BEFORE COMMISSIONERS APPOINTED

BY THE WAIKATO REGIONAL COUNCIL

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of the First Schedule to the Act
AND	
IN THE MATTER	of Waikato Regional Plan Change 1- Waikato and Waipā River Catchments and Variation 1 to Plan Change 1
AND	
IN THE MATTER	of submissions under clause 6 First Schedule
BY	**BEEF + LAMB NEW ZEALAND LIMITED** **Submitter**

BRIEF OF EVDIENCE OF CORINA JODI JORDAN

15 February 2019

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QUALIFICATIONS AND EXPERIENCE

1. My full name is Corina Jodi Jordan.

2. I am the Environment Policy Manager, North Island, for Beef + Lamb New Zealand (B+LNZ), and have been employed in that capacity since 2016. I have a Bachelor of Science degree (specialising in ecology and zoology), 1st Class Honour's degree in Natural Resource Management, and a master's in environmental management. I have over 15 years' experience in natural resource management planning, and freshwater ecology. My particular areas of expertise are in policy and plan development, natural resource management, particularly issues relating to land and water management, and freshwater ecology.

3. I previously worked for Fish and Game as their National Environmental Manager, and was tasked with providing natural resource management planning, and freshwater ecology expertise to the regions as required.

4. I have been involved in a professional capacity in a wide range of planning matters including the analysis and preparation of plan provisions, freshwater limits, and the implementation of plan provisions through resource consent conditions and standards. I have both assessed and prepared applications for resource consents, including in relation to wetland management and enhancement. I have provided policy and planning advice on a comprehensive range of natural resource management issues, including regional plans, with a focus on establishing policy which will ensure the sustainable management of land and freshwater resources. One element of this work has been to assist councils to develop robust freshwater quality limits and frameworks which manage to limits under the National Policy Statement on Freshwater Management (2011, 2014, and as amended 2017).

5. I have worked extensively with both Horizons Regional Council and Greater Wellington Regional Council in regard to informing frameworks for sustainable river management and flood control, and advising on and reviewing global river management consents, to ensure that these activities are undertaken in a manner which works with these systems and protects the natural character and ecological health of freshwater.

6. I have been involved in the development of the NPS-FM, and, in particular, the attributes now incorporated in the NPS-FM. I provided planning and technical advice to the Land and Water Forum, along with review and critique of draft recommendations, and was a member of the National Objectives Framework (NOF) Reference Group.

7. Since 2007, I have been involved in the technical and planning assessment of over 142 resource consent applications, which included 22 consent applications for discharges of treated wastewater to various waterbodies, and river management and flood control activities. I have provided statements of evidence in 32 local hearings including those pertaining to regional policy statements and regional plans. I have participated in 33 Environment Court mediations, covering resource consent applications, regional policy statements, and regional plans, and I have participated in 4 Board of Inquiry mediations.

8. I have presented expert evidence to the Environment Court on the Horizons One Plan, and to the Board of Inquiry on Hawkes Bay Regional Council Tukituki Plan and Ruataniwha Irrigation consents.

9. I am a member of the Government's Essential Freshwater Leaders Group (FLG) which has been tasked with providing advice to the Government on its "Essential Freshwater: Healthy water, fairly allocated program". This program promotes national statutory reform to address the health of freshwater ecosystems and provide for primary contact recreation. Reforms intended include changes to the RMA and amendments to the NPS-FM, along with development of a national environmental standard for agricultural land uses.

10. This brief of evidence provides a planning assessment which specifically focuses on the matters in the Waikato Regional Council's proposed Plan Change 1 and Variation 1 (PC1) that relate to farming, and on which Beef + Lamb New Zealand submitted. It assesses the topics the Hearing Panel has directed be considered in hearing stream 1 and that have been addressed in the s42A report. The evidence includes:

(a) Background – regionally significant natural resource management issues - brief review of current water quality within the Waikato Region, and impacts of farming land uses;

(b) Statutory requirements;

(c) Evaluation of the relevant planning instruments, including consideration of the recommendations of the s42A report where appropriate.

(d) Specific discussion on:

(i). Section 3.11.1 Values and uses for the Waikato and Waipā Rivers;

(ii). Objective 1, objective 2, objective 3, and objective 4;

(iii). Table 3-11.1

(iv). Economic and Science modelling; and

(v). Allocation

11. In preparing this evidence I have reviewed the plan change, supporting reports and statements of evidence of other experts relevant to my area of expertise, and relevant background documents and technical reports, including:

(a) Waikato Regional Councils proposed Plan Change 1 and Variation 1;

(b) Waikato Regional Councils s32 report;

(c) Waikato Regional Councils s42A report;

(d) Vision and Strategy for the Waikato River;

(e) Waikato Freshwater Strategy;

(f) B+LNZ submission on PC1 and Variation 1;

(g) Expert evidence of Mr Andrew Burtt;

(h) Expert evidence of Dr Hannah Mueller;

(i) Expert evidence of Dr Christopher Dada;

(j) Expert evidence of Dr Tim Cox;

(k) Expert evidence of Dr Jane Chrystal;

(l) Expert evidence of Mr Richard Parkes; and

(m) Expert evidence of Mr Gerry Kessels.

12. I have read the Code of Conduct for Expert Witnesses in the Environment Court's 2014 Practice Note and agree to comply with it. I confirm that the opinions I have expressed represent my true and complete professional opinions. The matters addressed by my evidence are within my field of professional expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

EXECUTIVE SUMMARY

13. Plan change 1 and Variation 1 are intended to give effect to the Vision and Strategy for the Waikato River and to implement the NPS-FM.

14. The Vision and Strategy applies to the Waikato River from Huka Falls to Te Puuaha o Waikato and the length of the Waipā River to its junction with the Waikato River, and includes the catchments which affect the Waikato River[1]. The Vision and Strategy establishes as its ultimate measure of success that the "*Waikato River will be safe for people to swim in and take food from over its entire length*"[2]. Where conflict with other higher level policy instruments exist the Vision and Strategy prevails.

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[1] The Vision and Strategy for the Waikato River, The area subject to the Vision and Strategy, paragraph 2, page 8.

[2] The Vision and Strategy for the Waikato River, paragraph 5, page 2.

15. In relation to the NPS-FM PC1 must:

(a) Consider and recognise Te Mana o te Wai in the management of freshwater[3];

(b) Safeguard life supporting capacity, ecosystem processes and indigenous species and their associated ecosystems, along with the health of people and communities as affected by contact with freshwater[4];

(c) Enable communities to provide for their economic well-being, including productive economic opportunities, in sustainably managing freshwater quality[5];

(d) Maintain and where degraded improve overall water quality within a freshwater management unit[6]

(e) Set freshwater objectives for values in accordance with policies CA1 – CA47; which includes:

i. Considering at all relevant points in the process how to enable communities to provide for their economic well-being, including productive economic opportunities, while managing within limits[8];

ii. set water quality limits and targets to achieve the freshwater objectives,

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[3] National Policy Statement for Freshwater Management (2014), updated August 2017, Objective AA1.

[4] National Policy Statement for Freshwater Management (2014), updated August 2017, Objective A1.

[5] National Policy Statement for Freshwater Management (2014), updated August 2017, Objective A4

[6] National Policy Statement for Freshwater Management (2014), updated August 2017, Objective A2

[7] National Policy Statement for Freshwater Management (2014), updated August 2017, Policy A1.

[8] National Policy Statement for Freshwater Management (2014), updated August 2017, Policy CA2 (f) iab.

iii. phase out existing over allocation, and

iv. Improve and maximise the efficient allocation and efficient use of water.

16. Important objectives in PC1 relate to the restoration and protection of water quality across the Waikato and Waipā River catchments, while providing for social, economic, and cultural wellbeing, people and community resilience, and protecting and restoring tangata whenua values.

17. Table 3-11.1 provides numerical objectives for water quality which are intended to be achieved over 10 year and 80-year time periods to give effect to PC1 objectives and the Vision and Strategy. These parameters include instream nitrogen, phosphorus, clarity, Chlorophyll *a*, Ammonia, and *E. coli* attributes.

18. Some of the key issues to be resolved in these proceedings, and which hearing 1 is to be focussed, are the appropriate linkages between the values, plans objectives, and the numerical freshwater objectives in Table 3-11.1, including the time to achieve them. The requirement to give effect to the Vision and Strategy is not, in my opinion in contention, but the methods to achieve it, including the appropriateness of the Plan's objectives and water quality freshwater objectives are.

19. I recommend the values identified in PC1 are explicitly referenced in the objectives. This is to ensure it is made clear what the Plan is seeking to restore and protect, alongside the freshwater objectives in Table 3-11.1.

20. As currently proposed the achievement of Table 3-11.1 water quality freshwater objectives is likely to significantly impact on the economic wellbeing of communities, in both the short and long term. As currently stated within PC1 achievement of the 80-year water quality outcomes "*requires technologies or practices that are not yet available or economically feasible. In addition, the current understanding is that achieving water quality restoration requires a considerable amount of land to be changed from land uses with moderate and high intensity of discharges to land use*

with lower discharges (eg through reforestation)"[9]. The consequence is that the agricultural sector, in particular, has no certainty in relation to their future, nor that of their businesses, or rural communities.

21. There is a requirement for certainty when imposing regulation on communities. That certainty allows for communities to plan for their future and make decisions about their wellbeing, including socially, economically and spiritually. PC1 create significant uncertainty by deferring management approaches to beyond the current 10 year planning cycle.

22. The Vision and Strategy recognises and is consistent with the definition of sustainable management in s5 RMA. It prioritises the restoration and protection of the Waikato River, but recognises in the vision that the Waikato River has a role in sustaining prosperous communities too. This is recorded in the objectives and is also consistent with the approach in the NPS-FM.

23. Health is not synonymous with water quality. Water quality is a part of water's health, but the level of quality (numerical outcome) and the parameters chosen are dependent on what values are being provided for. As such, concepts of 'restoration and protection' are shaped by that end goal.

24. Agriculture is the Waikato region's main economic activity and is vitally important to the sustainability and well-being of its communities. The sheep and beef sector is a significant farm type and employer within the region. These factors combined mean that the sheep and beef sector is inextricably linked to the region's viability and economic success.

25. PC1 takes the approach that nitrogen should be managed through application of a nitrogen reference point (NRP) based on historic modelled nitrogen leaching from the farm, such that discharges from the farm cannot

[9] PC1, page 15

exceed these historic levels. I consider this to be a 'grandparented' approach to managing nitrogen.

26. The sheep and beef industry is diverse, adaptable and to date has been resilient, continually making eco-efficiency [10] gains in how it produces red meat. Sheep and beef farmers have managed to increase meat production, while decreasing the total number of animals farmed, made significant progress in reducing their environmental footprint, while losing some of their most productive land to other land uses.

27. Overland flow is the primary contaminant transport pathway associated with sheep and beef farming, although the nature and scale of this loss are highly variable throughout the region. Contaminants most commonly associated with overland flow include sediment, phosphorous, and faecal bacteria. Nitrogen loss to water is proportionally much less of a concern for the sector.

28. In my opinion policy approaches that take into account the relative environmental impacts of land use and discharges, and which are sensitive to farm system and land use flexibility within boundaries, provide for integrated natural resource management. These are the most appropriate approaches to achieving the purpose of the Act, and the most efficient and effective way to achieve the objectives of the Plan.

29. Tailored integrated sub-catchment management provides an efficient and effective method to sustainably manage land and water resources in a way which provides for the economic, social, and cultural wellbeing of communities, and as such should be enabled and empowered through PC1.

