In the matter of:	Clause of Schedule 1 – Resource Management Act - Submission on publicly notified plan change – Proposed Waikato Regional Plan Change 1 – Waikato and Waipa River Catchments
And:	Hill Country Farmers Group Submitter ID 73321
And:	Waikato Regional Council Local Authority

Summary of Hearing Block 1 Presentation - Scheduled March 27, 2019

INTRODUCTION

1. My name is Jason Barrier. I am a sheep and beef farmer in the Waerenga sub-catchment in North Waikato. I am here today to represent a group of 49 hill country farmers from the Waerenga, Matahuru, Mangapiko and Whangape sub-catchments. Collectively we farm 21,400ha of land which includes 1265 waterways.

2. We fundamentally disagree with some of what has been put forward by the CSG and we seek changes to the proposal so that it becomes inclusive and practicable plan instead of being a divisive and dysfunctional one. Today we will be speaking with you about our financial capabilities, our communities, and our water - and the threat that PC1 poses to those three things. We will identify some fundamental omissions and errors in both the science and the economic analysis and will suggest some better strategies that would allow us to contribute in meaningful ways to the 80 year targets of the Vision and Strategy for the Waikato River.

3. We farm on strong North Waikato hill country, stable ash and clay-based soils that lie beneath hills of up to 40 degrees. It is strong resilient country where cattle and sheep have grazed for the past 100 years. We use non-intensive or extensive farming systems - where cattle and sheep are free to wander at low densities across wide expansive areas of hill country. They are moved on a weekly basis or sometimes left “set stocked” a few in each paddock for months at a time.

4. This type of farming system is distinct from the image many people have imprinted on their minds when they think about farming where cattle are confined onto small areas and moved twice daily. That is a highly productive system on flat to rolling land, high input and high output. It’s very important to our economy…it’s called intensive farming, and it’s nothing like what we do.

5. There are many micro environments which co-exist with our extensive farming practices. We are also blessed with a lot of water. In our valley of 4 farms there are more than 100 little creeks that feed into a main stream on the valley floor. These ecosystems provide habitat for native species, fishing and swimming holes for our

local children and Mahinga Kai for our local Marae.

6. It would be naive to pretend our waterways are perfect or even the same as they were 100 years ago, but most of them are still good enough to drink from. They provide natural stock water to every paddock and sustain the wildlife throughout in our valley. We curse them when they flood, we cross them every day - we are more than just “stakeholders” - we are the custodians - we live with them - our water is part of our lives.

7. We have farmed beside these creeks for a very long time - in some cases three generations. In most cases the intensity of our farming (SU/ha) is not dissimilar to the way our parents farmed. The financial returns to our hill communities are strong right now. Like all industries we have had tough years where money was short, and losses were common. Many of us could have profited by jumping upon the land use change bandwagon by selling pieces of our land to dairy farmers or to corporate forestry - but most of us chose not to. We chose not to because hill country farming is not just WHAT we do - it is WHO we are.

8. Hill country farming is in good shape as a legitimate, sustainable and profitable use of our land. The innuendo that our type of farming is unprofitable, that our land is somehow “marginal”, or could somehow be regulated toward ‘better uses’, to “offset” more intensive farmers downstream is incorrect. We are justifiably proud of our landscape, our stock, our community and also of our waterways. Whilst we may not have the financial muscle of the dairy industry in the Waikato, we believe we add value in many other ways that are just as important including - aesthetics, recreation, biodiversity, community and cultural values.

9. Notwithstanding all of that, we acknowledge we are part of a larger Waikato community and just like the dairy farmers, the dams and the cities, we too have an environmental footprint. So as the custodians of the largest share of Waikato’s freshwater we were initially very supportive of and our sector engaged with the CSG process which we hoped would bring about change for the better.

10. Regrettably PC1 will achieve NONE of those things. The outcome of the CSG process has been hugely disappointing to us. We strongly assert that without significant changes to several aspects of this proposal - PC1 will not achieve the things the CSG was tasked with achieving – at least not for our hill country communities and certainly not for our headwater ecology.

