

Health checkups for alpine lakes

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A new study shows zooplankton are an excellent indicator of the health of alpine lakes. Researchers examined data from more than 1,200 lakes, including Dog Lake, British Columbia, pictured above. Credit: Charlie Loewen

The best tool for assessing the health of mountain lakes comes in a very

small package. According to new research by University of Alberta biologists, alpine species of zooplankton are excellent bioindicators of lake health. And as extreme climatic events have been shown to increase with elevation, understanding the changing ecosystems of alpine lakes is more important than ever.

"Our work shows that alpine zooplankton communities are particularly sensitive to climate and therefore a valuable bioindicator of the impacts of climate change on [aquatic ecosystems](#)," said Charlie Loewen, former Ph.D. student in the Department of Biological Sciences and lead author on the study. Loewen conducted this research under the supervision of Rolf Vinebrooke.

Using a sophisticated [statistical analysis](#), the research team examined data from more than 1,200 lakes from the Yukon to the Sierra Nevada in California, including information on the presence of non-native sportfish, climate, and regional land cover, a stockpile of environmental data that had been accumulated since the 1970s.

"Why, you might ask, don't we measure the function of the lake directly?" said Vinebrooke. "That is a hugely complex, expensive, and time-consuming endeavour. It involves fine-scale measurements and intensive on-site sampling. With this bioindicator approach, if you know the ecological traits of each species, we can assess ecosystem function based on the plankton that live there."

Zooplankton respond quickly to changes in the environment and the authors found they also appear to travel relatively easily between ecosystems, making them an ideal indicator of lake health.

"Mountain regions themselves are ecologically unique, in large part because [environmental conditions](#) such as temperature and solar radiation change rapidly with increasing elevation," said Loewen.

"Studying natural gradients such as these help us to understand the reasons why certain species occur where they do, and allow us to predict how lake ecosystems will respond to a rapidly changing climate."

More information: Charlie J. G. Loewen et al, Macroecological drivers of zooplankton communities across the mountains of western North America, *Ecography* (2018). [DOI: 10.1111/ecog.03817](https://doi.org/10.1111/ecog.03817)

Provided by University of Alberta

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