

Dear NMN Pilot Study reviewers:

On behalf of the Lake Michigan Monitoring Coordination Council, the Great Lakes Commission is pleased to submit the attached Statement of Interest for a Lake Michigan Pilot Study for the National Water Quality Monitoring Network (NMN) for U.S. Coastal Waters and Their Tributaries.

The Lake Michigan basin is ideally suited to serve as a pilot study site for the NMN. Partners working on Lake Michigan have established a robust framework of research and collaborative monitoring efforts that will facilitate a timely and effective response to the objectives outlined for the NMN pilot studies. Much of the pilot effort would be devoted to further refining information that already exists and putting it in the NMN context to foster a successful Pilot Study.

The Great Lakes, and Lake Michigan in particular, are in a period of changing conditions due to a wide spectrum of watershed stressors. A Lake Michigan NMN pilot will enable partners in the basin to better address these stressors and the management issues associated with them. We hope you will consider our Statement of Interest favorably. We look forward to working with the National Water Quality Monitoring Council on this most important project.

If you have questions about the attached Statement of Interest or require additional information, please contact me or John Hummer ([jhummer@glc.org](mailto:jhummer@glc.org)) at the Great Lakes Commission (734-971-9135).

Sincerely,

Matt Doss  
Program Manager  
Great Lakes Commission



LakeMI-pilot\_Statement-of-Interest\_FINAL.doc

## **Lake Michigan Pilot Study – National Monitoring Network Statement of Interest**

*Submitted by the Great Lakes Commission  
On Behalf of the  
Lake Michigan Monitoring Coordination Council  
February 23, 2007*

### **Introduction**

The Lake Michigan basin is ideally suited to serve as a pilot study site for the National Monitoring Network (NMN) for U.S. Coastal Waters and their Tributaries. Partners working on Lake Michigan – including federal and state agencies and academic institutions – have established a robust framework of research and collaborative monitoring efforts that will facilitate a timely and effective response to the objectives outlined for the NMN pilot studies. Much of the pilot effort would be devoted to further refining information that already exists and putting it in the NMN context to foster a successful pilot study. Key elements of this infrastructure include

- The Lake Michigan Monitoring Coordination Council (LMMCC);
- The recently-completed Great Lakes Monitoring Inventory and Gap Analysis;
- A Lake Michigan-specific monitoring inventory;
- The Great Lakes Observing System, a regional node of the Integrated Ocean Observing System (IOOS); and
- Several collaborative monitoring efforts that are in process or have taken place in recent years.

The LMMCC is the primary and well-established forum for assessing and coordinating monitoring efforts for Lake Michigan and will lead the Lake Michigan Pilot Study. Formed in 1999, the Council includes representatives from the major regional, federal, tribal and state agencies around Lake Michigan, as well as academic institutions, local municipalities, environmental organizations, business and industry, and other partners. The Council is well established and enjoys strong support from the Lake Michigan community (<http://wi.water.usgs.gov/lmmcc/>).

The Great Lakes, and Lake Michigan in particular, are in a period of changing conditions due to a wide spectrum of watershed stressors. Among these are a host of toxic pollutants largely caused by atmospheric deposition from power plants; point and nonpoint sources of water pollution; water level fluctuations due, in part, to climate change; nearly 200 invasive species disrupting the food web and the region's ecosystem; and rampant developmental pressures throughout the region.

A Lake Michigan NMN pilot will enable partners in the basin to better address these stressors and the management issues associated with them. Moreover, the explicit linkage between upland, coastal and offshore waters necessitates a more coordinated monitoring network. The Lake Michigan NMN pilot will be a strong – and well-timed – catalyst for assessing observing, monitoring and reporting needs for rapidly emerging ecological problems. The pilot will also be an excellent surrogate for most coastal marine environments, since it focuses on integrating observations of complex physical, chemical and biological processes with implementation of enhanced monitoring strategies. Finally, assessing the efficacy of a Lake Michigan monitoring strategy will generate knowledge that could be applied to the other four lakes to restore and protect the entire Great Lakes ecosystem.

**Description of the proposed study area.** The map on page two illustrates the Lake Michigan basin and its watersheds. It is depicted in 8-digit Hydrologic Unit Codes (HUC).

The Great Lakes – Michigan, Huron, Superior, Erie and Ontario – are a dominant part of the physical and cultural heritage of North America. Shared with Canada and spanning more than 750 miles from east to west, these vast inland freshwater seas provide water for consumption, transportation, power,

recreation and a host of other uses. The Great Lakes are the largest surface freshwater system on the Earth. They contain about 84 percent of North America's surface freshwater and about 21 percent of the world's supply. Only the polar ice caps contain more freshwater.

Lake Michigan is the second largest of the Great Lakes. It is the only Great Lake entirely within the United States.

