Ecology supplementary report - Herpetofauna

February 2018

Ecology New Zealand 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	March 2018	Final

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Contents

Glossary

Term	Meaning
AEE	Assessment of Effects on the Environment Report
ACO	Artificial Cover Object
CCFC	Closed cell foam cover
EcIA guidelines	Ecological Impact Assessment guidelines
EIANZ	Environment Institute of Australia and New Zealand
ELMP	Ecology and Landscape Management Plan
Herpetofauna Assessment	Ecological Assessment – Herpetofauna, AEE Volume 3 Technical report 7d (Ecology NZ Ltd, 2017)
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 Herpetofauna Assessment (Ecology NZ Ltd, 2017), was completed as part of this package. The purpose of the Herpetofauna Assessment was to assess potential adverse effects of the Project on Herpetofauna, to inform the assessment of effects in the AEE and the proposed mitigation and offset package for the Project.

The ecology technical reports noted the conservative and precautionary approach taken in assessing potential adverse ecological effects from the Project, and that more information would be available following summer field investigations.

These field investigations have now concluded, and have informed this supplementary report. The purpose of this report is to describe those investigations and corresponding results and to update the original Herpetofauna Assessment as appropriate.

2 Further ecological investigations

2.1 Introduction

The Herpetofauna Assessment, dated December 2017, included assessments of ecological values and potential adverse effects based on the information available at the time the assessment was completed. As noted in that report and in Section 1 above, a conservative approach was taken when assessing potential adverse effects due to a lack of certainty about herpetofauna populations within the Project footprint.

Due to changes in alignment selection, the Herpetofauna Assessment relied on habitat assessments across the Project footprint, together with the results of field surveys undertaken to the west of SH3, along the previously proposed 'MC23' alignment. These earlier surveys were undertaken in an area subject to long-term pest control and were within the wider Project area, and hence provide insight into the herpetofauna values of the Project footprint. As noted in the original assessment, additional targeted field investigations were deemed necessary across the selected alignment to support and strengthen the assessment of effects on herpetofauna.

2.2 Methodology

2.2.1 Field assessment methods

A total of 13 herpetofauna species were identified within the original Herpetofauna Assessment (Ecology NZ Ltd, 2017) as being potentially present within the Project footprint and wider Project area (Table 2.1). Due to this high diversity of native herpetofauna species potentially present, a range of survey methodologies were employed to maximise the likelihood of detecting the full suite of potential species and where possible, their relative abundance.

Table 2.1 - List of herpetofauna species potentially within the project area

Common Name	Scientific Name	Threat Status
Archey's frog	*Leiopelma archeyi*	Threatened - Nationally Vulnerable
Copper skink	*Oligosoma aeneum*	Not Threatened
Duvaucel's gecko	*Hoplodactylus duvaucelii*	At Risk - Relict
Elegant gecko	*Naultinus elegans*	At Risk - Declining
Forest gecko	*Mokopirirakau granulatus*	At Risk - Declining
Glossy brown skink	*Oligosoma zelandicum*	At Risk - Declining

Common Name	Scientific Name	Threat Status
Goldstripe gecko	*Woodworthia chrysosiretica*	At Risk – Relict
Hochstetter's frog	*Leiopelma hochstetteri*	At Risk – Declining
Northern Grass skink	*Oligosoma polychroma*	Not Threatened
Ornate skink	*Oligosoma ornatum*	At Risk – Declining
Pacific gecko	*Dactylocnemis pacificus*	At Risk – Relict
Raukawa gecko	*Woodworthia maculata*	Not Threatened
Striped skink	*Oligosoma striatum*	At Risk – Declining

Field methodologies included artificial retreats, visual encounter surveys, nocturnal spotlighting, funnel traps (Gee-minnow) and tracking tunnels (Appendix A). These methodologies were employed during spring/summer 2017, predominantly during weather conditions considered favourable for herpetofauna surveys (i.e., little/no rain or wind and mild-warm temperatures).

