value (0-5)	2-4	2

***N=none, M=mist, R=rain, H=hail, S=snow**

Table 4: List of all bird species identified during avifauna surveys at (and adjacent to) the Site and their threat classification status.

Scientific Name	Common Name	Threat Status	Conservation Status
Botaurus poiciloptilus	Australasian bittern	Nationally Critical	Native
Anas superciliosa	Grey duck	Nationally Critical	Native
Hydroprogne caspia	Caspian tern	Nationally Vulnerable	Native
Porzana pusilla	Marsh crake	At–Risk Declining	Native
Porzana tabuensis	Spotless crake	At–Risk Declining	Native
Larus novaehollandiae	Red-billed gull	At–Risk Declining	Native
Phalacrocorax varius	Pied Shag	At–Risk Recovering	Native
Hirundo neoxena	Welcome swallow	Not Threatened	Native
Phalacrocorax melanoleucos	Little shag	Not Threatened	Native
Todiramphus sanctus	Sacred kingfisher	Not Threatened	Native
Larus dominicanus	Southern black-backed gull	Not Threatened	Native
Zosterops lateralis	Silvereye	Not Threatened	Native
Himantopus himantopus	Pied stilt	Not Threatened	Native
Circus approximans	Swamp harrier	Not Threatened	Native
Vanellus miles	Spur-winged plover	Not Threatened	Native
Cygnus atratus	Black swan	Not Threatened	Native
Anas gracilis	Grey teal	Not Threatened	Native
Anas rhynchotis	Australasian shoveler	Not Threatened	Native
Egretta novaehollandiae	White-faced Heron	Not Threatened	Native
Porphyrio melanotus	Pukeko	Not Threatened	Native
Rhipidura fuliginosa	Fantail	Not Threatened	Endemic
Charadrius obscurus	New Zealand dotterel	Nationally Increasing	Endemic
Bowdleria punctata	Fernbird	At–Risk Declining	Endemic
Anthus novaeseelandiae	New Zealand pipit	At–Risk Declining	Endemic
Poliocephalus rufopectus	New Zealand dabchick	At–Risk Recovering	Endemic
Haematopus unicolor	Variable oystercatcher	At–Risk Recovering	Endemic
Gerygone igata	Grey warbler	Not Threatened	Endemic

Scientific Name	Common Name	Threat Status	Conservation Status
Tadorna variegata	Paradise shelduck	Not Threatened	Endemic
Aythya novaeseelandiae	New Zealand scaup	Not Threatened	Endemic
Emberiza citrinella	Yellowhammer	-	Introduced and Naturalised
Prunella modularis	Dunnock	-	Introduced and Naturalised
Acridotheres tristis	Common myna	-	Introduced and Naturalised
Fringilla coelebs	Chaffinch	-	Introduced and Naturalised
Carduelis carduelis	Goldfinch	-	Introduced and Naturalised
Carduelis chloris	Greenfinch	-	Introduced and Naturalised
Turdus merula	Eurasian blackbird	-	Introduced and Naturalised
Phasianus colchicus	Common pheasant	-	Introduced and Naturalised
Columba livia	Rock pigeon	-	Introduced and Naturalised
Branta canadensis	Canada goose	-	Introduced and Naturalised
Sturnus vulgaris	Common starling	-	Introduced and Naturalised
Alauda arvensis	Eurasian skylark	-	Introduced and Naturalised
Anas platyrhynchos	Mallard	-	Introduced and Naturalised
Passer domesticus	House sparrow	-	Introduced and Naturalised
Gymnorhina tibicen	Australian magpie	-	Introduced and Naturalised
Turdus philomelos	Song thrush	-	Introduced and Naturalised
Anser anser	Greylag goose	-	Introduced and Naturalised

3.3 Herpetofauna

No native or invasive skinks were identified during either round of surveys using ACOs, and no native or invasive skinks were found during destructive hand searching efforts.

Anecdotally, TIL staff have not observed lizards on the Site during their time there.

Although it is impossible to be certain of the absence of lizards at the Site, the findings indicate that based on the habitat availability and understanding species, they are likely to only be present in low densities.

3.4 Katipō

No katipō were found during searches of the ACOs, their surrounding habitat, and systematic hand searches in defined quadrats along the foredunes. A number of non-indigenous false katipō, or black cobweb spider, (*Steatoda capensis*) were found in the dunes and under ACOs.

Although it is impossible to be certain that there are no katipō present on the Site, the findings indicate they are likely to only be present in low densities.

Figure 21: False katipō found in the foredunes.

Figure 22: Foredune habitat surveyed for katipō.

4.0 Ecological effects assessment

4.1 Ecological values

Based on SLR's understanding of the Site, the 'existing environment' at the Site from a terrestrial ecology perspective includes:

- Open grassland habitat that is used by bird species such as New Zealand pipit, and could be used by skinks;
- Pine plantation forest that is used by long-tailed bats for foraging and potentially roosting;
- Wetland and lake margin areas (located largely outside the mining area) that is used by wetland species including Australasian bittern;
- Stream margins that are used by long-tailed bats for foraging, and potentially roosting in mature trees along the streambank; and
- Dune vegetation that is used by bird species such as New Zealand dotterel, and that could provide habitat for skinks and katipō.

4.1.1 Bats

The bat surveys conducted to inform this assessment confirmed the presence of long-tailed bats (Threatened – Nationally Critical) in and around the Central and Southern Block. The frequency of recordings over multiple nights at multiple sites is indicative of a local population of long-tailed bats that utilise parts of the Site and other nearby habitats for foraging and possibly roosting. The majority of the recorded activity was along the upper extent of the Mitiwai Stream (along the northern boundary of the Central Block) and around the remnant stand of pines in the southern eastern part of the Site (in the Southern Block). Potential roost trees are present within the Site, including along the Mitiwai stream, regenerating indigenous forest, and likely low numbers within the pine plantation forest. Foraging areas are likely to be tracks, forest edges, along the streams and the wetland areas.

