SUBMISSION CLEAN WATER CONSULTATION 2017

TO: Clean Water Consultation 2017
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1 EIANZ is a professional association for environmental practitioners from across Australia and New Zealand. We provide opportunities for professional and academic dialogue across all sectors of the environmental industry. EIANZ was founded in 1987.

2 A significant initiative of EIANZ is the Certified Environmental Practitioner (CEnvP) Scheme, which is Australasia's first accreditation scheme designed exclusively for environmental practitioners, and recognises environmental professionals in line with their professional counterparts from engineering, accounting, planning and architecture.

3 EIANZ welcomes the opportunity to comment on the consultation document *Clean Water 2017* (**Consultation Document**).

4 Submission has been prepared by Dr Bryan Jenkins and Dr Mark Bellingham on behalf of the New Zealand Chapter of the Environment Institute of Australia and New Zealand

5 The goal of achieving 90% of rivers and lakes swimmable by 2040 is a laudable objective. However, the standards proposed and the changes to the National Policy Statement that have been indicated in the consultation document are insufficient to achieve the stated goal. This submission addresses the following matters:

A. The standards to achieve swimmability

B. The multiple health risk pathways to be addressed

C. The risk management approach of the Annapolis Protocol

D. The need to go beyond stock exclusion to manage bacterial contamination

E. A directive for Macroinvertebrate Community Index (MCI) monitoring

F. Freshwater Objective below the National Bottom Line (Policy CA3)

G. The cost of achieving the needed improvements.

The standards to achieve swimmability

6 The standards proposed in the discussion document represent a higher health risk in relation to recreational water quality than in the current New Zealand Microbiological Water Quality Guidelines (Ministry for the Environment, 2002) for freshwater recreational areas. The microbiological assessment categories in the Guidelines are:

A: 130 E coli/100mL 95th percentile

B: 131-260 E coli/100mL 95th percentile

C: 261-550 E coli/100mL 95th percentile

D: >550 E coli/100mL 95th percentile

7 The standards proposed in the discussion document have different criteria:

Blue: ≤ 540 E coli/100mL 95th percentile; ≤ 130 E coli/100mL median

Green: ≤ 1000 E coli/100mL 95th percentile; ≤ 130 E coli/100mL median

Yellow: ≤ 1200 E coli/100mL 95th percentile; ≤ 130 E coli/100mL median

Orange: > 1200 E coli/100mL 95th percentile; > 130 E coli/100mL median

Red: > 1200 E coli/100mL 95th percentile: >260 E coli/100mL median

8 This means the "blue" category (considered "excellent" for swimming in the standards proposed) is equivalent to microbiological assessment category (MAC) "C". In the Microbiological Guidelines, the highest rating in Suitability for Recreation Grading that a MAC "C" site could achieve is "fair". The "green" category (considered "good" for swimming in the standards proposed) is equivalent to MAC "D". In the Guidelines, the highest rating in Suitability for Recreation Grading that a MAC "D" site could achieve was "poor". Furthermore, the Guidelines also state that swimming is not recommended at a site when one sample exceeds the "Action Level" of 550 E coli/100 mL. The proposed standard allows 20% of monitoring results to exceed 540 E coli/100 mL to be classed as swimmable (i.e. the "yellow" category considered "fair" for swimming).

9 Health risk assessments for New Zealand (Till et al, 2008) indicate a "significant risk of infection" with an estimated risk of *Campylobacter* infection > 5% occurrence for MAC "D" (faecal contamination 95th percentile > 550 E coli/100mL). This equates to "green" category in the standards proposed (considered "good" for swimming). Even the "blue" category (considered "excellent" for swimming) which is equivalent to MAC "C" has a health risk that is a "substantial increase above background" with an estimated risk of *Campylobacter* infection of 1-5% occurrence". This can be compared to the Guidelines MAC "A" (95th percentile ≤ 130 E coli/100 mL) which qualifies for a "very good" suitability for recreation grade (when coupled with a "low" or "very low" sanitary inspection category) with a no calculated risk level (less than 0.1% estimated risk of *Campylobacter* infection).

