

BCLSS

February 2026 Newsletter



Konni Lake

In This Newsletter:

- NALMS 2026 - Call for Abstracts
- BCLSS Article - What's Happening Under the Ice?

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NALMS 2026 - Kelowna BC

Call for Abstracts



46th International Symposium for the North American Lake Management Society

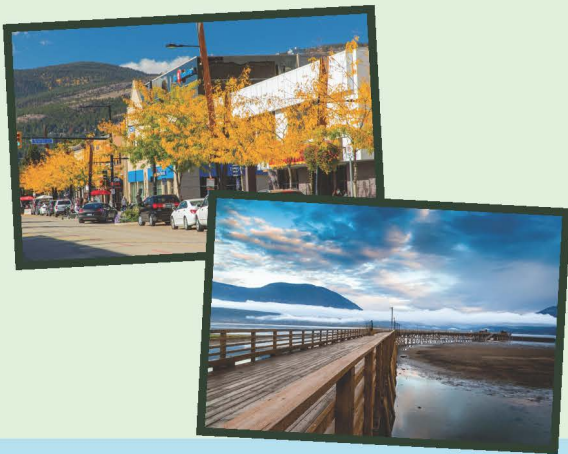
Swimming Upstream: Tackling Environmental
Challenges through Partnership, Innovation, & Science

November 2-6, 2026 -- Kelowna, British Columbia, Canada



Kelowna appears to have abundant water, but this city is in the most water-scarce region of Canada. The water resources in this semi-arid setting are under increasing pressure, compounded by watershed-scale disturbance and a warming climate. Warmer, drier conditions in the growing season means agricultural needs, urban use, and environmental flow needs frequently exceed the available water resources.

To discuss these, and other, issues, NALMS is pleased to return to Canada (after ten years) for NALMS 2026! The program will feature the below topics (and more), workshops, field trips, presentations, networking events, and vendor displays.



Potential topics include:

Aquatic Invasive Species Climate Change
Paleolimnology Harmful Algal Blooms
Community-Based Science
Emerging Technologies & Methods
Eutrophication & Nutrient Management
Indigenous-Led Monitoring & Stewardship
Managing Impacts of Extreme Events
Mining & Resource Extraction Impacts
Science & Management of Salmon Lakes
Urban Lakes & Stormwater Ponds

For sponsorship or general information, visit www.nalms.org/nalms2026 or contact nalms2026@nalms.org. For other details, contact Conference Coordinator, Sara Peel (speel@arionconsultants.com) or Conference Chairs, Hamish Kassa (hamishkassa@gmail.com) and Lucie Thomson (lucie.thomson@gov.bc.ca).

Hello Lake Enthusiasts!

With the annual NALMS conference coming to Canada this year, we encourage everyone able to attend to join the North American Lake Management Society in Kelowna from November 3-6th.

Anyone interested in presenting can submit their abstracts here -

<https://www.nalms.org/nalms2026/call-for-abstracts/>

Abstracts are due May 22.

We hope to see you there!

The BCLSS team

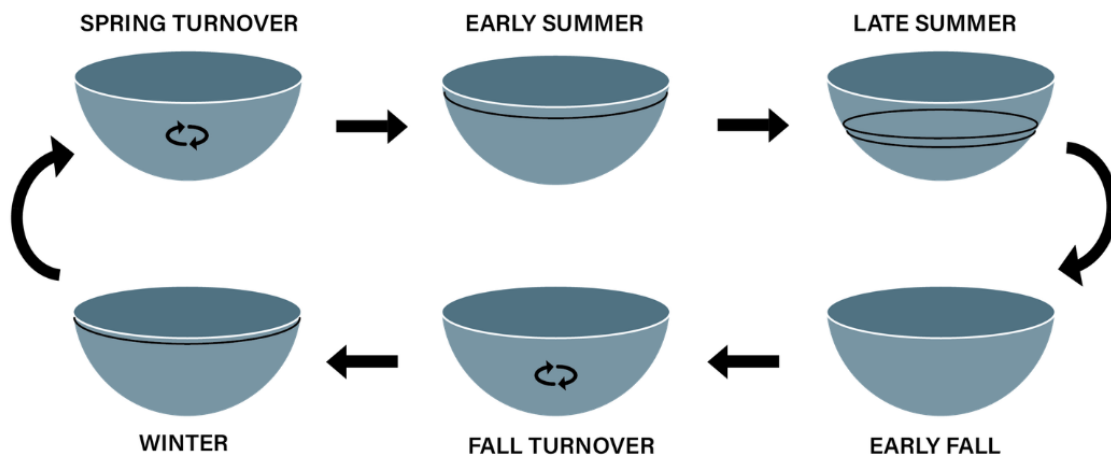
What's Happening Under the Ice?

