BEFORE THE INDEPENDENT HEARING PANELS

UNDER	the Resource Management Act 1991
IN THE MATTER	of submissions and further submissions on Greater Wellington Regional Council Proposed Change 1 to the Regional Policy Statement.
Submitter	**WINSTONE AGGREGATES (Submitter 162)**

STATEMENT OF EVIDENCE OF VAUGHAN KEESING

ON BEHALF OF WINSTONE AGGREGATES

Dated: 3 November 2023

Hearing Stream 5 – Freshwater / Te Mana o te Wai

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1.0 Qualifications and Expertise

1.1 My full name is Vaughan Francis Keesing.

1.2 I am a Senior Ecologist and Director with the consulting firm of BlueGreen Ecology Limited (BGE).

1.3 I have been a consulting ecologist for the last 25 years. My qualifications include a B.Sc. (Hons, 1st) in Zoology and a Ph.D. in Ecology, both from Massey University, as well as a Certificate in Research Statistics.

1.4 My skills lie in community ecology. I have specialist skills in the areas of plant ecology, entomology and freshwater ecology including wetlands. I have worked extensively in freshwater and terrestrial habitats throughout New Zealand.

1.5 Prior to being an ecological consultant, I was employed by Lincoln University as a research fellow where I taught entomology, applied ecology and restoration ecology. My research there was largely in invertebrate-plant ecology.

1.6 I have been practising as a consultant ecologist for the last 25 years, and have worked in a variety of locations including the Wellington region and elsewhere in the lower North Island, West Coast, Canterbury, central North Island, and the Far North, Auckland region, and the Bay of Plenty.

1.7 During that time, I have undertaken a wide range of ecological surveys of natural and semi-natural sites, incorporating both botanical and freshwater values. I have provided assessments of the values and significance of sites for many councils and private clients, as well as assessing ecological effects of a range of activities on those sites.

1.8 This work has included significance and effects assessments across a range of projects and habitat types, such as:

(a) Determining significant wetlands (as part of exercises in the West Coast Region and Ashburton to identify Significant Natural Areas (SNAs) and in Rangitikei as part of its Protected Natural Areas Programme);

(b) Bush significance assessments (e.g. over 150 Franklin District Conservation lots, 50 Western Bay of Plenty lots, and many more across New Zealand);

(c) Large-scale roading projects involving wetland assessment and devising proposals to offset wetland effects (e.g. MacKays to Peka Peka Expressway, Alnay to Puhoi SH 1, and Transmission Gully); Northern busway extension SH1, Northshore, Western link Road (pre M2PP) designation, Omokoroa to Te Puna;

(d) Wind farms (e.g. West Wind (Meridian), Hurunui (Meridian), Tararua 3, White Hill (Meridian), Mill Creek (Meridian), Kaiwrra Downs (Trustpower), Central Wind (Meridian) and Hauāuru mā raki (Contact Energy)) and Geothermal power generation: Te Kopa, TaHeke;

(e) Water storage, water take and waste water projects: Hurunui-Waitohi water storage (North Canterbury), Wakamoekau community water storage, Conway water take allocation, North Christchurch stream minimum flow assessments (macrophyte), Armold HEPS (Greytown), Wairau HEPS (Blenheim), Project Aqua - Waitaki scheme, Wahapo HEPS (west coast), Dobson HEPS Greytown, Kanierei Lakes HEPS, Ruataniwha tranche 2 water abstraction. Foxton wastewater up grade, Levin wastewater upgrade, Featherston wastewater upgrade;

(f) Mine related work: Rio Tinto Barry town flats restoration post mining, Tiwai smelter adjacent land values and management, Mananui sand mining Hokatika, Gold mining Ross, Roa mining coal impacts of streams, Grey town, Coal flat (Echo mines), Waihi gold mining expansion, and a number of assessments for mine prospecting operations on the West Coast;

(g) River diversion and modification projects: Manawatu River at Woodville for railway security, numerous diversions for roading (TG, M2PP), Taranaki Stream (Woodend), Duck Creek South and North (Porirua), Kakanui diversion (Waikanae);

