# REVIEW OF ECOLOGICAL ASPECTS OF THE APPLICATION TO REROUTE SH3 AT MT MESSENGER, NORTH TARANAKI - MAY 2018

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# REVIEW OF ECOLOGICAL ASPECTS OF THE APPLICATION TO REROUTE SH3 AT MT MESSENGER, NORTH TARANAKI - MAY 2018

*Valley to east of SH3, Mount Messenger*

## Contract Report No. 4402e

May 2018


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# 1. INTRODUCTION

New Plymouth District Council commissioned Wildland Consultants Ltd to provide an independent audit of the ecological components of a resource consent application to reroute SH3 at Mount Messenger, Taranaki. The New Zealand Transport Agency has selected a preferred route that passes to the east of the existing SH3 at Mount Messenger.

An initial assessment of the Alliance specialist ecology reports was provided to New Plymouth District Council in late October 2017 (Wildland Consultants 2017). This assessment was provided to Alliance ecologists, and the opportunity provided to revise specialist reports prior to lodgement. Resource consents and Notice of Requirement (NoR) was subsequently lodged on 15 December 2017, and the lodged specialist reports were subsequently provided to Wildland Consultants for review. Wildlands subsequently provided a review of the Application (the Notice of Requirement Technical Reports) (Wildland Consultants 2017a). This review focussed on issues raised in the initial review of the draft assessments, and the degree to which these were addressed and resolved in the Application.

This report updates the two previous reviews undertaken by Wildlands, and also addresses the draft Ecology and Landscape Management Plan and the S92 responses provided to New Plymouth District Council. This report provides reviews of these documents, and then considers the following:

- Key changes to the application since NOR lodgement.
- A summary of major outstanding concerns.
- An assessment of the mitigation and offsetting proposed to date.
- Advice as to what measures would increase confidence that the potential ecological effects will be adequately mitigated or offset.
- Further information that NZTA should provide in the hearing evidence on ecological effects and mitigation in order to assist in forming an opinion on the significance of effects, and the effectiveness of mitigation proposed.
- A review of the proposed designation conditions and how these should be modified or added to ensure key outcomes are met.

# 2. METHODS

## 2.1 Review of the draft Ecological and Landscape Management Plan

Wildlands reviewed the Ecological and Landscape Management plan (dated March 2018).

## 2.2 Review of S92 responses

Wildlands reviewed the responses of the Applicant to S92 questions posed by New Plymouth District Council. The S92 responses by the Applicant were discussed in a series of teleconferences between the Alliance ecologists and Wildland ecologists. These meetings were undertaken in April 2018.

# 3. REVIEW OF DRAFT ECOLOGY AND LANDSCAPE MANAGEMENT PLAN

## 3.1 Lack of evidence for poor ecological condition for habitats to east of SH3

Evidence for poor ecological condition of the area to east of SH3 has not been provided (Section 2.2). This has been raised in previous reviews of the Application by Wildlands, and is a significant issue as improvement of the health of this forest is a major component of the Applicant's mitigation package.

## 3.2 Assessment of ecological values

Further justification should be provided that the swamp forest has the "greatest ecological significance" in the wider project area. Notably it is of high value, but is of limited extent compared to far more extensive high quality hillslope forest within the proposed project footprint.

Kahikatea-swamp maire forest should be of "very high" ecological value.

As previously discussed, the ecological value of vegetation communities needs to consider fauna values (otherwise it is not an ecological assessment but strictly a botanical assessment). How can a vegetation type that is likely to support At Risk reptile species be assessed as being of Low ecological value? Similarly, can vegetation that may support bat roosts (e.g. treefern scrub) be assessed as being of Low ecological value?

## 3.3 Assessment of significant trees

The planting of 200 seedlings for each significant tree to be felled is one of the key components of the Applicant's mitigation package. However in the Ecology and Landscape Management Plan (ELMP) the Application states that the species of these may be substituted for other species, if the planting sites are not suitable. This gives no reassurance that this mitigation measure will occur, or be successful. The Applicant should provide performance measures for every component of the mitigation package, including significant tree plantings.

The Application provides the following definition for "significant trees".

"Significant trees were determined as having **one or more** of the following attributes:

- Being large and old (typically emergent) trees.
- Being relatively uncommon.
- Having significant habitat value for other flora and fauna such as, providing important flowering or fruiting resources, cavities for roost and nests, and supporting large epiphyte communities."

It is noted that this three-point definition for significant trees provided by the applicant above does not place any size thresholds on the trees, or consider relative abundance.

As previously discussed, many indigenous tree species that met the Applicant's definition for "significant trees" are not listed as significant, and therefore not considered for replacement plantings. If these three criteria for significant trees were to be applied consistently by the applicant, at least seven more species would be added to the Applicant list of 11 species, as follows:

- Tawa (important fruiting resources).
- Rewarewa (important flowering resources).
- Nīkau (important fruiting resources).
- Kaikomako (important fruiting resources).
- Kohekohe (important flowering and fruiting resources).
- Hard beech (important flowering and fruiting resources).
- Kamahi (important flowering resources).

Inclusion of these seven species would likely increase the number of significant trees within the footprint from a total of 17 to hundreds (or thousands), with a commensurate increase in number of trees needing to be planted, at a ratio to 1:200, from 3,400 to 20,000 or more.

Although the criteria met by each of the 17 significant trees selected is not provided, it is possible that trees are only regarded as significant by the Applicant if the first criterion is met "large and old (typically emergent) trees", or if all three criteria are met. It would be useful if the Applicant provided a breakdown of the number of trees selected using each of the three criteria.

The 17 trees listed by the Applicant as affected include 11 rimu, two tōtara, and one each of matai, hinau, miro, and pukatea. However this does not explain how species that don't reach emergent heights are included in the Applicant's list of significant tree species (e.g. *Mida salicifolia*, height to six metres). Additionally, the Applicant needs to provide clarification around how trees were surveyed and assessed for habitat value, including presence of cavities, and how many of the 17 significant trees were selected due to this criterion.

Table 2.3 refers to 17 "**large** significant" trees within the project footprint (emphasis in bold added). What is the number of "significant trees" within the footprint, as defined by the Applicant's three criteria?

It is not clear why kahikatea and swamp maire have been excluded from the 17 significant tree species within the footprint listed by the Applicant, given their inclusion in the significant tree list provided by the Applicant, and the project footprint including 0.159 hectares of "kahikatea swamp maire forest", 0.525 hectares of "kahikatea forest", and 0.641 hectares of "kahikatea treeland". Similarly, it seems very unlikely that only one miro tree is present within the project footprint when the footprint includes 0.536 hectares of miro rewarewa kamahi forest.

The Applicant needs to provide further detail as to how the significant tree criteria were developed and applied.

### 3.4 Conservation status of long-tailed bats

The conservation status of long-tailed bat is still incorrect, despite this being raised by all previous Wildlands reviews. The status is "Threatened-Nationally Critical", not the lesser "Threatened-Nationally Vulnerable". The continued use of 'Nationally Vulnerable' for long-tailed bats downplays the risks posed by the project to this species.

### 3.5 Invertebrates

The statement that the invertebrate fauna is "typical of communities inhabiting primary forests" is poorly supported, especially considering that no targeted surveys of Lepidoptera, including forest ringlet (conservation status "At Risk") were undertaken.

### 3.6 Mortality of herpetofauna during construction

As noted for previous reviews, Table 2.3 of the assessment fails to list "mortality during construction, especially vegetation clearance" as an adverse effect of construction for herpetofauna.

### 3.7 Connectivity provided by the tunnel

Section 3.2 notes that the inclusion of the 240 metre tunnel "preserved the important east-west connectivity of habitat (ridge to coast) and mobile animal movement (especially bats)". What evidence is there that the tunnel location preserves an important flight path/commuting route for long-tailed bats? How does the tunnel location provide benefit for other mobile species found along the project footprint e.g. kiwi and lizards?

### 3.8 Effects of light spill on fauna

Management of light spill during construction is acknowledged as an issue. How is light spill during long-term operation of the road to be managed, particularly with regards to bats and other nocturnal fauna, e.g. kiwi and geckos? Effects of lighting on long-tailed bats are further discussed in Section 3.24 below.

### 3.9 Adaptive management

Section 3.3 acknowledges that trajectories and endpoints for rehabilitated surfaces may be different from previous state. How is the potential for failure to reach "no net loss" for these areas dealt with, as the plantings on these surfaces (e.g. mānuka scrub) will only be at a ratio of 1:1? If trajectory may be different/less desirable, a higher ratio is required.

## 3.10 Fencing to prevent road kills of kiwi

Section 3.4 refers to kiwi protection fencing at "locations along the footprint margin" to reduce risk of kiwi road kills. Where is kiwi protection fencing not required? Can a map showing fence locations be provided? In contrast, the Avifauna Management Plan in the ELMP contains no references to kiwi protection fencing, despite this being a key measure proposed in the original AEE (Technical Report 7e). Further, Technical Report 7e referred only to temporary fencing to keep kiwi from entering the construction area, whereas ELMP Section 3.4 implies that it is permanent fencing to prevent road kill. Clarification is necessary of the duration (temporary vs permanent) and purpose (prevent road kill or entry into construction zones) of the kiwi protection fencing.

