

Nicola Lake 2025

# Year One Data Summary



BC Lake Stewardship Society

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**Photo 1:** Nicola Lake - Image obtained from Google Earth

## General Information

This report includes a year one summary of Level 1 BC Lake Stewardship and Monitoring Program (BCLSMP) Data from Nicola Lake collected by volunteers between May 25 and September 15, 2025. The Level 1 program at Nicola Lake included seasonal Secchi depth and surface temperature measurements. Dissolved oxygen and temperature profiles were not collected in 2025 but are planned for 2026 as well as biweekly chlorophyll-a and phosphorus data as the Lake will be moving to a Level 3 BCLSM Program.

Nicola Lake is also part of the BC Lake Monitoring Network (BCLMN). The BCLMN lake sampling protocol and effort have been standardized to provide a consistent province-wide approach. Sampling occurs twice per year, once in late winter/spring (February to May, depending

on location and ice melt) when the water column is in mixed conditions and once in late summer/fall (August to September) when the water column is stratified. Data is available for download on the [BC Lake Monitoring Portal](#).

Nicola Lake is in the Southern Interior Plateau, close to the town of Merritt. Nicola Lake is the largest lake in the Nicola River watershed and serves both as a popular recreational destination and a water source for agricultural use (Plewes et al., 2024). Nicola Lake also supports anadromous salmon by providing connectivity to spawning and rearing habitats in the Thompson-Nicola River system (Plewes et al., 2024).

The Nicola Lake area has a rich cultural and spiritual history for the Syilx and Nlaka’pamux people (Plewes et al., 2024). However, the ecological and cultural significance of Nicola Lake has diminished over the past century due to extensive ranching, recreational use, water withdrawals, and foreshore development (Plewes et al., 2024). The lake has been experiencing severe algal blooms, one of which occurred around the July long weekend of 2025 (see Photo 2). Tragically, the bloom was suspected to be toxic as multiple dogs became ill or died after being in contact with the lake (Holliday, 2025).



**Photo 2:** Nicola Lake Bloom – Photo by Dawne Tomlinson

Nicola Lake has a surface area of 2,500 hectares (MOE, 1958) and a shoreline of approximately 52 km. Results of a 2023 FIM survey indicate that 51.3% (26.5 km) of the Nicola Lake shoreline is in natural condition (Plewes et al., 2024). The mean depth of Nicola Lake is 23.5 m, and the maximum depth is 57 m based on a bathymetric map completed in 1958 (MOE, 2025) . The Level 1 Nicola Lake monitoring location is included in Figure 1.



**Figure 1:** Bathymetric map of Nicola Lake including the Level 1 BCLSMP monitoring location marked by the red X. The coordinates for the monitoring site are 50.183366, -120.505935.<sup>1</sup>

Species of management concern include Burbot, Kokanee, Bull Trout, Cutthroat Trout, Rainbow Trout, Steelhead, Chinook, and Coho salmon, with invasive species of concern including Yellow Perch and Carp (Plewes et al., 2024).

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<sup>1</sup> Readers are advised to use the zoom tool when viewing the bathymetric map to read the depth contours

A considerable amount of water quality and related work has been undertaken on Nicola Lake and its watershed in the past, providing baseline data that will be valuable to refer to and compare to the results of the Level 3 program after 3 years. Some of these reports are listed below:

- [Chemical and Biological Characteristics of the Nicola/Coldwater Watershed Including Nicola Lake \(1979\)](#)
- [The Water Quality of the Tributaries of Nicola Lake \(1988\)](#)
- [Paleolimnological analysis of Nicola Lake, B.C – Final Report \(March 1999\)](#)
- [Nicola Lake Phytoplankton Summary Report 2021-2022](#)
- [Nicola Lake Foreshore Integrated Management Planning Assessment and Update \(2024\)](#)
- Listening to the Lake – Upper Nicola River Watershed: Past, Present, Future (2025)

The Nicola Watershed Community Roundtable website contains some of these reports and others of interest, which can be accessed [here](#).

Of note, a sediment core was taken from Nicola Lake in 1998, and a paleolimnological analysis was completed as part of that work. A sediment core provides insight into historic water quality and can be used to assess whether the lake has changed over time. Cumming (1999) found that dominant diatom taxa throughout the core were indicative of meso- eutrophic conditions. Cumming (1999) also found that inferred total phosphorus had not changed in a directional fashion since preindustrial times, but the changes in diatom assemblages in the upper part of the core suggests however that the conditions in Nicola Lake may have become slightly more eutrophic. Diatom-inferred reconstructions indicate a slight increase in salinity beginning around 1960, suggesting that climate-related factors, including possible changes in lake water levels, may help explain some of the observed variation in phosphorus and diatom communities (Cumming, 1999).