(h) Over 20 large-scale subdivisions (e.g., Omaha South (Darby Partners), Long Bay (Landco), Pegasus Bay (Infinity Co), and Ravenswood (at Woodend));

(i) Sensitive area developments: Brand Housing, - Titirangi, 1999 – 2002, Piha Coastal Environments Ltd – Piha, 2000, Douglas Subdivision – Tutukaka, 1999, Lake Brunner subdivision, 2004, Lake Mahinapua tree top walkway, Te Ari Golf resort, Ohau Golf course; and

(j) Plan changes and statutory processes (e.g. Porters Ski field expansion); and Rakai Water Conservation Order (WCO) amendment, Hurunui WCO, Ngaruroro WCO, Rangitikei Ecological Region Survey Report for the Protected Natural Areas Programme, DoC, 1994; MfE Riparian Assessment Protocol, 2000; Wairoa Catchment Studies, ARC 1999.

2.0 Code of Conduct

2.1 I have read the Code of Conduct for expert witnesses issued as part of the Environment Court Practice Note 2014 (Part 7). I agree to comply with the Code of Conduct. I am satisfied that the matters addressed in this statement of evidence are within my expertise. I am not aware of any material facts that have either been omitted or might alter or detract from the opinions expressed in this statement of evidence.

3.0 Scope of Evidence

3.1 I, as a practising ecologist with substantive experience in freshwater ecology in the region, have been engaged by Winstone Aggregates (**Winstone**) to consider matters relating to Hearing Stream 5 (**HS5**) of Proposed Change 1 (**PC1**) to the Wellington Regional Policy Statement. I have particularly been asked to comment on the practical implementation of the policy direction as a practising freshwater ecologist.

3.2 My evidence assesses ecology matters related to the HS5 of PC1. My evidence is complementary to the planning evidence of Ms Catherine

Clarke. The planning evidence has a particular focus on Proposed Objective 12 and Policies 18, 40 and 41 and consistency with the National Policy Statement for Freshwater Management 2020 (**NPS-FM)** and the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (**NES-F**)

3.3 My evidence is structured as follows:

(a) I begin by considering the practical implementation of the proposed policy direction and the appropriateness of that direction from an ecological perspective,

(b) I then provide a case study example to help illustrate how the proposed policy direction will apply, and the resultant ecological outcomes,

(c) Finally, I consider the evidential basis, or lack thereof, for the proposed policy direction.

4.0 Practical implementation

4.1 I begin with a focus on the practicalities and realities related to the proposed policy directives and try to illustrate that rigid adherence to the literal meaning and loss of consenting pathways which have effects on management opportunities (as provided for in the NPS-FM and NES-F) more often than not lead to perverse outcomes and do not, in the end, result in the best ecological outcome.

Protect and enhance

4.2 As outlined in the evidence of Ms Clarke, the overall policy directive in Objective 12 and Policies 18 and 40 of PC1 seeks to “protect and enhance” waterbodies.

4.3 From an ecological perspective, the meaning of protection aligns with the ordinary meaning that Ms Clarke has provided, being the active intervention to remove harm. Notwithstanding the direction that falls within the policies, at a basic level, the direction will require active intervention to

remove harm to all water bodies. The definition of “water bodies” is broad and does not differentiate between natural and modified streams, rivers, and ponds, nor does it account for ecological value.

4.4 Protection implies that the existing state must remain as it is. It may therefore hinder any ability for improvements to occur or overall positive outcomes to be reached. From an ecological perspective, I consider that protection is appropriate for habitats that are predominantly indigenous, intact, representative and have no serious impediments to condition (and therefore should be significant) and that contain high natural value. These are habitats that should be retained in their current state. Highly modified water bodies do not need “protecting”, they need intervention and actions that make the quality better and sustainably so. Water bodies that contain moderate – low value also should not require protection as they do not have the values to warrant a “freeze” and they also require intervention and assistance and can sustain a level of effects in order to attain offset or remedial gains.

