

Water Quality Technical Advisory Group

Lake Rotomā water quality and catchment nutrient sources. (Abridged version July 2014).

Lake Rotomā has the highest water quality of the 12 lakes in the Rotorua Lakes Programme. Water clarity and phytoplankton biomass are currently not showing significant change, however, total phosphorus (TP) concentrations may be increasing. The Water Quality TAG advises that this is undesirable as phytoplankton growth is likely to be limited by phosphorus concentrations.

The WQTAG has advised that new targets should be set to protect Lake Rotomā from a decline in water quality. Catchment loads for total nitrogen (TN) and TP have been estimated to meet these targets using two methods and establish the required N or P reductions from the lake catchment.

Lake method: Catchment loads were estimated from lake characteristics and measured lake nutrient concentrations. The difference between estimated 'present' and 'target' loads defines the catchment nutrient reduction required to maintain the lake at its target water quality.

Estimated present (2010 to 2014) catchment loads were approximately 14,500 kg N per year and 850 kg P per year. TN is presently below target levels. TP is presently above target levels, and achieving this target will require a reduction of c. 15% of the catchment P load.

Catchment method: Estimated discharges of N and P to the lake from each catchment land use give the total load to the lake, as well as the relative contribution of each land use or source.

Estimates of total load using the catchment method (16,000 kg N and 1050 kg P per year) are in reasonable agreement with estimates from the lake method. Estimates of the contribution from septic tank are 1410 kg N and 141 kg P per year. Future possible increases in both household numbers and occupancy rates, for example, RDC's 'Ultimate HEU' projection of 432 households and increases in occupancy from 1.15 to 1.5 persons per household averaged over each year, would increase estimated septic tank P loads from 141 to 237 kg P per year.

Catchment load estimates suggest that the majority of the catchment target can be met by removal of nutrients from wastewater (141kg P per year) but allowing for some uncertainty, the P reduction target could be as high as 200 kg per year, reinforcing the need to deal with identifiable sources of P to the lake as comprehensively as possible.

The TAG advises that preventing discharge to the lake of nutrients from septic tanks is vital to the management of Lake Rotomā, because they represent the majority of the P reduction target, and because the proximity to the lake of many septic tank drainage fields means that removal of septic tank loads is likely to provide rapid benefits for the lake. A rapidly realised reduction in lake TP concentration is a highly desirable outcome.

The impact of nutrients from sources at greater distances from the lake (i.e. much of the agricultural land) is less certain, due to the potential for P absorption by soils. Some reduction of P sources from land use may be required in order to consistently meet water quality targets.

The TAG also advises that actions additional to sewerage reticulation may be necessary to address the P load reaching Lake Rotomā from its catchment. A review of the Action Plan is necessary to ensure that sufficient P reduction initiatives are implemented to protect Lake Rotomā.

