The Great Lakes Information Network (GLIN)

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Abstract

The integrated nature of the Internet and information dissemination tools such as the World Wide Web are ideally suited for use in our collective efforts to better manage the complex Great Lakes ecosystem. The Great Lakes Information Network is a computerized network that links data, information and individuals in the Great Lakes region using the Web and other resources available on the worldwide research network, the Internet. One of the nation's first regional efforts to implement the information superhighway, GLIN enhances communication by providing quick and easy access to current data as well as to leading researchers and policymakers. Its data and information services span environmental quality, resource management, transportation, demographic and economic data and more in the Great Lakes region of the United States and Canada.

A New Era for the Great Lakes

Over the past 40 years, the Great Lakes Commission, a compact agency of the eight Great Lakes states, and other regional agencies in the binational Great Lakes region have worked with hundreds of agencies, organizations and individuals to create a cooperative environment in which to develop regional answers to the Great Lakes ecosystem's unique environmental and economic challenges. The decades-long effort to build joint commitments to a sustainable economy and protect the Great Lakes Basin ecosystem has developed gradually through meetings, telephone conferences, newsletters and joint projects. This conventional "low tech" approach to what is increasingly a "high tech" challenge is no longer efficient — in and of itself — or cost-effective.

When we first visualized the GLIN network, we recognized that navigating these consultative and collaborative processes into the information age and linking geographically diverse agencies and organizations via a computerized information exchange network was a large, but technologically feasible challenge. In the nearly two years since GLIN came online, we have begun to meet that challenge by building a cooperative network supported by a number of public and private funders and by encouraging federal communications policies on both sides of the border and broad regional interest and commitment. In many cases, GLIN has grown far faster than expected; in others, GLIN development has lagged while necessary bureaucratic approval trails far behind technological capability. GLIN brings Internet experts into agencies and organizations to help educate managers and technical staff so that necessary approval moves ahead.

GLIN seeks to bring agencies online in the region's interest, capitalizing on the World Wide Web as an ideal tool for use in managing the various components of the complex and interrelated Great Lakes ecosystem. However, Internet connectivity is useful in many other aspects of agency/organization management. The future holds any number of applications to help an agency's work run smoother, including industry/government connections expediting data transmittals and permit review, sale of permits and licenses, and better coordination with staff in district offices, to name a few. It is expected that GLIN's service in bringing the region online for ecosystem management will earn dividends for agencies in numerous ways in the next few years.

To begin this process, GLIN seeks to demonstrate the advantage of electronic connectivity by providing seamless access to the interconnected environmental, economic, policy and health resources. By building upon the well-developed high speed Internet backbone in the region (CICNet), GLIN seeks to merge the wealth of new communications technology at our disposal with the long history of partnership. GLIN is not a site. It is an umbrella information service that helps agencies and organizations develop a) Internet access; b) One-stop shopping for high quality Great Lakes regional data and information; and c) Tools to aid collaboration among experts across the binational Great Lakes region. The specific strategic actions associated with each of these objectives is explained below.

1) Develop Internet Access. Bring partner agencies and organizations online with full ability to use Internet services. To this end, GLIN staff and advisory board members travel to state, federal and non-governmental agencies across the region. After a needs assessment, GLIN provides a host of services including demonstrations for senior management; line staff training; analysis of connectivity requirements and costs; 'firewall' seminars; space on the GLIN host server to pilot Internet dissemination of agency data and information; dial-up services; troubleshooting; and, on occasion, help configuring hardware and software and domain name service.

2) Provide one-stop shopping access to a broad range of regional resources, including information, data, news and analysis focused on the region's

environmental protection, resource management, economic development, human health issues and more. Here GLIN provides a regional gateway to the full array of Internet services provided by partner agencies, including World Wide Web (WWW); gopher; newsgroups; email mailing lists; and file transfer. Once a user is online at a site managed by any one of the dozens of GLIN partners, the rest of the Great Lakes research and management community is no more than a hypertext link away.