## 3.11 Understatement of time taken for restoration

Section 3.4 states that "planting will resemble what is removed in the matter of **a few years**". This is a gross understatement of the time required to replace the lost vegetation which, if the plantings succeed, might attain a similar state in 30-50 years. Section 3.5 of the ELMP then states that the establishment of mature swamp forest will take "**many decades**", which is correct, i.e. 100-200 years. The application also states that planted kahikatea will form 65% of the canopy by Year 35. This contradicts the statement in Section 3.4 of the ELMP that plantings will resemble what is removed in a few years.

## 3.12 Improvement of forest canopy health

Section 3.5.1 - as previously discussed the likelihood that canopy health can be improved, or the magnitude of this change, cannot be assessed. No quantitative data (or even semi-quantitative observations) has been presented as evidence for the poor health of the forest canopy.

## 3.13 Misleading statements regarding likely ecological gains

As previously discussed, there is a lack of evidence for a "spill over" effect for bats into surrounding areas, due to bats returning to natal areas to breed. Furthermore, the extent of pest control proposed may or may not provide measureable benefit to bats. Section 3.5.3 states that, with regards to the project, "the result will be the conversion of these *valleys* back to fully-forested and connected swamp and riparian forest and the elimination of forest edge". This is unachievable in the Mangapepeke Valley, where the restoration occurs in the same valley as the proposed road, and where the road will separate habitats and create new edges. To justify this statement the Applicant needs to provide a map of where the plantings will achieve fully-forested valleys without forest edges. If this statement is only in respect to the Mimi Valley, away from the road, the statement needs to be modified to not refer to valleys 'plural'. The Applicant also needs to clarify the extent of plantings required to achieve stream restoration outcomes are completely separate from, and in addition to, the extent of plantings required to mitigate for forest and wetland loss.

## 3.14 Reliance on literature or expert opinions without providing the supporting information

Section 3.5.4 acknowledges that the biodiversity offsets model couldn't account for lizards, bats, or invertebrates due to a lack of data, but that this has supposedly been addressed based on best available science and professional opinions, with the resulting inclusion of (1) an additional 855 hectares of pest control, (2) planting of 200 seedlings per 'significant tree' lost, and (3) a pest-free soft-release pen for lizards.

The Applicant needs to provide evidence, based on best available science, that 1,085 hectares of pest control will address potential adverse effects on bats and birds, given that much larger areas of pest control are required to result in a quantifiable increase in long-tailed bat populations and some bird species elsewhere in New Zealand (O'Donnell *et al.* 2017). The Applicant should not consider existing areas of pest control adjacent to the site, as the proposal needs to result in ecological gains that are additional and solely attributable to the mitigation package for the project.

## 3.15 Edge effects

Section 4.2 refers to an allowance of five metres for edge effects. As previously discussed, edge effects of 50-100 metres is more supportable based on long-standing literature for forest environments.

## 3.16 Extent of high value ecological areas adjacent to project footprint

The wording of Section 4.4.1 is misleading as it could imply that clearance of high value ecological areas is to be avoided. The wording should be changed to something along these lines: "clearance does not trespass into high value ecological areas *further than necessary*", as the road definitely passes through areas of high value indigenous vegetation.

Section 4.4.1 refers to the mapping of high ecological value margin areas in Figures 4.1 and 4.2, and Appendix A - the Ecology Constraints Map. Appendix A is missing from the ELMP and couldn't be reviewed.

The mapping of 'high ecological value margin areas' in Figures 4.1 and 4.2 only includes three small areas in the Mangapepeke catchment, and three areas in the Mimi catchment. This mapping conflicts with Table 2.1 of the ELMP, and the mapping of high ecological value areas in the Vegetation Technical Report 7a (e.g. Figure 3.3), which shows that most of the route passes through vegetation that is of high ecological value, e.g. tawa rewarewa kamahi forest, miro rewarewa kamahi forest, pukatea nīkau forest. Additionally, the overall assessment in Table 2.1 of the ELMP for affected vegetation is "High".

Where the Applicant has mapped "high ecological value margin areas" is critical, as the ELMP states that in these areas the margin of vegetation clearance for the additional works area (AWA) will be restricted to five metres. In areas of lower ecological value, the margin of clearance for the AWA will be 20 metres. A five metre margin for the AWA is justified for all habitats of "high ecological value" and it

is unclear why the Applicant has only included a small subset of areas where the extent of indigenous vegetation clearance will be minimised.

## 3.17 Translocation of threatened epiphytes

In Section 4.4.2 the applicant notes that At Risk or regionally distinctive epiphytes, growing in the crowns of large emergent trees, will be the subject of a translocation trial, with 30 of each species to be planted onto dead ponga. Whilst this may be the easiest option logistically, it is unlikely to succeed as ponga will not provide the rooting microsites provided by large canopy trees, e.g. deep knot holes, humus accumulation in branch forks, bases of other epiphytes such as *Astelia* spp. In any case, dead ponga will rot and collapse within a few years and will not provide ongoing habitat. Further consideration should be given to how epiphytes and their hosts can be salvaged intact, or setting the objective that the number of individuals lost by vegetation clearance will be successfully re-established through plantings.

## 3.18 Mitigation planting areas

In Section 4.6 the total area of 'offset and mitigation planting', including riparian planting, is 31.58 hectares. However this includes planting into existing areas of indigenous vegetation at some sites. As the total area of indigenous vegetation to be lost is 31.277 hectares, there will be a net loss of indigenous vegetation, on an area basis.

If kahikatea/swamp forest plantings are to occur in the Mangapepeke Valley, Section 4.6.2.1 states that this will result in a "fully reforested valley". This is misleading as the valley will also be the location for the newly constructed road.

Figures 4.3 and 4.4, when critiqued using Google Earth imagery, appear to include planting areas that are already vegetated, at least in part, with indigenous species. Based on the imagery, and Figure 3.3 of Technical Report 7a, these planting areas may include areas of "pukatea treefern treeland", "pukatea nīkau forest", and "mānuka communities". This issue was raised for previous reviews of the Applicant reporting. The ELMP now acknowledges that indigenous vegetation is already present in some of the planting zones (Section 4.6.3.2). Plantings are only justified where the current vegetation is dominated by exotic species. Where indigenous vegetation is already regenerating naturally, little gain will be made by planting, versus retirement from grazing. The applicant should map the planting units at an appropriate scale to show they are in need of planting, and provide criteria for where plantings are needed, and can be part of a mitigation package, e.g. less than 30% existing indigenous cover. This mapping should, as a starting point, exclude indigenous vegetation mapped in Technical Report 7a. In areas where there is existing indigenous cover, the density of plantings needed is also effectively reduced, which may then require an increase in planting area (e.g. to plant 1 hectare of indigenous vegetation in an area where 50% of cover is indigenous, two hectares needs to be planted).

In Section 4.6.2.2 it states that "the biodiversity offset targets for all valley floor plantings are to obtain a near complete cover of indigenous species *across the valley* (including riparian areas) by year 10". In the Mangapepeke Valley the valley floor will include areas bisected by the proposed road, so this is unachievable.

In Section 4.6.2.3 it states that "dryland" plantings on moderately well-drained soils will be used as the location for planting of most significant tree species, and if these species fail due to hydrological reasons such as excessive flooding, "species more suited to the conditions will be planted". This is concerning as it raises the possibility that significant tree species may not be replaced "like for like". The Applicant should give assurance that suitable planting sites are available within the project area to successfully establish 200 seedlings for each "significant tree" species to be affected, e.g. rimu, matai, northern rata, miro, pukatea. Some of these require planting sites that are unlikely to be present in poorly-drained valley floors.

In Section 4.6.3.2 it refers to dryland mitigation plantings (5.467 hectares) having planting conditions that include "mixed native wetland margins" and "open remnant mānuka stands". All areas of these vegetation types should be excluded from proposed mitigation plantings, as no planting of these habitats is necessary and it will not increase the area of indigenous vegetation at the site. Exclusion of livestock and feral goats, and control of pest plants is all that is needed to facilitate succession to higher value indigenous vegetation.

Section 4.6.3.6 provides performance measures for dryland mitigation plantings. These performance measures may already have been met for some of the proposed planting areas e.g. "80% indigenous plant cover" will already be the case for remnant mānuka stands. This highlights the issue that little may be gained by planting within areas of existing indigenous vegetation.

Details provided in Section 4.6.3.2 show that the project will result in a net loss of wetland on an area basis. Exotic rushland, most of which is probably wetland, will be replaced at a ratio of 0.5 hectare replacement planting for every hectare removed. What is the current vegetation at sites where mitigation plantings for exotic rushland will occur? The Applicant lists open pasture, pasture-rushland mosaic, mixed indigenous wetland margins, and mānuka stands. Of these, only wet areas of pasture or pasture-rushland mosaic are appropriate planting sites for mitigation of exotic wetlands.

## 3.19 Performance measures

Performance measures are not provided for the following actions described in the ELMP:

- In Section 4.4.2 it states that where suitable areas exist, in-situ dumping of plant material will occur, and that there is >0.6 hectares adjoining the Mangapepeke Valley where this will occur. No map is provided of where these areas are located, or performance measures for the expected results, e.g. regeneration of indigenous plant species restores 80% indigenous cover within five years?.

- In Section 4.4.2 it states that other suitable areas exist but no clear indication is given where these sites are, or if in-situ dumping will definitely occur at these locations.

- In Section 4.4.2 *Gahnia pauciflora* and *G. setifolia* are to be salvaged, cultivated and returned to suitable locations. No ongoing monitoring of survival or a target for survivorship is stated.