Under the EcIA guidelines, terrestrial species that are Nationally Threatened dictate the ecological value to be 'Very High'. Given that several of the surveyed habitats (Figure 7), notably wetlands, lake margins, stream margins and pine plantation forest, support a local

population that frequently utilise certain areas within the Site boundary, we consider the ecological value of these parts of the site for bats to be **Very High**. Based on recent aerial imagery, parts of the plantation forest have by now been mined, reducing the availability of this type of habitat, but this does not lead to a change in the overall outcome of the value assessment for bats.

4.1.2 Avifauna

A diverse range of avifauna were identified in and around the Site. They vary from coastal seabirds to grassland birds, to wetland birds, with a high proportion of indigenous species including bittern, fernbird, marsh crake and spotless crake. The dawn and dusk surveys identified the presence of a number of native and endemic species, including rare and cryptic wetland birds, by either direct observation or through the use of audio playback calls.

Pied shag are highly mobile species and are more commonly found in lake, estuarine and marine habitats, suggesting the wetland it was observed at (located outside the Site) does not provide exclusive feeding or roosting habitat. Fernbird are commonly found in wetland habitats in this part of New Zealand; they are habitat generalists and are not exclusively tied to wetland environments. Australasian bittern, marsh crake, and spotless crake, however, almost exclusively occupy wetland habitat (except on select islands)[6,7,8].

The five-minute bird counts also identified a wide variety of species, including seven 'At Risk' and two 'Threatened' species, including low numbers of the New Zealand pipit (At Risk – Declining), which were detected at two monitoring locations, and are likely to utilise the grassland areas available at the Site.

This variation of species is anticipated to be similar or the same to what would exist in the environment at the expiry of the resource consents.

Under the EcIA guidelines, terrestrial species that are Nationally Threatened dictate the ecological value to be 'Very High', and for At Risk – Declining species the ecological value is considered 'High'[9]. Therefore, we consider 'wetland birds' to be of very high ecological value, New Zealand dotterel to be 'Very High' and 'grassland birds' (i.e., New Zealand pipit) to be of 'High' ecological value.

While some areas in and around the Site supported these species, given these species and suitable habitats are present (notably NZ pipit in grassland areas and wetland bird species) and are in close proximity to proposed mining activity, and in light of the relevant "existing environment" in this case, we consider the ecological value of the habitats present for avifauna to be **Very High**.

4.1.3 Herpetofauna

The surveys indicated that no lizards were present in the targeted areas following the deployment of ACOs and undertaking manual hand searching. While these surveys were not exhaustive, areas that were considered the highest potential habitat value for lizards were prioritised. Anecdotal evidence provided by the TIL environmental team supported the absence of lizards within the Site. However, given the cryptic nature of skinks we cannot be

[6] Fitzgerald, N. 2013 [updated 2017]. Spotless crake. In Miskelly, C.M. (ed.) New Zealand Birds Online. www.nzbirdsonline.org.nz

[7] O'Donnell, C.F.J. 2013 [updated 2017]. Marsh crake. In Miskelly, C.M. (ed.) New Zealand Birds Online. www.nzbirdsonline.org.nz

[8] Williams, E. 2013 [updated 2018]. Australasian bittern. In Miskelly, C.M. (ed.) New Zealand Birds Online. www.nzbirdsonline.org.nz

[9] 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 edition.

certain they are not present, albeit likely in very low numbers, especially in the context of the "existing environment" where there is likely to be more suitable habitat than currently existing. The vast majority of skinks are listed as either At-Risk or Threatened, so the conservation status of most skinks dictates that even though no lizards were found, their potential presence, even if in low densities, in some areas of the Site (notably stream margins, grassland areas and micro refugia such as logs and debris)) means the ecological value of herpetofauna habitat at the Site is **High**.

4.1.4 Katipō

The surveys indicated that no katipō were present in the targeted areas following the deployment of ACOs and undertaking manual hand searching. While these surveys were not exhaustive, areas supporting what were considered the highest potential habitat value for katipō were prioritised. The surveyed foredunes (considered high value) were heavily trafficked and degraded by horses, cattle and feral pigs. Again however, given the cryptic nature of katipō we cannot be certain they are not present, albeit likely in very low numbers, especially in the context of the "existing environment". Katipō are listed as 'At-Risk declining'[10], so while the surveys did not identify any katipō, the conservation status dictates that based on their potential presence in some areas, notably dune environments and adjacent areas that offer suitable microhabitats such as logs, the ecological value of katipō habitat available at the Site is **High**.

4.2 Ecological effects

The potential adverse effects of TIL's proposed mining activities on these species and habitats include the following:

- Loss of nesting/foraging/commuting habitat or fragmentation through vegetation clearance, loss of 4.25 ha of wetlands and land disturbance;
- Potential or injury and/or death during vegetation clearance or during maintenance or emergency pipeline works required in dune/beach habitat during breeding season; and
- Potential adverse effects of dust, lighting, noise and vibration associated with mining operations.

4.2.1 Bats

The bat surveys indicate that there is a local population of long-tailed bats that frequently utilise the habitat in and around the Site, including the pine forest plantation (for foraging, commuting and potentially for roosting), parts of which located close to the processing plant have recently been removed; a limited number of individual trees within the Site, wetlands within the Site, and lake, stream and wetland margins within and adjacent to the Site (Figure 7). We note that the vast majority of detections were at the forest edge of the stand of plantation forest pines, along the edges of Lake Rotoroa and Lake Numiti, and the north-western portion of the Mitiwai Stream gully in the north of the Site (as shown in Figure 11 above). The low counts of bat detections recorded at 4S1 (south-eastern extent) and 4S2 (north-eastern extent) are indicative of incidental passes and suggest that these locations do not offer meaningful habitat for long-tailed bats.

Based on this assessment of ecological values for bats, the potential effects on bats associated with the proposal are:

[10] Sirvid, P.J.; Vink, C.J.; Fitzgerald, B.M.; Wakelin, M.D.; Rolfe, J.; Michel, P. 2020: Conservation status of New Zealand Araneae (spiders), 2020. New Zealand Threat Classification Series 34. Department of Conservation, Wellington. 33 p.

- Foraging and commuting habitat loss or fragmentation through vegetation clearance and land disturbance;
- Potential loss of short-term roosting habitat through vegetation clearance and land disturbance; and
- Adverse effects of lighting, noise and vibration associated with mining operations.

