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US Army Corps of Engineers
Detroit District

Great Lakes Update

Great Lakes Data and Information on the Internet

The Great Lakes-St. Lawrence River system is a dynamic environment, still evolving over time. Ever since the last glaciers retreated more than 10,000 years ago, Great Lakes water levels and outflows have varied dramatically. The Great Lakes affect human activities and all aspects of the natural environment, from weather and climate, to wildlife and habitat.

Researchers and scientists began studying the Great Lakes over 150 years ago. Each year brings more data and information about water levels, flows, precipitation and evaporation. New data and information are constantly being developed on water uses, diversion, tourism, and recreation. Also, new studies are available about the ecology of the system including its biologic and chemical characteristics.

In the past, people interested in Great Lakes research had to visit a library or call a number of state or federal agencies to find information they needed. Now much of this information is collected, stored and disseminated using computers and the Internet. The Internet has become the preferred method for delivering Great Lakes data to the public. The questions now are: "Who has what?" and "Where do I go?" This article will attempt to answer some of these questions. Unfortunately, there may still be many great web sites with valuable Great Lakes data and information that we might miss. If you know of others, please let us know.

The Great Lakes Portal to the Internet

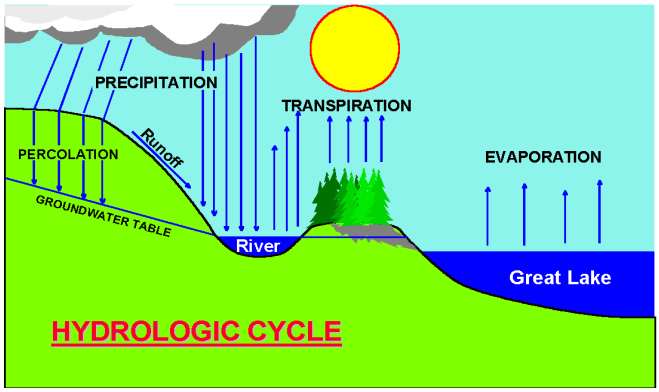
One of the best web sites for a wealth of information on the Great Lakes and the St. Lawrence River system is the Great Lakes Information Network (GLIN). The GLIN website can be accessed at: http://www.glin.net/ or http://www.great-lakes.net/.

A service provided to the region by the Great Lakes Commission, GLIN features the latest news about the region's economy, environment, tourism, education, laws and policies. GLIN includes pointers to hundreds of other web sites with valuable information about the Great Lakes - St. Lawrence River system.

Great Lakes Hydrology

Great Lakes water is continually recycled and returned to the ecosystem through the hydrologic cycle. The Great Lakes are supplied by moisture that originates in the northern Pacific Ocean, the Gulf of Mexico, or in the Arctic. Water enters the lake basins as precipitation directly over the lake surface, runoff from the surrounding land including snow melt, groundwater, and inflow from upstream lakes or tributary rivers.

Water evaporates from the lake surface when it comes in contact with dry air, forming water vapor. This vapor can remain as gas, or it can condense and form fog and clouds. Water is lost from a lake via outflows downstream. Other factors affect water quantity including temperature, ice cover and solar radiation.



There are many web sites that discuss the hydrologic cycle, weather factors and climate that affect it. Here are a few of them:

http://www.great-lakes.net/envt/water/levels/hydro.html
http://www.glerl.noaa.gov/data/
http://mcc.sws.uiuc.edu/
http://huron.lre.usace.army.mil/precipitation/hmpgpr.html
http://www.cpc.ncep.noaa.gov/
http://www.natice.noaa.gov/greatlakes.htm

Great Lakes Hydraulics

The Great Lakes are like a series of interconnected bathtubs with their outlets being the drains in the tubs. Outflows increase as the water levels rise in the upstream lake, but are restricted by the size of their outlet channels. The outflow from Lake Superior is controlled at the twin cities of Sault St. Marie, Ontario and Michigan. Water flows naturally from lakes Michigan-Huron into Lake St. Clair and then into Lake Erie. The outflow from Lake Ontario is controlled by hydropower facilities and navigation structures in the St. Lawrence River. There are five diversions on the Great Lakes: the Long Lac and Ogoki diversions into Lake Superior, the Chicago diversion out of Lake Michigan and the Welland Canal and New York State Barge Canal, which divert water between lakes Erie and Ontario.