- Section 4.4.3, regarding logs and debris for steam restoration, mentions that a number of each size of log will be added to the detailed report. Placement of logs in streams for restoration purposes requires performance measures.

- Section 4.4.4 states that weed control on exposed soil mounds will occur every six months. No performance measures are given regarding the degree of weed control to be achieved at the site.

- In Section 4.6.2.4 no performance measure is given for the control of weeds for the period between the exclusion of livestock removal and planting.

- Section 4.6.2.7 states that a 35 year performance measure will be used for the establishment of kahikatea. An interim assessment, at an earlier date, is recommended in case any additional work is needed to ensure this measure is met at Year 35, e.g. additional plantings, additional pest plant control.

- There are no performance measures for Section 4.6.4.5 (exclusion of livestock and feral goats from riparian restoration areas).

- Section 4.8, Table 4.1, states that "Propagules of any threatened or regionally distinctive plant within the project footprint will be harvested and material cultivated from these plants will be returned within restoration planting areas." This requires performance measures based on establishment success.

- For Section 7.4.7, the lizard release site, performance measures are needed for the level of pest animal control achieved, and the integrity and effectiveness of all fencing. These performance measures should specify the timeframe for which this area will be managed. Pest control should include control of hedgehogs within the release site.

- Sections 11.5.1 and 11.5.2 refer to plague skink and Argentine ant introduction and subsequent eradication. These require appropriate performance measures (e.g. eradication is attempted for all new invasions during the construction phase).

Technical report 7e (Avifauna) does not include performance measures for the kiwi exclusion fences (Sections 4.3.2 and 4.5.1.3).

In contrast to previous sections (e.g. 4.6.4.8), Section 4.6.5 does not include performance measures for addressing significant tree loss. An appropriate performance measure for plantings to address significant tree loss would be:

- For each significant tree felled, 200 saplings of the same species are present within areas of indigenous plantings 10 years following planting.
- 90% of these saplings are in good health, have grown in height at least 50 centimetres, and are either two metres tall or are emergent above the height of surrounding competing vegetation.

Section 4.7 specifies that the maintenance period will be up to six years. The maintenance programme needs to be continued until the agreed performance measures have all been met.

## 3.20 Effects of road construction on bats

In Section 4.6.4.3, site preparation for riparian plantings refers to willow removal. Willow (*Salix* sp.) can be important bat roost trees, and any willow removal will need to be subject to a bat management plan, and approved vegetation removal protocols. Removal of any vegetation related to the project will need to be subject to vegetation removal protocols, or alternative measures of control utilised (e.g. poison willow trees and leave standing).

In the summary of potential effects of bats (Section 5.6), the applicant fails to list mortality through vehicle strikes as an effect. As this effect will occur for the lifespan of the road, it could be a significant and ongoing effect.

In Section 5.7.1, vegetation removal protocols cannot "avoid effects on occupied bat roosts" and do not address effects on bats of the loss of unoccupied roosts. At best they will minimise effects by reducing the number of bat roosts felled while bats are in residence. The Applicant has suggested that there may be areas of the proposed project footprint where vegetation removal protocols are not practical. Information on these areas has not been provided. It is also possible that vegetation removal protocols have not been previously applied to a project of similar scale before.

For Section 5.7.2, which discusses high risk roosting trees, a review should be provided of the literature to support >50 cm diameter as a criterion for high risk roosting trees. Bat roosts can be commonly found in trees down to *c.*15 cm diameter. Alternatively, define high risk roosting trees based on the five sub-criteria provided by the Applicant (e.g. bat droppings, hollow trunks), regardless of tree diameter.

Section 5.7.3 discusses lighting but lacks design details, particularly with regard to minimising adverse effects on bats. There is evidence showing that long-tailed bats are less active, and less often detected, in areas with higher densities of street lights (Le Roux and Le Roux 2012). Consequently, given that this area is currently unlit, it should remain so to reduce the potential for unnecessary impacts on bats.

The Bat Management Plan does not address all effects stated as being addressed in relation to bats within the ELMP. These include the loss of unoccupied and occupied roosts, and mortality due to the operation of the road, and the effects of night work and lighting as well as vibration and noise. The Bat Management Plan does not describe the post-construction monitoring that will occur for bats. The Applicant needs to provide this information.

## 3.21 Avifauna Management Plan

Section 6.1.3 lists "Key Threatened and At Risk species of interest for which breeding habitat occurs within the Project footprint" as being brown kiwi, North Island fernbird, and North Island robin. It does not provide an explanation for listing these particular species. For example, two other At Risk species present in the footprint are

not listed: whitehead (At Risk-Declining) and long-tailed cuckoo (At Risk-Naturally Uncommon).

Kōkako are not included on the list and have not yet been recorded within or adjacent to the Project footprint. However, the species is classified as At Risk-Declining, is extremely rare in the region, and is the focus of an intensive iwi-led recovery programme at Parininihi. Most importantly, the Project footprint is well within recorded dispersal distances of translocated birds. Some birds translocated to Parininihi have not yet been re-sighted, and may have dispersed beyond the management area, and further releases are being carried out in 2018. For the reasons above, kōkako should be a key species of interest. Inconsistencies between the likelihood of kōkako dispersing eastwards are also present in Section 6.1.1, which states that pest control may benefit kōkako.

Section 3, which discusses management of effects, is presently limited to kiwi management, and does not address kōkako. Expert discussion on the possible presence of kōkako within the project footprint resulted in a change to the S92 response to Point 94. The altered S92 response now states that monitoring of kōkako will be undertaken at the same time as kiwi monitoring during construction, and advice will be sought if birds are found. However, the S92 response only recognises the event that kōkako are found *near* to the project footprint, and expects that any birds found will either be transient or possibly establishing a territory. The response does not address the possibility that birds are found *within* the project footprint, or that a pair may have already established a territory and nest in the vicinity. These possibilities, while low, should be addressed given the conservation importance of the species in north Taranaki. This subject needs to be addressed in the Avifauna Management Plan.

The section contains no cross-references to other sections that address potential ecological effects on avifauna such as habitat fragmentation and sediment run-off to wetlands (listed in Section 6.2).

Section 6.3.1, methods for kiwi management, refers to the Ecology Constraints Map in Appendix A. This is not included in the ELMP and cannot be reviewed.

The original AEE (Technical Report 7e) stated: "*Temporary fences in selected places along the Project footprint to prevent kiwi entering the construction zone have also been recommended, and will be provided when the Project is constructed".* This should be included within the Kiwi Management Plan and clarified (see also comments in Section 3.1.10).

The Kiwi Management Plan only appears to target territorial adult birds within the project footprint, and does not mention dispersing juveniles. The original AEE (Technical Report 7e) stated: *"The fences would be particularly valuable for protecting dispersing juveniles, which would not be radio-tagged, and could be located within or near to the construction zone at any time".* The Kiwi Management Plan needs to address the issue of dispersing juvenile kiwi.

*Training*: the Kiwi Management Plan does not make it clear whether experienced kiwi handlers will be hired to undertake the work, or if project ecologists/contractors

without experience are to be trained in kiwi handling and monitoring in order to undertake the work. This sentence from the plan: *"Project ecologists and contractors involved in relocating kiwi during construction works will be formally trained in handling kiwi and radio tracking techniques and shall be officially accredited. The Kiwi Recovery Group maintains a register of accredited handlers trained to ensure the welfare of kiwi is the top priority when they are being manipulated in any way".* This may simply be an issue of wording, but care should be taken to ensure that project personnel involved in kiwi handling and monitoring are sufficiently experienced to undertake the work required to a high standard.

*Wetland birds*: the S92 response considers that failure of erosion and sediment controls is unlikely, however, notes that "small slips are common across the wider Project area, even in bush catchments" (Paragraph 93). The response does not answer the question that was asked of the Applicant regarding the effects on local populations of North Island fernbird, spotless crake, and Australasian bittern if failure of controls was to occur. Catastrophic failure should result in restoration of all affected wetlands at a minimum, and possibly compensation elsewhere.

During expert discussion it was noted that the applicant intends to undertake monitoring of the six pairs of fernbird in the Mimi catchment during and post-construction. This should be added to the Avifauna Management Plan.

## 3.22 Lizard management plan

It is noted that the Lizard Management Plan in its current form is to be subject to considerable change following consultation with Department of Conservation and their requirement for lizard salvage to be a key focus of mitigation, with the striped skink (*Oligosoma striatum*) as the prioritised target species. However, in the absence of the updated LMP, the comments below relate to the LMP in its current state.

The plan should be rewritten so that it addresses indigenous frogs, should they be discovered during construction. Whilst their presence is unlikely-based on current information on known ranges, and habitat suitability of areas surveyed by the herpetofauna team - a substantial area of potentially suitable habitat has not been surveyed thoroughly. Exclusion of frogs from the protocols is not justified. The potential for small numbers to be present at levels below detectability thresholds, and within areas that have not yet been accessed, has been acknowledged by the Applicant.

With regards to Section 7.1, how will lizards benefit from restoration plantings (compared with the status quo of not felling habitat), especially considering that some of the restoration plantings are in existing areas of indigenous vegetation that may already be lizard habitat (e.g. mānuka scrub)? Additionally, how can restoration plantings re-create the structural diversity and complexity of micro-habitats which have been formed over many decades and even centuries?

Section 7.3 should be amended to state: "Lizard injury or death, including during <u>vegetation clearance and</u> construction activities".