The mining operations proposed in this application would see previously mined areas being re-worked. These areas support assemblages of fast colonising grasses and shrubs with no large stands of trees or waterbodies. The previously mined areas support a stand of pines that is managed as part of forestry operations within the Site; as well as wetland areas that are likely to provide bat foraging habitat.

4.2.1.1 Habitat disturbance

Within the "existing environment" there would be:

- The grassland environment that has recolonised over the previously mined areas is seen as potential foraging habitat for long-tailed bats but is considered to be of low value;
- Grazed and exotic dominated wetlands predominantly in the Southern Block, which could also provide foraging habitat of moderate value due to their impacted and currently grazed nature; and
- Potential roosting features existing within the pine plantation forest and along stream and wetland margins

It is understood that the mining operations proposed for the Southern Block of the Site will commence after the plantation pine trees on the eastern edge of the Site have been harvested. This assessment of ecological effects includes assessment of the effects of the pine removal on bats as required by the National Environmental Standards for Commercial Forestry 2017 (NES-CF).

High numbers of bat frequency passes were recorded at the forest edge of this pine block during the field surveys and it is considered high value foraging habitat and potential short-term roost habitat. The pines likely form only part of the foraging habitat available to the bats, with the nearby wetlands, lake margins, streams and native forest edges all providing suitable habitat. The remnant pine trees to the east are young and the majority of trees are not mature enough to be suitable for highly trafficked bat roosts. However, there may be some trees present within pine plantation forest, and smaller dead spars, that could be suitable as occasional roost habitat.

Accordingly, we consider the magnitude of effects on bats, without mitigation, within the wider landscape context of the Site to be **Moderate**.

4.2.1.2 Lighting, noise and vibration

Mining operations at the Site are proposed 24 hours per day, with areas around the plants illuminated by large flood lights and tailored lighting at the excavation pits to assist with machinery operation. Potential effects on bats from lighting are expected in areas of key use, which include areas of high numbers of bat detections near the Mitiwai Stream in the north of the Site, and the remnant pines in the east of the Site. The movement of mining operations into areas that have not been mined for some time (and are in a rehabilitated state) and close to key bat habitat areas (Figure 7) will likely result in an increase in nighttime luminosity at active workface areas. The level of effect that lighting has on the behaviour of long-tailed bats is not currently well understood, but it is likely that the effects are

adverse[11, 12]. Given the existing level of light and noise presented by the current mining operations (and absence of artificial light in the "existing environment"), the level of disturbance relative to current activities is expected to increase in these areas, however, the change in lighting will be localised and will be from those lights required to meet health and safety requirements at excavation sites. This is anticipated to be less than those around the processing plants.

Planting of buffer areas around streams, lakes and wetlands to attenuate light will be an important measure to minimise disturbance.

Subsequently, without mitigation we consider the magnitude of effect on bats from lighting to be **Moderate**.

Large excavation and transport machinery used by the mine produce noise and vibrations when operating. The movement of mining operations into areas that have not recently been mined will see an increase in the level of noise and vibration disturbance in these areas. Again, the level of effect this change in noise and vibration disturbance may have on the behaviour of long-tailed bats is not currently well understood, but the level of disturbance is expected to increase in areas not recently mined. Mining works will not take place in close proximity to the Mitiwai Stream (within 30m) in the north of the site where high number of bat detections were recorded. Effects on bats from noise and vibration is likely to be restricted to those areas around the remnant pines to the east of the site. We consider the magnitude of effect on bats from noise and vibration to be **Moderate**.

4.2.1.3 Potential level of effect on bats

Overall, we consider the potential adverse effects on bats as a result of the proposed reconsenting activities, and in the absence of mitigating measures to be **High**.

4.2.2 Avifauna

The mining operations proposed in the reconsenting application will result in previously mined and rehabilitated areas being re-worked. Operations may have the following potential adverse effects on avifauna:

- Loss of large areas of grassland nesting/foraging habitat for grassland species such as NZ pipit within the mining extent, prior to rehabilitation;
- Potential for NZ pipit disturbance, injury and/or death during clearance of suitable grassland habitat as part of mining activity;
- Potential for dust, vibration and noise disturbance to various wetland species (particularly Australasian bittern, and especially during breeding season) during mining activities near wetlands; and
- Potential for NZ dotterel disturbance, injury and/or death if maintenance or emergency pipeline works are required in dune/beach habitat during breeding season.
- Potential for native wetland bird disturbance, injury and/or death during mining of several wetlands (4.25 ha in total) of degraded quality (from a terrestrial fauna perspective). However, these wetlands are unlikely to provide habitat for any vulnerable wetland bird species.

[11] Dekrout A 2009. Monitoring New Zealand Long-tailed Bats (*Chalinolobus tuberculatus*) in Urban Habitats: Ecology, Physiology and Genetics. PhD thesis. University of Auckland.

[12] Le Roux DS, Le Roux NN, Waas JR. 2013. Spatial and temporal variation in long-tailed bat echolocation activity in a New Zealand city. NZ J Zoology.

Dust, noise and vibration have the potential to disturb birds, in particular wetland species frequenting retained wetlands. These stressors can affect birds in various ways, especially during the breeding season (typically September to January), when sensitivity to disturbance is heightened.

The level and types of effect, including flight initiation distance, are not well researched or quantified for the species anticipated to be present on the Central and Southern Block and therefore cannot be determined with certainty. However:

- Noise and vibration from mining operations (e.g., from heavy machinery, or vehicle movement) can cause flight initiation and interfere with various behaviours such as mating and nesting;
- Light pollution can disrupt feeding, mating and breeding behaviour. Wetland and grassland species are especially sensitive to light changes, which can disrupt circadian rhythms and increase predation risk; and
- Dust generated by mining activities can degrade habitat quality and directly affect bird health.

It is reasonable to assume that all these factors are likely to negatively affect birds to some degree. There is expected to be an increased likelihood of disturbance during avifauna breeding season, when birds are more vulnerable to disturbance and habitat degradation.

