

EXPERT WITNESS CONFERENCING

Proposed Natural Resources Plan

Topic: Water Quality Objectives

Date: **22 February 2018**

Witnesses:

Name	For
Dr Michael Greer	Greater Wellington Regional Council
Professor Russell Death	Wellington Fish and Game Council
Dr Adam Canning	Wellington Fish and Game Council
Ms Kate McArthur	Minister of Conservation and Rangitāne o Wairarapa

Environment Court practice note:

It is confirmed that all witnesses:

- Have read the Environment Court Practice Note 2014 Code of Conduct and agreed to abide by it

And in particular:

- Have read the Environment Court Practice Note 2014 Code of Conduct Appendix 3 – Protocols for Expert Witness Conferencing and agreed to abide by it

Joint Witness Statement

1. Assumptions

- Conferencing was limited to consideration of the attributes and outcomes listed in Table 3.1, 3.2, 3.4 and 3.5 of the proposed Plan, the water quality standards set out in Policy P.71, and the submitter expert evidence on these matters.
- Conferencing did not involve discussion on whether Table 3.4 should or should not be expanded to include attributes considered by The Council to be ‘drivers’ of ecosystem health in the context of the proposed Plan. Rather consideration of these attributes for the purposes of this conferencing statement was limited to deciding what appropriate outcomes would be if the decision was made to include them in the proposed Plan.
- Note: That agreement was reached on suitable numeric outcomes does not mean that all experts agreed that outcomes for ‘drivers’ should or should not be included in the Plan. It is Professor Death, Dr Canning and Ms McArthur’s stance that the attributes considered by The Council to be ‘drivers’ of ecosystem health should be included as components of ecosystem health, while it is Dr Greer’s opinion that this is not necessary.

2. Conferencing topic 1: Objective O.24 – Contact Recreation

2.1 Benthic cyanobacteria outcomes in Table 3.1 and 3.2

Experts present: Dr Greer, Dr Canning, Professor Death and Ms McArthur

2.1.1 Unresolved issues

- Agreement was not reached on whether the benthic cyanobacteria outcomes in Table 3.1 and 3.2 should be replaced with the interim guideline level of <20% cover of the stream bed set out in the *New Zealand guidelines for cyanobacteria in recreational fresh waters: Interim guidelines* (MfE/MoH, 2009). It is Ms McArthur’s, Dr Canning’s and Professor Death’s opinion that benthic cyanobacteria blooms pose a sufficiently large health risk to recreational users in the Wellington Region that a numeric outcome is appropriate, and that the MfE/MoH (2009) guideline is robust enough for this purpose.
- Conversely, it is Dr Greer’s opinion that the MfE/MoH (2009) guidelines are not sufficiently robust for inclusion in the proposed Plan, as they are based on a risk of exposure to cyanobacteria rather than a risk of illness. It is Dr Greer’s opinion that the use of a narrative is most appropriate, as it allows for the adoption of new guidelines as they become available, while still allowing for the MfE/MoH (2009) guidelines to be used to assess rivers against the outcome in the interim.

2.1.2 Points of agreement

- It was agreed that if numeric outcomes for benthic cyanobacteria were to be included in the proposed Plan, the MfE/MoH (2009) guideline value of <20% cover of the stream bed currently represents the best currently available option.
- It was agreed that if numeric outcomes for benthic cyanobacteria were to be included in the proposed Plan, the same outcome should apply for primary (Table 3.1) and secondary (Table 3.2) contact recreation (i.e. <20%).

2.2 Additional aesthetic attributes

Experts present: Dr Greer, Dr Canning, and Ms McArthur

2.2.1 Points of agreement

- It was agreed that if aesthetic attributes for contact recreation were to be included in Table 3.1 of the proposed Plan, an appropriate outcome for macrophytes would be $\leq 50\%$ cover of channel water surface, and an appropriate outcome for nuisance algae cover would be a periWCC of $\leq 30\%$. These outcomes reflect the provisional guidelines identified in the *Review of the New Zealand instream plant and nutrient guidelines and development of an extended decision making framework: Phases 1 and 2 final report* (Matheson et al., 2012) for the protection of instream aesthetic and recreation values.
- Experts agreed that more appropriate guidelines may exist for the protection of trout fishery values for Schedule I: Important Trout Fishery rivers, but agreed to defer conferencing on this matter until Hearing Stream 5.