The sediment core data and inferred total phosphorus results will be useful to compare to phosphorus results from the recent BCLMN data and the Level 3 program to determine if phosphorus levels have changed significantly since the core was taken and help to determine the current trophic status of the lake.

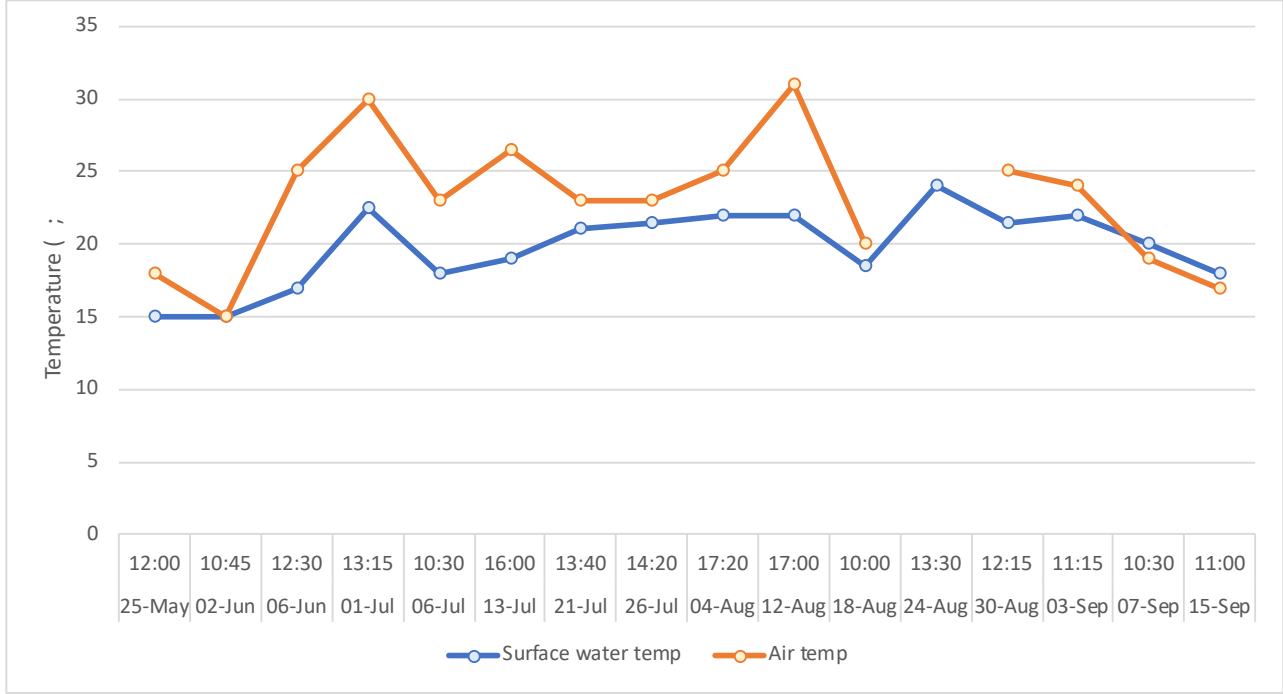
## What's Going on Inside Nicola Lake?

### Surface Temperature

*Why Measure Surface Temperature?*

Measuring temperature over time allows us to understand a lake’s specific thermal structure. Temperature measurement also provides important information on the health of the biological community by indicating when and where the temperature tolerances of fish and other animals or plants may be exceeded. Surface temperature monitoring is important to provide background conditions and therefore identify trends that may be present. Surface temperature also helps to determine much of the seasonal oxygen, phosphorus, and algal conditions.

Surface temperature readings were collected by volunteers from May 5<sup>th</sup> to September 15<sup>th</sup> 2025. Figure 2 shows surface water temperature and air temperatures throughout the monitoring season.



**Figure 2:** Nicola Lake 2025 Surface water temperature and air temperatures. Date of reading also includes the time the reading was taken.

The maximum surface water temperature reading was 24°C (August 24) and the minimum was 15°C which was measured during the first monitoring event of the season (May 25). The average surface temperature reading for the 2025 season was 19.8°C.

Water temperature results may be of particular interest in Nicola Lake considering cyanobacteria often thrive in warm, stable waters with high nutrient concentrations (Algae Watch BC, 2021). Typically in Canada, blooms are most common in the late summer and early fall when waters may reach optimal temperatures for cyanobacterial growth of around 25–30°C (Health Canada, 2017). However, optimal temperature ranges for cyanobacteria also depend on species, and different species can produce different toxins. A study of over 2,800 U.S. lakes found that cyanobacteria are most

likely to produce unsafe levels of the toxin microcystin when water temperatures are between 20 °C and 25 °C, peaking around 22 °C (Merder et al., 2023). The toxin microcystin can harm the liver and kill animals.