30. Tailored FEPs, focussed on reflecting the natural character of the farm in its catchment context, along with the identification and management of critical source areas, provides an approach which is farm, and catchment-specific,

[10]Eco-efficiency has been proposed as one of the main tools to promote a transformation from unsustainable development to one of sustainable development. Eco-efficiency is based on the concept of creating more goods and services while using fewer resources and creating less waste and pollution.

adaptable and can be implemented and owned by farmers and communities.

31. The recommendations made through this planning evidence are designed to provide land use flexibility, and allow for innovation, adaptability and resilience within the sheep and beef sector, while giving effect to the Vision and Strategy, NPS-FM and RPS, along with meeting the purpose of the Act.

B+LNZ SUBMISSION

32. B+LNZ have made a submission on PC1 that I have summarised below. This evidence is intended to focus on and address the resource management issues raised in the submission, and provide a planning analysis of that submission, including the planning justification of the relief sought and evaluation.

33. B+LNZ's submission focussed on 7 key issues:

    (a) Certainty, or lack thereof, for individuals and communities on how the 80-year outcomes will be achieved;

    (b) Requiring farms to provide and then not exceed a modelled N leaching value, referred to as a nitrogen reference point (NRP), based on their 2014/15 or 2015/16 farming systems. B+LNZ consider this to be a 'grandparenting' allocation approach;

    (c) Concerns that the regulatory framework in PC1 fails to provide the sheep and beef sector with the flexibility required for them to be resilient into the future. Including failure to recognise the significant gains that the sector has made in relation to the sustainable and integrated management of land and water resources;

    (d) Stock exclusion from waterbodies through permanent fencing in particular for hill country farms[11];

[11] Those properties which are largely over 15 degrees slope and which include Land Use Classification (LUC) classes 5, 6, and 7.

(e) The content and structure of farm environment plans (FEP); and

(f) The application of the regulatory instruments. It considers they are applied in a 'blanket' manner so local conditions and communities are not recognised. It seeks a tailored sub catchment approach, which B+LNZ submit would provide a more efficient and effective approach.

34. My understanding of B+LNZ's submission is that the organisation supports giving effect to the Vision and Strategy through PC1, and the establishment of actions to manage water quality, and in particular the identification of environmental risk tied with appropriate actions to avoid, remedy, or mitigate this risk. B+LNZ, however, has expressed concerns that the provisions, including rules and activity standards, are overly prescriptive and may not be sufficiently linked to an effect on water quality or ecosystem health and processes.

35. Furthermore, B+LNZ is concerned with the linkages, or in its opinion, lack of linkages, between the values, freshwater objectives, and the numerical reflection of these through Table 3-11.1. B+LNZ has submitted in opposition to a number of PC1 Table 3-11.1 numerical objectives including *E. Coli*, clarity, and nitrogen, seeking amendments to these which they submit are more closely aligned to the values which the objectives set to provide for.

BACKGROUND WATER QUALITY & FARMING LAND USES

36. Waikato Regional Council have identified water quality as a regionally significant issue which is intended to be addressed through PC1 and subsequent plan changes over an 80-year time period.

37. The Waikato River contains significant conservation, community, cultural, and recreational values. The river is the longest river in New Zealand travelling around 425km from Lake Taupo through to the Port of Waikato.

38. As set out in the Waikato Regional Policy Statement, the Waikato River is "*at the heart of the social and economic development of the Waikato region. It supports the domestic and municipal needs of the region and is important for many reasons, including for primary production, powering the Waikato*

Hydro Scheme, providing drinking water and for cultural and recreational activity "[12].

39. The Vision and Strategy is to be given effect to by PC1. The Vision and Strategy states that "*Our vision is for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come*". The key measure of success identified by the Vision and Strategy is the restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length.

40. PC1 also must give effect to the NPS-FM. It says that *"New Zealand faces challenged in managing our fresh water to provide for all of the values that are important to New Zealanders. The quality, health, availability and economic value of our fresh water are under threat… To respond effectively to these challenges, we need to have a good understand of our freshwater resources, the threats to them, and provide a management framework that enables water to contribute to New Zealand's economic growth and environmental integrity and provides for values that are important to New Zealanders*".

41. Consistent with the NPS-FM, and Vision and Strategy, the Waikato Regional Policy Statement "*recognises that the Waikato and Waipā Rivers are degraded and an important resource that requires balanced management and planning. It contains provisions aimed at restoring the rivers' health as a regional priority while continuing to provide for the communities they support*"[13].

42. Water quality degradation is caused by both point source discharges from municipalities, storm water discharges, and discharges from factories, along with non-point source pollution from farming, which cumulatively contributes

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[12] Waikato Regional Policy Statement, paragraph 3, page 8.

[13] Waikato Regional Policy Statement, paragraph 4, page 8.

to the state of freshwater quality and associated ecosystem health. The principal driving factors for these adverse effects include nutrient levels, loss of riparian habitats, altered and reduced flows, suspended and deposited sediment, along with faecal contamination. Pest species and changes to the physical habitat of the rivers systems, such as dams, also contribute to changes in the natural character of the river and its associated values. All externalities of concern are required to be managed in order to protect the life supporting capacity of the region's freshwater resources, and in giving effect to the Vision and Strategy.

43. Water is a critically important resource, supporting indigenous biodiversity, the recreational fishery, and cultural, amenity, aesthetic, and intrinsic values. The availability of clean, abundant water is also essential to the sustainability and resilience of the region's agricultural activities, energy production, and industrial processing. These activities support the health and economic wellbeing of communities, the wider region, and are important contributors to national GDP.

44. Review of the state and trends in water quality across the catchment indicate that the health of freshwater is variable[14] and dependent on catchment characteristics, land use, and land use intensity, including of agriculture.

45. Agriculture is the Waikato Regions main economic activity and is vitally important to the sustainability and well-being of its communities. Sheep and beef farming is a significant land use and employer within the region. It is inextricably linked to the region's viability and economic success.

46. Mr. Burtt outlines the economic importance of the sheep and beef sector at both the regional and national scale. The New Zealand sheep and beef sector's total value of production is $10.4 billion, with exports worth $7.5 billion and domestic sales worth an additional $2.9 billion in 2018. The

[14] Section 42A Report (2019), paragraph 93, page 18 "*Overall, 19% of water quality measures improved at individual sites, and 16% deteriorated*".

sector has 80,000 employees, of which 59,000 are directly employed and an additional 21,000 indirectly employed.

47. The sector supports 5,877 direct jobs in Waikato, and contributes GDP of $294 million. The sector exports over 90 percent of its production and is New Zealand's second largest goods exporter and largest manufacturing industry. The health and wellbeing of the red meat sector within New Zealand is important to the economy and regional New Zealand, accounting for 3.2 percent of gross domestic product[15].

48. The importance of agriculture to the economic, social, and cultural wellbeing of the region is recognised in the Waikato Regional Policy Statement[16], and is recognised and provided for within PC1 through the values under section 3.11.1 Primary Production: "*The rivers support regionally and nationally significant primary production in the catchment (agricultural, horticultural, forestry). These industries contribute to the economic, social and cultural wellbeing of people and communities, and are the major component of wealth creation within the region. These industries and associated primary production also support other industries and communities within rural and urban settings*". Recognition of these values is carried over into Objective 2, and Objective 4 of PC1[17].

49. In terms of water quality, as set out in the expert evidence of Dr Mueller and the s42A report, water quality in the upper Waikato Catchment is considered good with low levels of nitrogen (though increasing), phosphorus, *E. coli*, and suspended sediment[18] [19]. Water quality parameters generally decline

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[15] Evidence in Chief Mr Andrew Burtt (2019) paragraph 108, and 109, pages 71, and 72 (respectively).

[16] Waikato Regional Policy Statement, Explanation, Objective 3.1, Objective 3.2, Objective 4.4, Policy 4.4.

[17] PC1, objective 2 Social, economic and cultural wellbeing is maintained in the long term, and objective 4 People and community resilience, page 31.

[18] Evidence in Chief Dr Mueller (2019), paragraph 26, page 10.

[19] Section 42A (2019), paragraph 90, page 17.

as you move down the catchment[20], however there are improving trends in relation to phosphorus and chlorophyll *a*[21], while nitrogen levels show significant increasing trends (that is nitrogen levels in the catchment are increasing)[22]. In the Waipā catchment sediment levels increase as you move down the system and are generally high, as with *E. Coli*[23]. Nitrogen shows no trend[24], while phosphorus is improving[25].

50. Trend analyses also show important improvements in *E.coli* (27% of sites), with "*only small numbers of deteriorations*"[26]. In relation to the Waikato River *E.coli* improved at the Ohakki site, and deteriorated at the Whakamaru site, but remained stable at all other sites in the river[27].

51. As already noted, importantly, the degradation of water is not uniform, even beyond the broad trends described above. Waikato Regional Council measures water quality every month at 115 river and stream sites throughout the region. Differences can be identified at various sub-catchment levels as set out in WRC Water Quality Monitoring Map – all rivers and streams[28], and the Land, Air, Water Aotearoa (LAWA) site[29].

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[20] Evidence in Chief Dr Mueller (2019), paragraph 23, page 8.

[21] Section 42A Report (2019), paragraph 95, page 18.

[22] Section 42A Report (2019), paragraph 92, page 17.

[23] Evidence in Chief Dr Mueller (2019) paragraph 30, page 16.

[24] Evidence in Chief Dr Mueller (2019) paragraph 30, page 16.

[25] Section 42A Report (2019) paragraph 95, page 18

[26] Vant, B. (2018) Trends in river water quality in the Waikato Region, 1993 – 2017, paragraph 5, page iii. Waikato Regional Council Technical Report 2018/30

[27] Vant, B. (2018) Trends in river water quality in the Waikato Region, 1993 – 2017, paragraph 6, page 12. Waikato Regional Council Technical Report 2018/30

[28] https://www.waikatoregion.govt.nz/environment/natural-resources/water/rivers/our-other-rivers/water-quality-monitoring-map/

[29] https://www.lawa.org.nz/

52. The contaminants of concern from farming land uses along with approaches to managing those contaminants are discussed in the evidence of Mr Parkes[30] and Dr Chrystal[31].

53. As set out by Mr Parkes[32], overland flow is the primary contaminant transport pathway associated with sheep and beef farming, although the nature and scale of this loss are highly variable throughout the region. Contaminants most commonly associated with overland flow include sediment, phosphorous, and faecal bacteria. Nitrogen loss to water is proportionally much less of a concern for the sheep and beef sector, though is of concern for more intensive pastoral and horticultural land uses[33].

54. Since 1990 the average stocking rate for sheep and beef farms in Waikato has significantly reduced, with sheep numbers reducing by 60%, and beef cattle numbers reducing by 25%, and is currently sitting at a stocking rate of 9.2SU per effective hectare[34]. The number of dairy cows has increased by over 20%[35]. The weighted average stocking rate for sheep and beef farms is 9.2 SU per effective hectare on average, which is equivalent to just over one cow per ha.

PLANNING APPROACH PROPOSED BY WAIKATO REGIONAL COUNCIL

55. The Waikato Regional Council has a statutory role under the Resource Management Act 1991 to promote the sustainable management of natural resources, including, but not limited, to the control of discharges of

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[30] Evidence in Chief Mr Richard Parkes, (2019) paragraph 35 and paragraph 42 page 8, and page 11 (respectively).

[31] Evidence in Chief of Dr Jane Chrystal, (2019) paragraph 15, 16, 25, and paragraph 59 - 63 page 4, 5, 7, and pages 18 -19.