3) Foster use of electronic communications tools by groups of scientists, policymakers and others who are collaborating on basinwide projects. Committee and task force work is a way of life in the binational Great Lakes region. Multi-agency, multi-jurisdictional responses to the issues facing the region require cooperation and coordination at all levels. GLIN helps formally- mandated groups, such as a state/federal task force writing software for toxic air emission estimation, as well as more ad hoc collaborations, such as a group of research scientists and industries sharing information on new pollution prevention techniques. These groups use GLIN to transfer data files, download and test software; hold private online conferences, exchange email, solicit reviews and comments, and set up WWW or gopher distribution points to the general public to disseminate results.

History

GLIN development began in May 1993, with funding provided by the Ameritech Foundation. GLIN leadership and administration is provided by the Great Lakes Commission, an interstate compact agency of the eight Great Lakes states. Technical support is provided by the region's Internet backbone provider, CICNet Inc., a cooperative network of the large research universities in the region. The services provided by CICNet are a key component in GLIN success.

By May 1994, GLIN, online less than one year, had developed a sound framework to provide access to the broadest possible range of data and information and individuals in the Great Lakes region. Growth in GLIN usage has been phenomenal. By April 1994, usage (total number of transactions logged anywhere on the GLIN central computer, including file and index viewing, downloading, printing) approached 12,500 per month; by February 1995, that number topped 67,000.

In October 1994, the Ameritech grant was augmented with grants from the National Telecommunications Information Administration of the U.S. Department of Commerce and the Great Lakes National Program Office of U.S. EPA. Now, nearing the end of the two-year Ameritech pilot project, GLIN has secured substantial inkind contributions and commitments for future collaboration from many Great Lakes partners,

including Environment Canada, U.S. Army Corps of Engineers - Detroit District, Michigan Public Service Commission, the Federal Reserve Bank of Chicago, Indiana DNR, Michigan DNR, U.S. EPA and many more.

Products

GLIN continues to progress toward its intended goal: to provide participants throughout the Great Lakes community with immediate access to regional experts from diverse disciplines, and data and information such as:

- Business and industry statistics, trends and projections to assist economic development strategies. (Underway. Lead Agency: Federal Reserve Bank of Chicago)

- Socioeconomic data, including demographics, labor force statistics and related census information to assist trend analyses. (Underway. Lead Agency: Federal Reserve Bank of Chicago)

- State, provincial, and federal legislative, regulatory and policy developments affecting Great Lakes interest groups. (Underway. Lead Agency: Northeast-Midwest Institute)

- Inventories of socioeconomic and environmental research activities to enhance coordination within the research community and transmit results to policymakers. (Underway. Lead Agency: International Joint Commission)

- Air emissions data collected by the Great Lakes states to assist in Clean Air Act implementation efforts. (Underway. Lead Agency: Great Lakes Commission)

- Human health data from U.S. and Canadian agencies to strengthen the binational focus on critical issues. (Underway. Lead Agency: Great Lakes Research Consortium/SUNY-Syracuse)

- Lake levels statistics and trends to assist shoreline residents, businesses and local officials in land-use planning and coastal protection efforts. (Underway. Lead Agencies: NOAA Great Lakes Environmental Research Laboratory and U.S. Army Corps of Engineers)

The GLIN Advisory Board oversees and assists in all aspects of GLIN development and outreach. Membership includes representatives from state, federal, provincial, nongovernmental and other organizations. Dr. Virgil Frizzell, Deputy for Great Lakes Research, U.S. Geological Survey is serving a one-year term as GLIN Advisory Board chair; Mike Quigley, Director of the

Information Management Division at Indiana DNR, serves as co-chair.