Several wetlands are proposed to be removed (Figure 23). These are of a degraded nature, currently impacted by stock and provide habitat that is generally of low value to vulnerable bird wetland species, and does not offer suitable vegetation cover for nesting of these species.

In addition, alteration of wetland hydrology has the potential to drain several other wetlands, discussed in detail in the Terrestrial Ecology Report[13] (Section 6). Depending on the level of this effect, there could be additional functional loss in wetland bird habitat, in particular feeding habitat, associated with this alteration. The effects management outlined in the Wetland Report (Section 6.4.2, Table 15 of the document) will be required to be fully implemented to avoid adverse effects on birds.

Emergency works such as repair works on pipeline infrastructure within the CMA, also may have to take place within NZ dotterel habitat, which could adversely affect this species and their nesting sites. The breeding season for New Zealand dotterel is typically from September to January.

The New Zealand pipit, an ‘At Risk’ species, occupy rough, open habitat ranging from coastlines to alpine shrublands and forages on an omnivorous diet of grains, seeds and small invertebrates[14]. They were observed in the grassland vegetation within the Site and the habitats directly north and south of the proposed reconsenting footprint are considered suitable for this species. Vegetation removal is expected to remove the available grassland habitat leading to the temporary loss of most suitable habitat for this species at the Site, prior to rehabilitation.

There is also risk of disturbance and direct injury during vegetation clearance, particularly if conducted during the nesting period.

[13] SLR Consulting 2025. Ecological Impact Assessment for wetlands and terrestrial vegetation. Taharoa Ironsands Central and Southern Block Mining Project. Report prepared for Taharoa Ironsands Ltd.

[14] Beauchamp, A.J. 2013 [updated 2022]. New Zealand pipit | pīhoihoi. *In* Miskelly, C.M. (ed.) *New Zealand Birds Online*. www.nzbirdsonline.org.nz

Based on these potential adverse effects, prior to mitigation, we consider the magnitude of potential adverse effects on wetland/grassland birds, NZ dotterel and NZ pipit to be **Moderate** and the potential level of effect to be **High.**

Figure 23 Wetland impact status. Sites in orange will be removed as part of mining operations

4.2.3 Herpetofauna

Suitable lizard habitat is present within the Site and is part of the existing environment for this assessment. The proposed mining operations have the potential to have the following adverse ecological effects on lizards:

- Loss of large areas of grassland habitat within the mining extent, prior to rehabilitation; and
- Potential injury or death for skink as a result of vegetation clearance.

The monitoring conducted on site found no lizards present in the surveyed areas, however given the cryptic nature of skinks we cannot be certain they are not present, albeit likely in very low numbers. Taking into consideration their absence in the surveys and the conservative approach that they may be scarcely distributed in low densities, we consider the magnitude of effects to be **Low**, and the potential adverse effects on herpetofauna to also be **Low**. No mitigation measures are recommended.

4.2.4 Katipō

A 100m setback from MHWS was required under the previous resource consent (100902) and is proposed by TIL to apply to the equivalent new consent, meaning no mining operations would take place in the foredune habitat considered to be of highest value and most suitable habitat for katipō. No mitigation measures are recommended.

The proposed mining activities will result in the permanent loss of large areas of grassland habitat but, given there will be no works within the high value foredune habitat, we consider the magnitude of effects to be negligible.

Overall, we consider the ecological value of katipō as an ‘At-Risk’ species to be high and the magnitude of effects of the proposed works to be **Negligible**. Accordingly, we consider the potential level of effect of the proposed reconsenting activities on katipō to be **Very Low**.

4.2.4.1 Summary

The ecological values of the faunal species in and around the Central and Southern Block, the assessed magnitude of effects, and the potential level of effects prior to mitigation options being implemented are presented in Table 5 below.

Table 5: Summary of fauna values, magnitude of effects, and potential level of adverse ecological effects.

	Ecological Value	Magnitude of Effect	Potential Level of Effect
Bats	Very High	Moderate	High
Avifauna	Very High	Moderate	High
Herpetofauna	High	Low	Low
Katipō	High	Negligible	Very Low

5.0 Recommended mitigation

This section describes mitigation measures recommended to address adverse effects on ecological fauna values

Recommendations for mitigation measures focus on minimisation of disturbance through buffers to sensitive ecological features, minimising direct harm to fauna species during vegetation removal, animal pest control, and a rehabilitation plan following cessation of mining activities.

While avoidance of certain areas at the Site is not possible due to functional requirements of the activity (i.e. location of the mining resource), high value areas such as lake and stream fringing wetlands and dune environments are recommended to be avoided and a buffer implemented to minimise effects on these key fauna habitats.

5.1 Bats

The stand of plantation forestry pines to the southeast of the Site is considered to be effective habitat for bat foraging, and may also include some trees that offer potential roosting habitat. It is our recommendation that the pine forest is removed in stages rather than felled in one harvest or a buffer of pine forest is retained, to maintain foraging habitat as long as possible. As indigenous tree species can take a long time to become potential roost trees, replanting of fast-growing exotic species in adjacent areas not to be mined is also recommended to shorten the lag time between habitat loss and new foraging and roosting habitat becoming available. This could also entail adding non-invasive exotic species to the restoration planting proposed.

In order to reduce the potential effects on bats as a result of the proposed mining activities, Bat Roost Protocols (vegetation clearance protocols) should be adopted during the removal of the plantation pine forest to minimise the risk to any roosting bats during tree felling. Given the relatively young age and small size of the pines compared to full grown specimens, this may mean only a small number of trees are considered suitable roost habitat by an experienced specialist and will require further management.

There are no New Zealand light pollution guidelines to protect wildlife at the time of writing this assessment, however, the Australian Government has released guidelines that are applicable to flying fauna species, particularly shorebirds, seabirds and bats in a New Zealand setting[15]. The guidelines include best practice lighting design and light management principles, with a summary provided below.

