BEFORE THE NEW PLYMOUTH DISTRICT AND TARANAKI REGIONAL COUNCILS

IN THE MATTER	of the Resource Management Act 1991 ("the Act")
AND	
IN THE MATTER	of applications from NZTA to alter a designation and for resource consents for the Mt Messenger Bypass Project - SH 3 between Uruti and Ahititi ("the Project")

Laurence Peter Barea

EVIDENCE ON BEHALF OF THE DIRECTOR-GENERAL OF CONSERVATION

(Biodiversity Offsetting and Environmental Compensation)

Dated: 24 July 2018

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1. QUALIFICATIONS AND EXPERIENCE

1.1. My full name is Laurence Peter Barea.

1.2. I am employed as a Technical Advisor in ecology, with a focus on biodiversity offsets, with the Department of Conservation (hereafter termed **DOC**) in Hamilton.

1.3. I have been in my current role since 2012. Prior to that I was a senior environmental consultant with Golder Associates (NZ and Canada) Limited. Prior to that I was an Ecologist and Biodiversity Technical Support Supervisor for the Waikato Conservancy of the Department of Conservation from October 2007 – February 2010. Between 2001 and 2004 I worked as a consulting wildlife biologist in Boise, Idaho on a range of development projects across the Pacific Northwest of the United States of America before moving to Australia in 2004 to undertake my Doctoral research in terrestrial ecology. Between 1996 and 1998 I worked for the Department as a wetland and threatened species ecologist. I have published ten scientific papers in the peer reviewed literature, including on the subject biodiversity offsets. I am a member of the New Zealand Ecological Society.

1.4. I have been an expert witness on biodiversity offsetting in relation to the Hauāuru mā Raki (HMR) Wind Farm, the Hurunui Water Project, Oceana Gold Coronation Extensions (Phases I and II), the Auckland Unitary Plan, South Taranaki District Plan, Queenstown Lakes District Plan, Thames

Coromandel District Plan, Dunedin City Plan, Buller District Plan (proposed plan changes 133 – 145), and the Kapiti District Plan.

1.5. In my current role I provide technical advice to the Director General and associated decision makers on biodiversity offsets and their development and assessment. I also represent the Department on the Advisory Group to the international Biodiversity and Business Offsets Programme (BBOP), and lead the Kokako Specialist Group.

1.6. I am familiar with the proposed route of the Mt Messenger bypass generally, and visited the site in August 2017.

1.7. I have read the Environment Court's Code of Conduct for Expert Witnesses, and I agree to comply with it. I confirm that the issues addressed in this brief of evidence are within my area of expertise.

1.8. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed. I have specified where my opinion is based on limited or partial information and identified any assumptions I have made in forming my opinions.

1.9. My opinions rely in part on the Evidence in Chief presented by expert witnesses appearing for NZ Transport Agency, in particular the statements of evidence of:

a) Mr MacGibbon;
b) Mr Singers;
c) Mr Chapman;

1.10. In addition, in preparing my evidence I have reviewed the relevant documents provided as part of the Mt Messenger Bypass Resource Consent applications including:

a) Mt Messenger Alliance Ecology and Landscape Management Plan, (ELMP).

b) Mt Messenger Bypass Project – Draft proposed designation conditions (Draft Conditions)

c) Assessment of Ecological Effects – Vegetation, December 2017, NSES Ltd, Technical Report 7a (Singers (2017)).

d) Ecology supplementary report – Vegetation, February 2018, NSES Ltd (Singers (2018a)).

e) Mt Messenger Bypass Biodiversity Offset Calculation Report, NSES Ltd (Singers (2017)).

f) Ecology supplementary report – Biodiversity Offset Calculation, February 2018, NSES Ltd, (Singers (2018b)).

g) Section 42A reports from Taranaki Regional Council and New Plymouth District Council and Review of ecological aspects of the application to reroute SH3 at Mt Messenger, North Taranaki - May 2018; Contract Report No. 4402e by Wildlands to the New Plymouth District Council (Wildlands (2018)).

2. KEY FACTS AND OPINIONS

2.1. In this evidence I refer to biodiversity offset and environmental compensation according to the definitions in paragraphs 3.11 and 3.20, and to mitigation in the context of the High Court decision in paragraph 3.16 below. These differ from the definitions contained in Mr MacGibbon's evidence. Mr MacGibbon's definitions of offset and compensation do not reflect NZ Guidance or the BBOP definitions.

2.2. The use of the 'no net loss' terminology applying across all significant residual adverse effects of the Project is inappropriate. Although compensation, as well as offset, can be viewed as a positive environmental effect, the term 'no net loss' can only be used when it can be *demonstrated*. As that is not the case here, I disagree with Mr MacGibbon that the Project will result in no net loss in 10-15 years. The Applicant has not obtained data that can be used to justify that claim.

2.3. I commend the Applicant for proposing pest control in perpetuity. However it is critical for those involved in an assessment of this particular offset design to understand what no net loss actually means, the limitations in the design process and the ability to effectively monitor outcomes in 10-15

years. What is proposed in this Project is a mixture of offset and environmental compensation.

2.4. For the offset component, I commend the use of the DOC offset accounting system however:

a) To balance biodiversity in the impact and offset sites, the model uses the currency of Ecological Integrity (EI). EI represents a particular ecological measure of condition for browse intolerant elements of forest types. No net loss only applies to the specific concept of EI as developed for this Project.

b) The limitations of EI must be understood: EI does not cover all forest types. EI does not cover the *area* of forest lost (Mr Singers' calculations involve an offset implemented in an *existing* forest). EI does not cover individual components (because different plant species may be traded in this model). EI does not include measures for freshwater values, wetlands, long-tailed bats, birds or other fauna.

c) Indeed my understanding is that Mr Singers' currency is not intended to cover these matters. For similar reasons, he has developed a separate and specific currency for the kahikatea offset.

d) Overall I am comfortable with the offset design for kahikatea. However the EI offset is not transparent.

e) Unfortunately the data and weightings for the EI offset have not been provided creating a difficulty with repeating the calculation in 10-15 years. It may be possible to resolve these issues by going back to the raw field data and from there documenting in a repeatable manner the process by which the EI values were generated. In the absence of that, the approach should be viewed as environmental compensation.

2.5. There is no rigour provided to support how the Applicant's experts (other than Mr Singers) have determined the proposal is sufficient to achieve no net loss. In many cases there is lack of sufficient baseline data to support the claim. For some fauna there are no available or reliable techniques for determining no net loss.

2.6. If consent were to be granted, it would need to be accepted that the construction of the Bypass will result in a residual adverse effect comprising loss of forest area, and adverse effects on some fauna. In considering these adverse effects, I set out a range of additional matters that I believe would need to be included in consent conditions and/or the ELMP.