The International Lake Superior Board of Control and the International St. Lawrence River Board of Control monitor hydrologic and hydraulic conditions on their respective watersheds and make recommendations on outflows for approval by the International Joint Committee (IJC). The IJC's International Niagara Board of Control is responsible for regulating the distribution of waters in the Niagara River between hydropower plants and that flowing over the Niagara Falls. Information on policies and decisions made by the IJC and its Boards of Control can be found at the following sites:

http://www.ijc.org/
http://huron.lre.usace.army.mil/ijc/superior.html
http://huron.lre.usace.army.mil/ijc/niagara.html
http://www.islrbc.org/

Great Lakes Water Levels

Great Lakes water levels have been recorded since the late 19th century. The U.S. Army Corps of Engineers (USACE) and Environment Canada use recorded water levels to predict future water levels on the Great Lakes. These data are also used in the regulation of outflows from lakes Superior and Ontario. The data are invaluable in aiding commercial navigation, marinas, and recreational boaters.

Water level data are also used by environmental specialists to measure how water level fluctuations affect plants, fish, and wildlife. Water level data are used by geologists and coastal engineers to study the dynamic effects of water levels in coastal zones.

The USACE, the National Ocean Service (NOS), of the National Oceanic and Atmospheric Administration (NOAA) and the Canadian Hydrographic Service (CHS) collect water level data on the Great Lakes. Current water level conditions and forecasts of future levels can be found at these web sites:

http://huron.lre.usace.army.mil/levels/hmpglv.html
http://www.on.ec.gc.ca/glimr/water-levels/intro.html
http://www.on.ec.gc.ca/glimr/data/level-news/intro.html
http://chswww.bur.dfo.ca/danp/tidal.html
http://www.co-ops.nos.noaa.gov/data_res.html
http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Databases/Data_e.htm

Water levels and streamflow information for rivers and streams draining into the Great Lakes within the U.S. can be found at: http://water.usgs.gov/

Great Lakes Water Quality

The availability of water quality data on the Internet continues to improve over time. The U.S. Environmental Protection Agency (USEPA) provides a valuable tool that allows the user to 'surf your watershed.' This is a great place to start when looking for all kinds of environmental data and information. The web site address is: http://www.epa.gov/surf2/

Surf Your Watershed

Your watershed, or general area of interest, can be located using a map or by searching by name of city, state, zip code, or places of interest (such as lakes, rivers, schools, parks, etc.). The web site contains information on overall watershed health, a list of wastewater discharges, water sources, water consumption information, as well as land cover and air quality information.

The USEPA uses two other systems to house water quality data: the STORET system (short for STOrage and RETrieval) and the Legacy Data Center (LDC). These systems store biological, chemical, and physical data on surface and groundwater collected throughout the United States.

These systems are clearinghouses for data collected by various agencies, tribes, volunteer groups, academics, and others. The data collected by the various entities is, in turn, available to other agencies, groups, and private citizens to access. USEPA is in the process of web-enabling the STORET and LCD systems. Check out their web site for updates on the progress: http://www.epa.gov/OWOW/STORET

In recent years, periodic closing of public beaches due to poor water quality has become a serious public concern. The USEPA has established a BEACH Watch web site that contains a variety of valuable information regarding beach water quality legislation and monitoring activities. The web site address is: http://www.epa.gov/ost/beaches/

BEACH Watch

Information and data on the water quality conditions at specific beaches can be found at: http://yosemite.epa.gov/water/beach2000.nsf

The USEPA Great Lakes National Program Office (GLNPO) also has a tremendous amount of water quality data and information on their site. They also host The Great Lakes Environmental Atlas and distribute digital photos via their section on "Visualizing the Great Lakes". These are excellent resources. The website can be accessed at: http://www.epa.gov/glnpo/.