11. Our concerns have been documented in our pre-circulated submission evidence relate to 3 key areas which we will outline today:

    11.1 Richmond Beetham will explain the dire and poorly understood financial implications of the proposed policies for many families in our hills.

    11.2 Kirstie Hill will explore how those financial consequences will inevitably erode the vibrancy of our communities.

    11.3 Kelly Deihl and I, Jason Barrier will show how our catchments have been understudied. How this dearth of relevant hill country water information combined with a lack of practical experience of hill country environments has led to some fundamental failings and misplaced strategies which have in turn given rise to a set of rules some of which are at once, both impracticable and unenforceable. Rules that if taken at ‘face value’ will cause more environmental harm than good.

RICHMOND BEETHAM – FINANCIAL IMPLICATIONS

12. Expert Evidence of Richmond Beetham, including the Baker Ag Report on Implications of the proposed Waikato Regional Plan Change 1, has been pre-circulated.

KIRSTIE HILL – COMMUNITY IMPACT

13. My name is Kirstie Hill. I live in the Waipuna Valley with my husband and our 3 sons, where we farm sheep & beef on hill country. Our group represents 49 farmers today who are part of our Hill Country Farming Group. Some are close neighbours and others widespread across the Lower Waikato. The following anecdotal examples provided are based around information from my local district. However, these scenarios are typical of Hill Country farming and rural communities in general and have widespread applicability in relation to the decisions in front of this hearings panel on the Waikato Regional Councils Plan Change 1 and Variation 1 (PC1).

14. There is an inextricable connection of farming to rural communities. We seek to highlight the unintended consequences of PC1 or other such policy, that does not consider vibrant rural communities as a part of the whole and establish management frameworks that are effects based and equitable.

15. The people living within an ecosystem cannot be held apart from that system, and interactions, influences and interdependence must be considered. In this way, the economic and social health of our community is inseparable from environmental wellbeing. It is the position of the Hill Country Farming Group that PC1 has failed to take an integrated and sustainable approach to addressing the health of our waterways, by failing to consider the people within the ecosystem.

16. The rules and methods of PC1 will impose significant economic burden on hill country farming families – those with the most extensive pastoral farming systems and lightest environmental footprint. This is not fair and equitable.

17. The risk to industry, economy and the livelihoods, culture, and wellbeing of many families hinges on the proposition that PC1 will be successful and the assumption that there is no other way to achieve clean water. Yet the plan itself acknowledges its current form will not achieve its environmental outcomes, that further plan changes will be required and that significant reversion into forestry is likely. This is not effects-based.

18. Common sense tells us that unjustified costs are unsustainable for hill country farming. They will eventually put us out of business, and we must consider what will also be lost in that scenario. The very character of hill country culture is intimately linked with our farms and families and we have an interdependence and synergy with our local communities. It's a logical projection that hill country communities, which are closely tied to farming life, will also decline.

19. The hill country community has felt marginalized by the lack of consultation on this proposed plan change. Hill country farmers have the experience and knowledge to have offered practical insight, if only we'd been asked and then also listened to.

20. Lack of consultation has not been for a lack of trying on our part. We have been involved at a local level to support the development of the Lake Waikere and

Whangamarino Wetland Catchment Management Plan. However, after much time and effort invested, very little of our input was reflected in the CMP document.

21. Over the course of CMP discussions, the destructive capacity of Koi carp was identified as a significant insult to our waterways. An analysis report by Dr Doug Edmeades indicates koi carp are perhaps the most pressing issue affecting sediment in the waterways where they are present. At the very least, it's an obvious place to start turning the trend away from deterioration to allow for potential improvement.

22. PC1 completely disregards the threat presented by koi carp which we have observed to grow exponentially as population density and distribution continue to increase unchecked. Yet PC1 takes no measures toward control or eradication of koi carp.

23. In modelling outcomes for PC1 the TLG Integrated Assessment Two states: "This scenario will have minimal impact on pest weed and fish populations. Pest fish such as carp, catfish, gambusia and rudd are very resilient to a range of water quality characteristics. This scenario is not expected to see reductions in their number."

