BEFORE THE HEARINGS PANEL

IN THE MATTER of the Resource Management Act 1991 ('the Act')

AND

IN THE MATTER of Proposed Plan Change 9 to the Hawke's Bay Regional Resource Management Plan

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STATEMENT OF REPLY EVIDENCE OF DR BARRY LYNCH FOR HAWKE'S BAY REGIONAL COUNCIL

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1. INTRODUCTION

1.1 My name is Barry Lynch.

1.2 I hold the qualifications of PhD Chemical Engineering (environmental) from the University of Birmingham UK, MSc Environmental Pollution control, BSc Environmental Science. I hold the intermediate certificate in Sustainable Nutrient Management (Overseer) from Massey University.

1.3 I have over 20 years' experience working in the environmental applied science and research sector. I currently hold the position of Team Leader/Principal Scientist – Land Science, for Hawke's Bay Regional Council (**HBRC**). My role entails the design, management and delivery of numerous land-based projects including soil erosion and movement, soil quality, soil mapping, riparian assessment, wetland survey and inventory, land use and land use change monitoring and mapping. I have held this position for the past 11 years. I have contributed to the TANK process with several presentation to the TANK stakeholder group outlining the results of the SedNetNZ modelling and provided data and maps regarding sediment loss that has been included in the Section 32 Evaluation Report.

1.4 Prior to working for HBRC, I was an Environmental Consultant with Duffill Watts Ltd & CPG NZ, specialising in contaminated land and modelling nutrient loss through soils.

1.5 In the UK, I was a senior scientist for the combined laboratory of South Yorkshire, monitoring and investigation of contaminated land and soil movement through the landscape.

1.6 I am group leader of the National Environmental Monitoring and Reporting team (**EMaR**) looking at 'soil movement and protection'.

1.7 I was also part of the working group that produced the National Environmental Monitoring Standards (**NEMS**) for 'Measurement of Fluvial Suspended Sediment Load and its Composition'.

1.8 I have co-authored a number of technical reports and scientific papers detailing various land science issues.

1.9 I am a member of the New Zealand Soil Science Society (**NZSSS**) a member of the Royal Society and a member of the New Zealand Association of Resource Managers (**NZARM**)

1.10 I have prepared this evidence in my capacity as an expert and, although this is not a court hearing, I confirm that I have read and understand the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note dated 1 December 2014. I have complied with it when preparing my evidence, and I agree to comply with it when I give any oral evidence. Other than where I state that I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

Purpose and scope of evidence

1.11 The purpose of this evidence in reply is to address matters raised in statements of evidence filed by submitters.

1.12 I provide narrative on matters raised by other witnesses only where I consider that what they are saying may not be correct or that it should be qualified.

1.13 For the avoidance of doubt, any failure to cross reference or specifically discuss any matter raised by other witnesses does not mean I agree with that evidence of the other witnesses.

1.14 My evidence will address matters raised in the evidence of Ms Sturgeon on behalf of Horticulture New Zealand.

1.15 My evidence addresses the following matters:

(a) the removal of the riverbank erosion component of the SedNetNZ model and focus only on hill country erosion processes as part of priority catchment selection;

(b) use of updated SedNetNZ model and selection of new priority catchments better recognising hill country processes in sediment production; and

(c) future improvements in modelling to differentiate between areas of natural erosion that can't easily be mitigated and areas that can be managed by landowners.

2. KEY FACTS AND ASSUMPTIONS RELIED ON

2.1 In preparing my evidence I have reviewed the following documents and evidence:

(a) *Application of a revised bank erosion model to update SedNetNZ results for Hawke's Bay* (Smith et al. 2020)

(b) HBRC Section 32 Evaluation report

3. REMOVAL OF RIVERBANK EROSION COMPONENT OF SEDNETNZ WHEN SELECTING PRIORITY CATCHMENTS FOR SEDIMENT MITIGATION ACTIONS

3.1 I understand Ms Sturgeon's reasoning for removing the riverbank component from SedNetNZ, when selecting priority catchments for erosion mitigation actions (paragraphs 54 & 55), but I disagree with this action. To remove the riverbank erosion component of the model would remove a significant proportion of the total erosion budget and may give a false representation of what should and should not be a priority catchment. I understand that there are some areas identified by SedNetNZ as a priority catchment that wouldn't be suitable for landowner mitigation works (e.g. the Ngaruroro river corridor) but it is my opinion that there are substantial lengths of riverbank that can be improved and in so doing reduce overall erosion in the Tūtaekurī, Ahuriri, Ngaruroro and Karamū (**TANK**) Catchments.

3.2 In 2020, the SedNetNZ model was updated with an improved riverbank erosion component (Smith et al, 2020). This update allows the model to present a more realistic interpretation of the riverbank erosion contribution. With the new modelling, the Ngaruroro River Corridor Catchment is still presented as a priority catchment but showing a lower yield than before. This particular area (that couldn't be greatly improved by landowner intervention) will be investigated further by HBRC's asset management section and is discussed in Ms Baker's evidence.

3.3 The updated version of SedNetNZ also gives us the opportunity to increase resolution at a sub-catchment scale and so better select areas as 'Priority' Catchments. This is described in the next section.

4. UPDATED PRIORITY CATCHMENT SELECTION FOR SEDIMENT YIELD

4.1 The sediment Priority Catchments – Sediment Yield, presented in the TANK plan have been revisited and a more detailed map has been produced. This map is based on the updated (2020) version of SedNet NZ.

4.2 This map uses a more detailed sub-catchment base map presenting a much more detailed view of where priority catchments are (Appendices 1 and 2).

