

Mapping the benefits of the world's largest lakes

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Fresh water is the most important substance on Earth, but it isn't equally distributed across the planet.

Relatively few, massive lakes hold an incredible majority of the world's fresh water. These lakes are scattered all over the globe, meaning the relationship between humans and the fresh water nearest them varies by location.

For the first time, a project based at the University of Minnesota Duluth

Large Lakes Observatory has mapped the precise ways in which people benefit from these huge bodies of water. In a study published this week in the journal *Ecosystem Services*, researchers analyzed the natural benefits provided to humans by the 21 largest lakes on Earth. They found the types of services these lakes provide depend on factors both social and ecological.

"Humans are drawn to water—in fact, the earliest human cultures likely arose near large lakes in Africa," said lead author Bob Sterner, director of the Large Lakes Observatory and professor of biology at the University of Minnesota Duluth.

"However, until now, we have not had a solid framework for understanding the specific ways people benefit from these immense bodies of fresh water," said Sterner, an expert in [lake](#) chemistry and biology, specifically how nutrients affect organisms and structure ecosystems.

"Our study illustrates how the benefits people gain from nature depend greatly on the social and ecological context of the communities that surround these lakes."

Earth's largest lakes are located all over the planet, in locations warm and temperate, rich and poor, heavily populated and with very few people.

These ecological and [social factors](#) greatly affect the way different communities utilize their large lakes:

- The Great Lakes of North America are important economic drivers, supporting power generation, freight transportation and recreation for the U.S. and Canada;
- fisheries in the African Great Lakes are a tremendously important source of protein in a location where malnutrition is

common;

- other lakes provide important sources of water for irrigation or for human consumption.

"Large water bodies profoundly shape their surrounding human communities," said Steve Polasky, a professor of applied economics and ecology, evolution and behavior at the U of M Twin Cities, and an expert in ecosystem services and the integration of economics and ecology.

"This study provides the first description of many of the benefits people gain from Earth's largest lakes."

Understanding how people benefit from large lakes is especially important given how [human interactions](#) with [fresh water](#) will change due to [climate change](#).

"Our reliance on large lakes will likely increase as people are displaced due to sea level rise, as temperatures warm, glaciers melt and overall patterns of precipitation become more variable," said Bonnie Keeler, an assistant professor at the U of M Humphrey School of Public Affairs and an expert in [ecosystem services](#) and the economic value of clean [water](#).

"Our study illuminates key gaps in our understanding of [large lakes](#)—social, economic, ecological—that will be critical to ensuring these systems are managed sustainably in a changing environment."

More information: Robert W. Sterner et al. Ecosystem services of Earth's largest freshwater lakes, *Ecosystem Services* (2019). [DOI: 10.1016/j.ecoser.2019.101046](https://doi.org/10.1016/j.ecoser.2019.101046)

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