10 The European Union bathing water criteria are (European Parliament and Council 2006):

Excellent: 500 cfu/100 mL 95th percentile

Good: 1000 cfu/100 mL 95th percentile

Sufficient: 900 cfu/100 mL 95th percentile

11 The EU "excellent" is slightly higher water quality than the "excellent" in the standards proposed (500 compared to 540 E coli/100 mL). The EU "good" is equivalent to the "good" in the standards proposed (both 1000 E coli/100 mL). The EU "sufficient" is difficult to compare because it uses a 90th percentile, but is likely to be similar to the "fair" in the standards proposed.

12 It is noteworthy that in 2015 that 96% of the bathing sites across Europe meet the "sufficient" criterion and 84% of bathing sites meet the EU "excellent" criterion (European Environment Agency 2016). This compares with 72% of New Zealand sites meeting the "fair" criteria of the standards proposed and 41% of New Zealand sites meeting the "excellent" criterion of the standards proposed. Furthermore, Luxembourg, Cyprus, Malta, Greece, Croatia, Italy, Germany and Austria already exceed 90% of sites meeting the EU "excellent" criteria. This compares with the discussion paper goal for New Zealand of 50% of sites greater than the New Zealand "excellent" criterion in 2040.

13 **EIANZ recommends that New Zealand retain the swimmability criteria in the New Zealand Microbiological Water Quality Guidelines because these guidelines reflect the health risk based on New Zealand research. The proposed changes reflect a downgrading of the definition of swimmability. The target for bacteriological contamination for 2040 should be at least to achieve 90% of bathing sites to MAC "C" and 50% of bathing sites to MAC "B".**

The multiple health risk pathways to be addressed

14 In terms of health risks to humans from recreation involving immersion in freshwater systems, there are a number of pathways to be managed. In the Suitability for Recreation Grade this includes two components: (1) microbial assessment category based on indicator bacteria levels collected over 5 years; and (2) sanitary inspection category based on the susceptibility of the water body to faecal contamination from sources like sewage outfalls, agricultural runoff and stormwater (Ministry for the Environment, 2002). Studies have found elevated risks of gastrointestinal and dermatological symptoms associated with drinking and domestic use of water with raised cyanobacterial cell counts (El Saadi et al. 1995). This pathway is reflected in the New Zealand Guidelines for Cyanobacteria in Recreational Freshwaters (Ministry for the Environment and Ministry of Health, 2009).

15 Rather than managing the multiple pathways that have been identified as potential health risks, the proposal changes the management approach to the bacterial contamination pathways for rivers and the cyanobacterial contamination pathway for lakes. With rivers

experiencing algal blooms but not bacterial contamination and lakes experiencing bacterial contamination but not algal blooms the proposal leaves risks unmanaged. For example, the Selwyn River at Glentunnel would be classed as "good" for recreational use based on microbiological assessment but currently has a toxic cyanobacteria warning against recreational use; and, Lake Alexandrina at Bottom Huts fails on bacterial contamination criteria but doesn't show evidence of algal blooms. Furthermore, rivers like the Avon Otakaro River which receives sewage overflows would never get an acceptable recreational rating based on sanitary inspection criteria. Surveys of river sediments indicate the presence of viruses even when water-borne bacterial contamination may be satisfactory.

16 It is important to note that it is only possible to infer the existence of pathogens when faecal contamination indicators reach particular levels. Also, it is not possible to ensure that pathogens are absent when faecal contamination indicators temporarily fall below nominated criteria. (Ashbolt et al). The validity of any indicator system is affected by the relative rates of removal and destruction of the indicator versus the target hazard. So, differences due to environmental resistance or even ability to multiply in the environment all influence their usefulness. Hence, viral, bacterial, parasitic protozoan and helminth pathogens are unlikely to all behave in the same way as a single indicator group, and certainly not in all situations.