    - Integrated Assessment Two: Achieving water quality for swimming, taking food and healthy biodiversity. - TLG (2016)

24. Some of our members initiated a trial project on koi carp, to test the possibilities of intervention within a contained drainage area. This was to be a collaboration between farmers, WRC and DOC with expectation of support from WRA. This proof-of-concept trial has been hindered by an adversarial approach by WRC and at present this project, with huge potential benefits for our Lower Waikato waterways has been shelved.

25. In evaluating the threat PC1 presents to our rural communities, we must consider not only social vibrancy, but the presence of a rich and tenured culture. Culture in this sense referring to the ideas, customs, and social behaviour of a particular people or society – how we relate to each other, our rituals and traditions, our values and our food. For Hill Country communities, our culture, regardless of race, ethnicity, or diverse background, is our common way of life.

26. PC1 is, in fact, having an immediate impact. There is an atmosphere of uncertainty created by this bureaucracy, which appears to be over-concerned with procedure at the expense of efficiency or common sense. The process has consumed countless hours of time, re-tasked valuable resources and increased personal stress-load, impacting engagement and participation, and ultimately, our wellbeing.

27. If, for the sake of discussion we accept the detrimental financial impact of PC1, we can project the possible outcome, as the associated erosion of social capital will inevitably disrupt the very fabric of our communities.

28. The CSG was given a clear directive to balance social, economic and environmental aspirations to ensure all are equally considered and preserved through PC1.

29. The modelling summary presented in the Integrated Assessment Two report by the TLG suggests the direction and degree of change for social and economic indicators will be overwhelmingly negative versus the smaller magnitude improvements predicted for environmental and Maori cultural indicators. Proceeding with PC1 as is, places meagre environmental outcomes ahead of dramatic social and economic shortcomings and shows an obvious bias toward pursuing aspirational outcomes

based on mahinga kai and swimmability over the reality that this plan poses undue burden of economic cost and social disruption. Furthermore, we suggest the social impact of PC1 in its first 10 years has been grossly underestimated, and in relation to its 80-year outcomes has been all but ignored.

30. The modelling and analysis seem heavily weighted on social indicators over cultural ones. The commentary provided on Vibrant Resilient Communities is solely concerned with job losses and adaptability to imposed land use and industry change. Although there is positive outlook for Mātauranga Māori as related to water quality attributes, there is gradual but dramatic decline in 'economic benefit directly from water'. We respect, and it is right to recognize, the welfare and security of Tangata Whenua. However, it is concerning there appears a complete lack of acknowledgement of the wider scope and richness of hill country culture.

31. Community is the intersection of place, lifestyle, interests, values, and relationships. A community develops over time, shares history and experience and exudes a distinct culture. Hill Country Farming communities are distinct.

32. We share values around care of the land and our livestock. We appreciate our working dogs and horses. We prioritise family, good friends and food. We appreciate simple pleasures and can commiserate over similar adversities. Hill Country farming is a place where income is dictated by weather and influenced by many other external factors such as local and global markets. We exist on inconsistent margins - one good year offsetting many challenging ones. Such a variable income cannot sustain unjustified costs.

33. A thriving community is certainly correlated with such social measures as low unemployment rates, low health costs, diverse local businesses, sustainable local services, and thriving school enrolment. However, the rich tapestry of our hill country culture can be seen in the diversity of our backgrounds, connectedness to this place and each other, family and personal wellbeing, enriching social gatherings, common values, appreciation of local food, and celebration of academic, music, art and sporting achievements.

34. We have connection to the land and relish our role as caretakers of our ecosystem which provides:

    34.1 Economic contribution to local businesses and service industries. Sheep, wool and beef sales in 2017/18 generated a total of $7.5 billion which represents a significant contribution to the NZ and Waikato's economy.

    34.2 Hill Country farmers provide nutrient-dense protein which directly contributes to the basic nutrition requirements of a huge population – both locally and globally. PC1 insinuates a 'not in my backyard' attitude which is deleterious to our food industries. Protecting local food security for the health and wellbeing of all New Zealanders surely must be given importance.

