

Lake Michigan Lakewide Management Plan 2004 Status Report

Introduction

The purpose of this Lakewide Management Plan (LaMP) 2004 status report is to provide:

- An executive summary of the status of the Lake Michigan ecosystem;
- A report on the progress in achieving the Lake Michigan goals described in LaMP 2000 and examples of significant activities completed in the past two years since LaMP 2002;
- A summary of the current Lake Michigan mass balance data and findings;
- Links to more detailed information in LaMP 2000, 2002, or other sources;
- An opportunity to comment on targets and plans for pollution reduction and ecosystem restoration;
- A proposal to identify additional pollutants to be addressed by the LaMP in the future; and
- An overview of the 33 major sub-watersheds that flow into Lake Michigan, and their status.

What is the Status of the Lake?

“Lake Michigan is an outstanding natural resource of global significance, under stress and in need of special attention.” LaMP 2000

Since the release of LaMP 2002, several key indicators point to the continuing concern for the health of the ecosystem.

- Beach season data exhibited a continued number of beach closings.
- Data reveal that a critical layer of the Lake Michigan aquatic food web continues to disappear, and with the discovery of new aquatic nuisance species—there are now a total of 170 in the Great Lakes ecosystem—the integrity of the food web of Lake Michigan is in question.
- Mercury in fish 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.
- 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 ground water and surface water 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.
- 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.

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



The Lake Michigan-Mississippi River basin divide: Chicago Avenue west of East Avenue in Oak Park, Illinois.

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) have been successful and have received new resources from the passage of the 2002 Great Lakes Legacy Act. Their status is outlined in Chapter 8. The Lake Michigan Watershed Academy was launched from four states and has brought together the regional planning agencies for the first time.

Background on the LaMP

Under the Great Lakes Water Quality Agreement (GLWQA), as amended in 1987, the United States and Canada agreed "to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem." To achieve this objective, the parties agreed to develop and implement, in consultation with state and provincial governments, LaMPs for open waters. In the case of Lake Michigan, the only one of the Great Lakes wholly within the borders of the United States, the Clean Water Act (Section 118c) holds the U.S. Environmental Protection Agency (EPA) accountable for the LaMP.

Work on the Lake Michigan LaMP began in the early 1990s with a focus on critical pollutants affecting the lake. At that time, monitoring data showed that point source regulatory controls established in the 1970s and 1980s were reducing the levels of persistent toxic substances such as polychlorinated biphenyls (PCB), DDT, and other pesticides. Monitoring results also indicated that nonpoint sources of pollution such as runoff and air deposition, as well as aquatic nuisance species, were stressing the Lake Michigan ecosystem. The LaMP states that "pathogens, fragmentation and destruction of terrestrial and aquatic habitats, aquatic nuisance species, uncontrolled runoff and erosion are among the stressors contributing to ecosystem impairments."

It has been documented that core regulatory programs at the federal, state, tribal, and local levels have effectively controlled many pollutants.

Increased water quality protection is now being addressed with the adoption of more stringent water quality standards for the Great Lakes basin by each Great Lakes state, with the goal of having the new standards reflected in all permits by 2006. What remains is a set of difficult, persistent, and multifaceted problems. In response, agencies must develop new tools, refocus their strategies and methods, and continually obtain new data. As the 1994 State of the Lakes Ecosystem Conference reported, "governments have traditionally addressed human activities on a piecemeal basis, separating decision making on environmental quality from decision making on natural resources management or on social or economic issues..." In addition, decisions at different levels of government or across political boundaries are being made unilaterally without regard to watershed or ecosystem alignment. LaMP 2004 recommends using a watershed framework as the most effective scale and structure working on these problems.

Linking LaMP Goals to RAPs

Remedial Action Plans (RAP)

The GLWQA amendments of 1987 also called for the development of RAPs for specific Area of Concern. The two Federal governments were directed to cooperate with the state and provincial governments to develop and implement RAPs. The RAPs and LaMPs are similar in that they both use an ecosystem approach to assessing and remediating environmental degradation, focus on the 14 beneficial use impairments outlined in GLWQA, Annex 2, and rely on a structured public involvement process. RAPs, however, encompass a much smaller geographic area, concentrating on an embayment, a single watershed, or stretch of a river. The RAP focus is on local areas that also use impairments for the local areas and the lake as a whole.

