Ecology supplementary report - Avifauna

February 2018

Environmental Services Ltd

NZ TRANSPORT AGENCY WAKA KOTAHI Mt Messenger Bypass

New Zealand Government

Quality Assurance Statement			
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Revision schedule		
Rev. Number	**Date**	**Description**
A	February 2018	Final

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Contents

Glossary

Term	Meaning
AEE	Assessment of Effects on the Environment Report
DOC	Department of Conservation
EcIA guidelines	Ecological Impact Assessment guidelines
EIANZ	Environment Institute of Australia and New Zealand
ELMP	Ecology and Landscape Management Plan
Parininihi	The area spanning the Waipingao Stream catchment located to the west of existing SH3, approximately 1,332ha in size
Pest Management Area	Area of land proposed to be actively managed for pests, across a number of parcels of land
Project	The Mt Messenger Bypass project
Project footprint	The Project footprint includes the road footprint (i.e. the road and its anticipated batters and cuts, spoil disposal sites, haul roads and stormwater ponds), and includes the Additional Works Area (AWA) and 5m edge effects parcel.
RMA	Resource Management Act 1991
SH3	State Highway 3
Transport Agency	New Zealand Transport Agency

1 Introduction

The NZ Transport Agency (Transport Agency) is proposing to construct and operate a new section of State Highway 3 (SH3), generally between Uruti and Ahititi to the north of New Plymouth. The Transport Agency lodged applications for resource consents and a Notice of Requirement on 15 December 2017 to alter the existing SH3 designation, to enable the Mt Messenger Bypass project (the Project) to proceed.

This application included assessments of ecological effects attached as Technical Reports 7a – 7h, in Volume 3 of the Assessment of Effects on the Environment (AEE) report. The Avifauna Assessment, dated December 2017 (Baber and McLennan 2017), was completed as part of this package. The purpose of the Avifauna Assessment was to assess potential adverse effects of the Project on birds, and to inform the assessment of effects in the AEE and the proposed mitigation and offset package for the Project.

The ecology technical reports noted that more information would be available following summer field investigations. These field investigations have now concluded, and the information from these investigations have informed this supplementary report. The purpose of this supplementary report is to describe those investigations and their results as they relate to avifauna, and subsequently to update the assessments set out in the original avifauna assessment as appropriate.

2 Further ecological investigations

2.1 Introduction

The original Avifauna Assessment (Baber and McLennan 2017), included assessments of ecological values and potential adverse effects based on the information available at the time the assessment was completed. Below, methods and results are set out in relation to further field investigations that further inform our assessment of effects.

2.2 Methodology

2.2.1 Field assessment methods

Three independent survey methodologies were undertaken to obtain information on birds in the footprint and proposed pest management area, including:

- Daytime counts of forest birds;
- Daytime searches for spotless crake and fernbird in wetland areas; and
- Nocturnal kiwi call surveys.

2.2.1.1 Daytime counts of birds in the Project footprint and proposed Pest Management Area

Daytime bird counts using standard 5 minute count methodology (Dawson and Bull, 1975) were undertaken from November 20, 2017 to November 24, 2017 (inclusive) in and around the Project footprint, and in the proposed Pest Management Area (PMA). These bird counts were undertaken to determine the composition of the avifauna community, and to measure baseline bird abundance before the proposed onset of road construction and pest management.

The survey along and near the Project footprint was designed to provide robust indices of species abundance, sufficient to allow population changes of 20% or more to be detected at any time in the future.[1] Over the five days, 355 counts were obtained by five counting teams (each with two people) from sites spread more-or-less evenly throughout the PMA (Figure 2.1). The sites were selected before fieldwork began and located in the field using handheld GPS units. Where possible, counting stations were located on ridge crests to maximise listening coverage.

Counts were undertaken from 0730h to 1700h each day. The weather was warm, sunny and relatively calm throughout the whole counting period.

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[1] The Gpower 3.1 programme (GPower 2018), shows that a sample size of 355 enables an effect of 0.19 or larger to be detected with a two tailed t-test at the 5% level of significance on 90% of occasions (i.e. Power = 1-β error probability = 0.90). Dawson and Bull (1975) presented a power analysis in a different way, but showed that a sample size of 300-400 was required to detect a 20% difference in two sets of counts, when the mean count (per 5 minutes) for the two samples combined exceeded 0.60 per count.