The northern part is in the colder, less developed upper Great Lakes region. It is sparsely populated, except for the Fox River Valley, which drains into Green Bay. This bay has one of the most productive Great Lakes fisheries but receives the wastes from the world's largest concentration of pulp and paper mills. The more temperate southern basin of Lake Michigan is among the most urbanized areas in the Great Lakes system. It contains the Milwaukee and Chicago metropolitan areas, with over 11 million people dependent on the lake for drinking water. This region represents about one-fifth of the total population of the Great Lakes basin.



Since the release of the Lake Michigan Lakewide Management Plan (LaMP) in 2000, several key indicators point to continuing concern for the health of the ecosystem:

- Beach season data exhibit a continued number of beach closings.
- Data reveal that a critical layer of
- PCBs and mercury are both detected in Lake Michigan fish. This is such a prevalent problem that 44 states now have mercury fish advisories, and a national advisory has been issued for certain ocean fish, pointing to a problem of global proportions. Both air deposition and sediment problems in Great Lakes Areas of Concern drive the PCB fish advisories.
- Climatic pattern changes, whether temporary or permanent, are lowering lake levels as well as raising concerns about groundwater levels and lake/groundwater interaction and diversion.
- The interaction between groundwater and surfacewater is becoming better understood in the Lake Michigan basin, as declines in water levels from overpumping are resulting in regional declines in baseflow levels in streams that affect habitat. Seventy-nine percent of Lake Michigan water originates as groundwater, more than any other of the Great Lakes.
- Following the September 11, 2001 terrorist attacks the issue of protecting the lake's vast supply of fresh drinking water has become a higher priority.

In spite of its large size, Lake Michigan is sensitive to the effects of a wide range of pollutants. Major stresses on the lake include toxic and nutrient pollution, invasive species and habitat degradation. Sources of pollution include the runoff of soils and farm chemicals from agricultural lands, waste from cities, discharges from industrial areas and leachate from disposal sites. The large surface area of the lake also makes it vulnerable to direct atmospheric pollutants that fall as rain, snow, or dust on the lake surface, or exchange as gases with the lake water. Outflows from Lake Michigan are

relatively small (less than 1 percent per year) in comparison with the total volume of water. Pollutants that enter the lake are retained in the system and become more concentrated with time.

Despite these concerns, Lake Michigan supports many beneficial uses. For example, it provides drinking water for 10 million people; has internationally significant habitat and natural features; supports food production and processing; supplies fish for food, sport, and culture; has valuable commercial and recreational uses; and is the home of the nation's third-largest population center. Furthermore, significant progress is being made to remediate the legacy of contamination in the basin. Specifically, ongoing actions to restore the Areas of Concern (AOC) designated under the Great Lakes Water Quality Agreement have been successful and have received new resources from the passage in 2002 of the Great Lakes Legacy Act, which provides funding for remediating contaminated sediments.

## **I. Primary contact person.**

John Hummer	Phone: 734-971-9135
Project Manager	Fax: 734-971-9150
Great Lakes Commission	Email: jhummer@glc.org
2805 South Industrial Hwy. Suite 100	
Ann Arbor, MI 48104-6791	

## **II. Statements of interest and contributions from key study partners.**

**John Hummer and Matt Doss, Great Lakes Commission and Lake Michigan Monitoring Coordination Council (LMMCC)** – The Great Lakes Commission, as secretariat and coordinating body for the LMMCC, is the official applicant and point of contact for this effort. The Commission is a binational public agency dedicated to the use, management and protection of the water, land and other natural resources of the Great Lakes-St. Lawrence system. In partnership with the eight Great Lakes states and provinces of Ontario and Québec, the Commission applies sustainable development principles in addressing issues of resource management, environmental protection, transportation and sustainable development.

Formed in 1999, the LMMCC provides a regional forum to coordinate and support consistent, scientifically defensible monitoring methods and strategies in the Lake Michigan basin. The focus of the Council is to improve monitoring collaboration and data comparability and to define a regionally coordinated agenda for monitoring and assessment of the Lake Michigan basin. The LMMCC is composed of resource-based workgroups that coordinate existing monitoring around several common considerations: monitoring objectives; spatial, temporal and parameter network design; methods comparability; quality assurance and control planning; database sharing; and data analysis approaches.

Both the Commission and the LMMCC view a Lake Michigan pilot study for the National Monitoring Network as an important initiative to bring monitoring and observing entities around the Lake Michigan basin together to accomplish common goals and improve monitoring coordination. In concert with the goals of the NMN, both organizations strive to promote uniform data collection and information management standards for use by the Great Lakes states and the region as a whole, while attempting to address institutional barriers to efficient exchange of data and information.

Mr. Hummer provides secretariat support and coordination for the LMMCC on behalf of the Great Lakes Commission. He will coordinate the Lake Michigan pilot study with other project partners described below. Mr. Doss is program manager for the Commission's Environmental Quality program area and will provide project support and assistance on key issues as the pilot study develops.