2.7. The long-tailed bat is critically endangered. In situations where uncertainty is high, and the level of conservation concern of affected biodiversity is also high, it is good practice to ensure that proposed management actions provide a high level of confidence that intended outcomes can be achieved (Pilgrim et al 2013). I rely on Dr O'Donnell's recommendation that a minimum of 5000ha of effective predator control would be required to address the uncertainty in the Applicant's long-tailed bat management plan.

2.8. I also agree with Dr O'Donnell that the proposed 3650ha PMA might do that if it is implemented adjacent to an existing local programme, such as the Parininihi management area. However, for the combination to be successful, the long-term security of management at Parininihi would need to be established.

2.9. Further, for the reasons set out below, I am not confident that the proposed pest control can achieve its stated targets (upon which the Applicant's assumptions of no net loss appear to largely rely on). In his supplementary evidence Mr MacGibbon refers to significant benefits attributed to the larger area. On an area basis alone effective management of pests will result in biodiversity gain significantly greater than previously proposed. However:

a) I remain unclear as to the intended areal extent of ungulate control. In addition to occurring over the entire PMA, it should effectively prevent reinvasion from surrounding farmland and bush. Without this the potential benefits will be compromised.

b) I have a concern regarding appropriate buffers for other pest animals. The ELMP proposes to address this issue by considering the outer 200m of the PMA (for rats) and 500m (for mustelids) as a 'buffer' in which monitoring pest target levels will not occur because they may have exceeded target levels due to invasion. This effectively reduces

the effective size of the PMA from 3650ha to <2590 ha for full potential rat control benefits and about 1500ha for that of mustelid control. I note Dr O'Donnell also has this concern in relation to benefits for long-tailed bats (in addition to his concerns regarding the size of the PMA *per se*).

2.10. An adaptive approach to management is proposed in the event that pest performance measures are not met. For an adaptive management approach, the design and frequency of monitoring pest levels must be adequate to inform appropriate responses, However I am not confident the pest management targets can be robustly monitored, given the topographic constraints. In any case, the monitoring provision in the ELMP is insufficient for this purpose.

3. THE BUSINESS AND BIODIVERSITY OFFSETS PROGRAMME

3.1. The Business and Biodiversity Offsets Programme (BBOP; http://bbop.forest-trends.org/) is an international collaboration of more than 80 organizations and individuals including companies, financial institutions, government agencies and civil society organizations. New Zealand has been a key contributor to the programme with members from the Department of Conservation, extractive industry and legal profession contributing to the work. The members have produced guidance on biodiversity offsetting to achieve no net loss or a net gain in biodiversity.

3.2. The BBOP's vision and expectation is that biodiversity offsets will become a standard part of business practice for those companies undertaking activities with a significant residual effect on biodiversity after avoiding, remedying, and minimising effects; and that the routine mainstreaming of biodiversity offsets into development practice will result in long-term and globally significant conservation outcomes.

3.3. The BBOP has established key definitions and a principles-based approach to biodiversity offsetting (BBOP 2012a). These principles underpin the concept of biodiversity offsetting, support its definition and form the standard to inform the design, implementation and assessment of a biodiversity offset.

3.4. International organisations are increasingly incorporating BBOP principles and guidance into their sustainable business policies to manage reputational, social and environmental risk. Examples include the International Finance Corporation arm of the World Bank, 83 international banking institutions in 36 countries adopting the Equator Principles, the International Union for the Conservation of Nature (IUCN), and the European Union No Net Loss Initiative, amongst others. This broad international accordance, in my opinion, supports a conclusion that the BBOP standard, guidance and principles are biodiversity offsetting good practice.

The BBOP Biodiversity Offset Principles

3.5. The BBOP (BBOP 2012) has developed ten principles that are expected to be met for a project to be considered a biodiversity offset. The principles underpin offset design and implementation and provide a foundation for expected outcomes from a biodiversity offset. They recognise both ecological equivalence and social interest in biodiversity, and acknowledge that societal wellbeing is eroded when biodiversity is lost. These principles have been incorporated into the NZ Guidance.

3.6. The BBOP principles are (in no particular order):

a) Adherence to the mitigation hierarchy: A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the mitigation hierarchy.

b) Limits to what can be offset: There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected.

c) Landscape context: A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach.

d) No net loss: A biodiversity offset should be designed and implemented to achieve in situ, measurable conservation outcomes that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity.

e) Additional conservation outcomes: A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations.

f) Stakeholder participation: In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring.

g) Equity: A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognised rights of indigenous peoples and local communities.

h) Long-term outcomes: The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity.

i) Transparency: The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner.

j) Science and traditional knowledge: The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

Guidance on Good Practice Biodiversity Offsetting in New Zealand

3.7. In response to an increasing number of proposals involving offsets, where consistency of approach and a standard were lacking, the Department led a cross government department initiative to develop biodiversity offsetting guidance between 2009 and 2014. The intention of the New Zealand Government Guidance (NZ Guidance) was to ensure that solutions addressing residual effects are ecologically sound and demonstrably result in no net loss or a net gain. The NZ Guidance is contextually related to Goal 3 of the New Zealand Biodiversity Strategy (2000), which is to halt the decline in New Zealand's indigenous biodiversity.

3.8. The NZ Guidance is New Zealand's implementation of BBOP's international work. It was developed under the auspices of the Department's Biodiversity Offsetting Programme, with participation of the Ministry for Business, Innovation and Employment, Ministry for the Environment, Land Information New Zealand and the Ministry for Primary Industries.

3.9. The New Zealand Programme has drawn from the work of the BBOP, including adoption of the ten principles, to the extent that the NZ Guidance is essentially the New Zealand embodiment of that work.

3.10. The NZ Guidance was formally launched by the Minister of Conservation on 7 August 2014. Although the NZ Guidance is not a statutory document it is a valuable tool for the design and assessment of ecologically sound management of adverse effects and reflects the relevant government departments' view on biodiversity offsetting. It is supported by additional resources that provide more detail on the design, implementation and assessment of biodiversity offsets.[1]

Biodiversity Offsets Definition

3.11. Biodiversity offsetting refers to a process that seeks to counter-balance the unavoidable effects of activities on biodiversity by enhancing the state of biodiversity at a site other than the affected site. The NZ Guidance draws from the BBOP definition of biodiversity offsetting to define a biodiversity offset as:

> *Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising*

[1] https://www.doc.govt.nz/about-us/our-policies-and-plans/guidance-on-biodiversity-offsetting/.

from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground.

Biodiversity Offsetting and other forms of Effects Management

3.12. In any activity there is usually a range of measures presented by the applicant to address adverse effects on the environment. It is usual that a mixture of solutions will be tabled: from avoiding, remedying and mitigating certain adverse effects through to actions addressing the loss of residual ecological values which cannot be avoided, remedied and mitigated.

3.13. The range of management options for these residual effects might be seen as existing along a continuum representing increasing confidence that no net loss or a net gain can be demonstrated in support of its practical achievement on the ground. This is illustrated conceptually in Figure 1.