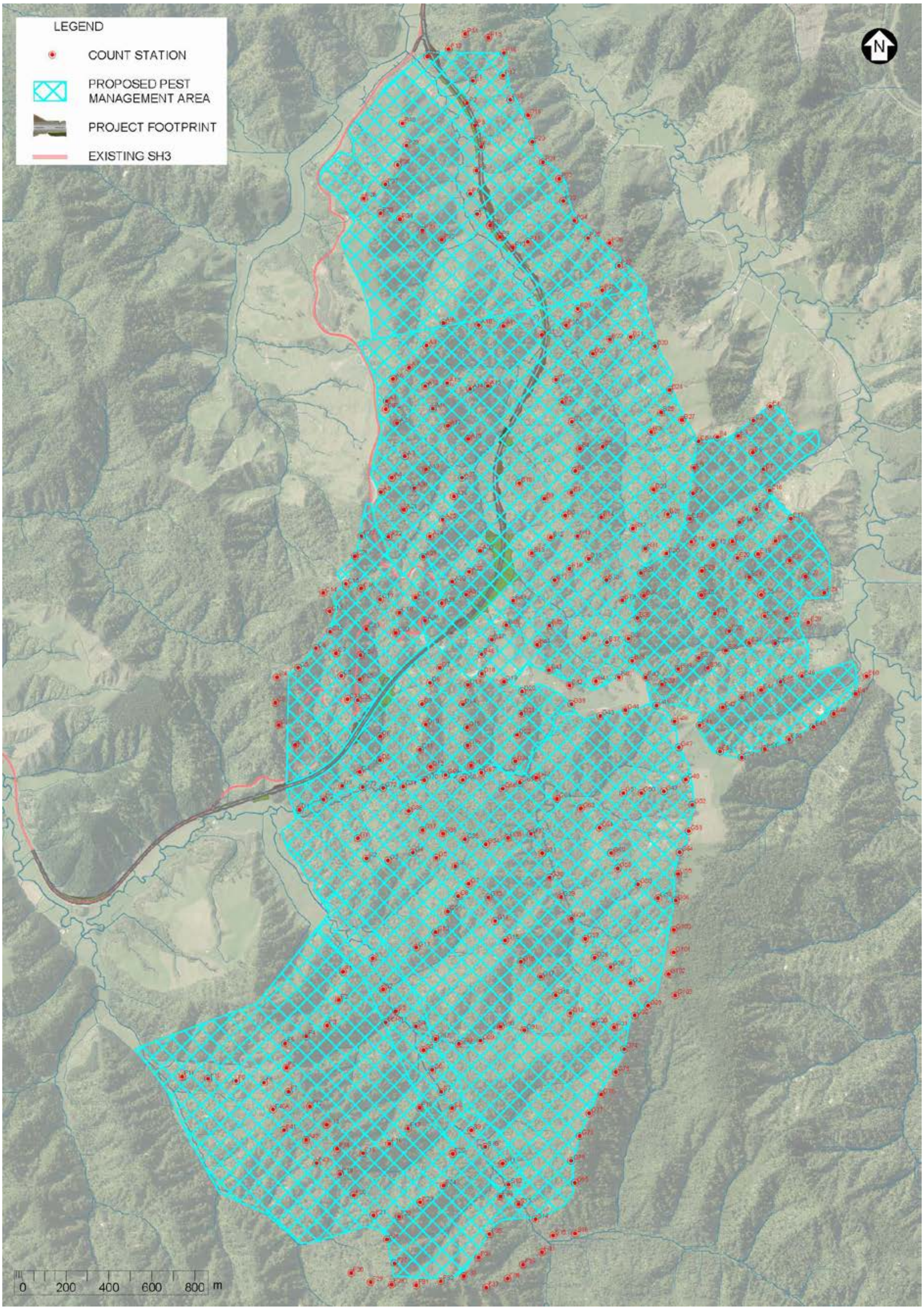

Figure 2.1 - Locations of 5-minute bird count stations along the route of the Project footprint and in the proposed Pest Management Area and surrounding buffer zones.

2.2.1.2 Searches for spotless crake and fernbird in wetland areas

On November 22 and 23, 2017, detailed searches were undertaken in wetlands near the Project footprint (within the proposed PMA) to map the number and distribution of fernbird and spotless crake. Both species were initially detected by Singers (2017) during his botanical investigations in the catchment of the Mimi River.

The surveys were undertaken by two observers walking slowly up through the wetlands, with stops at 50m intervals to broadcast taped calls, and listen for responses. Each listening stop lasted 5-15 minutes to give potential respondents sufficient time to approach and/or call. Efforts were also made to photograph respondents to help distinguish individuals.

2.2.1.3 Nocturnal kiwi call surveys

A team of six people mapped the location of calling kiwi along the Project footprint and in the forests within 200 m of each side of it on the nights of December 18, 2017 to December 20, 2017 inclusive. On each night, surveys began at approximately 9pm (nightfall) and continued through to 1am. The listening watches were longer than those typically adopted for kiwi surveys, but were chosen to increase the chances of detecting incubating males, which typically emerge later in the night than non-incubating kiwi.

