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THE CATALYST GROUP
strategy and environment

Hon Amy Adams and Hon Nathan Guy
Freshwater Reform
Ministry for the Environment
PO Box 10362
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[withheld]

Dear Ministers

FEEDBACK ON THE PROPOSED AMENDMENTS TO THE NATIONAL POLICY STATEMENT FOR FRESHWATER MANAGEMENT (2011)

Introduction

1. The Catalyst Group (TCG) is an environmental management consultancy based in the lower North Island. We have been in private practice for two years, but the four practitioners in the company have amassed in excess of 50 years of experience with the Resource Management Act (RMA) at central, regional and local government levels from senior management down. We believe we have a good collective grasp of what is, and is not working with the RMA, and where the problems lie. A large part of our practice is focussed on freshwater management and issues, often involving advice on water quality limit setting from both a policy and science perspective.
2. TCG welcomes the opportunity to comment on the proposed amendments to the National Policy Statement (NPS) for Freshwater Management (2011) and the addition of a National Objectives Framework (NOF) for freshwater as a component part of those amendments.
3. In addition to the points raised in this feedback, TCG fully endorse and support the feedback provided by the New Zealand Ecological Society (NZES), the New Zealand Fresh Water Sciences Society (NZFSS), the New Zealand Ecological Society (NZES) and the Environmental Defence Society (EDS).
4. TCG is concerned about the widespread decline in aquatic biodiversity, habitat and water quality in New Zealand; particularly the ongoing and escalating effects of intensification of agricultural land use on water quality¹.
5. TCG members enjoy and make considerable use of this country's rivers and coast. As such, we believe it should be every New Zealander's birthright to be able to swim safely in, and collect food from, our rivers and coast.
6. In is from this perspective that TCG provides feedback on the following matters:
 - a. The proposed amendments to the objectives and policies of the NPS Freshwater Management
 - b. The proposed National Objectives Framework (NOF)
 - c. The application of national bottom lines

¹ Documented in numerous journal and other publications, including the Parliamentary Commissioner for the Environment's 2013 report *Water Quality in New Zealand: Land use and nutrient pollution*.

7. Finally, whilst not forming part of the NPSFM, we would like to make comment about the consultative (roadshow) process used to inform the wider public about the NPSFM. From our perspective the approach adopted does not constitute consultation, and falls well short of the ministry's own guidelines for consultative or collaborative engagement. The parties contracted to present and guide the sessions were professional, but were not prepared to engage in discussion or dialogue that may have better informed the positions present at the workshops, or worked towards developing shared perspectives. There have been two rounds of submissions in relation to the Freshwater Reforms, which is an expensive and time consuming process, but is necessary given MfE has provided no other opportunity for engagement outside of its selected or purchased expert forums.

Proposed amendments to the National Policy Statement for Freshwater Management

8. TCG **supports** the government in requiring more integrated, targeted and sustainable management of New Zealand's freshwater resources as a priority. TCG **support** the definition of compulsory values for Ecosystem Health and Human Health and we also strongly support the inclusion of Te Mana o te Wai as a compulsory value within the NPS FM. We believe clear identification of these three compulsory values within the NPS FM will assist Regional Councils and communities to better prioritise outcomes for freshwater when creating plans or setting limits that take into account these critical values for water.
9. Compelling Councils and communities to provide for Ecosystem Health, Human Health and Te Mana o te Wai as national objectives is central to ensuring future 'collaborative' or Schedule 1 processes will set limits consistent with the section 5 purpose of the RMA and account at least in part for intrinsic, cultural and recreational values. That being said, the degree to which Councils and communities will be required to provide for these strong objectives through the setting of human health levels (i.e. for primary or secondary contact) and the national bottom lines within the NOF attribute tables will determine whether values are protected for future generations or eroded over time.

Human Health - secondary contact recreation level

10. For the above reasons we strongly **oppose** any reference to secondary contact recreation as the level to provide for the compulsory Human Health value and contribute to Te Mana o te Wai. An objective is a goal to aim for over time. If our goal as a nation is only to achieve moderately safe boating and wading standards then our values, expectations and the mauri of our freshwaters will continue to be eroded by unchecked agricultural and urban development. This legacy will be left to our children to remedy, which is likely to incur significant future costs, in both a direct economic sense and through damage to our international image as well as our cultural identity and national pride.
11. **We seek replacement of all proposed references to secondary contact with *primary contact recreation* throughout the NPS FM - the compulsory Human Health value should be set at Primary Contact Recreation.**
12. It is our firm belief that swimmable rivers are an integral part of New Zealand life and culture and that any lower standard for contact recreation will not meet iwi expectations for Te Mana o

te Wai as an objective. Given time, guidance from government and a firm compulsion to do better, this level of water quality is both achievable and desirable in most circumstances.