**Roger Gauthier, Great Lakes Observing System (GLOS)** – GLOS is the Great Lakes regional component of the U.S. Integrated Ocean Observing System (IOOS). Mr. Gauthier is the interim executive director of GLOS. He will facilitate coordination between the IOOS community and the

LMMCC in the development of the Lake Michigan NMN pilot project. GLOS is dedicated to addressing observing system gaps, enhancing long-term monitoring functions and integrating physical, biological, chemical and socio-economic data for real-time and historic conditions. GLOS has developed nine subsystems, including open lake observations, coastal and tributary inflows, scientific ship coordination, interconnecting waterways, remote sensing, atmospheric monitoring, ecological forecasting and numeric modeling, education and outreach and information integration. As such, GLOS will play a pivotal role in facilitating assessments of regional observing needs and provide staffing to facilitate data integration for the pilot project.

**Greg Good, Illinois Environmental Protection Agency** – The Illinois Environmental Protection Agency (Illinois EPA) is willing to take part in the Lake Michigan pilot study proposal for the National Monitoring Network. A representative of Illinois EPA is currently an active member of the presidential-level Advisory Committee on Water Information, of which the National Water Quality Monitoring Council is a subcommittee. Over the past several years, Illinois EPA has provided oversight and represented state level input into development of the NMN. The Illinois EPA is willing to participate in meetings and conference calls, as well as provide the information necessary to support this project. The Illinois EPA supports the efforts of the Great Lakes Commission to coordinate this pilot study proposal and looks forward to contributing to this project.

**Art Garceau, Indiana Department of Environmental Management** – The Indiana Department of Environmental Management (IDEM) is willing to participate in a Lake Michigan pilot project in support of the NMN for U.S. Coastal Waters and their Tributaries. An IDEM representative participated in the NMN design process and currently serves as a member of the LMMCCC. IDEM is willing to provide staff to attend meetings and/or conference calls, and provide information as necessary to help make the pilot a success. An important step in the pilot project would be to identify gaps between existing monitoring and that indicated by the Network design. This would help estimate costs of ongoing monitoring and costs to fill identified gaps. By assessing the gaps and their associated costs, the pilot project could then identify management issues in the study area that would be better addressed if the monitoring gaps were filled and data were more comparable and accessible. IDEM believes that this type of study would be helpful to Indiana and to the Lake Michigan watershed and is pleased that the Great Lakes Commission has agreed to be the lead organization to help coordinate this endeavor. The agency looks forward to participating in this pilot project.

**Gary Kohlhepp, Michigan Department of Environmental Quality** – The Michigan Department of Environmental Quality (MDEQ), in conjunction with other federal and state agencies in the Lake Michigan basin, is willing to participate in a Lake Michigan pilot project in support of the NMN. A MDEQ representative currently serves as a co-chair for the LMMCC. An inventory of Lake Michigan monitoring activities and a gap analysis were completed in 2006. MDEQ is willing to attend meetings and/or conference calls, and provide information as necessary, to update these reports. In addition, MDEQ will work with other agencies and stakeholders to review data comparability and sharing issues, and to identify opportunities for improvement. Because of the existing LMMCC activities and infrastructure, MDEQ believes that the Lake Michigan watershed is an ideal pilot candidate for the NMN. MDEQ is committed to continuing its leading role within the LMMCC and, should Lake Michigan be selected as a pilot, to ensuring the project's success.

**James Baumann, Wisconsin Department of Natural Resources** – The Wisconsin Department of Natural Resources (WDNR) is very interested in a Lake Michigan Pilot Study as part of the efforts of the National Water Quality Monitoring Network for U.S. Coastal Waters and their Tributaries. Its interest has been heightened by the return after 30 years of Cladophora and other macroalgae on Lake Michigan beaches. Within the last few years, WDNR has increased its monitoring of both nearshore waters and nutrient loads from tributaries. It is also very active in the removal of contaminated sediments from Lake Michigan harbors and tributaries. WDNR has worked closely with a number of federal partners to monitor the quality of Lake Michigan and looks forward to enhancing these collective efforts.

**Jack Kelly, Mid-Continent Ecology Division, U.S. EPA Office of Research and Development**

The Mid-Continent Ecology Division (MED) of U.S. EPA's Office of Research and Development (ORD), located in Duluth, Minn., has been researching new technologies, sampling designs, and ecological indicators for Great Lakes coastal zones for almost the past decade. Dr. John (Jack) Kelly of MED, along with ORD's Environmental Monitoring and Assessment Program (EMAP) design team, was one of the architects of the Great Lakes chapter of the NMN and reported its development at the 2006 National Water Quality Monitoring Conference. Dr. Kelly and the MED research team have been key participants in both coordinated lakewide monitoring and assessment designs (e.g., recent binational efforts in Lakes Superior, Huron, and Ontario) and in coastal indicator evaluation through collaboration in EPA's STAR-funded Great Lakes Environmental Indicator (GLEI) project. Dr. Kelly is committed to the goals of the NMN and is pleased to be an active participant and technical advisor to the LMMCC for the Lake Michigan pilot study. In particular, Dr. Kelly will assist with monitoring gap analysis and development of design refinements that are efficient for the regional community but also remain true to the goals of the NMN as an active model for the U.S. coastal region.

