

BEFORE THE INDEPENDENT COMMISSIONERS

IN THE MATTER of the Resource Management Act
1991

AND

IN THE MATTER of the Proposed Canterbury Land
and Water Plan

**REBUTTAL EVIDENCE OF ROGER GRAEME YOUNG ON BEHALF OF
NORTH CANTERBURY, NELSON/MARLBOROUGH AND CENTRAL
SOUTH ISLAND FISH AND GAME COUNCILS**

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QUALIFICATIONS AND EXPERIENCE

1. My name is Roger Graeme Young. My qualifications and evidence were set out in my Evidence in Chief, dated 4 February 2013.
2. In preparing this rebuttal evidence I have reviewed:
 - a. The reports and statements of evidence of other experts giving evidence relevant to my area of expertise, including:
 - i. Gerard Willis;
 - ii. Dr Greg Ryder; and
 - iii. Shirley Hayward.
3. I have again prepared this evidence in compliance with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2011.
4. The particular points that I consider it useful for me to rebut are set out below.

'OVERALL' QUALITY OF FRESHWATER

5. In paragraphs 3.10 – 3.16 of his evidence in chief, Mr Willis outlines his understanding of Objective A2 of the NPS for Freshwater Management ("NPSFM") which states:

The overall quality of fresh water within a region is maintained or improved while:

- a) *Protecting the quality of outstanding freshwater bodies*
- b) *Protecting the significant values of wetlands and*
- c) *Improving the quality of fresh water in water bodies that have been degraded by human activities to the point of being over-allocated.*

6. An important point for debate in Objective A2 is the spatial scale relating to *“The **overall** quality of freshwater within a region is maintained or improved...”*
7. Water quality can only be determined in relation to whether it is sufficient to support particular values or objectives. For example, the water temperatures that are suitable for supporting swimming values are likely to be significantly different from water temperatures required to support a diverse and temperature-sensitive invertebrate community. Limits should be set so that critical values and other significant values supported by a waterbody are sustained.
8. Since values will vary from one water body to another, and from reach to reach within a single water body, it makes sense that limits will also vary spatially depending on the particular values that have been identified. Because of this spatial variation in values and limits, it is not a simple matter of adding up and averaging the water quality of a range of water bodies (as suggested by Mr Willis, para 7.37) and thus allowing some waterbodies to drop below a particular limit, as long as others remain above the limit.
9. Mr Willis (in para 3.13) suggests that on a volumetric basis *“the overall quality of freshwater may be improved if the quality in the mainstem of a river is improved even though the quality of a particular tributary deteriorates.”*
10. In my opinion, an assessment like this should be based on the values supported in the different parts of the river catchment, rather than on a volumetric basis. For example, a tributary may support a regionally rare and highly valued spawning and nursery area, while the mainstem may support more common values, despite having a larger flow. Therefore, I consider a water quality accounting system somehow based on water volumes is not practical or appropriate.

11. Mr Willis (paragraph 3.14) also suggests that overall water quality may be improved by securing an improvement in some water quality parameters, while allowing other water quality parameters to decline. I don't disagree with this assertion, as long as the particular water quality parameters are related back to the values and objectives identified for that waterbody. For example, in a waterbody where there are no swimming or contact recreation values it may be acceptable to allow an increase in faecal bacteria (*E. coli*) levels without jeopardising the native fish population that is present, as long as minimum flows and dissolved oxygen levels are improved.
12. However, there are some risks with this approach if there is incomplete understanding of the factors required to sustain particular values. I certainly don't consider that a decline in a parameter that will cause deterioration in a critical value is appropriate, even if other parameters are improved. This situation would fail to meet Objective A1 of the NPSFM which requires that life-supporting capacity, ecosystem processes and indigenous species are safeguarded.
13. That is why it is important at the outset to identify the values of water bodies, and set limits to protect those values as bottom lines. As long as Mr Willis' approach does not cause any breaches of the bottom lines for any limits that are established on this basis, it is not contrary to what I consider to be an effective management regime. I could not support trade-offs in water quality parameters that cause water quality to drop below the bottom lines set to protect the identified values as that would defeat the purpose.

ACHIEVEABLE OBJECTIVES

14. In my opinion the updated Table 1a limits proposed in Fish and Game's updated submission and referred to in my evidence in chief are achievable bottom lines for each of the river management units and were set using information on the current state of water quality in the Canterbury region (Hayward et al. 2009). They are certainly not

'ideal' environmental states, as has been inferred by Mr Willis (Para 3.33).

15. In her evidence in chief, Ms Hayward reiterates that the "*numeric criteria set for each indicator and river/lake type was developed with the aim of setting 'aspirational but **achievable**' objectives*" (my emphasis bolded, para 3.14). Despite the numbers in Table 1a being initially developed prior to the gazetting of the NPSFM, I consider that they are appropriate to use as limits, as defined in the NPSFM.

16. Many water bodies will meet these limits at all times. Some water bodies will normally meet the limits, but with occasional breaches, while others will regularly breach the proposed limits. However, water bodies or reaches of waterbodies that are beyond the limits, and thus deemed to be over-allocated, do not need to meet the limits at all times immediately. Therefore, I support the Council Officers' Section 42A report amendment that timeframes for meeting the limits should be specified in Policy 4.1. Timeframes for meeting the limits could also be a topic for the sub-regional sections to address. However, I consider that efforts to address over-allocation should be started promptly so that the objectives will be met in an appropriate timeframe, rather than relying on (or hoping for) a shift to the goal posts in future revisions of the sub-regional sections to address over-allocation, as has been inferred by Mr Willis (para 7.6).