2.2.1.1 Artificial retreats

A total of 259 artificial retreats including Artificial Cover Objects (ACOs) and Closed Cell Foam Covers (CCFCs; Bell, 2009) were deployed across the Project alignment from 23 October to 27 October 2017 (Appendix A). These retreats subsequently remained *in situ*, and included:

- 182 ACOs deployed across 14 transects (13 ACOs per transect). Transects consisted of nine single-layer ACOs spaced approximately 10m – 20m apart (dependant on onsite conditions), with a terminating 10th transect point being a cluster of four overlapping ACOs.
- 77 CCFCs deployed across eight transects.

These new transects are additional to two existing CCFC transects (comprised of 20 and 23 CCFCs), which were established along ridges to the west of the alignment during January 2017 (Appendix A)[1].

The new transects were established in a range of habitat types, including gully and ridgeline habitats. Single-layer CCFCs were nailed onto the tree trunks of large mature trees bearing significant epiphyte loads wherever possible, since these types of trees were deemed most likely to host arboreal lizards. ACOs were deployed in terrestrial habitats, within targeted habitat interfaces and in micro-habitats such as light wells, clumping vegetation and woody debris.

[1] The ACO transects to the west of the alignment that were originally surveyed for the Herpetofauna Assessment were not resurveyed.

All artificial retreats, including the two CCFC transects west of the alignment, were checked twice: once during the week of November 3rd and again during the week of December 18th 2017.

2.2.1.2 Visual encounter surveys

As described within the Herpetofauna Assessment, visual encounter surveys (VES) were recommended to be undertaken within the Project area to supplement the opportunistic surveys previously undertaken (Ecology NZ Ltd 2017). Visual encounter surveys involved both passive and active daytime searches across the Project footprint and wider Project area.

Passive surveys involved scanning terrestrial and arboreal habitat for active herpetofauna. Searches targeted potential habitat features such as forest clearings adjacent to forest tracks, habitat interfaces, light wells in forest interiors, epiphytes, and dense low-growing foliage.

Active surveys involved manual searches across potential terrestrial and aquatic habitats. These included searches across stream banks, under instream habitat objects (e.g. rocks, debris dams), under and through terrestrial habitat objects (e.g. loose bark, fern skirts, fallen and low-growing epiphytes, woody debris), and through dense and clumping vegetation. The majority of epiphyte habitat within searched areas was inaccessible and could not be thoroughly manually searched for safety reasons.

2.2.1.3 Nocturnal spotlighting

Nocturnal spotlighting surveys occurred across both the southern and northern extents of the Project footprint over five consecutive nights during each of the weeks of 23rd October, 3rd November and 18th December 2017. Spotlighting was undertaken by herpetologists and ecologists (in teams of four to six) using high-powered handheld and head-torches to scan for arboreal herpetofauna species.

Binoculars were used to scan vegetation at a distance for herpetofauna eyeshine and to investigate any potential sightings in the canopy. Targeted manual searches of suitable herpetofauna habitats were also undertaken during spotlighting efforts. These manual searches targeted fern skirts, divaricating shrubs, loose bark, and low-growing epiphytes.

2.2.1.4 Funnel traps

To further target epiphytic habitat, 17 Gee-minnow traps were installed into epiphytic habitat across the Project area to help detect cryptic arboreal lizard species. Gee-minnow traps were installed 10m – 15m into the canopy using a slingshot and rope system. These traps were installed in epiphytes and baited with a selection of fruit-based baits on the 18th and 19th of December. All funnel traps were checked daily until they were removed on the 22nd of December for a deployment period of 3-4 nights per trap and an overall funnel trapping effort of 55 trap nights.

2.2.1.5 Tracking tunnels

Three tracking tunnels were deployed in terrestrial habitats within the Project area during December 2017 (Appendix A). These tunnels were baited with fruit and were checked and removed after three nights.

An additional tracking tunnel was deployed for two nights (also during December 2017) to the west of the Project area in response to a possible arboreal skink sighting in an epiphyte along one of the original transects of CCFCs. This tunnel was placed on a tree beneath the epiphyte and baited with fruit.