17 Numerous epidemiological studies of waterborne illness in developed countries indicate that the common aetiological agents are more likely to be viruses and parasitic protozoa than bacteria (Levy *et al*. 1998). Given the often lower persistence of vegetative cells of the faecal bacteria compared to the former agents, it is not surprising that poor correlations have been reported between waterborne human viruses or protozoa and thermotolerant coliforms (Kramer *et al*. 1996). Such a situation is critical to understand, as evident from disease outbreaks where coliform standards were met (Craun *et al*. 1997; Marshall *et al*. 1997). Nonetheless, water regulatory agencies have yet to come to terms with the inherent problems resulting from reliance on faecal indicator bacteria as currently determined.

18. **EIANZ recommends that New Zealand retains consideration of the multiple pathways for lakes and rivers (i.e. faecal contamination, cyanobacteria and source risk).**

The risk management approach of the Annapolis Protocol

18 The Annapolis Protocol established the World Health Organisation's approach to health-based monitoring of recreational waters (World Health Organization, 1999). Experts agreed that an improved approach was needed to the regulation of recreational waters that better reflected health risk and provided enhanced scope for management intervention.

19 They were concerned that a pass/fail approach (that was common in many jurisdictions at the time) doesn't reflect a large number of factors that can influence a bathing site. They recommended a combination of a microbiological indicator of faecal contamination with an inspection-based assessment of the susceptibility of an area to direct influence from faecal contamination. The current New Zealand guidelines (Ministry for the Environment, 2002) reflect such an approach whereas the proposal in the discussion document does not. The WHO report gives a specific example where faecal contamination indicators were within

acceptable criteria but this didn't reflect the risk of exposure to viruses. The proposed approach in the discussion document is inconsistent with the Annapolis Protocol.

20 The proposed approach also moves away from the graded risk management response of a surveillance level (less than 260 E coli per 100 mL), an alert level (260 E coli per 100 mL) for increased monitoring and search for possible sources, and, an action level (one exceedance of 550 E coli per 100 mL) with increased sampling, catchment assessment and public notification of health risk.

21 **EIANZ recommends that New Zealand retain the graded risk management approach of the WHO Annapolis Protocol with both "alert" and "action" criteria.**

The need to go beyond stock exclusion to manage bacterial contamination

22 The Silverstream catchment is representative of a groundwater-fed lowland stream catchment in the Selwyn-Waihora Zone. Concerns about the Silverstream catchment and its contribution to poor microbial water quality in the Selwyn River at Coes Ford were identified in a study conducted in 1994-5 by Environment Canterbury (Adamson and Main 1996). Direct dairy shed discharges were considered the most obvious sources of faecal coliform bacteria. However, the highest concentrations were recorded in McGraths Creek where there were no direct discharges. Run-off from agricultural land receiving animal effluent, particularly where the effluent loading was excessive and stock access to creeks and drains were identified as other potential significant sources.

23 Since 2002, the Silverstream Water Improvement Group and the Environment Canterbury Living Streams programmes have been encouraging land owners to fence out reaches of tributaries and improve riparian vegetation. Comparisons between stream walks in 2006 and 2013 indicate that fencing to prevent stock access has increased - reducing unfenced areas from 20% of stream length to 9% (Glasgow 2013). In the ten years to 2012 water quality monitoring shows significant improvements in turbidity, ammonia-nitrogen, dissolved reactive phosphorus at Coes Ford (Robinson and Stevenson 2012). However the microbial contamination is still non-compliant for recreational use and has a suitability grading of "poor" for 2014/5 (Bolton-Ritchie and Robinson 2016). The 95th percentile of E. coli (MPN/100mL) has reduced at Coes Ford from 1600 to 1000 which is still well above the microbiological assessment category D level of 550 MPN/100mL.

24 Further reductions in microbial contamination are needed, related to land management and stocking density in the Silverstream catchment to achieve water quality at Coes Ford compatible with recreational use. Controlling stock access is not enough to achieve acceptable microbiological water quality.

25 EIANZ recommends the NPSFM incorporate microbial contamination controls related to land management and stocking density as well as stock exclusion provisions in order to manage bacterial contamination.

