



great lakes
observing system

Smart Great Lakes
STRATEGIC PLAN 2020–2025





THE VISION:

Smart Great Lakes

Over the past decade, “smart” technologies have transformed the way society interacts. Smartphones and inexpensive sensors have proliferated, enabling us to collect far more data than we can currently use and influencing how we choose to search for, consume, and share information. Ongoing technology advancements include distributed sensing, artificial intelligence, edge computing, machine learning, diverse data integration, adaptive and predictive analysis, and automated control and interoperability. These give us the ability to transform a high volume of diverse, high-velocity data into value in the form of actionable information—and sometimes, direct action.

This notion of using technology to make our environment “smarter” is what inspires the Great Lakes Observing System (GLOS) vision and strategic plan. As a regional association of the U.S. Integrated Ocean Observing System (IOOS) program, GLOS provides data services that play a foundational role in helping the Great Lakes overcome information gaps and improve access to data to tackle issues related to water quality, ecosystem restoration, resource management, and more. **We envision that GLOS will serve as a critical underpinning for Smart Great Lakes, working with regional partners to advance technology applications that improve our understanding, management, and use of the Great Lakes.**





Why the Great Lakes? Why Now?

The Great Lakes have several supporting policies, programs, and initiatives that can be leveraged to advance this initiative. From high-level, binational policies such as the Great Lakes Water Quality Agreement to site-specific decision-making at a local drinking water utility, effective management of the Great Lakes requires the aggregation of data and information to serve as measures of progress toward desired outcomes. These programs provide a foundation of science, planning, management, and policy, and they need to be supported by dedicated investments in monitoring and in data coordination, analysis, and dissemination.

The region also has an established culture of binational, multidisciplinary partnership and coordination in support of the Great Lakes. This partnership network is motivated to advance the collection and use of data in the Great Lakes and can mobilize public and private partners ready to do their part in the data and information supply chain. The region also benefits by having a certified data assembly center in GLOS.

Our region will continue to face numerous management challenges in the next five years and beyond. Threats from

climate change, invasive species, and pollution present new and emerging management issues as conditions in the Great Lakes constantly change. With the current monitoring infrastructure roughly 5 to 10 years behind that of other coastal regions, it is critical that we combine resources and energy to upgrade and expand our capacity to collect, analyze, and communicate information about the Great Lakes. It is not just environmental conditions that could threaten the region, but human- and machine-initiated as well. Cyberattacks and terrorism activities are threats that could affect human and infrastructure safety.

Science, security, and management communities need to be empowered to utilize new technologies so they can easily leverage shared data as they work with policymakers to create a safe and sustainable future for the region.

Opposite page: photo by NOAA Great Lakes CoastWatch

This page, top right: photo by Gresham Halstead Photography





THE MISSION:

How Does GLOS Support Smart Great Lakes?

GLOS provides end-to-end data services that support science, policy, management, and industry in the Great Lakes.

What's new? – Our support for Smart Great Lakes does not reflect a change in *what* we do, but we are updating *how* we do it. GLOS is transitioning from a grants-based organization to a services-based one, changing our funding model, and adjusting the way we manage projects. GLOS uses IOOS funding as base capacity support for our information technology platform and relies on revenue from client and subscriber services to enhance and extend the full suite of observing and data management resources we are able to provide to the Great Lakes region.

Information Technology (IT) platform – GLOS provides an IOOS-certified data management infrastructure that can transform and deliver data and information to users. The

IT platform can power supporting applications, ingest and disseminate content through application programming interfaces, and serve as a comprehensive window into available data in the Great Lakes region. This flexible, edge-capable, cloud-scalable platform enables open data, analytics, and other technology solutions required to support the data-to-information life cycle. This technology is a valuable resource and point of leverage for Smart Great Lakes stakeholders who require agile solutions to information needs.