The basics: Lake thermal stratification patterns

Have you ever wondered what is happening to lakes and all the organisms that they host under the ice in the winter? Most interior BC lakes freeze in the winter, forming a layer of ice covering the entire surface of the lake. The majority of lakes and ponds don't completely freeze as the ice, and eventually the snow that layers on top, acts to insulate the water below (Ausable River Association, 2016). Most interior lakes follow a pattern where they stratify (separate into layers that don't mix) in the summer, turnover or fully mix in the spring and fall, and then they re-stratify in the winter. This is known as a dimictic lake or a lake that turns over twice per year. In the summer, the warmest water is found at the surface and the coolest, most dense water can be found at the bottom of the lake. A thermocline forms which is defined by a temperature change of at least 1°C per vertical meter. As temperature begins to cool down in the fall, the upper layer cools and all the water in the lake can mix as the density differences breakdown. Coastal lakes that lack ice cover will maintain the fall overturn thermal structure and remain mixed through the winter period.

LAKE THERMAL STRATIFICATION PATTERNS

ANNUAL THERMAL STRATIFICATION CYCLE OF A DIMICTIC LAKE



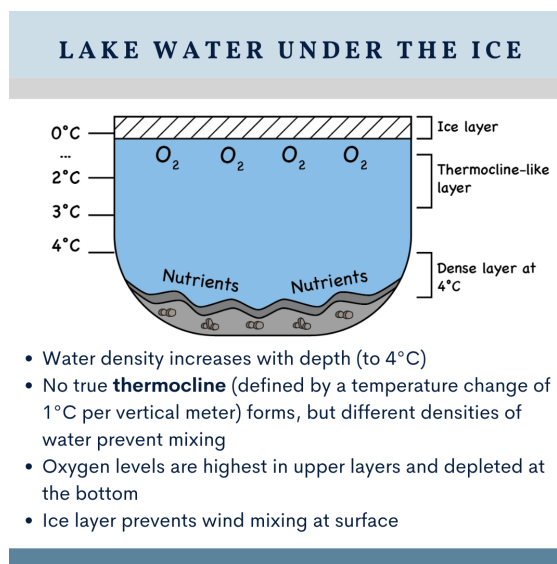
- A **dimictic lake** is a lake that turns over twice per year.
- Most interior BC lakes **stratify**– separate into layers that do not mix in the summer and winter.
- Most lakes freeze in the winter, forming a layer of ice covering the entire surface of the lake.

Lake water under the ice

To start, it is important to understand why ice floats. [This video](#) offers a great explanation; in summary, the way that the H₂O molecules bond together at freezing temperatures, causes there to be lots of space between molecules, meaning that ice is less dense than water allowing it to float. If this were not the case, and ice formed from the bottom up, there would be no habitat for fish and other aquatic organism in the winter. In winter, a reverse stratification pattern forms. As water is most dense at 4°C, this can be found at the bottom of the lake.

Water freezes at 0°C so the narrow layer of water, just below the ice, will be similar to the ice temperature and a slight warming can be observed towards the bottom of the lake. Although a true thermocline does not form, the different densities between water layers prevent mixing from occurring. The ice layer also prevents mixing of the lake water by wind. Without the mixing of water, the influx of oxygen at the surface, or oxygen produced by plants that are photosynthesizing, there is little supply of oxygen to the lake in the winter.

Lakes that are clear and less biologically productive will have sufficient oxygen to support life at all depths through periods of stratification. As lakes become more productive and increasing quantities of plants and animals respire and decay, more oxygen consumption occurs, especially near the bottom where dead organisms accumulate. Oxygen in bottom layers may decrease rapidly, forcing fish to move into the upper layer. Fish kills can occur when decomposing algae and organic material use up the oxygen.