Update on Recent Activities

As a cooperative effort, GLIN relies on the commitment and experience of each member agency or organization to enhance network services and provide meaningful data and information to the Great Lakes management community. GLIN also relies on participants' interest in coordinating presentation of meaningful data and information to provide a multitude of inter-agency links throughout the system. Exemplifying this cooperation is a basin map of 42 Areas of Concern (AOCs) on the Environment Canada server at the Canada Centre for Inland Waters (CCIW). The map is directly accessible to users of Environment Canada's Great Lakes Information Management Resource (GLIMR); U.S. EPA's Great Lakes Regional Environmental Information System (GLREIS) and the GLIN central server. When users select an AOC on the United States side of the border, the hyperlink leads the user seamlessly to information held in the United States under the auspices of U.S. EPA. When the user selects a Canadian location, they immediately access files on CCIW's system. However you get there, this graphical interface leads you to the best source of information, no matter where it's physically located. Further cooperative geographic, index and search capabilities across the whole GLIN universe are currently under development. As time goes on, more agencies in the region will have their own servers; GLIN will continue to build bridges to their information resources. GLIN philosophy encourages stakeholders in the region to maintain and be responsible for their own data, but to link to similar data and information anywhere in the system.

Agencies and organizations in the region are in varying stages of development with regards to the Internet, both in terms of accessing information and data available and in becoming a provider. The snapshot of some of the Internet data and information services of GLIN partners, provided below is fairly indicative of the state-of-the-art efforts in various camps. Federal agencies working on Great Lakes environmental issues are further along than their state and provincial counterparts. Small regional agencies and
organizations, including the Great Lakes Commission,

International Joint Commission, National Wildlife Federation Great Lakes Natural Resource Center and others, are online thanks to the jumpstart provided by the common GLIN server and training.

Federal

- U.S. Environmental Protection Agency, Great Lakes National Program Office. GLNPO is proud to provide access to many documents and databases via their Great Lakes Regional Environmental Information System. This massive effort to put documents and databases online was undertaken in 1994 under a cooperative agreement with CIESIN. By summer 1995, look for large datasets on Lake Michigan and a powerful tool supporting freeform queries of data on their servers. GLNPO also provides a number of resources on Gopher and hosts training sessions for potential partners/users in a new state-of-the-art computer laboratory.

- U.S. Geological Survey. The USGS has one of the most famous Web sites in the United States. Now the push is on to bring water data for each state online in a consistent WWW format. California and Colorado demonstration pages are the first of the next generation of web sites for the Survey.

- U.S. Army Corps of Engineers, Detroit District. GLIN staff are working under contract with the Corps to set up a combined WWW and gopher server for the Detroit District. Soon the district office will be using this server to provide lake level forecasts, historical and recent water level data and more.

- *NOAA / Great Lakes Environmental Research Laboratory (GLERL).* Recent developments have focused on extensive cataloguing of available data and information from NOAA's Great Lakes Coastwatch program. Metadata and maps drawn from near realtime data collected from various points in the Great Lakes provide users with a glimpse of GLERL's extensive data stores.

- Environment Canada. The shining star of Environment Canada's online presence in the "Green Lane" is the Great Lakes Information Management Resource (GLIMR). Environment Canada has developed a graphical user interface which leads users to data or information about almost any program, database or publication in the agency with relevance to the Great Lakes Basin. Recent developments include a GLIMR interactive touch-screen kiosk in Toronto's CN Tower.

State

- Michigan DNR. The agency expects to bring another 2000 users to GLIN and the Internet in the next three to four months. Their new webmaster is busy designing the web presence for the agency; watch the GLIN partners page for the MDNR web presence.

- Indiana DNR. The state government has a server on the Internet and recently finished installing security measures. Look for the IDNR Division of Water to come to GLIN soon.

Regional

- Great Lakes Commission. The Commission is leading GLIN development, having moved from an office without a local area network to a LAN with 56kbs Internet service to every computer in the office. The Commission's GLIN resources available by both WWW and gopher, span the entire breadth of the agency's interests, from environmental protection and resource management to transportation and economic development, policy and legislative actions and regional coordination. The Commission also is leading efforts to enable regional task forces and other working groups to conduct business together online.

- International Joint Commission. The IJC has made a number of important regional documents, including the Boundary Waters Treaty of 1909, recent biennial reports and RAP information, available on the GLIN gopher. Staff are now working on a WWW presence.

- Great Lakes Natural Resource Center, National Wildlife Federation. Once they found GLIN there was no turning back. The Center promises to become a strong online leader among environmental nongovernmental organizations. Their Web pages will debut on GLIN in early May 1995.

