

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of the Proposed Waikato Regional
Plan Change 1: Waikato and Waipā
River Catchments to the Waikato
Regional Plan

EVIDENCE - RESPONDING TO HEARINGS PANEL QUESTIONS TO COUNCIL

William Nesbit (Bill) Vant - Waikato Regional Council

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INTRODUCTION

1. My name is William (Bill) Nisbet Vant. I am a water quality scientist with the Waikato Regional Council, a position I have held since 1997. I hold the degrees of MSc (First Class) in Biochemistry from the University of Auckland (1975), and MSc in Ecology from the University of Wales (1978). I also hold a certificate from the Making Good Decisions programme.
2. I have worked in environmental science for 41 years, and was previously a research scientist with the National Institute of Water and Atmospheric Research, NIWA (and its various predecessors). I am responsible for designing and overseeing the Regional Council's river water quality monitoring programmes. I am also responsible for the analysis and reporting of the information gathered in these programmes.
3. I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014, and agree to comply with it. Except where I state that I am relying upon the specified evidence of another person, my evidence in this statement is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions which I express.

PURPOSE

4. The purpose of this evidence is to provide a response to the following question from the Hearings Panel questions to Council dated 19 February 2019:

QUESTION 7: The report - Trends in river water quality in the Waikato region, 1993 – 2017

5. The Panel has asked the following question

The entire premise of the Plan Change is that the surface water network associated with the Waikato and Waipa river catchments is degraded and needs urgent action.

It appears from Table 3.11.1 that the 80 year targets are already met in some sub-catchments, implying that in those sub catchments at least water quality is not degraded. It appears also from reviewing the recently released report, that all the water quality trends (Water Quality) are either neutral or positive, except nitrogen, and in relation to the latter, periphyton is improving and not likely to be an issue.

What does the Council see as the implications of the findings of this report in relation to the PC1 provisions?

RESPONSE

6. I am the author of *Waikato Regional Council technical report 2018/30*. This report describes changes in the water quality of the Region's rivers over the past 25 years (1993–2017). As has been the case in previous analyses of changes, the results are mixed: some water quality records have remained broadly stable, others have improved and some have deteriorated.

7. It is important to note that as financial advisors routinely warn, "past performance is no guarantee of future results". That is, the changes in water quality that we have seen over the past 25 years will not necessarily tell us what changes may occur in the future. Past performance may provide a useful guide, but to predict future conditions in the rivers we need to understand how changes to catchment processes and activities will affect future contaminant loads.

8. It is also important to note that the apparent finding of a widespread improvement in concentrations of total phosphorus is provisional only, because as I say in the report (p. 3), "*the reliability of the long-term records of total phosphorus at the monitoring sites is uncertain*". Note also that the results for chlorophyll a in report 2018/30 refer to the concentrations found in the freely-floating, microscopic phytoplankton in the Waikato River, and not to "periphyton", as mentioned by the Hearing Panel. Chlorophyll a concentrations in periphyton are not routinely measured in the Regional Council's monitoring networks.

9. In report 2018/30 I conclude that the observed increases in concentrations of total nitrogen in the main-stem of the Waikato River and at many sites in the south-east part of the region reflect legacy effects in the groundwater in that particular part of the catchment. On page iii (and on p. 24), I state, "*In the south-eastern part of the region where large groundwater aquifers are present in the freely-draining volcanic soils, older water that fell as rain prior to the development of the area has been progressively replaced with newer water that is more-contaminated with development-based nitrogen. As a result, increasing nitrogen concentrations have been common in streams in this area in recent decades.*"

10. Other than that, all I can say is that the report suggests there are promising signs that concentrations of some contaminants have reduced as a result of management of the catchment. The improvements in concentrations of both total ammonia and *E. coli* at a number of sites may well reflect the improved management of wastewaters – including farm dairy effluent – that has occurred in recent decades. As such, they suggest that the goal of improving the region’s river water quality may be achievable. But these results on their own do not imply that such improvements will necessarily be sufficient to achieve the PC1 goals.
11. As noted above, the key matter to address is whether any changes that may be made to the loads of contaminants entering the region’s rivers will be enough to meet the PC1 goals. This is best illustrated by considering the gap between the current state of the rivers and the 80-year goals for them. I think it is helpful to consider the condition of the Waikato River at Tuakau Bridge – the most downstream monitoring site on the main-stem of the river, and the location where all of the upstream loads and processes operating in the catchment have a cumulative effect. Table 1 below shows the current state (2010–14) that was included as Appendix 1 of section D.4 of the Section 32 Evaluation Report and the 80-year targets for several key water quality variables at this location. It also shows the extent to which the current values will need to be reduced to meet the 80-year targets.

Table 1: Current state (2010–14) and proposed future water quality, Waikato River at Tuakau Bridge. “Med”, median; “95%ile”, 95-percentile; “Chla”, chlorophyll a; “N”, nitrogen; “P”, phosphorus. Units are mg/m³ for Chla, total N and total P; m for clarity; and number/100 mL for *E. coli*.

	Current (2010–14)	Future (80-year target)	Reduction needed
Med Chla	12	5	58%
Med total N	595	350	41%
Med total P	53	20	62%
Med clarity	0.61	1.0	39%*
95%ile <i>E. coli</i>	1700	540	68%

*Reduction needed in the load of the suspended particles that reduce clarity

12. The main challenges that this table indicate to me are: (1) will it be possible to reduce average loads of total phosphorus across the entire PC1 catchment by the 62 percent required to meet the 80-year target; and (2) will it be possible to reduce loads of *E. coli* by the required 68 percent? I do not think the (backward-looking) report 2018/30 can answer such questions; at best it might suggest the answers are “possibly”, because over the past two decades loads of some contaminants entering waterways have

reduced – reflecting management interventions; The concomitant improvement in river water quality may well have resulted from these interventions. But it is unclear to me what actions will be needed in the future to ensure that improvements will continue to a sufficient extent to meet the PC1 targets.

Bill Vant

11 March 2019