Decomposition of organic material from dead organisms or organic material from the watershed (leaves, fallen trees, etc.) is an important process in lakes and can be more obvious when lakes are ice covered. With clear ice, the rising bubbles of carbon dioxide and methane are frozen into the ice and make for a spectacular display (Ward, 2021). Some lakes produce very large volumes of methane – to the point where it can be ignited as it exits a sampling hole in the ice surface (Fox, 2019). Visit [this link](#) to see this spectacular phenomenon for yourself! BCLSS advocates following safety protocols for all on ice activities. If venturing out on the ice for any activity, precautions should be taken to ensure ice is sufficiently safe. To learn more about ice safety, read [this article by the Canadian Red Cross](#).

What do fish do in the winter?

Being trapped under the ice with little oxygen might not sound very appealing, however, many organisms such as fish, have adapted to these conditions. Lake fish including Pike, Largemouth Bass, Trout, Yellow Perch, and more have adapted to this low oxygen, cold environment. Some fish species will move to the lake inlet, where freshwater from the streams flowing into the lake brings in dissolved oxygen allowing the fish to breathe. Other fish that live at the bottom of a lake, move towards the edges of the lake where the shallow water is oxygenated to the bottom. Some fish hover near the ice surface where oxygen in the ice slowly dissolves into the water (Trout Unlimited Canada, 2020).

While the area right below the ice may be one of the most oxygen rich areas in the lake during the winter, it is also the coolest where water can be less than 1°C. To avoid hypothermia, fish conserve energy by entering a state of semi-dormancy

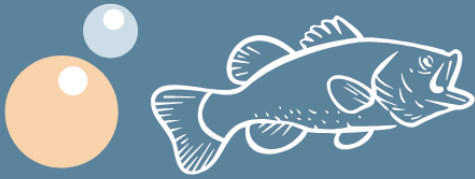
where they reduce their metabolism, limit movement, breathing rate, and primary bodily functions (NOAA, 2021). Another way fish can combat the cold environment is to increase their activity and breathing rates to stay warm which also means they need to feed actively throughout the winter which can be difficult with scarce resources (Trout Unlimited Canada, 2020).

WHAT DO FISH DO IN THE WINTER?

Some fish hover near the ice surface where oxygen in the ice slowly dissolves into the water



Other fish move towards the edges of the lake where the shallow water is oxygenated to the bottom



Some fish species move to the lake inlet where freshwater from the streams flowing into the lake brings in dissolved oxygen allowing fish to breath