In Section 7.4.3, the methods for lizard management refer to the Ecology Constraints Map in Appendix A. This is not included in the ELMP and cannot be reviewed. Medium and High Risk trees and/or habitat needs to include areas of early successional vegetation dominated by mānuka and/or kānuka, due to the potential for arboreal gecko species to be found in these types. It is important that important habitat values are considered when assessing the ecological value of vegetation types. This does not appear to have been taken into account at this stage as vegetation such as mānuka and or kānuka scrub has been assigned low ecological value in other parts of the Application.

The Applicant needs to justify why medium risk trees and areas (i.e. patches of mānuka and or kānuka scrub) will not be marked-up on site also, as this has potential for contractors to miss areas if not marked up in the field.

In Section 7.4.4.1 the Applicant has specified the use of 20 Artificial Cover Objects (ACOs) per hectare as the selected density for this device type, however should provide the rationale behind this to justify how this number was selected. The Applicant noted during the teleconference that, in the revised LMP, ACOs are likely to be used only as a supplementary tool to target copper skink (*Oligosoma aeneum*) in their previously-identified habitat. If ACOs are going to be used at a different density, then the rationale for this should also be described.

With regards to Section 7.4.4.3 the Applicant needs to provide further justification why, in the four weeks prior to clearance, a two-night survey of medium or high risk habitats for all areas in the project footprint is adequate, especially given the Applicant's conclusion that lizard populations are very sparse, and at densities below detectability. Additionally, the application needs to provide clarification of whether the protocol is to be a 'two-night survey' or, '20 person-hours of nocturnal searching per hectare', as these are both stated as being the preferred protocol.

It is understood, through discussions with the Applicant, that high risk trees in inaccessible areas have been identified through high resolution drone footage and followed up with ground-truthing. Confirmation of this should be provided in the revised LMP, or clarification if this is not the case, as to how 'any high risk trees' are to be identified as clearance progresses throughout the footprint?

Trees deemed unsafe to access are to be 'stockpiled adjacent to lizard habitat'. It needs to be confirmed where this will be, and how these stacks will be managed eventually for skinks that may take up residence whilst geckos disperse? Provisions should be included for log stack deconstruction to be supervised by a herpetologist prior to chipping, noting the potential for striped skink to take up residence.

For Table 7.1, the Applicant needs to add a prediction of what habitat and vegetation types are likely to be included in each habitat risk class listed in the table.

For Section 7.4.7, it was noted during consultation with the Applicant, that the 'soft-release pen' is likely to become a 'mouse controlled lizard sanctuary' with a 'leaky fence' design to allow lizards to emigrate. Justification needs to be provided that a 400 $m^2$ pen (i.e. 20 m × 20 m) is adequate for a release site and soft-release pen. If this size is to be changed in the revised LMP, please provide the rationale behind pen size

selection. For example, the Applicant could refer to the sizes of release pens for other projects with a similar extent of vegetation clearance.

Whilst it is acknowledged that there are challenges with post-translocation monitoring, not all useful measures require density comparisons before and after construction. For example, geckos may be individually identified by photographs, with follow up monitoring to assess survivorship of a few selected animals for each gecko species. The Applicant could also consider an assessment of occupancy rates for enhanced and/or newly-created habitats, which at the very least would confirm whether lizards are utilising created habitats.

The application states that 'if required, a soft release pen will be constructed'. Please explain what the determinants are for this being required? It is understood from the teleconference discussion that one of the triggers will be the discovery of green gecko (*Naultinus elegans elegans*) as there is evidence of this as a successful translocation strategy for the species. Please include this information in the revised LMP, along with any other likely triggers selected for use.

The soft release pen design proposed specifies that mesh will be pinned, however rodents are known to burrow, and the standard is to trench the skirt into the ground. Please consider trenching, or provide an option to account for rodent burrowing potential.

How will the area selected for the pen be assessed in terms of its capacity to take on specified numbers of lizards (i.e. "at least 40 copper skink, or up to 100 animals") when no preliminary density assessment will be undertaken to determine resident species/numbers of lizards? Please clarify how the number of lizards to be released into each pen will be determined, or, provide a methodology to assess the species composition and population densities in the revised LMP.

Table 11.2 provides protocols for management of plague skink, if they are found at the site. The Application discusses possible fencing and signage 'until eradication has taken place', which may be possible if they are detected at the time of initial introduction. However, as no eradication protocols have been tested or proven for plague skink, the effort should instead be focused on measures to reduce the risk that they are introduced to the site.

## 3.23 Freshwater Ecology Management Plan

The key issue with the Freshwater Ecology Management Plan is the lack of alternatives if landowner permission is not granted to plant along some (or all) sections of the Mangapepeke Stream and Mimi River. The total stream length to be restored cannot be confirmed until the offset reaches are known (and assessed). It could significantly change if there are changes in the width of the finalised restoration reaches. However, progress had since been made on confirming the availability of suitable restoration reaches in the project area. During the teleconference held between the freshwater experts on 6 April 2018, Brett Ogilvie and Keith Hamill mentioned that the Alliance was in the process of negotiating with local landowners about stream use, and it is likely that approximately nine kilometres of available stream length will be confirmed shortly.

It is important that any tributaries earmarked for restoration purposes do not already have indigenous woody vegetation along their riparian margins, i.e. there needs to be a clear benefit as a result of restoration works.

Ecological gains will be higher if restored reaches are contiguous with forested areas rather than being planted in isolation. Post-teleconference, it is our understanding that this is being sought by the Applicant.

A detailed map(s) should be included in the ELMP that clearly marks the location and length of each of the proposed offset reach. It was noted in the teleconference (6 April 2018) that a revised ELMP would be provides before the hearing, which will include these maps.

With regards to Section 4.6.4.6, pre-planting monitoring should be undertaken to determine if pūkeko occur in high numbers. Control by shooting may be required.

With regards to Section 4.6.4.8, the performance targets for riparian restoration are: 80% indigenous plant cover from one metre inside the fence line (i.e. out of cattle browsing reach) to the top of the bank or to the water's edge, whichever is appropriate for planting, 10 years following planting.

Eighty percent plant cover can - and should - be achieved within 3-5 years after planting with appropriate management. This should be a condition of consent. It was noted in the teleconference (6 April 2018) that the timeframe for post-planting management would be addressed by Roger MacGibbon.

With regard to Section 8.3.2 (Sediment control - kahikatea swamp forest), the raupō reedland provides only a partial buffer to the swamp forest. Along its northern boundary, most of the swamp forest is bounded by steep terrestrial forest, and the swamp forest is highly vulnerable to failures of sediment controls. This issue was discussed during the freshwater teleconference (6 April 2018) and the Alliance experts are confident that with the implementation of the erosion and sediment controls in the CWMP and the SCWMP (once developed), the likelihood of excess sediment affecting the swamp forest is very low. It was emphasised by Keith Hamill that the catchment already receives relatively large volumes of sediment due to the topography and geology. In addition, monitoring will be undertaken during construction in order to detect increased levels of sediment, although a baseline will need to be set prior to earthworks commencing.

One issue that has recently come to light is the timing of the earthworks. It is our understanding that the Alliance is seeking to undertake works during winter (C. Stewart, Southern Skies Environmental Ltd, pers. comm., May 2018.). This poses significant risks with regards to sediment and erosion control, and fish spawning.
The topographical and geographical constraints of the project area, together with the high average annual rainfall, means that sediment and erosion control will be particularly challenging during winter, and will increase the likelihood of excess sediment loadings in freshwater receiving environments.

Various indigenous fish species are known to spawn in autumn-early winter, including kōaro, giant kōkopu, banded kōkopu, shortjaw kōkopu, common bully, and redfin bully, which leaves them vulnerable if in-instream works were to be carried out in winter. It is noted in Section 8.3.4 (Fish passage) of the ELMP that "timing of online stream diversion works to avoid peak fish migration and spawning seasons as practicable" and that "Priority will be given, where practicable, to avoiding works during peak migration period (August to December inclusive)". To avoid the spawning and migration periods of most of the indigenous fish species present, in-stream works should be avoided from **May to December** inclusive.

## 3.24 Pest management plan

For Section 9.2, the Applicant needs to provide evidence, based on research and robust monitoring undertaken in New Zealand that a 1000 hectare area of pest control will result in long-tailed bats increasing in number. This assessment should also consider other adverse effects of bats for the project, e.g. loss of roost trees, increases in lighting, habitat fragmentation. Other studies of the effects of predator control on long-tailed bats have taken place at locations removed from the effects of infrastructure (e.g. the only key change was a positive reduction in pest numbers). Presumably, where there is a positive influence (predator control) and a negative effect (loss of roosts), a greater area of pest control would be required to result in an increase in the bat population.

It remains uncertain whether the area where pest control is proposed to take place is similar to the project area in terms of species presence, prevalence, and distribution. As it stands, it is also likely that the proposed pest management will not include the control of mice or introduced wasps. Both of these can have significant adverse effects on indigenous biodiversity, and populations of both mice and wasps may increase due to the effects of construction, e.g. edge effects creating more favourable habitats for these pests.

The size of the area is also small for the management of a minimum viable population of North Island brown kiwi. Basse and McLennan (2003) suggest 11,000 hectares, to take account of the significant natal dispersal distances of brown kiwi of several kilometres. It is not clear whether the proposed Pest Management Area will sustain increased numbers of kiwi in the long term (see further comments below regarding outcome monitoring objectives).