4.3 The updated map with increased detail allows easier identification of areas that would be classed as areas of 'High Priority' and as a result reveals that it is the hill country

areas with hill country erosion processes that are mainly now classed as Priority areas.

4.4 It will be seen that if the original range scales for sediment yield were kept as they were in proposed Plan Change 9 (**PPC9**) (i.e. Priority Areas identified as having a loss of over 500 tonnes per km^2 per year), using the updated model, then there would be very few Priority Areas. A new map with new sediment yield ranges has been proposed with the upper range designating a Priority Area now being set above 450 tonnes per km^2 per year (Appendix 1). This gives a better spread of different classes of sediment yield areas allowing better focus on mitigation of sediment production. The application of these maps is discussed further in the evidence of Ms Baker.

5. FUTURE IMPROVEMENTS

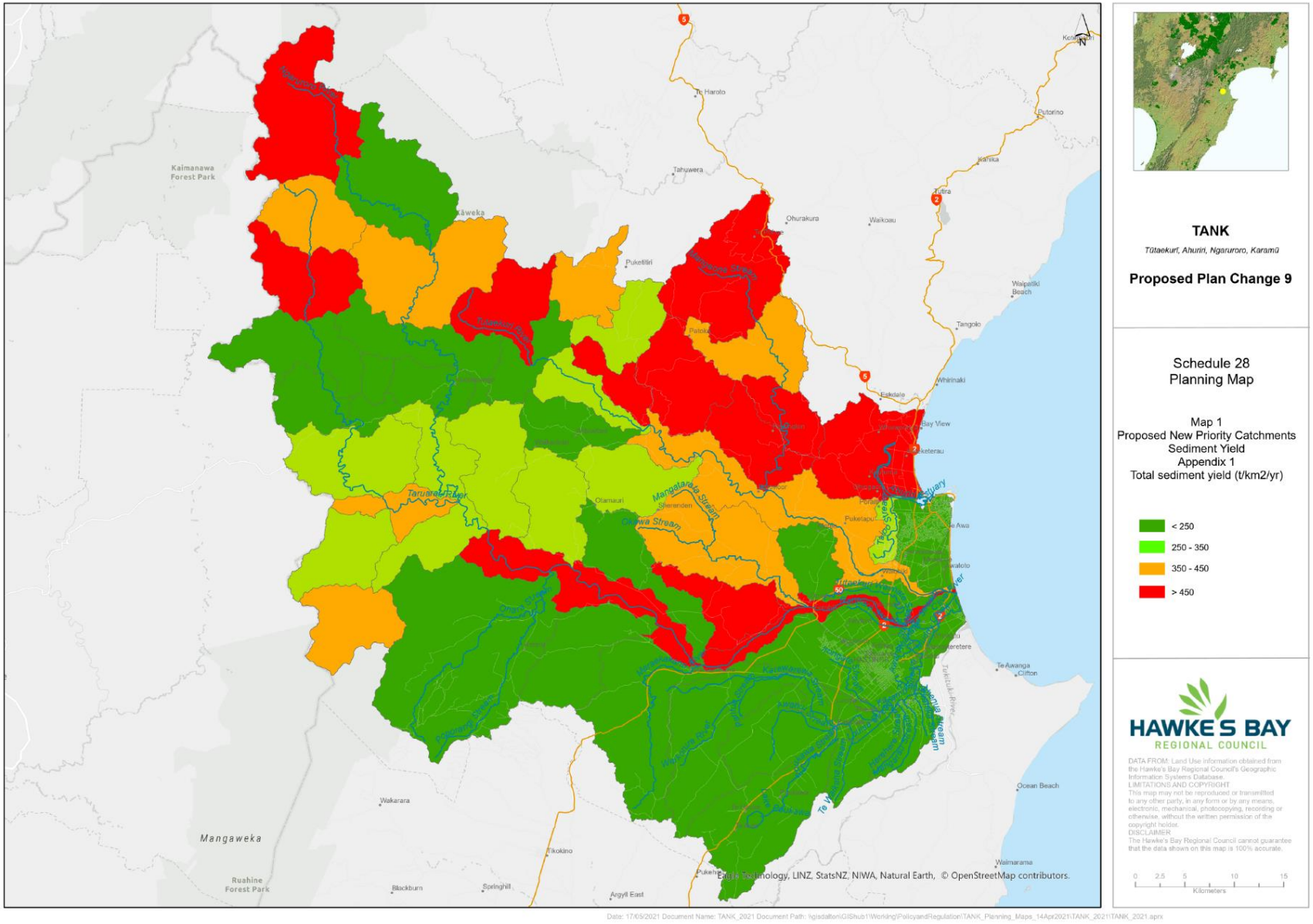
5.1 With advances in remote sensing imagery and data collection and better modelling, it will be possible to further improve the SedNetNZ model and differentiate between areas that could be classed as natural erosion, and may not respond to land owner mitigation e.g. deep incised gullies, and areas that will respond well to erosion mitigation measures such as unprotected riparian areas on flat land or steep grazed pasture.

Dr Barry Lynch
19 May 2021

REFERENCES

Smith, H, Spiekerman, R, Herzig, A, Dymond, J, 2020. *Application of a revised bank erosion model to update SedNetNZ results for Hawke's Bay*, NZ: Manaaki Whenua Press.

APPENDIX 1: New updated Priority Catchment map for TANK using new sediment yield ranges.



APPENDIX 2: New updated Priority Catchment map for TANK using original sediment yield ranges from PPC9.