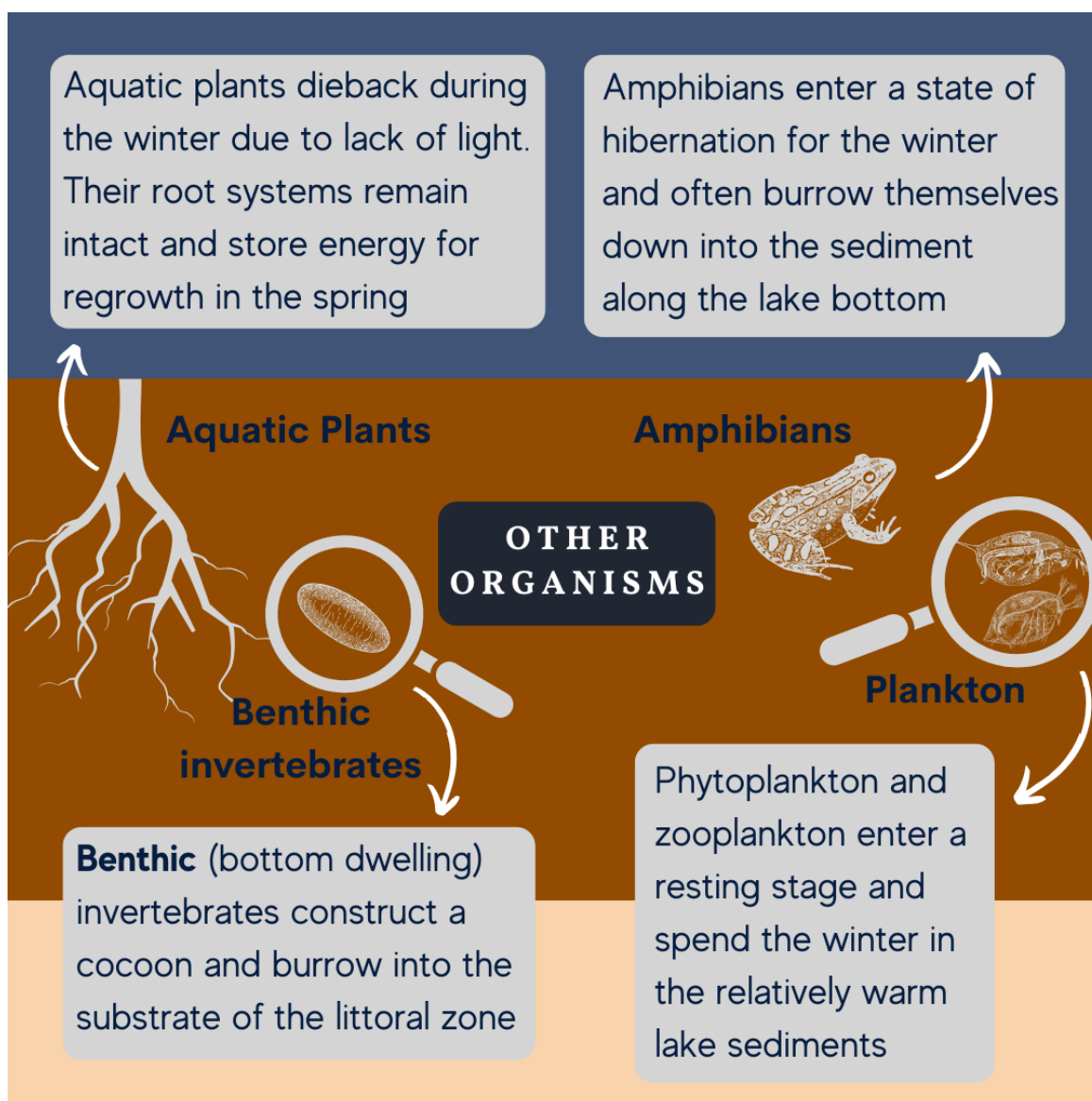


What about other organisms?

Other organisms such as phytoplankton that live in lakes, produce thick-walled resistant cells that settle to the bottom of the lake where they overwinter. Zooplankton use a similar strategy, where they enter a resting stage and spend the winter in the relatively warm lake sediments. Amphibians will enter a state of hibernation for the winter and often burrow themselves down into the sediment along the lake bottom. Aquatic plants die back during the winter as they aren't able to receive enough light beneath the ice to continue growing. However, their root systems remain intact and store energy so that they can produce new vegetation in the spring (Ausable River Association, 2016). In winter months, benthic, or bottom dwelling invertebrates have been found to burrow into the

substrate of the littoral zone, the zone where sunlight reaches the bottom in sufficient amounts to promote plant growth. They construct a cocoon and burrow deep into the bottom sediments and remain in this temporary habitat until it returns to a suitable state (Oldenburg, 2014).

It is being discovered that in some lakes under specific conditions, there can be very active biological activity under the lake ice. Research has documented algal blooms under lake ice (Weisberger, 2016; Sorensen, 2016) with some specific case studies in Lake Erie (Hill, 2020) and in Lake Baikal (Hampton et al., 2020). Clear ice that enables algal photosynthesis seems to be an important factor.



The natural world is incredibly resilient. This unique environment demonstrates the varied properties of water and some of the many cold adaptations that plants and animals have to survive the harsh reality under the ice.

Article by Marie McCallum (2021) with additions by Amy Baxter (2026)

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Were you forwarded this newsletter? [Subscribe today](#) to get monthly updates on stewardship activities, lake science, and much more delivered to your inbox!

The BCLSS acknowledges that the lake stewardship activities of our staff, directors, and volunteers take place on the traditional, ancestral, and unceded lands of First Nations Peoples throughout British Columbia. We recognize that Indigenous Peoples have stewarded these lands and waters for generations and we are grateful to the Elders, Traditional Knowledge Keepers, and youth that implement their knowledge and traditional laws to preserve water and life for the benefit of all.



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