13. If Te Mana o te Wai is included as an objective (as we recommend) and the level for Human Health is not elevated to Primary Contact Recreation then these two values and objectives are in direct conflict with each other. This is an untenable policy position which would not meet the Part 2 tests of the RMA sections 6(a) (e), 7(a) (aa) (c) (f) or 8 (as well as Objective D1 of the NPS FM). If the NPS FM is amended in the manner set out above, it would provide little more than lip service to both iwi values and to the expectations of everyday New Zealander's to swim in their local waterways.
14. Secondary contact recreation does not set the bar high enough in our opinion for a number of reasons, including:
 - New Zealander's hold an expectation of being able to take their families swimming in rivers and lakes. Freshwater recreation is often a whānau or group activity. Moderate risks from microorganisms when wading or boating means elevated risks to children or the elderly if they are in contact with the water, for example children paddling on the water's edge while other family members are boating or fishing.
 - Risks from microorganisms through the consumption of fish and other mahinga kai have not been investigated in the current framework and are largely unknown.
 - Primary contact recreation is achievable for many rivers at lower flows (i.e. less than median flow), particularly with good riparian and point source management.
 - Exceptions could be made following high rainfall/flow events in catchments with significant diffuse faecal contaminants from overland run-off, with an expectation of improvement over time.
 - Adequate treatment of point source discharges to remove faecal pathogens is practically and financially achievable in most circumstances and should be considered standard practice under all conditions that river flows are suitable for swimming and gathering food.
 - The NPS allows long timeframes for implementation. The costs of adequate riparian management can be spread over affordable and achievable timeframes to work towards primary contact recreation as a long term goal (potentially inter-generational) where water quality is currently below secondary contact standards. No waters should be allowed to degrade further in terms of their suitability for primary contact recreation.

Use of the terms 'overall', 'significant', 'outstanding' and 'freshwater management units'

15. The addition of the term 'significant values'² to Objective A2 and the proposed changes to the definition of 'outstanding freshwater bodies' to require identification in a regional policy statement or plan adds a further layer of 'burden of proof' to justify protection or recognition of values. This relies on regional councils to formally recognise 'outstandingness' and 'significance', though no guidance is provided through the NPS FM.

² The term 'significant values' is not defined in the amendments to the NPS FM or in the RMA. Guidance on criteria or methods to determine significance is needed otherwise there is a risk of a case-by-case values argument, the very situation that the NPS FM amendments are seeking to avoid. The listing of some conflicting additional national values in Appendix 1 is likely to further exacerbate values-related arguments.

16. The ability for stakeholders to resource a process of formal recognition of outstanding or significant values is likely to be a barrier for many iwi/NGO groups. Additional barriers can be raised by interactions and relationships with Councils. Relationships will be critical to the success of such a process. In our experience Councils are not always minded to maintain challenging or difficult relationships with stakeholders. For example, there are instances where Councils have not recognised the outstanding nature or significance of values, even when nationally accepted criteria are used to determine their significance (i.e. the RIVAS method; Hughey and Baker 2010).
17. Recognition of outstanding water bodies and significant values within Regional Policy Statements and Plans will only be able to be achieved through the cumbersome and resource intensive process of plan development, review or change. Outstanding values may be lost or degraded over the timeframes required to formally recognise their status, or adequate resources may simply not be available for stakeholders to sustain plan processes over the necessary timeframes.
18. Use of the terms 'overall', 'significant values', 'outstanding waterbodies' and 'freshwater management units' do not provide protection for values at the local level. This does not meet the needs of iwi and communities to provide better outcomes for their local water bodies, which may be the most significant to them but struggle to meet significance criteria at the regional level or be recognised by the Regional Council in a plan or policy statement. Additionally, disclosure of sites of spiritual value is not always desirable or palatable, depending on the history or relationship of Māori with the site. By their very nature spiritual values are not always values to be shared with the wider community.
19. To clarify Objective A2 in relation to outstanding water bodies and their values, the term 'outstanding values' in the interpretation of 'Outstanding freshwater bodies' could be changed to 'significant values'. This would clarify the determination of significance as including values listed within the regional plan or policy statement in relation to an outstanding freshwater body. Although still problematic for the reasons outlined above, the interpretation of the words in the policy would be clearer.