The U.S. Geological Survey (USGS) has operated two national stream water quality networks over the past 30 years. The networks assess stream water quality conditions and trends in undisturbed and developed watersheds throughout the country. Information on the program and availability of data can be found at: http://wwwrvares.er.usgs.gov/wqn96/

Environment Canada – Ontario Region's site has a wide variety of environmental information available at: http://www.on.ec.gc.ca/

State/Provincial Environment Sites

Most state and provincial agencies in the Great Lakes region also provide data, reports, and monitoring program information on these sites:

http://www.dnr.state.mn.us/
http://www.dnr.state.wi.us/
http://www.epa.state.il.us/
http://www.state.in.us/dnr/
http://www.deq.state.mi.us/
http://www.epa.state.oh.us/
http://www.dep.state.pa.us/
http://www.dec.state.ny.us/
http://www.mnr.gov.on.ca/MNR/
http://www.ene.gov.on.ca/
http://www.menv.gouv.qc.ca/
http://www.mrn.gouv.qc.ca/

Great Lakes Biology

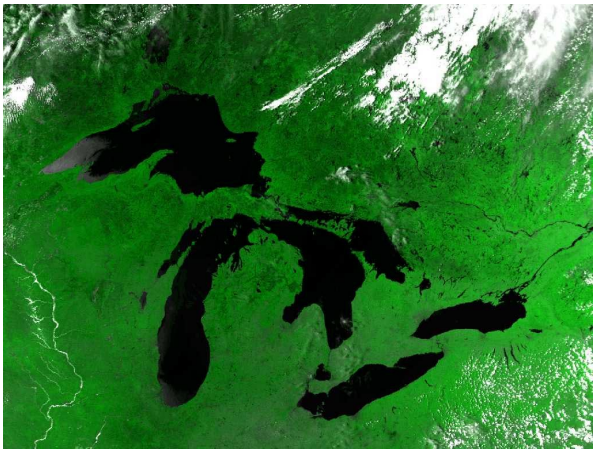
The region's glacial history and the tremendous influence of the lakes themselves create unique conditions that support a wealth of biological diversity, including more than 130 rare species and ecosystems. The Great Lakes are the only lakes of their size in a temperate climate. With the lakes' moderating effect on climate, their ecosystems provide habitat for a wide variety of species and complex communities.

The coastlines and interconnecting channels are by far the most diverse and productive part of the Great Lakes – St. Lawrence River ecosystem. These areas include small wetlands nestled in scattered bays, extensive wetlands such as those along Saginaw Bay on Lake Huron, river-mouth wetlands such as the Kakagon Sloughs of northern Wisconsin, enormous delta marshes of the St. Clair River, and critical spawning beds in the St. Marys Rapids.

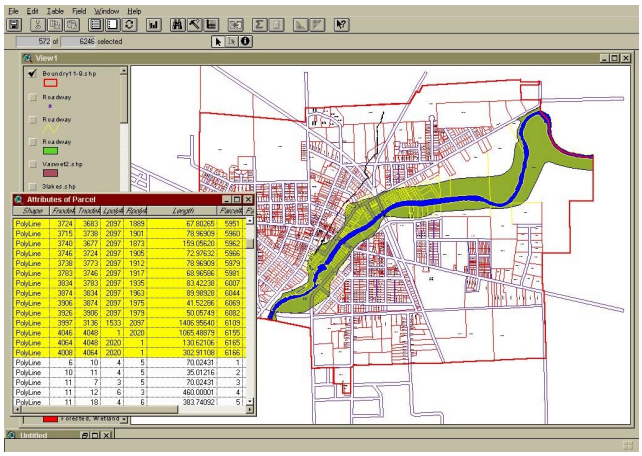
There are many excellent web sites about biodiversity and Great Lakes habitats, including many of the web sites previously mentioned for the USEPA, Environment Canada and GLIN. Other notable web sites include sites maintained by the Sea Grant Network of regional universities, the U.S. Fish and Wildlife Service, the U.S. Natural Resources Conservation Service, the USGS, National Biological Service's Great Lakes Science Center, and the Great Lakes Fishery Commission. Here are some good sites:

http://ag.ansc.purdue.edu/il-in-sg
http://www.engin.umich.edu/seagrant
http://www.d.umn.edu/seagr
http://www.seagrant.sunysb.edu/
http://www.sg.ohio-state.edu/
http://www.pserie.psu.edu/seagrant/seagindex.htm
http://www.seagrant.wisc.edu/
http://www.dnr.state.mn.us/
http://www.dnr.state.wi.us/
http://dnr.state.il.us/
http://www.state.in.us/dnr
http://www.dnr.state.mi.us/
http://www.dnr.state.oh.us/
http://www.dcnr.state.pa.us/
http://www.dec.state.ny.us/
http://www.great-lakes.net/envt
http://www.on.ec.gc.ca/glimr/intro.html
http://www.fws.gov/r3pao/
http://www.glsc.nbs.gov/
http://www.glfc.org/
http://www.nhq.nrcs.usda.gov/

Great Lakes Maps and GIS Data



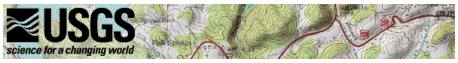
Maps are an invaluable tool for planning projects, displaying information, or just getting a general sense of an area. A Geographic Information System (GIS) is a tool that combines multiple layers of data and displays them geographically on a base map. It is an extremely powerful tool used in planning, engineering analysis, and a wide variety of other applications.



GLIN recently launched a Maps and GIS site, which provides a place where people can find and submit digital data for areas within the Great Lakes region. The site includes GIS data sets, online mapping, a map gallery, and lists of other GIS/mapping resources. It is a great site. The address is: http://www.great-lakes.net/gis

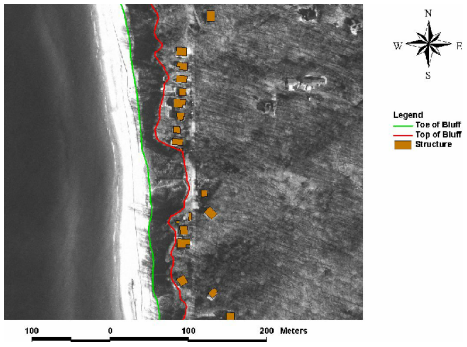
Other federal agency web sites that offer geospatial data online include:

http://mapping.usgs.gov/
http://corpsgeo1.usace.army.mil/
http://www.epa.gov/nsdi/
http://www.glerl.noaa.gov/



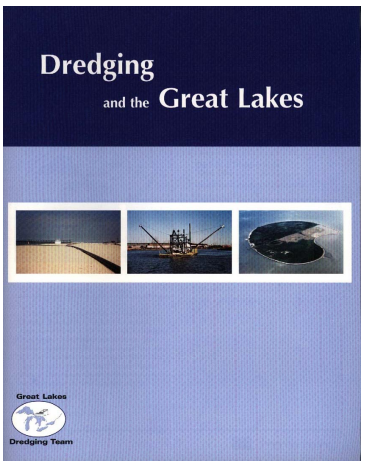
Great Lakes Coastal Zone Studies

Over the last three years, an Internet web site has been established to provide information being collected under the Lake Michigan Potential Damages Study (LMPDS). The LMPDS is focused on improving knowledge of coastal processes including beach erosion / bluff recession, flooding, and low water events. The LMPDS also is focused on assessing potential economic impacts of fluctuating water levels, including extremely high or low levels not yet seen. For further information on this study, see: http://huron.lre.usace.army.mil/coastal/LMPDS/



A similar study has been initiated on lakes Erie and Ontario. This study is limited, however, to coastal erosion without the emphasis on economic impacts. For further information, see: http://www.cjscons.com/LGLES/.

Want to learn more about dredging in the Great Lakes?



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- How can dredged material be used beneficially?
- What role does the public play in the dredging process?