Simple management principles can be used to reduce light pollution, including:

1) *Start with natural darkness and only add light for specific purposes.*
2) *Use adaptive light controls to manage light timing, intensity and colour.*
3) *Light only the object or area intended –keep lights close to the ground, directed and shielded to avoid light spill.*
4) *Use the lowest intensity lighting appropriate for the task.*
5) *Use non-reflective, dark-coloured surfaces.*
6) *Use lights with reduced or filtered blue, violet and ultra-violet wavelengths.*

These management principles will help mitigate the adverse effects artificial lighting will have on bats, and we recommend as many of these as practicable are implemented for any additional lighting at the Site.

[15] National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds. Commonwealth of Australia. 2020.

Condition 2 of the previous resource consent 100902, requires a 30 m setback around perennial waterbodies. This requires key bat habitat along the Mitiwai stream to be retained and it is therefore recommended that this condition, and the 30 m setback, is retained.

To mitigate for effects of dust, light and other disturbance to bats within key habitat areas, we recommend an indigenous, fully vegetated buffer within the setback around the perimeter of waterbodies/wetlands, this is reiterated below in Section 5.2. As part of this planting buffer, we recommend a number of large native tree species be included, so that over time a native forested edge will buffer between stream or wetland habitat and mining operations and encourage foraging and commuting behaviour already observed by bats around the remnant stand of pines.

As detailed in the Natural Inland Wetland and Buffer Management Plan, restoration planting of wetlands and buffer areas is proposed, which is also designed to mitigate the effects of bird and bat habitat loss. The planting of appropriate species including large trees (such as kahikatea) is recommended in wetland and buffer planting areas, to provide both foraging and roosting habitat for bats as the restoration area becomes established. This, along with the staged removal or maintenance of a buffer during harvest, and planting around a proposed wetland offset area, will ensure that some habitat is maintained.

Pest control across the Site and along the edges of neighbouring native forest, riparian margins and wetlands would alleviate pressure from mammalian predators on the local population of bats. We recommend that animal pest management be undertaken including by detailing target species, methods, locations and service times in a pest control plan. The benefits of pest management would also apply to avifauna and any herpetofauna that may be present.

If mitigation recommendations are implemented, we consider the overall ecological effects on bats to be **Low**.

5.2 Avifauna

We support replication of Condition 2 of the previous resource consent 100902, requiring a 100 m setback above MHWS and a 30 m setback around perennial waterbodies, including dune lake/wetland habitat to the east and south of the Site, and the riparian habitat surrounding the Wainui and Mitiwai Streams. It is proposed that these conditions are imposed under the new consent.

In addition, we recommend the following avoidance, minimisation, and mitigation conditions to address adverse effects on avifauna:

1. Ensure the 100 m setback above MHWS and 30m setback around perennial waterbodies is clearly and permanently marked to ensure compliance, and confirmed by a qualified ecologist.
2. A 30 m wide indigenous planting buffer to be planted within the setback around the perimeter of waterbodies/retained wetlands in advance of mining operations to mitigate effects of dust and disturbance to sensitive wetland species and to reduce potential disturbance effects on key bird habitats. A buffer of 30m is considered to be adequate when considered alongside other effects management measures that are recommended, including a comprehensive predator control programme, which is expected to promote breeding success, in particular of ground-nesting wetland birds.
3. Prohibition on planned maintenance works inside the CMA between the months of September – January (inclusive) for the protection of nesting New Zealand Dotterels..
4. Protocols and best-endeavours to be included around:
    - ensuring no nesting birds are present within wetland, grassland and shrubland vegetation to be cleared during peak breeding season (September – January).

From September – January it is recommended that TIL engage an ecologist to undertake surveys, including of wetland birds, before mining takes place to identify any nests. If nests are discovered TIL will be required to maintain a 30m setback from that nest for the duration of the breeding season.

- avoiding impacts on nesting dotterel in the event an emergency pipeline repair is necessary within dotterel nesting habitat – noting that the conditions proposed by TIL require consultation with Waikato Regional Council and DOC in the event that emergency repairs are required during the dotterel nesting season.

5. Animal pest management detailing target species, methods, locations and service times.
6. Management steps to guide clearance of habitat suitable for grassland bird species.

To mitigate potential disturbance effects on key bird habitats, an indigenous, fully vegetated buffer within the setback around the perimeter of waterbodies and wetlands to be retained is recommended.

The opening of previously mined areas through tracks and accessways may act as opportunities for pest species including rats, possums, mustelids and other species to areas of high ecological value bordering the Central and Southern Block. Hence, we recommend the preparation of an animal pest management programme to alleviate pressure from mammalian predators on the local populations of Threatened and At–Risk wetland bird species. The benefits of an animal pest management programme would also apply to bats and any herpetofauna that may be present.

It is our understanding that areas set to be reopened for mining as part of the Project will be done in a staged approached, meaning not all grassland habitat within the Site will be lost at the same time. To encourage the regeneration of suitable grassland habitat for grassland birds, we recommend that the tailings cells are rehabilitated as quickly as possible after mining operations in each area has finished, to ensure any effects are only temporary. Details of a managed approach to clearance and replanting works are addressed in the proposed consent conditions.

Additional restoration planting is also recommended to be detailed in the Ecology and Rehabilitation Plan) within a wetland area that is currently degraded and has previously been used by pine plantation forestry, to the east of Pits 1 and 2 in the Southern Block (Figure 4 of the Terrestrial Ecology Report[16]). Planting of appropriate species including large trees (such as kahikatea) is expected to provide enhanced habitat for wetland bird species as this (or any alternative) restoration area becomes established.

If the recommended mitigation measures are implemented, the overall ecological effects on wetland birds is expected to be **Low**; the effects on New Zealand dotterel to be **Low**, and the effects on grassland birds to be **Low**.

[16] SLR Consulting 2025. Ecological Impact Assessment for wetlands and terrestrial vegetation. Taharoa Ironsands Central and Southern Block Mining Project. Report prepared for Taharoa Ironsands Ltd.

5.3 Summary

The ecological values of the faunal species in and around the Site, the assessed magnitude of effects, and the overall level of effects following implementation of the recommended effects management measures are presented in Table 6 below.

Table 6: Summary of fauna values, magnitude of effects, and overall level of ecological effects following mitigation.