Opposite page: photo by Ed Verhamme, LimnoTech





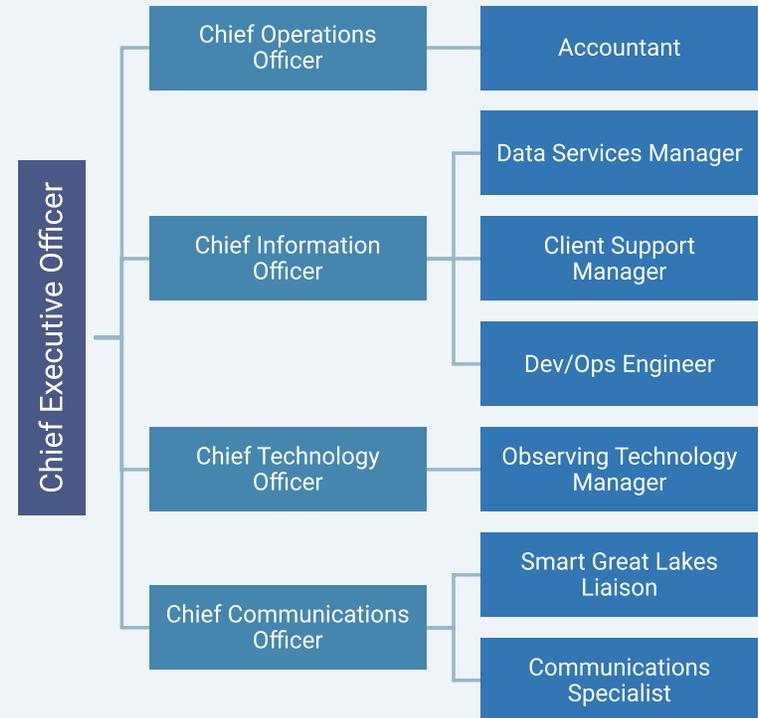
Organization

GLOS is a 501(c)(3) non-profit organization and serves as one of eleven regional associations of the U.S. IOOS program.

GLOS advocates for Great Lakes regional interests and needs within the IOOS framework and ensures that regional data integration efforts support larger scales of observing coordination through U.S. IOOS, Canadian IOOS, the Global Ocean Observing System, and the Global Earth Observing System of Systems.

GLOS staff leverage the three core competencies, detailed ahead, to support the growth of GLOS. Staff work together with partners to develop and maintain technology as well as to cultivate integrated observing and data sharing projects that meet Great Lakes information needs. GLOS staff provide oversight and management of such projects and activities with academics, nonprofits, and private sector contractors to execute tasks, as appropriate.