**Judy Beck, U.S. EPA Great Lakes National Program Office** – The Lake Michigan Lakewide Management Program in U.S. EPA's Great Lakes National Program Office (GLNPO) is most interested in the National Water Quality Monitoring Council and the Advisory Committee on Water Information charged with implementation of recommendations in the report of the U.S. Commission on Ocean Policy.

A history of unique and collaborative monitoring exists that provides both an example of a collaborative network and lake specific data. This work has been conducted as a special component of GLNPO's monitoring efforts. Routine spring and summer efforts include water quality surveys in offshore waters with monitoring stations to detect and evaluate trends in chloride, nitrate, nitrogen, particulate nitrogen, silica, and total and dissolved phosphorus. Work also includes a biological program and a bioaccumulative toxic survey of air and fish.

In 1994 and 1995, an enhanced monitoring effort by GLNPO and many partners, the Lake Michigan Mass Balance (LMMB) Project, set out to identify relative loadings of four categories of pollutants (PCBs, mercury, trans-nonachlor and atrazine) entering Lake Michigan from major media, establish a baseline and sample 11 tributaries for nutrients. In 1999, The Lake Michigan Monitoring Coordinating Council was formed to continue a collaborative effort for Lake Michigan monitoring. In 2005, the LMMCC guided a ten-year update of the LMMB.

All of this work not only involves the 31 federal, state, tribal, local government, academic and environmental members of the LMMCC, but is also reported in the Lake Michigan Lakewide Management Plan and at the State of Lake Michigan Conference. As the LMMCC is one of the first ecosystem based monitoring councils in the country, a pilot that focuses on one of the Great Lakes and builds upon a decade of collaborative monitoring could be very informative.

**Steve Blumer and Norm Grannemann, U.S. Geological Survey, Michigan Water Science Center**  
As representatives of the Michigan Water Science Center (Mr. Blumer) and Northeastern Region Great Lakes Program (Mr. Grannemann), they will assist with the organization and planning of the pilot project. Mr. Grannemann is involved with numerous interest groups, committees, and stakeholder groups concerned with Great Lakes programs. His position and work will promote the pilot project's exposure, aid in cutting across jurisdictional lines, and foster discussion among several USGS offices. Mr. Blumer is responsible for interacting with 50-plus local cooperating agencies facilitating the streamgaging, groundwater, and water quality hydrologic monitoring networks in the state of Michigan. Because of long-term involvement with water monitoring – methods, instrumentation, field site location and selection, knowledge of USGS datasets, and other agencies' datasets – the Michigan Water Science Center, like the adjoining USGS Water Science Centers, will be able to assist with data gap issues and facilitate data sharing. Utilizing other hydrologists and technical specialists within the Michigan Water Science Center, expertise can be directed toward water management, ground water use and withdrawal, and emerging bacterial concerns.

**Charlie Peters, U.S. Geological Survey, Wisconsin Water Science Center** – As co-chair of the LMMCC, Mr. Peters will help to organize partner support for development and implementation of the requirements of the pilot study. He will be involved in the determination of gaps between ongoing monitoring and the proposed Great Lakes network for the Lake Michigan watershed, the development of a refined Lake Michigan network, and determination of costs to fill the gaps between existing and the refined network. Mr. Peters, past co-chair of the Methods and Data Comparability Board (a NWQMC working group), will participate in the determination of data comparability between ongoing monitoring and the development of an approach to sharing the data that would be collected through implementation of the NMN in the Lake Michigan basin. He will help connect the various management issues in the Lake Michigan watershed and the ongoing monitoring and research in the basin to the refined network. Finally, Mr. Peters will participate in the preparation of the final pilot study report.

### **III. Course of activities and milestones to accomplish the Lake Michigan Pilot Study.**

#### **1. Inventory current data and information collection in the study area at a scale similar to that proposed in the Network design.**

The Great Lakes Commission will take the lead on this task. In 2006, the Commission developed a centralized repository of Great Lakes monitoring information, the *Great Lakes Monitoring Inventory and Gap Analysis*. It is the first comprehensive binational inventory of monitoring programs in the Great Lakes basin. Using the inventory and input from U.S. and Canadian monitoring experts, Commission staff assessed the capacity of current programs to respond to established monitoring needs. In addition to highlighting recommendations for improving the overall Great Lakes monitoring regime, the inventory identified gaps, overlaps and opportunities for improved regional coordination.

The Great Lakes Commission has worked with U.S. EPA Region 5, GLNPO, and its partners in the Lake Michigan LaMP process to assess existing monitoring efforts in the Lake Michigan basin and subwatersheds, including the ten Lake Michigan AOCs) and four other major tributary watersheds. In 1999, the Commission completed a Lake Michigan Monitoring Inventory and associated assessment.