4.5 If highly modified rivers and those with low ecological value must be protected and with no consent pathway with well managed effects management provided in the policy directives then, in my experience, that feature will continue to degrade until there is little to no ecological value in the feature. To provide an example, imagine a 1km rural stream which is blocked from fish access, has eutrophication issues to the point where the macroinvertebrate fauna are very poor, is sediment filled, has exotic macrophyte dominating the bed, the water quality is polluted (by stock or stormwater), the banks are topped in blackberry, but bare sided and so erode, and periodically the system is cleaned out with a digger. Such a stream (common in the rural landscape) has virtually no ecological value and little potential. Is its protection necessary or even beneficial? In my opinion, I would very readily promote 200m to be lost to a culvert if the remaining 800m could be as a result restored to full function, the water quality corrected, a buffering native riparian revegetation program and fish habitat created and provided. Surely that is preferential to nothing occuring because the priority was to “protect”. It is not always possible to ensure a linear / area offset and there needs to be a process that allows real betterment for some loss of extent in some examples / situations.

4.6 I would support direction that requires the “maintenance” and where possible the “improvement” of waterbodies. I consider that maintaining is about the retention of values and condition and processes that have functional importance not the stagnation in the exact current condition and state (where that is less than good).

Policy pathways

4.7 Subclauses (c) and (e) of Policy 18 require “no further loss” to inland natural wetlands and the extent and values of rivers. I understand that this has been derived from Policies 6 and 7 of the NPS-FM.

4.8 The NPS-FM does not intend that all wetlands and rivers be avoided or that the literal sense of “loss of extent” means not one square centimetre can be lost. However, a literal interpretation can often be taken, as I have witnessed on several occasions. While I understand that the Regional Policy Statement may not be able to assist with such interpretation issues, it can and should avoid the potential for new interpretation issues.

4.9 As Ms Clarke discusses in her evidence, the NPS-FM also includes additional direction through Clauses 3.22 and 3.24 which provide a pathway for certain activities within rivers and wetland. This direction is important and, in my experience, does allow for positive environmental outcomes to occur. I consider that if Policy 18 is seeking to reflect Policies 6 and 7 of the NPS-FM, it must also include the pathway clause. Without doing so, there is risk for further implementation issues through literal interpretation.

4.10 I have been directly involved with Council staff in wetland areas of creeping butter cup and soft rush or creeping bent and soft rush that, while pasture in use, qualify as natural inland wetlands (as the NPS process defines). Council staff were then adamant those areas in total required avoidance. That avoidance (inconvenient to the developer as it was) removed any effects of the project. No effects management was required and because it was avoided, no improvement were made to either wetland. Thus, while the project would have removed those (or some of those) “natural wetlands” the proposed offset returned substantially better, and more indigenous, better functioning wetlands. Council however, remained stuck on avoidance of low no value

features. I assume because the plan did not provide a readily accessible pathway to remedy poor condition, low representative features through effects management.

Avoid the reclamation, piping, straightening or concrete lining of rivers

4.11 I understand that changes have been suggested by the Section 42A report writer to Clause (n) of Policy 18 to require avoidance of reclamation, piping, straightening, or concrete lining of rivers unless there is a functional need, and the effects management hierarchy can be met (noting some difficulties that can be meet under the new offset principals in the NPS FM Appendix 3). As I understand it, this policy assumes that all of those activities would result in "loss of river value and extent".

4.12 In my experience, such activities can occur within modified rivers and rivers of low ecological value (for instance ephemeral flow paths) without any discernible ecological effect. There can be the construction of a new and often longer extent of waterway (a diversion) or improvement of an existing reach that otherwise had very little to no ecological value.

4.13 Despite this, the direction would not provide for such activities and assumes that there would be "loss of river value and extent". There is also no consideration of the value and condition where the direction is to avoid it entirely. Too often I have experienced Council failing to consider the current levels of modification and challenge when they are considering avoidance as the priority rather than having a pathway to attain the removal of the harm and the restoration of the system, even if that means some effects.