    34.3 On a personal level, our farm provides an enriching home for our family. It is a veritable playground for our 3 teenage boys – eeling, hunting for koura, controlling the rabbits and feral goats, trapping possums, exploring the native bush. We have a significant family garden and orchard which pays dividends on many hours of work at time of harvest. We have the privilege to feed ourselves with fresh, local, seasonal produce, swapping or sharing any surplus with others when we can.

34.4 We are mindful of our clean and abundant water supply. Our home relies on the same supply as our stock water system. Our farm has many tributaries which converge into the Waerenga River, which support eels, koura, watercress, and native birds. The river is generally clean and inviting and we swim in it regularly. Our nearby swimming hole is popular for locals and many others around the district.

35. We share our landscape, diverse terrain, knowledge and time for the benefit of our families, and the local and wider communities – Pony Club, School Calf Club Day, Dog Trials, Hunt Club Horse Trek, Community Motorbike Trail Ride, TK College School Camp.

36. We have strong intergenerational relationships.

36.1 Farming life gets the whole family involved. There are appropriate roles for everyone to learn and contribute. There is flexibility in planning workload around family commitments and family time can be opportunistic and spontaneous rather than organised and scheduled. There are obvious efficiencies and synergies in living in our workplace and working where we live. But it's more than work, it's a way of life. Farm kids appreciate the connection to the land, understand the cycles of life and where their food comes from. They develop work ethic and are sought-after by employers as having a base of practical skills and experience, show initiative with problem-solving and understanding outcome-based process.

36.2 A strong local culture of engagement has supported an excellent primary school. Students, staff, PTA and BOT stem from the local district and its history of achievement reflects the culture of local families. It has become a sought-after school for out-of-zone enrolments, when other schools in the area, such as Waiterimu, have been closed due to low enrolment numbers.

36.3 We ensure our young people have opportunities to gain experience and growth through both school and sport, and encourage an early sense of belonging and contribution.

36.4 "Social capital is generated and accumulated within families and correlated with improved long-term social welfare of children as a consequence of growing up in "social capital rich" families."

- Rural families, industry change and social capital: some considerations for policy. (2011)

36.5 Multi-generational arrangements support emergent farm management and enables a transition of workload that gradually passes on both farming responsibilities and farming knowledge.

36.6 Hill Country farmers love their land, their role and their lifestyle and many are reluctant to 'retire' in the conventional sense at the standard age of 65. Being able to stay on the farm provides a continued sense of identity and purpose for our older family members as well as companionship and assistance for continued independent living when that becomes appropriate. Underpinning

this situation must be a robust business that can continue to support such a multi-generational arrangement.

36.7 Farm succession is a complicated and often stressful process. No two succession plans are alike. There must be children with the interest, skills and drive to carry on. There must be agreement among siblings over acceptable values on inheritance. Most importantly, there must be an asset to pass on, not a liability.

37. Interdependence - We care for and rely on each other. We engage with the wider community, leaning in to solve a problem or face adversity or filling a need to create and maintain opportunities. Service takes many forms. Examples to follow.

37.1 Volunteers run sport & other clubs, manage & maintain community assets.

37.2 Good neighbours are valued and we help each other.

37.3 Regular social gatherings provide good company, great food and a stress-relief valve that is a crucial offset to the persistent demands of farm life.

38. We provide employment for others and support related services and economy.

39. “Where farming is the primary economic activity, the entire rural economy, including services such as health care, education and basic infrastructure, may depend on the profitability of the sector.”

- European Commission paper on Agriculture’s Contribution to Rural Development (2000)

40. This unique interdependence and synergy of work, family and community is what makes our lifestyle appealing and satisfying. It provides a fund of social capital that is an asset that we both contribute to as well as draw on.

41. The term "social capital" originated, in part, in an attempt to understand how "those features of social organisation, such as trust, norms and networks can improve the efficiency of society by facilitating coordinated actions". In general, a rural setting tends to intensify the need for and prevalence of social capital. Social capital becomes the "social glue" that holds communities together, so that families, as the building blocks of community, can function in optimum social health.