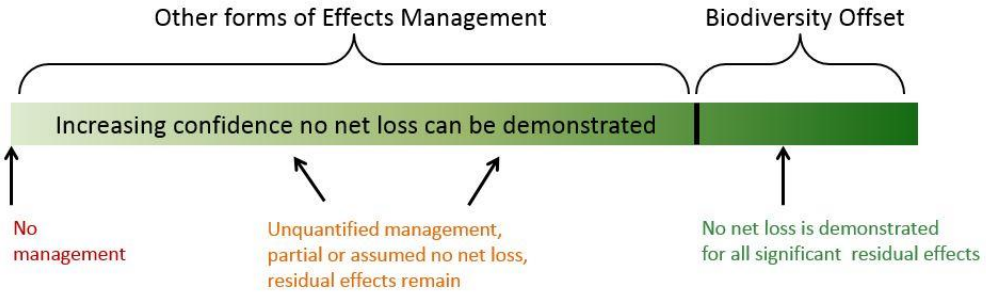

Figure 1. Impact management spectrum (after BBOP 2012a).

3.14. At the extreme left of the Figure, and under little or no investment in effects management, there is low confidence that no net loss can be demonstrated. With increased investment in identifying adverse effects and management options, outcomes improve, but biodiversity losses and gains may remain un-quantified (how much has been lost and gained?), different types of biodiversity are exchanged for those lost (e.g., rat control for vegetation loss), and residual effects often remain.

3.15. A biodiversity offset is indicated at the point along the spectrum where no net loss or a net gain is demonstrated to be achievable on the ground. How this

is calculated and demonstrated is critical to understanding what no net loss means for a specific project. I elaborate on the meaning of no net loss below, with respect to the Applicant's offset design.

3.16. I have frequently observed biodiversity offsetting being confused with mitigation or expressed as offset mitigation. The High Court in *RFBPS v Buller District Council* [2013] NZHC 1346 held that under the Act, offsets are not mitigation (in the sense of the usual meaning of mitigation being to alleviate, or to abate, or to moderate the severity of something) and do not address effects at the point of impact; rather, they are better viewed as a positive environmental effect and are able to be taken into account under section 104(1)(a) and section 5(2). Since that case the Act has been amended to specifically allow consideration of any measure proposed or agreed to by an applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects that may result from allowing that activity.

3.17. The High Court decision referred to above is helpful because it clarifies the distinction between mitigation and offsets. Throughout my evidence I refer to mitigation and offset using this distinction.

3.18. However, as I set out further, environmental compensation as well as an offset can create positive environmental effects.

Compensation v Offsets

3.19. As noted above, the Act now refers to compensation as well as offsetting. Environmental compensation often comprises a range of offerings, from financial payments to specific management actions aimed at improving habitats or species populations, or both. A critical difference between environmental compensation and biodiversity offsets is that compensation is not designed to demonstrate, *a priori*, that no net loss or a net gain in biodiversity is achievable on the ground. Thus, the outcomes of compensation differ from those of biodiversity offsetting.

3.20. A useful definition for environmental compensation is as follows:

> *"Actions offered as a means to address residual adverse effects on the environment arising from project development where no net loss or net gain of biodiversity on the ground is not intended or able to be measured."*

3.21. Thus, biodiversity offsets are differentiated from other forms of effects management, including environmental compensation, by requiring three essential components:

a) Explicit measurement and balancing of biodiversity predicted to be lost and gained;
b) A mitigation hierarchy to be followed, i.e. offsetting significant residual effects after appropriate avoidance, minimisation/mitigation and on-site rehabilitation activities have taken place; and
c) A goal of no net loss and, preferably, a net gain of biodiversity to be reasonably demonstrated and then achieved on the ground.

3.22. In order for biodiversity offsets to be sound, their design should incorporate these three essential components and transparently communicate how that has been achieved. Doing so clearly distinguishes an offset from environmental compensation.

3.23. In my opinion both biodiversity offsets and environmental compensation can provide positive effects on the environment, albeit with different ecological goals. Avoiding conflation of the two concepts is critical to understanding an overall approach to managing adverse effects to the environment.

No Net Loss

3.24. No net loss is the essence of biodiversity offsets. It is the goal of an offset. In its absence, management of effects becomes simply a collection of actions lacking an explicit outcome. No net loss refers to the point at which biodiversity gains from targeted biodiversity management activities match the losses of biodiversity due to the effects of a specific activity, and essentially means no overall reduction in indigenous biodiversity, as measured by type, amount and condition. A net gain means that biodiversity gains exceed a specific set of losses associated with an activity.

3.25. Under the BBOP and the NZ Guidance, a biodiversity offset should be designed and implemented to reasonably demonstrate that no net loss and, preferably, a net gain of biodiversity can be achieved.[2] Demonstrating no net loss involves explicit identification and quantification of biodiversity losses and gains and their balancing in an accounting system. Biodiversity is complex and

[2] The preference for a net gain over no net loss reflects the risk to biodiversity associated with its certain loss for uncertain gain, and reduces some of the uncertainty around accurate quantification of biodiversity and its future management.

it is not possible to measure everything. Accordingly, demonstrating no net loss requires biodiversity to be simplified into units that can be measured, compared and subsequently balanced at affected and offset sites. For these reasons, biodiversity offsetting will always be an exchange of biodiversity between affected and offset sites, and no net loss can only ever be reasonably demonstrated.

3.26. In order to balance losses and gains, biodiversity must be translated into a currency. This provides the basis for exchange and describes 'how much of what' is being lost and gained. It essentially defines the meaning of no net loss on a case by case basis. The mathematical balancing of the currency across affected and offset site demonstrates the point of no net loss. A simplified example of the outcome of this concept is provided in Figure 2.

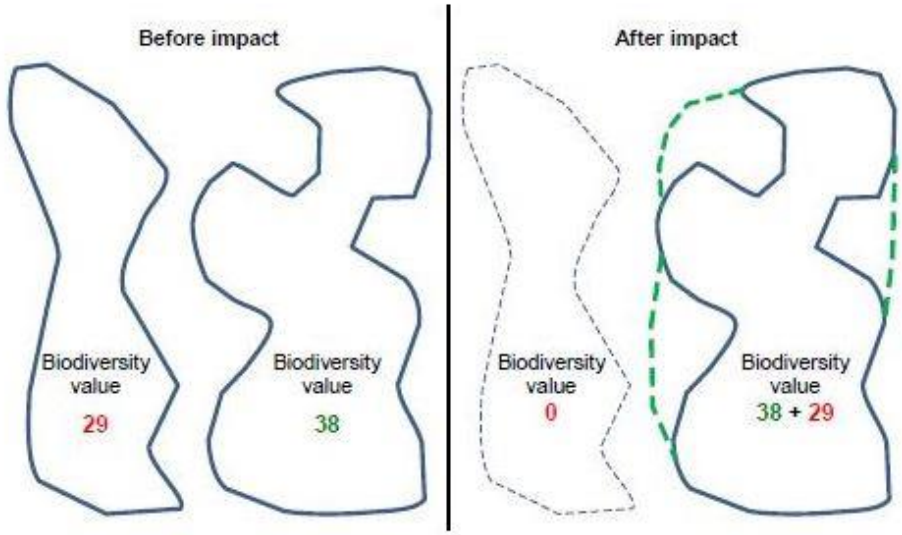

Figure 2. Simplified illustration of the goal of no net loss of biodiversity values. Values are lost due to the effects of the development and gained through management actions to improve the area and condition of the offset site (New Zealand Guidance; Exhibit A).