Forging a strong relationship between the LaMPs and RAPs is important to the success of both efforts. The RAPs serve as point source discharges to the lake as a whole. Improvements in the AOC areas will eventually help improve the entire lake.

Much of the expertise and land use control about use impairments, possible remedial efforts and watershed planning reside at the local level. Cooperation between the two efforts is essential in order for LaMPs to remove lakewide impairments and for the RAP watershed to be able to restore integrity.

LaMP 2000, 2002, and 2004: How and by whom are they used?

The publication of LaMP 2000 documented the beginning of a basinwide dialogue on which pollutants and stressors should be prioritized for control, what reduction targets should be applied



Door County, Wisconsin, Lake Michigan Lakeshore
Photograph by Karen Holland, EPA

to them, and which ecologically rich areas should be identified for restoration and protection. Some issues, such as aquatic nuisance species, legacy sites, and drinking water protection, require immediate attention. Other issues continue to be the subject of public dialogue, and new issues may arise that require additional research. In 2000, the GLWQA Binational Executive Committee determined that an adaptive management approach would guide the LaMP process, making it an iterative approach. LaMP 2004 provides new information since 2002, responds to input received, and provides targets, objectives, and strategies and a set of watershed fact sheets for public comment.

What was Accomplished and What Challenges Remain?

Issues that were highlighted in LaMP 2000 and 2002 and that have been accomplished include the following:

- Setting targets for reduction of critical pollutants and stressors (see Chapter 7 and Appendix A),
- Reviewing the LaMP list of contaminants and stressors (see Appendix A),
- Filling data gaps, including the Lake Michigan Mass Balance Project (see Chapter 7),
- Identifying ecologically rich areas and habitats (see Chapter 4 and Appendix D),
- Developing the concept of the area of stewardship (see Chapter 9),
- Convening public conferences and workshops for development of a Total Maximum Daily Load (TMDL) strategy, beach management, monitoring issues, and watershed management (see Chapter 1), and
- Further developing remedial action plans and coordinating them with other basinwide and local efforts.

Progress made on accomplishing these objectives is outlined in this status report.

In addition, Appendix A to LaMP 2004 reports on a number of pollutants that could be placed on the LaMP pollutant list. The process for identifying LaMP pollutants, the 2004 pollutants list, potential pollutants to be added in 2006, and information on pollutant management activities completed since 2002 are presented in Appendix A.

Areas of LaMP Work that Remain a Challenge

Finalization of a monitoring plan and prioritization of indicators are still in progress. A draft monitoring plan was issued along with a set of recommendations in August 2000. To prioritize indicators and gather missing data, two major Great Lakes wide initiatives have begun that are focused on wetlands and the importance of the "coastal area." The results of these efforts will

Status of LaMP Pollutants Proposed in LaMP 2002

	Lake Michigan LaMP Pollutants Proposed in LaMP 2002	Lake Michigan LaMP Pollutants in LaMP 2004
Critical Pollutants	PCBs, chlordane, DDT/DDE, mercury, dioxin	PCBs, chlordane, DDT/DDE, mercury, dioxin
Pollutants of Concern	PAHs, lead, cadmium, chromium, copper, zinc, arsenic, cyanide, endrin, heptachlor epoxide, lindane, nickel, nutrients, pathogens, sediments	PAHs, lead, cadmium, chromium, copper, zinc, arsenic, cyanide, endrin, heptachlor epoxide, lindane, nickel, nutrients (a category which includes phosphorus), pathogens, sediments
Pollutant Watch List	atrazine, selenium, PCB substitute compounds	atrazine, selenium, PCB substitute compounds

provide not only new data but also refined indicators for wetlands, and the LaMP will utilize this work in finalizing a set of LaMP indicators by 2006.

One of the key functions of the LaMP process is to identify pollutants that are or have the potential to adversely affect the Lake Michigan ecosystem. In Appendix A to LaMP 2004, the process for identifying three categories of Lake Michigan LaMP pollutants on a geographic basis is outlined:

- Critical pollutants,
- Pollutants of concern, and
- Watch List pollutants.

