

Before an Independent Hearing Panel of the Hawke's Bay Regional Council

In the matter of the Resource Management Act 1991 (the Act)

And

In the matter of applications APP-123534, APP-123548, APP-123526, APP-123550, APP-123535 & APP-123536 by the Regional Assets Section, Hawke's Bay Regional Council to remove gravel and undertake other earthworks at various locations along the Ngaruroro River, Tukituki Catchment Rivers and Tutaekuri River to the coast

Statement of Evidence of Shade Smith on behalf of Ngāti Kahungunu Iwi Incorporated and Te Taiwhenua o Heretaunga as Submitters to the Applications.

Dated 30 November 2021

INTRODUCTION

1. My full name is Shade Smith. I am the Kaitātari matua (Senior analyst) in the Taiao me Ōna rawa (Environment and Natural Resources) Unit at Ngāti Kahungunu Iwi Incorporated (NKII).
2. Since 2006 my work has focused primarily on assessment and monitoring of activities affecting aquatic environments (both freshwater and marine) including the ecological effects of discharges, and more broadly on aquatic ecology and environmental impacts.
3. I have the following qualifications and experience relevant to my evidence:
 - a) MSc in Marine Science from the University of Auckland.
 - b) Interpretation of how policy decisions and data science interact and best recognise and provide for Maori cultural relationships and values, and in particular that give effect to Te Mana o te Wai.
4. My expertise includes general environmental science, freshwater and marine ecology, benthic ecology, statistical design and analysis, and design and analysis of kaupapa maori assessments of aquatic environments.
5. Through my work I have conducted survey and assessment work extensively throughout the Hawke's Bay region, including a number of assessments within the Ngaruroro, Tutaekuri and Tukituki rivers, related tributaries and receiving estuaries.
6. I am employed by NKII (Submitter) and provide evidence on behalf of NKII and Te Taiwhenua o Heretaunga (TToH) in relation to applications for gravel extraction and associated activities (the Applications) at various sites in the waterways of interest i.e. the Ngaruroro River, Tukituki Catchment Rivers and Tutaekuri River.
7. My evidence applies in particular to actual and potential effects on flow dynamics between surface water and groundwater, natural character and habitat quality as a consequence of gravel extraction and associated activities as proposed in the Applications.

8. In preparing this statement of evidence I have read the section 42A RMA Officers' report and the recommendation of the Officer in respect of submissions.

EXPERT CODE OF CONDUCT

9. I confirm that I have read the Expert Witnesses Code of Conduct contained in the Environment Court of New Zealand Practice Note 2014. My evidence has been prepared in compliance with that Code in the same way as I would if giving evidence in the Environment Court. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

SCOPE OF EVIDENCE

10. In my evidence I will describe and address actual and potential effects of the Applications on the waterways of interest, particularly with regard to Te Mana o Te Wai as referenced in the National Policy Statement for Freshwater Management 2020 (NPSFM2020) wherein the hierarchy of management priorities places the needs of the waterway above other needs.

INTRODUCTION TO POTENTIAL EFFECTS

11. Freshwater and in particular riverine ecosystems are under increasing pressure globally from human activities through in-channel activities such as gravel extraction or flood protection, river channelisation (e.g. with stop banks, planting, or riverbank 'reinforcement'), damming, land cover changes, and encroachment (e.g. of farmland).
12. These stressors have traditionally been considered by resource managers in isolation, however there is now a growing acknowledgement of the synergistic effects of independent stressors to cause wholesale change in aquatic environments and unintended consequences of implementing solutions without addressing fundamental imbalances.
13. This growing acknowledgement among the mainstream scientific community aligns with a centuries held worldview of maori, that implicitly acknowledge the interconnected nature of the environment and people that

results in a holistic and precautionary approach to use and care for the environment while incorporating the needs of tangata whenua.

14. Te Mana o Te Wai is a concept that encompasses the above notion and acknowledges the inherent connectivity of wai, and connected features including for example habitat, groundwater, and wetlands.
15. While my evidence has a particular focus on issues arising from gravel extraction and associated activities it is emphasized that these factors do not act alone in the degradation of affected ecosystems.

