

LAKEWIDE MANAGEMENT PLANS

An ecosystem approach to protecting the Great Lakes

INTRODUCTION

Few concepts enjoy such broad support as “the ecosystem approach” to management, the idea that management efforts should address environmental, economic and social factors in an integrated manner along ecological — rather than geopolitical — boundaries. By necessity, however, managers often focus on specific components of an ecosystem, such as individual species or pollution sources. A notable exception is the lakewide management planning process underway in the Great Lakes.

Lakewide Management Plans (LaMPs) stem from the Great Lakes Water Quality Agreement, originally signed by the United States and Canada in 1972. This historic agreement committed both countries “to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem.” To meet this commitment, the two governments agreed to develop and implement LaMPs for open lake waters and Remedial Action Plans (RAPs) for specific geographic Areas of Concern (AOCs).

The LaMPs are intended to identify critical pollutants that affect beneficial uses of the lakes and to present strategies, recommendations and policy options to restore those beneficial uses. According to Annex 2 of the agreement, the LaMPs “shall embody a systematic and comprehensive ecosystem approach to restoring and protecting beneficial uses ... [and] are to serve as an important step toward virtual elimination of persistent toxic substances ...”

LaMPs for lakes Erie, Michigan, Ontario and Superior have been developed. With leadership from the U.S. Environmental Protection Agency (U.S. EPA) and Environment Canada, the LaMP development process has entailed extensive involvement from numerous stakeholders within each lake basin. While time consuming and resource intensive, this process has produced comprehensive, binational plans to

protect and restore the lakes.

At the direction of the Binational Executive Committee, the LaMP process has been accelerated and streamlined, with new documents released for lakes Erie, Michigan and Superior in April 2000 reflecting existing knowledge and associated recommendations. Through an iterative approach, these documents will be updated and released every two years to incorporate new data, public input and other information.

Numerous opportunities for public input and involvement will be available between now and the release of the updated LaMPs in April 2002. Web sites for each LaMP will provide online public comment forms and display input received by the agencies. Public meetings will be held in coming months to educate stakeholders about the LaMPs, receive input and encourage actions to improve the lakes’ ecosystems. The web sites also will be updated to reflect implementation activities, new data and revised information.

This special feature highlights the new LaMPs for lakes Erie, Michigan and Superior. Also, the updated Lake Ontario LaMP is addressed, as are the Lake Huron Initiative and a proposed Lake St. Clair Management Initiative. Contacts are identified for each lakewide management planning initiative, if further information is desired.



LAKE ERIE

OVERVIEW

Lake Erie is the shallowest and most biologically productive Great Lake, supporting major municipal, industrial, agricultural, recreational and fishery uses. It has undergone considerable environmental change over time, being the most highly populated basin of the Great Lakes. The highly polluted conditions of the 1950s to the 1970s were reversed by controlling



View the Lakewide Management Plans for lakes Erie, Michigan, Superior and Ontario and the Lake Huron Initiative at www.epa.gov/glnpo/gl2000/lamps/

Prepared by the Great Lakes Commission, June 2000

domestic and industrial discharges to the lake, particularly phosphorus loadings. Populations of commercial and sport fish species have increased due to improving environmental quality and fishery management efforts.

ENVIRONMENTAL CONDITIONS

Lake Erie's water quality has improved through advances in wastewater and sewage treatment. However, stresses such as urbanization, improper agricultural practices and nonindigenous invasive species continue to adversely affect habitat and fish populations. The lake's shallow nature also makes it particularly vulnerable to land-use changes and associated pollutant loadings. The LaMP documents 11 beneficial use impairments for the lake: restrictions on fish and wildlife consumption, beach closings, degradation of fish and wildlife populations, fish tumors or other deformities, degradation of benthos, eutrophication or undesirable algae, degradation of plankton, loss of fish and wildlife habitat, bird or other animal deformities, degradation of aesthetics, and restrictions on dredging. The causes of impairment to date have been identified as PCBs, mercury, PAHs, lead, chlordane, dioxins, DDE, DDT, mirex, dieldrin, phosphorus, nitrates, *E. coli*, fecal coliform, nonindigenous invasive species, habitat loss and sediment loading. There are 12 AOCs in the Lake Erie watershed. Ten are located on tributaries to the lake, and the St. Clair and Clinton River AOCs empty into the upstream portion of the Lake Erie drainage basin.