[32] Evidence in Chief Mr Richard Parkes (2019), paragraph 16, page 5

[33] Evidence in Chief Mr Richard Parkes (2019), paragraph 17, page 5

[34] Evidence in Chief of Mr Andrew Burtt (2019) paragraph 12, 17, and 18, page 5.

[35] Evidence in Chief of Mr Andrew Burtt (2019) paragraph 19, and figure 13, page 5, and 26 (respectively).

contaminants into or onto land, air, or water, and controlling the use of land for the purpose of maintaining and enhancing water quality.

56. A core focus of PC1 is:

(a) The restoration and protection of water quality such that it achieves the 80-year freshwater objectives in Table 3.11-1 for the following water quality parameters: nitrogen, phosphorus, sediment, ammonia, clarity, and *E. Coli*, and that over allocation be avoided;

(b) Increasing the stringency of regulatory requirements on agricultural land uses such that these activities are managed to reduce impacts on water quality overtime.

57. PC1 establishes plan objectives, and numerical freshwater objectives for the region which are intended to give effect to the Vision and Strategy, the NPS-FM, and the Waikato Regional Policy Statement. Numerical freshwater objectives are to be achieved over a staged 10 year and 80-year timeframe. PC1 policies and methods, including rules, then establish management frameworks which are intended to start the journey towards achievement of the 80-year freshwater objectives, with the intention that 10% improvement in water quality will be achieved in the life of this plan.

58. While achievement of the Vision and Strategy is intended to be staged over an 80-year period, PC1 is intended to give effect to the NPS-FM in this plan change. Subsequent plan changes are intended to progressively implement 'more stringent' regulatory requirements on agricultural land uses. PC1 therefore establishes:

(a) Community values for freshwater, Section 3.11.1;

(b) Catchment wide plan objectives, Section 3.11.2;

(c) Freshwater management units (FMU) based on 4 riverine and 4 lake FMU, these include the Upper Waikato River, Middle Waikato River, Lower Waikato River, and Waipā River, along with Riverine lake, Peat Lake, Volcanic lake, and Dune Lake FMU;

(d) 74 sub catchments, including priority ranking, for when the methods, including rules, have legal effect;

(e) Numerical freshwater objectives and targets in Table 3-11.1 which relate to these 74 sub catchments; and

(f) Methods (including rules) to stop any further over allocation and to start to improve water quality over a 10-year period.

59. PC1 contains region-wide rules controlling:

(a) Discharges of various kinds (both point source and diffuse);

(b) Land use to manage risks of intensification along with potential discharges of sediment, diffuse nutrients, and pathogens from farming activities; including:

i. Establishment of a non-complying rule for land use change to a more intensive land use such as forestry to pasture, sheep and beef to dairy, or pasture to horticulture;

ii. Allocation of nitrogen through provisions which establish a nutrient reference point (NRP) based on modelled nitrogen leaching from the farm to 2014/15 or 2015/16 years;

iii. Requirement for modelled nitrogen leaching from the farms within the top 75th percentile for their FMU to reduce emissions to the 75th percentile within 10 years;

iv. Exclusion of cattle, deer, and pigs from all permanently flowing waterbodies, including drains, lakes, and wetlands through fencing or a natural barrier such as a cliff. Consideration of alternative exclusion methods are provided through consent for land over 25 degrees' slope;

v. The requirement for a FEP either through a controlled activity or through a permitted Certified Industry Scheme, which includes activity specific requirements in relation to riparian setback distances, cultivation, along with adherence to the properties NRP, and stock exclusion. FEPs also require

implementation of good farming principals (GFP) to manage erosion and adverse effects on water quality from contaminants transported via overland flow. The FEP is to be signed off by a certified farm environment planner; and

vi. Permitted activity rules for low intensity land uses, where the stock exclusion requirements are met and modelled nitrogen leaching from the property does not exceed the property's NRP or 15kgN/ha/yr, whichever is the lesser. Permitted activity rules do not apply where stock is grazed on land over 15 degrees (which includes hill country) or where land over 15 degrees is cultivated.

60. PC1 contemplates that achievement of the 80-year water quality freshwater objectives, will require significant investment, and changes in pastoral land use including reforestation. PC1 states that achievement of the 80-year water quality outcomes "*requires technologies or practices that are not yet available or economically feasible. In addition, the current understanding is that achieving water quality restoration requires a considerable amount of land to be changed from land uses with moderate and high intensity of discharges to land use with lower discharges (eg through reforestation*)"[36].

61. As noted earlier, it is intended these provisions be reviewed on the usual statutory basis to determine if they remain suitable to achieve the purpose of the Act and give effect to the Vision and Strategy. However, PC1 does recognise that further contaminant reductions will be required and has signalled anticipated future management approaches will be implemented in order to achieve objective 1 in a staged manner, including the development of an alternative N allocation[37].

STATUTORY FRAMEWORK

[36] PC1, page 15.

[37] PC1, objective 4.

62. When evaluating the provisions of PC1, I have adopted the modified *Long Bay-Okura* tests. I am mindful of the relevant provisions of the RMA at part 2 to part 5 that impact upon my analysis, but in the interests of efficiency I have not repeated them here.

63. The evaluation I have undertaken in preparing this evidence is underpinned by the requirements set out above. I do not analyse each provision against each of the tests, but where my evaluation requires it I have provided commentary on specific tests.

64. The s32 report and the s42A report provide an assessment of PC1 against the RMA and relevant planning documents. I do not replicate that assessment, but rather focus on areas where I have a different interpretation or view.

RELEVANT PLANNING DOCUMENTS

65. Along with the Resource Management Act, there are three settlement Acts that are relevant for PC1[38]:

    (a) Waikato – Tainui Raupatu Claims (Waikato River) Settlement Act 2010;

    (b) Ngati Tuwharetoa, Raukawa and Te Arawa River Iwi Waikato River Act 2010; and

    (c) Nga Wai o Maniapoto (Waipā River) Act 2012.

66. These three Acts establish the Vision and Strategy for the Waikato River. and deem it to be part of the RPS. It prevails over any inconsistent provision of the RPS. The Settlement Acts also describe the relationship between the Vision and Strategy and other RMA documents, including the Waikato Regional Plan and national policy statements. The Council must give effect to the Vision and Strategy in its own right and as part of the RPS. The

[38] Section 8 RMA.

Settlement Legislation also requires Council to have particular regard to the Vision and Strategy when exercising powers under the RMA.

67. Therefore, the planning documents that the Plan must give effect to are[39]:

(a) The NPS-FM;

(b) The New Zealand Coastal Policy Statement (NZCPS);

(c) The National Policy Statement on Renewable Energy Generation (NPSREG);

(d) National Environmental Standard for Sources of Human Drinking Water;

(e) The Vision and Strategy; and

(f) The RPS.

68. The only plan that PC1 must not be inconsistent with[40] is the Regional Coastal Plan.

69. The relevant planning documents that the Plan must have regard to are[41]:

(a) The Waikato Conservation Management Strategy 2014 – 2024 (Department of Conservation, 2014); and

(b) Auckland Waikato Fish and Game Sports Fish and Game Bird Management Plan.

70. The relevant planning documents that the Plan must take into account are[42]:

(a) Iwi management plans:

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[41]Section 67(3) RMA.

[40] Section 67(4) RMA.

[41] Section 66(2) RMA.

[42] Section 66(2A)(a) RMA.

i. Ngāti Tūwharetoa Environmental Iwi Management Plan 2003;

ii. Ko Tā Maniapoto Mahere Taiao; Maniapoto Environmental Management Plan 2016;

iii. He Mahere Ika: Maniapoto Upper Waipā River Fisheries Plan 2015;

iv. Te Rautaki Taiao a Raukawa; Raukawa Environmental Management Plan 2015;

v. Raukawa Fisheries Plan 2012;

vi. Waikato-Tainui Environmental Management Plan; Tai Timu Tai Pari Tai Ao 2013;

vii. Te Aranga Ake i te Taimahatanga - Rising Above the Mist - Ngāti Tahu - Ngāti Whaoa Iwi Environmental Management Plan 2013;

viii. Te Arawa River Iwi Trust Environmental Management Plan 2015; and

ix. Te Arawa River Iwi Trust Fisheries Plan 2015.

71. I am also mindful of the Settlement Acts.

National Policy Statement for Freshwater Management 2014

72. The key national policy statement of relevance to PC1 is the NPS-FM, as amended in 2017. The NPS-FM directs regional councils to determine community values for freshwater, which must include national values, set freshwater objectives, limits, targets and methods in regional plans to achieve freshwater objectives, to avoid over allocation, and where over allocation exists to phase this out over time. This applies to both water quality and quantity. These limits, targets and methods are to achieve the objectives of the NPS-FW.

PLANNING ASSESSMENT OF WAIKATO REGIONAL COUNCIL PC1

73. This section of my evidence identifies the key issues, in relation to the submission by B+LNZ, pertaining to hearing stream 1. I consider the evidence I have available to me and examine the proposed provisions against the statutory tests set out previously in this evidence. Where required I provide amendments to, or alternatives to the provisions, which in my opinion are a more efficient and effective way to achieve the purpose of the Act, and to give effect to the NPS-FM and Vision and Strategy, taking into account the costs and benefits, and the risk of acting or not acting if there is uncertain or insufficient information.

Recognising and Providing for Values: Objective 1

74. The objectives set in PC1 relate to the restoration and protection of water quality [own emphasis] across the Waikato and Waipā River catchments, while providing for social, economic, and cultural wellbeing, people and community resilience, and protecting and restoring tangata whenua values. Table 3-11.1 provides numerical freshwater objectives for water quality which are *intended* to be achieved over a long-term staged process. As such PC1 establishes 10 year numerical freshwater objectives and 80-year numerical freshwater objectives. The 80-year freshwater objectives are intended to give effect to PC1 objectives and the Vision and Strategy. The numerical freshwater objectives in Table 3.11-1 include instream nitrogen, phosphorus, clarity, ammonia, and *E. Coli* outcomes.

75. Table 3.11-1 is referred to in a number of ways throughout the plan. As set out in the Explanatory Statement[43], terms marked with ^ are defined in the NPS-FM. PC1 defines the numerics in Table 3.11-1 as "*Short term and long-term numerical water quality targets*"[44], but then also as "*attributes*" within

[43] PC1, Explanatory Statement, paragraph 9, bullet point 2, page 9

[44] PC1 Section 3.11.6 List of Tables and Maps/ Te Rangi o nga Ripanga me nga Mahere, paragraph 1, page 63

the explanatory text[45], and when setting out the process required by the NPS-FM in setting attributes ^, and limits^[46].

76. On review of Table 3.11-1 and how is it applied through PC1, particularly its application through the objectives such as objective 1, I consider the numerical parameters to be more akin to 'Freshwater Objectives' as defined in the NPS-FM. This is because Table 3.11-1 is intended to set the numerical instream outcomes that are to be achieved in the respective waterbodies over the life of the plan, and also to give effect to the Vision and Strategy over a longer term 80-year timeframe.

77. To illustrate this conclusion, the NPS-FM defines a freshwater objective as:

*"**Freshwater objective**" describes an intended environmental outcome in a freshwater management unit.*

78. While targets and limits are defined as:

*"**Limit**" is the maximum amount of resource use available, which allows a freshwater objective to be met.*

*"**Target**" is a limit which must be met at a defined time in the future. This meaning only applies in the context of over-allocation.*

79. Some of the key issues to be resolved in these proceedings, and which hearing 1 is to be focussed, are related to whether the Plan's objectives are the most appropriate to achieve the purpose of the Act, whether the provisions give effect to the Vision and Strategy, and the appropriate linkages between the values, objectives, and the numerical freshwater objectives in Table 3-11.1, including the timeframes for these to be achieved.