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Phone_____

Mail to: U.S. Army Corps of Engineers – Detroit District, ATTN: CELRE-ET-HH-W, P.O. Box 1027, Detroit, MI 48231

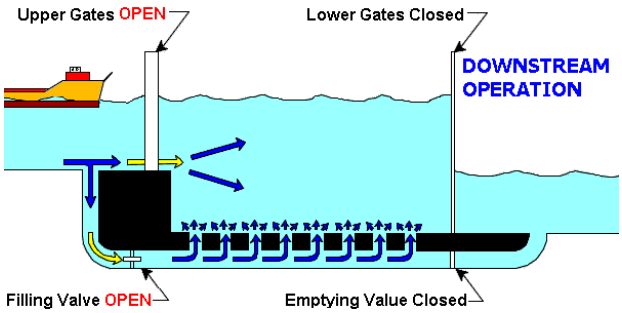
This document is available at http://huron.lre.usace.army.mil/levels/Update141.pdf.

Great Lakes Education

We are all stewards of the natural resources of the Great Lakes and St. Lawrence River ecosystem. Only through understanding of natural processes and human interactions can we make informed decisions about how to live harmoniously with the lakes.

Many of the web sites that have been mentioned in this article have sections dedicated to education. The USACE has a web site that describes the history of the world-famous Soo Locks which includes an animated demonstration of how the locks operate. The USACE also has a site with four web cameras for various views of the Soo Locks. A viewer can watch a 1000-foot vessel lock through from the comfort of their own home. These sites are:

http://huron.lre.usace.army.mil/SOO/soohmpg.html
http://www.crrel.usace.army.mil/ierd/webcams/soo



Diagrams like the one above help to illustrate Great Lakes operations.

Internet surfers can learn about fish and wildlife, geology, commerce, history, and the environment of the Great Lakes – St. Lawrence River system. The sites listed below are only a fraction of what is available on the Internet dealing with Great Lakes educational opportunities:

CENTER FOR GREAT LAKES ENVIRONMENTAL EDUCATION

http://www.greatlakesed.org/

http://www.epa.gov/glnpo/ecopage/

The Education And Curriculum Homesite (TEACH Great Lakes) is a new component of GLIN. With modules focusing on environment, history and culture, geography, pollution, and careers and business, the site is geared for

T.E.A.C.H.

elementary through high school students. The site is also an impressive tool for teachers and other educators. It can be reached at:
http://www.great-lakes.net/teach

Meetings

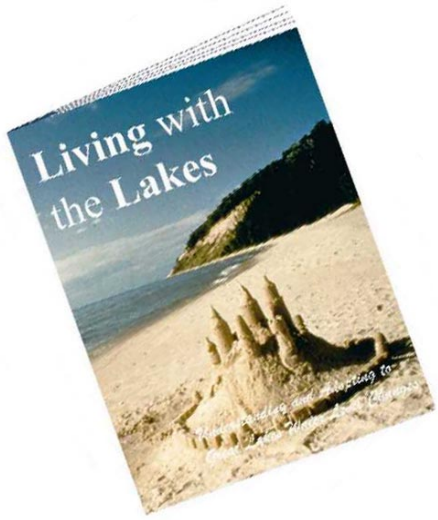
International St. Lawrence River Board of Control (ISLRBC) Teleconference

The ISLRBC held a multi-city teleconference on September 7, 2000 to receive public input on Lake Ontario outflow regulation. For a copy of the transcripts of this teleconference, see: http://www.islrbc.org/.

Lower Great Lakes Erosion Study (LGLES) Update Workshop

U.S. and Canadian governmental and academic staff attended a workshop on the LGLES on September 20-21, 2000 in Niagara Falls, New York to discuss on-going work and future directions of coastal studies on lakes Erie and Ontario. Emphasis was placed on how these studies could affect the newly authorized IJC re-examination of the Lake Ontario-St. Lawrence River outflow regulation criteria. A summary of the proceedings of the workshop is posted at: http://www.cjscons.com/LGLES/documents.htm

Want to learn more about the ups and downs of the Great Lakes water levels?



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- Why do water levels fluctuate?
- How can residents protect their shoreline property?
- How do lake level changes affect the region's environment and economy?
- How are the water levels managed?

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