Fish passage

4.14 Clause (r) of Policy 18 as proposed requires "restoring and maintaining fish passage". This also is a laudable, desirable outcome typically, however only where it is reasonable and sensible to do so. While only the Director General has the power to permit not retaining existing fish passage, fish passage is not always desirable or required. There are times when, because of upstream vulnerable populations of rare native fish, fish passage should be hindered or removed (such as to exclude trout, or eel).

Or there are times when an intermittent headwater is sufficiently low in water that there is no fish habitat and does not require passage. Or there may be water quality or physical conditions that are harmful to fish and passage is not desirable (at least in the short to middle term). I have encountered all of these examples and in each the Council has simply, without discussion, required provision of fish passage.

4.15 The plan should recognise that there may be exceptions and that there should be a process to consider where fish passage would not be beneficial or is not required. I understand that the Section 42A author has recommended the addition "where appropriate" which I support.

Use of "maintaining"

4.16 Policy 40 uses the defined term "maintaining" in various parts (e.g. subclause (d),(e)(i), (j),(k)). The definition of maintaining (Plan Change 1) means:

> *At least no reduction in the following:*
>
> *(a) the size of populations of indigenous species*
>
> *(b) indigenous species occupancy across their natural range*
>
> *(c) the properties and function of ecosystems and habitats*
>
> *(d) the full range and extent of ecosystems and habitats*
>
> *(e) connectivity between and buffering around, ecosystems*
>
> *the resilience and adaptability of ecosystems. The maintenance of indigenous biodiversity may also require the restoration or enhancement of ecosystems and habitats.*

4.17 The data to support consideration of these "criteria" in assessing a regional resource consent for activities affecting freshwater bodies do not, in the main, exist and any consent application assessing its impacts against these will be significantly at risk.

4.18 Item (a) in a literal sense requires no loss of any individual of any indigenous species. Without qualifiers this means any plant, bird, fish, bat, any invertebrate (beetle, butterfly, wasp, fly, worm, crayfish), any algae, protozoans, bacteria etc. If it is about a meaningful loss to affect the population then you must know what the population of species x is, and its natural numerical fluctuations (natural variable death rate, birth rate, immigration and emigration). From a biological science perspective, you cannot just state “no reduction in the size of a population” and expect an applicant to be able to determine if this will be the case where there is the presence of indigenous species and habitats which cannot in total be avoided.

4.19 If it is just about fish, birds and bats even then, and while current practices are total salvage / rescue, there will be some losses. How is an applicant to prove that that loss does not cause a reduction in the population at all scales (e.g. local, catchment, reginal and nation). In my opinion, this would be impossible.

4.20 Item (b) requires no reduction in species occupancy across its natural range. However, the natural range of most indigenous species is not known. There are some broad geographic boundaries for most plants and birds but little or nothing for other taxa groups. Further a species range is fluid and dependent on climate change, species breeding and disbursal success and on local catastrophe events as well as on the success of other species, including its predators. An applicant has no way of assessing this item realistically.

4.21 Item (c) “properties and functions“. Again, the understanding of the range of these aspects for habitats and ecosystems is in its infancy and poorly research and understood. At best we consider buffering, filtering, absorption and corridor functions, but cannot measure quantitatively effectively these functions across a habitat or ecosystem never mind being able to deduce a reduction in their function due to a subtle effect or even what the entire loss causes. Item (e) is a subset of (c), and these concepts, although intuitive in their meaning, are not well understood and very difficult to measure / quantify but easy to state without empirical proof of the function or the level of function.