3.27. The concept of like for like is inseparably linked to no net loss. This is because, as the degree of dissimilarity between the biodiversity being lost and gained increases, the more difficult it becomes to replace all the components lost because they may not exist at the offset site. As such, demonstrating and then achieving no net loss requires like for like biodiversity exchanges.

The Mitigation Hierarchy

3.28. Under the Act, section 5(2)(c) requires adverse effects to be avoided, remedied or mitigated. The BBOP mitigation hierarchy is an integral part of biodiversity offsetting. It consists first of avoidance, then minimisation (analogous to mitigation), then on-site rehabilitation, then, as a final step, offsetting.

3.29. Offsetting is invoked as a last step in the hierarchy after first avoiding, remedying and mitigating effects to the degree that is reasonable. Following this process ensures that residual adverse effects are identified, made transparent and offsets are as small as reasonably possible which reduces the cost of offsetting and the likelihood of failure. The hierarchy is also appropriate in the context of realising positive effects of environmental compensation for the same reasons, except that no net loss goal is not its goal.

4. ASSESSMENT OF THE ADEQUACY OF PROPOSED ADVERSE EFFECTS MANAGEMENT AND CONDITIONS OFFERED

4.1. I have reviewed the Ecology and Landscape Management Plan (ELMP) the draft conditions attached to Mr Roan's evidence and those contained within the section 42A reports.

4.2. In my opinion, the draft conditions, the ELMP and the proposed Biodiversity Offset do not completely address the significant residual adverse effects of this Project.

4.3. The ELMP and Mr MacGibbon's evidence claim the Project will result in no net loss in 10-15 years. This relies on a 'no net loss' claim made by many of the Applicant's witnesses on the basis of opinion, and lacking the level of rigour required to *demonstrate* that no net loss is possible. Assuming no net loss is achievable, or claiming it based on opinion without supporting quantitative evidence, is unhelpful and potentially misleading.

4.4. As I have outlined, biodiversity offsetting involves a rigorous process because claiming no net loss can be viewed as a 'gold standard' approach to addressing adverse effects. As such no net loss needs to be *demonstrated* as being possible prior to its delivery. This is important so that decision makers and other stakeholders have confidence in relying on the claim.

4.5. Mr MacGibbon[3] defines offset as:

> *"Offset: aspects of restoration and management for which the effects and outcomes can be measured and compared. All offset in this Project has been generated using the SEV Model and Offset Model."*

4.6. Mr MacGibbon[4] defines compensation as:

> *"Compensation: all remaining restoration and management actions recommended that have been determined by the Project ecology specialists to be sufficient to achieve no net loss of biodiversity."*

4.7. Mr MacGibbon's definition of "offset" does not include the crucial 'no net loss' goal, or reference to significant residual adverse effects. Mr MacGibbon's definition of "compensation" *does* include the no net loss goal, but one which is determined by the project ecologists to achieve no net loss. He does not adopt the internationally accepted biodiversity offset definition reflected in the NZ Guidance.[5] Mr MacGibbon has presented definitions for offset and compensation that are inconsistent with NZ and international guidance.

4.8. In many cases there is insufficient baseline data upon which project ecologists can conclude 'no net loss' would be achieved. For example, Mr Chapman claim of a no net loss (and possibly a net gain) outcome for long-tailed bats[6] is unsupported by any quantitative assessment of losses and gains. That is not surprising because the Applicant has not obtained data that could be used in such a manner, and therefore cannot demonstrate no net loss for long-tailed bats. The Applicant has not identified the location of breeding or day roosts and so the adverse effects to long-tailed bats, including the potential for local extinction must considered an outcome of the road being constructed.

4.9. Environmental compensation actions should not refer to no net loss outcomes that cannot be supported by a good practice process. In saying this, I acknowledge that well designed environmental compensation can achieve beneficial outcomes for the environment.

4.10. In my opinion, the Applicant is proposing a <u>mixture of environmental compensation and a biodiversity offset</u> to address significant residual adverse

[3] MacGibbon EIC at [53(b)].
[4] MacGibbon EIC at [53(c)].
[5] Although it is provided in MacGibbon EIC at [50].
[6] Chapman EIC at paragraph 63.

effects. For the above reasons, the use of the 'no net loss' terminology should not be applied to the compensation measures proposed.

Proposed Biodiversity Offset - No Net Loss

4.11. The Applicant proposes to address part of the forest vegetation losses with a biodiversity offset (Biodiversity and Offset Calculation Report – December 2017 & February 2018).

4.12. I consider it critical that implementation of the biodiversity offset is additional to what would have occurred in the absence of the application. This is a key offsetting principle reflected in international good practice (BBOP 2012) and the NZ Guidance.

4.13. I support in principle the Applicant's intent to demonstrate, and then achieve, no net loss with an offset. As a co-author of the publication describing the accounting system/model developed for DOC (Maseyk et al. 2016), I have reviewed how it was used and commend Mr Singers for his use of the model. However I do have concerns regarding the transparency of the input values and how they were generated. I consider this compromises an ability to monitor and report achievement of its no net loss goal.

4.14. Whenever no net loss is proposed as a goal it is critical to ask oneself, "no net loss of what?". This is particularly important in this application because Mr MacGibbon states that:[7]

> "*All of the forest types affected by the Project that are not able to be replaced by mitigation planting require offsetting to reduce the residual effects of the Project on them to the point of no-net-loss, and then to achieve the Project aim of net biodiversity gain. The Project team have set the target of achieving no net loss of biodiversity by year 10 (following construction) and net gain in biodiversity from year 15*."
>
> (My emphasis).

4.15. However, no net loss has not been assessed for all forest types and the offset is intended to be implemented in existing forest, which means there remains a residual loss of forest area.

[7] MacGibbon EIC at [87].

4.16. No net loss only relates directly to the biodiversity values, or their robustly supported surrogates, that are quantified using data reflecting biodiversity at both the impact and offset sites, and then assessed and balanced in a model or accounting framework.

4.17. These values are expressed as a currency which defines the 'what' of no net loss and the accounting system describes 'how much' of what is required. This forms the basis of the offset.

4.18. The achievability relates to the availability of knowledge, management techniques and their appropriate implementation as well as spatial considerations (where no net loss will be achieved).

Currency: Ecological Integrity

4.19. The currency is the critical descriptor of no net loss for any project designing a biodiversity offset. It should capture what is important, both ecologically and to society, and should minimize exchanges of biodiversity elements not explicitly accounted for (Salzman and Ruhl, 2000).