SELECTED RECOMMENDATIONS

- Clean up and remove PCBs from the ecosystem
- Reduce mercury in the environment through education, proper collection and disposal, pollution prevention, and regulatory standards and programs
- Develop and implement a comprehensive habitat restoration plan
- Locate source areas for particular chemicals of concern
- Select one of four identified ecosystem alternatives for Lake Erie to guide future management
- Build stronger connections with other ongoing programs such as RAPs, the Great Lakes Fishery Commission and the Binational Toxics Strategy
- Continue to monitor ongoing and emerging issues, including nonindigenous invasive species, climate change, long range transport, endocrine disruptors and phosphorous management
- Continue to promote public involvement in protecting and restoring the Lake Erie ecosystem
- Research, monitor and communicate environmental health risks and how to minimize them

Contacts: Rita Garner, U.S. EPA Region 5, 312-886-2440, garner.rita@epa.gov; Marlene O'Brien, Environment Canada, 905-336-4552, Marlene.O'Brien@ec.gc.ca; www.epa.gov/glnpo/lakeerie/; www.cciw.ca/glimr/lakes/erie/



LAKE MICHIGAN

OVERVIEW

Lake Michigan is the second largest Great Lake by volume and the only one entirely within the United States. The basin contains the nation's third largest population center, the world's largest concentration of pulp and paper mills, and 40 percent of the nation's steel-making capacity. Fruit and grain production, as well as water-based recreation, are also important to the area's economy. The lake provides safe drinking water for 10 million people. Its basin extends from the colder, forested north woods to the more temperate southern dune and swale system and contains significant natural features and rare habitat, including 40 percent of the coastal wetlands of the entire Great Lakes system.

ENVIRONMENTAL CONDITIONS

The Lake Michigan ecosystem is an outstanding natural resource of global significance, yet is under stress and in need of special attention. The lake has 10 AOCs, and the LaMP documents 14 beneficial use impairments on local, regional or lakewide levels. Although efforts have been made to remediate damage, particularly in the area of chemical pollution at legacy sites, human impacts continue to impair the ecosystem. Toxic air deposition and nonpoint source pollution are significant problems. Fish advisories remain in effect. In some areas, drinking water supplies are susceptible to contamination. Some Lake Michigan beaches are closed periodically due to high bacteria counts. Unique habitats are fragmented by poor land-use practices, including uncontrolled development. Contaminated sediments threaten nearshore waters and wildlife. Many aquatic nuisance species have entered and spread within the ecosystem.

SELECTED RECOMMENDATIONS

- Develop guidelines for ballast water treatment to prevent new aquatic nuisance species introductions
- Clean up contaminated legacy sites by 2020
- Protect source water used by 10 million people
- Protect habitat
- Collaborate on fisheries projects
- Match decisionmakers with issues at the appropriate level
- Control combined sewer overflows and sanitary sewer overflows
- Develop an agriculture pollution prevention strategy
- Implement RAPs for AOCs
- Promote research to fill data gaps
- Develop a strategy to ensure long-term, consistent funding of Clean Sweep programs for each state
- Continue to develop the Lake Michigan Monitoring Coordination Council and establish a beach community monitoring network and a volunteer monitoring network
- Promote public involvement and online information, such as a habitat atlas in a Geographic Information System format

- Develop a cooperative approach to Total Maximum Daily Load efforts
- Strengthen partnerships with other education and outreach efforts to promote stewardship actions
- Research, monitor and communicate environmental health risks and how to minimize them

Contact: Rita Garner, U.S. EPA Region 5, 312-886-2440, garner.rita@epa.gov; www.epa.gov/glnpo/lakemich/



LAKE SUPERIOR

OVERVIEW

Lake Superior has the largest surface area of any freshwater lake in the world and is the deepest and coldest of the Great Lakes. The lake basin also is a center of industry, with manufacturing, pulp and paper, and maritime transportation providing an economic base. Lake Superior's basin is sparsely populated, with less development, urbanization and pollution than the other Great Lakes. In fact, most of the basin is forested with little agriculture because of its cool climate and poor soils. The basin contains estuaries, rare beach dune communities, and wetlands in their natural state with abundant plant and animal species, including moose, black bear, timber wolf and common loons.

ENVIRONMENTAL CONDITIONS

The Lake Superior basin is the least developed of all the lake basins, and much of it retains wilderness characteristics. Nonetheless, several stressors threaten the overall health of the ecosystem, including persistent bioaccumulative toxic chemicals introduced via atmospheric deposition from local and out-of-basin sources, nonindigenous invasive species, increasing development, loss of ecologically important wetlands, and urban runoff contaminated with pollutants and nutrients. Lake Superior has eight AOCs, and beneficial use impairments include restrictions on fish and wildlife consumption, fish tumors or other deformities, bird or animal deformities or reproductive problems, degradation of benthos, dredged materials requiring special handling, and eutrophication.