Macroinvertebrate Community Index

25 Macroinvertebrate Community Index (**MCI**) is an index used in New Zealand to measure the water quality of fresh water streams. The presence or lack of macroinvertebrates such as insects, worms and snails in a river or stream can give a biological indicator on the health of that waterway. Policy CB1 of the NPSFM needs to be more directive in requiring regional councils to monitor macroinvertebrate communities. This needs to follow the Land and Water Forum's (LWF) recommendations (in summary)[1]:

a. Plans be required to have a trigger for action if there is a downward trend in MCI, or it is below 80.

b. The required action is to investigate and develop an action plan to either maintain or improve MCI scores in the waterbody. The key points in this process are:

c. If the natural state is below 80, then the requirement is to maintain MCI at that level.

d. If the MCI score in a waterbody is below 80 for human-induced reasons, then the requirement is to develop an action plan to improve the MCI score.

e. If there is a downward trend in MCI then the requirement is to develop an action plan to reverse the trend.

26 The LWF's recommendations are based on advice from an independent science panel that MCI is scientifically robust and fit for purpose.

27 **EIANZ recommends that:**

a. A more directive policy on MCI monitoring is incorporated into the NPSFM following the LWF's recommendations.

b. MfE develop technical advice covering various drivers and management responses to support implementation of this requirement, and delivered alongside the rollout of the NPS-FM changes.

[1] LWF letter to Ministers 19 August 2016.

Freshwater Objective below the National Bottom Line (Policy CA3)

28 The additions to this policy are intended to clarify when a regional council can seek an exception so that freshwater objectives can be set below bottom lines, and that any exception is reasonably necessary to realise the 'benefits provided by the listed infrastructure'. This is defined as:

"…the positive effects of infrastructure on the well-being of the community and can include, but are not limited to, renewable electricity generation, employment and economic well-being".

29 A general statement that employment and economic wellbeing are sufficient benefits to trigger application of the exception in Policy CA3 is too broad. Almost any activity will have employment and economic outcomes. A higher threshold needs to be applied for freshwater limits. Care needs to be taken in determining criteria allowing infrastructure to qualify for an exception.

30 **EIANZ recommends that**

a. **Government work with regional councils to identify what significant infrastructure may need relief from national bottom line requirements, how that might be achieved and for how long that is necessary.**

b. **Appendix 3 be populated and that significant infrastructure that needs an exception so that freshwater objectives are set below bottom lines are identified and annotated.**

The cost of achieving the needed improvements

31 In the announcement of the proposed changes it was stated that: "This 90 per cent goal by 2040 is challenging and is estimated to cost the Government, farmers and councils $2 billion over the next 23 years."

32 While this sounds a substantial sum, it is worth looking at some of the cost estimates being generated by councils to address water quality improvements. One example is the Selwyn catchment where there are specific concerns related to swimmability at Coes Ford and Te Waihora/Lake Ellesmere. A solutions package has been developed by the Selwyn Waihora Zone Committee to improve water quality in the catchment (Canterbury Water 2013). The report indicates that "Significant funding, probably of the order of at least $200 million, will be required over the next 20 or more years for this work programme to implement the solutions package". Furthermore, the Zone Committee stated: "While the package is a significant first step it does not achieve all of the Selwyn Waihora ZIP (Zone Implementation Programme) outcomes and continual improvement is needed over time."

33 A second example is the Avon Otakaro River. In a river graded as "very poor" under the Suitability for Recreation Grade, a stormwater management plan developed for the catchment identified a series of scenarios for water quality improvement (Christchurch City Council, 2015). The most comprehensive scenario, Scenario E, had an estimated capital cost of $124 million. The report also indicated that a strategy at least as comprehensive as

Scenario E was needed because stormwater treatment devices alone are unlikely to deliver water quality outcomes to achieve all objectives.

34 Thus, for two relatively small catchments at least 16% of the central government estimate for achieving the swimmability goal for all of New Zealand is needed. At this rate only six catchments might be remediated from the Government's package of $2 billion. The likely cost of achieving the desired water quality outcome for New Zealand is likely to be far more than $2 billion.

35 **EIANZ recommends that New Zealand increase the funding for water quality improvement including polluter pays contributions as well as government funding.**

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