



Central South Island Fish & Game

Plan Change 3

Temperature

Fish & Game advocate for a maximum temperature of 19°C based on scientific data that shows a number of impacts on aquatic ecology as temperatures rise above 19°C. Not only do brown trout cease feeding once temperatures climb above 19°C, but macroinvertebrates are negatively impacted and recreational activity is constrained.

Adam Canning states in his evidence given at the LWRP Variation 2 hearing, "Furthermore, Quinn and Hickey (1990) found that as temperatures surpassed 19°C that distributions of Ephemeroptera and Plecoptera taxa were restricted, thus drastically altering the community composition."¹ Canning also states that 50% of *Deleatidium* mayflies will die after 4 days in water at 22.6°C. Mr Canning notes that "whilst the native fish species each have different preferred thermal ranges, the Ephemeroptera and Plecoptera are important components of native fish diet and their absence could significantly reduce fish productivity."

F&G have not been able to locate any scientific data or justification to warrant an increase in temperature above 19°C within a planning instrument to safeguard life supporting capacity and ecosystem health.

DIN and DRP

Fish & Game consider it important to include DIN and DRP in the Plan and that the most appropriate place to include DIN and DRP is in Table 15(a).

Table 15(a) Freshwater Outcomes are aspirational in that it may take a longer timeframe to achieve; however, it is important to get a trajectory of change with appropriate feedback loops in place to ensure that the Plan is meeting the specified Freshwater Outcomes to achieve life supporting capacity and ecosystem health, to meet the policies of the NPS, and to give effect to Part 2 of the RMA.

NPSFM Policy CA2 directs Regional Councils to apply certain processes in developing freshwater objectives for all freshwater management units including (but not limited to)

¹ Canning, Adam. EiC. Variation 2 LWRP. 7 May 2015. para 21.



- o (e) formulating freshwater objectives:
 - i. in those cases where an applicable numeric attribute state is specified in Appendix 2, in numeric terms by reference to that specified numeric attribute state; or
 - ii. in those cases where the attribute is not listed in Appendix 2, in numeric terms where practicable, otherwise in narrative terms; and
 - iii. on the basis that, where an attribute applies to more than one value, the most stringent freshwater objective for that attribute is adopted;

As we understand the proposed plan, the N limits in the plan (Table 15(c)) are based on modelling to reflect the Zone Committee's solutions package. The P limits are based on current measured state. It is unclear as to whether the limits in Table 15(c) will meet the outcomes in 15(a) and how these limits fit into the overall planning framework. Limits are defined in the NPSFM as "the maximum amount of resource use available, which allows a freshwater objective to be met."

F&G believe that the limits in Table 15(c) may need to be amended in a future plan change (given staged implementation) in order to meet the Freshwater Outcomes of Table 15(a). The load limits in Table 15(p) must also meet Table 15(a) outcomes and may need to be amended at a future date to ensure that the freshwater outcomes are met. Therefore, it is important to have DIN and DRP instream concentrations within Table 15(a) to ensure that the end state supports life supporting capacity and ecosystem health. Table 15(a) is the only place in the plan where these "aspirational" numeric attributes can sit in order to measure progress.

As currently proposed, the DIN and DRP concentrations in Table 15(c) will not achieve the Freshwater Objectives proposed by Fish & Game to safeguard life supporting capacity as set out in Table 15(a) and are required to be amended. Fish & Game's position is that given that some of the DIN numerical parameters proposed by Fish & Game, which do give effect to the MCI and periphyton indicators and may take longer to achieve, fit more appropriately in Table 15(a) as outcomes. Fish & Game believe that there is no issue with repeating the DIN and DRP concentrations in Table 15(c) given that in it's current form, Table 15(c) is not used within the planning framework and is redundant.

Outcomes referenced in PA rules

F&G submitted that for the use of land to be a permitted activity, it must achieve the freshwater outcomes in Tables 15(a) and (b). F&G submit that it is unclear within the plan whether the limits will



achieve the freshwater objectives and therefore, the activity must ensure that there are no significant adverse effects on aquatic life (s70 RMA).

Numerical parameters are necessary to determine whether adverse effects are occurring. The numerical attributes sought in Table 15(a) can be referred to as limits, attributes or outcomes as these are all numerical measures that should be set to support life supporting capacity and ecosystem health.