On each night, the six observers occupied listening stations that afforded coverage of the Project alignment (see Section 2.3.1.4 below, Figure 2.4). The spacing between observers varied from 200-400m, increasing the chances of calling kiwi being detected by neighbouring observers.

On most occasions observers were in radio contact, so could check whether a kiwi heard by one observer was also heard by others. The time, estimated distance, and magnetic bearing (from the observer) was noted for each call, to determine how many different kiwi were responsible for calls heard during a listening watch. Calls coming from the same place were always assumed to be made by the same individual, irrespective of whether they were heard on the same night, or on different nights. The surveys coincided with the dark lunar phase, generally regarded as the most favourable moon phase for kiwi surveys. The weather on the first and third nights was calm, warm and clear, while light rain fell on the second night, though not enough to significantly reduce listening coverage.

2.2.2 Assessment of effects methodology

As in the December 2017 report (Baber and McLennan 2017), the assessment of effects based on the summer investigations broadly follows the EcIA Guidelines (EIANZ, 2015), with some adaptation, including to allow for expert opinion to be applied within the context of the EIANZ framework. Section 2.3 of the December 2017 report sets out the methodology in full including the three-step assessment of ecological values, the magnitude of unmitigated effects, and the level of unmitigated effects.

2.3 Results from further investigations and discussion

2.3.1 Five-minute bird counts

2.3.1.1 General community composition

The daytime counts showed that the bird community in the Project footprint and proposed PMA was virtually identical to the one described by Opus (2017) along the formerly proposed MC23 alignment, to the west of Mt Messenger (Table 2.1). Both surveys confirmed the presence of a diverse and near complete assemblage of small forest insectivores, with rifleman the only notable absence from these surveys. Both surveys also recorded kererū and honeyeaters (bellbirds and tūī) in moderate numbers. Neither of them detected falcon, kākāriki, kākā or kōkako.

Amongst native species, there were only two differences in detections between surveys. Pipit was recorded only by Opus (2017) and fernbird was recorded only in the current survey. Both differences result from small variations in habitat availability between sampling areas. Amongst introduced species, eastern rosella *Platycercus eximius* was recorded in the current survey, but not by Opus (2017).

The results confirm the assumptions of Baber and McLennan (2017) that:

1. The bird communities on the western and eastern sides of Mt Messenger are similar and probably identical; and
2. The findings of the Opus (2017) survey to the west could be used to describe the bird community living along and near the Project footprint on the eastern side of Mt Messenger. The important point is that there were no species omissions or erroneous additions in the AEE prepared by Baber and McLennan (2017) and its findings and conclusions therefore remain unchanged.

Table 2.1– Species detections along the formerly proposed MC23 alignment (Opus 2017) and the Project alignment (current survey).

Species	Opus Survey	Current Survey Presence and % of counts detected
Fernbird	No	Yes 0.56%
NI brown kiwi	Yes	Yes (sign only)
Long tailed cuckoo	Yes	Yes 5.3%
Shining cuckoo	Yes	Yes 25.6%
North Island robin	Yes	Yes 43.3%
North Island tomtit	Yes	Yes 39.1%

Species	Opus Survey	Current Survey Presence and % of counts detected	
Whitehead	Yes	Yes	15.2%
Fantail	Yes	Yes	57.5%
Grey warbler	Yes	Yes	94.4%
Silvereye	Yes	Yes	53.5%
Tūī	Yes	Yes	74.1%
Bellbird	Yes	Yes	70.4%
Kererū	Yes	Yes	23.9%
Pipit	Yes	No	0
Kingfisher	Yes	Yes	25.6%
Shelduck	Yes	Yes	2.50%
Welcome swallow	Yes	Yes	0.28%
Harrier	Yes	Yes	2.5%
Pukeko	Yes	Yes	0.28%
Spur-winged plover	Yes	Yes	3.10%
Black-backed gull	Yes	Yes	1.10%
Black shag	Yes	Yes	0.28%
White faced heron	Yes	Yes	0.56%
Blackbird	Yes	Yes	42.2%
Thrush	Yes	Yes	7.0%
Chaffinch	Yes	Yes	64.7%
Goldfinch	Yes	Yes	3.9%
Yellow hammer	Yes	Yes	4.8%

Species	Opus Survey	Current Survey Presence and % of counts detected
Greenfinch	Yes	Yes 1.9%
Starling	Yes	Yes 0.84%
Pheasant	Yes	Yes 0.55%
Mallard	Yes	Yes 0.55%
House sparrow	Yes	Yes 1.10%
Eastern rosella	No	Yes 1.10%
Magpie	Yes	Yes 16.9%

