

Steve Rice

From: Gerry Kessels [GKessels@tonkintaylor.co.nz]
Sent: Friday, August 9, 2019 4:26 PM
To: Steve Rice
Subject: FW: Healthy Rivers Hearing on Table 3.11.1-Panel questions
Importance: High

Hi Steve,

My responses to the questions directed at me from the panel are as follows:

Here are the panel's questions:

1. In relation to macrophyte nuisance, at page 173 of the Joint Witness Statement, should the suggested bottom line be less than 50% cover (rather than greater than 50%)?
2. Also in relation to macrophyte cover, what evidence do you have in relation to the current state, relative to the suggested bottom line?

My responses are as follows:

1. Correct. This is a typo and should read <50% (less than 50%). My apologies.
2. The technical paper on macrophytes in the JWS presented by Dr Scarsbrook (Attachment 8, p78, JWS) citing Scarsbrook (2016), notes that the Technical Leaders Group agreed that macrophyte biomass was an important measure of ecosystem health relevant to the Waikato region (p78 JWS). Regardless of a perceived difficulty in the ability to link macrophyte biomass to the four contaminants, I consider it is an important attribute to include, because it is an important measure of ecosystem health. To give effect to the Vision and Strategy, a wider ecosystem perspective than a focus on nutrients (or the four contaminants as put forward by Dr Scarsbrook – p78, JWS), is appropriate. In my opinion, protecting and restoring the health and wellbeing of the Waikato River is, from an ecologist's perspective, synonymous with ecosystem health.

As the technical paper on a Macrophyte Attribute acknowledges (p78 JWS); there is data of sufficient quality, quantity and representativeness to assess the current state of the attribute: Collier et al. (2014) state there is a macrophyte sampling network of 180 non-tidal perennial wadeable streams on developed land sampled on a 3-year rotating panel in the Waikato Region. As discussed by Dr McArthur in her run sheet (p178, JWS), Pingram et al (2016) found "On streams flowing through developed land, macrophyte cover averaged 31% of the channel", which presents broad evidence on the region's current state in terms of macrophyte cover. I suspect that further analysis of the REMS data would likely give a more focussed overview of the current state (for example, analysis of 4 sites from Taupo to Tuakau). I also consider that further fine-grained refinement of the REMS survey programme (for example upstream and downstream sampling of the confluences of key sub-catchments), would be helpful in identifying bio-physical factors (such as light availability, flood frequency, flow velocity, substrate and colonist availability) from influences associated with landuse activities.

In a review of the New Zealand instream plant and nutrient guidelines (Matheson et al. 2012) recommended a provisional guideline for macrophyte abundance of $\leq 50\%$ of stream cross-sectional area or volume. Given the complexity of factors influencing macrophyte substrate cover, in light of

Pingram et al's analysis of Waikato REMS data and Matheson et al's recommendation, I consider less than 50% an appropriate numeric threshold for macrophytes in wadeable streams.

References

Collier, K., Hamer, M, Champion, P. (2014). Regional guidelines for ecological assessments of freshwater environments: Aquatic plant cover in wadeable streams - version 2. TR 2014/03.

Matheson F, Quinn J and Hickey C. 2012. Review of the New Zealand instream plant and nutrient guidelines and development of a new decision making framework: Phases 1 and 2 final report. Report No: HAM2012-081 prepared for the Ministry of Science and Innovation Envirolink Fund by NIWA, Hamilton.

Pingram M, Hamer M, Collier K 2016. Ecological condition of Waikato wadeable streams based on the Regional Ecological Monitoring of Streams (REMS) Programme 2012 – 2014 report. Waikato Regional Council Technical Report 2014/46.

Scarsbrook, M. (2016). Water quality attributes for Healthy Rivers: Wai Ora Plan Change. Report HR/TLG/2016-2017/2.1A. Waikato Regional Council Technical Report 2018/66.

Ngā Mihi | Kind regards,

Gerry Kessels | Principal Ecologist

MREP (hons 1)

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