80. In my opinion PC1's objectives are, in part, inconsistent with the Vision and Strategy, and the freshwater objectives have not been developed in

[45] PC1 Section 3.11.6 List of Tables and Maps/ Te Rangi o nga Ripanga me nga Mahere, paragraph 6, page 63

[46] PC1, Section 3.11.1, paragraph 1, page 24, and objective 1, page 31.

consideration of the suite of values. As such PC1 does not give effect to the NPS-FM. I also consider it to be inconsistent with the purpose of the Act, in relation to reflecting both limbs of sustainability under part 2. I set out my reasoning below.

81. As set out in the s32 report[47], and s42A report[48], identifying Values and Uses is a key step in developing policy, which gives effect to the RMA and NPS-FM. The Values recognised by PC1 are set out under section 3.11.1, of the Plan and include Mana Atua, the intrinsic values of water, and Mana Tangata, the use values.

82. The overarching vision which PC1 is intended to achieve as set out in The Vision and Strategy is "*Our vision is for a future where a healthy Waikato River sustains abundant life and prosperous communities who, in turn, are all responsible for restoring and protecting the health and wellbeing of the Waikato River, and all it embraces, for generations to come*". In that sense the Vision is one which encompasses environmental, economic, social, cultural, and spiritual values. Which in itself I find is consistent with the purpose of the Act, and the objectives of the NPS-FM.

83. It is important here to review the requirements of the Vision and Strategy in considering how these are reflected and ultimately given effect to by PC1.

84. The Settlement Acts give the Vision and Strategy[49] status as the primary direction-setting document for the Waikato River. It applies to the rivers and to activities in the rivers' catchments. To this end it establishes 13 Objectives for the Waikato and Waipā Rivers, and 12 Strategies.

85. The objectives seek:

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[47] Section 32 Report B.3 page 30

[48] Section 42A B2 Values and Uses, page 30 to 46.

(a) The restoration and protection of the health and wellbeing of the Waikato river;

(b) The restoration and protection of the relationship of Waikato River iwi according to their tikanga and kawa, with the Waikato River, including their economic, social, cultural, and spiritual relationships; and

(c) The restoration and protection of the relationship of the Waikato region's communities with the Waikato River including their economic, social, cultural and spiritual relationships.

86. As such the objectives in the Vision and Strategy are focussed around the health and wellbeing of the Waikato River, and its communities, including their economic, social, cultural, and spiritual relationships with the river. They recognise all elements of the health and wellbeing of the Waikato River and its communities in respect to the relationships people have with water.

87. The objectives create a much more holistic and integrated particularisation of the vision of the Vision and Strategy (Vision) which relates to the restoration and protection of the 'health' of the river, and the wellbeing of communities. Concepts therefore of restoration and protection more appropriately relate to the values, which in my opinion are recognised under section 3.11-1 of PC1, rather than singularly as 'water quality' as currently reflected in objectives 1 - 4.

88. The only objective in the Vision and Strategy that specifically relates to water quality is objective k. which states, "*The restoration of water quality within the Waikato River so that it is safe for people to swim in and take food from over its entire length*". However, restoration in this sense is still not open ended and is book marked by the end values which are swimmability and mahinga kai, both of which are recognised as national values within the NPS-FM.

89. Health is not synonymous with water quality. Water quality is a part of water's health, but the level of quality (numerical outcome) and the parameters chosen are dependent on what values are being provided for. As such, concepts of 'restoration and protection' are shaped by that end

goal. As discussed in the expert evidence of Dr Mueller[50] and helpfully set out under Section 3.11.1[51], other relevant matters to be considered when assessing the health of a waterbody include:

(a) River geomorphology and processes;

(b) Connectedness;

(c) Ecological corridors, and riparian margins;

(d) Additional water quality parameters (DO, temperature, conductivity, deposited sediment);

(e) Instream nitrogen concentrations ranging from <0.11 mg/L (A band<), >0.58 mg/L (B band) and <1.66 mg/l (C band) for nitrate;

(f) Biodiversity indicators such as the Macroinvertebrate Community Index (MCI) and measurements of biota (e.g. fish, birds); and

(g) Mātauranga Māori indicators such as the cultural health index (CHI).

90. Recognition that provision for the restoration and protection of the Waikato River is broader than just water quality, and encompasses ecosystem processes and the health and wellbeing of communities, is reflected within the strategies of the Vision and Strategy, in particular those that recognise and provide for integrated and holistic management of the health of the Waikato river. These strategies include strategies 9 which encourages a "*whole of river' approach to the restoration and protection of the Waikato River*", and 8 and 10 which recognise the importance of community understanding, ownership, and participation in working together to restore and protect the health of the Waikato River.

91. The premise therefore in the PC1 objectives, particularly objective 1 and 3, places an undue emphasis on the continued improvement of water quality

[50] Evidence in Chief Dr Mueller, paragraph 35 to 48, Table 1, pages 18 – 22.

[51] Values and uses for the Waikato and Waipā Rivers / Ngā Uara me ngā Whakamahinga o ngā Awa o Waikato me Waipā.

parameters, without recognising the values that are sought to be provided for under PC1, Vison and Strategy and the NPS-FM.

92. It is also important to reflect on the requirements of the NPS-FM in relation to determining values for freshwater and establishing freshwater objectives. The NPS-FM is clear in its requirements to:

(a) Objective AA1 consider and recognise Te Mana o te Wai in the management of freshwater, and that this includes the recognition of the connection between water and the broader environment. The definition of Environment under the Act is set out above and include the health of people including economic wellbeing. Objective AA1 under policy AA1 also requires that the values of the community are identified and inform the setting of freshwater objectives and limits;

(b) Objective A1 safeguarding the life supporting capacity, ecosystem processes and indigenous species including their associated ecosystems and the health of people and communities;

(c) Objective A4 enable communities to provide for their economic well-being, including productive economic opportunities, in sustainably managing freshwater quality within limits.

93. When considered side by side the NPS-FM and Vision and Strategy in relation to the suite of values which must be considered are consistent and can be given effect to by PC1.

94. The Vision and Strategy recognises all elements of the health and wellbeing of the Waikato River and its communities and the relationships people have with water, including their social and economic wellbeing. The strategies set out in the Vision and Strategy are aspirational, and in some respects abstract, and in my opinion are consistent with the NPS-FM. The NPS-FM imposes a discipline on councils when establishing freshwater objectives to provide for the values identified by communities.

95. I support the values identified in section 3.11.1 PC1, noting that these recognise and provide for both parts of the definition of sustainable management: the management and enabling aspects. Of particular relevance to B+LNZ's submission, I note it says "*the rivers support regionally*

and nationally significant primary production in the catchment (agricultural, horticultural, forestry). These industries contribute to the economic, social and cultural wellbeing of people and communities, and are the major component of wealth creation within the region. These industries and associated primary production also support other industries and communities within rural and urban settings"[52]. I consider PC1 correctly identifies the relevant values highlighted by the Vision and Strategy and the NPS-FM, in particular in giving effect to Objective A1 and A4.

96. However, in my opinion, PC1 fails to provide a clear line of sight between the values set out under section 3.11.1, the objectives in section 3.11.2 and the short and long term numerical water quality freshwater objectives set out in Table 3-11.1. Matters of misalignment between the NPS-FWM and PC1, in particular in terms of values and uses for each FMU, identification of freshwater objectives, and appropriate attributes, have been acknowledged by the Reporting Officers[53] and I agree with their analysis.

97. To explain this, it is helpful to review the approach to setting instream numerical water quality objectives / limits under the NPS-FM. The NPS- FM requires that every regional council establish freshwater objectives in accordance with Policies CA1 – CA4, which include numerical freshwater objectives / attributes, and set freshwater quality limits to give effect to the objectives[54]. Policies CA1 – CA4 require that freshwater objectives are set for national and regional values, which include numerical attribute states. The freshwater objectives in PC1 are set out in Table 3.11-1. The table provides for short and long term numerical water quality targets and in that way is intended to reflect the NPS-FM national objectives framework requirements, along with the Vision and Strategy's intergenerational vision.

98. As currently proposed Table 3.11-1 freshwater objectives were derived through, what was known as scenario 1, which provides, in my

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[52] PC1 page 29.

[53] Section 42A, para 167, page 32

[54] National Policy Statement for Freshwater Management, policy A1.

understanding, for a core subset of values identified under Section 3.11.1, including ecosystem health, human health and mahinga kai. Scenario 1 provides the most stringent of the scenarios tested for providing for a limited suite of values. This will be discussed further under Table 3.11-1, however for example, the *E.coli* freshwater objective was derived from modelling historic water quality for the Waikato and Waipā catchments for 1863, and is intended to provide for the value of human health in relation to water quality.

99. The Plan's objectives do not reflect the range of values identified under Section 3.11.1. In particular, the Plan's objectives fall short of representing the requirement in the Vision and Strategy that PC1 set outcomes that provide for the health and wellbeing of the Waikato River, and its communities, including their economic, social, cultural, and spiritual relationships with the river. The Vision and Strategy objectives are not singularly or specifically related to the "*restoration and protection of water quality*" as set out in Objective 1 of PC1 but encompass a much more holistic and integrated vision which relates to the restoration and protection of the 'health' of the river, and the wellbeing, including economic wellbeing of communities, as discussed above.

100. This raises an important planning issue that can be overlooked when solely focusing on the intrinsic and spiritual values. That is, PC1 is required to give effect to the parts of the Vision and Strategy, NPS-FW, and the purpose of the Act, that recognise other relationships, including economic and cultural values, at the same time as intrinsic values, particularly given the Vision and Strategy recognises the contribution of the Waikato and Waipā Rivers to all these matters is of national importance.

101. In my opinion objective 2, which appears to be the primary way of recognising these wider aspects of the notion of the health of the rivers, does not do so adequately. The objective correctly acknowledges the benefits to communities from the restoration and protection of water quality in the catchment, but nowhere do the objectives recognise the need to continue to provide for importance of primary production and the economic wellbeing of people and communities at the same time as pursuing the restoration and protection of water quality.

102. The superior documents contain appropriate and robust planning approaches to the contribution the rural sector makes to the Waikato Region: see the Regional Policy Statement, the values in Section 3.11.1 PC1, and as described by expert witnesses called by B+LNZ. While I have not had the opportunity to review other parties' evidence in respect to other agricultural activities, based on my experience and expertise I predict that the other sectors will likewise be reflected in these values.

103. A key planning issue in this case is therefore the relationship between the values, plan objectives, and freshwater objectives. In my opinion when read as a whole, the statutory planning documents, including the Vision and Strategy do not support an approach that fails to recognise both the limbs of sustainable management under the Act.

104. In my opinion it is important that PC1 is amended to recognise that the provision for the intrinsic values of freshwater, including ecosystem health and processes, and provision for the use values of freshwater including for economic, social, and cultural wellbeing and future generations, should not be in competition with, or in opposition to, each other. The outcomes being sought by PC1 should consider carefully the provision of both limbs of sustainable management and provide for those opportunities within clearly and carefully defined provisions to identify and achieve freshwater objectives.