STATISTICS FOR ASSESSING COMPLIANCE WITH LIMITS

17. Several witnesses (e.g. Mr Willis, para 7.30-7.38; Dr Ryder, para 2.5-2.6), including myself (e.g. para 11.16), identify that there is a considerable lack of clarity about how compliance with the proposed limits in Table 1a, 1b and 1c ("Table 1") of the proposed Canterbury Land and Water Regional Plan ("pCLWRP") is to be assessed.

18. The Table 1a limits in the updated Fish & Game submission are set at a sufficient level to provide for the identified values, as such they

should be considered absolutes. However, as I mentioned in my evidence in chief, I believe that different statistics are required for different parameters to acknowledge and account for natural variability and measurement errors. The reason for specifying these is to assist the regional council in identifying whether or not a catchment is over-allocated in regards to a limit. For example, I recommended that the 95th percentile of monthly periphyton biomass measurements, the 5th percentile of daily minimum dissolved oxygen measurements, the 95th percentile of daily maximum water temperature measurements, and the three year rolling mean of annual QMCI scores were used to determine compliance with the periphyton, dissolved oxygen, water temperature and QMCI limits, respectively. This approach specifies how often measurements should be made, and the statistic that is used to determine whether or not the freshwater objectives are being met. My understanding is that Table 1 is not a compliance tool in regards to activities, but is more a management tool that will be used to set the allocation limits within catchments, and specific standards and that an individual consent holder must meet.

19. There is of course a risk of allowing even occasional exceedances for some water quality parameters. For example, a very low dissolved oxygen level for just a short period may result in widespread mortality of sensitive aquatic life that will affect the values in a waterbody for a prolonged period. Nevertheless, I think the statistics that I have suggested provide a balance between the risk of such a circumstance occurring and the benefits of acknowledging that natural environmental variability does occur.
20. I do not support Mr Willis' suggestion (para 7.37) of averaging the results over time for all parameters, which would potentially allow regular exceedance of limits and (by definition) result in objectives not being met for a large proportion of the time.
21. This concern is particularly relevant for parameters such as water temperature, dissolved oxygen and flow where even relatively short

and rare breaches of limits could result in mass mortalities of sensitive aquatic life that would affect the ecosystem for a prolonged period.

PRECISION OF MANAGEMENT UNITS

22. As Ms Hayward points out in her evidence in chief (para 3.2), the management units used in Table 1 group water bodies according to “common key characteristics that are overarching controllers on the biological functioning and condition of rivers and lakes”. However, as Ms Hayward acknowledges the management units are rather coarse and considerable natural spatial variability is expected within each of these management units. This may lead to water bodies in some management units being unlikely to meet some limits, as highlighted by Ms Hayward (para 3.3-3.4). On the other hand, it may also lead to considerable degradation being allowed from current state in some waterbodies that are naturally well above average condition within some management units. I consider that the limits have been set at an appropriate level to provide for the values, while considering the current state of the resource and consumptive values.
23. As Mr Willis points out (para 7.13) the limitations of the management units are not surprising, since they are merely an attempt by policymakers and scientists to encompass some of the natural spatial variability present throughout the region to aid management. However, I note that there were 43 water management zones and 117 subzones defined in the Horizons region (22,215 km²) in Horizons Regional Council’s Proposed One Plan. This compares with 11 river management units in the Canterbury Region (45,239 km²). Not surprisingly, the more detailed management zone approach in the Horizons Region enabled a more detailed analysis of the spatial spread in values, objectives and limits required throughout the region.
24. I recommend that a more detailed water management unit framework is developed within the Canterbury region in the near future. However, in the interim I support the application of the management units proposed in Table 1a.

CONCLUSION

25. Water quality can only be determined in relation to whether it is sufficient to support particular values or objectives. Values vary spatially, therefore to determine 'overall' water quality it is not a simple matter of just adding up and averaging water quality measurements from a range of water bodies. Any attempts to define overall water quality need to carefully consider the values that are being sustained.
26. In my opinion the updated Table 1a limits proposed in Fish and Game's evidence are achievable bottom lines for each of the river management units and were set using information on the current state of water quality in the Canterbury region.
27. Water bodies or reaches of waterbodies that are beyond the limits and thus deemed to be over-allocated do not need to meet the limits immediately. Therefore, I support the Council Officers' Section 42A report amendment that timeframes for meeting the limits should be specified in Policy 4.1.
28. It needs to be made clearer how compliance with the proposed limits in Table 1 of the pCLWRP is to be assessed. However, I do not support Mr Willis' suggestion of averaging the results over time for all parameters, which would potentially allow regular exceedance of limits and result in objectives not being met for a large proportion of the time. As I mentioned in my evidence in chief, I believe that different statistics are required for different parameters.
29. I agree with Ms Hayward that the current management units used in the pCLWRP are rather coarse and considerable natural variability is expected within each of these management units. However, I recommend these management units be adopted in the interim until a more detailed water management unit framework is developed within the Canterbury Region in the near future.

Roger Graeme Young

13 February 2013

REFERENCES

Hayward S, Meredith A, Stevenson M 2009. Review of proposed NRRP water quality objectives and standards for rivers and lakes in the Canterbury region. Report No. R09/16. Environment Canterbury.