In Section 9.2, how is increased "abundance of habitat" to be achieved for the project, given a net area loss of indigenous habitats, the loss of key ecological features such as emergent trees, and net loss of stream habitats?

As previously discussed, the likelihood of "rapid recovery" of possum-palatable tree species cannot be assessed without quantitative evidence for their current state of health. Similarly, no evidence is provided to support the claim that, in the Paraninihi block, diversity and volume of forest regeneration is far greater than the unmanaged forest to the east of the existing road.

Section 9.2 again refers to spill over effects for bats. As discussed previously in this review, and former reviews, there is little if any evidence that this is relevant to bats.

In Section 9.7 the Applicant needs to describe the financial mechanisms that will be put in place to ensure ongoing availability of funds for pest control in perpetuity.

Section 9.5.3.2, which describes outcome monitoring within the PMA, states that the "purpose of outcome monitoring for bird species is to provide sufficient evidence that the stated benefits of the pest control programme on those species affected by the project will be achieved". The "will be" should be changed to "are".

The plan states that monitoring will focus on tui, bellbird, kererū, and kiwi. There is no reference to fernbird and robin, which are listed as key species of interest (Section 6.1.3 above).

The plan sets a single performance target for the four forest bird species of a 20% increase in relative abundance within 12 years of road construction. The plan intends to use existing five-minute bird count stations and nocturnal kiwi call locations to monitor the four species which is appropriate. Kiwi monitoring is to be undertaken for 12 years, but forest bird monitoring is to be undertaken for up to 12 years. These should presumably be the same.

Section 9.5.3.3, adaptive pest management response to monitoring targets, states "In the event that…more than one of the biodiversity outcome monitoring targets are not met, for reasons associated with the impact of pests or the effects of the road, the pest management programme will be reappraised…" It is not clear from this statement whether the four bird species represent a single biodiversity outcome target, or four separate targets. If the latter, this indicates that it will be acceptable for a single outcome target to not be met; for example, for no improvement in kiwi counts to be observed. This possibility does not match with the final sentence of the paragraph which indicates that management methods will be adapted until all biodiversity indicator targets have been met. The latter approach is appropriate.

It is recognised that some best practice pest control methods undertaken by the Department of Conservation sometimes do not produce the outcomes expected for key faunal elements (for example, intensive stoat control for the rarest kiwi species, rowi, failed to significantly reduce the impact of stoats on productivity), and unforeseen events can potentially affect results (such as severe weather or disease). Because of this, the approach to managing outcomes needs to not only be adaptive but also needs to be flexible if it is shown that achieving a particular outcome is not possible. Decisions regarding the adequacy of the adaptive management approach, and any alterations to proposed management tools, approaches or outcomes, should be made by independent experts, based on annual reports on pest control operations and outcome monitoring results.

However, improvement in kiwi abundance is a key outcome for mitigation and may require a considerably larger area for pest control, and/or different strategies such as the introduction of young birds (if the existing population is largely old with lower reproductive abilities), or Operation Nest Egg, to achieve the stated 20% increase.

It is noted that during conversations with the Alliance herpetologist that pest control efforts are to also extend to a 'pest animal exclusion pen' as part of a compensation

and mitigation package addressing effects on indigenous lizards. The compensation component specifically is to address the significant proportion of habitats to be removed that will not be safe or accessible for herpetologists to undertake salvage work in. Please provide details on the methodology (including site selection and size quantification based on a 'like for like' ratio) to be used within this area, with specific focus on mice, hedgehogs, and rats. The description should include management tools including habitat enhancement, and measures against which success can be assessed, i.e. pre- and post-translocation monitoring.

It is also noted that significant uncertainty remains around the benefits of large-scale, mainland pest control to declining herpetofauna populations. Given this uncertainty, the use of pest control outside of the exclusion pen (where herpetofauna population improvements cannot be measured), should not serve as the significant measure of success with respect to mitigating the impacts of the project upon herpetofauna in the wider area. In this sense, it would be preferable to have multiple pest animal exclusion pens installed in a variety of habitats throughout the wider area so that the compensatory nature of these areas can be quantified (or a much larger fenced pest-free enclosure with a variety of habitats).

## 3.25 Overview of key issues for the proposed ELMP

### 3.25.1 Ecology Constraints Map not provided

The Ecology Constraints Map (Appendix A) is referred to throughout the ELMP and is critical for understanding where different components of the ELMP will be implemented. Appendix A is not included in the document.

### 3.25.2 Mitigation plantings in areas of existing indigenous vegetation

Some areas of mitigation plantings are proposed for areas of existing indigenous vegetation, but these areas are not mapped separately, and cannot therefore be quantified or located from the reporting provided. No meaningful gains will be made by plantings in these areas, when the road by default will exclude livestock from these areas, and pest control in the wider area will facilitate regeneration. Given that the ratio for mitigation plantings is a low 1:1, and some of these areas are already indigenous vegetation, there will be a net loss of indigenous vegetation and habitats due to the project, and the loss of early successional vegetation is not adequately addressed. To count as mitigation, any plantings must create additional habitat and the Applicant should clearly map where these gains will be made.

### 3.25.3 Potential for substitution of species

The planting of 200 seedlings for each significant tree to be felled is one of the key components of the Applicant's mitigation package. However in the ELMP they note that the species of these may be substituted for other species, if the planting sites are not suitable. This gives little reassurance that this mitigation measure will occur, or be successful. The Applicant should provide performance measures for every component of the mitigation package, including significant tree plantings.

### 3.25.4 Exclusion of canopy trees from significant tree definition

As previously noted, there is also little justification for the exclusion of many tree species from the "significant tree" list. If the criteria for significant trees were to be applied consistently by the Applicant, at least seven more species would be added to the 11 listed. Inclusion of these seven additional species would add hundreds, and probably thousands, of trees to the number of "significant trees" to be felled.

### 3.25.5 No monitoring of bats during or post-construction

The application does not include any during or post-construction monitoring for bats to determine whether there are outstanding effects of road construction, or operation, on the activity, behaviour, or population size of either long-tailed or short-tailed bats and whether these effects are/can be addressed by mitigation. The reporting proposed in Section 5.7.4 is also minimal. This is despite effects of roads on long-tailed bats being recently confirmed by research (Smith *et al*. 2017a). Other large scale roading projects in New Zealand (e.g. the Huntly Section of the Waikato Expressway) have adaptive management requirements for bats.

The ELMP states (pages 13-14): "research suggests that measurement of no net loss for long tailed bats, lizards, and invertebrates may not be possible (refer to the monitoring section in Chapter 9 of this ELMP). This is not necessarily because the proposed measures will not result in a beneficial effect, but because the monitoring methods available are not necessarily able to detect it." This opinion is not supported. There are methods available to measure population status and survivorship, including capture-mark-recapture studies. The Applicant should explain what they mean by the statement that "the monitoring methods available are not necessarily able to detect it" and reference the research that they are relying on.

Part of the justification for a lack of post-construction monitoring has been that the effects of predator control on bats are well-known. However, predator control has only been confirmed as sufficient to increase survivorship of long-tailed bats and consequently population size, when it takes place over larger areas than are proposed (i.e. greater than 3,000 hectares) , O'Donnell *et al*. 2017 (p. 163) found that:

> "long-tailed bat population growth rate was positive in the three study-colonies ($\lambda$= 1.05−1.09), with rat control using bait stations once the management area was sufficiently large (> 3000 ha; 2009/10, 2011/12)".

In contrast, rat control over smaller scales (e.g. 650 hectares) did not result in a discernible benefit, with survival similar to years with no predator control. This was attributed to immigration of rats back into the pest management area, and, post-control in late winter, recovery of rat numbers by November, when females form colonies and prepare to give birth (O'Donnell *et al*. 2017).

The disparity between the size of the area that is proposed, and the area over which predator control is known to support increases in bat populations, means that effects on bats may not be adequately addressed. Additionally, the pest management plan should ensure, through the frequency and timing of pest control operations, that rat

numbers will be sufficiently reduced at critical times of the year for bat populations. This will not be able to be determined with confidence without robust monitoring.

### 3.25.6 Unsupported or misleading statements

The application continues to make unsupported or misleading statements regarding the likely benefits of the project. It is stated that the application uses "best available science and the professional opinions of faunal experts" to support conclusions, but the science referred to is rarely, if ever, referenced. The application refers to fully forested valleys and the elimination of forest edges as being an outcome of this project, which will place a new road through an existing forested valley, creating substantial new edges. The extent of proposed pest control is at the lower end of spatial extent required to provide benefits for bats (based on best available science) for a site *without countering adverse effects*, e.g. loss of tree roosts, habitat fragmentation.

### 3.25.7 Lack of detail regarding location of mitigation sites

The ELMP is still largely conceptual due to uncertainty around land ownership and the location of restoration sites. This creates considerable uncertainty with regards to the likely conservation outcomes, and whether they do actually address the adverse ecological effects of the project.

This is a key issue for aquatic habitats. The total stream length to be restored cannot be confirmed until the offset reaches are known (and assessed). It could change significantly if there are changes in the width of the finalised restoration reaches. It is important that any tributaries earmarked for restoration purposes do not already have indigenous woody vegetation along their riparian margins, i.e. there needs to be a clear benefit as a result of restoration works along streams. A detailed map(s) should be included in the ELMP that clearly shows the location and lengths of each of the proposed offset reach.