Integration with coastal waters

20. We strongly **support** the addition of references to the connections between freshwater and coastal water. Integrated management of fresh and coastal resources and values requires consideration of connectivity between the two in plan development and decision making. In particular, reference to the use and development of land and freshwater on coastal water is a useful policy directive and an important planning consideration, given the context of increasing agricultural and urban intensification and the effects of this on coastal waters via rivers and groundwater.
21. Given this policy directive it is therefore totally inconsistent for the Human Health value to be set at the secondary contact recreation level and for many of the other numeric attributes and bottom lines to be set at the levels they are within the proposed NOF tables in Appendix 2 (e.g. nitrate and ammonia toxicity). Specific comment on each of the numeric attributes is included below. We wish to emphasise here that managing rivers to secondary contact standards or to nitrate or ammonia toxicity levels has the potential for large loads of faecal or nitrogenous contaminants to be exported into the coastal environment (which is often nitrogen sensitive)

unchecked and may in turn mean coastal bathing or shellfish collection standards are unable to be met in many locations.

22. If integrated management with coastal waters and the effects of discharges from freshwaters on coastal waters is not included in the NOF framework, regions will need to be clearly directed and compelled through additional policies within the NPS FM amendments to set limits and targets which account for coastal and estuarine water quality as well as Human Health, Ecosystem Health and Te Mana o te Wai values in these environments. This is likely to be a more difficult policy undertaking than to amend the numeric attributes in the NOF tables accordingly.
23. In addition to the risk of contamination of coastal water from freshwater contributions, appropriate bottom lines for estuaries have not been included in the NOF framework. Estuaries are the first receiving environment for discharges from our rivers and are often areas of considerable conservation, biodiversity, cultural and recreational significance. Effects on estuarine ecosystems must be accounted for in managing river water quality in particular. In the absence of limits or numeric objectives within the NZ Coastal Policy Statement (NZCPS) there is a risk that estuarine ecosystems will continue to 'fall through the cracks'. Already there is evidence of significant estuarine degradation as a result of land use and freshwater management. Examples include the Tauranga Harbour, Porirua Harbour and Pauatahanui Inlet, the New River Estuary in Southland and the Firth of Thames. Many of our main centres sit on the edge of these estuaries and harbours and the effects are in plain sight (or smell).
24. **Amendments to Policy C2 (b) provide a good platform for adding specific reference to estuaries.** An addition to clause (b) could be added to Policy C2 which reads "*land and fresh water on estuaries and coastal water.*" Or something to that effect, so that consideration of estuaries is specifically required whether they are within the coastal marine area (coastal waters) or not. We understand an estuary limits group was established as part of the science background to the freshwater reforms. Technical outputs from that group may be useful to inform the limit setting process at the regional level.

Potential to undermine existing regional limits and unnecessary economic focus

25. Some regions have set more stringent limits/targets for many of the numeric attributes in the NOF tables (e.g. Manawatu-Wanganui, Otago, Rotorua Lakes, Lake Taupo) or have set limits for numeric attributes not contained within the NOF (e.g. soluble inorganic nitrogen in rivers). We believe there is a very real risk that without a stronger policy framework the numeric attributes in the NOF tables will be misused to 'downgrade' or undermine more stringent limits at the regional level, that the national bottom lines (lower end of the 'C band') will be misconstrued or misrepresented as best practice or all that is required for most water bodies, and that regions that have not yet gone down the challenging pathway of setting limits and targets will simply adopt the national bottom lines and make no further progress towards maintaining or improving existing water quality. Many politicians, councillors and resource managers simply lack the understanding to differentiate between the national bottom lines and the limits and targets required at a local level to protect values.
26. TCG requests that the government provide an analysis of the relationship of proposed national objectives and minimum bottom lines to existing freshwater objectives and limits already in regional plans. The risk of a national objectives framework diluting regional objectives, limits or standards should be investigated and addressed prior to the final release of the amendments.

Guidance should be provided so that more stringent, locally-derived objectives and limits for freshwater are encouraged.

27. Section CA of the proposed amendments holds the bulk of policies dealing with how the NOF will be applied. Policy CA1(f) lists matters for consideration when developing objectives, identifying values and applying relevant numeric attributes and governs the consideration of limits, the current and anticipated state based on current and past resource use, spatial scale, timeframes for achieving objectives and implications for resource users and communities *“including for actions, investments, ongoing management changes and any social and economic implications;”*. This clause in what is a critical policy for implementation is unjustifiably biased towards consideration of social and economic implications. There is no mention of ecological, recreational or cultural implications and therefore no balance to this clause. **References to investments are entirely inappropriate in the NPS FM and we request these are removed.**
28. It is our understanding that the economic implications of the numeric attributes and national bottom lines chosen for the NOF table have already been modelled and included within the numeric values in the final NOF attribute table. Additionally, a more economically focussed requirement has been added in the recent RMA amendments to section 32 in evaluating the cost and benefits of plans. The section 32 lens is required for setting objectives, limits and targets in plans through the NPS FM. Further reference to the economic implications is unnecessary and will undermine consideration of non-market values, particularly through the collaborative process currently under consideration.
29. The purpose of the RMA is to enable social, economic and cultural well-beings *WHILE* sustaining natural and physical resources to meet the needs of future generations, safeguarding the life-supporting capacity of water and avoiding, remedying, or mitigating any adverse effects (paraphrased and own emphasis added). The purpose of the Act does not presume or consider a trade-off or economically favoured philosophy. Social and economic implications are already provided for in the purpose of the Act, which is a higher instrument than the NPS, duplication is not appropriate nor warranted.