4.20. The Applicant has not developed a currency describing no net loss for "all forest types**"**.[8] Rather, it has created an offset currency reflecting a measure of Ecological Integrity (EI) (Singers 2017, 2018b), which is a surrogate for explicit measures of *part of the forest systems* lost to the development.

4.21. For this case, EI essentially represents an ecological measure of condition, aggregated across the *browse intolerant elements* of the forest types and the expected system wide ecological benefits associated with condition improvement. I am not criticising the use of EI, but consider it important to understand the currency.

4.22. EI is comprised of the current state multiplied by its condition (both scores represented as a %; Singers 2017). Both current state and condition are values (set between 0 – 1) derived from non-quantitative field assessments described in the vegetation reports (Singers 2017, 2018b). It does not explicitly incorporate field measures such as species occurrence, structure or other direct field measurements.

4.23. Thus, no net loss for this proposal is an improvement in the ecological integrity of the forest, based largely on recovery and improved survival of

[8] As stated in Mr MacGibbon EIC at [87].

palatable plant species and the dynamic responses of other components of the ecosystem. It is not no net loss of forest or the area occupied by forest types. Benefits to other ecological components, including function are plausibly assumed based on condition improvement, but not explicitly accounted for in the offset calculation (because those losses and gains are not quantified and balanced). EI does not incorporate any measures for freshwater values, wetlands or long-tailed bats, kiwi, birds or other fauna.

4.24. Because EI is a surrogate for biodiversity more generally, no net loss cannot be demonstrated for the individual ecological components (e.g. plant species) because they are not made explicit, and accordingly can be unknowingly traded between each other i.e. reductions of a particular species can be concealed by gains in another (Gibbons and Lindenmayer, 2007; Walker et al., 2009). While the EI currency developed by Mr Singers is in my opinion a laudable concept, it does not and was not intended to fully represent the forest types lost to this development.

4.25. Ideally EI would be complemented with direct measures of ecological attributes themselves, e.g. quantitative plot-based data and seedling and foliar browse indices, but such baseline data have not been collected (as also stated in paragraph 25b in the New Plymouth Reporting Officer's Report).

4.26. Because the offset design based on a currency of EI does not address loss of forest area in its implementation (all gains of condition are generated within existing forest nearby), the construction of the bypass will result in a residual adverse effect comprising permanent loss of forest area.

Currency: Kahikatea Canopy Cover

4.27. A second currency was developed by Mr Singers representing percent canopy cover of kahikatea within forest type WF8 (Supplementary Biodiversity Offset Calculation Report – February 2018) because kahikatea does not respond positively to browser control. As I explain here, overall I am comfortable with the offset design for kahikatea. By adopting the highest of three field measurements of 55% (remaining two values 45% and 15%), I acknowledge a precautionary approach has been adopted.

4.28. In my opinion, it is appropriate and necessary to use disaggregated and complementary currencies for components that are quantified differently, or require different management methods, to avoid concealed losses (i.e. loss of

one value being quantitatively masked by gain in another), as is the case with kahikatea.

4.29. As I have stated above, it is important to understand what no net loss means in the context of the values represented by a particular currency. In this case the loss of a range of ages of kahikatea sparsely distributed within WF8 will be replaced by restoration planting of younger aged trees.

4.30. No net loss reflects the point where the canopy cover of 10 year old planted kahikatea reaches 65%, regardless of their age relative to those lost. Thus, no net loss of percent cover may be achieved, but the age and spatial dynamics of the resulting kahikatea will be unavoidably different to that currently existing.

Outstanding Concerns with the Biodiversity Offset for Ecological Integrity

4.31. I am concerned about the ability of the biodiversity offset to demonstrate no net loss of EI. My concern relates to the currency's transparency. In today's society there is an increased expectation for greater precision and certainty for larger impacts on highly-valued biodiversity and transparent documentation of how these data were derived (Maseyk et al. 2016). The developers of the model used recommend that the user compiles exhaustive and transparent supporting documentation (Maseyk et al. 2016).

4.32. How the data was used to calculate EI has not been documented or provided with the offset calculation. This means:

a) It is not possible to fully assess or evaluate the offset design in the context of the biodiversity informing it; and

b) the offset calculation is not repeatable by anyone other than the person developing it. This introduces substantial uncertainty into the offset design and the ability to know whether it achieves its intended no net loss outcome.

4.33. Understanding and documenting the level of weighting and assumptions and where these have been applied is also critical to monitoring the offset outcome because the monitoring needs to collect field data and derive future EI values in the same manner as that used to develop the offset.

4.34. The current version of the ELMP states:[9]

> *"These monitoring performance targets should allow success of the offset to be determined resulting in improved plant and population health (e.g. recovery towards expected demography distributions such as reverse J-shaped curve for tawa). The forecast measures of ecological integrity used within the offset calculator were +5% and +5.25% by year 10 (no net loss) and +8% and 9% by year 15 (net gain) (Singers 2018). It is considered that if the performance targets described above are met or exceeded, then no net loss and net gain will have occurred."*

4.35. In the absence of the raw field data and the method by which it was collected along with a clear pathway explaining how it was used to generate the EI values, I do not consider that monitoring by anyone other than the person who designed the offset could produce a robust result in 10-15 years. The field values are not presented, and therefore those values are not able to be re-measured and new EI values generated in the future.

4.36. New field data at that time would need to be collected in the same manner for that person to calculate new EI values at the offset site.

4.37. In addition, I understand that Mr. Singers 'adjusted' either the EI scores or the values they are based on to conservatively allow for uncertainty or ecological importance (Mt Singer's evidence paragraphs 172 and 185). I acknowledge that such weighting is a common approach in ecological modelling, but it is good practice when doing so to transparently report how the adjustments were made so that the work is repeatable.

4.38. It may be possible to resolve these issues by going back to the raw field data and from there documenting the process by which the EI values were generated.

4.39. In the absence of this being resolved, in my opinion the proposed biodiversity offset is not consistent with the NZ Guidance or international good practice (BBOP 2012) because it lacks transparency leading to an inability to verify whether no net loss has been achieved.

[9] Section 9.5.3.2 at page 109.

4.40. For the reasons I set out above, I have low confidence that the no net loss outcome can be *demonstrably* achieved. I agree with Mr Singers that the management would be expected to significantly improve forest condition, but in my view this forms environmental compensation.

4.41. In Mr Singers' supplementary evidence he states that he re-ran the offset model to reflect the updated restoration package discussed in Mr MacGibbon's supplementary evidence. Mr Singers states that the size of the proposed pest management area has increased from 1085ha to 3650ha and includes the Mt Messenger Conservation Area (administered by DOC) and land privately owned by Ngati Tama.[10] The pest species managed and their target levels remain unchanged from the initial proposal.

