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Op-ed: Why we must make the Great Lakes 'smarter' to prepare for climate change

By AARON PACKMAN AND KIMBERLY NEELY DU BUCLET
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FEEDBACK

Large Lake Michigan waves break near 31st Street Beach on Sept. 22, 2021, in Chicago. (Antonio Perez / Chicago Tribune)

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Smart technologies, such as sensor networks linked with powerful computers, have been used with great success to track air quality in Chicago and detect wildfires in the West. Now we need to make the Great Lakes smart, too. The health of this enormous resource — and our drinking water, shorelines and livelihoods — depends on it.

The Great Lakes region is facing tremendous uncertainty from climate change, extreme weather and shifting economies. It is difficult to predict the long-term outcomes of these changes in the Great Lakes. By increasing innovation in smart technologies and sharing the resulting information among Great Lakes communities, we can begin to manage and solve these problems.



The Smart Great Lakes Initiative, or SGLi, a consortium of organizations from the U.S. and Canada, supports the use of advanced information technology and analytics to generate shared “big data” resources that will improve the management, security and health of the Great Lakes. These results will provide an unparalleled picture of conditions in the lakes and improve the effectiveness of Great Lakes management strategies.

In recent years, lake levels have varied wildly, from historic lows that threatened access to water supplies and harbors to today’s historic highs that are causing coastal flooding and erosion. Regional warming is changing the Great Lakes, shifting the seasons and decreasing the amount of ice cover on the lakes. Extreme weather threatens Great Lakes communities with increased disasters, property damage and infrastructure failures. In the future, rainfall is expected to increase over the region, but this is likely to come in bursts, yielding more frequent floods and droughts. All of these changes disrupt Great Lakes ecosystems.

The [Common Strategy for Smart Great Lakes](#), recently released by SGLi, outlines how we can work together to improve understanding, use and management of the Great Lakes. New smart technologies driven by advanced computer processors and communications platforms are transforming the way we observe the world. From cellphone videos of neighborhood flooding to satellite-based monitoring of algal blooms, smart technologies greatly increase the ability of lake-adjacent communities to identify and respond to hazardous conditions.

Here in Chicago, smart monitoring technologies are being used to determine how green infrastructure reduces flooding and when Lake Michigan beaches and the Chicago River are free from wastewater contamination. Expanded smart technologies will enable us to continuously verify the safety of our water supplies and reduce stormwater discharges to better protect Lake Michigan. These new capabilities are critical to developing more resilient infrastructure that will let us maintain our lives and our economy despite regional climate change.

To ensure broad access to information, the Common Strategy promotes best practices for data management and sharing across the Great Lakes. To improve capability, it advocates for innovation and testing of new smart measurement technologies, along with coordinated investment in smart observing systems for the lakes. To ensure that benefits are equitable, it balances principles of open sharing of public data with community control of local data — particularly for Indigenous and other vulnerable communities.

Through these efforts, the Smart Great Lakes Initiative and its Common Strategy will support private, Indigenous and public-sector initiatives to acquire, analyze, interpret and deliver information for the collective benefit of Great Lakes communities. By working together, we can develop technologies and share information to protect the Great Lakes as a critical resource and a unique ecosystem.

Aaron Packman is a member of the leadership team for the Smart Great Lakes Initiative. He also is a professor of civil and environmental engineering at Northwestern University and director of Northwestern's [Center for Water Research](#). Kimberly Neely Du Buclet is a Metropolitan Water Reclamation District of Greater Chicago commissioner.

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