### 3.25.8 Performance measures inconsistent or absent

The performance measures proposed will not consistently provide a measure of mitigation success. Meaningful performance measures should be designed that will assess success for all components of the proposed mitigation package. Performance measures should also ensure that they are not met at the outset, with no input required, to ensure that the mitigation proposed will result in meaningful, additional, and quantifiable, ecological gains.

# 4. REVIEW OF RESPONSES TO S92 INFORMATION REQUESTS

The Applicant responded to S92 requests from New Plymouth District Council on 6 April 2018. Most of these S92 requests sought either clarification or justification for the views held by the Applicant, or supporting evidence. The responses by the Applicant included the following:

- Responses that include new errors of fact that may have influenced the Applicant's assessment of effects, e.g. Point 62, which states "there are not any freshwater wetlands dominated by indigenous species within the footprint".
- Requests to provide evidence or case studies to support a statement, with the response being a reference only to an opinion, e.g. Points 65, 68, 78, and 80.
- Responses that have no scientific basis, with this being acknowledged by the Applicant during the teleconferences, e.g. Point 80.
- A request for the Applicant to provide further evidence to support a statement, with the response being a reference to a publication that contradicts the view of the Applicant, e.g. Point 87, in reference to the minimum size of a pest control area needed to provide benefits for bats.
- Responses that do not answer the question posed in the S92 request, e.g. Points 89, 99, and 104.
- A request for a factual error to be corrected, with the response being acknowledgement of that error, but no plan for its correction, e.g. Point 77.
- Responses that refer the reader to the relevant section of the Ecology and Landscape Management Plan, e.g. Point 84. This has been reviewed in Section 3 of this report.
- A misleading response. Clarification was sought as to whether the proposed pest management plan also included control of wasps, due to their known impacts on invertebrate species. The S92 response (Point 113) stated that the pest management plan includes predatory species. When questioned in the invertebrate teleconference (Tuesday 8 May) as to whether this includes wasps, the response from the Alliance was that it does not. The proposed pest management plan also does not address mice.
- Responses that refer the reader to other documents that have not yet been provided, e.g. Point 90, the Ecology Constraints Map.
- Responses that acknowledge that the mitigation package is reliant on adjacent areas of existing conservation management to "form a significant contiguous pest controlled area", e.g. Point 85.
- Responses that confirm that the wording of the assessments at times understate ecological effects, e.g. describing trees within the footprint as "pole[1] kahikatea" when Point 58 notes that the trees include individuals 60-70 cm diameter.
- Disagreement with the view posed in the S92 request, e.g. Points 54, 61, and 91.

Overall, the responses provided further highlight the considerable weight placed by the Alliance ecologists on opinions as supporting information, when a project with a construction footprint of this scale and nature should have a mitigation package based

[1] Usually defined as trees 10-25 centimetres diameter http://www.wvfa.org/pdf/sfi/Glossaryofforestryterms.pdf

on evidence. Where further evidence or supporting case studies to support an opinion have been requested, but not provided, it raises the concern that the opinions being provided are not supportable.

The S92 responses also draw attention to various key outstanding issues, where Alliance ecologists remain in significant disagreement with ecologists acting for New Plymouth District Council.

# 5. SUMMARY OF MAJOR OUTSTANDING ISSUES

## 5.1 Overview

Most of the key issues in the Application were identified in the two previous reviews of the reporting (Wildland Consultants 2017a, b), which were provided to the Applicant. These are repeated here if they have not been addressed in the Ecology and Landscape and Management Plan, or in the S92 responses provided by the Applicant.

## 5.2 Understatement of ecological values

Assessments of ecological effects provided by the Applicant frequently understate ecological values. This is a result of either inappropriate grouping of vegetation or habitat types (e.g. including an area of kahikatea-swamp maire forest within an ecological values assessment of kahikatea forest, so that it is ranked as "High" not "Very High"), or not considering the fauna values when assessing the values of a vegetation type (e.g. ranking mānuka scrub that is gecko habitat as "Low"). Each Alliance ecologist has provided a stand-alone assessment of effects for their respective specialist field, without the expected cross-over and integration required to assess the full significance of ecological effects associated with this project. A single coherent integrated assessment of ecological effects has not been provided by the Applicant. An assessment of ecological effects, by definition, should consider all of the biotic and abiotic components of the site as a whole and how they are to be affected and addressed.

## 5.3 No quantitative data to support claimed poor condition of forest to east of SH3

A key commonality between the specialist reports that comprise the Application (with the exception of the aquatic assessment) is the argument that the eastern block is of lower ecological value due to the relative lack of pest animal control to the east of SH3 (relative to the Parininihi block, to the west of SH3, that has had 15 years of pest control). Whilst this difference in pest control history may be an appropriate generalisation for the route as a whole, it is problematic for the Application for the following reasons:

- The lack of evidence presented regarding the relative forest condition of the tracts to the east and west of SH3. Field observations on 19 September 2017 indicated that at least northern rata to the east of SH3 (a browse-sensitive species) are in good health. The Applicant also notes that at least one area within the project area to the east of SH3 is in high ecological condition and of high ecological value.

- The Applicant also recognised in the draft assessment that further field work is needed to determine baseline forest condition (Vegetation report, Section 5.6).

- Quantitative data on differences in forest condition and tree health between the eastern and western sides of SH3 has still not been provided (e.g. foliar browse index, seedling ratio index), and is critical for justifying the mitigation approach taken by the Applicant.

- Referring to "the potential increase in vegetation condition" (S92 response, Point 68) without providing supporting data, means there is little assurance that the current vegetation is in poor health, and therefore has the potential to improve.

- The temporal nature of the assessment, given that the health of the forest to the east of SH3, if it is notably degraded, could be rapidly improved within 5-10 years if a pest control plan was implemented.

- The considerable weight that is being applied to differences in forest condition and health, as assessment criteria, is therefore dubious and is not supported based on the lack of information provided to date.

## 5.4 Lack of consistency within and between the Applicant's specialist reports

Significant inconsistencies still remain in the reporting provided to date. These inconsistencies need to be addressed by the Applicant to ensure that the ecological values assigned to habitats are accurate as an appraisal of the habitat as a whole (e.g. collectively considering vegetation, flora, and fauna values of each habitat type), and to ensure that the proposed mitigation package is likely to achieve no net loss of biodiversity values.

All ecologists acting for the Applicant should review all components of the ecological reporting. This would help to identify both internal conflicts in the proposed mitigation measures (e.g. the potential for weed control to remove bat roosts), and also where methods can be revised to achieve better outcomes (e.g. how might restoration plantings be designed to result in vegetation of high value as bat habitat?). As of 11 April 2018, it appears that cross-discipline review or collaboration between Alliance specialists has not occurred, or at least been very limited, e.g. the Alliance bat specialist stated in a teleconference that he had only been commissioned to provide input into the bat management section of the Ecology and Landscape Management Plan.

## 5.5 Net loss of indigenous vegetation and habitats

In Section 4.6 the total area of 'offset and mitigation planting', including riparian planting, is stated as 31.58 hectares. However, this includes planting into existing areas of indigenous vegetation at some sites. As the total area of indigenous vegetation to be lost is 31.28 hectares, there will be a net loss of indigenous vegetation on an area basis. The mitigation package should, as a minimum, ensure that there is no net loss on an area basis. This will require all plantings to be undertaken at sites that are not currently indigenous vegetation.

The Application also fails to consider the lag time between restoration plantings and the establishment of vegetation of similar composition, structure, and habitat value to the considerable area of vegetation to be lost. Normally this would be addressed by planting a larger area than the area to be lost, with this ratio considering the likely number of years/decades required to reach equivalence. The application does not do this, and uses a basic and minimalistic 1:1 replacement ratio for all vegetation loss to be addressed by plantings. Some of the forest vegetation is very old, probably centuries, and a minimum ratio of at least 1:2 would be expected (even that would be very conservative).

## 5.6 Mitigation that is not 'like for like'

The Applicant states that planting 200 seedlings for each "significant tree" felled is a one of three measures to address the residual ecological effects of the project (Ecology and Landscape Management Plan Section 3.5.4). Technical Report 7h Section 3.3.2 states that these will be of the same species as trees removed, but Section 4.6.2.3 of the Ecology and Landscape Plan states that if these species fail due to hydrological reasons such as excessive flooding, "species more suited to the conditions will be planted". This could mean the plantings fail to meet the principle of "ecological equivalence' described by the Applicant in Technical Report 7h Section 2.1.2. To ensure ecological equivalence the Applicant should ensure that appropriate planting sites are available for each of the significant tree species affected. Furthermore, even if the same species are used, the ecological functions of mature trees are orders of magnitude greater than the seedlings and saplings to be provided, and it will take hundreds of years for plantings, if they survive, to achieve similar ecological functioning.

In a teleconference on 1 May 2018 between Wildlands and the Alliance, Mr MacGibbon stated that the significant tree plantings would be of the same species as those felled, and that he wasn't aware of the clause that allowed substitution. The Alliance agreed that this was an error, and would be corrected.

## 5.7 Pest management approach unlikely to meet required mitigation outcomes

In the draft Assessment of Ecological Effects, and the ELMP, the Applicant places considerable weight on pest management to address the adverse effects of road construction on vegetation and habitats, herpetofauna, lizards, birds, bats, and invertebrates.

