

LAKE WATER QUALITY



Lake Wanaka

Otago is world famous for its photogenic landscapes, the soaring mountain ranges complemented by the region's big blue lakes.

Tourists, holidaymakers and locals alike value our lakes for their clean, clear waters. And we want to keep it that way.

Otago Regional Council (ORC) regularly monitors the water quality in nine lakes throughout the region, including lakes Wakatipu, Wanaka and Hawea.

We want you to know how good your lakes are, so you can fish, swim, ski, board or bathe knowing the water is healthy and safe.

WHAT DOES LAKE MONITORING INVOLVE?

Our team monitors lake water quality using a measurement known as the *Trophic Level Index* (TLI). This value gives us an overall picture of the health of the lakes.

Depending on its content and clarity, each lake is assigned a number between 1 and 5 – the lower the number, the better the water quality of your lake.

A lake's TLI value is calculated from these four water quality parameters:

- Chlorophyll content
- Total phosphorus
- Total nitrogen
- Water clarity
(not in all cases)

How did your lake score in 2016?

Lake Wakatipu	1.6
Lake Wanaka	2.1
Lake Hawea	1.6

INDEX	DESCRIPTION	RATING
Less than 2	Microtrophic <i>The lake is clear and blue with very low levels of nutrients and algae</i>	VERY GOOD
2-3	Oligotrophic <i>The lake is clear and blue, with low levels of nutrients and algae</i>	GOOD
3-4	Mesotrophic <i>The lake has moderate levels of nutrients and algae</i>	AVERAGE
4-5	Eutrophic <i>The lake is green and murky, with higher amounts of nutrients and algae</i>	POOR
Greater than 5	Supertrophic <i>The lake is fertile and saturated in phosphorus and nitrogen, often associated with poor water clarity</i>	VERY POOR

Source: <https://www.lawa.org.nz/learn/factsheets/lake-trophic-level-index/>

Visit www.lawa.org.nz for the latest water quality information on your local lake.

LAKE SNOW

Lake snow is a sticky, biological material made up of groups of algae that form colonies. *Lindavia intermedia* are the algae species responsible for creating lake snow.



Currently it is found in Lake Wakatipu, Lake Wanaka and Lake Hawea. It has also been found in Lake Coleridge in Canterbury. In the past, it has been found in Lake Benmore, Lake Aviemore and Lake Hayes in the South Island and Lake Waikaremoana in the North Island; however it does not appear to be present in these lakes today.

WHERE DOES LAKE SNOW COME FROM?

Research has found that the genetic source of *Lindavia intermedia* (the algae responsible for creating lake snow) is highly likely to be from outside NZ.

Genetic testing of lake snow samples from NZ lakes found that specimens were identical in more than one respect to samples from Lake Youngs in Washington State (USA).

HOW DOES IT GROW?

There are some suggestions of the reasons behind the rise of lake snow algae, which are linked to both natural and human-made influences. For example:

Climate change effects

With a changing climate, any increase in temperature, even a subtle one, may produce conditions that favour the growth of different species of algae.

Land-use changes and increased nutrients

Many Central Otago lakes have very low Trophic Level Index (TLI) values, which indicate low levels of nutrients and algae, a sign of good water quality. Because of this even very slight increases in nutrients in a lake can result in marked changes in the algal community.

Water fleas and space

Water fleas (*Daphnia* spp.) in the lake may preferentially graze on an algae that typically competes with lake snow algae. The introduced North American water flea *Daphnia pulex* is a more efficient consumer of these competing algae than the New Zealand native water flea, *Daphnia carinata*.

This increased grazing pressure from *D. pulex* may remove more competitor algae than normal, creating a vacancy in the environment for lake snow algae to get the upper hand.

IS IT HARMFUL?

Although it is not toxic and poses no known human health risk, it is creating costly problems for water users. If it gets into the residential water supply, lake snow causes blockages, clogs filters and household appliances connected to the system. On the lake, fishermen may find the algae accumulates on their fishing lines and lures. It can also stick to boat hulls and equipment, wetsuits and your skin or hair if you come in contact with it.

WHAT ARE WE DOING ABOUT IT?

Recent findings will give impetus to multi-agency efforts (ORC, Environment Canterbury, Environment Southland, and the Ministry for Primary Industries) to identify appropriate ways to manage lake snow in the southern alpine lakes and elsewhere in NZ.

The work stream will focus on:

- the origins of the species
- researching the drivers of the dominance of lake snow in lakes
- the development of technologies for effective sampling and monitoring of lake snow
- the development of methods to stop the spread of lake snow between lakes.

We are currently running a comprehensive lake monitoring programme that will give us detailed information on how many nutrients are in the lake and the overall trophic state of the lakes. The ultimate aim of this research is to determine whether it is possible to manage lake snow.

CHECK. CLEAN. DRY.

Freshwater pests, including lake snow or didymo can be spread by a single drop of water or plant fragment. With limited control tools available for some aquatic pests, and none at all for others, it is very important to limit and prevent it from invading other water bodies. ORC employs a Freshwater Biosecurity Advocate to travel around the lakes and popular aquatic recreational sites, spreading the CHECK, CLEAN, DRY message.

If you are moving your boat from one lake to another, you must always CHECK, CLEAN, DRY any equipment that comes into contact with the water, between every waterway, every time.

You can also help by letting us know if you find lake snow in an Otago lake or waterway other than Wanaka, Wakatipu or Hawea. Report it to us on **0800 474 082**

For our future