POTENTIAL EFFECTS OF GRAVEL EXTRACTION ON GROUNDWATER RECHARGE

16. Understanding how braided rivers work hydrologically in the relationship between surface flow, subsurface flow (hyperheic exchange) and groundwater exchange is the focus of a five year (2019 – 2024) MBIE funded research project led by Lincoln Agritech Ltd, which both NKII and the HBRC, among others, are research partners to.
17. By understanding how braided rivers work conceptually the aim of the research is to appreciate how different aspects of river management, i.e. gravel extraction and river confinement, influence their ability to sustain flows during dry periods and provide groundwater recharge.
18. One of the main pieces of missing information about braided rivers is the extent and nature of subsurface saturation, and how it changes with different flow conditions. Although the research is ongoing there has been some preliminary findings that provide evidence of the negative effects of unsustainable gravel extraction on groundwater recharge.
19. One of the study reaches of the research is the Ngaruroro River downstream of Roys Hill where large quantities of gravel have historically been extracted. This has led to a lowering of the riverbed and reduction in braiding, with water largely constrained to one or two braids along the true left bank. These are both signs of a gravel deficit in the area. The area is also known to be the principal area of exchange, i.e. recharge, between waters of the Ngaruroro River and the Heretaunga aquifer.
20. The way in which gravel extraction appears to affect groundwater recharge is through changes in the integrity of an intermediary process between the

overlying river water and the underlying regional aquifer, i.e. the Heretaunga aquifer, called the Braid Plain Aquifer (BPA).

21. Losses from the river to the regional aquifer are mediated by the BPA, in other words the BPA exchanges flow with the surface water, and provides recharge to the aquifer, and this exchange varies through time, i.e. during dry summer conditions the river may be disconnected from the BPA while in higher flows and winter months the BPA is likely to be hydraulically connected to the river.
22. Recharge therefore depends on how well the BPA functions, which is in turn a function of a number of factors including resistance (or conductivity) at the base of the BPA, volume of the BPA, i.e. area, thickness, and the head above the BPA base which is related to volume, i.e. thickness.
23. It is suggested that both gravel extraction, and confinement of the river, in the Ngaruroro study reach has negatively affected the BPA by reducing its width and therefore volume through both a reduction of braiding and water surface elevation (head) from a lowering of the riverbed.
24. In summary maintenance of the integrity of the BPA is key to managing river flow, and groundwater recharge in the dry season.
25. This relationship between gravel extraction and river confinement vis-à-vis river bed level and braiding characteristics and groundwater surface water interactions is an important example of the connectivity between environmental features protected by Te Mana o Te Wai, which in my opinion failed to be assessed in the AEE nor addressed in the s42A Officers report.
26. Given the connected nature of gravel extraction, river confinement and groundwater recharge there is a need to integrate flood risk and water resources management within Council such that where gravel extraction consents are considered the implications on water resources are given equal and concurrent consideration.
27. Finally, given the likely heterogeneous degree of subsurface saturation, and variation in BPA characteristics among the waterways of interest there is a need for location specific effects assessments. Use of the recently collected SkyTEM data may assist in this respect.

POTENTIAL EFFECTS OF GRAVEL EXTRACTION ON NATURAL CHARACTER AND HABITAT QUALITY

28. In continuance of the above discussion on the inherent connected nature of surface water and groundwater in braided river systems, I suggest that connectivity is also fundamental to natural character, and that s6 of the RMA direct Councils to “recognise and provide for the preservation of natural character of... rivers and their margins...” while the NPSFM2020 uses the term “natural form and character” in relation to giving effect to Te Mana o Te Wai.
29. In order to better understand what I mean by natural character and habitat quality I first provide an explanation of what these terms mean. A river reach can be characterised by its set of physical features such as riffles, runs, pools, backwaters, and bars. These features in combination with the characteristics of the channel (straight, sinuous, etc.) and floodplain (wide, confined by terraces, gorged, etc.) as well as flow regimes and sediment supply, determine a rivers unique form. Where there is a wide range of these features and representation of these variables, habitat quality is generally likely to be high. Where these features are lacking, generally habitat quality is likely to be low. The overall form of a river, in combination with the mosaic of features within the river, defines its natural character.
30. The potential effects of the proposed Applications on natural character and habitat quality have been alluded to in the previous section, and are related to the loss of habitat from the general flattening of the river bed from gravel extraction and from effects on natural character from related river confinement.
31. It is my opinion that the AEE in support of the Applications has failed to address natural character and habitat quality, and indeed the s42A report is silent on the matter. TToH expressed concerns about the effects of gravel extraction on these matters and sought amendments to the Applications to address concerns with the ecological effects of HBRC’s anachronistic approach to river management for flood protection with limited consideration to the wellbeing of the waterbody.