Whilst it is agreed that pest management could and should form a key part of the mitigation package, the small scale at which it is proposed is not supportable. Furthermore, the statement made in the draft assessment, that the biodiversity offsetting area "currently receives very limited ecological management" (Technical Application 7h, Section 4.2.2) has been deleted in the Application without explanation. The Application should provide sufficient evidence that areas to be brought under active management as part of the mitigation package are currently unmanaged, to show that the proposed gains are real and additional, and would not have occurred if not for the Project.

The area of pest control proposed now totals 1085 hectares, comprising a core area of intensive pest control of 230 hectares and a buffer. This falls well short of the pest-controlled area likely to result in significant positive benefits for bats (greater than 3,000 hectares, as discussed in Section 3.25.5 of this report). In the teleconference with the Alliance on 11 April 2018, the Alliance bat specialist also noted that achieving an area of pest control of 3,000-5,000 hectares would be ideal, but isn't feasible. This was attributed to the limited extent of existing forest adjacent to the proposed pest management area that is not already subject to pest animal control. In this teleconference, the Alliance specialist was asked to describe the degree to which the bat population was likely to be reduced due to the construction of the road, and if so, whether 1,000 hectares of pest control would mitigate for this population loss. The Alliance bat specialist said that they didn't know the answer to these questions, but noted that in their discussion with other parties that the Department of Conservation had predicted that the road would lead to the extinction of one colony/social group, and if this occurred, that 3,000-5,000 hectares of pest control would be needed to offset this.

The area of pest control will only likely result in positive effects for birds as the area would extend the existing area of control that is to the west of SH3, in the Parininihi block. The Applicant's assertion that the core area can be buffered by open farmland is not correct. The current design of the proposed pest management area may therefore have a core area, within which pest animals could be maintained at low densities, that is significantly smaller than the core area proposed by the Applicant.

No post-construction monitoring is proposed for some ecological components of the site (e.g. for bats, lizards, invertebrates) partly on the basis that the relationship between pest control and benefits to indigenous biodiversity is well-proven. Whilst this is correct in a broad sense, outcomes of pest control will be strongly influenced by site-specific variables and the methods used, including extent and timing. Given that most of the mitigation package is dependent on the proposed pest control resulting in ecological benefits, post-construction monitoring should be regarded as essential. Post-release monitoring is recommended in the Application for lizards salvaged during construction (Technical Report 7h, Section 3.6.2.1). Monitoring of planting success is not proposed by the Applicant (Section 3.3.3) but should be regarded as essential. Resource consent conditions should include comprehensive monitoring requirements for all components of the mitigation package.

## 5.8 Use of existing managed areas to achieve mitigation outcomes

The issue of additionality, with respect to the extent of pest management proposed, was raised in the teleconference on 11 April 2018. It was suggested to the Alliance that mitigation to address the effects of the project on bats should be solely attributable to this project in isolation, without reliance on existing adjacent areas of pest management (i.e. pest management for this project should extend over a minimum area of 3,000 hectares, as this is the area that, based on the literature, could result in quantifiable increases for bat populations O'Donnell *et al*. 2017). The Alliance team noted that the proposed pest management area of 1,085 hectares brings the cumulative total of pest controlled area up to 3,000 hectares, and that they are "not claiming credit for the existing areas of control". The Alliance predicted that bringing the total area of pest control up to 3,000 hectares would result in a "declining"

population becoming an 'increasing' population, and that this would create a regional benefit for long-tailed bats (a secure population in the Taranaki Region). The quantum and additionality of the pest control area is a remaining point of disagreement.

### 5.9 Proposed mitigation and offsets package unlikely to mitigate or offset adverse ecological effects

The proposed mitigation and offsets package, as it currently stands, is unlikely to mitigate or offset adverse ecological effects. This is due to the very considerable scale of the adverse effects and the relatively small size of the pest management area, compared to what, based on current knowledge, is likely to be needed to meet the objectives of the pest control. Key limitations of the mitigation and offset package are summarised in Table 1.

Table 1: Assessment of proposed mitigation measures and mitigation objectives against current knowledge or best practice

| Mitigation Proposed by Applicant | Desired Outcome as Stated by Applicant | Mitigation Requirements to Achieve Outcome, Based on Current Knowledge |
|---|---|---|
| 1085 hectares of pest management. | Long-tailed bats increasing in number. | At least 3000 hectares (O'Donnell *et al.* 2017)[1]. |
| 1085 hectares of pest management. | North Island brown kiwi population increasing. | 11,000 hectares to maintain a viable population (Bass and McLennan 2003). |
| 1085 hectares of pest management. | Offset 25.81 hectares of indigenous vegetation loss. | Unknown. Dependent on vegetation condition within area of proposed pest control, and therefore what gains can be achieved. Unclear how pest control can offset loss of low palatability vegetation types (e.g. mānuka-tree fern-rewarewa forest). |
| Mitigation plantings for younger vegetation (8.38 hectares). | One for one replacement plantings (8.38 hectares of plantings). | Ratio of at least 1:2 for vegetation loss: vegetation restored. Mitigation planting sites should not already be indigenous vegetation. |
| Offset plantings for swamp forest/ kahikatea (6 hectares). | Restoration plantings to address 1.32 hectares of loss. | Possibly acceptable if accompanied by appropriate performance measures. |

## 6. ADDITIONAL REQUIREMENTS FOR MITIGATION AND OFFSET MEASURES

The following additional mitigation and offset measures would substantially increase the likelihood that the adverse ecological effects of the project could be addressed:

- Increase the extent of pest management to a minimum of 3,000 hectares, additional to areas of existing pest animal control. Timing of control pulses for

[1] O'Donnell *et al.* 2017 noted that smaller areas of pest control didn't result in quantifiable benefits for bats.

pest control should aim to achieve a significant reduction in rat numbers for the times when long-tailed bats are most vulnerable, e.g. in November.

- Plantings to ensure no net loss in area of indigenous vegetation, with a minimum of 1:2 loss to replacement ratio for all scrub/shrubland/forest habitats.
- Restoration of hillslope forest to offset the loss of 19.85 hectares of hillslope podocarp broadleaved forest (possibly by fencing and retirement from grazing of a much larger area).
- Define significant trees as per the Applicant's three point definition, with 200 seedlings of each of these species planted.
- Retro-fitting any existing perched or broken culverts along the route to facilitate upstream fish passage.
- Adequate measures to reduce the mortality of kiwi due to vehicle collisions.

# 7. FURTHER INFORMATION REQUIRED

The following information is requested as part of the hearing evidence:

- All missing documentation noted in this report, e.g. Appendix A of ELMP.
- A quantitative assessment of forest condition and tree health to the east of SH3, including a canopy measure (e.g. Foliar Browse Index) and an understorey measure (e.g. Seedling Ratio Index)
- Maps showing existing vegetation types for all areas of proposed mitigation plantings, to determine if these will result in habitat gain, together with the location and extent of the stream reaches proposed for restoration works.
- Details of the location, vegetation types, size, management, and monitoring of the soft-release pen(s) for herpetofauna. Additional information is needed regarding how compensation activities (i.e. creation of rodent exclusion areas and enhanced habitats) will be separate and additional to mitigation activities, i.e. lizard salvage, translocation and pest control. This will need to address the significant areas of habitat where lizard salvage will not be possible/practical, and therefore where a compensation approach needs to be applied. Additionally, this will provide a measure to assess whether mitigation and compensation activities are likely to result in meaningful, long-term gains for herpetofauna.

# 8. REVIEW OF DRAFT DESIGNATION CONDITIONS

## 8.1 General comments

Until the project footprint has been fully surveyed, and extent of loss of indigenous habitats has been accurately quantified, the designation conditions should not state the extent of mitigation works required. Instead, ratios should be stated, so that final extent of loss can be offset by the appropriate quantum of mitigation. This would also recognise the inherent uncertainty in relation to the extent of planting area available.

As a minimum, the consent conditions should stipulate that the project results in no net loss of indigenous vegetation, on an area basis, and that the plantings to replace vegetation loss should be "like for like". All mitigation plantings need to occur at locations where successful establishment will result in an increase in the extent of indigenous vegetation, e.g. exclude all areas of existing indigenous forest, shrubland, scrub, wetlands. The conditions should state that all new plantings should be eco-sourced from the North Taranaki Ecological District.

## 8.2 Designation Condition 24

With regards to the how the ELMP will address ecological values, (a) vegetation/ habitat (including wetlands) should specifically also include Threatened, At Risk or Regionally Significant plants.

The ELMP needs to include indigenous invertebrates in the list of ecological values to be addressed.

The designation condition refers to "herpetofauna (lizards)", which therefore excludes frogs. All designation conditions regarding herpetofauna should refer to both lizards and frogs, by using the term herpetofauna. Additionally, the term 'offset' should be added to 'avoid, remedy or mitigate' in the herpetofauna management plan to address the areas where mitigation will not be possible.

The designation condition should stipulate that the ELMP will include all of the mitigation measures proposed in the Application, e.g. Section 3.3.2.1.

## 8.3 Designation Condition 25

Proposed conditions for the ELMP (25a) state that the mitigation shall include the pest management measures referred to in Condition 28, which is now proposed to cover 1085 hectares. However, the Applicant's proposed pest control fails to meet their own stated objectives, as discussed in Section 13.5 of this report, and may not provide benefits for all of the target fauna species. The ELMP should include a pest management plan that will achieve measurable biodiversity gains, with the area of this to be determined by the area requirements of the indigenous fauna that will be adversely affected by the route. Any core area of pest control should be buffered on all sides, or the area of core pest control should be increased to achieve the required core area. This should also include details for mouse control within the herpetofauna compensation package, i.e. the rodent exclusion pen.

