

Trophic Level Index (TLI)



What is the Trophic Level Index?

The Trophic Level Index is a number used to indicate the health of lakes in New Zealand. As a general rule of thumb the higher the number, the worse the water quality in the lake.

What makes up the Trophic Level Index?

The number is calculated using four separate water quality measurements – total nitrogen, total phosphorous, water clarity and chlorophyll-a.

Why do these measurements matter?

Total nitrogen and total phosphorous are nutrients that plants thrive on. Large amounts of these nutrients in the lakes encourage the growth of algae which can lead to poor water quality.

Water clarity is a measurement of how clear the water in the lake is. In general, the clearer the water the better the water quality.

Chlorophyll-a is the green colour in plants. Knowing how much chlorophyll is in a lake gives us a good idea of how much algae the lake has. It's okay to have algae in a lake, just not too much. The more algae there is, the poorer the water quality.

These four measurements are combined into one number which is the Trophic Level Index.

Are there other ways to measure water quality?

Yes. Other water quality indicators include levels of dissolved oxygen, Escherichia coli, usually known as E coli (an indicator of how many harmful bacteria are in the water), metals, pesticides, water temperature, suspended solids and the presence of fish and aquatic plants.

Why does the Bay of Plenty Regional Council use the Trophic Level Index and not other indicators?

The Trophic Level Index is used by the Ministry for the Environment as one of their national environmental indicators, which means our Bay of Plenty lakes can easily be compared with all other lakes in New Zealand because we all use the same indicator.

Also, the Trophic Level Index takes into account four key characteristics of water quality, not just one. This gives us a better overall picture of how healthy the lake is. Because we have been using this measure for some time we can look at trends over several years and know whether the health of our lakes is getting better or worse.

Information reported to the public is often summarised and uses the Trophic Level Index, rather than more detailed information.

So what does the number actually tell us?

The Trophic Level Index gives us an indication of lake water quality. Each range of numbers translates into a scientific description, like microtrophic or supertrophic. This is just another way of describing the overall water quality in a lake using the Trophic Level Index. Examples of this are in the table below.

The Regional Council has calculated a Trophic Level Index for each of the lakes in the Rotorua area to assess the overall health of each lake. The Trophic Level Index for each lake is compared over time to see if water quality is getting better or worse.

What happens if the Trophic Level Index shows a lake has poor water quality?

The Trophic Level Index is used in the Regional Water and Land Plan. A baseline has been set for each Rotorua lake. If this level is exceeded, an Action Plan must be developed and implemented by the Regional Council to maintain or improve lake water quality.

Currently, nine lakes have water quality poor enough to require Action Plans – Rotorua, Rotoiti, Ōkāreka, Ōkaro, Rotoehu, Tarawera, Rotomā, Tikitapu, and Ōkātina.

| Trophic Level Index (TLI) | Lake Type | Example |
|---------------------------|--|--------------------------|
| Less than 2 | Very good water quality (microtrophic) | Lake Sumner (Canterbury) |
| 2 – 3 | Good water quality (oligotrophic) | Lake Rotomā |
| 3 – 4 | Average water quality (mesotrophic) | Lake Rerewhakaaitu |
| 4 – 5 | Poor water quality (eutrophic) | Lake Rotoehu |
| Greater than 5 | Very poor water quality (supertrophic) | Lake Ōkaro |



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