- Rural families, industry change and social capital: some considerations for policy. (2011)

42. To illustrate the integral roles that Hill Country Farmers play in the wider community we asked our members to offer up some examples of how they invest in social capital. We received 17 responses which detailed 91 unique community involvements. This clearly demonstrates an intricate web of community connections and social interactions that is ultimately dependent on the diverse demographic and overall population that it serves. PC1 threatens much more than our businesses – It

threatens our communities which will end up as collateral damage to the imminent restructuring that is signaled.

43. The modelling analysis by the TLG for the 100% scenario indicates significant dependence on conversion to forestry. This is predicated on the assumption that hill country water actually needs significant intervention, for which there is little to no supporting water quality data.

44. If planting our beautiful, productive valleys into forestry is considered an appropriate alternative for hill country farmers then we suggest that environmental and social impacts have not been given reasonable consideration. Any exit of the farming families from the Waipuna valley would immediately precipitate a complete break-down in the vibrancy of this small sub-community. Multiply that by every small hamlet and valley in the Waikato and we will see a region wide hollowing out of rural communities - precisely the opposite of what the V&S intended.

45. Our hill country community has felt marginalized by the lack of consultation on this proposed plan change. The reality is farmers are not sitting back 'doing nothing' - a perception expressed by some. We are proactively seeking ways to improve what we do, how we do it and to present a legitimate voice in the wider discussion about issues we all face together.

45. The Vision & Strategy for the Waikato Catchment envisages the sustenance of "prosperous communities" in addition to and arising from PC1 regulation. The CSG was given a clear mandate to balance social, economic and environmental aspirations to ensure all are equally considered and preserved through PC1. Richmond has shown already how the CSG proposal would impose grievous and unsustainable costs on many individual families from within our community. Such erosion of economic opportunities is inextricably linked with our community vitality and social capital - and therefore we contend that social cost of PC1 has been grossly underestimated, that the CSG has failed to deliver a balanced approach and that PC1 does not give effect to the Vision and Strategy.

<u>KELLY DEIHL – HILL COUNTRY WATER QUALITY</u>

46. Advocacy statement of Kelly Deihl has been pre-circulated.

<u>JASON BARRIER – ALTERNATIVE SOLUTIONS</u>

47. Environmental problems – like all problems are solvable. Real scientific progress is a function, not of beliefs and aspirations, but of problem solving supported by relevant data and practical evidence-based solutions. We question whether the science used to produce PC1 is relevant science.

48. Supporting reports on water quality are almost entirely based upon lowland experiments in intensive farmland or in other regions or even in other countries with very little in common with Waikato hill country. Our water is not even included in the model data that the TLG provided the CSG with to make decisions at least not until passing through many kms of other land uses.

49. No allowance was made in the water model for the 'slug of sediment' that will slowly but surely move down our streams if farmers are forced to fence to 25 degrees. If sediment is, as the WRCs figures suggest, the main issue for our sub-catchment, is it appropriate to recommend a set of rules that will inadvertently multiply this sediment discharge many times over? It sounds counter-intuitive, and fencing creeks may work on lowland intensive farms - but putting up fences on both sides of a creek in hill country is about the worst possible thing you can do for that creek.

50. There are far better solutions for hill country waterways that come without this financial and environmental baggage - they are called CSAs or critical source area management. We agree with Richard Parkes (B&L expert evidence summary statement that: "Management of Critical Source Areas (CSAs) is one of the best ways to mitigate environmental risk associated with sheep and beef farming, with up to 80 percent of sediment and phosphorus loss able to be mitigated in this way (McDowell et al., 2011; Monaghan et al., 2017)." We note also Mr. Dada's (B&L expert evidence) executive summary, where he suggests the deletion of blanket hill country fencing rules due to their relative lack of effectiveness in mitigating E.coli and sediment runoff from hills and instead recommends increasing requirements to manage critical source areas and overland flow pathways.

51. Quite simply CSA management will deliver a far better "bang for our buck" in improving the health of our aquatic ecosystems. Examples to follow.