	Ecological Value	Magnitude of Effect	Potential Level of Effect	Level of Effect Following Mitigation
Bats	Very High	Moderate	High	Low
Avifauna	Very High	Moderate	High	Low
Herpetofauna	High	Low	Low	N/A
Katipō	High	Negligible	Very Low	N/A

6.0 Summary

The Site is located on the Waikato west coast and situated between dunelands bordering the west of the site, and rural pastoral land further inland. Dune lakes, wetlands, indigenous forest cover and pine forest plantation are also present within and surrounding the open mine site. The site is predominantly a heavily modified area containing clusters of buildings, mining infrastructure, and vast areas of mine pits.

For the purposes of this assessment (and considering the existing environment) it must be assumed that the existing mining activity is not continuing and that the area has been rehabilitated in accordance with the requirements of the current consent (although this involves a number of assumptions). This means the area to be mined as part of this Application has previously been mined, but now includes open dunes, open pasture (grasslands) and an area of pine plantation forest. These features provide habitat for terrestrial fauna, including bats, birds, and lizards.

From a terrestrial ecology perspective, the Site (and the existing environment) includes:

- open grassland habitat that is used by bird species such as New Zealand pipit, and could be used by skinks;
- pine plantation forest that is used by long-tailed bats for foraging and potentially roosting;
- wetland and lake margin areas that is used by wetland species including Australasian bittern;
- stream margins that are used by long-tailed bats for foraging, and potentially roosting in mature trees along the streambank; and
- dune vegetation that is used by bird species such as New Zealand dotterel, and could provide habitat for skinks and Katipō.

Ecological values have been assessed for bats, avifauna, herpetofauna and Katipō spider. Due to their ecological significance, values for bats and avifauna have been found to be very high, and values for herpetofauna and Katipō spider have been found to be high.

From an ecological perspective the potential level of effects of the proposed mining without mitigation have been assessed as high for bats and avifauna, low for herpetofauna and very low for Katipō spider.

Mitigation measures are recommended which will provide habitat enhancement benefits to terrestrial fauna species and appropriately avoid, remedy and mitigate the anticipated adverse effects on terrestrial ecology. The overall level of effects from an ecological perspective, following implementation of recommended mitigation measures have been assessed as low for bats, avifauna and herpetofauna and very low for Katipō spider. No residual effects are therefore expected following implementation of all mitigation measures, including restoration planting and animal pest management discussed in the Terrestrial Ecology Report.

Key mitigation measures focus on minimisation of disturbance through buffers to sensitive ecological features, minimising direct harm to fauna species during vegetation removal (Bat Roost Protocols, bird management and lizard salvage), animal pest control, and an Ecology and Rehabilitation Plan following cessation of mining activities in the extension area.

While avoidance of certain areas at the Site is not possible due to functional requirements of the activity (i.e. location of the mining resource), high value areas such as wetlands and dune environments are recommended to be avoided and a buffer implemented to minimise effects on these ecological features.

The implementation of the recommended effects management package of pest control and habitat restoration, alongside the adoption of all appropriate protocols to minimise direct effects on fauna (detailed in conditions) is considered to adequately manage the expected adverse effects on indigenous fauna associated with the mining proposal.

7.0 Closure

This fauna assessment report has been prepared by SLR Consulting to inform TIL's application for all necessary approvals for the Central and Southern Blocks Mining Project under the Fast-track Approvals Act.