LaMP 2004 finalizes the critical pollutants, pollutants of concern, and watch list pollutants that were proposed in LaMP 2002. See Table I-1. In addition, pollutants in each category are proposed for finalization in LaMP 2006. See Appendix A, especially Table A.6. Finally, a more detailed discussion of the LaMP pollutant identification process is provided in Appendix A.

In addition, a list of the pollutants that were proposed for these categories in LaMP 2002 and are now made final in LaMP 2004 is provided (see Table 1-1). Finally, information for a set of potential Watch List pollutants for LaMP 2006 is also provided in the Appendix.

A Focus on Ecosystems and Watersheds

In 1995, the Federal Interagency Ecosystem Management Task Force defined an ecosystem as “an interconnected community of living things, including humans, and the physical environment with which they interact. As such, ecosystems form the cornerstone of sustainable economies.” With regard to ecosystem management, the Task Force explained that “the goal of the ecosystem approach is to restore and maintain the health, sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities. Based on a collaboratively developed vision of desired future conditions, the ecosystem approach integrates ecological, economic, and social factors that affect a management unit defined by ecological—not political—boundaries.”

In 1998, the Lake Michigan Management Committee adopted the ecosystem approach. The significance for the Lake Michigan LaMP was the intent to address not only the 10 areas that had been formally designated AOCs by the 1987 GLWQA amendments, but also other areas that were responsible for impairing the lake’s ecosystem. The prime example was the Chicago area. Because of the rerouting of the Chicago River into the Mississippi River system, Chicago’s surface water has been diverted out of the basin;

however, groundwater from the Chicago area has not been diverted, and the city’s large airshed has been shown to be a source of pollutants that are deposited in and affect the lake. The watershed/diversion connection is currently critical as steps are underway to prevent invasive or aquatic nuisance species from entering the Lake from the Mississippi River system (See chapter 8).

A Focus on Partnerships and Innovation

As the LaMP 2000 points out, this framework “also develops partnerships of organizations brought together to solve problems too large or complex to be dealt with by one agency with a limited mission. This approach also has the potential to leverage and direct local, state and federal, and private resources into a coordinated effort. The challenge is to create the framework for participating organizations to contribute their expertise and resources, often on an uneven basis, but in a manner that allows all partners to participate in the decision making on an even basis” (see chapter 10).

A Focus on Shared Information

A key to engaging the necessary partners is a common, accessible, and scientifically sound body of knowledge. Lake Michigan protection and restoration requires open dialogue between academia and government agencies, as well as a collaborative monitoring plan to provide a current database. Reporting of current data and conclusions to the public is an important component of this system. This component presents many challenges, as data quality plans improve data accuracy but hinder the speed of reporting. Current management decisions are often made with gaps in both data and interpretation. These gaps may lead to incorrect problem assessments or incorrect response actions. The Lake Michigan LaMP has formed a basinwide coordinating and monitoring council to coordinate and promote common protocols and comparability in monitoring. The goal is to facilitate data sharing across agencies as well as among academic and research disciplines. Lake

Michigan as a studied object is a moving target, and to provide adaptive management, there is a continuing need for monitoring and reporting of the lake’s current status (see chapter 11)

A Focus on the Future: Sustainability and Stewardship

While partnerships can leverage resources, they also must be led and supported. Setting shared goals, objectives, and indicators in alignment helps to conserve resources but does not do away with resource needs. The interdependencies inherent in the ecosystem



**Yellow Moccasin, Gibson Woods, Indiana
Photography by Karen Holland, USEPA**

approach require a balance among three fundamental elements: environmental integrity, economic vitality, and sociocultural well-being. The ability of these elements to function in balance over time is one measure of sustainability. Complex ecological processes link organisms and their environment. These processes are often referred to as “ecological services” because they perform functions that combine to sustain life in the ecosystem. The significant natural features of Lake Michigan, such as its encompassing the world’s largest collection of freshwater sand dunes, supporting 43 percent of the Great Lakes’ large sport fishing industry, and providing drinking water for over 10 million residents, means billions of dollars not only to the economies of the four states that share the lake but also to the nation as a whole (see chapter 6).

