



# GLERL

Great Lakes Environmental Research Laboratory

[www.glerl.noaa.gov](http://www.glerl.noaa.gov)

## Lake Michigan Field Station ~ Muskegon, MI



In 1990 the National Oceanic and Atmospheric Administration's Great Lakes Environmental Research Laboratory (GLERL), part of the U.S. Department of Commerce, assumed ownership of the former Coast Guard base at Muskegon, Michigan on the south side of the channel between Muskegon Lake and Lake Michigan. The site includes three buildings and research vessel dockage next to the main building. During 1993, one of the three buildings was renovated to include scientific laboratories, offices, and storage, and in 1994 a lead scientist and ship operations were permanently relocated to the site, which was officially named the Lake Michigan Field Station (LMFS). Presently, four full-time scientists, three full-time ship crew, and one regional marine manager reside at the LMFS.

The other buildings provide space for small vessel storage and repair, additional space for scientific activities, a meeting room, the Vessel Operations Office, and equipment storage. The functions of the Field Station include providing a base of operations for GLERL's research vessels and to provide a focal point for field research on Lake Michigan for GLERL scientists and partners.

### Lake Michigan Long-Term Trends Research

One of the research programs that was transferred from Ann Arbor to Muskegon began over 10 years ago and focuses on understanding and assessing long-term changes in, and monitoring the long-term health of, the Lake Michigan ecosystem, especially the lower food web. The Lake Michigan ecosystem is threatened with dramatic changes due to the introduction of various nonindigenous organisms, such as the zebra mussel, the quagga mussel, and the spiny water flea (*Bythotrephes*). Several new nonindigenous fish that have entered the Great Lakes in the past decade include the ruffe and the round-nose goby. The ruffe has not been found in Lake Michigan yet, but was recently found in Thunder Bay, Lake Huron. The round-nose goby and fish-hook water flea have already been found in Lake Michigan. GLERL's Lake Michigan Long-Term Trends Program is the most comprehensive long-term study of Lake Michigan in existence. Besides the traditional monitoring of water quality and phytoplankton and zooplankton communities, a fisheries component was added with the arrival of a fisheries scientist at the LMFS in 1997.



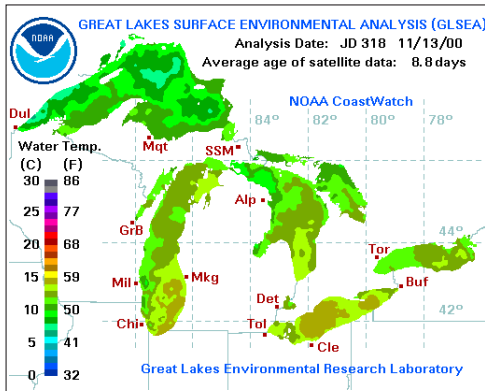
### Great Lakes and Coastal Marine Ecosystem Research

Researchers at the Lake Michigan Field Station participate in a variety of ecosystem studies in Lake Michigan, all the Great Lakes, and the Gulf of Mexico. Current studies in Lake Michigan include assessing the impact of the decline in the amphipod, *Diporeia*, on fisheries populations, assessing recent changes in the nearshore region of Lake Michigan, and examining the importance of benthic algae to nearshore food-webs. Researchers at the LMFS are also working on determining the vectors of transport of non-indigenous species into the Great Lakes. Specifically, they are examining the potential of NBOB vessels (vessels that declare they have No Ballast water On Board when they enter the Great Lakes) as a source of non-indigenous species, and efficacy of open ocean exchange of ballast water. Finally, researchers at the LMFS are determining the factors contributing to blooms of the red tide in southwest Florida.



## CoastWatch

CoastWatch is a nationwide NOAA environmental data service, and GLERL's Ann Arbor facility is the location of the Great Lakes CoastWatch site, one of eight national CoastWatch nodes that receives and produces environmental data. The Great Lakes Surface Environmental Analysis (GLSEA) is a daily surface water temperature map, Great Lakes meteorological observations are obtained hourly from lake environmental buoys and other sources, and water level gauge measurements are acquired daily from the National Ocean Service. The Michigan State University Center for Remote Sensing accesses the GLERL CoastWatch node to obtain satellite images of Lake Michigan surface temperature, which they then convert to contour maps usable by the general public. These maps are distributed to thousands of private sector users, such as sports fishers, in western Michigan and Indiana with the assistance of the Michigan Sea Grant Extension located in Grand Haven, and are also available at the Lake Michigan Field Station.



GLSEA, a map of daily surface water temperature, is one of many CoastWatch products.

## Volunteer Partnerships

Help from trained volunteers is very important to efforts of state and Federal agencies to effectively monitor the health of the Great Lakes. GLERL's Lake Michigan Field

Station scientists are committed to working with trained volunteers to better monitor the health of Lake Michigan, and have collaborated with the Muskegon Lake Public Advisory Council and the White Lake Public Advisory Council to establish LakeWatch monitoring programs for each of their respective lakes. The Muskegon Lake LakeWatch and White Lake LakeWatch Programs use local volunteers who have been trained to measure and sample each of the lakes for key environmental parameters on a regular basis. These programs will measure and monitor the water quality of the lakes over time, thus providing data that will help the advisory councils make informed decisions to improve and protect the future health of their lakes. Dr. Gary Fahnenstiel acts as Technical Advisor for both LakeWatch programs, and the Lake Michigan Field Station is used for training the volunteers. In addition, GLERL scientists plan to study the sediments in Muskegon Lake to reconstruct its past environmental history, possibly as far back as the early 1800s.

Scientists at the Lake Michigan Field Station also worked with members of the Muskegon Chapter of the Michigan Steelheaders to monitor the diet of Lake Michigan perch. Failed recruitment of the perch in Lake Michigan has caused much recent concern. Volunteers from the Steelheaders are collecting perch using scientifically established methods, and these same volunteers will assist scientists from the Lake Michigan Field Station and the University of Michigan in analyzing the contents of the perch stomachs. The results from this study will be useful to assess the role of cannibalism and competition in contributing to the recruitment failure.



An open house at the Lake Michigan Field Station gives the public a close look at our research activities.

For more information about the Lake Michigan Field Station and the research activities centered there, please contact:

Dr. Gary L. Fahnenstiel, Head  
NOAA/GLERL - Lake Michigan Field Station  
1431 Beach St.  
Muskegon, MI 49441-1098  
<http://www.glerl.noaa.gov/lmfs/>  
231-759-7824  
231-759-7906 (FAX)