2.2.2 Assessment of effects methodology

As in the December 2017 report, the assessment of effects based on these spring/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 of further investigations

2.3.1 Artificial retreats

No herpetofauna species were detected in ACOs or CCFCs in either of the artificial retreat checks undertaken during the survey period (Appendix A). However, a local Iwi representative (Conrad O'Carroll, Ngati Tama, pers. comm. 2017) provided anecdotal evidence that a lizard was observed in December 2017 under one of the original CCFCs west of the alignment by a pest control field worker[2]. A field team member also reported that a substantial proportion of the CCFCs west of the alignment had been damaged by pest mammal scratches and bite marks, with several being torn off trees.

2.3.2 Visual encounter surveys

In total, 28.5 dedicated person-hours of manual habitat search effort was undertaken across the Project footprint and wider Project area. Though difficult to quantify, additional opportunistic passive and active VES are estimated to have included searches of at least 100 potential habitat items (e.g. woody debris, fern skirts, fallen epiphytes).

The only confirmed sighting of herpetofauna species during VES were four copper skinks (*Oligosoma aeneum*) detected near the existing SH3, between the highway and the Project footprint (Appendix A).

These skinks were found under building wood, woody debris and corrugated iron sheets in a paddock adjacent to the existing SH3 road on the eastern side, approximately 500-600 m west of the Project footprint (Figure 2.1 below). The four skinks were all detected within a 10-minute period, within 40m of each other. Of these skinks, three were captured,

[2] No further information relating to the sighting (e.g. precise location, genus/species identity) was provided.

measured, photographed and released, whilst the fourth escaped. One captured individual appeared gravid, indicating that breeding is occurring at the site.

Figure 2.1 – Copper skink captured within Project area (left) and habitat it was detected in (right)

Another potential sighting of a lizard, underneath a mat of epiphyte roots located on top of a CCFC in the original transects to the west of existing SH3 (Appendix A), was made by a project herpetologist in November. A follow-up check several weeks later did not detect further evidence of lizards in this location, and a trapping tunnel positioned on a the host tree (Section 2.3.3 below) did not capture herpetofauna.

2.3.3 Funnel traps and tunnels

Gee-minnow traps deployed to detect arboreal herpetofauna did not detect any herpetofauna presence during the trapping period. A single ship rat (*Rattus rattus*) was captured in a trap positioned approximately 15m high within an epiphyte (*Astelia* sp). This male ship rat was euthanised and dissected, with no obvious signs of herpetofauna within its stomach contents.

Tracking tunnels deployed over three nights failed to detect any herpetofauna within the Project area. As noted in Section 2.3.2 (above), another trapping tunnel positioned on a tree to the west of existing SH3, in response to the earlier possible lizard sighting in November, did not provide any evidence of herpetofauna presence over the two nights it was set.

2.3.4 Nocturnal searches

A total of 44.75 person-hours of nocturnal searches failed to detect any herpetofauna species across the Project footprint and wider Project area (Appendix A).

2.3.5 Incidental observations

A team of freshwater ecologists undertaking electrofishing investigations within the Project footprint (during late 2017) indicated a possible native frog observation on a side tributary central to the Project footprint. Targeted manual searches for native frogs in this area found

only two mature koura (*Paranephrops planifrons*) which may have been mistaken for leaping frogs when they reacted to the electrofishing machine in operation.

2.4 Discussion and recommendations

The results of the spring/summer survey effort employed across the Project footprint and wider Project area have provided more robust insight into the potential adverse effects of the project on herpetofauna values and the best options for mitigating potential effects. The range of survey techniques utilised, together with the spread of effort during these supplementary surveys, ensured that reliance on a single methodology was avoided, enabling a wider range of herpetofauna taxa to be targeted.

2.4.1 Monitoring

None of the 13 herpetofauna species identified as potentially present in the Herpetofauna Assessment (Ecology NZ Ltd 2017) – or any additional herpetofauna species – were detected within the Project footprint itself.

The four copper skinks discovered during this supplementary survey were detected outside the Project footprint in a paddock under wood and other debris. This relatively common, non-threatened native species was expected to be present within the Project area as indicated within the Herpetofauna Assessment (Ecology NZ Ltd 2017). No other native lizard species were positively identified during the surveys.