2.3 Conferencing topic 2: Objective O.25 – Existing ecosystem health attributes in Table 3.4 and 3.5

2.4 Table 3.4 - Periphyton

Experts present: Dr Greer, Dr Canning and Ms McArthur

2.4.1 Points of agreement

- It was agreed that a periWCC numeric outcome could be included in Table 3.4 alongside the numeric biomass outcomes, for the reasons outlined in para. 43 to para. 45 of Ms McArthur's statement of primary evidence.
- It was agreed that a periWCC outcome of <20% would be an appropriate outcome for rivers where the existing biomass outcome is <50 mg chl-*a*/m² and that a periWCC outcome of <40% would be an appropriate outcome for rivers where the existing biomass outcome is <120mg chl-*a* /m². All experts acknowledged that the periWCC and the biomass outcomes will not always reflect the same state, and at times some rivers may meet one outcome but not the other.

- It was agreed that the methodology used to classify rivers as “productive” in the proposed Plan should reflect Footnote 1 of the periphyton biomass attribute table in the NPS-FM 2014, rather than the more lenient process described in para. 6.35 of Dr Greer’s statement of primary evidence, which results in all rivers belonging to Classes 3,5 and 6 being classified as “productive”.

2.5 Table 3.4 - Fish

Experts present: Dr Greer, Dr Canning and Ms McArthur

2.5.1 Points of agreement

It was agreed that a numeric IBI outcome could be included in Table 3.4, but the existing narrative outcome would also need to be retained, as the IBI only considers diversity, and does not capture the resilience, composition or structure components of the current outcome. Note: Although Ms McArthur agreed with retaining the narrative for fish she remains of the view that the term “balanced” should be removed from that narrative.

- It was agreed that before a numeric IBI outcome is included in the proposed Plan further technical work is required to define an IBI grading system that aligns with poor-fair-good-excellent system that forms the basis of other numeric outcomes in Table 3.4. Note: Dr Canning noted that the paper that describes the development of the NZ Fish-IBI, *Application of the Index of Biotic Integrity Methodology to New Zealand Freshwater Fish Communities* (Joy & Death, 2004), defines IBIs between 40-60 as indicative of high quality, IBIs between 20-40 as indicative of medium quality and IBIs between 0-20 as indicative of low quality.

2.6 Table 3.4 – Macrophytes

Experts present: Dr Greer, Dr Canning and Ms McArthur

2.6.1 Unresolved issues

- Agreement was not reached on whether the macrophyte outcome in Table 3.4 should be replaced with the interim guideline level of $\leq 50\%$ cross sectional area cover/volume set out in the *Review of the New Zealand instream plant and nutrient guidelines and development of an extended decision making framework: Phases 1 and 2 final report* (Matheson et al., 2012).
- It is Dr Greer’s opinion that the guideline presented in Matheson et al. (2012) may not be sufficient to meet the intended ‘good’ level of ecosystem health, and is too lenient for inclusion in Table 3.4. Conversely, it is Ms McArthur’s and Dr Canning’s opinion that nuisance macrophyte growths pose a sufficiently large risk to ecosystem health in the Wellington Region that a numeric outcome is required. It is the opinion of both Ms McArthur and Dr Canning that the Matheson et al. 2012 guideline is robust enough for inclusion in the proposed Plan as a “bottom line”, even if it may not be sufficient to achieve a ‘good’ level of ecosystem health.

2.6.2 Points of agreement

- It was agreed that the Matheson et al. 2012 guideline does not reflect a ‘good’ level of ecosystem health, and instead reflects a “bottom line” below which ecosystems will be significantly impacted by nuisance plant growths, ideally prompting a response by Council to investigate causes.

2.7 Table 3.5 - Phytoplankton and nutrients

Experts present: Dr Greer, Dr Canning and Ms McArthur

2.7.1 Unresolved issues

- Agreement was not reached on whether the narrative outcomes for phytoplankton and nutrients in Table 3.5 should be replaced or paired with the relevant B/C attribute state thresholds set out in Appendix 2 of the NPS-FM.
- It is Dr Greer’s opinion that, although the current outcomes should be aligned with the narratives for the relevant B attribute states in the NPS-FM 2014, the shallow nature of lakes in the Wellington Region means those narratives maybe accomplished with less stringent numeric outcomes than what is prescribed in the NPS. It is Dr Greer’s opinion that future research is needed in order to set Wellington specific numeric outcomes for phytoplankton and nutrients that best reflect the narratives for the relevant B attribute states in the NPS-FM.
- Conversely, it is Ms McArthur’s and Dr Canning’s opinion that the relevant numeric attribute state thresholds set out in the NPS-FM are nationally accepted numbers, are sufficiently robust for inclusion in the interim and will ensure that the pNRP narratives for phytoplankton in lakes in the Wellington Region are met.