4.22 Item (d), related in part to (b) has at least a framework through the Protected Natural Areas Program and LENZ (Land Environment's New Zealand) and Land Cover Data Base (5) such that habitats and ecosystems representation pre-human can be estimated and the quanta of those areas remaining can be calculated (to a degree) and we know then which habitats and ecosystems are less than those historic cover representations, but we will never have the "full range" as competing land uses will always cause less indigenous habitat to be present than historically. Therefore, there is already a reduction from the "full range" and extent. Most plans and systems these days (including the NPS IB) seek to protect or cause the protection of between 20 and 30% of the original extent. The plan under maintenance should reference this as a more viable goal and one that could be effectively tested. But even then, it should not be an absolute.

4.23 Lastly, item (f), the resilience and adaptability of ecosystems. These are intangible ecological terms with theoretical meanings related to assemblage fidelity after disturbance and level of environmental tolerances and strength of food webs etc. They are not measurable testable terms a consent applicant (or Council) could measure and make a determination as to if the activity affected an assemblage's resilience or adaptability (unless it was total removal).

4.24 The maintenance and no reductions in items (a) – (f) are all aspirational but have little to no supporting data and very little way for applicants to measure and test most of them.

4.25 It is similar with the other aspects required to be maintained under policy 40. i.e.:

- maintaining the functioning of ecosystems in the water body;
- maintaining the ecological functions of riparian margins;
- maintaining natural flow regimes required to support aquatic ecosystem health;
- maintaining space for rivers to undertake their natural processes; and
- maintaining fish passage.

4.26 Most of these aspirational and nominally good things to consider don't have empirical measurable attributes and are not testable and will rely instead in a narrative and knowledge of the Council officers and a shared understanding which is typically missing.

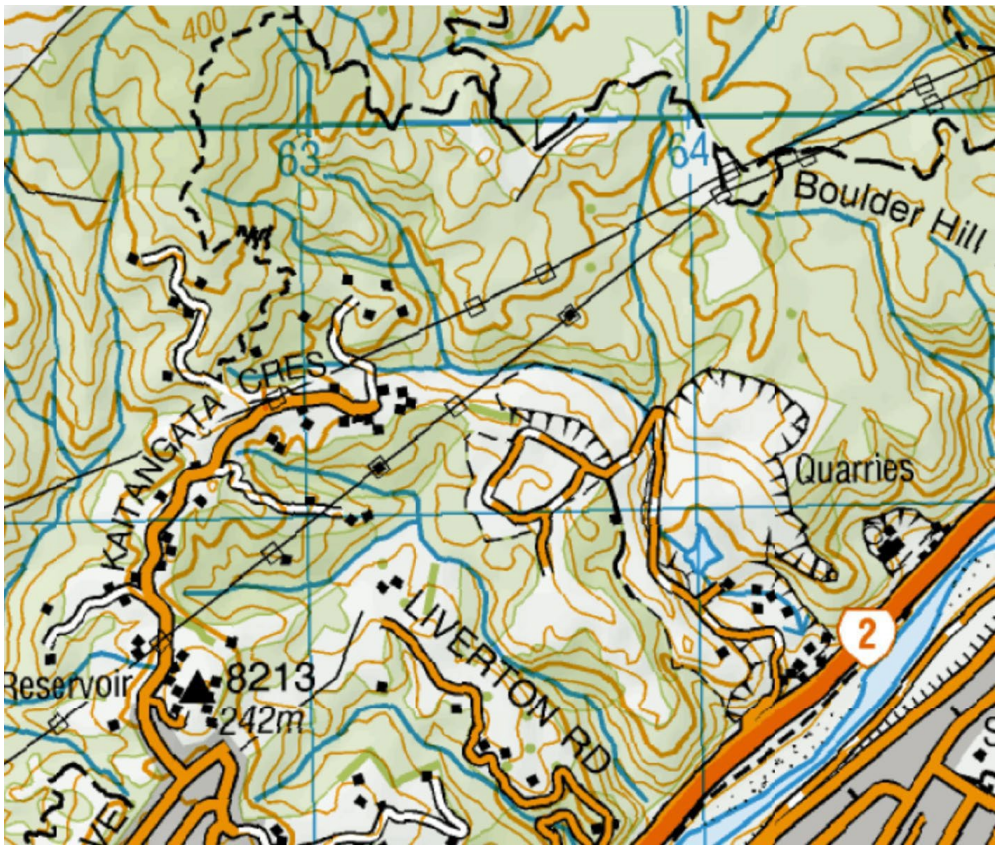
5.0 Case study

5.1 In order to provide further understanding to the practical implementation of the proposed policy, I will provide an example of how it may be applied to a Winstone site in the Wellington region.