Timeframes and exceptions

30. Policy CA1(f)vi allows for the consideration of timeframes, including intergenerational timeframes for achieving freshwater objectives and targets. Given the allowance for unspecified and long timeframes within the policy national bottom lines should be more stringent as costs can be offset over a longer period and innovations for improvement in land use practices are likely. We believe that **either the national bottom lines should be set higher (more conservatively) in the numeric attribute tables or objectives and targets should be clearly time bound with an indication that further improvements through more stringent numeric objectives will be required upon reaching those time limits.**
31. An expectation of whether national water quality objectives are to be achieved within our own, our children’s, or our grandchildren’s lifetime is not unreasonable. There is a risk inherent in allowing long (particularly unspecified) timeframes for action that there is unlikely to be political will to implement change in a proactive manner. Human nature tells us that most people will wait until the last possible moment to make changes that are challenging or uncomfortable.

32. Our additional concerns with respect to long timeframes include how the effectiveness of the NPS FM will be monitored and measured over time when regions vary in the implementation timeframes and whether the long (unspecified) timeframes are not contrary to the purpose of the Act at section 5 2(a) with respect to meeting the needs of future generations. Which generations will have any certainty as to the outcome or effectiveness of this NPS FM to stem the tide of degradation, and improve water quality in New Zealand?
33. Policy CA2 provides for exceptions to setting objectives at or above the national bottom lines. We believe this policy is too open to interpretation, does nothing to ensure water quality will be maintained or improved and like all exception policies carries an inherent risk that the exceptions will become the rule³ and the NOF framework will be undermined. Our experience with an exceptional circumstances provision that exempted discharges to water from water quality standards in the Manawatu River in the late 1990's was that almost any combination of circumstances, no matter how common-place could be argued as an exception, thereby undermining the water quality standards and making no appreciable difference to water quality in the degraded Manawatu River.
34. There are always some legitimate exceptions, particularly when attempting to manage within a national context. In our experience, all exceptions should be explicitly listed and provisions included for the addition of new legitimate exceptions as they arise to ensure exceptions policies are not abused. For example, Policy CA2 (a) referring to naturally occurring processes should list those processes specifically (e.g. elevated arsenic levels in freshwater from geothermal sources). Policy CA2 (b)i allows for exceptions associated with the impacts of historical activities which have caused water quality to fall below the national bottom line and where reversal of impacts is not reasonably practicable physically or ecologically even in the long term. This policy should be worded to ensure it allows only for historical activities which have ceased not those which are currently ongoing (e.g. poor farming practices that have degraded freshwater and continue to do so). Clause ii should refer to reversal that potentially causes more harm physically or ecologically than leaving the freshwater in a current degraded state (i.e. acid mine drainage). **The term 'reasonably practicable' should be removed from the NPS FM**, such a term has no place in RMA policy as it provides no certainty. The decision of Judge Thompson on the use of 'reasonably practicable' in the Proposed One Plan supports the removal of this clause⁴.
35. **It is our preference that Policies CA2(a) and (b) are deleted from the NPS FM or amended to require listing in Appendix 4 along with reasons for exemption.** In order to provide for legitimate exceptions the references to 'transitional' exemptions and timeframes for these could be removed from Policy CA3 and all exceptions that are not associated with significant existing infrastructure (listed in Appendix 3) could be listed, along with the reasons for exemption, in Appendix 4 and be added to this list through a transparent public consultation process.
36. Policy CA2(c) and the listing of exemptions in Appendix 3 is supported as a specific and transparent process for exempting a water body from the national bottom lines, it also allows

³ See McArthur KJ (2012) Setting water quality limits: lessons learned from regional planning in the Manawatu-Wanganui Region. *Resource Management Theory and Practice*. Journal of the Resource Management Law Association of New Zealand.

⁴ *Day v Manawatu Whanganui Regional Council* Interim decision [2012] NZEnvC 182 paragraphs 5-180-5-181

for public consultation on the exemption. In our opinion this is *the only* appropriate way to allow exceptions to the national bottom lines. **If the policy remains in the NPS FM, all exceptions under Policy CA2(a) and (b) should similarly be listed and open to scrutiny through public consultation processes.**

37. We **support** provisions requiring monitoring plans (section CB), accounting for freshwater takes and contaminant loads (section CC), and review of progressive implementation plans to align with the NPS FM amendments (section E(f)). TCG have been involved in development of such systems for the Manawatu-Whanganui Regional Council in recent years. Data from such accounting should be available not only for central government but to the wider science community to better enable the development of public good science around the management of freshwater resources.