105. Objective j of the strategy makes it clear that the strategic importance of the Waikato River is subservient to the restoration and protection of the River. As such it is important to specifically acknowledge that objective's impact on my opinion. I do not consider that objective j means that an approach that fails to give proper recognition to the limb of sustainable management providing for the social, cultural and economic wellbeing is correct. That is because, in my opinion, the requirement to sustainably manage resources while, at the same time, enabling people to provide for themselves is contemplated in the part of the Vision that seeks the Waikato River sustains prosperous communities, who at the same time are responsible for restoring and protecting the health of the river.

106. While there is a strong focus on the intrinsic, and spiritual values of freshwater, with recognition that the health of the Waikato River needs to be

protected and restored, The Vision and Strategy also recognises other elements in the management of freshwater. Under the objectives for the Waikato River[55], the restoration of economic, social and cultural values are recognised and provided for, including at *b, c*, and *d. F*or example at d "*The restoration and protection of the relationship of the Waikato region's communities with the Waikato River including their economic, social, cultural and spiritual relationships*".

107. Thus, in my opinion, it is appropriate to restore and protect the health and wellbeing of the Waikato River catchment, but it should be done in a way that enables people and communities to provide for themselves, within defined environmental limits that achieve the restoration and protection of the *values* that have been identified in the Catchment.

108. Under s67(3)(c) the Regional Plan must give effect to the RPS. Both the Waikato Regional Plan and the RPS contain further recognition of the significant importance of the agricultural sector to the economic, cultural and social wellbeing of individuals and communities. As set out in the evidence of Mr Burtt, the sector supports 5,877 direct jobs in the Waikato, and contributes GDP of $294 million. It is New Zealand's second largest goods exporter and New Zealand's largest manufacturing industry, exporting over 90 per cent of its production. The health and wellbeing of the red meat sector within New Zealand is important to the economy and regional New Zealand.

109. While I agree with the Officers that giving effect to the NPS-FM and the Vision and Strategy are mandatory (para 285, page 49), that does not necessarily mean the numerical freshwater objectives in Table 3-11.1, nor the methods to achieve them give effect to either. I have analysed the approach proposed by PC1 under s32 and consider that it is neither efficient or effective to adopt such an approach, because, amongst other things, it does not recognise and provide for the values of freshwater, including but not limited to, the

[55] Vision and Strategy for the Waikato River, Objectives for the Waikato River, page 6.

importance of primary production, nor provide for the economic, social, or cultural, wellbeing of communities.

110. I support the Officers' recommendations[56] to amend Section 3.11.1, however, this in itself, does not address the issue in relation to providing clear links between the values and the freshwater objectives. It merely provides background information and does little to assist decisions on resource consents, or to guide consideration of the appropriateness of the Plan's objectives, freshwater objectives, policies, or methods, which are a key component in meeting the requirements of the NPS-FM.

111. Section 67(1)(a) requires that Regional Plans must state the objectives for the region. Objectives are an essential element of regional plans, they must achieve the purpose of the Act, and give effect to national policy statements. They assist decision makers in relation to assessing applications for consent. The importance of clear, specific objectives which are written in a way that is assessable, and, ideally, clear enough to provide outcomes that the policies seek to achieve is accepted as being consistent with good practice in writing objectives (whether fresh water objectives, or plan objectives)[57].

112. As such, objectives should clearly communicate what the plan is trying to achieve, and they should clearly and logically provide a link between the methods (including rules), policies, and the intended outcomes as set by the objective.

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[56] Section 42A Report, paragraph 165, page 32.

[57] See for example 'Writing good objectives' on the Quality Planning website http://www.qualityplanning.org.nz/index.php/plan-steps/writing-plans/writing-issues-objectives-andpolicies

113. In my opinion, the objectives of PC1 are lacking when assessed against the parameters set out above. I support the officers[58] position that the objectives should be amended so that they better reflect the outcomes sought.

114. To assist with plan structure and to provide a clear link between the values and the Plan's objectives, and freshwater objectives, I recommend that objective 1 is replaced with the following objective in section 3.11.2.

Objective 1A Water Management Values[59]

Surface water bodies are managed in a manner that recognises and provides for the Mana Atua and Mana Tangata Values set out in Section 3.11.1.

and

Objective 1B Water Quality

Water quality is managed to ensure that:

(a) water quality is protected in those surface waterbodies where the existing water quality is at a level sufficient to support the Values in Section 3.11.1 and Objective 1A; and

(b) water quality is restored in those surface waterbodies where the existing water quality is not at a level sufficient to support the Values in Section 3.11.1, so that the Values are supported by 2097.

Objective 2 and Objective 3

115. While some consideration has been given to the importance of the economic wellbeing of the region through objective 2 (as discussed above), the objective does not in itself provide enough clarity to decision makers around

[58] Section 42A report paragraph 312 and 313, page 54

[59] I support a Te Reo Maori translation in the title.

how the Plan achieves the purpose of the Act, and the community's aspirations while addressing significant natural resource issues.

116. In my opinion the PC1 objectives should be strengthened to explicitly recognise that an outcome the Plan pursues is the use of water and land resources to provide for the economic, social, and cultural wellbeing of the region, within natural resource limits to protect and restore the values identified in Section 3.11.1:

Social, economic and cultural wellbeing is recognised and maintained ~~in the long term~~/Te Whāinga 2: Ka whakaūngia te oranga ā-pāpori, ā-ōhanga, ā-ahurea hoki i ngā tauroa.

Management of the Values identified in Section 3.11.1 of land and water resources within the Waikato River Catchment within natural resource limits that recognises and provides for Waikato and Waipā communities and their economic and social wellbeing, vibrancy and resilience.

117. I recommend deletion of objective 3

Objective 4

118. B+LNZ opposed objective 4 and sought amendments to the objective to recognise and provide for people and community resilience, adaptive management and a tailored sub-catchment approach to the integrated and sustainable management of natural resources and achievement of the freshwater objectives.

119. Objective 4 as proposed provided for people and community resilience in the short term, while signalling changes in controls on the use of land over a longer time period to achieve the Table 3.11-1 Freshwater objectives. PC1's approach to a targeted sub catchment approach as proposed is largely non-regulatory and is not currently an outcome sought by the plan[60].

[60] Section 42A paragraph 138, page 27.

120. Integrated management is a requirement of councils under s30 of the Act, the NPS-FW, and Vision and Strategy. The Vision and Strategy includes objectives which specifically recognise and provide for an integrated, holistic and coordinated approach to management of the natural, physical, cultural and historic resources of the Waikato River[61], along with 4 specific and targeted strategies. These strategies focus on enhancing community participation, including knowledge sharing, and responsibility, in working together to achieve holistic and integrated outcomes in relation to enhancing and restoring the health of the Waikato River.

121. Three strategies are worth setting out:

(a) Strategy 5 - Develop and share local, national and international expertise, including indigenous expertise, on rivers and activities within their catchments that may be applied to the restoration and protection of the health and wellbeing of the Waikato River;

(b) Strategy 8 - Actively promote and foster public knowledge and understanding of the health and wellbeing of the Waikato River among all sectors of the Waikato regional community;

(c) Strategy 9 - Encourage and foster a 'whole of river' approach to the restoration and protection of the Waikato River, including the development, recognition and promotion of best practice methods for restoring and protecting the health and wellbeing of the Waikato River; and

(d) Strategy 10 - Establish new, and enhance existing, relationships between Waikato-Tainui, other Waikato River iwi (where they so decide), and stakeholders with an interest in advancing, restoring and protecting the health and wellbeing of the Waikato River.

122. Integrated management of natural and physical resources, which is holistic, collaborative and catchment based, is a requirement under the RPS (for example s3.1, policy 4.1, policy 4.4, policy 8 and policy 11.3). The RPS

[61] Vision and Strategy, objective e, page 6.

requires the restoration and protection of the ecosystem health and biodiversity values of the Waikato River through a range of policy requirements, including the requirement to implement the Vision and Strategy (s3.4.) and maintaining or enhancing indigenous biodiversity (policy 11.1). As such PC1 is required to give effect to these provisions.

123. I believe that adoption of a sub-catchment approach would not pose the risks identified by the officers such as "not having an 'eye on the prize': which is the health and restoration of the whole river system"[62]. Rather this approach would empower communities to understand local and broader spatial scale issues in relation to environmental health, with a focus on aquatic ecosystem health. Solutions would be found that are spatially explicit and more efficient and effective at achieving freshwater objectives, at a broad range of scales rather than the current one size fits all approach proposed in PC1.

124. Mr Kessels says in his evidence in chief that the 1980 World Conservation Strategy states that long-term management of natural resources depends on the support and co-operation of local people[63]. Sub-catchment approaches integrate ecological, economic and social factors in a particular management unit, which, in turn, is a pathway to provide ownership and empowerment of local people to share in the management and monitoring of the natural resources in their area[64]. Mr Kessels goes on to say that there is also New Zealand specific literature to indicate that collaborative, ecosystem management approaches are effective in achieving desired freshwater ecosystem health objectives[65].

125. As set out in the expert evidence on behalf of B+LNZ, and in the Officers' s42A report, water quality varies across sub catchments and is reflective of land use and history of land use. In upper catchments where land cover is

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[62] Section 42A paragraph 143, page 28.

[63] Evidence in Chief Mr Kessels, paragraph 36, page 11.

[64] Evidence in Chief Mr Kessels, paragraph 37, page 11.

[65] Evidence in Chief Mr Kessels, paragraph 38, page 12.

under native cover, or/and land uses are extensive, water quality outcomes are already achieved, and for others the level of over allocation and the numerical parameters vary e.g. from sediment or nitrogen.

126. I recommend tailored, integrated sub catchment management be included within the objectives of PC1. I propose objective 4 be deleted and replaced by the following objective, which establishes an outcome based on supporting and empowering collective action at the sub catchment scale to deliver holistic and integrated outcomes when sustainably managing natural resources including freshwater.

People and community resilience / Te Whainga 4: Te manawa piharau o te tangata me te hapori, and the achievement of the Vision and Strategy for the Waikato River.

Communities working together to sustainably manage land and water resources within sub catchments, to protect the Values for freshwater identified in Section 3.11.1, to maintain, and where degraded improve, water quality, and to protect and restore biodiversity, for generations to come.

Intergenerational Outcomes

127. The background and explanation for chapter 3.11 adopts the collaborative Stakeholders Group (CSG) choice of an 80-year timeframe for achieving the freshwater objectives of the Vision and Strategy. It explains that the challenges facing communities and businesses means that a staged approach is required.

128. PC1 sets long term freshwater objectives but fails, beyond signalling further plan changes, to clearly and logically provide a link between the methods (including rules), policies, and intended outcomes set by the long-term freshwater objectives. It states that achievement of the 80-year water quality outcomes "*requires technologies or practices that are not yet available or economically feasible. In addition, the current understanding is that achieving water quality restoration requires a considerable amount of land*

to be changed from land uses with moderate and high intensity of discharges to land use with lower discharges (eg through reforestation)"[66].

129. The information supporting the development of PC1 indicates that the full achievement of the Vision and Strategy by 2096 is likely to be costly and difficult[67]. The 80-year timeframe recognises that significant reductions in discharges from some land uses may be required and as such a considerable amount of land to be changed from land uses with moderate and high intensity of discharges to land use with lower discharges (e.g. through reforestation) [68]. What it calls the 'innovation gap' means full achievement of water quality outcomes set under Table 3.11-1 may require significant reductions in discharges from some land uses in sub-catchments which are currently over allocated. In addition, the current understanding is that achieving water quality restoration takes time due to lag phases between changes in land management approaches, and establishment of on farm and edge of field mitigation (for example slope stabilisation, critical source management, wetland creation and enhancement, and establishment of riparian vegetation), and resultant water quality improvements.