Hence, in the interest of NMN goals, there is no start-up process needed for this task as this groundwork has already been laid. For the Lake Michigan pilot study, Commission staff will re-examine and compare the results and recommendations of prior monitoring inventories and gap analyses to the data and information collection parameters and scale of that proposed in the network design. Staff will prepare an assessment of monitoring coverage as aligned with the network design.

#### **2. Identify gaps between existing monitoring and that indicated by the network design. Estimate costs of ongoing monitoring and costs to fill identified gaps.**

Following completion of Task #1 above, the Commission will forward its assessment of monitoring coverage relative to the NMN design and parameters to key partners in the project, including U.S. EPA, USGS, and the states. Partners from these agencies will use this information to further identify gaps between existing monitoring and that indicated by the network design. A narrative statement will be prepared illustrating these gaps along with an estimation of costs of ongoing monitoring and costs to fill identified gaps.

#### **3. Investigate data comparability and data sharing issues in the study area and recommend procedures for their resolution.**

As part of their spring 2007 meeting, the LMMCC will host a separate workshop for Lake Michigan pilot study partners. One of the main outcomes of the workshop will be recommendations of procedures for data comparability and data sharing issues that would help foster alignment with the NMN design parameters. The products identified in #1 and #2 above will serve as the basis for these discussions and resulting recommendations. The Data Management and Communications Plan of GLOS may serve as a blueprint and vehicle for implementing these recommendations. GLOS, as the

IOOS node for the Great Lakes region, will take the lead on the observational aspects for the Lake Michigan pilot in regard to refining network observational requirements.

**4. Prepare a report that documents activities and accomplishments of the Pilot Study and participate in preparing reports that refine network observational requirements.**

The LMMCC, GLOS and the Commission will complete this task. Commission staff will review all preceding products of the project and incorporate them into a report that documents activities and accomplishments of the Lake Michigan pilot study. Building upon what they learn from the tasks above, project partners will participate in preparing reports that refine network observational requirements.

**5. Identify management issues in the study area that would be better addressed if the monitoring gaps noted in item 2 above were filled and data were more comparable and accessible.**

U.S. EPA (MED and GLNPO), USGS and the Great Lakes states will complete this task. As identified in the Lake Michigan LaMP, one of the major management issues in the region is the continued cleanup of Great Lakes AOCs, the basin's most degraded waterways. The Lake Michigan basin contains 10 of these areas. Each AOC is stricken with a number of use impairments including, among others, degradation of benthos, restrictions on drinking water consumption, loss of fish and wildlife habitat, eutrophication or undesirable algae, beach closings, and restrictions on dredging activities. Each AOC has a remedial action plan (RAP) to address the use impairments of these waterways. As part of the RAPs, restoration targets are being or have been developed to assess progress toward addressing these impairments. Although monitoring is a required part of the process in order to remove or "delist" these waterways as AOCs, protocols for standard monitoring procedures are, in most cases, non-existent or in a partial implementation stage due to a paucity of observations. The Lake Michigan NMN pilot study could help determine monitoring protocols for AOCs if the data gaps identified in #2 above were filled.

Critical management issues in the Lake Michigan basin include the presence of cladophora in the nearshore zone and beach health. Through a current review of the Great Lakes Water Quality Agreement, there is a renewed desire to model the nearshore areas of Lake Michigan and other Great Lakes to better address the return of cladophora and nearshore processes related to beach health. Researchers are revising their models to account for the influence of mussels and nearshore processes related to beach closure. Nearshore data is likely needed to accomplish modeling of cladophora and beach health issues. Thus, a principal gap to fill is a comprehensive nearshore/coastal program that integrates with watershed/tributaries and offshore monitoring programs.

The parties identified above will produce a narrative statement on such management issues and how they can be better addressed for the Lake Michigan basin through the NMN.

#### **IV. Description of collaboration among the Lake Michigan study partners.**

Several important collaborative efforts have taken place or are currently underway in both the Lake Michigan and Great Lakes basins:

- *Lake Michigan Monitoring Coordination Council (LMMCC)*: Formed in 1999, the LMMCC provides a regional forum to coordinate and support consistent, scientifically defensible monitoring methods and strategies in the Lake Michigan basin. The focus of the Council is to improve monitoring collaboration and data comparability and to define a regionally coordinated agenda for monitoring and assessment of the Lake Michigan basin. The LMMCC is composed of resource-based workgroups that coordinate existing monitoring around several common considerations: monitoring objectives; spatial, temporal and parameter network design; methods

comparability; quality assurance and control planning; database sharing; and data analysis approaches.