5.2 Winstone has a quarry and processing plant in the Hutt Valley in the lower Hutt City on the Belmont Hills just off State Highway 2.

5.3 They have an operational requirement to move streams to attain the resource and to place overburden in places that do not interfere with quarry operations. They are space poor and have a premium for sediment management space, internal roading and the quarry areas themselves. They often require fill sites which in the past have typically involved gullies, headwater tributaries, and stream valleys.

5.4 The quarry was founded on and through an un-named tributary of the Hutt River.



5.5 In 1939 The tributary was somewhat bush clad, although farm clearances had occurred over most of the less steep land and the connection to the Hutt River was already compromised by the road. Nevertheless, while fish may have struggled to gain access it would have been good macroinvertebrate habitat.

Photo 1 - 1939 the quarry stream prior to quarrying.

5.6 Quarrying started in earnest in the 1950's and by 1966 the lower stream tributary was "gone". It has not as yet been returned.

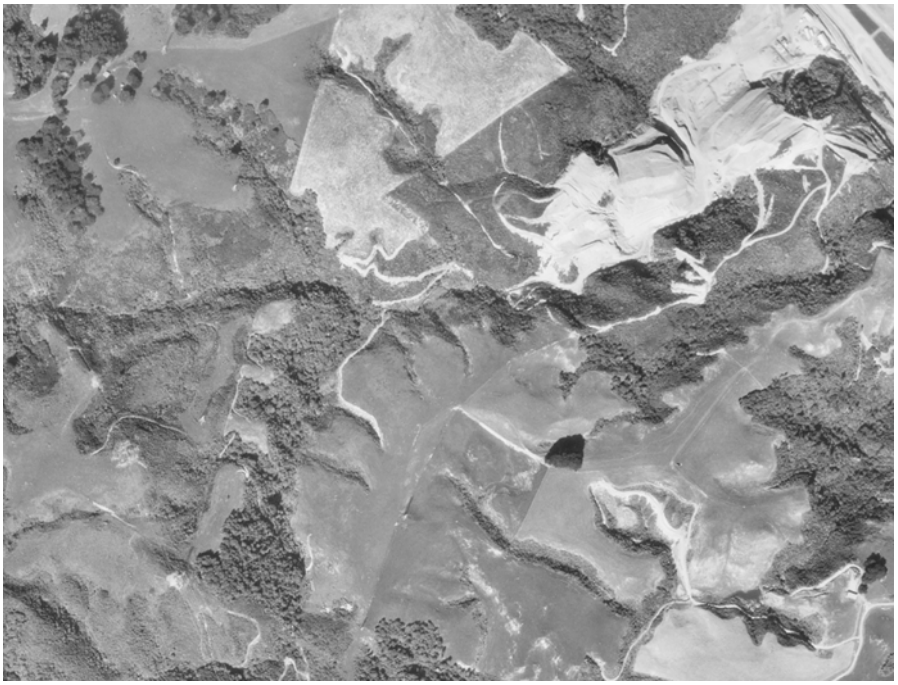


Photo 2 - 1966 the quarry area is cleared, and the lower stream is gone.

5.7 Meanwhile the upper branches have accumulated sediment, due in part to the retention caused by the new gradient and the culvert system withholding flood flows, and due to upstream land uses (although these have diminished). The true right tributary's true right bank was removed and replaced with a concrete retaining wall (and fill). The condition of the stream is very poor to non-existent in the quarry and that has led to flow on upstream adverse effects compounded by down flowing sediment and reduced riparian quality, not to mention the blockage of fish passage for decades. The upstream reaches are of moderate quality and condition and the main stem is no longer the cobble / gravel hard bottomed stream it was but soft deep mud systems or sediments with gravels.

