

Lakes

Northland has a large number of small and generally shallow lakes. The majority of these were formed by dune activity and are therefore called 'dune lakes'. However, some – such as Lake Ōmāpere – were formed by volcanic activity, or were artificially made. Northland's lakes are a valuable economic, social, cultural and environmental resource.



Lake Ngakeketa South basin is a deep dune lake, one of many in the region.

The Northland Lake Water Quality Monitoring Network (LWQMN) was set up by the Council in 2005 as a means of collecting information on water quality in the region's lakes, and monitoring change over time. The Council currently has the largest lake water quality monitoring programme in New Zealand.

The programme includes 28 lakes in the Kai Iwi, Aupōuri, Central/ Karikari and Poutō lake groups. These lakes are sampled every three months to test for a range of properties including temperature, nutrients and clarity.

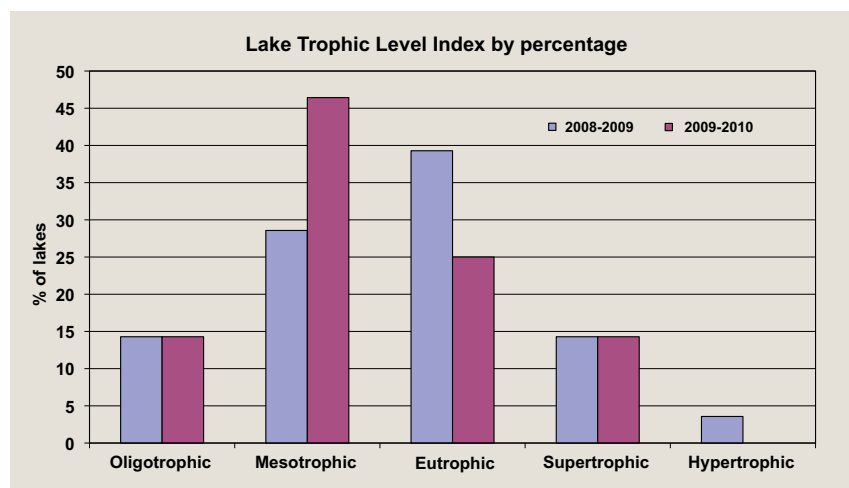
Lake water quality

Lakes are graded using the Trophic Level Index (TLI), which gives a measure of the amount of nutrients in the water and an indication of a lake's overall health.

Aquatic plants need many types of nutrients, including nitrogen and phosphorus, for growth. However, increased levels of nutrients can encourage excessive plant growth, particularly of pest plant species, and can also lead to algal blooms. High levels of nutrients in the water most often come from agricultural runoff and urban wastewater.

At the end of the monitoring season, lakes are given a TLI grade from ultra-microtrophic (very low nutrient levels) to hypertrophic (saturated) depending on their nutrient levels. The graph shows the TLI grades for the lakes that form the LWQMN. For more information, go to

www.nrc.govt.nz/lakedata



Lakes performance targets

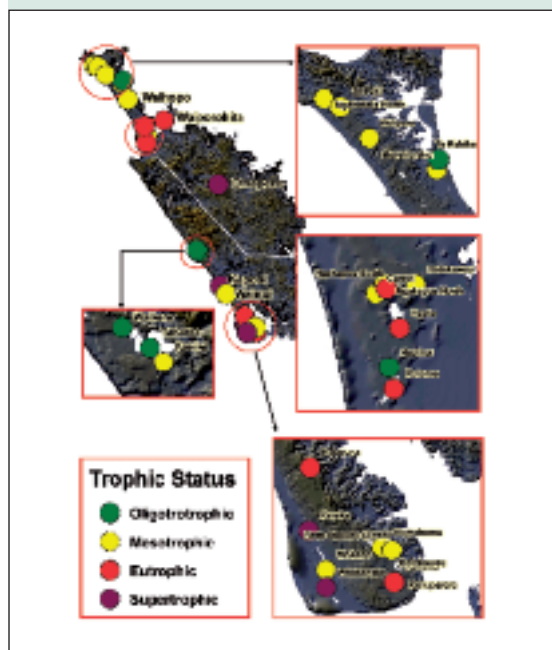
Continue to implement and improve a prioritised State of the Environment (SoE) monitoring programme and monitor compliance with, and the effects of, the exercise of resource consents and Regional Plans by:

- Operating a region-wide water quality network for the measurement, recording and reporting of river, lake and groundwater quality trends.
- Report the results from the SoE monitoring programmes in the annual monitoring report and make available on the Council's website at www.nrc.govt.nz/soe by 31 October each year (loaded six weeks late).