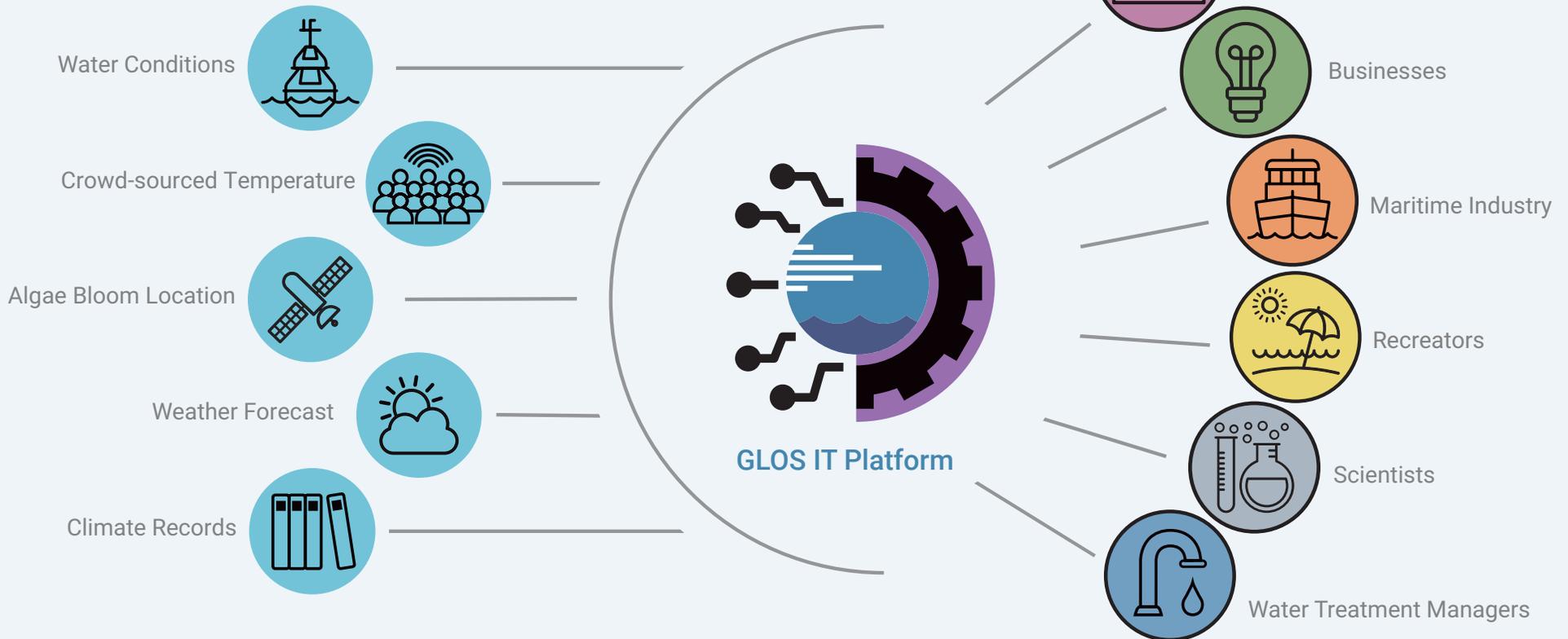
Organizational Chart



GLOS Serves as a Data Assembly Center for the Great Lakes

Data Providers

Data Users



Core Competencies

Data Management & Delivery – GLOS serves as a data and metadata assembly center for the Great Lakes on both sides of the border and cuts across government, private sector, academic, and research institutions. The true power of the platform is its ability to transform diverse datasets into data products and actionable intelligence for diverse stakeholders.

The platform provided by GLOS is a secure pipeline that provides automation where possible to simplify deployment of smart sensors into the field and easily transform data into information. All of this is possible in a system that prioritizes collaboration, integration of 3rd party technologies and datasets in addition to providing access to content, metadata, utilities, and integration through open APIs (Application Programming Interfaces) and web services.

Stakeholder Engagement – GLOS engages stakeholders in a variety of ways to carry out Smart Great Lakes, to ensure data delivery in a timely, intuitive manner, and to build on GLOS data services with additional analysis and verifications. Engagement will be the focus of the new IT platform design. It includes direct correspondence through the GLOS website, two-way communication on the IT platform, web surveys, focus groups, our annual meeting, and relevant conferences, among other activities. As a service-based organization, GLOS continually