The volunteers collected data on July 1<sup>st</sup>, 2025 (when the severe 2025 algal bloom was occurring in parts of Nicola Lake) which showed elevated surface water temperatures (22.5°C) compared to the closest monitoring visits before (June 6, 17°C) and after (July 6, 18°C). This spike in surface water temperatures could have contributed to creating favorable conditions for the cyanobacteria bloom. However, it is important to note that surface water temperatures will also be impacted by time of day the reading was taken.

## **Water Clarity**

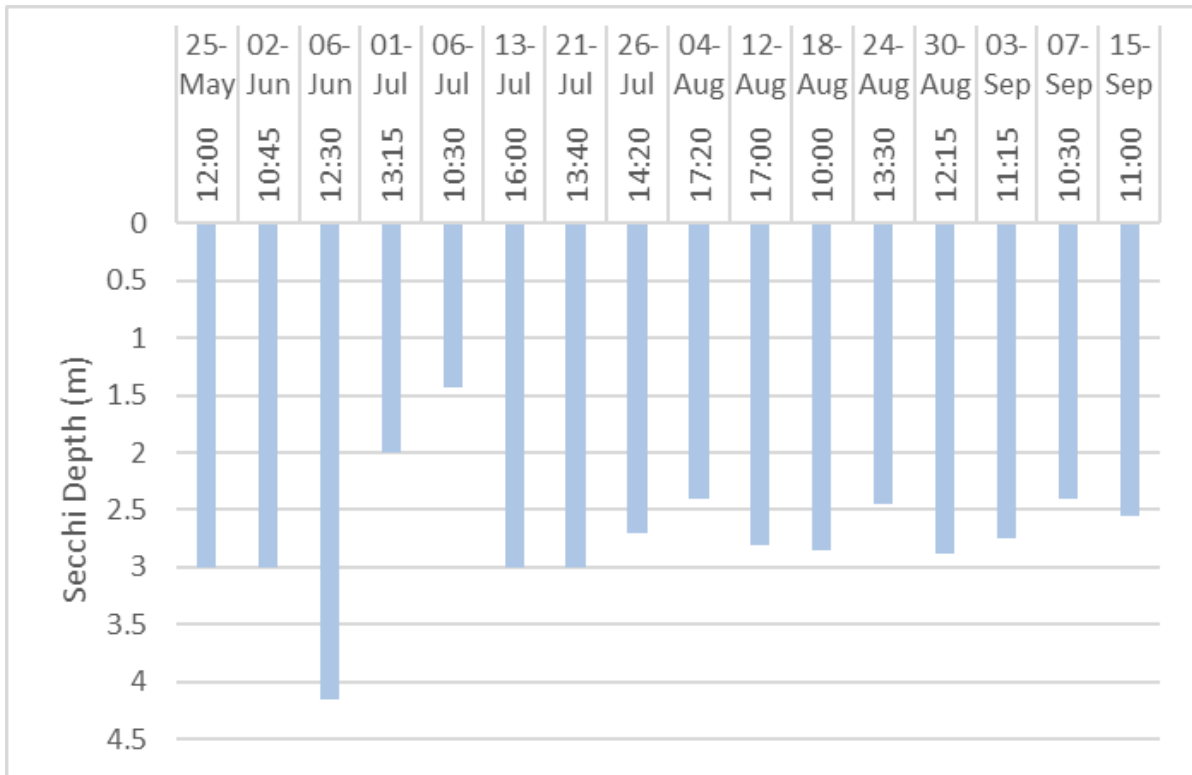
### *What is a Secchi Disk?*

The Secchi disk typically used in lakes is a 20 cm disk with alternating black and white quadrants. It is attached to a tape measure and lowered into the water until the observer can no longer see it. The depth of disappearance, called the Secchi depth, is a measure of the transparency of the water.

### *Why Measure Water Clarity?*

Transparency (clarity) is a good indicator of the impacts from human activity on the land surrounding the water body. If transparency is measured through the season and from year to year, trends can be observed. It can serve as an early warning that activities on the land are affecting water quality. The clarity of the water impacts the amount of light penetration and in turn can affect photosynthesis and the distribution of organisms. Clarity decreases as colour, algae, or suspended sediment increases. The colouration could be due to staining which is largely from the decay of plant material. Algal growth is promoted by nutrient inputs, mainly phosphorus. Suspended sediments can increase as a result of increased runoff from urban or agricultural environments. Glacial sediments can also impact water clarity as the fine glacial silts remain suspended in the waterbody.

Figure 3 shows the Secchi readings collected by volunteers between May 25 and September 15 2025. The minimum data requirement of 12 readings over the sampling season was exceeded and the spread of measurements was fairly evenly distributed except for some visits missed in mid-late June.