2.7.2 Points of agreement

- It was agreed that if numeric outcomes for phytoplankton and nutrients in lakes were to be included Table 3.5, the B/C numeric attribute state thresholds for phytoplankton, total nitrogen and total phosphorous set out in the NPS-FM 2014 represents the best currently available option, as they represent a “good” level of ecosystem health on a poor-fair-good-excellent scale. Fish and Game have requested that a TLI outcome of 3 be set for Lakes Wairarapa and Onoke (when closed), it was agreed that for this to be achieved total nitrogen, total phosphorus and phytoplankton outcomes would have to be set at the relevant A/B attribute state thresholds in the NPS-FM.

2.8 Conferencing topic 3: Objective O.25 – Drivers of aquatic ecosystem health recommended for inclusion in Table 3.4 by submitters

2.9 Nutrients

Experts present: Dr Greer, Dr Canning, Professor Death and Ms McArthur

2.9.1 Unresolved issues

- Agreement could not be met on the appropriateness or the applicability of the broad scale NO₃-N/DIN and DRP outcomes recommended in Professor Death's (NO₃-N and DRP) and Ms McArthur's (DIN and DRP) evidence. It was agreed that further conferencing on this matter was required between Professor Death, Ms McArthur and Dr Storey, who presented technical evidence on this matter on behalf of The Council.

2.9.2 Points of agreement

- It was agreed that nitrogen and phosphorus are important drivers of ecosystem health, and that nutrient management in some form will be required if the numeric periphyton and MCI outcomes are to be met. However, it is Dr Greer's opinion that this is best done at the catchment or sub-catchment scale.

2.10 Deposited fine sediment

Experts present: Dr Greer, Dr Canning and Ms McArthur

2.10.1 Points of agreement

- It was agreed that if an outcome were to be set for fine sediment in Table 3.4, a cover threshold of < 20% or within 10% cover of reference condition represents the best currently available option. This is in line with the *Sediment Assessment Methods: Protocols and guidelines for assessing the effects of deposited fine sediment on in-stream values* (Clapcott et al. 2011).
- Experts agreed that more appropriate guidelines may exist for the protection of trout spawning in Schedule I rivers, but agreed to defer conferencing on this matter until Hearing Stream 5.

2.11 Habitat Quality Index

Experts present: Dr Greer, Dr Canning, Professor Death and Ms McArthur

2.11.1 Points of agreement

- It was agreed that habitat quality has a significant influence on ecological function and structure and will need to be managed if the outcomes listed in Table 3.4 are to be met. However, it is Dr Greer's opinion that this is best done at the catchment or sub-catchment scale.
- Experts agreed that **in the context of the current plan** habitat quality could be considered a driver of ecosystem health, although Dr Greer notes that it does not meet the criteria Council used to select the biotic attributes currently included in Table 3.4, which are set out in the Section 32 report for aquatic ecosystems (GWRC, 2015).
- It is Dr Canning's, Professor Death's and Ms McArthur's opinion that ecosystem health has a wider interpretation than what is in the plan and should include abiotic factors like habitat, flow and water quality. Conferencing did not include further discussion on whether the definition of ecosystem health in the plan was appropriate or whether the criteria for inclusion in the outcome tables set out in the Section 32 report for aquatic ecosystems (GWRC, 2015) is appropriate.
- Dr Greer, Dr Canning and Professor Death agreed that if an attribute for habitat quality was to be included in Table 3.4 the HQI recommended in Professor Death's evidence for Hearing Stream 3 would be an appropriate metric. Ms McArthur did not express an opinion during conferencing having not seen the Hearing 3 evidence of Professor Death on HQI outcomes.

2.12 Temperature

Experts present: Dr Greer, Dr Canning and Ms McArthur

2.12.1 Points of agreement

- It was agreed that if temperature were to be included as an attribute in Table 3.4 an appropriate numeric outcome would be a maximum temperature $\leq 18^{\circ}\text{C}$ in significant rivers with high macroinvertebrate community health, and $\leq 20^{\circ}\text{C}$ in all other rivers. This is in line with recommendations in *National Objectives Framework - Temperature, Dissolved Oxygen & pH proposed thresholds for discussion* (Davies-Colley et al. 2013).
- Experts agreed that more appropriate temperature guidelines may exist for the protection of trout fishery and spawning values for Schedule I rivers, but agreed to defer conferencing on this matter until Hearing Stream 5.