130. Mr Beetham's evidence concludes that compliance with the requirements of PC1 in working towards the achievement of Table 3-11.1 water quality freshwater objectives is likely to significantly impact on the economic wellbeing of sheep and beef farmers, in both the short and long term. The outcome is that the sector and rural communities that rely on it, have no certainty in relation to their future. In the short term sheep and beef businesses are faced with uncertainty in relation to whether or not they

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[66] PC1 page 15

[67] Ibid.

[68] PC1 Full achievement of the Vision and Strategy will be intergenerational, paragraph 1 and 2, page 16.

should invest in their businesses to meet the compliance costs of PC1 over this next 10 year period.

131. He notes that the intergenerational timeframe for these changes mean that PC1 is seeking substantial investment (beyond that reflected in the Council's s32 analysis) by the agriculture sector to comply with the Plan's rules for the first 10 years[69], but without providing longer term business and investment certainty.

132. The planning issue arising is how effective and efficient the first 10 year block of provisions will be in giving effect to the Vision and Strategy, NPS-FM and the RPS?

133. There is a requirement for certainty when implementing objectives and policies. This is an important part of planning; the ability for people and communities to make decisions that affect their health and wellbeing informed by the regulatory framework in place. This, in turn, is a function of a s32 analysis when determining whether a plan change is appropriate, efficient and effective. If a policy indicates that changes are coming, but those changes are only generally signalled then the implications of those changes are difficult to assess.

134. Asking people and communities to provide for their health and well-being in an information vacuum beyond a short-term horizon is, in my opinion, contrary to the principles of sustainable management. Through more traditional planning approaches this is not usually a problem because, in giving effect to the NPS-FM, the values are identified, and freshwater objectives, limits, and targets are set, including policies and methods that work toward them in 10 year blocks. PC1 however, has set out the 80-year freshwater objectives, and in so doing established the outcomes. While this may be of assistance in determining the trajectory of travel for water quality, it is not useful in a s32 sense because we cannot assess how effective the **current** provisions will be in reaching those ultimate outcomes. This is compounded because those most effected by PC1 cannot identify how its

[69] See evidence of Richmond Beetham.

requirements (e.g. fencing) will affect them in the longer term i.e if they will still be in business. As such I am unable to access the efficiency and effectiveness in this information vacuum, particularly in relation to the effect this plan change will have on communities' ability to provide for their health and wellbeing.

135. That is not to say a policy requiring a 10% improvement target in 10 years, implemented by certain and clear rules and the need to assess effectiveness of PC1 over time, is always inappropriate. It is the next step in relation to what is to come, which has not been clearly or reasonably identified. Timeframes should provide for investment in infrastructure, remediation, mitigation, innovation, and farm optimisation.

136. As set out above, PC1 has signalled the need to change current land uses, probably within the next 10 year planning cycle, while still requiring changes in land use by way of rules now in PC1, which provides farmers with no ability to plan forward. In my opinion this cannot be considered a programme of action to achieve the targets for improving the health of the Waikato River, in its broad sense as set out in the Vison and Strategy. It is only a single step.

137. B+LNZ along with other submitters[70] have raised concerns around the intergenerational timeframe, and short and long term numerical freshwater objectives for this same reason. I agree that there is a need to provide more guidance and certainty on what will be required beyond the 10 year timeframe in the Plan. This needs to be more than the attribute outcomes in Table 3-11.1 and provide guidance as to what will be required of land users that discharge diffuse or point source contaminants to give effect to the Vision and Strategy's objectives.

138. Experts on behalf of B+LNZ have identified alternative methods, including a tailored sub catchment approach, which could be implemented now, and which would be more effective and efficient at achieving the objectives of the Plan (as proposed to be amended) and integrated and sustainable

[70] Section 42A paragraph 307, page 53.

management. I understand further evidence is to be provided on this through hearing stream 3.

139. I therefore propose in the first instance that Section 3.11 is amended to specifically recognise and support a sub-catchment, and tailored farm-specific approach to integrated and sustainable management, including achievement of freshwater objectives. Further, that statements foreshadowing the conversion of large tracts of pastoral land back into forestry are deleted, and that the approach to managing water quality to achieve freshwater objectives, which in themselves provide for the values, is clearly established. The statutory requirements in setting and managing to freshwater objectives is further elaborated on in my planning analysis of Table 3-11.1.

140. I recommend deletion of paragraph 2, and paragraph 3 and replacement with a new paragraph

> Plan change 1 therefore adopts a targeted and risked based approach to managing land and water resources which is focussed on sub catchments and which ensures that:
>
> > (i) water quality is managed to ensure that:
> >
> > (a) water quality is maintained in those rivers and lakes where the existing water quality is at a level sufficient to support the Values in Section 3.11.1 Objective 1A;
> >
> > (b) water quality is enhanced in those rivers and lakes where the existing water quality is not at a level sufficient to support the Values in Section 3.11.1 Objective 1A, so that the values are supported by 2097;
> >
> > (c) accelerated eutrophication and sedimentation of lakes in the catchment is prevented or minimised.

141. At paragraph 4 I recommend deletion of bullet point 3[71] in relation to the nitrogen reference point and holding land uses to this historic discharge rate.

142. I further recommend amendment of bullet point 5:

"Waikato Regional Council to incentivise, enable, and support, sub-catchment approaches to sustainable land and water management, and adoption of edge of field mitigation where required. Regulatory, non-regulatory, and financial instruments are provided to enable and support communities working together in their watershed (sub-catchments) to address ~~develop approaches outside the rule framework that~~ both point source and diffuse losses of contaminants to water, ~~allow contaminant loss risk factors to be assessed at a sub – catchment level~~, and implement mitigations that look beyond individual ~~farm~~ property boundaries to identify the most cost-effective and influential solutions."

Freshwater Objectives Table 3.11-1

143. The Officers' s42A report takes the position that, as such, the Vision and Strategy requires a higher level of protection for water quality than currently provided under the RMA and NPS-FMW. Hence that justifies the water quality outcomes in Table 3-11.1.

144. There can be no doubt that freshwater objectives must ensure the restoration and protection of the health and wellbeing of the Waikato River. However limited information or evidence is put forward to justify the numerical freshwater objectives in Table 3-11.1. The values presented in PC1 and the narrative contained in the Vision and Strategy, which in itself is reflected in the values in PC1, do not, in my opinion in themselves, justify the numerical limits.

145. While I agree with the officers that the achievement of the NPS-FM and the Vision and Strategy are mandatory (para 285, page 49), that does not necessarily mean the numerical freshwater objectives in Table 3-11.1 are

[71] PC1, Full achievement of the Vision and Strategy will be intergenerational, paragraph 4, page 19.

appropriate, nor the methods to achieve them. To seek water quality outcomes that go beyond safeguarding the life supporting capacity of natural resources, and ecosystem health and processes, or which are more stringent than those required to provide for water quality that is safe for people to swim or take food from is not, in my opinion, justified sustainable management of resources because it does not acknowledge the other, contemporaneous, aspects of sustainable management.

146. The Officers state[72] that Tables 3.11-1 and 3.11-2 are the freshwater objectives that correspond to the values identified for each FMU. However, in relation to the second point around the relationship between the values and the freshwater objectives there does appear to be inconsistencies, as stated by the officers in considering the values, and uses for each FMU, and establishment of appropriate attributes[73] .

147. As provided in expert evidence on behalf of B+LNZ the numerical freshwater objectives may not be appropriate in relation to providing for the values. This last point is essential when considering the appropriateness of a plan that, along with 10 year freshwater objectives, sets freshwater objectives to be achieved over an 80-year time period, in recognition that significant change will be required to achieve those objectives and to enable individuals and communities to change and adjust in a manageable way.

148. Freshwater objectives must be included in PC1 in order to give effect to the NPS-FM. I consider that the adoption of NPS-FM freshwater objectives identification is consistent with the approach required by the Vision and Strategy.

149. A freshwater objective has two key components. It must:

(a) Describe the intended environmental outcome(s); and

(b) Give effect to the objectives of the NPS-FM.

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[72] Section 42A paragraph 304, pages 52 and 53.

[73] Section 42A, paragraph 167, page 32

150. The process for setting numerical freshwater objectives, which provide for national and regional values in accordance with the RMA and NPS-FM, can be summarised as:

(a) For each river reach or FMU identify the appropriate values;

(b) Establish numerical water quality and quantity freshwater objectives and, where appropriate, limits to provide for those values;

(c) Undertake an assessment of current state against desired state (numerical freshwater objectives / limit) and use that to determine the allocation state for the waterbody; and

(d) Establish management approaches to address any over allocation issues and to enhance or provide for the life supporting capacity of the waterbodies concerned.

151. As covered in the preamble to the NPS-FM "*Setting enforceable quality and quantity limits is a key purpose of this national policy statement. This is a fundamental step to achieving environmental outcomes and creating the necessary incentives to use fresh water* efficiently*, while providing certainty for investment. Water quality and quantity limits must reflect local and national values. The process for setting limits should be informed by the best available information and scientific and socio-economic knowledge*."

152. It is also recorded in the preamble that the management of the water resource needs to reflect the catchment-level variation between water bodies. The process for setting water quality limits/ outcomes/ objectives are set out in the NPS-FM, which includes requirements to safeguard ecological health and processes as a fundamental requirement, but also includes consideration of economic wellbeing.

153. The second part to consider are the requirements under section 30 RMA and Objective A2 NPS-FM in relation to maintaining and, where degraded, enhancing freshwater quality.

154. Section 30 requires regional councils to control of the use of land for the purpose of (s30(1)(c)) the maintenance and enhancement of the quality of

water in waterbodies and coastal water (s30(1)(c)(ii)) for the purpose of giving effect to the Act in their region. While the NPS-FMW Objective A2 requires that the **overall** [own emphasis] quality of freshwater within a **freshwater management unit** [own emphasis] is maintained or improved, in accordance with policy CA2 (e)(iia)(A) and (B).

155. While 'water quality' is not defined in the RMA or the NPS-FMW, the Board of Inquiry decision on Hawkes Bay Regional Council Plan Change 6 and Ruataniwha Irrigation Scheme, determined that water quality should be defined in a manner that is consistent with the United Nations definition of water quality, namely: "*From a management perspective, water quality is defined by its desired end use. Consequently, water for recreation, fishing, drinking and habitat for aquatic organisms require higher levels of purity, whereas for hydro power, quality standards are much less important. For this reason, water quality takes on a broad definition as the "physical, chemical, and biological characteristics of water necessary to sustain desired water uses"*[74]. I adopt this definition in my planning assessment.

156. NPS-FM defines "Existing freshwater quality" as the quality of the fresh water at the time the regional council commences the process of setting or reviewing freshwater objectives and limits in accordance with policy A1, policy B1, and policies CA1-CA4. In this case that date is 2014. Freshwater Management Units have been set in PC1 and include four river and four lake FMUs.

157. Policy CA2 (3)(iia)(A) requires that where an attribute is set as listed in Appendix 2 to the NPS-FMW, that the freshwater objective is at least within the same attribute state as existing water quality. Policy CA2 (3)(iia)(B) requires that where an attribute is not listed in Appendix 2 that freshwater objectives are set so that the values identified by the plan will not be worse off when compared to existing water quality.

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[74] Final report and decisions of the board of inquiry into the Tukituki Catchment Proposal, volume 1 of 3: Report and Decisions, Paragraph 344, page 111.