Sincerely,

SLR Consulting New Zealand

Hannah Mueller, PhD, CEnvP
Principal Ecologist

Appendix A Weather data

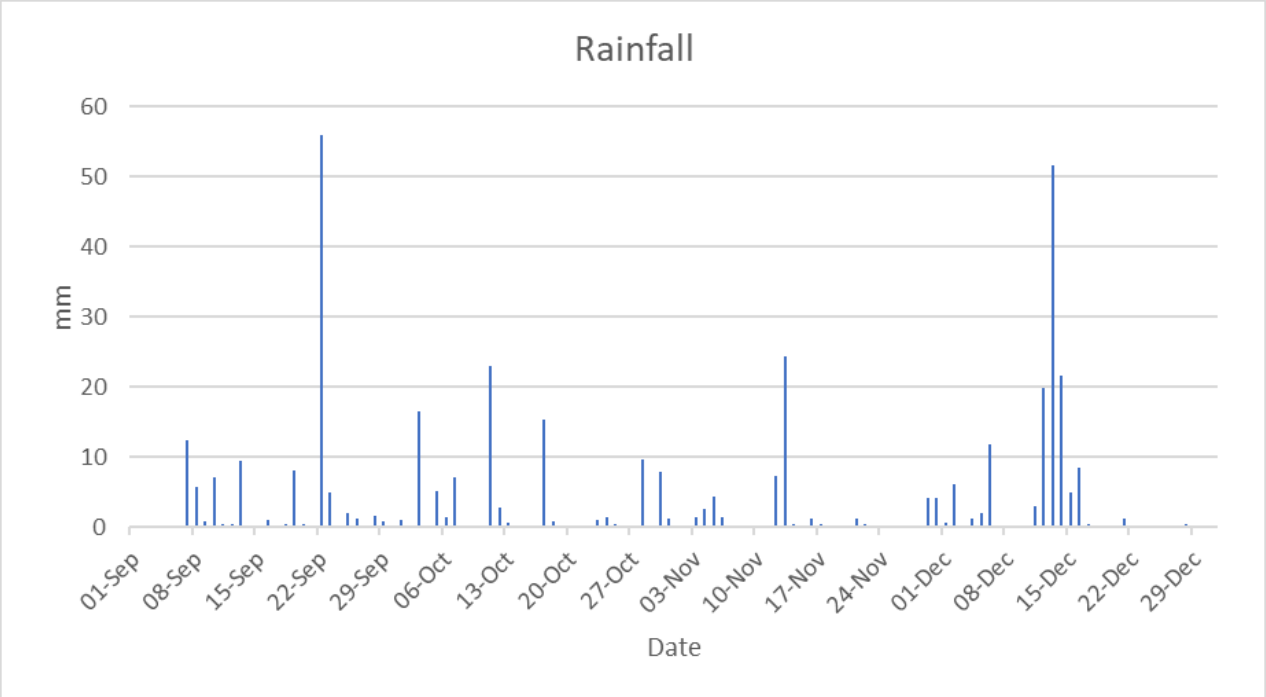
Fauna Ecological Assessment

Taharoa Ironsands Central and Southern Blocks Mining Project

Taharoa Ironsands Limited

SLR Project No.: 850.V15262.00001

8 September 2025


Rainfall
mm
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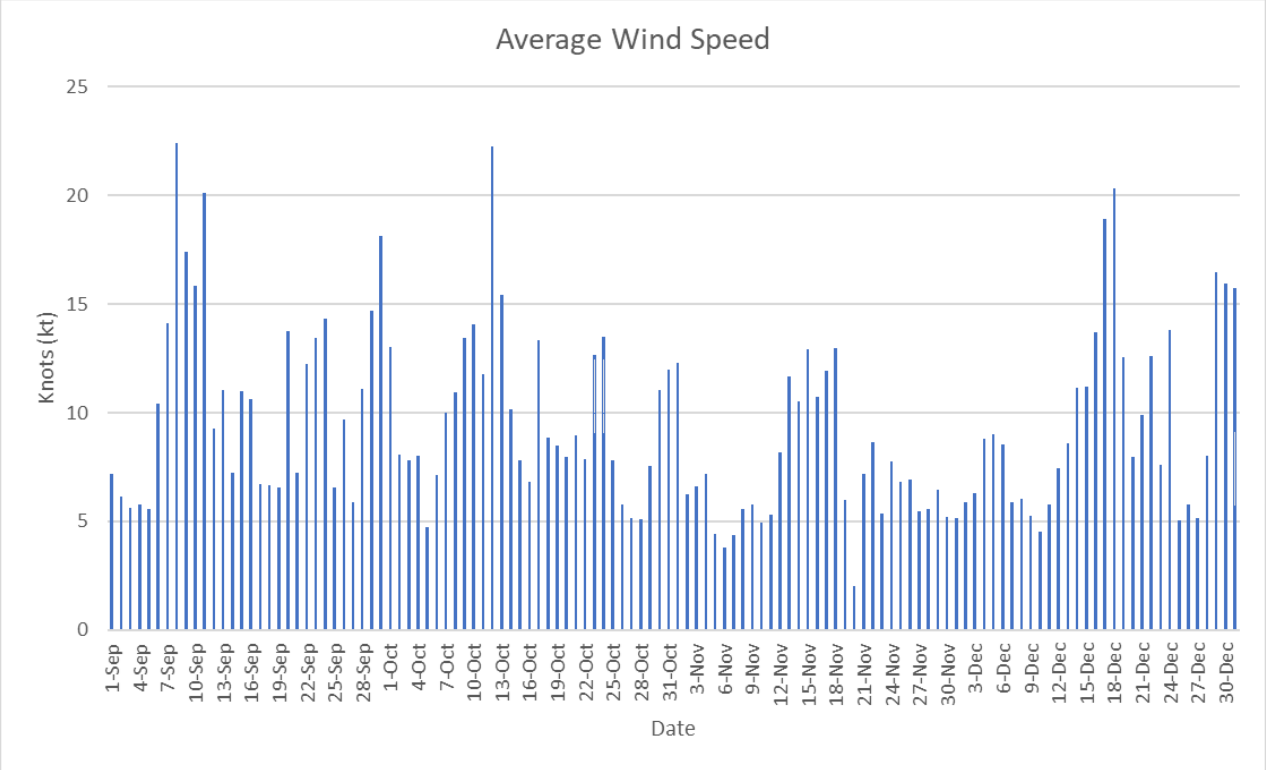
50
40
30
20
10
0
01-Sep
08-Sep
15-Sep
22-Sep
29-Sep
06-Oct
13-Oct
20-Oct
27-Oct
03-Nov
10-Nov
17-Nov
24-Nov
01-Dec
08-Dec
15-Dec
22-Dec
29-Dec
Date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Knots (kt)
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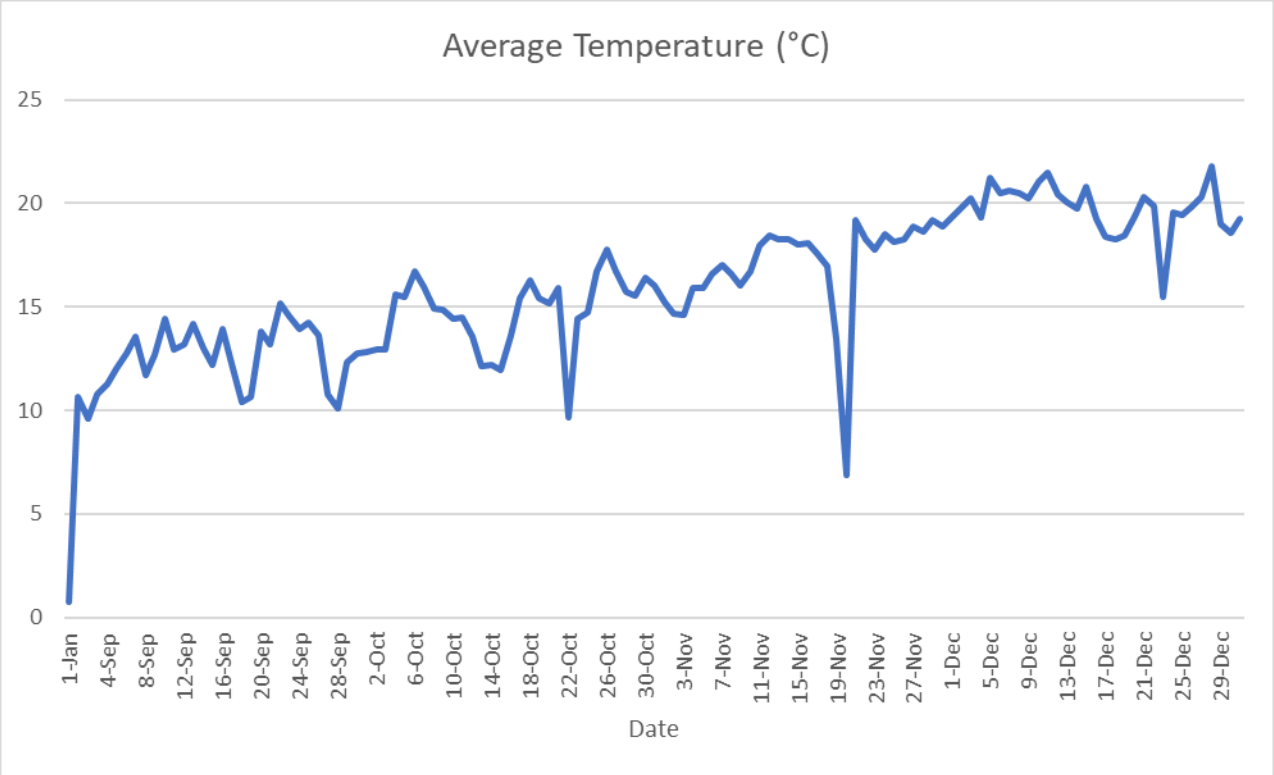
20
15
10
5
0
1-Sep
4-Sep
7-Sep
10-Sep
13-Sep
16-Sep
19-Sep
22-Sep
25-Sep
28-Sep
1-Oct
4-Oct
7-Oct
10-Oct
13-Oct
16-Oct
19-Oct
22-Oct
25-Oct
28-Oct
31-Oct
3-Nov
6-Nov
9-Nov
12-Nov
15-Nov
18-Nov
21-Nov
24-Nov
27-Nov
30-Nov
3-Dec
6-Dec
9-Dec
12-Dec
15-Dec
18-Dec
21-Dec
24-Dec
27-Dec
30-Dec
Date