32. In order to maintain, protect, and restore natural character and physical habitat, river management approaches need to change, and better monitoring of natural character and physical habitat is required.
33. I propose a simple approach to monitoring changes in physical habitat and natural character in the waterways of interest is warranted through the use of ratio-based before/after comparisons known as the Habitat Quality Index and Natural Character Index to assess change in the condition of habitat or natural character.
34. This monitoring would also satisfy the issue identified by Dr. Jon Tunnicliffe and Prof. Paul Kench (University of Auckland) in Appendix 2 of the s42A Officers report (section 3.2, page 6 of their review of the Applications) that discusses the need for monitoring of reach morphology in addition to three yearly cross section surveys in order that changes in sediment supply are better identified.
35. Moreover, use of the Natural Character / Habitat Quality Index would also seek to identify potential areas of the waterways of interest where adverse effects on the integrity of the BPA, and groundwater exchange may be occurring.
36. This part of my evidence draws on evidence provided by Mr. Thomas Kay for Forest & Bird submitted to the recent Hearings for the Regional Catchment Plan - TANK. Mr. Kay's evidence is provided in full in Appendix 1.
37. For guidance as to how to incorporate this methodology for measuring changes in natural character and habitat quality for the Applications, I direct the panel to the evidence of Mr. Kay (paragraphs 45 – 57). Mr. Kay also proposes limits on changes in natural character and habitat quality and I direct the panel to Tables 1 and 2 of his evidence, that both NKII and TToH are supportive of being added to as a condition of consent for the Applications.
38. This proposed condition seeks to assist in ensuring a more informed and modern approach to river management is taken and drive a transition away from degradation to enhancement and restoration.

GIVING EFFECT TO TE MANA O TE WAI

39. Before assessing how the Applications might give effect to Te Mana o Te Wai it is helpful to understand the definition of Te Mana o Te Wai. The provenance of the policy traces back to the NPSFM2017 and is articulated by Assoc. Prof Linda Te Aho as ‘the innate relationship between the health and wellbeing of the water and the wider environment and their ability to support each other while sustaining the health and well being of people¹.
40. Implicit therein is the exercise of rangatiratanga and kaitiakitanga which deal with in this case, due to the modified and degraded nature of parts of the waterways of interest, protection, restoration and enhancement. This must therefore involve incentives to further improve connectedness of the various elements of the waterbody and associated features, including mana whenua and funding for restoration and protection measures.
41. An example of what an enhanced relationship and connectedness between tangata whenua and the waterbodies of interest, and in accordance with the exercise of kaitiakitanga is the existing relationship NKII and mana whenua kaitiaki have with the Works Group staff who manage the waterway clearance programme. Following an unfortunate fish mortality event during water clearance activities in 2019 a review of the relevant HBRC Code of Practice (COP) was undertaken with the iwi and various other stakeholders to ensure future waterway clearance activities avoided or minimised fish mortality.
42. Following the adoption of the revised COP I now accompany the HBRC Programme Lead out in the field to assess each waterway for habitat and risk of fish mortality from clearance activities, and then if required facilitate the engagement of a kaitiaki technician from the mana whenua of that particular area to assist with any fish rescue and repatriation.
43. I note this is in conflict with a proposal by HBRC to hire ‘Kaitiaki’ in-house to undertake similar work for gravel extraction.
44. I am open to further exploration of ideas with the applicant to give effect to Te Mana o Te Wai, specifically in relation to ensuring mana whenua of the

¹ Te Aho, L. 2018. Te Mana o Te Wai: an indigenous perspective on rivers and river management. River Res Applic. 2018;1–7.

waterways of interest are able to meet their obligations as kaitiaki with respect to the Applications.

Signature

A handwritten signature in blue ink, appearing to read 'Shade Smith', with a long horizontal flourish extending to the right.

Shade Smith
1 December 2021

Appendix 1