The proposed National Objectives Framework (NOF)

38. TCG broadly **supports** the concept of a national objectives framework. TCG believes the current state and trends in water quality and aquatic biodiversity require a determined, national approach. However, national bottom lines should not be confused with objectives. Objectives are outcome focussed whereas bottom lines are minimum thresholds. The difference between these two needs to be clear in any policy or regulation. Minimum bottom lines for freshwater are not objectives to aspire to. The NOF should re-emphasise the ‘maintain or enhance’ approach of the NPS Freshwater Management and should clearly state that no water body should be allowed to degrade or worsen.

Values - Appendix 1

39. The freshwater attributes listed in Appendix 2 for the Human and Ecosystem Health values are incomplete. For example, Human Health attributes exclude critical aspects of recreational safety and value, in particular water clarity and periphyton cover. Key attributes relating to Ecosystem Health are also absent from the NOF. More commentary is included specific to these attributes below (e.g. macroinvertebrate indices).

Optional National Values

40. Primary contact recreation (activities such as swimming or boating with a high likelihood of submersion) is an optional value in the NOF; the major pitfalls of this approach are discussed above. Identification of areas to be managed for primary contact recreation will be at the discretion of regional councils or collaborative groups charged with value setting. We believe this approach risks ‘non-management’ of important areas of community recreational use (often these are not identified well through plan development processes in our experience) and will result in increased health risks to rivers users. Management of faecal contaminants to safe levels at sites identified for ‘primary contact recreation’ downstream of areas that are not managed for this purpose will be practically difficult, if not impossible. To ensure sites valued for primary contact recreation are not compromised by upstream water quality, the NOF needs to include a requirement for all waters upstream of a primary contact recreation site to also be managed to this level.

41. Significant additional benefits arising for ecosystem health through managing faecal inputs to water (e.g. reductions in associated nutrient and phosphorus run off). River users from the wider community are unlikely to be aware of which sites are 'safe to swim' nor engaged in the processes to determine where these sites should be located⁵. It is our view that 'safe to swim' for all rivers has been regarded as an informal national objective and a common expectation of many New Zealanders. It is an objective for freshwater that all New Zealanders can identify with.
42. Values associated with primary productivity are likely to be in direct conflict with compulsory values. The food security value relates to the use of land (rather than water) and may be difficult to reconcile against ecosystem health and human health values within the same framework because food production activities and land use can have significant adverse effects on in-stream water values. Land use values associated with primary productivity are naturally prioritised as part of the economic and social functioning of a region. Identifying land use values in the NPS FM is another implicit method of elevating economic values within the RMA framework and in our opinion is double-dipping when combined with values for irrigation or commercial and industrial use values.
43. Links between some NOF optional values and existing statutory provisions require further clarification. For example, the recognition of the freshwater supply value may assist in implementing the New Zealand Drinking Water Standards, however what is less clear is whether rivers with existing damming prohibitions (i.e. through water conservation orders) will be excluded from consideration for hydroelectric power generation values. Values which relate specifically to legal access or the management and/or harvest of particular species covered by other regulations (e.g. Conservation Act or Fisheries Regulations) may create difficulties if included in an RMA context through the NPS FM (e.g. Mahinga kai values). Habitat and water quality aspects of providing for these values can and should be considered through the framework but the abundance and species management cannot.

Numeric attributes - Appendix 2

44. A number of key attributes for Ecosystem Health are missing from the table of numeric attributes (Appendix 2). Water temperature is critical to the survival, reproductive success and distribution of aquatic species but is not included in the Ecosystem Health attributes. Enough is known about the effects of water temperature on organisms like aquatic macroinvertebrates (Quinn and Hickey 1990) and recommendations for managing freshwater to achieve temperature attributes (Rutherford et al. 1997, 1999, 2004), particularly in upper catchments or small rivers with potential for shading through riparian management to use water temperature as an attribute in the NOF.
45. Dissolved oxygen (DO) is also critical for life and yet it is only present as an attribute where it relates to rivers below point-sources.
46. Water clarity is integral to Ecosystem and Human Health values. In lakes and estuaries, clarity determines whether submerged plants are able to grow and survive. Reductions in lake clarity are closely associated with loss of diversity and distribution of native aquatic plants and the ecosystems they support. In rivers and lakes, clarity is closely associated with safe recreation,

⁵ There is no identified NGO or stakeholder group that would represent swimming values in either a collaborative or Schedule 1 planning process. The 'average' kiwi on the street is not represented.

desirability for use for swimming or wading, and suitability for fishing and boating as well as ecological attributes. Poor clarity can affect the migration of native fish species, causing avoidance of some waterways and thereby loss of habitat (Rowe et al. 2000). Clarity-reducing sediment loads carried by rivers also have significant adverse impacts on estuaries, creating anoxic conditions through deposition of mud and providing substrate for the growth of nuisance macroalgae.