52. There are a lot of things we can do and should be doing. CSA management will bring real improvements to our headwater catchments - not wasting our time and huge amounts of money building vast networks of expensive and unnecessary fences along our streams that will simply create more sediment in our waterways.

53. There are two possible alternative approaches we would like this commission to consider.

    53.1 The first is the approach that has been adopted by Auckland, Gisborne, Southland, Canterbury, Marlborough, Horizons and Taranaki regions:

    Define Intensive and Non-Intensive Farming. Mandatory Fencing of waterways on Intensive Farms and on High Risk activities on Non-Intensive Farms. Focus Low Risk Non-Intensive farms on CSA management.

53.2 Here is a different approach favoured by Wellington, Northland, LAWF and NPS-FM:

Blanket fencing of waterways on all farms' flats and low hills (<15) and then adopt the same CSA focus for hill country and steep land (>15).

54. Our preference would be the first approach being far simpler for everyone involved. Simpler to interpret and to implement, avoiding uncertainties of measuring slopes of the adjoining land for every stream. However, we could also work with WRC on the second approach should the commission decide that a generic slope-based approach is required.

55. If the WRC wants to adopt a 25 degree stock exclusion approach that flies in the face of what little science has been done in hill country, that goes against advice that national bodies of experts have recommended to government, that is completely out of step with other regions, and that ignores all the practical experience of the people who actually live in the hills– then the onus is on the council to first provide some scientific evidence that such an approach might work and that the extreme costs for individual ratepayers are justified?

56. We agree with the statement made by WRC CEO Vaughan Payne, in the WRC as proponent evidence "A complex issue such as water quality management needs to be founded on a robust information and evidential basis, one that has been tested, and one that is open and transparent and shared with all involved." Point 34.

57. On November 21, 2018, at the Information Forum we submitted a few simple questions:

57.1 Question (Verbal): Did the economic model allow for any impact on land value?

Answer: No, it did not. Mr. Doole however agreed it was a "good question" as anything that impacted profitability would inevitably impact land values.

Other questions were unable to be answered on the day due to 'time constraints' but we were promised answers by the Forum facilitators. We were finally provided with answers by WRC's Science Manager Mike Scarsbrook on 28 February 2019. Mike's detailed response is appended to these notes but in summary…

57.2 Question: Exactly what cost/benefit analysis was provided by TLG to the CSG prior to their proposal to fence creeks to 25 degrees?

Answer: None. Although an attempt was made to model costs post this decision being made.

57.3 Question: What was the total cost modelled for the "mitigation" of all waterways over 25 degrees?

Answer: None

57.4 Question: How much additional sediment was modelled due to the construction of fencing in hill country resulting from bulldozing of fence lines pre-construction and increased stock tracking along fence lines, post construction?

Answer: No allowance was made.

CONCLUSION

58. There are good hill country solutions out there. Ones that if given a chance WILL help clean up our waterways. They are different to the dairy industry solutions, just as we are different to the dairy farmers. Our water is different, our overall footprint is different, and our specific issues are different. Sadly, those workable hill country solutions focusing on CSAs have been pushed into the margins by a "one rule for all" approach that pays no heed to catchment nor to topography nor ecosystem, nor to economy. All we are asking for is a set of hill country rules that are appropriate to our environment and are not based upon what works for dairy farmers on flat land.

59. We question the integrity of an approach that asks us to make huge capital investments to head down a path which may or may not lead to a set of final 80-year targets.

60. We consider it inequitable and inconsistent to impose punitive obligations on one landowner in order to meet overall water quality targets whilst other landowners with considerably more intensive practices are entrenched and indeed rewarded by the NRP grandparenting approach.

61. We agree with the S42A report itself which comments at para 132 that N grand parenting is costly, inflexible and "….potentially has a range of unintended consequences."

62. We believe long term outcomes will only be secured when all sectors "buy-in" to the plan. We strongly reject the S42 notion of a so called "collaborative" approach which ended up with no consensus and morphed into a 'majority rules' approach where the minority viewpoint was trampled upon.

63. This Hearings process should be not a defense of the CSG proposal but an examination of it. An examination that identifies fundamental flaws in the policy and seeks to fix them before they turn from theory into reality. The fundamental flaws are the grandparenting of Nitrogen and the 25-degree fencing rule.