The confirmed presence of a native lizard species (copper skink) in the wider Project area supports a conclusion that at least one species of native lizard is likely to be present within the Project footprint.

Intensive efforts utilising a range of methodologies supported prior findings of the Herpetofauna Assessment (Ecology NZ Ltd, 2017), confirming that herpetofauna species within the Project area are difficult to detect within this environment. Local habitat modification, in conjunction with the impacts of pest animals, may have driven a number of species that are potentially present to either local extinction or to population levels below detectability.

Clear evidence of pest animal abundance within the Project area was demonstrated, with a total of 25 brushtail possum (*Trichosurus vulpecula*) observed during a single night of spotlighting in the northern sector of the Project area, and three ship rats (*Rattus rattus*), one mouse (*Mus musculus*) and one brushtail possum during a single night of spotlighting within the southern sector of the Project area. The additional presence of goats (*Capra aegagrus*), pigs (*Sus scrofa*) and un-fenced livestock throughout the Project alignment highlighted the impacts of habitat modification throughout wetland and forest environments.

Overall, the conclusions within the Herpetofauna Assessment (Ecology NZ Ltd 2017), which placed reliance on habitat assessments and the results of surveys west of the Project footprint, align with the results of spring/summer field investigations.

2.4.2 Recommended mitigation

In light of these more recent surveys which highlight the low detectability levels of herpetofauna within the Project footprint, practical mitigation measures are now recommended during the construction phase of the project. These measures would target key high-risk habitat types where lizards have been found (e.g. woody debris), in addition to arboreal epiphytic habitats.

Though lizards were not detected within epiphytes, they may be present but difficult to detect, being cryptic species. The possibility that threatened lizard species may be present in epiphyte habitat within the Project footprint therefore cannot be discounted.

As outlined in the Herpetofauna Assessment, the development and implementation of a Project-specific Lizard Management Plan is recommended as a chapter within the Ecology and Landscape Management Plan (ELMP).

To further address the residual uncertainty around the potential presence of threatened herpetofauna species within the alignment, the core focus of mitigation will centre on undertaking pest control across the nominated Pest Management Area in perpetuity (refer to Mitigation Report).

This Pest Management Area should ideally be utilised as the herpetofauna relocation site, into which all individuals captured during salvage works are released. With advances in lizard relocation and translocation research, it is considered best practice for lizards to be released into a 'pen' which is to be maintained for the duration of the construction phase of the Project. It is further recommended that mice are controlled within this pen and surrounding radius (200m). This radius would primarily act as a buffer for pests. It would also provide an area in which multiple pens could potentially be later established, if a high number of lizards are captured and require relocation.

3 Conclusions

As an extension to preliminary field investigations, extensive surveys targeting native herpetofauna were undertaken across the Project footprint and wider Project area during the spring/summer of 2017. A population of copper skink was recorded less than 1km from the Project footprint, with no further species detected across surveyed areas. The results of these investigations have validated conservative conclusions described within the Herpetofauna Assessment (Ecology NZ Ltd, 2017).

The recommendations made within the Herpetofauna Assessment to mitigate potential adverse effects on herpetofauna largely remain, with modifications to mitigation suggested. The primary focus for herpetofauna mitigation will be realised through the implementation of pest control in perpetuity across the nominated Pest Management Area. It is recommended that a site-specific Lizard Management Plan addresses targeted lizard mitigation measures (i.e. salvage), the construction and maintenance of a lizard soft-release pen within the Pest Management Area, and the provision of mouse control within this lizard pen and surrounding radius (200m).