158. National Objectives Framework (NOF) sets out numerical attributes under Appendix 2 NPS-FM. The following attributes apply:

(a) For rivers: Periphyton (as measured at milligrams chlorophyll-a per square metre (mg chl-a/m2)), Nitrate (toxicity), and Dissolved Oxygen (below point sources);

(b) For Lakes, and rivers: Escherichia coli (*E. Coli*), and Ammonia (toxicity); and

(c) For Lakes: Phytoplankton (as measured at milligrams chlorophyll-a per cubic metre (mg chl-a/m^3)), total nitrogen (TN), total phosphorus (TP), and Cyanobacteria – Planktonic.

159. I understand that current water quality across the Waikato and Waipā Rivers is above the bottom lines set out in Appendix 2 NPSFWM, and generally within the A or B bands[75], with the exception of *E.coli* I therefore support the retention of water quality specific to those attribute states being maintained in the first instance at current water quality.

160. In relation to those attributes which are included as freshwater objectives in PC1 and which are included in Appendix 2 to the NPS-FM, the second matter to consider is whether or not improvements should be sought from existing water quality. As the freshwater objectives are currently above the bottom lines specified for each attribute in Appendix 2 NPS-FM, the matter hinges on whether to not the values are currently being met or whether freshwater objectives need to be set at more stringent levels in order to provide for the values.

161. I consider this approach to give effect to the requirement to restore and protect the health and wellbeing of the Waikato River in the Vision and Strategy because it achieves an outcome that, in turn, restores and protects the values that are identified by PC1.

[75] Evidence in Chief Dr Mueller, and CSG report attributes.

162. On review of the freshwater objectives, it is clear that the 80-year time horizons, and associated implications for individuals and communities, are due to where the numerical freshwater objectives have been set in relation to current water quality. As stated above, all parameters fall above the NPS-FM national bottom lines, so decisions around where the numerical state should be hinge off the value[s] that the numerical freshwater objectives seek to provide for. Swimmability and mahinga kai are two of those values, which is consistent with the NPS-FM. Human health for recreation and ecosystem health are the two compulsory national values within the NPS-FM. Other national values include natural form and character, mahinga kai, fishing, irrigation/ cultivation/ and food production, animal drinking water (which I note is provided for under section 14 RMA), wai tapu, water supply, commercial and industrial use, hydroelectric power generation, and transport and tauranga waka. As such under the NPS-FM values are a mix of intrinsic and consumptive use values, with primacy given to ecosystem health and processes and contact recreation.

163. The numerical 80-year freshwater objectives are based off achievement of scenario 1, which is the most aspirational of the water qualty scenarios tested and seeks improvement in water quality everywhere in the Waikato and Waipā catchments irrespective of where current water quality is and whether or not the values are currently being achieved, as set out by Doole (2016)[76]. In my opinoin this is inconsistent with the requirements of the NPS-FM.

164. As set out above, freshwater objectives should be set to achieve the values of the waterbody or / and FMU, including protecting the ecosystem health and processes of freshwater. Where water qualiy is not sufficient to provide for the values, or / and where it falls below the national bottom lines as set out in Appendix 2 NPS-FM then it shoud be improved. Otherwise it can be

[76] Doole (2016) Model structure for the economic model utilised within the Healthy Rivers Wai Ora process. Report No. HR/TLG/2015-2016/4.8, Draft for Discussion Purposes, 23rd February 2016.

maintained, provided the values continue to be protected and attribute states remain at or above the minimum state identified.

165. In my opinion the same applies to the restoration and protection required by the Vision and Strategy. From a planning perspecitve there is subjectivity in the notion of restoration, which means to "bring back". The question is, what are we bringing the water quality back to? I do not interpret the Vision and Strategy to provide a definitive answer to that question, so that is why I have looked to the values to inform my conclusion that the NPSFM approach is appropriate. The approach adopted in PC1 and supported by the Officers, in my opinon, leads to an outcome that does not recognise all parts of the Vision and Strategy or NPS-FM[77].

166. Dr Mueller and Dr Dada provide evidence in relation to the appropriateness of the water quality freshwater objectives in PC1, in providing for the values. As I understand it the long-term freshwater objectives are intended to primarily achieve the Vision and Strategy which sets as its ultimate measure of success that the "*Waikato River will be safe for people to swim in and take food from over its entire length*"[78].

167. This takes me to the freshwater objectives. The *E. coli* freshwater attribute, is set to provide for human health in relation to primary and secondary contact, with the numerical state established based off modelled water quality for the Waikato and Waipā catchments for 1863. Dr Dada provides evidence in relation to the use of *E. coli* as a measure of pathogenic risk, along with the appropriateness of the numerical freshwater objectives established in PC1. Dr Dada concludes that *E. coli* is a poor proxy for pathogenic risk, is not highly correlated with land use activities or management, may in fact be driven in some instances by natural stream events, and further that the models used to determine the numerical

[77] As discussed earlier in my evidence in respect to the objectives of PC1.

[78] The Vision and Strategy for the Waikato River, paragraph 5, page 2.

freshwater objectives were not validated and therefore are not fit to inform or underpin PC1; that is, that the models are not fit for purpose .

168. Dr Dada provides alternative freshwater attributes for *E. coli* which, in his expert view, are a more appropriate way of providing for the values, meet the requirements of the NPS-FM, while recognising the inherent complications with using *E. coli* as a freshwater objective.

169. While *E. coli* is an unreliable measure of pathogenic risk scientifically, the NPS-FM requires regional councils to set instream freshwater objectives for *E.* Coli. Currently there is no viable alternative in a regional planning context. Therefore, we should take care with the numerical values incorporated in Table 3.11-1, and associated interventions on land use (which I will address further in hearing stream 2). Those numerical values in Table 3.11-1 should therefore be relaxed as the models and underlying premise for setting these values did not acknowledge these limitations. I adopt the evidence of Dr Dada that the values as set out in Appendix 1 to his evidence should be adopted.

170. PC1 sets freshwater objectives for nitrogen and phosphorus in the Waikato River, which I understand are set to assist with in river algal biomass, with the actual numerical parameters chosen off the basis of lake habitats and in accordance with the NOF attributes for lakes, specifically band A and B. The numerical states for total nitrogen (TN) and total phosphorous (TP) relate to the achievement of the medium and maximum chlorophyll *a* (mg/m^3) freshwater objectives. The range of (TN) is between 0.134mg/L ($134mg/m^3$) and 0.631mg/L ($631mg/m^3$), along with between 0.001mg/L ($10mg/m^3$) and 0.050mg/L ($50mg/m^3$). Freshwater objective numerics increase as you move down the catchments. However, for rivers feeding to the Waikato annual medium nitrate concentrations ranging from 0.0039mg/L to 3.390mg/L are provided.

171. The NPS-FM does not set instream TN or TP attributes for algal biomass for rivers, though it does set instream periphtyon attributes which apply to appropriate river systems, noting "*to achieve a freshwater objective for periphyton within a freshwater management unit, regional councils must at least set appropriate instream concentrations and exceedance criteria for dissolved inorganic nitrogen (DIN) and dissolved reactive phosphorus*

(DRP). Where there are nutrient sensitive downstream receiving environments, criteria for nitrogen and phosphorus will also need to be set to achieve the outcomes sought for those environments". As such the specific parameters for nitrogen and phosphorus to be applied to rivers depend on (1) the type of river which is being managed, (2) its values, (3) if the NOF periphyton attributes are being applied; and (3) if so, the relationship between instream nutrients and algal biomass.

172. As I understand from the evidence of Dr Mueller, there is uncertainty around the level of nutrient concentrations related to achieving algal biomass objectives[79], but that ranges of between 0. <0.11 mg/L (A band<), >0.58 mg/L (B band) and <1.66 mg/l (C band) for nitrate, have been provided in the literature, along with ranges of between TN 0.295mg/L and 0.614mg/L for lowland rivers.

173. Significant restriction points have been identified in the evidence of Dr Cox, relating to PC1 TN freshwater objectives, where these are provided for at low concentrations e.g. TN concentrations < 0.3mg/L. Setting instream nutrient concentrations below, or at levels more stringent than those required to provide for ecological health or a freshwater attribute, such as algal biomass, could impact on other values such as primary production or the provision of people's and communities' wellbeing. In my opinion, where the overall health of the River is consistent with the vision for a healthy River that sustains abundant life in the long term, taking this approach to nutrient concentration would not be consistent with the purpose of the Act or the NPS-FM.

174. Dr Mueller states that while the parameters in Table 3.11-1 are useful indicators of water quality[80], that in themselves they do not give effect to ecological health, the life supporting capacity of freshwater systems, or incorporate mātauranga Māori concepts to measure ecosystem health. As such Dr Mueller recommends the inclusion of additional freshwater

[79] Evidence in Chief Dr Mueller, Paragraph 51, page 24.

[80] Evidence in Chief Dr Mueller, paragraph 36, page 19.

objectives in order to give effect to the NPS-FM, and to recognise and provide for the intrinsic and ecological values identified in Section 3.11.1.

175. As set out under paragraph 38 of her evidence "*to adequately assess, monitor and manage for ecological health, PC1 should consider additional water quality parameters (DO, temperature, conductivity, suspended sediment which all can impact biota such as* invertebrates*). It should also include biodiversity indicators such as the Macroinvertebrate Community Index (MCI) and/or other measurements of biota (e.g. fish, birds), as well as consider mātauranga Māori indicators such as the cultural health index (CHI)*".

176. Dr Mueller provides suggested parameters *along* with numerical states or ranges for a number *of* these attributes, as set out in her evidence in chief Table 1, and include:

(a) Dissolved oxygen with a suggested range of: 7-day mean: ≥8.0 – 9.0 mg/L, 7-day mean minimum: ≥7.0 – 8.0 mg/L, and 1-day minimum: ≥5.0 – 7.5 mg/L;

(b) Temperature ≤18 degrees C; and

(c) MCI: Upper Waikato: >120 (A), Lower Waikato: > 100 (B), and Waipā: >100 (B).

177. Table 3.11-1 provides the freshwater objectives which are to be achieved over the life of this plan and over a longer term 80-year timeframe. The achievement of them has been recognised as being difficult, and likely to require significant land use change and practice change which will impact on the economic, social, and cultural wellbeing of people and communities. Given this, it is important that the freshwater objectives are determined in a transparent and scientifically credible manner. On the balance of evidence reviewed to date, there is significant concern that Table 3.11-1 lacks scientific integrity.

Load Limits

178. B+LNZ, and Horticulture NZ sought the inclusion of load limits within PC1. HortNZ provided a table[81], Schedule 1C table XX, which sets these load limits out. B+LNZ provided a narrative description, including a methodology, seeking that Table 3.11-1 be amended to include both the allowable instream load, and maximum allowable zone load (MAZL) for nitrogen for all sub catchments and Freshwater Management Units (FMUs). Furthermore, that Nitrogen loads should be provided which relate to 1) current instream nitrogen concentrations, and 2) desired instream nitrogen concentrations. The inclusion of load limits was to provide for alternative approaches to managing nitrogen including through alternative allocation frameworks and through sub catchment collectives or integrated frameworks.

179. The load limit, simply speaking, is a function of concentration and flow, as set out in the evidence of Dr Cox[82]. The freshwater objective provides the basis for determining the load limit. Table 3.11-1 currently sets out numerical instream nitrogen concentrations to be achieved over a 10 year and 80-year period. In so doing it establishes what the freshwater objective is and the timeframe for achieving it. I Dr Cox has provided instream load limits for Waikato River based on current instream load, desired instream load, and the load range which could be provided[83].