4.42. Mr Singers explains the process by which the offset model was re-run using a larger core area of 903.5ha (replacing the 230ha reflected in his EIC).[11] This was the only input parameter that differed from the model reported in his EIC i.e. the EI values used in the initial model were applied to the updated model.

4.43. I acknowledge that by managing pests to the specified target levels will provide increased benefit over the initial proposal, simply due to the increase area. I support that. However, the concerns I have stated above regarding the offset approach are also apparent in the updated model approach, including that it appears not to be informed by field assessment of the expanded area. As such, my view remains that no net loss of EI cannot be demonstrated.

4.44. In my opinion the Applicant could abandon its proposed biodiversity offset and present a package as environmental compensation while also acknowledging that some residual adverse effects, e.g. loss of forest area, are a permanent loss of the Project.

4.45. An additional concern I have is the inadequacy of buffers between the PMA and surrounding landscape. Reinvasion is a critical risk to meeting and maintaining pest target levels and intended biodiversity outcomes.

4.46. I am unclear from the Applicant's supplementary evidence whether ungulate and pig control is planned to initially occur beyond the 750ha area[12]

[10] Singers supplementary evidence at [9].
[11] Singers supplementary evidence at [26] – [40].
[12] Referred to in Singers' supplementary evidence at [17] and [18] including: "The target of 'very low' abundance of feral ungulates, required to achieve regeneration of palatable flora, is expected to be achieved within 1 year within a 750 ha area…"

and whether it is intended to expand to 900ha by year 3.[13] In an email correspondence dated July 23, 2018, Mr MacGibbon clarified this issue stating that "Ungulate control is proposed for the full 3650ha PMA". However, as I note below, reinvasion risk from all pests should be managed by ensuring an adequate buffer around the PMA.

Review of Mr MacGibbon's evidence on biodiversity offsets

4.47. I agree with the NPDC Officers report (paragraph 115) that critical to considering whether offsets and compensation are truly positive effects there needs to be assurances as to the detail, delivery, certainty and timing of offsets. The current proposals are lacking in these details which in my opinion results in unacceptable levels of uncertainty. With respect to this, I support the condition 25(b) proposed by the NPDC requiring a quantitative assessment of forest condition and tree health, including a canopy measure (e.g. Foliar Browse Index) and an understorey measure (e.g. Seedling Ratio Index). This should apply to the east of SH3 and include the PMA to provide a baseline for vegetation outcome monitoring.

Proposed Environmental Compensation

4.48. Environmental compensation can be appropriate when consents are issued for a range of reasons, including, as is the case with this Application, in situations when no net loss can't be reasonably demonstrated to be achievable. For this Project, limits to what can be offset relate to:

a) the level of existing knowledge;

b) availability of reliable management techniques (e.g. for long-tailed bats and herpetofauna); and

c) the presence of old mature forest that takes hundreds of years to develop.

4.49. In my opinion if a consent is issued, adequate and effective environmental compensation is an appropriate approach to managing non-offsetable residual adverse effects. I also consider it critical that any environmental compensation is additional to what would have occurred in the absence of the application and

[13] Singers supplementary evidence at [19] states: "It is expected that a 'very low' feral ungulate abundance will be achieved in a minimum of just over 900 ha by year 3, if not earlier."

that the remaining offsetting principles (other than No Net Loss) are relevant to providing good outcomes.

Proposed Pest Management Plan

4.50. I refer to the proposed pest management plan (PMP) as outlined in the ELMP and the evidence of Mr MacGibbon. I commend the Applicant for proposing pest control in perpetuity and recognise that future technology may influence management approaches to meet pest level targets.

4.51. However the proposed consent conditions do not contain measurable performance measures. My recommendation is that performance measures for all management actions be explicitly stated in consent conditions, which then inform the consent holder's development of an ELMP (rather than the other way around). This provides certainty to stakeholders and provides the consent holder with flexibility in how they are achieved.

4.52. The pest species targeted and performance measures are provided in section 9.5.2 of the PMP as follows:

I. Possums – 5% or lower residual trap catch index or 5% or lower chew card index
II. Rats – 5 % or lower RTI (residual tracking tunnel index)
III. Goats - < 1 kill/man day.
IV. Mustelids – no detections
V. Cats – no detections
VI. Pigs < 1 kill/man day then no fresh pig sign or pig detections.
VII. Farm livestock – zero presence.

4.53. I agree with these performance targets and their application across the whole PMA. I consider it important that these targets be explicitly stated in the conditions for increased certainty, rather than in the ELMP which can be modified. With the target pest species and their performance levels contained within condition, I am comfortable to leave much of the detail on how they are achieved to implementing the ELMP.

4.54. I recommend appropriate wording regarding monitoring methods to provide for flexibility and robustness by requiring monitoring to follow DOC best practice or equivalent established best practice methods approved by NPDC in consultation with DOC. The word "equivalent" is critical because any alternative

method must be able to be interpreted in the context of the ecological context of a 5% (or other result) residual trap catch or tunnel tracking index.

4.55. The Applicant has proposed the assemblage of a Pest Management Review Panel. While I support this development, I regard other ecological aspects of the Project as also being of sufficient complexity to justify the establishment of an Ecology Review Panel with a broader mandate that addresses all ecological aspects of this Project, including reviewing and making recommendation to council on a revised ELMP. For avifauna, these issues include the design of the road-side kiwi fence and culverts, monitoring of kiwi movements relative to the road post-construction, outcome monitoring for kiwi and other birds, surveys for bittern, bittern mitigation measures (if detected within the Project Area) and the development of a Kokako Management Plan.

4.56. Section 9.5.2 of the ELMP and Mr MacGibbon's supplementary evidence[14] refer to the 5% RTI target at times being exceeded and that tracking results of 10% or greater over 2 consecutive years will trigger a review of methods used. While I acknowledge that sometimes factors beyond the control of a pest manager result in targets not being met, I am concerned that this approach creates an 'effective' 10% target.

4.57. Accordingly, and if the 10% trigger is adopted, I recommend that an annual pest monitoring report is provided to the Ecology Review Panel at the same time it is provided to the NPDC. This would provide the Panel with opportunity to review the pest monitoring results, consider wider environmental or other factors that may be relevant, and make recommendations in the event that a breach is substantial. If this were adopted in consent conditions, I support a review of methods after two consecutive years where a 10% trigger is breached.

Pest management buffers

4.58. I agree that 3 yearly aerial 1080 application can reduce possum and rat levels in a few weeks to meet 5% performance levels. Secondary poisoning of stoats will significantly contribute to the non-detection performance measure, with maintenance of that possible with year-round trapping. However it is frequently observed in rat management in NZ forests that due to rapid immigration and reproduction, rat populations increase to pre-control levels

[14] At [20].

within 4-5 months. This means that by the first winter after a 1080 operation the rat population is expected to be above the 5% residual tracking index. In my experience as coordinator of the Kokako Specialist Group, this is commonly reported.

