

**RECORD OF CONFERENCING – LAKE WATER QUALITY, LAKE ECOLOGY, AND
STORMWATER QUALITY**

Dated: 13th November 2020

Experts Acknowledgement

1. The experts that sign this statement acknowledge that they have read the 2014 Environment Court Practice Note as it concerns the role of expert witnesses and witness conferencing protocol and they agree to comply with the practice requirements.

Conferencing notes Whanganui Prison Stormwater discharge consent.

Present: Regional Council: Logan Brown (LB). Applicant: Vaughan Keesing (VK), Keith Hamill (KH), Peter Cochrane (PC).

2. Discharge direction and which lake is affected by the discharge (point a):

The majority of stormwater flows are to Lake Wiritoa, on occasions under particular circumstances flows of stormwater are to Lake Pauri.

The flow to Lake Pauri could be minimised by a larger culvert sizing and on-going maintenance of the culvert under the access road to Lake Pauri.

3. Causes of Lake Wiritoa's current condition and in general conditions of dunes lakes (points b and c):

There is agreement that dune lakes (in fact all lakes) act as sinks for nutrients. Therefore, in order to maintain or enhance water quality, management of nutrients in the catchment from all activities is important. It is important when considering lakes to consider all the inputs from the catchment that end up in the lake, this includes those inputs in both the surface and groundwater capture zones (or those diverted into the lake) and includes internal nutrient cycling. It is correct that some of the regions dune lakes that are in a degraded state only have land use as the driver of that change e.g. Lake Herbert. Others have land use and diffuse discharges from septic tank systems e.g. Lake Dudding with a discharge to land from the Dudding Lake camp ground; land use and point source discharges e.g. Lake Waipu and the point source discharge from the Rātana Wastewater Treatment Plant; and landuse and stormwater discharges e.g. Lake Horowhenua, Pauri, and Wiritoa. We use these examples to show that there are many reasons for the degradation of water quality in the region's dune lakes. The one thing that they all share in common is that these are human induced changes. Therefore, when looking at a lake and the drivers of water quality one needs to consider what is occurring in both the catchment and also in-lake processes specific to that lake.

We agree that the solutions for these lakes need to be tailored to each individual lake.

LB states he has been asked to assess the effect of the proposal that is in front of him by the Department of Corrections. If other activities in the catchment require a resource consent and he was asked to undertake the technical assessment it would be approached in the same manner as this assessment.

In terms of cumulative effects of nutrients, we agree that the lake is a sink, that the Whanganui Prison stormwater even with an improved discharge quality, will continue to release nutrients to the lake, that additional nutrient load does not assist in the lake's condition, but that the proposed treatment of stormwater and mitigation to harvest macrophyte biomass could balance the inputs to a point of a neutral or net load reduction from the lake system.

We note that in addition to biomass harvesting there are other potential interventions that could be used as well or instead of macrophyte harvesting. LB states that macrophyte harvesting is more easily controlled by the Applicant to provide more certainty over the outcome.

Consent conditions need to ensure certainty of that sufficient mitigation actions will occur to achieve the anticipated load reductions. Consent conditions should also have a level of flexibility in how the load reductions are achieved.

4. Capacity to assimilate pollution (point d):

LB – Considers that the NPS-FM Band D attribute state and failure to meet some Schedule B and E One Plan targets means that there is no further capacity to assimilate pollutants.

VK – Considers that where values are largely gone, the system is robust and largely insensitive, so assimilation of pollution is possible without further damage.

The One Plan has a value (in schedule B) which is “*The capacity of a waterbody to assimilate pollution*” and this should not be exceeded”¹. - *The capacity of a waterbody to assimilate pollution* is the ability to assimilate a certain level of pollution without the values within that waterway being compromised.

The One Plan nutrient targets (schedule E) were set to manage algal levels within waterways (in the case of lakes phytoplankton). It has been agreed that some of the water quality targets identified in Schedule E are not met, and that the majority of values these are intended to protect are compromised, not provided for, or are not present.

5. Flipping (point e):

Patterns of seasonal algae growth indicate that “flipping” (from a macrophyte dominated “clear” water state to an algae dominated “turbid” water state) is a possibility in Lake Wiritoa and Paori (as well as a number of other lakes in the region).

6. The BPO process and why it is entirely appropriate to consider Lake Wiritoa as an option for discharge (point f):

In regard to the assessment of the BPO for the application, we all agree that it was appropriate to include in the BPO assessment the option of continuing to discharge at the current location.

7. Meeting Schedule E water quality outcomes for deep lakes (point g):

We agree that in the absence of the dilution factor (but see below) the improved prison stormwater will likely not meet the One Plan Schedule E nutrient targets.

Dilution – in practice dilution of nitrogen and phosphorus in the receiving water will be small to negligible when the concentrations of the receiving waters and the discharge are similar. We accept that any one discharge (of nutrient) which is reliant on dilution to achieve a One

¹ Ausseil, O., Clark, M, (2007). Identifying Community Values to Guide Water Management in the Manawatū-Wanganui Region: Technical Report to Support Policy Development.

Plan target will inevitably fail to meet the target where the background water quality already exceeds it. This cannot change until background water nutrient levels reduced.

Achieving the One Plan nutrient targets for the lake will require interventions catchment-wide and in-lake.

We are less concerned by concentration issue, as opposed to a load issue. It is the load (of N or P) that is of biological concern, and the long-term accumulation within the lake.

8. Monitoring if consent is to be granted (point i):

Future investigations can be undertaken to inform the effectiveness of the stormwater treatment.

Continuous monitoring of stormwater discharge is impracticable in the network but a programme of investigations similar to those already undertaken is achievable and would be sufficient to establish contaminant loads following the commissioning of the treatment device.

A number of flow proportional sampling events undertaken after on-site mitigation actions have been finalised for several storm events and is proposed by the Department. This could be repeated occasionally through the consent life to confirm stormwater quality. There remains a number of details that need to be worked through in this regard, but a reasonable array of investigations could be undertaken to confirm the estimate of nutrient loads from the Prison stormwater.

Signed 13.11.2020



Vaughan Keesing



Keith Hamill



Peter Cochrane

Logan Brown