The condition for the ELMP (25b) states that restoration planting should include six hectares of swamp forest and nine hectares with an appropriate mix of plant seedlings. The extent of plantings required should be reassessed once the project footprint has been fully surveyed. The designation conditions need to achieve no net loss of indigenous vegetation, on an area basis, and should stipulate that all mitigation plantings are undertaken in areas that are not currently indigenous vegetation.

The condition for the ELMP (25c) states that 200 seedlings are planted of the same species for each significant tree that is felled. The definition of significant tree should be expanded to include other canopy tree species that are to be felled that meet the

three point definition provided by the Applicant, but are currently omitted from the Application. The designation conditions should require the successful establishment of these plantings. The consent conditions should specify that the species planted are like-for-like, e.g. 200 matai planted for every significant matai felled. The success of plantings should be documented by post-planting monitoring, with appropriate performance measures and contingency actions.

Designation conditions refer to relocation of threatened plants found within the Project Area, but not relocation of significantly affected brown kiwi (as detailed in Section 6.3.1 of the ELMP). A condition should be added addressing the action(s) required if an established kōkako territory/breeding pair was to be found within the Project footprint.

Designation conditions should specify details regarding temporary fences around construction areas, and permanent fences along the new road, to protect kiwi.

## 8.4 Designation Condition 26

Designation Condition 26 lists only three components of the ecological works that are to be monitored. The list should be expanded to include all of the monitoring proposed in the Application (Technical Report 7h Section 3.3.3):

- Monitoring of salvaged lizards post-release (recommended in the Application Technical Report 7h Section 3.6.2.1).
- Monitoring of stream diversions (recommended in the Application Technical Report 7h Section 3.7.3).
- Monitoring of avifauna (recommended in the Application Technical Report 7h Section 3.5.3, and detailed in Section 9.5.3.2 of the ELMP).
- Monitoring of the plant translocation trials (Section 4.4.2 of the ELMP).

Pre-construction monitoring of kiwi and kōkako should be included as a designation condition (Section 6.3.1.1, ELMP), during-construction monitoring of kiwi (Section 6.3.1.2, ELMP), as well as post-construction (or outcome) monitoring of forest birds, kiwi, and fernbird (Section 9.5.3.2, ELMP).

Performance targets for birds should be included as designation conditions (Section 9.5.3.2). The ELMP sets the target at a 20% increase in relative abundance for tui, bellbird, kereru, and kiwi within 12 years. North Island robin should be added to this list (the ELMP states that North Island robin is a key species of interest at Section 6.1.3 of the ELMP).

Designation conditions should require the regular compilation of pest management and outcome monitoring reports (e.g. annual), which documents the results of outcome monitoring, and proposes alterations as required to achieve performance measures. Relevant independent experts should be involved in reviewing any refinement, alterations, or extensions to management, particularly when outcomes are not being achieved.

Post-construction monitoring of bats should also be included as a designation condition, in line with best practice for major roading projects. Post-construction monitoring is recommended by the recently published NZTA framework document (Smith *et al.* 2017c) in order to determine the effectiveness of mitigation measures, and the Opus (2017) mitigation-focused report for this project suggests that monitoring will take place: *"to determine if the target outcomes [*of predator control*] are being achieved (Section 4.4.2 Page 36)".* Consideration should also be given to carrying out fish surveys in the headwater tributaries upstream of new culverts to help determine if the new culverts are providing adequate fish passage.

Post-construction monitoring of translocated lizards into 'soft-release' pens and monitoring of resident lizard density responses within additional rodent exclusion areas should be included within the plan. These are critical assessment criteria for both mitigation and compensation activities.

Post-construction monitoring of translocated *Gahnia* species should also be required (Section 4.4.2 of the ELMP). This is the only measure proposed to protect habitat for the forest ringlet butterfly (At Risk-Relict), should this species be present, and shifting of *Gahnia* species is often prone to establishment failure. The Designation Condition should require an assessment of the extent of *Gahnia* species within the project footprint, and specify the number or percentage of existing plants to be translocated, with an appropriate performance measure, e.g. 80% survival one year post-translocation.

Designation Condition 26 states that pre-construction vegetation monitoring will be undertaken to provide detailed baseline information on vegetation condition. As the core focus of the Applicant's mitigation package is improvement of forest condition, by the implementation of a pest management plan, it is critical that this Designation Condition also requires post-construction monitoring of vegetation condition. If vegetation condition then does not improve, the mitigation package has failed to meet its objectives, and alternative means of mitigating effects will need to be implemented.

Designation conditions should also incorporate the restoration of wetlands affected by failure of sediment or erosion controls.

## 8.5 Designation Condition 27

The draft consent conditions require planting to occur within three planting seasons of completion of works. The critical outcome here is not the planting itself, but the successful establishment of these plantings.

The designation conditions should be expanded to require maintenance of all plantings until canopy closure[1] with indigenous species has been achieved. Maintenance should be continued until restoration area targets have been met, including until 200 trees for each significant tree felled (subject to the larger list of what comprises a "significant tree") have successfully established. This could be

[1] Canopy closure could be defined in the consent condition as 85% cover by indigenous species.

defined as the significant tree plantings increasing in height by at least 0.5 metres, and reaching an average height of two metres.

### 8.6 Designation Condition 28

As discussed in Section 14.3 above, the pest management plan should be redesigned once the ecology of the project footprint, and of the proposed pest control area, has been fully surveyed. The Applicant should confirm the suitability of the pest control area to support the flora and fauna to be adversely affected by the project. To ensure that the objectives of the pest control have been met (e.g. benefits to herpetofauna and invertebrates), the core area of intensive pest control should include all introduced mammals, including mice, and wasps. Timing of pest control pulses should consider the timing of when these should be implemented to achieve the greatest ecological benefits, e.g. protection of maternal roosts for long-tailed bats.

To avoid ambiguity, "controlling at low densities" should be rewritten as "controlling to low densities". What constitutes "low densities" should be defined for each target species and stated in the designation conditions. In some cases these can be based on the Residual Trap Catch or hunter kill rates for target species that, when achieved, are known to lead to measurable benefits for indigenous biodiversity.

## 9. CONCLUSIONS

At this stage, a full assessment of the ecological effects of the proposed works cannot be completed. The Application still includes missing documentation, such as the appendices for the Ecology and Landscape Management Plan, and the Applicant has noted, in recent communication, that some aspects of the reporting will be significantly revised following stakeholder consultation.

That said, evaluation of the existing documentation, as it stands, continues to raise significant concerns that are unlikely to be adequately addressed by the Applicant. Many of these issues have been raised in this review and in two previous reviews of the earlier documentation, i.e. the draft assessment of ecological effects. These outstanding issues mean there is little assurance that significant adverse ecological effects will be meaningfully addressed.

The Application continues to place a heavy reliance on the implementation of a pest management plan to address the identified adverse effects of the proposed road. This remains very problematic for four key and interrelated reasons:

- Based on currently available research findings, the area of pest control proposed is too small to result in the prescribed outcomes for that pest control, e.g. a population of long-tailed bats that is increasing in size.
- The current pest management area does not include the control of wasps or mice, and these are likely to increase at the site due to the effects of road construction.
- Little or no monitoring is proposed to document the outcomes of pest control on indigenous fauna.

- The Application does not provide any quantitative evidence for the current condition/health of the forest in which pest control would be undertaken, and therefore the magnitude of ecological gain that could be made by implementing pest control. This quantitative evidence, and the importance of it, has been noted in all previous reviews of the Application. Without firm evidence of the current suggested poor state of the forest, and a pest management plan that is likely to result in measureable gains for the affected flora and fauna, little weight can be given to the mitigation proposed.

Over-reliance on the pest management plan to address adverse effects could have been addressed through the restoration of habitats to replace areas of vegetation loss, on a like-for-like basis. However, this is only proposed for younger areas of vegetation within the footprint (e.g. mānuka scrub) and areas of swamp forest. The maximum ratio used for area lost to area restored is a low 1:1, and some of the areas proposed for restoration planting are already areas of indigenous vegetation. The project will therefore result in a net loss of indigenous vegetation, with respect to both extent and ecological functioning. Any shortcomings of pest control for addressing the loss of older forests will not be addressed by plantings, e.g. the loss of hillslope podocarp broadleaved forest.

The Application also lacks certainty of outcomes due to the omission of performance measures for all components of the mitigation package. All parts of the proposed mitigation package need to be accompanied by a measureable performance measures, otherwise there is no legal requirement for the measures to be implemented. These performance measures need to be drawn together and evaluated as part of an integrated package of works to address the considerable scale of proposed adverse effects.

As noted in previous reviews, the Application continues to rely heavily on the opinions of the Applicant's ecologists to support key conclusions. This, in combination with misleading statements, means the Application understates the likely adverse effects of the project, and overstates the likely benefits of the proposed mitigation.

The Application should be assessed again in full, when the revised documentation has been provided. This should include the missing information, the changes that arise from stakeholder consultation, and the changes that would arise if the previous reviews of the documentation were adequately addressed. As it currently stands, the Application provides little assurance that the project will adequately address the major potential adverse ecological effects of the proposed rerouting of SH3 at Mount Messenger.

## ACKNOWLEDGMENTS

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