- *Lake Michigan Mass Balance Study (LMMB)*: This project was a multimillion dollar, multiagency effort to measure the loadings, fate, and transport of contaminants within Lake Michigan. A substantial amount of data was collected between 1993 and 1995 on Lake Michigan tributaries, air deposition, and Lake Michigan water, sediment, and biota. Research was conducted to evaluate processes such as air-water exchange and the sediment-water interface. The project focused on PCBs, trans-nonachlor, atrazine, and total mercury; tributary and air deposition samples also were analyzed for additional parameters such as trace metals, other chlorinated pesticides, and nutrients. The development of a mass balance model, the final component of the study, was recently completed. The LMMB model results can be found in the 2006 Lake Michigan LaMP at <http://www.epa.gov/glnpo/lakemich/2006/>.
- *Lake Michigan Tributary Monitoring Project*: The purpose of this effort is to revisit select major Lake Michigan tributaries (the Fox, Kalamazoo, Grand Calumet, St. Joseph, and Grand rivers) that were sampled in the LMMB study to characterize present-day water column contaminant concentrations and loadings. Several federal and state partners from around the Lake Michigan basin have taken part in this project. The LMMB study described above is benefiting from the acquisition of a present-day validation data set. In addition, the Lake Michigan LaMP and Great Lakes Binational Toxics Strategy are benefiting from a revised set of water column PCB data and mass loading estimates. Data analyses will be complete this fall and presented at the 2007 State of Lake Michigan conference; the final report will be prepared in FY2008 and published in the LaMP.
- *Michigan Clean Water Corps*: The Michigan Clean Water Corps (MiCorps), administered under contract by the Great Lakes Commission, is a network of volunteer monitoring programs in Michigan. It was created through an executive order by Gov. Jennifer M. Granholm to assist the Michigan Department of Environmental Quality in collecting and sharing water quality data for use in water resources management and protection programs. The mission of MiCorps is to network and expand volunteer water quality monitoring organizations statewide for the purpose of collecting, sharing and using reliable data; educate and inform the public about water quality issues; and foster water resources stewardship to facilitate the preservation and protection of Michigan's water resources.
- *Milwaukee Metropolitan Sewerage District (MMSD) Corridor Study*: This study, begun in 2001, is a collaborative effort between the MMSD, Southeast Wisconsin Regional Planning Commission, WDNR, USGS, and area universities built in three phases: 1) Development of a regional database that includes all known tributary water quality data and defined data gaps; 2) A monitoring program designed to fill in the data gaps determined during phase one; and 3) Begun during FY2007, expanding the constituents and locations monitored during phase two. The data collected as part of field activities and the data maintained in the data warehouse will be used to assess future impacts, measure the benefits of watercourse modifications and other watershed management efforts, and detect new watercourse concerns or impairments.
- *Great Lakes Observing System*: The Great Lakes Observing System (GLOS) is a nonprofit corporation dedicated to providing wide community access to real-time and historic data on the hydrology, biology, chemistry, geology and cultural resources of the Great Lakes, its interconnecting waterways and the St. Lawrence River. GLOS is a regional node of the U.S. IOOS initiative.
- *Great Lakes Regional Collaboration*: The Great Lakes Regional Collaboration (GLRC) is a wide-ranging, cooperative effort to design and implement a strategy for the restoration, protection and sustainable use of the Great Lakes. It was initiated by President Bush's 2004 Executive Order calling the Great Lakes a "national treasure" and calling for a plan to restore and protect them. Eight strategy teams (Aquatic Invasive Species, Habitat/Species, Coastal Health, AOC/Sediments,

Nonpoint Source, Toxic Pollutants, Indicators and Information, Sustainable Development), each focusing on a different issue affecting the Great Lakes basin, developed recommendations for action that were released in December 2005 in the *Great Lakes Regional Collaboration Strategy to Restore and Protect the Great Lakes*. These recommendations focused on the steps that should be taken over the next five years to proceed with restoration to achieve the greatest results.

Among its recommendations was a call for dramatic acceleration of the cleanup process at Great Lakes Areas of Concern (see above). The document also emphasized that nonpoint sources of pollution contribute significantly to problems in the Areas of Concern, as well as to other locations in the Great Lakes, including the open waters, and listed a series of recommended actions to address these problems. The Strategy also called on the region to better coordinate the collection of critical information regarding the Great Lakes ecosystem and support the U.S.

Integrated Earth Observation System (IEOS) and IOOS as key components of the Global Earth Observation System of Systems (GEOSS). Although the issues described above only represent a small portion of the Strategy, they are clearly connected to the goals of the NMN design.