2.13 Dissolved oxygen

Experts present: Dr Greer, Dr Canning and Ms McArthur

2.13.1 Points of agreement

- It was agreed that if dissolved oxygen were to be included as an attribute in Table 3.4, the attribute state thresholds for dissolved oxygen in the NPS-FM 2014 would be appropriate numeric outcomes. It was agreed that the A/B attribute state threshold (Summer 7-day mean minimum ≥ 8.0 mg/L + Summer 1-day mean minimum ≥ 7.5 mg/L) should apply in significant rivers with high macroinvertebrate community health and the B/C attribute state threshold (Summer 7-day mean minimum ≥ 8.0 mg/L + Summer 1-day mean minimum ≥ 7.5 mg/L) should apply in all other rivers.
- It was agreed that if an attribute for dissolved oxygen is included in Table 3.4, outcomes should apply everywhere, not just below point source discharges.

2.14 Toxicants, metals and metalloids

Experts present: Dr Greer, Dr Canning and Ms McArthur

2.14.1 Points of agreement

- It was agreed that if toxicants, metals and metalloids were to be included as an attribute in Table 3.4, a narrative outcome outlining that toxicants are below the 99% species protection level in significant rivers with high macroinvertebrate community health and below the 95% species protection level in all other rivers would be appropriate. The reference to species protection levels reflects the approach taken in the ANZECC (2000) guidelines and in research on the toxicity of nitrate and ammonia, but it was agreed the guidelines should not be referenced in the outcome to allow for updated versions to be used when they become available. Ms McArthur notes work is underway on this update to the ANZECC guidelines.

3. Conferencing topic 4: Policy P.71 – Water quality standards

Experts present: Dr Greer, Dr Canning and Ms McArthur

- It was agreed that the water quality standards listed under Policy P.71 in the notified version of the proposed Plan do not guarantee that the outcomes in Objective O.25 will be met at a particular site, and may allow for ecological degradation, particularly through cumulative effects. However, it is Ms McArthur's opinion that water quality standards have significant benefits for consenting processes to manage site-specific effects. Dr Greer and Dr Canning did not express an opinion on the suitability of the standards in relation to consent processing.

4. References

- Australian and New Zealand Environment and Conservation Council (ANZECC). (2000). Australian and New Zealand guidelines for fresh and marine water quality. Canberra, Australia: Australian and New Zealand Environment and Conservation Council.

- Clapcott, J. E., Young, R. G., Harding, J. S., Matthaei, C. D., Quinn, J. M., & Death, R. G. (2011). Sediment assessment methods: Protocols and guidelines for assessing the effects of deposited fine sediment on in-stream values. Nelson, New Zealand: Cawthron Institute.
- Davies-Colley, R. J., Franklin, P. A., Wilcock, R. J., Clearwater, S., & Hickey, C. W. (2013). National Objectives Framework - Temperature, dissolved oxygen & pH proposed thresholds for discussion. (Client Report No. HAM2013-056) (p. 83). Hamilton, New Zealand: NIWA.
- Greater Wellington Regional Council. (2015). Section 32 report: Aquatic ecosystems – for the Proposed Natural Resources Plan for the Wellington Region (Greater Wellington Regional Council Report No. GW/EP-G-15/56) (p. 7191). Wellington, New Zealand: Greater Wellington Regional Council.
- Joy, M. K., & Death, R. G. (2004). Application of the Index of Biotic Integrity Methodology to New Zealand Freshwater Fish Communities. *Environmental Management*, 34(3), 415-428.
- Matheson, F., Quinn, J., & Hickey, C. (2012). Review of the New Zealand instream plant and nutrient guidelines and development of an extended decision making framework: Phases 1 and 2 final report (Client Report No. HAM2012-081) (p. 127). Hamilton, New Zealand: NIWA.
- Ministry for the Environment and Ministry of Health (MfE/MoH). (2009). New Zealand guidelines for managing cyanobacteria in recreational fresh waters – Interim guidelines. (p. 89). Wellington, New Zealand: Ministry for the Environment.

Name	For	Date	Signed
Dr Michael Greer	Greater Wellington Regional Council	01/03/2018	
Professor Russell Death	Wellington Fish and Game Council	01/03/2018	
Dr Adam Canning	Wellington Fish and Game Council	01/03/2018	
Ms Kate McArthur	Minister of Conservation and Rangitāne o Wairarapa	28/02/2018	