4.59. Research shows that rats can attain population levels higher than pre-control levels due to competitive release when possums are reduced to low levels. The availability of food is a major driver of rat productivity increases (Sweetapple and Nugent 2007; Ruscoe et al. 2011). If that occurs, I would anticipate increased predation pressure on birds and their eggs or nestlings, as well as that on long-tailed bats, in particular at any maternity nests.

4.60. The map shown in Appendix F of the ELMP indicates that significant portions of the core area boundary have no buffer between adjacent farmland and bush. The entire PMA has no buffer which compromises maintaining targets. The ELMP proposes to address this issue by considering the outer 200m (rats) and 500m (mustelids) perimeter of the PMA as a 'buffer' in which monitoring pest target levels will not occur because they may have exceeded target levels due to invasion. This reduces the effective size of the PMA from 3650ha to <2590 ha[15] for full potential rat control benefits and about 1500ha for that of mustelid control. Based on Dr O'Donnell's evidence, this reduced area falls below that required to compensate for adverse effects to long-tailed bats.

4.61. Mr MacGibbon refers to the problem of reinvasion stating:[16] "…*many of the introduced animal pests present in New Zealand, especially rats but also possums and stoats, reinvade forest rapidly when pest control ceases and can eliminate many of the biodiversity gains generated by pest control very quickly.*" The reinvasion problem is not just relevant to the cessation of management. Reinvasion from surrounding landscapes is constant and reflects the movement patterns of pests for which the performance measures are intended to be met in perpetuity. Accordingly, reinvasion must be managed through buffers across the same time scale.

4.62. Appendix F to the ELMP also shows an area to the south west and south of the Parininihi pest management area (coloured pink) as part of the PMA. This area essentially has no effective buffer (notwithstanding the nearby Parininihi management area). Its small size, shape and isolated nature means

[15] ELMP Section 9.3, page 99.
[16] EIC at [94].

that reinvasion across the entire area will be an ongoing problem. Although the area would likely receive some benefit from pest control, its full potential may not be realised. It would be far preferable to include an area contiguous with the main PMA.

Performance monitoring

4.63. Mr MacGibbon's evidence[17] refers to measuring the recovery of palatable species within the ungulate browse tier and improvements in canopy condition from a reduction in possum abundance. These components describe the focus of the biodiversity offset and its EI currency. Mr MacGibbon outlines proposed monitoring for vegetation with target performance outcome of 75% of tagged palatable individual plants in the browse tier of the Recce plots showing no sign of animal pest browsing within five years after the completion of road construction.[18]

4.64. Mr MacGibbon refers to an adaptive approach to management if pest performance measures are not met.[19] In that case *"[t] he pest management methods and intensity will continue to be adapted until all pest density targets and biodiversity indicator targets have been met."*

4.65. While I generally agree with the adaptive management concept, I am concerned that topographic constraints severely limit best practice management and the ability to accurately monitor performance measures. It is critical that the design and frequency of monitoring pest levels is adequate to inform appropriate adaptive management responses to provide confidence that they are being maintained. Biodiversity gains are contingent on effective sustained pest control. I am not confident that the density of pest control devices at 1/ha on a 100x100m grid (if such a grid can be established given the topography of the PMA) will be successful in achieving and maintaining pest target levels. I am aware that rat control on Mt Taranaki is based on a 100mx150m grid and is achieving variable results ranging between 1% and 15% RTI (Gareth Hopkins, Operations Manager DOC New Plymouth, personal communication). I am also concerned that the placement of ferret and cat traps only around the perimeter and without an effective PMA buffer will inadequately protect kiwi and long-tailed bats from predation. Additionally, the topographic challenges of the site also mean that establishing best practice monitoring may not be possible. The timing and

[17] EIC at [149].
[18] EIC at [150].
[19] EIC at [151].

frequency of monitoring must be capable of providing an accurate understanding of whether pest target levels are confidently met. Accordingly, I recommend that the Ecology Review Panel has input to the design of the pest management regime and the monitoring of pest levels, both before and after the application of management actions. In my opinion the ELMP requires revision to address this matter.

Long-tailed bats

4.66. The Applicant states a no net loss outcome for the critically endangered long-tailed bat. However, no net loss cannot be demonstrated because, as Dr O'Donnell states in his evidence, the Applicant has not conducted a radio tracking study to identify where long-tailed bat roosts or foraging areas are located. Therefore Mr Chapman cannot quantify how many bats might be killed, disturbed or displaced in the area affected by development in the proposed Bypass. There is no quantitative loss baseline to compare gains with. I agree with Dr O'Donnell that this lack of knowledge introduces significant uncertainty into the Applicant's assessment of effects for long-tailed bats and the Applicant's proposed management of those effects.

4.67. If long-tailed bat maternity trees are felled, Dr O'Donnell predicts reduced breeding success and/or reduced adult survival and/or fragmentation of social groups threatening population viability.

4.68. In situations where uncertainty is high and the level of conservation concern of affected biodiversity is also high, as it is for the critically endangered long-tailed bat, it is good practice to ensure that proposed management actions provide a high level of confidence that intended outcomes can be achieved (Pilgrim et al 2013). I rely on and support Dr O'Donnell's recommendation that a minimum of 5000ha of effective predator control would address the uncertainty in the Applicant's long-tailed bat management plan.

4.69. I also agree that the proposed 3650ha might do that if it is implemented adjacent to an existing local programme, such as the Parininihi management area. However, for the combination to be successful, the long-term security of management at Parininihi would need to be established.

4.70. I also agree with Dr O'Donnell's proviso with respect to the current proposal, regarding the requirement for adequate buffers. I have addressed that issue in my evidence above. In the absence of ensuring adequate buffers

I support Dr O'Donnell's recommendation to consider implementing the PMA in a more defendable block of c. 5000 hectares of forest with a remnant bat population elsewhere in North Taranaki.

Restoration Planting Additional Works Area

4.71. Mr MacGibbon outlines 8.38ha of restoration planting to account for loss of primarily manuka-tree fern scrub, manuka succession, tree fern scrub and manuka scrub on a 1:1 replacement ratio, and for the loss of exotic rushland on the Mangapepeke floodplain on a 0.5:1 ratio.[20] I do not support a 1:1 ratio (or a lower one such as the proposed 0.5:1) because it does not account for time lags and assumes 100% success. If a 1:1 ratio is adopted, then anything less than 100% success results in a net loss.

4.72. Accordingly, I support the recommendation in the NPDC Officer's report for a 1:2 ratio for all restoration planting within the AWA.

4.73. I have discussed the importance of following the mitigation hierarchy. I agree with Dr O'Donnell that the Vegetation Removal Protocols (VRP) for long-tailed bats fall at the end of this sequence. I support the recommendations made by Dr O'Donnell to increase the effectiveness of VRP, particularly given the uncertainty for long-term persistence of long-tailed bats in the area, should a consent be granted under the current management proposal.