2.3.1.2 Species abundance

Table 2.2 lists the results of the daytime bird counts, expressed as mean number ± standard deviation of individuals detected (seen and heard) per 5-minute count. This is based on the sample size of 355 counts. The Opus (2017) measures of abundance along the route of the previously proposed MC23 alignment are also shown for comparison, although these are based on fewer samples collected at a slightly different time of year (mid-summer rather than late spring) and do not show standard deviation. Also shown for comparison in Table 2.2 are mean bird counts derived by the Department of Conservation at Boundary Stream, a forested pest-managed area located in Hawkes Bay. Based on multiple counts (from spring and autumn) over 20 years, these Boundary Stream data represent a 'typical range' in a pest-managed location for comparative purposes.

Table 2.2 – Mean number of individuals seen and heard per 5-minute count in November 2017 in the Project area, as shown in Figure 2.1. Also shown are mean number of individuals observed in the Opus survey (Opus 2017) and bird count results from Boundary Stream in Hawkes Bay.

Species	Current survey (mean ± SD)	Opus survey	Boundary Stream (typical range)
North Island robin	0.606 ± 0.797	0.24	0.22 to 0.67
North Island tomtit	0.473 ± 0.652	0.44	0.43 to 0.93
Whitehead	0.214 ± 0.577	0.95	0.96 to 1.88
Fantail	0.746± 0.780	1.43	0.32 to 0.58
Silvereye	1.014 ± 1.215	1.60	0.67 to 0.68
Grey warbler	1.89 ± 1.061	1.49	0.57 to 1.86
Bellbird	1.130± 1.0	1.62	2.28 to 2.5
Tūī	1.527 ± 1.389	0.56	2.3 to 3.8
Kererū	0.324 ± 0.650	0.37	0.26 to 0.56
Kingfisher	0.324 ± 0.601	0.08	0.03 to 0.20
Long tailed cuckoo	0.056 ± 0.243	0.03	0.12 to 0.20
Shining cuckoo	0.301 ± 0.554	not recorded in summer	0.19 ± 0.55
Chaffinch	1.121 ± 1.11	–	–
Goldfinch	0.059 ± 0.327	–	–
Yellow hammer	0.051 ± 0.252	–	–
Greenfinch	0.02 ± 0.139	–	–
Blackbird	0.572 ± 0.786	–	–
Thrush	0.076 ± 0.286	–	–
Magpie	0.200 ± 0.478	–	–

In general, species that were relatively numerous in the Opus survey were also relatively numerous in the current survey, with some notable exceptions. Whitehead and fantail appear to be more abundant along the formerly proposed MC23 alignment to the west (Opus 2017) than in the Project footprint and PMA, while the converse appears true for North Island robin and tūī.

Some of these apparent differences are probably temporary and attributable to seasonal effects. Rewarewa, for example, was flowering heavily in the PMA during the current survey, perhaps attracting tūī from neighbouring localities and inflating their local abundance. By national standards, the counts along the alignment and PMA are generally typical of those in large forest tracts elsewhere in the North Island. They are dominated by 'widespread and secure' species that are limited by factors other than predation (Innes et. al, 2010). Such species do not respond to predator control, and their levels of abundance are similar in both managed (predator controlled) and unmanaged (no predator control) forests. They include silvereye, fantail, grey warbler, kingfisher, tomtit, and morepork. They also include several introduced species that occupy indigenous forest habitats year-round (blackbird, thrush, chaffinch) or use it seasonally for feeding or breeding (magpie, greenfinch, goldfinch, yellow hammer and (in some localities) redpoll and dunnock.

Nevertheless, predator control in the PMA is likely to significantly increase the abundance of kiwi, kererū, long-tailed cuckoo, tūī, bellbird and whitehead. Counts from Boundary Stream in Hawkes Bay, a DOC-managed mainland site subject to continuous pest control for more than 20 years, indicate that the honeyeaters, long-tailed cuckoo and whitehead will more than double in abundance in the PMA in the first decade of control, while kererū are likely to increase by 10%-30% (Table 2.2). Robins are also another potential respondent, with relatively low rates of nest success in the presence of mammalian predators (Innes et. al, 2010) but variable responses to predator removal.