Average Temperature (°C)
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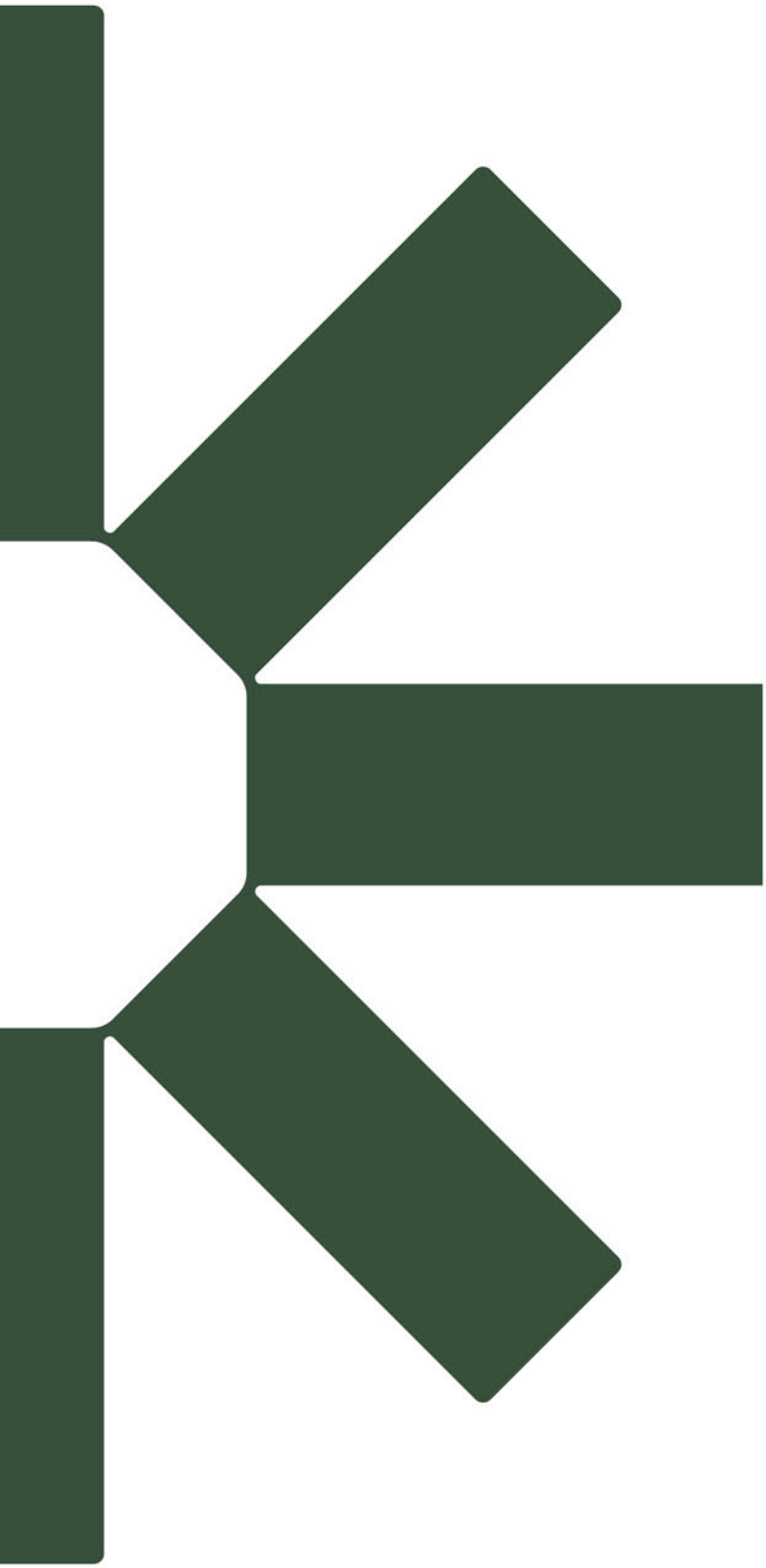
20
15
10
5
0
1-Jan
4-Sep
8-Sep
12-Sep
16-Sep
20-Sep
24-Sep
28-Sep
2-Oct
6-Oct
10-Oct
14-Oct
18-Oct
22-Oct
26-Oct
30-Oct
3-Nov
7-Nov
11-Nov
15-Nov
19-Nov
23-Nov
27-Nov
1-Dec
5-Dec
9-Dec
13-Dec
17-Dec
21-Dec
25-Dec
29-Dec
Date



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