47. Closely associated with water clarity is the level of deposited sediment in rivers. Considerable regional and central government resource has been spent on the development of national guidelines for deposited sediment in rivers (Clapcott et al. 2011) and yet these guidelines are not being utilised within the NOF.
48. Important bioindicators of Ecosystem Health are completely absent from the NOF table, although they did appear in earlier versions. For example, the Macroinvertebrate Community Index (MCI; Stark 1985, 1993) is a well-accepted and nationally used bioindicator of Ecosystem Health. Aquatic invertebrates integrate conditions over long time-scales, providing more information about river conditions than physical or chemical spot water quality measures. To remove attributes which directly explain and relate to Ecosystem Health (i.e. established biomonitoring indices) is a significant omission. No indicators of the health of higher organisms (e.g. fish) are included.
49. Periphyton cover is also an extremely important biological aspect of the health of rivers. Previous versions of the NOF and the example picture in the freshwater reforms document referred to percentage of periphyton cover as a central attribute. Periphyton cover has since been replaced by periphyton biomass, expressed by the surrogate biomass measure chlorophyll *a*. There are several disadvantages to using chlorophyll *a* in place of periphyton cover, including:
 - It is expensive and time consuming to monitor, requiring specialist sampling, transport and laboratory costs (which reduces the ability of communities to monitor their local rivers)
 - It is a surrogate measure and not a direct measure of effect on values as percent cover is
 - Chlorophyll *a* can be affected by factors such as light/shading, temperature and taxonomic composition of the periphyton and
 - Chlorophyll *a* is highly variable as a result of sampling bias.
50. A recent review of the instream plant and nutrient guidelines recommended a combined (and simpler) composite periphyton cover guideline known as PeriWCC (Matheson et al. 2012). This guideline utilises weighted cover of filamentous and mat algae in one combined attribute with several levels of cover associated with ecological condition (general guidelines of <20%, 20-39%, 40-55% and >55% periphyton weighted composite cover are recommended as indicators of 'excellent', 'good', 'fair' and 'poor' ecological condition, respectively, at sites where other stressors are minimal) and aesthetic/recreation values (<30% PeriWCC). Given this is the latest recommendation with respect to periphyton, on which significant regional and central government resources have been spent, it seems a waste to have developed a national level tool if it isn't utilised through the NOF.
51. Benthic cyanobacteria cover has been excluded from the Human Health attribute tables in the draft NPS amendments. This attribute was included in the NOF table 'leaked' by the NZ Herald (10 September 2013). Risk of toxic compounds from benthic cyanobacteria such as *Phormidium* is an increasing concern for Human Health and recreational river use. Without attributes

relating to benthic cyanobacteria in rivers, Human Health values are not protected, regardless of the contact recreation level designated for a particular water body (e.g. small children, dogs and livestock are still at risk).

52. Barriers to native fish migration or other physical habitat limitations are not mentioned within any of the attributes or policy framework. Barriers to migration are a critical impediment to maintaining the life-supporting capacity of many waterways and realising their full Ecosystem Health value and potential. Reference to native fish and their migration pathways is needed somewhere within the NOF. Possible links to the Freshwater Fisheries regulations (with respect to barriers) requires clarification.

Proposed numeric attributes

53. The numeric attribute state for **cyanobacteria** refers to both rivers and lakes but contains an attribute unit of biovolume for planktonic cyanobacteria that is **only relevant to lakes**. Toxic algae are mentioned in the value state table but no numeric attributes for benthic cyanobacteria are proposed. Proliferations of benthic cyanobacteria are a significant concern for human and animal health with respect to recreation in rivers. National guidance on benthic cyanobacteria risk in rivers has not been included (MfE and MoH 2009).

Other general comments (NOF)

54. Attribute bands are wide ranges and allow for significant changes in water quality within each band (which often equates to significant effects) for most attributes. The latest science developments for national level guidelines are not being utilised within the NOF attributes - this implies that work on such guidelines is redundant and has wasted time and resources (e.g. deposited sediment⁶, cyanobacteria⁷ and periphyton cover⁸ guidelines). Many of the narrative attribute states refer to effects or losses of sensitive species. It is difficult to understand or clearly determine the effects of the National Bottom Lines without knowing what these species are, their current conservation threat status and what the implications for Ecosystem Health and other values are if they are 'lost' or stressed. A list of sensitive species affected by the National Bottom Lines would be useful to provide context.