180. In my opinion of the inclusion of instream nutrient load limits (unattenuated) within PC1 provides a more efficient and effective approach to underpinning management frameworks for nitrogen, than to not include them in PC1[84]. Instream nitrogen load limits would enable sub catchment/ specific approaches to the management of nitrogen to be adopted, tailored to the catchment/ sub catchment, and communities, and if appropriate would enable transfer regimes to be implemented. I have already addressed sub-

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[81] HortNZ Submission on PC1 Schedule 1C Table XX Estimated sub catchment unattenuated loads for the short-term water quality targets (excluding point sources)

[82] Evidence in Chief Dr Tim Cox, paragraph 74, page 17.

[83] Evidence in Chief Dr Tim Cox, Table 1 and 2, page 17 and 18

[84] I note that the officers dismissed this approach siting a lack of information. I do not agree with their analysis, noting the HortNZ table sited above in particular.

catchment approaches previously in this evidence so will not repeat my analysis here.

181. This will be further considered through later hearings.

Economic and Science Modelling

182. An important issue that impacts upon the planning analysis underpinning PC1 is the reliance placed by Council and the CSG on the models. The evidence of Mr Kessels, Dr Cox, Dr Chrystal, and Dr Dada, all examine the models and their reliability.

183. Dr Dada states[85] in reference to the models that were used to determine the *E.coli* freshwater objectives in Table 3.11-1 that the modelling that underpins the PC1 decision making failed to include key factors that influence variabilities in *E.coli* levels in primary productive land and receiving streams. Furthermore, formula and coefficients applied in the model were not explicitly stated, thus preventing independent verification of inputs and outputs of the model. This is important because modellers 'optimise' these coefficients/functions to best make the data fit and the failure to disclose this information means that the model on which the PC1 decision making was based cannot be independently verified to be trustworthy. Also, the *E.coli* models that informed the decision making process in the PC1 were not tested with new measured data not originally included during the model development, a standard process in model validation.

184. Dr Cox raises significant concerns with the catchment model constructed by the technical team to quantify sources and relative contributions of nutrient load throughout the Waikato and Waipā River basins, to perform predictive simulations, and which underpinned the economic modelling. Despite noted significant uncertainties in many of the key model parameters, the models

[85] Evidence in Chief Dr Dada, paragraph 9, page 4.

are not supported by uncertainty or sensitivity analyses of any sort[86]. The models appear to be using outdated land use and export coefficient (emissions) information. This may be skewing results significantly. In particular, the contribution of dairy farming to current nutrient loads in the basin appears to be underestimated[87].

185. Dr Cox has undertaken his own modelling to validate the input data and assumptions of the modelling undertaken by the Technical Leaders Group (TLG), and to run alternative land use and mitigation scenarios. Dr Cox states that his modelling demonstrates and quantifies uncertainties associated with key model input parameters[88]. Modelling results also highlight higher relative cost effectiveness associated with dairy land mitigation, compared to dry stock[89]. Lastly, results highlight the fact that the required level of mitigation effort to achieve the 80-year water quality goals is significant, given the stringent level these targets are set at, and particularly without a commensurate reduction in point source loads. Many parts of the catchment require full reforestation (or mitigation down to background export levels)[90]. More specifically, the modelling identifies that upper basin long-term nitrogen targets may be overly constraining. Without significant point source load reductions in the upper basin, nearly 100% afforestation would be required of all pastoral farm lands to achieve the targets[91].

186. Dr Chrystal analysed the sector nitrogen discharge profiles used through the HRWO modelling, which then underpinning the economic modelled, based

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[86] Evidence in Chief, paragraph 18, page 4.

[87] Evidence in Chief, paragraph 20, page 4.

[88]Evidence in Chief, paragraph 24, page 5.

[89] Evidence in Chief, paragraph 26, page 6.

[90] Evidence in Chief, paragraph 26, page 6.

[91] Evidence in Chief Mr Kessels, paragraph 27, page 6.

on actual case study farms and concluded that the nitrogen discharge parameters used were incorrect[92].

187. Mr Kessels provides further evidence in relation to the effectiveness of requiring hill country fencing stating that the effectiveness of fencing off stock as a strategy to mitigate contaminant loads is highly site and contaminant specific, ranging from highly effective in flat areas and where contaminants are particulate associated, to very ineffective in steeper areas and where contaminants are mobile. In addition, while some research has indicated the efficacy of riparian zones for nitrate removal, there is a well-established concern that these areas could act as a *source of nitrogen*, if vegetation is not regularly cut and removed[93]. Mr Kessels cites concerns with the range and scale of mitigation scenarios that were modelled by the TLG[94] .

188. Mr Beetham undertook case study analyses on the application of PC1 on hill country farms, concluding that PC1 will affect how sheep and beef farmers can operate in the catchment and the choices they can make around land use and land management. He concludes these impacts on farmers are unlikely to achieve the best environmental outcomes including for aquatic ecosystem health, nor to promote the sustainable management of natural resources[95]. He considers that PC1 will limit the earning potential of the land and reduce the flexibility in enterprise selection that farmers currently have. This in turn will alter what the market is prepared to pay for land, impacting land values and the equity of some businesses. The impact on land values and income-earning potential will be largest on undeveloped

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[92] Evidence in Chief Dr Chrystal, paragraph 169, page 50.

[93] Evidence in Chief Mr Kessels, paragraph 51, page 17.

[94] Evidence in Chief Mr Kessels, paragraph 60 to 66, pages 20 – 21.

[95] Evidence in Chief Mr Beetham, paragraph 26.

sheep and beef properties and conservatively stocked properties that would be given a low NRP[96].

189. The costs of compliance with PC1 were analyses as follows: The up-front capital costs to comply ranged from $26,139 to $541,437 per farm; the ongoing annual costs associated with compliance ranged from $5,905 ($66/ha) to $70,859 ($219/ha) per farm; the biggest impact and most inequitable outcome will be the yearly opportunity cost or loss of potential future income created by a grandparenting approach to nitrogen. The opportunity cost ranged from $75,698 ($164/ha) to $256,800 ($285/ha) per farm.

190. This analysis by the B+LNZ experts has significant implications for PC1 because it calls into question the reliability of the principal methods being adopted. However more importantly for this hearing topic, the evidence highlights issues with the reliability of the science underpinning the preparation of the freshwater objectives intended to give effect to the decisions around the allocation of responsibility and essentially costs between different resource users.

191. Key methods have not been appropriately considered through the section 32 analysis, which on the evidence provided to date would be more efficient and effective at achieving PC1 Objectives, such as tailored sub catchment approaches, edge of field mitigation and increased flexibility for extensive farming systems. Importantly for a s32 perspective, and in order to best give effect to the NPS-FM, the distribution of responsibility in relation to key methods within the Plan should be amended. Further evidence will be provided through hearing streams 2 and 3.

Allocation

192. PC1 takes the approach that nitrogen should be managed through application of a nitrogen reference point (NRP) based on modelled nitrogen leaching from the farm over the years 2014/15 or 2015/16, such that

[96] Evidence in Chief Mr Beetham, paragraph 27.

discharges from the farm cannot exceed these historic levels. I consider this to be a 'grandparented' approach to managing nitrogen.

193. PC1 allows land use as a permitted activity, provided the modelled nitrogen loss does not exceed either the property's NRP or 15kgN/hga/yr, whichever is the lesser. Land uses which cannot meet the permitted activity rules become a controlled activity. A condition of the controlled activity rule is that land must not leach more than its modelled nitrogen discharge. This effectively allocates the current nitrogen leaching. Land uses modelled to be discharging within the top 75th percentile for their FMU must reduce to the 75th percentile within the 10 year life of PC1.

194. Through the controlled activity status, consideration of the amount of nitrogen lost by the activity means the resource consent will contain conditions to limit the amount of nitrogen lost, or management practices or mitigations required to minimise the amount of nitrogen lost beyond just the NRP. The applicant then holds a resource consent which authorises a particular amount of nitrogen to be lost from the property. In my opinion this is an allocation of nitrogen loss.

195. Dr Chrystal, presents evidence on the Overseer model which is used to calculate a property's NRP. Dr Chrystal, while acknowledging Overseer as a useful on farm management tool, also outlines some of its limitations. Dr Chrystal concludes that use of the tool in policy needs careful consideration to enable the appropriate use of the model to reduce risk and assist with informing on-farm management approaches[97]. She is not proposing that Overseer not be used at all in regulation, given that alternatives such as input controls on stock numbers for example, have significant issues of their own[98]. She concludes that there are significant risks associated with utilisation of the model to grandparent farming practices to a particular number at a particular point in time. Alternative approaches including

[97] Evidence in Chief Dr Chrystal, paragraph 99 – 100, pages 30 – 31.

[98] Evidence in Chief Dr Chrystal, paragraph 99, page 30.

consideration of thresholds should be considered in relation to establishing outcome or output based risk management frameworks[99].

196. I have considered this issue in a planning context and consider Dr Chrystal's approach to be robust. Allocation approaches should be considered in relation to viable alternatives. This will be considered further in hearing stream 2 as further expert evidence is presented, however, it is important to consider that one of the issues that PC1 is addressing is the relationship between land use and diffuse discharges. There is an inevitable link between the two and it is known that there is a causative relationship. Use of an allocation mechanism provides land users with certainty about their rights and responsibilities in relation to an output parameter, and the link between their activities and cumulative freshwater outcomes, which makes the Plan accessible and logical.

197. However, if nitrogen is to be allocated to land use, then consideration still needs to be given to whether the approach in PC1 is the most effective and efficient tool available.

198. The Environment Court[100] also considered allocation of N including several management options, including grandparenting, LUC based allocation and direction of 'reasonably practicable farm management practices. The Court in that case came to the conclusion that an allocation based on the natural capital of land was the most appropriate allocation mechanism. In particular, the Environment Court roundly rejected a grandparenting approach as "…*an unattractive option. Quite apart from its inherent disadvantages of failing to provide an incentive to reduce leaching, such a process would be administratively inefficient*".

199. The section 42A officers in considering PC1 approach to allocating nitrogen 'grandparenting' regime expressed concerns[101] that the PC1 regime in

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[99] Evidence in Chief Dr Chrystal Paragraph 100, page 31.

[100] *Day v Manawatu-Wanganui Regional Council* (Proposed One Plan Appeals) [2012] NZEnvC 182, paragraph [5-177].

[101] Section 42A report paragraph 132, page 26.

relation to nitrogen is costly, inflexible and potentially has a range of unintended consequences. On *these* points I concur. These issues were considered extensively through both the Horizons One Plan, and Hawke Bay Regional Council Tukituki Plan Change 6 statutory processes, in relation to a grandparenting regime the following issues were accepted:

(a) Rewards those that have been high N emitters;

(b) Disadvantages low emitting users or land uses, including those that have already adopted advanced environmental management systems;

(c) Is inflexible;

(d) Fails to incentivise innovation and adaption;

(e) Fails to respond the changing markets and climate conditions; and

(f) Affects land values.

200. In both cases the decisions favoured allocation based on the natural capital of the land. Based on my experience, I consider that in principle an allocation based on the natural capital of land has the most benefits, least costs, and greatest efficiency of all the allocation mechanisms with which I am familiar.

201. The final design of an allocation mechanism depends on a good and integrated understanding of what is achievable on farms, the time period, and the outcomes for the river. Ideally all possible options would be modelled using the same techniques, this would enable a robust comparative analysis. As signalled by the officers this matter will be further explored in hearing stream 2.

DATED 15 February 2019

Ms Corina Jodi Jordan