- *Great Lakes Coastal Wetlands Consortium:* The Great Lakes Coastal Wetlands Consortium, facilitated by the Great Lakes Commission, is working to design a long-term program to monitor Great Lakes coastal wetlands, through the development of indicators to assess the condition and overall status and trends of Great Lakes coastal wetlands. The group consists of science and policy experts drawn from U.S. and Canadian federal, state and provincial agencies and nongovernmental organizations. A monitoring plan for Great Lakes coastal wetlands is due out this fall. This work can contribute significantly to the refinement of the network design with input regarding coastal wetland monitoring.
- *Great Lakes Beach Association:* The Great Lakes Beach Association (GLBA) is made up of members from several Great Lakes states, including those surrounding Lake Michigan (Michigan, Indiana, Illinois, Wisconsin), as well as a diverse array of other agencies including local, county and state public health, regulatory agencies, coordinating agencies, researchers and environmental groups. The GLBA's mission is the pursuit of healthy beach water conditions in the Great Lakes area. To meet this goal, information is shared in four major categories: Investigative, Modeling, Methodology, and Information Systems. This group's work can also contribute to the refinement of the network design for coastal beaches.

## V. Meetings and events that will support the Lake Michigan Pilot Study.

The following meetings and conferences will provide forums for communicating with and coordinating contributions from Lake Michigan stakeholders in support of the Lake Michigan Pilot Study:

- *State of Lake Michigan Conference:* This fifth biennial conference will take place Oct. 3-5, 2007 in Traverse City, Mich. Key players from around the Lake Michigan basin, as well as the entire Great Lakes, will attend this event. It will include a session on the Lake Michigan Tributary Monitoring Project.
- *LMMCC Spring Meeting:* This meeting is tentatively scheduled to take place May 9-10, 2007. A special workshop for partners in the Lake Michigan pilot study for the NMN will take place during this time.
- *LMMCC Fall Meeting:* This meeting will take place in conjunction with the 2007 State of Lake Michigan Conference. A second workshop for partners in the Lake Michigan pilot study may occur at this time. This meeting could focus on the full gamut of ecological processes (including physical, as well as landscape and tributary relationship), and consider how this can and should shape the design and objectives of monitoring, its results, data interpretation, and utility.
- *Michigan Clean Water Corps Annual Conference:* The third annual MiCorps conference is tentatively scheduled to be held in October 2007 in Higgins Lake, Mich. The conference highlights work of volunteer monitoring organizations in Michigan, among other topics.

- *GLOS Annual Meeting:* The GLOS second annual meeting is scheduled for April 12-13, 2007 in Niagara Falls, NY.
- *International Association for Great Lakes Research (IAGLR) Conference:* The 50<sup>th</sup> anniversary of this large gathering of Great Lakes researchers and stakeholders is scheduled for May 28 – June 1, 2007 at University Park, Pa. The conference will recognize the history of research on the Great Lakes and our present state of knowledge, as well as take a look into the future of how IAGLR can address the complex limnological and management issues that lay ahead.
- *Great Lakes Regional Data Exchange (RDX) Conference:* This conference is scheduled for Oct. 28 – Nov. 1, 2007 in Ottawa, Ontario. RDX conferences bring together data exchange experts and decisionmakers from around the Great Lakes basin.
- *Great Lakes Commission Annual Meeting:* This meeting will be held Oct. 1-2, 2007 in Chicago, Ill. and will include senior agency managers, elected officials and other representatives from the Great Lakes states. Major Commission activities will be presented, likely with a special focus on Lake Michigan.
- *International Joint Commission Biennial Conference:* This important regional meeting will be held June 5-7, 2007 at the University of Illinois in Chicago, Ill. It is the primary forum for the U.S. and Canadian governments to report on actions under the Great Lakes Water Quality Agreement.

## **VI. Overview of major federal and nonfederal monitoring programs active in the Lake Michigan basin.**

- *National Water Quality Assessment Program:* The National Water Quality Assessment (NAWQA) Program is designed to describe the status and trends in the quality of the nation's ground- and surfacewater resources and to gain a better understanding of the factors that impact the quality of these resources. As part of the program, investigations are conducted in 59 "study units." Ultimately, the purpose is to provide a framework for national and regional water quality assessment. One of these study units is the "Western Lake Michigan Drainages."
- *U.S. EPA GLNPO Aquatic Contaminant Monitoring Program:* GLNPO is responsible for monitoring the water quality of the Great Lakes. GLNPO has been collecting data on levels of persistent bioaccumulative toxic (PBT) substances in air and fish since 1990 and the 1970s, respectively. Data complementary to the air and fish data is needed for the water so that U.S. EPA can accurately estimate the net amount of these pollutants that are being put into the lakes from the air and to determine how high levels are in fish relative to the levels in the water. Levels in fish can be millions of times higher than in the water itself. U.S. EPA monitored these contaminants in the past and in 2005 again for Lake Michigan.

GLNPO's water quality surveys generally focus on the offshore waters of the lakes (water greater than 30 meters in depth, or greater than three miles from shore). To ensure that sampling activities are representative of lake conditions, samples are collected from multiple sites within each lake basin. The surveys provide data to detect and evaluate trends and annual changes in chloride, nitrate nitrogen, particulate nitrogen, silica, total phosphorus, total dissolved phosphorus, particulate phosphorus, chloride, and reactive silica. The biology program monitors phytoplankton, zooplankton, benthic invertebrates, and chlorophyll a in the water column. Zooplankton and phytoplankton samples are collected twice per year, in spring and summer. The majority of benthos samples are collected in summer, although a small number of stations are visited in spring. Some benthos-only stations are located closer to shore.