64. The solutions are obvious. Some N flexibility for low emitters and either an intensity based or lower slope based fencing rule. Challenge us to focus instead CSA management. The justifications for change have been presented, - environmental justifications, economic justifications and equity justifications.

65. We want to improve water quality in our headwaters and our hill country catchments. We do understand that we will have to bear significant costs for many, many years to come. And there is so much we can offer as the custodians of the largest part of Waikato's freshwater system. All we ask for in return is some fairness - where the costs imposed upon us are in some way proportionate to our environmental footprint.

66. We do not accept any proposal that undermines our very existence – nor any plan where those with the best water and those with the lightest footprints are asked to bear the heaviest costs.

APPENDIX I

Email response from Mike Scarsbrook to questions posed November 21, 2018, at the Information Forum

Hi Francis and Jason

Thanks Francis for meeting with me on Friday 22nd February. I realise this required you to take time away from your business, but our conversation gave me valuable context for the questions raised by your group. I also greatly enjoyed our wide-ranging discussion.

I have set out below my answers to the five questions you first posed to the Information Forum back in November. I hope this information is of value to you as you prepare for the PC1 Hearing.

Regards

Mike

Question 1: How many, of the 74 water quality monitoring test sites, upon which the water quality model is based, are located in hill country tributaries and where are they located?

I had considered this question was best answered with reference to a map showing the monitoring sites overlain on a terrain map (e.g. Wadhwa & Elliott 2015 - https://www.waikatoregion.govt.nz/assets/WRC/Council/Policy-and-Plans/HR/land-characteristics.pdf), but from our conversation I took that the question was more about the representativeness of the monitoring network for describing conditions in headwater tributaries. We discussed the Matahuru @ Waiterimu Rd as an example. This site has an upstream catchment area of 10637 hectares and you made the comment that water quality at this site doesn't necessarily reflect water quality in hill country tributaries of the Matahuru.

In river systems, water quality monitoring sites integrate the conditions in the catchment upstream of the monitoring point. We use this fundamental property of rivers to measure contaminant concentrations and relate this back to land use activities in the catchment. A significant issue we face though is the diffuse nature of contaminants generated from different land use practices. It is exceedingly difficult and costly to identify exactly where diffuse contaminants have come from. So, our monitoring sites integrate what is happening in the catchment upstream of that point, but there is a high degree of uncertainty about where specifically the contaminants have come from.

Downstream sites such as the Matahuru @ Waiterimu Rd reflect the accumulation of contaminants from the upstream catchment, but also reflect a range of processes (e.g. storage, transport, biological uptake) that we term attenuation. Not all contaminants that are lost to water from a land parcel in the upper Matahuru will make it to Matahuru @ Waiterimu Rd (e.g. denitrification processes transforming nitrate to nitrogen gas, E. coli die-off from sunlight).

We usually rely on models to estimate contaminant generation on the land (e.g. OVERSEER) and its transport and attenuation between the point of contaminant generation (e.g. a cow urine patch) and the monitoring location (e.g. CLUES model). This provides us with modelled estimates of the relative contributions of different land use types and land parcels to the measured contaminants loads (= concentration x flow) at any particular monitoring site. From a management perspective we use this information to target actions on the land predicting these will reduce measured contaminants at the monitoring site.

Please excuse the long-winded description, but it leads me to the following answer. Water quality monitored at the Matahuru @ Waiterimu Rd site reflects contaminant generation and attenuation processes in the whole catchment, but does not necessarily represent water quality in particular headwater tributaries. Individual tributaries may (or may not) have lower contaminant levels when compared to the downstream site. I understand the Lake Waikare and Whangamarino Catchment Management Plan recommends development of a water quality monitoring network to assist in achieving the Plan's objective. I think this is a very sensible approach, as a regional monitoring network (i.e. 114 sites across the whole Waikato region) can never hope to provide all the information needed, particularly for specific catchment management activities within the wider Waikare-Whangamarino, or Matahuru.