National bottom lines

55. Many of the NOF 'National Bottom Lines' are set lower than current water quality and will allow significant degradation of water quality and Ecosystem Health, Human Health and other values.

⁶ Clapcott JE, Young RG, Harding JS, Matthaedi CD, Quinn JM, Death RG (2011) Sediment Assessment Methods: Protocols and guidelines for assessing the effects of deposited fine sediment on in-stream values. Cawthron Institute, Nelson, New Zealand.

⁷ Ministry for the Environment and Ministry of Health (2009) New Zealand Guidelines for Managing Cyanobacteria in Recreational Fresh Waters – Interim guidelines. Prepared for the Ministry for the Environment and the Ministry of Health by S.A. Wood, D.P. Hamilton, W.J. Paul, K.A. Safi, W.M. Williamson. Wellington: Ministry for the Environment. 89 p.

⁸ Matheson F, Quinn JM, 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. Prepared for the Ministry of Science & Innovation Envirolink Fund. NIWA Client Report No: HAM2012-081.

56. The National Bottom Line for chlorophyll *a* to support the Ecosystem Health value in lakes (annual median 12 mg/m³ and annual maximum of 60 mg/m³) is only appropriate to shallow, highly eutrophic lakes. As an example, recent Environment Court rulings supported limits for chlorophyll *a* in shallow eutrophic lakes such as Lake Horowhenua⁹ of an annual average of 8 mg/m³. As a bottom line for lakes that are deep and currently oligotrophic these numeric attribute states will allow for significant degradation. Total nitrogen and phosphorus bottom lines also reflect this inappropriate pattern.
57. The National Bottom Line for **nitrate toxicity** (annual median 6.9 mg/L and annual 95th percentile 9.8 mg/L) are **greater than current concentrations of nitrate in most New Zealand rivers** by orders of magnitude. For example, the highly polluted Manawatu River had a median nitrate concentration of 0.51 mg/L and a maximum of 1.42 mg/L between July 2010 and March 2013. Use of a 95th percentile as a maximum also allows for 5% of the results to exceed even the extreme concentrations of Band C. Concentrations of nitrate at this level are also likely to stimulate nuisance algal growth and may also contribute to high nitrogen loads in nitrogen-sensitive downstream receiving environments, including estuaries and the coast (e.g. the Manawatu Estuary (Ramsar site)).
58. The National Bottom Line for **ammonia toxicity** is higher in the draft NPS attribute table than the table leaked to the NZ Herald (10 September 2013). The C band has a wide range and **concentrations specified by the bottom of the C band are very high, not reflecting common ammonia concentrations in NZ Rivers**. For example, median ammonia concentration for the Manawatu River at Teachers College was 0.021 mg/L and a maximum of 0.563 mg/L between July 2010 and March 2013. Use of a 95th percentile as a maximum permits 5% of the results to exceed even the high concentrations of the National Bottom Lines. Concentrations of the level bounded by Band C are likely to stimulate nuisance algal growth and may also contribute to high nitrogen loads in downstream receiving environments, including the coast.
59. Relating **dissolved oxygen** only to river **below point-sources** is inappropriate as discussed above. **Using DO concentration as a National Bottom Line is also inappropriate** as DO is highly influenced by temperature, barometric pressure, salinity and growth of nuisance plants/aquatic weeds; these are not included in the attribute table. The attributes also relate to a 7-day minimum - we assume this to mean the lowest DO concentration over any 7-day period. The attribute band descriptors provide for circumstances where DO levels can cause loss of sensitive fish and macroinvertebrate species - this is inconsistent with the requirements for discharges under section 107 of the Act, undermining the requirement for no significant adverse effects on aquatic life.
60. The **Periphyton** biomass (expressed as chlorophyll *a* mg/m²) National Bottom Line is **lower than established and extensively used national guidelines** (Biggs 2000) to provide for recreation/angling or biodiversity values. It is difficult to see the relationship between the proposed periphyton biomass bottom line and an Ecosystem Health value. Periphyton should also be linked to contact recreation values more explicitly. However, the narrow focus of the Human Health value does not allow for this linkage to be made. Additionally, the allowance for the annual maximum to be exceeded on two occasions based on monthly monitoring means the numeric attribute is no longer an 'annual maximum' and that significant periods of exceedance could occur in every year.

⁹ Lake Horowhenua is currently considered to be 'super-eutrophic'.