Detailed field studies show the fortunes of brown kiwi at Boundary Stream have been mixed over 20 years, with the population suffering repeated ferret predation, despite ongoing pest control. The kiwi population in the sanctuary exceeded 50 at its peak, but is currently at about 8-15 (DOC, 2015). A little further north, at Lake Waikaremoana, sustained predator control from 1995 to 2004 increased average kiwi chick survival from 14% to 56% and doubled the treatment population in 7 years (McLennan et. al. 2004). Both studies indicate the range of possible responses of kiwi to predator control in the proposed PMA, with the actual result depending on residual predator abundance and the success of the pest management programme. Stoats and ferrets (mustelids), the two main predators of kiwi in forest habitats, are distributed widely throughout Taranaki (Pestdetective.org.nz).

Predator control in the PMA may also eventually benefit some former avian inhabitants if they recolonise it naturally following the onset of predator control. The three prime candidates are rifleman, falcon and kaka, all still extant in the wider Taranaki region (Robertson et al 2007) and all with locality records near (<10 km from) the PMA. Kōkako is a fourth candidate, with spill over from the neighbouring Parininihi reserve expected in the next 10-20 years. No natural re-colonisation is expected from kākāriki because both species (red crowned and yellow crowned) are now probably extinct in Taranaki (Robertson et al 2007). Both species, however, are relatively easy to re-establish in mainland forest habitats, using founders sourced from captive populations. Re-establishing kākāriki in the PMA is identified here as a potential offset for the Project, to be considered and possibly initiated later if some of the predicted benefits of the PMA fail to materialise.

Finally, there is insufficient information available to assess how fernbird and spotless crake are likely to respond to predator control in the PMA. However, for both species, constraints in habitat availability are likely to limit their responses to predator control.

To summarise, effective and sustained predator control is likely to increase the abundance of at least six native species currently resident in the PMA, and possibly benefit a further four species if they recolonise the site naturally from nearby areas. Kiwi are likely to be the single greatest beneficiary, with a doubling of the existing population potentially achievable within a decade.

2.3.1.3 Fernbird and spotless crake surveys

Searches revealed six pairs of fernbird in the catchment of the Mimi River, most in a tributary immediately below the southern end of the Project alignment (Figure 2.2). Equally intensive surveys in the Mangapepeke stream catchment at the northern end of the alignment failed to reveal any fernbirds. This result was expected given that the vegetation in the catchment is open, of low stature, and highly modified by domestic livestock.

The fernbirds typically responded to broadcast calls by approaching, some silently and covertly, others by flying from shrub to shrub in full sight. Most could be photographed (Figure 2.3) but plumage variations between individuals were small and not useful for individual identification. Often, however, neighbouring pairs called simultaneously, enabling observers to determine where one territory finished and another started.

Playback calls in the same wetlands failed to produce any responses from spotless crakes, though footprints in soft mud suggested at least one pair inhabits the tributary of the Mimi River at the southern end of the alignment, in the vicinity of Fernbird Pair 2 and Pair 3 (Figure 2.2). Singers (2017) heard a pair in the same locality during his survey work in 2017, and thought there may have been a second pair further upstream.

No bitterns were seen or heard booming in the catchments at the northern and southern ends of the alignment during the November bird surveys or December kiwi surveys, but they are cryptic and difficult to see. The extensive seepages in the upper Mangapepeke catchment would appear to be especially favourable feeding sites for bittern, and one individual was seen in a similar habitat in a nearby catchment in late 2017.