Key points 2009-2010

Of the 28 lakes monitored during 2009-2010:

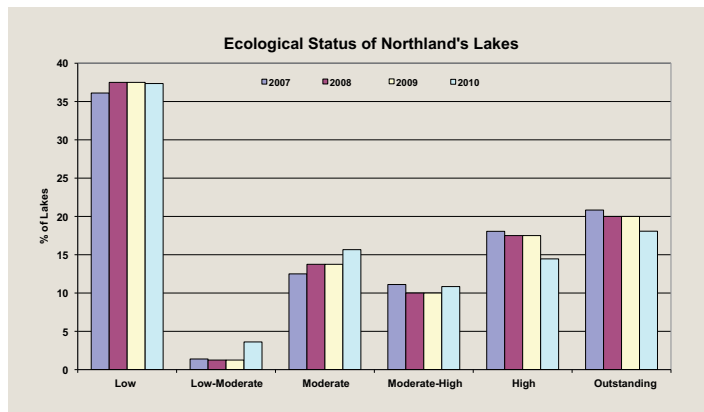
- 4 were graded as oligotrophic (low nutrients).
- 13 were mesotrophic (medium nutrients).
- 7 were eutrophic (high nutrients).
- 4 supertrophic (very high nutrients).
- 2 lakes have declined in water quality since 2008-2009 – Ngatu (mesotrophic to eutrophic) and Kai-Iwi (oligotrophic to mesotrophic).
- 9 lakes have improved water quality since 2008-2009.
- Changes are most likely due to natural nutrient cycles in each lake and as a result of the drought experienced summer 2009-2010.



Ecological Monitoring

In addition, ecological monitoring is undertaken on 83 lakes in the region on a rotational basis by the National Institute of Water and Atmospheric Research (NIWA). In 2009-2010, ten lakes were monitored as part of this programme.

Lakes in the programme are ranked according to their ecological value, i.e., how many native or endangered plant and animal species they contain, the absence of pest species and how close the lake is to its natural state.



Pest plant surveillance

In May 2009, grass carp were released into Lake Roto-otuauru (Swan) on the Poutō peninsula to control the very invasive aquatic plants hornwort and egeria (oxygen weed). Lake Swan is the only lake on the Poutō peninsula to have hornwort so it is vital to control it before it spreads to other neighbouring, high value lakes.

Monitoring carried out in March 2010 showed that most of the egeria and approximately 50% of the hornwort have already been removed by the grass carp.

In June 2010, grass carp were released into Lake Heather, north of Kaitiāia. This high value dune lake is also infested with hornwort and egeria and grass carp are expected to have an impact on these weeds over the coming summer months. Fish will be removed from the lakes once the pest plants have been eradicated, which is predicted to take up to five years.



Lake Ngatu fish survey.

Lake Ōmāpere

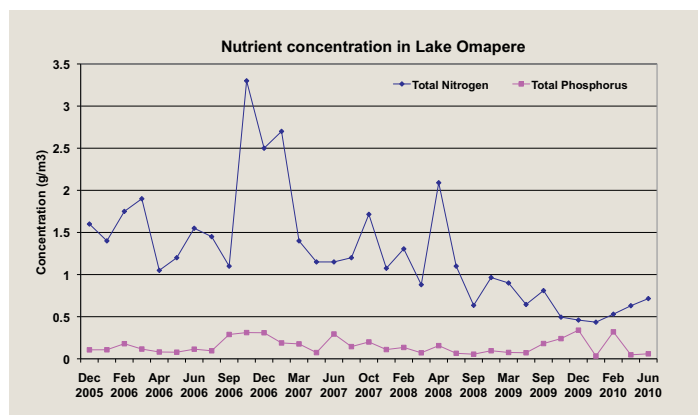
Lake Ōmāpere is located north of Kaikohe and feeds the Utakura River, which flows into the Hokianga Harbour. It is a large shallow nutrient-rich lake which is prone to blooms of toxic algae, which affect downstream water quality.



Lake Ōmāpere

The Council and the local community have been working closely together for the last two decades to improve water quality in the lake, through active management and regular monitoring.

Over the last year there have been positive signs that the lake may be improving. The TLI grade for Lake Ōmāpere was 5.06, an encouraging result considering the previous year's grade was 5.32 which decreased from 5.98 the year before.



Blue-green algae levels also remained low during 2009-2010 with peaks in November 2009 (684 cells/mL) and February 2010 (235 cells/mL), which coincided with peaks in total phosphorus. There has also been a considerable drop in total nitrogen concentration in the lake over the last year.

It is still too early to tell if these changes are due to improvements in water quality, or as a result of climatic conditions and natural nutrient cycles. The Council will continue to monitor the water quality of Lake Ōmāpere and also carry out monitoring of freshwater mussels and aquatic plants.