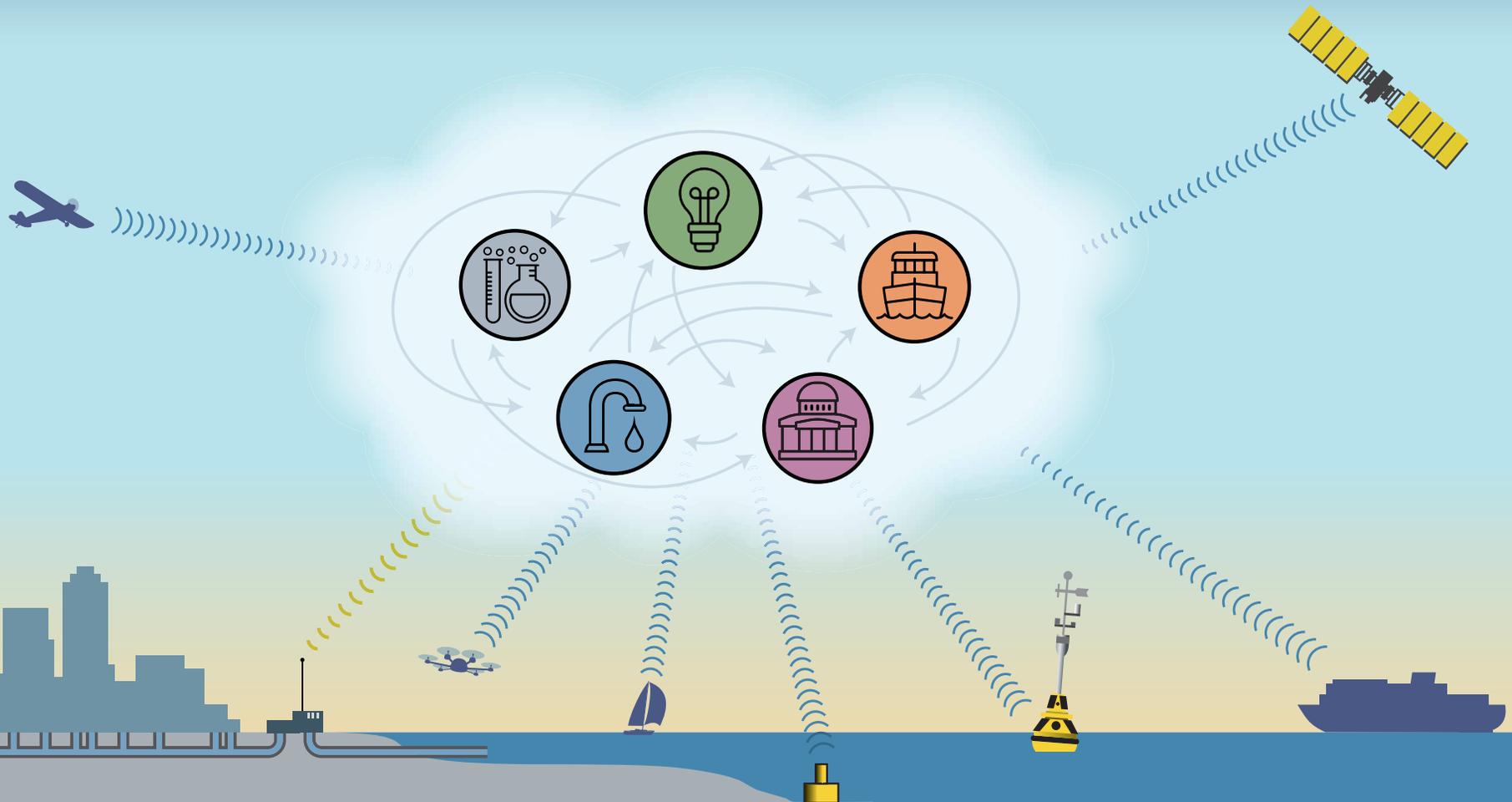
seeks stakeholder feedback to assess the impact of its data services. This requires dedicated customer service, systematic evaluation, working closely with stakeholders, and adjusting our approach to respond to changing and emerging needs and technology.

Observation Network Facilitation – GLOS enables and supports a diverse portfolio of freshwater observing technologies, including buoys, water quality stations, ships and gliders, lakebed mapping, and high frequency radar. GLOS facilitates the cooperation of U.S. and Canadian federal agencies with state, provincial, and local government; academic; nonprofit; and commercial organizations. This multilateral federation represents the interests of Great Lakes-observing stakeholders, including data collectors, researchers, educators, and various data user groups. Within this network, GLOS coordinates activities and provides resources, products, and services that fill identified information gaps and make integrated data more widely available.

This page, top: photo by Great Lakes Outreach Media, courtesy of NOAA GLERL; middle: photo by Nathan Shaiyan/Michigan Tech



Smart Great Lakes is an Information Ecosystem





Partnership Structure

As part of the transition to a service-based organization, GLOS is moving away from a traditional nonprofit membership structure and towards a business-oriented partner structure. This structure is divided into four broad categories differentiated by how partners relate to the GLOS IT platform.

Partners – The general extended network of GLOS partners includes data providers, data users, open data advocates, and others engaged with GLOS but with no direct financial relationship. These partners enjoy a level of data access and service that is freely available from GLOS, made possible through base capacity funding from the IOOS program. GLOS cultivates its partner network in many ways, but seeks to formalize these partnerships through the development of the Smart Great Lakes coalition. GLOS relies on its partners to help inform and prioritize data and information needs and seeks input on these needs through meetings, surveys, and web analytics.