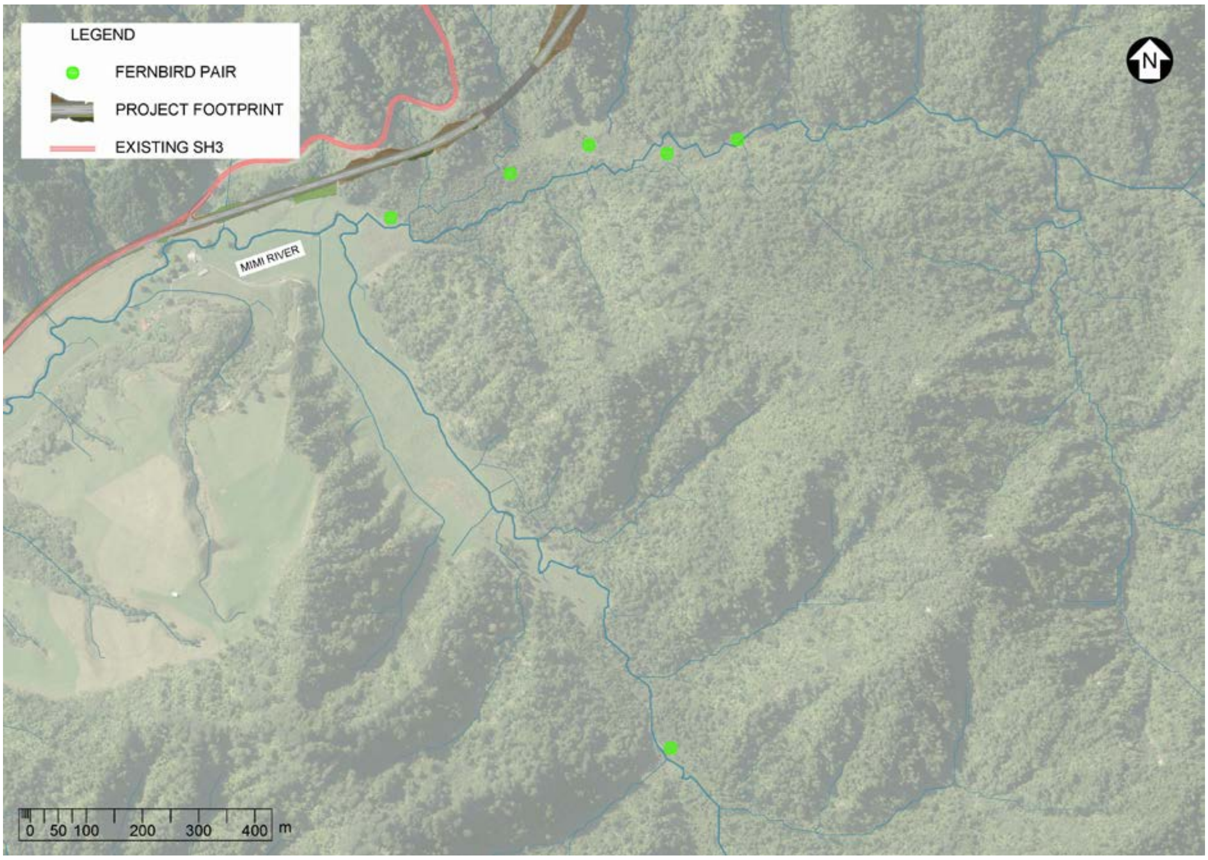

Figure 2.2 – Distribution of fernbirds in wetlands in the Mimi catchment, November 2017.

Figure 2.3 – Fernbird in the catchment of the Mimi River, November 2017.

2.3.1.4 Kiwi surveys along the proposed alignment

In the December 2017 kiwi survey, listening watches were undertaken from 11 different sites over three nights (Figures 2.4a & 2.4b). On any one night, observers occupied six stations, generally half of them in the catchment of the Mangapepeke Stream and half in the catchment of the Mimi River.

Over the three nights, five different pairs were detected in the catchment of the Mangapepeke Stream. The male of the northernmost pair, in the lower part of the catchment, was incubating at the time of the survey, emerging each night from the same place 1.5 – 2.0 hours after sunset. A second pair was present slightly further up the catchment, near listening site 2, where the Mangapepeke splits into two tributaries. The third, fourth and fifth pairs were all detected in the upper catchment in the western tributary, near or on the route of the Project alignment.

Over the same period, three pairs were heard in the catchment of the Mimi River, on or near the Project footprint. In addition to these pairs, another three males were heard in the catchment, two of them on the eastern side of the wetland in the valley below listening sites 6 & 7 (Figure 2.4b). The third male was recorded alongside the existing road, half way up the southern side of Mt Messenger. Some or all of these males are also likely to be paired, indicating that there are probably another five pairs of kiwi living near the Project alignment on the southern side of the Mt Messenger ridge line.

Throughout the survey, surprisingly few kiwi were detected by more than one observer, even though some birds called from locations midway between two listening sites. For whatever reason, average detection distances appeared to be about 80–250 m, significantly less than the 500m–800m often reported in other locations. Given the average spacing between locations, it seems likely that all kiwi living along or near the alignment were actually detected: but it is also clear that many kiwi living further afield would have been missed. Surprisingly, no kiwi were heard calling above the existing road on the southern side of Mt Messenger, even though some were detected there by Opus (2017) 12 months earlier.

To conclude, the December 2017 survey identified 10 potential kiwi pairs, confirming the prediction of Baber and McLennan (2017) that the proposed alignment is likely to encroach on or bisect the territories of some 10–15 pairs of kiwi.