One way to determine whether the activity is having an effect or not can be determined by referring to the State of the Environment monitoring report, which the Regional Council can assess and respond to. The Board of Inquiry decision in Rule TT1 addresses this same issue and condition (j) of the rule along with the associated footnote (75) provides an example of how a rule can have PA status whilst still managing to outcomes. TT1(j) states:

"After 31 May 2020, for farm properties or farming enterprises exceeding 4 hectares in area excluding:

- i. low intensity farming systems;
- ii. those that solely comprise plantation forestry (being forestry operations deliberately established for commercial purposes),

nitrogen leached from the land shall be demonstrated (Footnote 75: "Demonstrated" means as a result of monitoring and/or modelling undertaken by the Hawke's Bay Regional Council. Individual land owners seeking Certificates of Compliance under Rule TT1 will not be required to undertake any modelling or water quality monitoring themselves) to be not causing or contributing to any measured exceedence of the Table 5.9.1B limits for the 95th percentile concentration of nitrate-nitrogen or the limit for dissolved inorganic nitrogen at the downstream HBRC monitoring site nearest to the farm property or farming enterprise in the relevant mainstem or tributary of a river to any measured exceedence of the Table 5.9.2 groundwater quality limits for nitrate-nitrogen."

Toxicity

In order for nitrogen to be set at toxicity, it has to be proven that ecosystem health and life supporting capacity will be safeguarded. The only way to do this is to prove that nitrogen management is not required to achieve periphyton limits or protect macroinvertebrate communities. The only way to do this is to prove that only phosphorus is required to be managed to protect ecosystem health. Nitrate toxicity is based on laboratory experiments and does not take into account ecosystem health (the



indirect effects of nitrate on species caused by trophic cascades, or the direct effects on species which may be immeasurable (e.g. changes in behaviour, increased risk of infection or disease)).

The MfE draft attribute guide² states that there are three factors that generally determine periphyton biomass (time between high flows, light, and temperature) and can be considered as natural characteristics of the river environment. This means that, in most cases, achieving periphyton objectives requires the management of nutrient (N and P) concentrations.

Ecological Health Indicator

In Table 15(a), a QMCI of 6 is set for Hill-fed lower water bodies, which Dr Death refers to in his evidence for the LWRP as representing 'clean water' and should protect a sustainable and health trout fishery; however, a Chlorophyll *a* indicator of 200 mg/m³ is not compatible with a QMCI indicator of 6. Dr Death states that in his experience "chlorophyll *a* levels of 200 mg/m³ are very high and normally only occur in very eutrophic (nutrient enriched) waterbodies. Furthermore, they would also not be consistent with a filamentous algal cover of less than 30% presented alongside the 200 mg/m³ numeric." He recommends that it would be more consistent to have 120 mg/ m³ to maintain ecological health.³

QMCI cannot be managed directly; therefore, there is a need to manage DIN and DRP. QMCI is the most important attribute and best parameter to monitor ecological health. Dr Death recommends using the relationship between QMCI and nutrient concentrations to achieve limits for QMCI and periphyton.⁴

The DIN and DRP numbers recommended for Table 15(a) are what F&G believe to be the upper bounds of what is needed for a healthy ecosystem and are greater than what is recommended by Biggs to maintain periphyton biomass less than 120 mg/ m³ as Dr Ryder points out. Therefore, this illustrates how crucial it is to err on the side of caution when setting appropriate attributes to safeguard life supporting capacity in the face of the number of uncertainties that comes with this Plan Change.

Whilst periphyton growth is not dominant in the Spring-fed plains, the Technical Report by ECan states, "Although the spring-fed streams in SCCS are dominated by macrophyte growth, they are also

² Ministry for the Environment. A Draft Guide to Attributes. September 2015.

³ Death, Russell. EiC. LWRP. 4 February 2013. p 14.

⁴ *ibid*, p 20.



prone to growth of nuisance periphyton."⁵ F&G consider it appropriate to have a Chlorophyll a indicator for Spring-fed plains.

Critical Values

Fish & Game believe that in order to set meaningful freshwater outcomes there must be values attached to them. F&G recommend these values sit within Table 15(a) to clearly define what exactly is being managed in each freshwater management unit. The MfE document⁶ illustrates that values are achieved by objectives and the objectives are justified by the values.

Within the Guide to the NPSFM, Policy CA2 requires regional councils to set freshwater objectives for a range of values. Setting freshwater objectives for the compulsory value 'ecosystem health' using the attributes in Appendix 2 will contribute to, but not completely be sufficient to fully give effect to, Objective A1(a). Regional councils will need to develop freshwater objectives in each freshwater management unit (FMU) for all attributes that are applicable to the value and the freshwater body type. F&G believe that identifying values as they relate to sports fish lies solely with F&G as the statutory managers of the sports fish resource under Part 2 of the Act.

A handwritten signature in black ink, appearing to read 'Angela Christensen'.

Angela Christensen

Resource Officer

17 November 2015

⁵ Kelly, David. Predicting consequences of future scenarios: surface water quality and associated values. Technical Report. Environment Canterbury. February 2015. p 4.

⁶ Ministry for the Environment. p 20.