GLIN Information Infrastructure

GLIN Network Server

The GLIN Network server was established within weeks after the start date of the project in 1993, with the name great-lakes.net coming online in August 1993. It resides at the CICNet high speed (T4) node in Ann Arbor, Michigan. Usage and storage needs are constantly monitored and upgraded when necessary. More than 200 user accounts are established on a SUN Sparc10 machine while the gopher, WWW connections and ftp files reside on a Sparc5 running GN server software which manages both gopher and web files simultaneously.

GLIN User Accounts

More than 200 accounts have been created for GLIN users on the GLIN network server. This is many more than planned, which has both positive and negative impacts. While it indicates enthusiastic interest in networked communications, GLIN users are now encouraged to seek dial-up accounts with local providers of SLIP and PPP access.

Gopher and Web Services

GLIN has developed both gopher and WWW services. The gopher services, online longest, contain the richest and most comprehensive resources. World Wide Web services, online almost one year, are most interesting and captivating for new users and include a rich tapestry of photos, charts, clickable images, graphs and text. With public interest heightened by high-profile Internet services such as the White House web server, GLIN's WWW services are growing very quickly (in both content and profile). Major revisions in the GLIN subject catalogue are now underway and are available online for review and comment from interested users.

Mailing Lists

GLIN staff have created and manage several email lists. These include general lists like "GLIN-announce," designed to reach a wide community of Great Lakes interests (more than 500 individuals on the list), and specific lists like "airtoxics," "GLIN-board," "P2Tech," and others that provide direct communication for Commission Task Forces, and specific Great Lakes communities. In addition, the GLIN network server provides the community with an anonymous ftp server for disseminating large documents and software.

Accessing GLIN from the Internet

World Wide Web http://www.great-lakes.net:2200/0/glinhome.html

Gopher address: gopher.great-lakes at port 2200
path: U.S./Michigan/CICNet Gopher Server/The Great Lakes Information Network.

Anonymous FTPftp.great-lakes.net (pub/great-lakes)

E-mail lists GLIN hosts several e-mail groups on topics such as pollution prevention, education, Remedial Action Plans for Areas of Concern, and the most popular list, announcements concerning the Great Lakes region. To join a GLIN e-mail list, send a message with "help" in the body to the listserv machine, *glin-majordomo @great-lakes.net*

A Look to the Future

GLIN partners are working to create a catalogue and indexing system on the GLIN core server and to replicate appropriate segments of this system on servers across the region. The goal is to ease information and data access and to eventually support cross- agency searches.

An Invitation

We encourage your collaboration in GLIN. The design and long-term viability of the network is only as good as the commitment of the Great Lakes community to make it a tool useful for ecosystem management. Interested members of the Great Lakes research and policy communities are encouraged to contact GLIN staff or advisory board members with your ideas and your URLs. Contact the GLIN advisory board by sending an email message to GLIN-board@great-lakes.net; staff can be reached at GLIN@great-lakes.net.

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Great
Lakes
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Welcome to the Great Lakes Region of North America

The Great Lakes-St Lawrence region comprises eight states and two provinces: Illinois, Indiana, Michigan, Minnesota. New York, Ohio, Pennsylvania and Wisconsin in the United States, as well as Ontario and Quebec m Canada. Although the international border separates distinct political traditions and cultures within the region, an integrated resource base and manufacturing complex has developed The binational region is North America's industrial heartland, and also supports a multi-billion dollar outdoor recreation and tourism industry, a world-class maritime transportation system and a diverse and extensive agricultural base.

A major influence underlying the region's economy and culture are the five Great Lakes, which form the largest fresh surface water system in the world. These 'Freshwater Seas'--Superior, Michigan, Huron, Erie and Ontario--dominate the landscape of the Great Lakes Basin. 1n fact, this system is so large that from the moon it is visible to the naked eye. These lakes greatly affect our way of life in the region, as well as all aspects of the natural environment, from weather and climate, to wildlife and habitat.