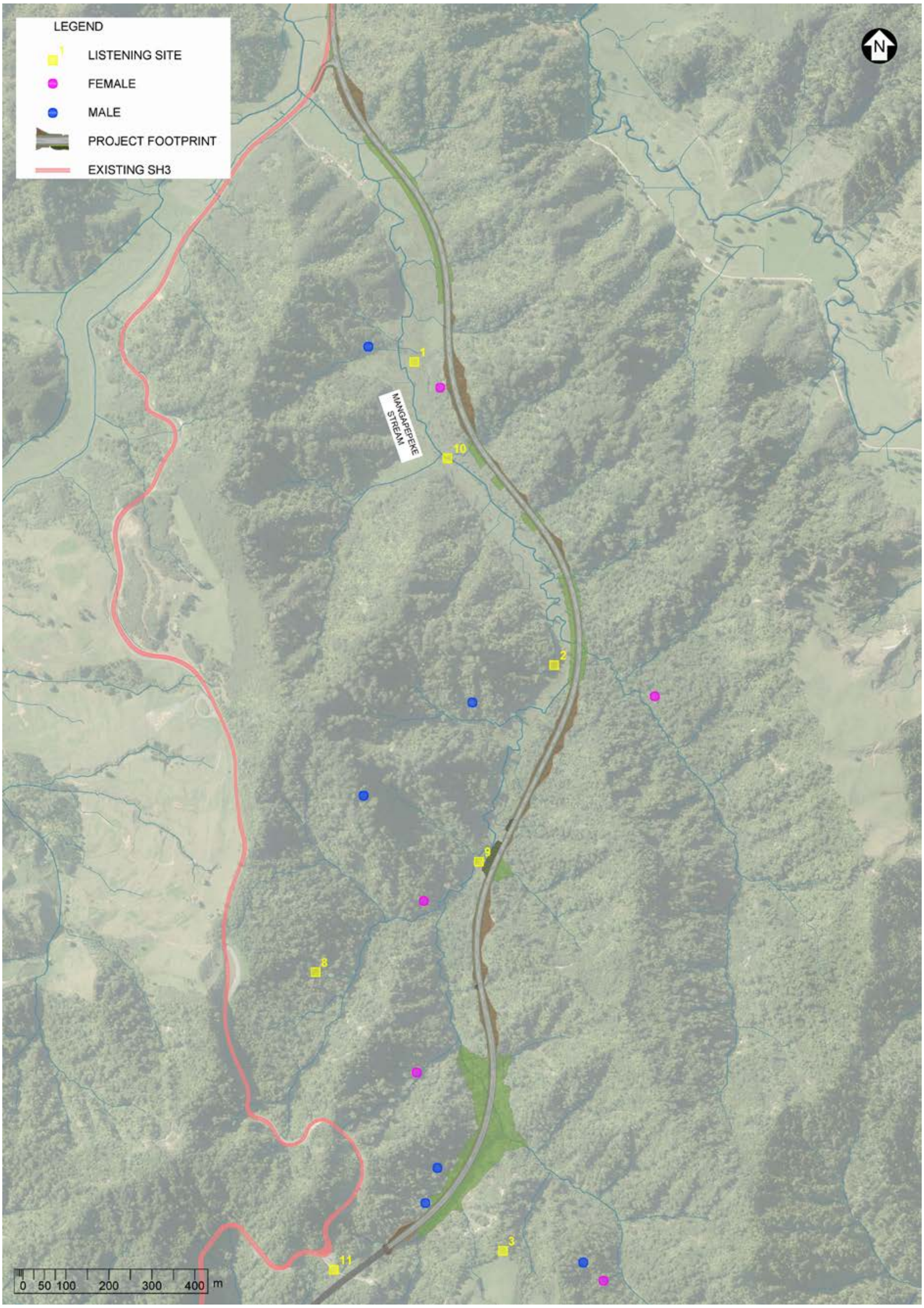

Figure 2.4a – Kiwi distribution in the Mangapepeke catchment, as revealed by nocturnal surveys over three nights in December 2017.