Question 2: Exactly what cost/benefit analysis was provided by TLG to the CSG prior to their proposal to fence creeks to a 25 degree slope threshold (given this threshold is well beyond national recommendations and other regional approaches) so that they could make an informed decision? Please provide a copy of this analysis.

I've pulled together a timeline to help answer this question.

19 January 2016 – CSG considered a draft livestock exclusion rule that was to be consulted on with sectors in February. In the previous CSG guidance it was identified that there was "No strong desire to see terrain or intensity included as a factor for exemption"

13 July 2016 – Report on "Simulation of the proposed policy mix for the Healthy Rivers Wai Ora process" (Doole et al 2016). Section 3.2 covered stream fencing and notes "The WRPC1 outlines that by 2026 all stock will be excluded from streams on land that has a slope less than or equal to 25 degrees. In contrast, all streams on land that has a gradient greater than 25 degrees will not be fenced" Modelling of the policy mix proceeded under this assumption and contains the analysis of mitigation costs for different sectors.

September 2016 – Publication of "National Stock Exclusion Study – Analysis of the costs and benefits of excluding stock from NZ waterways." Exec summary "The Government is proposing to exclude stock on flat and rolling land (less than 15 degrees slope), due to the practicalities of fencing on steep hill country and the high costs relative to benefits. Regional councils could still apply more stringent rules, where desirable."

October 2016. - Section 32 Evaluation Report. Pg. 15 States "Slope is currently used in the Regional Plan to apply more stringent requirements for earthworks on land over 25 degrees; in this instance a careful site inspection is needed to ascertain slope. A slope threshold linked to timeframes for stock exclusion was considered. However, the slope of land surrounding

streams in rolling hill country may be difficult to assess, and a slop threshold could result in a situation where a fence was required for only part of a stream's length. Slope thresholds have therefore been included in Schedule 1 that guides Farm Environment Plans, rather than in the rule itself….The provision for land over 25 degrees to have alternative measures to exclude stock was based on the judgement that it is probable these areas will be lightly stocked, with a lesser effect in waterways, and riparian setbacks are likely to be less effective on steep land. Also there is more practical impediments to fencing waterways in steep land, and fencing is likely to be more costly; fence construction on steep land could also have unintended effects from earth works and soil disturbance.

I have been unable to discover where the 25 degree exemption came from, but conversations with various staff suggest it most likely arose from conversations with the drystock sector and also our own land management officers.

Please note that the proposed central government stock exclusion regulations were produced after development of the PC1 policy mix.

Question 3: What fencing cost (per meter) was used for the drystock farming portion of the model?

The fencing costs used in the modelling can be found in Report No. HR/TLG/2015-2016/4.6. This report was prepared by Dr Gareme Doole on 28 September 2015.

The report identifies the following fencing costs:

· Dairy farms – The total cost is $5 per m. Annualised over 25 years (8% interest rate) is $0.47 per m.

· Drystock farms – Total cost is $35 per m (includes fencing, maintenance and water reticulation). Annualised cost is $3.28 per m over 25 years (8% interest).

Question 4: How much additional sediment was modelled due to the construction of fencing in hill country resulting from bulldozing of fence lines pre-construction and increased stock tracking along fence lines, post construction?

I spoke with Dr Sandy Elliott at NIWA and our collective understanding is that the modelling of stock exclusion as a contaminant mitigation did not consider any additional sediment that might be generated from earthworks or stock activity associated with fencing.

Question 5: What was the total cost modelled for the "mitigation" of all waterways over 25 degrees?

As far as I can determine, this question was not addressed in the modelling work undertaken. As mentioned above, the modelling of the HRWO proposed policy mix (Doole et al 2016) and

Section 32 evaluation report both took into account the proposed exemption of terrain >25 degrees in their analysis.

Mike Scarsbrook Manager | Science, Science and Strategy

WAIKATO REGIONAL COUNCIL | Te Kaunihera ā Rohe o Waikato
Take a look at the work we do
P: +6478592705
M: +6421864602
F: facebook.com/waikatoregion
Private Bag 3038, Waikato Mail Centre, Hamilton, 3240, New Zealand