61. The National Bottom Line for *E. coli*/100 ml relates only to secondary contact such as wading or boating and even so still allows for a **5% risk of infection from water-borne pathogens** such as *Campylobacter*, *Salmonella*, *Cryptosporidium* or *Giardia* and is only sufficient to **provide a minimum level of safety for stockwatering**, not human health. The levels of *E. coli* are **entirely inappropriate for lakes** and non-flowing waters. Setting the national bottom line at this level is irresponsible in our opinion and unlikely to meet the expectations of most New Zealanders. It is easy to see how Mauri will be denigrated across many water bodies by such high allowable levels of faecal contamination. A more stringent limit linked to river flow would be more relevant to protect human health values for *both primary and secondary* recreation as a priority. Other benefits would be conferred to contaminants such as sediment and phosphorus at the same time.
62. The National Bottom Line for **Suitability for Recreation Grade (SFRG)** for the **optional contact recreation** value has a minimum acceptable state of 'Fair', which allows for a moderate risk of infection from water-borne pathogens such as *Campylobacter*, *Salmonella*, *Cryptosporidium* or *Giardia*. This is inappropriately low as a minimum state, particularly with respect to the risk of serious illness to children or the elderly from swimming.

Conclusion

63. TCG members enjoy and make considerable use of this country's rivers and coast. As such, we believe it should be every New Zealander's birthright to be able to swim safely in, and collect food from, our rivers and coast. The commentary above sets out the amendments we would like made to the NPSFM to ensure this becomes a reality.
64. Although we are critical of the consultation process adopted to date regarding the NPSFM, we remain committed to further engagement should MfE provide the opportunity for stakeholders such as ourselves to seek common ground around the outcomes described in our submission.
65. Thank you for taking the time to read this submission. Please feel free to contact us if you have any questions or comments regarding this submission.

References

- Biggs BJF 2000. New Zealand periphyton guidelines: detecting, monitoring and managing enrichment of streams. Prepared for the Ministry for the Environment by the National Institute for Water and Atmospheric Research (NIWA). Wellington, Ministry for the Environment.
- Clapcott JE, Young RG, Harding JS, Matthei CD, Quinn JM, Death RG 2011. Sediment Assessment Methods: Protocols and guidelines for assessing the effects of fine sediment on in-stream values. Cawthron Institute, Nelson, New Zealand.
- Hughey K, Baker M (Eds) 2010. The River Values Assessment System: Volume 1: Overview of the Method, Guidelines for Use and Application to Recreational Values. LEaP Report No.24A, Lincoln University, New Zealand.
- Matheson, F, Quinn J and 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. Prepared for the Ministry of Science & Innovation Envirolink Fund.

Ministry for the Environment and Ministry of Health. 2009. New Zealand Guidelines for Cyanobacteria in Recreational Fresh Waters – Interim Guidelines. Prepared for the Ministry for the Environment and the Ministry of Health by SA Wood, DP Hamilton, WJ Paul, KA Safi and WM Williamson. Wellington: Ministry for the Environment.

Quinn J, Hickey C 1990. Characterisation and classification of benthic invertebrate communities in 88 New Zealand rivers in relation to environmental factors. *New Zealand Journal of Marine and Freshwater Research*, 1990, Vol. 24: 387 – 409.

Rowe D, Hicks M, Richardson J 2000. Reduced abundance of banded kokopu (*Galaxias fasciatus*) and other native fish in turbid rivers of the North Island of New Zealand. *New Zealand Journal of Marine and Freshwater Research* 34: 547-558.

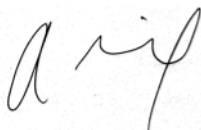
Rutherford JC, Blackett S, Blackett C, Saito L, Davies-Colley RJ 1997. Predicting the effects of shade on water temperature in small streams. *New Zealand Journal of Marine and Freshwater Research* 31(5): 707-721.

Rutherford JC, Davies-Colley RJ, Quinn JM, Stroud MJ, Cooper AB 1999. Stream shade: towards a restoration strategy. Department of Conservation, Wellington, NZ. 159 p.

Rutherford JC, Marsh NA, Davies PM, Bunn SE 2004. Effects of patchy shade on stream water temperature: how quickly do small streams heat and cool? *New Zealand Journal of Marine and Freshwater Research* 55(8): 737-748. 9

Stark JD 1985. A macroinvertebrate community index of water quality for stony streams. *Water and soil miscellaneous publication 87*. National Water and Soil Conservation Authority, Wellington.

Stark JD 1993. Performance of the Macroinvertebrate Community Index: effects of sample method, sample replication, water depth, current velocity and substratum on index values. *New Zealand Journal of Marine and Freshwater Research* 27: 463-478



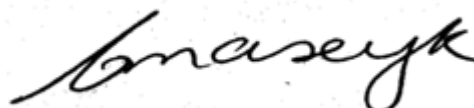
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