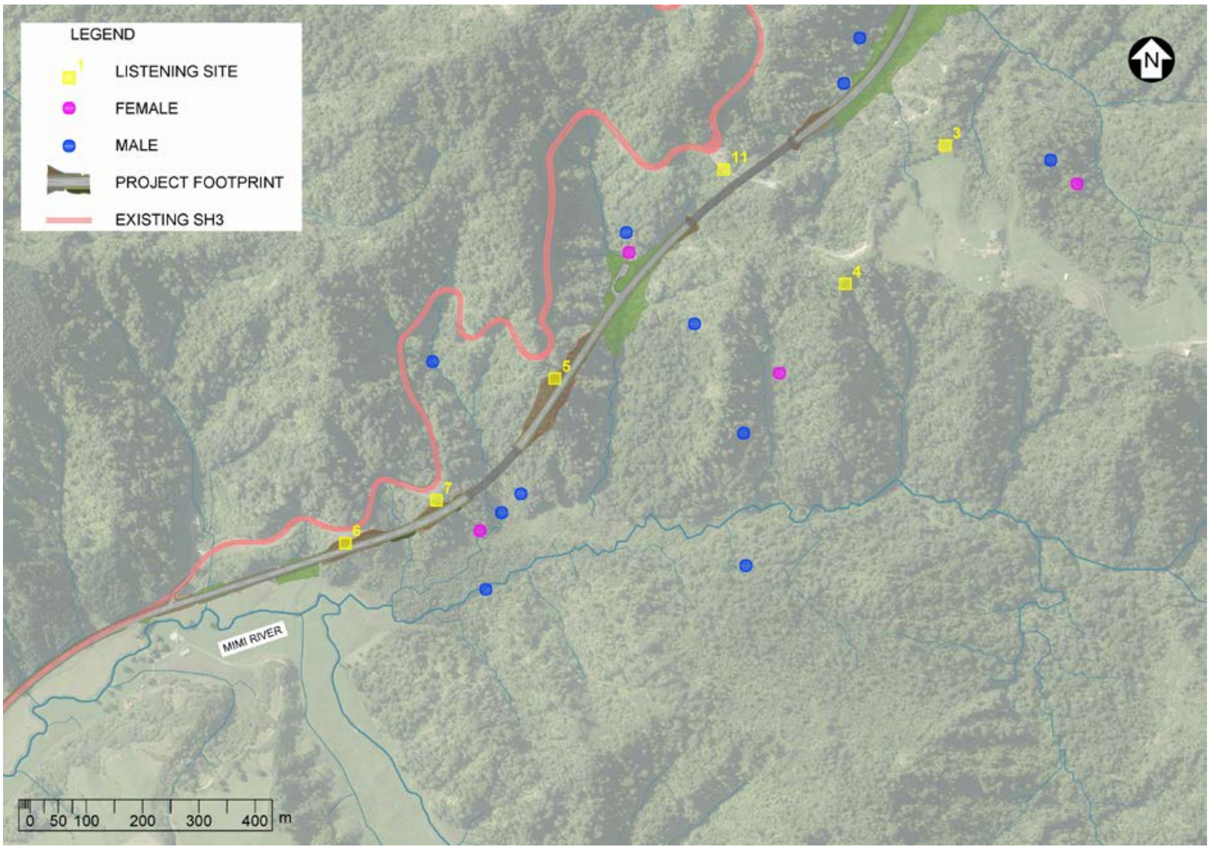

Figure 2.4b – Kiwi distribution in the Mimi catchment, as revealed by nocturnal surveys over three nights in December 2017. NB: Figure 2.4(b) intersects with Figure 2.4(a) south of listening station 11.

3 Conclusions and implications for Avifauna assessment of effects

The additional field investigations have:

- Provided detailed information on the composition of the bird community in the Project footprint and proposed Pest Management Area;
- Measured the current abundance of native and introduced birds in the PMA, before the onset of predator control;
- Measured the absolute abundance of fernbirds in wetlands in the Project area, and confirmed the potential presence of one pair of spotless crake in the Mimi catchment. This baseline information will enable impacts on wetland birds to be quantified, should sedimentation controls fail during road construction and the 'worst-case scenario' eventuate.
- Provided detailed estimates of the number of kiwi living along and near the Project footprint.
- Confirmed that the bird community along the Project footprint and surrounds was likely to be similar to the one to the west of Mt Messenger along the formerly proposed MC23 alignment
- Confirmed that NI brown kiwi are the most significant bird species in the Project area based on their threat status, population size and relative vulnerability to the potential effects of the Project.

In relation to this supplementary work, it is noted that:

- The work has not provided additional information about the location of kōkako and their potential to disperse from their release site toward the Project footprint since this matter was addressed in detail in Baber and McLennan (2017). To reiterate, the kōkako population in Parininihi is expected to increase slowly at about 9% per annum and to remain close to the release site for some years to come. The results from the first release of 20 birds in Parininihi in 2017 have been six established pairs, with three chicks fledged successfully and a four-egg clutch. Twenty additional kōkako will be translocated to Parininihi in April 2018.
- Young kōkako typically do not disperse far from natal areas (J. Innes pers. comm. 2017) and the natural rate of spread of a population from a source location is slow. This indicates kōkako of Parininihi origin are unlikely to colonise the Project area and PMA for years, and possibly decades.
- Call count surveys are planned for autumn 2018 to obtain baseline measurements of kiwi abundance in the proposed Pest Management Area. Kiwi sign was commonly noted in the PMA during the November 2017 diurnal bird surveys.
- The additional field studies indicate that the assessment of potential adverse effects in the original Avifauna Assessment (Baber & McLennan 2017), taking into account the

measures proposed to address potential adverse effects, was appropriate and justified.

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35