Grantees – In certain circumstances, GLOS financially supports partners to implement parts of its mission and priorities within IOOS. When regional information needs are identified through Smart Great Lakes and resources to support are available, GLOS administers competitive bidding processes and works with grantees to execute projects that advance these priorities and contribute to ongoing development of the IT platform. A grantee may transition into a client, subscriber, or partner or could enter into a revenue-sharing agreement, depending on the nature of the activity.

Clients – Clients are organizations, groups, or programs that invest in GLOS for a specific data management service or to build out a custom instance or functionality of the IT platform to address specific data sharing needs. The functionality required is a more complex and comprehensive suite of services and/or products than what is available through existing capacity and therefore needs direct financial support to develop. GLOS seeks client relationships where it is clear our core competencies can be of service, where there is a mutual benefit for both parties, and where added value is created that benefits science, policy, management, and enjoyment of the Great Lakes.

Subscribers – Subscribers are organizations, groups, or programs that have a modest but consistent need to access data via “lightly customized” GLOS services (e.g., instrument calibration, data management plan execution) or products (e.g., custom alerts, queries, custom portals/viewers). While a base capacity to provide these services exists, direct financial support is needed to sustain maintenance and operations. GLOS seeks subscriber relationships where continual and/or dedicated capacity is needed to serve expressed stakeholder needs.



Core Values

The GLOS core values are guiding principles to help the organization reinforce our commitment to carrying out our mission in ways that best serve our vision for Smart Great Lakes. These values reflect what is special and unique about GLOS, our contributions to the Great Lakes community, and our organizational culture. Success to us is when the Great Lakes community uses data and information resources to evaluate and influence management and policy outcomes. Our aim is to make managers, policymakers, and stakeholders in the larger Great Lakes region more confident and better informed through improved access to information.

Empowerment – GLOS is the engine that enables others to make the Great Lakes smarter. GLOS is the steward of observing resources and an IT platform that facilitates the sharing, management, and use of quality-controlled, open data for the benefit of the Great Lakes. This capacity is a resource for the region to use in improving understanding about the current conditions, trends, and emerging issues facing the lakes.

Simplicity – GLOS strives to ensure our data products and services are comprehensive, accessible, and user-friendly. Our IT platform is designed to be flexible, responsive, and intuitive. It should scale easily as more data is integrated, information needs become more complex, and more sophisticated interoperability solutions become necessary. Whether

accessing data, participating in a meeting, or handling an administrative task, those working with GLOS should find it a simple, satisfying experience.

Integrity – GLOS is committed to developing genuine solutions that address regional data requirements and that adhere to professional standards for information management and delivery. We value transparency and honesty, and we recognize that solutions are most effective when developed through collaboration with a diverse suite of partners. GLOS seeks constructive, mutually beneficial partnerships where we can execute our core competencies and successfully serve the information needs of Smart Great Lakes stakeholders.



Smart Great Lakes Goals 2020 – 2025

GLOS will work toward three main goals in the coming five years in support of Smart Great Lakes.

GOAL 1 – LAUNCH SMART GREAT LAKES

2020

Build the Coalition

Develop a membership/**governance structure** for Smart Great Lakes.

Develop and execute an outreach plan.



- founding partners

2021

Kick-off the Initiative

Establish and facilitate meetings of the coalition of partners.

Develop foundational documents for Smart Great Lakes, including a **common strategy document**.



2022-2023

Implement the Strategy

Support Smart Great Lakes **data access and sharing needs** via GLOS IT platform.

Provide ongoing advisory and secretariat support as needed.



- coalition partners
- cooperative data projects
- legislative priorities

2024

Evaluate Progress

Initiate **evaluation process** including partner surveys to assess effectiveness.

Identify emerging priorities and information needs that might influence future strategy.



2025

Adapt the Strategy

Determine **next steps** for Smart Great Lakes vision and coalition as appropriate.



- legislative successes
- partner dollars increased
- success stories

Note: Bulleted items in light blue are success metrics.