5.8 If Winstone were to look to fill the stream reaches with overburden the current proposed plan / plan change would not appear to present any form of pathway for such an activity. But what if that activity could be used to attain a better stream habitat and quality, with greater habitat security and benefits such as fish passage? Would not this outcome be better than the status quo?

5.9 It would require a novel solution and cause all sorts of difficulties with respect to consent conditions and compliance monitoring etc but rather than "avoid loss of extent" and so no consent available and the system remains as it is for the life of the quarry and possibly longer, what if the planning regime allowed consideration of options that would focus on returning the Mana of the Wai and the linear length and area of aquatic habitat and resolve the sediment issue and return full indigenous managed riparian vegetation cover and fix the fish access issues? And that that consent process cause the combined consideration of the lower stream, currently artificial in the quarry, and its restoration plan as part of the whole also. Then surely that would be an outcome worth considering and exploring through the consent process.

6.0 Evidence basis for proposed policy

6.1 From an ecological perspective, I consider that there is a lack of evidence for the direction proposed. Where the direction goes beyond the NPS-FM, for instance the protection of <u>all</u> water bodies, it would be expected that a

robust ecological assessment is provided in support. This assessment should provide detailed assessment of all waterbodies in the Wellington region and why protection is necessary.

6.2 Based on my review of the Section 32 evaluation, there is a very limited evidence basis. It makes very generalised and rather sweeping statements about land uses having degraded the water quality and reduced aquatic habitat quantity. They were not wrong when they stated the causes of degradation are complex, but the level of degradation is not the same across all land uses and even within the same land uses. It is correct to generalised in a sweeping way that pasturalisation (1830s-1960s) from indigenous forest cover radically changed the type and quantity of aquatic habitat and proportional representation of instream fauna and flora and changed the water chemistry and the food webs. And it is correct to generalise that farming intensification and urbanisation and roading has caused novel stormwater additions to lowland waterways and reduced their fitness. It is not the case that all streams and wetlands everywhere have degraded or degraded to the same extent.

6.3 There is no evidence presented that shows the need to protect, in an absolute way, all waterways and natural inland wetlands in all places. Some are not “worthy” of protection (they need substantial assistance). It is not correct that they must all be treated in the same precautious manner and that all are vulnerable to further degradation. In some cases, some waterways have become so tolerant because of the factors of the last 200 years that it is almost impossible to reduce their condition further. This is why even though very large earthwork projects which discharge sediments over numerous years, year in and year out, the aquatic fauna hardly changes.

6.4 The evidence for degraded indigenous biological diversity is somewhat better in that at least the section 32 references some scientific or general literature on the matter of reduced biological diversity in the region. However, in stating degradation continues their own evidence reports a 1% increase in forest cover. NZ statistics reports more than that and over wider habitat types.

6.5 Indeed, the DoC Biodiversity strategy (2020) (referenced by section 32a) states that predation / pests are the largest current threat to IB, not continued habitat loss or degradation (although that is partially caused by the pest species).

6.6 So, the case for protection and enhancement of waterbodies, and no loss of extent and avoidance of adverse effects to particular features is not well supported by evidence. It also misses what I believe will be crucial in the reversing of trends which is the use of an effects management regime in consenting processes that allow conversations and considerations of all but the very valuable, intact, rare and irreplaceable.

7.0 Conclusions

7.1 In this evidence I have tried to illustrate why a protection focused plan is unlikely to reverse the harm or restore the streams and wetlands in our landscape.

7.2 I have tried to show how maintenance as defined and directed will be near impossible to prove and is not always required or desired and is dependent on the condition of the water way or wetland in contention.

7.3 Currently I see very little such pragmatic and historic issue resolution occurring and less will occur under the proposed plan change.

Dr Vaughan Francis Keesing

Dated the 3rd day of November 2023