Organization of the LaMP and this Status Report for 2004

This document is intended to provide a status report on the health of the Lake Michigan ecosystem and a summary of the activities related to the Lake Michigan LaMP that have occurred during the last 2 years. It is based upon the vision, goal and subgoals of the Lake Michigan LaMP. The vision and goal were adopted by the Management Committee August 18, 1998. The vision is:

A sustainable Lake Michigan ecosystem that ensures environmental integrity and that supports and is supported by economically viable, healthy human communities.

The LaMP goal is:

To restore and protect the integrity of the Lake Michigan ecosystem through collaborative, place-based partnerships. Specifically, this report is organized to provide a summary status report on the subgoals identified by the Lake Michigan LaMP. These subgoals are stated as questions and are organized in the following 11 chapters:

Sub-goals:

1. Can we all eat any fish?
2. Can we all drink the water?
3. Can we swim in the water?
4. Are all habitats healthy, naturally diverse, and sufficient to sustain viable biological communities?
5. Does the public have access to abundant open space, shorelines, and natural areas, and does the public have enhanced opportunities for interaction with the Lake Michigan ecosystem?
6. Are land use, recreation, and economic activities sustainable and supportive of a healthy ecosystem?
7. Are sediment, air, land, and water sources or pathways of contamination that affect the integrity of the ecosystem?
8. Are exotic species controlled and managed?
9. Are ecosystem stewardship activities common and undertaken by public and private organizations in communities around the basin?

10. Is collaborative ecosystem management the basis for decision-making in the Lake Michigan basin?
11. Do we have enough information, data, understanding, and indicators to inform the decision-making process?

Each chapter provides reports on current status, challenges and next steps. The chapters describes the status of the 11 Lake Michigan LaMP subgoals. The targets for each subgoal are depicted graphically, followed by a short description of the status of the subgoal and the challenges facing the LaMP process to improve the status of the subgoal. Key activities or updates relevant to the subgoal that have occurred over the past two years are then described, followed by a brief description of key next steps to achieve the subgoal targets.

Overall, the finding of this report is that the status of achieving the goals is mixed. Some successes have been achieved in pursuing these subgoals – notably, drinking water quality is generally good throughout the basin– but there is much room for improvement in all the other areas. Water quantity is an issue that is developing quickly. One objective of the LaMP is to foster activities that will cause the status of the subgoals to be “mixed/improving” by 2010 and “good” by 2020. A summary graphic at the start of each chapter of this report highlights the current and projected future status of each subgoal. In addition, following this introduction, an executive summary of this status report is provided in the form of a table. The table outlines the status of the subgoals organized under the strategic agendas outlined in LaMP 2000, significant activities completed in the last 4 years, and next steps to achieve the targets for each goal. Comments are requested on the next steps and proposed targets and other portions of the LaMP.

Following the status report, this document concludes with a proposal for updating the list of pollutants addressed under the LaMP. The LaMP has adopted an adaptive management approach that requires a continuing review of the LaMP goals and pollutants. The proposed process for updating the LaMP pollutant list along with an updated proposed list of pollutants for 2004 are provided in Appendix A and are being offered for comment. Appendix D includes

information on the 33 major watersheds of the Lake Michigan system.

What are the “Text” Boxes and What Do They Provide?

Throughout the document, “text” boxes are employed to portray examples of work underway in the basin, or, in some cases, a noteworthy event. They are also used to provide details of what is being discussed in the chapter. They often contain a web address where the reader can follow up if interested. The information does not necessarily imply LaMP activity.

Where Can I Find LaMP 2000 and the 2002 Status Report? Where Do I Send Public Comments?

Lake Michigan LaMP 2000 and 2002 are available on line at www.epa.gov/glnpo/michigan.html. For a CD or printed copy of the LaMP or to make a public comment, contact the U.S. Environmental Protection Agency, Mail Code T-17J, 77 West Jackson Boulevard, Chicago, IL 60604. Public comments are factored into LaMP deliberations and will be reflected in LaMP 2006.

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