- *U.S. EPA Wadeable Streams Assessment:* The Wadeable Streams Assessment is a study of the ecological condition of small streams throughout the United States, being conducted by state water quality agencies with support from the U.S. EPA. The study uses comparable methods at randomly selected sites stratified by ecoregion. The Escanaba and Menominee rivers in Michigan were part of this initiative's stream survey conducted in 2004.

- *USGS Cooperative Water Program (CWP)*: Numerous water quantity, water quality and data management studies are conducted in cooperation with local, regional, state, and tribal authorities throughout the Lake Michigan watershed.
- *Great Lakes Aquatic GAP*: An aquatic gap program is underway for the riverine systems of the Great Lakes region. A central database has been developed to accommodate stream habitat characteristics, aquatic biota sample collections, and habitat affinity information. Initial modeling for fish-environment relations has begun. A conceptual framework for identification and classification of coastal habitat types has been developed for near-shore coastal systems and applied to a pilot study area in western Lake Erie.
- *State water quality monitoring programs*:

**Illinois:** The Illinois *Water Monitoring Strategy* identifies the data collection programs and their associated goals and objectives to be carried out by the Illinois Environmental Protection Agency. Water quality for the Lake Michigan basin is monitored through a variety of programs: 1) Monitoring through the Great Lakes Program consists of sampling for fish contaminants and water chemistry. 2) Intensive Basin Survey Program is based on a five-year rotation and includes collection of biological, chemical and habitat data. Lake Michigan direct tributaries, the Calumet River and the Chicago/Little Calumet Rivers, were last completed in 2006. Lake Michigan harbors have also been monitored as part of this basin since 2001. 3) Special watershed (319) monitoring projects include the Waukegan River, which has been monitored periodically from 1994 through 2006. 4) Approximately 51 Lake Michigan beaches are sampled daily during the swimming season for *E. coli* bacteria by local agencies.

**Indiana:** The Surface Water Quality Monitoring Strategy (Strategy), developed by the Indiana Department of Environmental Management, directs the water quality assessment of Indiana's rivers, streams, and lakes for designated uses. The Strategy focuses on a watershed approach for addressing water quality issues and uses a five-year rotating study cycle of all major river basins in the state. Data collection efforts can be divided into the following categories: 1) Statewide Monitoring: Sampling of the Lake Michigan shoreline and selected rivers on a monthly basis each year; 2) Rotating Basin Monitoring: Probabilistic sampling of each basin once every five years according to the Strategy planning schedule; limited follow-up monitoring to identify sources of impairment; 3) Total Maximum Daily Load (TMDL): Sampling of waterbodies on the 303(d) list; and 4) Other Office of Water Quality (OWQ) Program Support: Special sampling projects to assist OWQ program areas.

**Michigan:** The Strategic Environmental Quality Monitoring Program for Michigan's Surface Waters (Strategy), developed by the Michigan Department of Environmental Quality, describes the necessary monitoring activities for a comprehensive assessment of water quality in Michigan's surface waters and guides Michigan's monitoring program implementation. Monitoring activities fall under one or more of the following types of study design: five-year Rotating Basin; Fixed Station; Probabilistic; and Targeted Sites/Special Studies. The five-year rotating basin approach serves as the primary study design for assessing current water quality status and attainment of Michigan water quality standards. The data generated by this approach allows MDEQ to identify impaired and high-quality waters, and to pinpoint causes and sources of impairment.

**Wisconsin:** The Department of Natural Resources is conducting a number of monitoring activities directly related to Lake Michigan water quality. They include:

- Coordination of local government monitoring of Lake Michigan beaches;
- With the River Alliance of Wisconsin, coordination of volunteer monitoring on a number of smaller tributaries to Lake Michigan;
- With the University of Wisconsin – Milwaukee Water Institute, research and monitoring of cladophora and other algae in nearshore waters of Lake Michigan, including the role of zebra and quagga mussels in the return of the algal mats on beaches;

- Flow-related phosphorus load monitoring on major tributaries to Lake Michigan, including the Milwaukee River, the Sheboygan River, the Manitowoc River, the Fox River and the Menominee River (re-initiated in 2006);
  - Monthly or quarterly long-term trends monitoring of a long list of pollutants near the mouth of major tributaries to Lake Michigan; and
  - Fish tissue analysis of PCBs, mercury and other bioaccumulative toxins in Lake Michigan waters.
- 
- *Volunteer water quality monitoring programs:* All of the states in the Lake Michigan pilot study area have active volunteer monitoring programs. In many cases, the data are collected using specific quality assurance/quality control techniques that allow the states to use this valuable data in water quality assessment reports, such as the Section 305(b) reports.