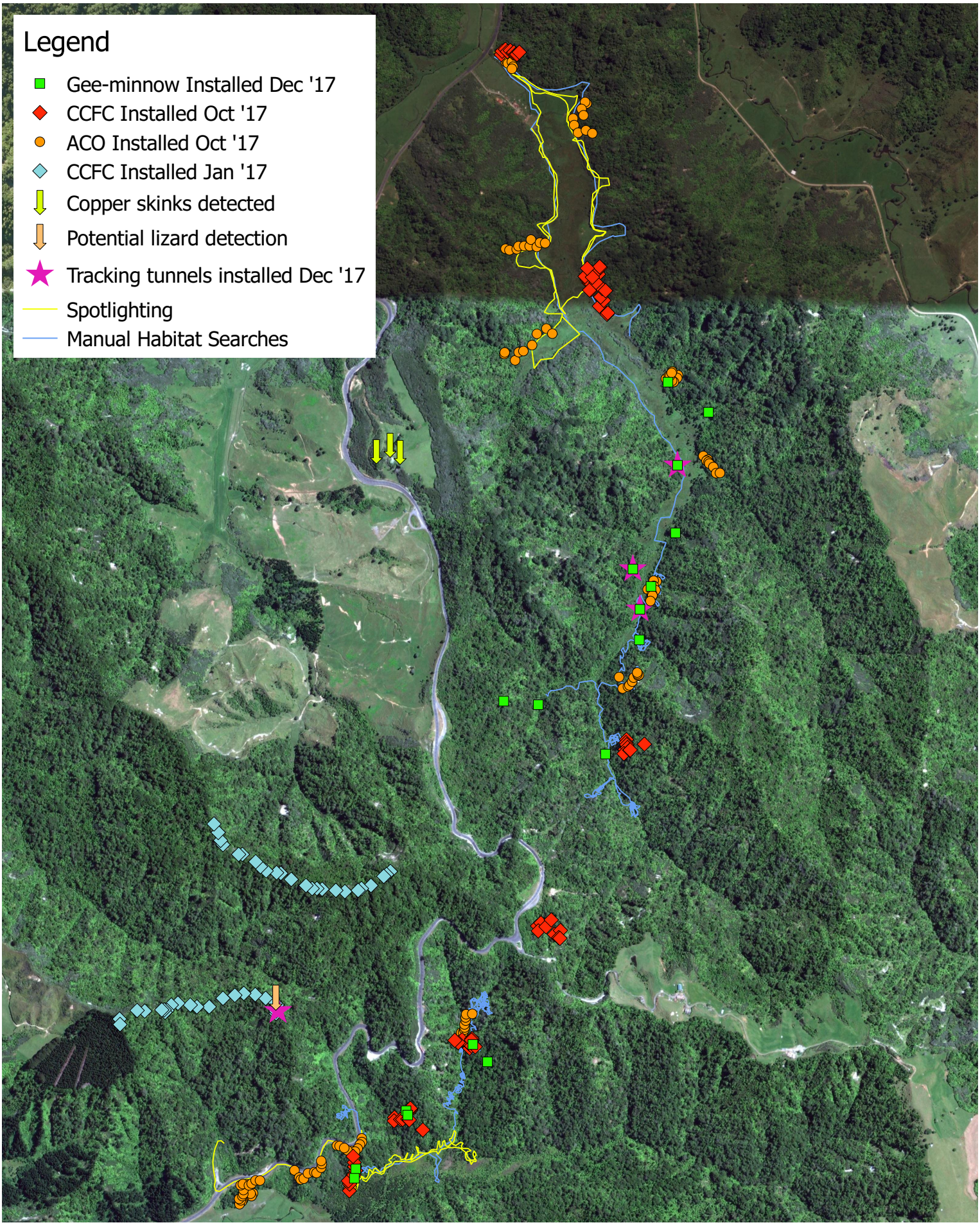
4 References

Bell, T. (2009). A novel technique for monitoring highly cryptic lizard species in forests. *Herpetological Conservation & Biology, 4(3)*: 415–425.

Ecology NZ Ltd (2017). Ecological Assessment – Herpetofauna, AEE Volume 3 Technical report 7d.

EIANZ (2015). Ecological Impact Assessment (EcIA): EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems.

Appendices



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These graphics have been produced as a result of information provided by the client and field data sourced by Ecology New Zealand Ltd. This map provides indicative positions of field survey effort employed across the Mt Messenger area. The graphics are provided to the client for the benefit and use of the client and for the purpose for which it is intended.

Mt Messenger

Appendix A: Herpetofauna Survey Effort

Date: 14 February 2018 - Rev1

Map prepared by Ecology New Zealand Limited
For Mt Messenger Alliance

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