**Figure 3:** Nicola Lake 2025 Secchi depths. Date of reading also includes the time the reading was taken.

The maximum reading was 4.15 m on June 6<sup>th</sup> and the minimum was 1.43 m on July 6<sup>th</sup>. The two shallowest readings occurred in the same timeframe as the severe 2025 algal bloom (July 1<sup>st</sup>: 2 m and July 6<sup>th</sup> :1.43 m) The average Secchi depth was 2.71 m in 2025. After 3 years of Secchi data is collected (provided it meets the requirements of evenly spread throughout the monitoring season and a minimum of 12 readings) we can use the data to make inferences about the current trophic status of Nicola Lake. This will be further supported through the collection of chlorophyll-a and phosphorus data that will be completed through the Level 3 program starting in 2026.

## Monitoring Recommendations

- Volunteers and citizens are encouraged to continue learning more about algae blooms and to stay vigilant. Increasing awareness around cyanobacteria blooms may help limit harm to humans and animals in the future. Here is an article to begin learning more about cyanobacteria – [Cyanobacteria Blooms: Be Cautious of Potential Toxicity](#)
- **If you observe a bloom that you believe could be cyanobacteria and it is impacting drinking or recreational waters, it is important to contact the local health authority and stay away from the water.** In addition, please submit your observations to [Algae](#)

[Watch BC](#). Algae Watch is an educational program for Citizen science data gathering with the goals to help people recognize and identify algae blooms and relies on citizen science to help water quality experts identify and better understand cyanobacteria and algae blooms in B.C.

- With the growing community concern for the health of the lake, more volunteers may become interested in assisting with the monitoring. To reduce the likelihood of human error, and differences in Secchi readings, we recommend keeping the core monitoring team who collect the measurements as small as possible. However, additional volunteers may be interested in joining a trip and assisting someone from the core team, which could act as a good learning opportunity for the public.
- Due to the increasing level of interest in the health of Nicola Lake, the community could benefit from an extended course to learn more about monitoring and lake health. BCLSS offers a variety of training courses depending on interests and skill levels. More information can be found here. <https://www.bclss.org/training-courses>
- It is recommended to record any applicable field observations throughout the next monitoring seasons (i.e. algae and its colouration, dead fish, weather events etc.) as it helps to identify trends and interpret the data. Photographs of observations can also be valuable.

## Keeping Nicola Lake Healthy

1. Cyanobacteria are a natural part of BC's lakes, but under the right conditions they can flourish and become problematic for human, animal and ecosystem health. In addition to learning more and reporting blooms, there are ways individuals can reduce their impacts on lakes to help reduce the likelihood of blooms including:
  - Maintaining healthy shore zone areas
  - Use a mulching lawn mower and reduce fertilizer applications
  - Maintaining septic systems and ensuring they abide by regulations
  - Using phosphate-free products
  - Agricultural landowners should consider environmental farm planning. More information on Environmental Farm Plans is available [here](#).
2. Utilize existing management tools to protect Nicola Lake such as the Foreshore Integrated Management Planning Study. From this study a [Foreshore Development Guide \(FDG\)](#) was created with development planning guidelines, aimed at protecting sensitive fish and wildlife species and their habitats. The FDG is an initial tool that should be used when planning for, prescribing, or reviewing riparian and shoreline alterations (McPherson & Schleppe, 2024).

## **Ice on / Ice off data**

### *Why Collect Ice-On and Ice-Off Data?*

Not all lakes freeze in the winter, but for those that do, Ice-on and Ice-Off data contributes to a better scientific understanding of climate change. By analyzing citizen records, scientists have found that the freeze-thaw cycles of northern water bodies are changing. Observations of ice-on and off dates for BC Lakes can be submitted online through the BC Ice Reporting Tool (<https://arcg.is/qy1e5>). This data is important for interpreting seasonal data and for tracking climate change impacts on BC lakes.

## **Summary**

Nicola Lake has been the subject of a considerable amount of past limnological and related work. The lake has been experiencing algal blooms, one of which occurred in early July of 2025. This bloom impacted the use of the lake and has been the suspected reason for the death of multiple dogs (Holliday, 2025).

The volunteers at Nicola Lake have started to establish a good current set of Secchi and surface temperature readings. The lake has also been accepted into a Level 3 BC Lake Stewardship and Monitoring Program for 2026 which will support the volunteers in expanding the monitoring to collect bi-weekly phosphorus and chlorophyll-a samples as well as temperature and dissolved oxygen profiles. This data will be useful for comparison to past data/reports to determine if water quality has significantly changed over time. After three years of data collection through the Level 3 program, a full analysis of the data will be done, and a report will be written.

Local volunteers and citizens are encouraged to continue learning more about algal blooms and to continue to report and avoid any bloom they suspect could be cyanobacteria. Education and awareness are important to reduce the likelihood of harmful human and animal cyanotoxin impacts in the future.

## References

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# Appendix

## 1. Proper Secchi Reading Procedure