Birds

4.74. With the provision of an adequate buffer around the proposed PMA and provided that the pest management measures are successful, I rely on Dr Burns' evidence that the scale of management should adequately address adverse effects on indigenous forest birds.

4.75. I support the Applicant's intention to monitor bittern, but I do not consider the ELMP contains the detail or reporting requirements to undertake this meaningfully.

4.76. I also recommend that, because there is a possibility that kokako may move into the construction area that a consent condition requiring a Kokako Management Plan be prepared in consultation with DOC and certified by NPDC under the consent conditions. The purpose of a Kokako Management Plan will be to provide for the detection of kokako in the construction area during the

[20] MacGibbon at [81] – [85].

construction period, immediate notification to the New Plymouth DOC Operations Manager if detected and avoiding disturbance to any kokako pairs and nests detected during the October – April breeding season.

Invertebrates

4.77. With the provision of an adequate buffer around the proposed PMA I am satisfied that the management proposed is likely to adequately addresses adverse effects on indigenous invertebrates.

Herpetofauna

4.78. Ms. Adams provides evidence on herpetofauna and outlines the challenges with detecting, monitoring and managing lizards using pest control or habitat enhancement or salvage. She provides her preferred option for compensation for adverse effects to lizards involving enhancement of an existing diverse population with a predator proof fence.

4.79. With a suitable predator fence in the right location (with known lizard population), I agree with Ms Adams that that adverse effects to lizards are satisfactorily addressed. I recommend that this be addressed in consent conditions.

Freshwater values

4.80. I support Dr Drinan's view that the SEV should be redone addressing the concerns he states in evidence leading to a re-evaluation of the quanta of riparian planting required, and that confirmation of agreement with private landowners where planting is required on their property be provided for certainty.

4.81. I also support his recommendation that fish and koura passage not be impeded by any culverts where fish passage is intended. Accordingly I support the Taranaki Regional Council's proposed condition stating "*The culverts shall not restrict fish passage"* but recommend that this be expanded to include koura.

4.82. I also support his and Mr Duir's recommendations regarding sediment risk and management and recommend the adoption of the conditions relating to this matter.

Other vegetation and values

4.83. I note that Mr MacGibbon[21] states that up to 3400 seedlings representing 200 seedlings of each of 17 significant trees will be planted in the designation or immediately adjacent to it. There is no confirmation that the species-appropriate sites required by these species (mostly rimu) are available in the designation, or that landowner permission is granted to do so adjacent to it. This provides uncertainty of outcome and is something that I consider should have been addressed prior to hearing.

4.84. I acknowledge that the Applicant's ecologists have identified some wetlands within the Project footprint. Mr Edwards highlights the presence of an invertebrate community assemblage indicative of wetland habitats that could be provided by the floodplain. Mr Singers (Singers 2017 and 2018a) assessed the botanical values of the flood plain and determined them low. However, he explains that wetlands are defined not just by vegetation, but also by soil types and hydrology.

4.85. The erosion and sediment control conceptual drawings show areas where significant amounts of fill will be dumped within the flood plain as well as retention ponds and other works that will impact the floodplain. I am unaware of any assessment by a hydrologist, given the substantial floodplain area affected by fill, and the potential for hydrological impacts due to constrained flood flows.

4.86. In the absence of these assessments there is in my view a risk of residual adverse effects of unknown magnitude to section 6(c) values, wetland and floodplain function and wetland-associated invertebrate communities that have not been addressed.

Adoption of current ELMP in conditions

4.87. The Applicant seeks that the ELMP be adopted into consent conditions as currently proposed. In my opinion, and as set out in some of my concerns above, it is not currently in a state where that would be appropriate. Reasons include the following;

a) In the absence of adequate buffers and certainty of management for the Parininihi management area, the proposed PMA is currently insufficient to achieve its stated goals, in particular for long-tailed bats.

[21] EIC at [111(a)].

b) The ELMP provisions for long-tailed bats, including VRP, are inadequate and the outcomes uncertain.

c) The ELMP contains provisions for a biodiversity offset that cannot demonstrate no net loss now or in the predicted 10-15 years. The ELMP needs to be revised to remove reference to the offset and no net loss for EI and instead focus on biodiversity gain under an environmental compensation framework.

d) Provision for vegetation outcome monitoring lacks design and operational detail and methodological certainty.

e) The ELMP needs to provide for a Ecology Review Panel with function beyond pest management (e.g. fauna outcome monitoring), rather than the narrow (proposed) Pest Management Review Panel. The function of the Panel should also include reviewing a revised ELMP and ecological reports provided to Council and making recommendations to Council based on those reviews.

f) The ELMP needs incorporate a clearer process for adaptive management and input by the Ecology Review Panel.

g) Landowner permission for much of the land required has not been obtained.

h) Provisions for monitoring the performance of pest control are inadequate to inform adaptive management (for a site that will be challenging to manage). Outcome monitoring lacks detail on design adequacy and certainty.

i) Provisions for a predator proof fenced area for lizards need to provide further detail to implement Mr Chapman's recommendations.

j) Insufficient detail on the monitoring and reporting of bittern during the construction period and the provision for addressing the presence of kokako that may move into the construction area.

k) Lack of confirmation that the species-appropriate sites for planting 200 seedlings of each of 17 significant trees are available in the designation, or that landowner permission is granted to do so in land adjacent.

l) Absence of a hydrological assessment of the Mangapepeke floodplain affected by fill, wetland function of that floodplain, and the potential for hydrological impacts due to constrained flood flows.

m) Lack of adequate biosecurity provisions around restoration planting. As stated by Mr Edwards, these should include measures for biosecurity management of pest plants and pest animals including any exotic species of insects, any other invertebrates, weeds, or plague skink eggs that may be introduced with plants brought into the area for restoration planting.

5. CONCLUSION

5.1. I have set out why the Applicant is proposing environmental compensation rather than a biodiversity offset to address significant residual adverse effects and this needs to be acknowledged to avoid confusion in this Project (and beyond). In my opinion the proposed biodiversity offset is not repeatable and therefore a no net loss outcome cannot be verified. I do not consider the claim for no net loss associated with values that have not been measured (e.g. long-tailed bat) to be consistent with good practice biodiversity offsetting because losses and gains have not been quantified and then balanced. In my opinion the no net loss statements should be abandoned and ecological benefits acknowledged as environmental compensation. I accept that an appropriate environmental compensation approach has the potential to create biodiversity benefits.

5.2. I have concerns about the Applicant's proposal to manage ecological adverse effects.

5.3. Although consent conditions can be developed to avoid, remedy and mitigate then address residual adverse effects relating to vegetation, avifauna, herpetofauna and invertebrates, the proposal will not avoid, remedy, mitigate and address residual effects to long-tailed bats with sufficient certainty. In addition, the current proposal falls short of an appropriate response to freshwater values. In the absence of a revised PMA proposed by the Applicant addressing the concerns of Dr O'Donnell, and a response to addressing the concerns of Dr Drinan, I do not support the issuing of the resource content for the Application.

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