GOAL 2 – ESTABLISH THE NEW IT PLATFORM

2020

Develop IT Platform Roadmap

Starting in 2020, GLOS will have the initial **road map** to build out the needed capacity.

Development schedule for alpha, beta, and final releases.

2022-2023

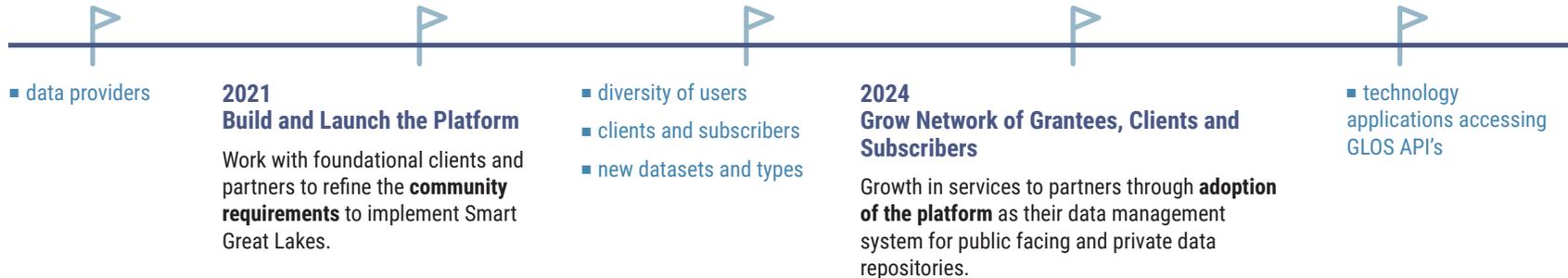
Demonstrate the Power of the Platform

Showcase the power and potential of the platform to partners and stakeholders to implement Smart Great Lakes.

2025

Adapt the Platform

Determine **next steps** for IT platform in supporting Smart Great Lakes vision.



GOAL 3 – SUPPORT & ENHANCE THE OBSERVING NETWORK

2020

Prioritize Observation Needs

Develop a systematic process to **identify observing priorities** and direct resources to GLOS data contributors.

2021-2025

Cultivate a Community of Practice

Facilitate **coordination** between data contributors and stakeholders.

Demonstrate value of stakeholder engagement among data contributors.

2025

Adapt the Strategy

Determine **next steps** for data contributors to support Smart Great Lakes.





Be a Part of Smart Great Lakes

This strategic plan outlines the ways GLOS can support Smart Great Lakes, but we can't do it alone. Mobilizing a consortium of partners that can work collaboratively is critical to fully realizing the Smart Great Lakes vision. Through a Smart Great Lakes initiative, we can organize the region's technology ecosystem and network of partners around common policy goals to improve monitoring, advance data management and analysis, and spur technological innovation.

Partners involved in Smart Great Lakes will identify and support Great Lakes information needs for policymakers, managers, and users of the region's natural resources. The initiative is intended to be a collaborative effort including private industry, state, provincial, federal, tribal, academic, and nonprofit stakeholders. Each stakeholder will bring their own analysis and expertise to the effort, and by participating, they agree to work in coordination toward common goals that support a Smart Great Lakes vision.

You can be a part of Smart Great Lakes by:

- Identifying and participating in specific Smart Great Lakes projects or related opportunities to inform water policy and management.
- Filling a niche within the Smart Great Lakes data supply chain (e.g., internet of things sensor manufacturer, data provider, telecommunication network provider, software analytics developer).
- Becoming an active user of Smart Great Lakes data and information products.

The initial product of this initiative will be the development of a document that describes a common vision for Smart Great Lakes and details the strategies for executing that vision, including shared promotional efforts to increase investment. There are, however, myriad other goals and outcomes that could be realized through this cooperative approach, and we look forward to exploring those opportunities further with the coalition of partners who get involved.

We invite partners to work with us to make the Great Lakes smarter: improving the way people learn about and respond to lake events, informing critical policy, and directing future innovation and science.



If you'd like to be a part of Smart Great Lakes, reach out to us: info@glos.org.



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