SELECTED RECOMMENDATIONS

- Implement strategies to achieve future pollution reduction targets, including voluntary agreements and cooperative efforts, outreach programs among regulatory authorities and emitters, product stewardship, incentive programs, and regulation
- Support and pursue activities to reduce mercury emissions
- Fill data gaps that hinder continued reductions in pollutant loadings to Lake Superior
- Encourage states to take innovative measures to address local air sources of targeted pollutants
- Monitor contaminant levels in the environment and human tissues to determine levels of exposure

- Support continued research into linkages between environmental contaminants and human health outcomes
- Communicate health risks and how to minimize them
- Protect and maintain existing high quality habitat sites in the basin and the ecosystem processes that sustain them, and restore degraded habitats
- Support a diverse, healthy and sustainable native wildlife community in the basin
- Gather basic biological and ecological information in order to understand the linkages between habitat and aquatic community structure and function
- Further assess the status of sustainability in the basin and implement projects to change social and personal behavior
- Implement efforts to prevent the introduction and spread of nonindigenous invasive species
- Encourage more extensive involvement by local and county government in the Lake Superior Binational Program
- Develop a more extensive commercial-industrial outreach program

Contacts: Kristina Bell, U.S. EPA Region 5, 312-886-7489, bell.kristina@epa.gov; Marlene O'Brien, Environment Canada, 905-336-4552, Marlene.O'Brien@ec.gc.ca; www.epa.gov/glnpo/lakesuperior/; www.cciw.ca/glimr/lakes/superior/



LAKE ONTARIO

The recently released Lake Ontario LaMP Update 2000 reports on progress made since the May 1998 release of a "Stage 1 LaMP" by Environment Canada, U.S. EPA, New York State Department of Environmental Conservation and the Ontario Ministry of the Environment. The Stage 1 LaMP was an action plan that included a three-year, binational work-plan identifying activities to further develop source reduction strategies and other actions to restore beneficial uses in Lake Ontario. Four lakewide beneficial use impairments and six critical pollutants (PCBs, DDT, mirex, dioxins/furans, mercury and dieldrin) are identified. Lake Ontario has seven AOCs.

The Update 2000 report notes that specific sources and pathways of critical pollutants were located, and work with local facilities and communities is reducing inputs of contaminants from these sources. New research shows that populations of colonial water birds, bald eagles, mink and otter are increasing, indicating improved ecosystem health. Population dynamics of the lower trophic levels of the lake's food chain reveal major changes in the functioning of the ecosystem. The agencies also have determined that loss of fish and wildlife habitat is a lakewide impairment caused by artificial lake level management; the introduction of nonindigenous invasive species; and the loss, modification or destruction of natural features through deforestation and damming of tributaries.

Numerous habitat restoration and protection efforts are currently underway in the Lake Ontario basin with support from

federal, state, provincial and other partners. Indicators to measure progress toward ecosystem objectives are in various stages of development, and the LaMP's public involvement committee continues to improve and expand links with existing organizations. More detailed information will be provided in the Lake Ontario LaMP 2000, targeted for release at the end of this year. A public meeting will be held on June 29 in Niagara Falls, N.Y.

Contacts: Mike Basile, U.S. EPA Region 2, 716-285-8842, nfpio@sysr.com; Marlene O'Brien, Environment Canada, 905-336-4552, Marlene.O'Brien@ec.gc.ca; www.epa.gov/glnpo/ontario.html; www.cciw.ca/glimr/lakes/ontario/

ADDITIONAL LAKEWIDE INITIATIVES



LAKE HURON

The goal of the Lake Huron Initiative is to restore and maintain the chemical, physical and biological integrity of the waters, tributaries, and nearshore terrestrial and aquatic ecosystems of Lake Huron. Initiated by the Michigan Office of the Great Lakes, the effort involves numerous state, provincial, federal, and local agencies and interest groups. After only one year, the Lake Huron Initiative Action Plan has been produced, outlining an action-oriented process to identify priority issues and future efforts to ensure sustainable use of the Lake Huron watershed.

Lake Huron critical pollutants have been proposed as PCBs, chlordane, dioxins, mercury, sediment/suspended solids, DDT, PBBs, metals, nutrients (phosphorus), pathogens (*E. coli*) and tritium. The lake basin has three AOCs. (A fourth, Collingwood Harbour, is the only AOC to be delisted to date.) The lake's critical stressors have been identified as nonindigenous invasive species, loss of essential habitat, habitat isolation, sedimentation and eutrophication.

To date, the primary focus of the Lake Huron Initiative has been protecting intact critical habitats and restoring degraded coastal wetlands, nearshore areas and tributaries.

SELECTED RECOMMENDATIONS

- Develop a Geographic Information System to quantify, map and identify remaining high-quality natural communities and important habitats
- Pursue long-term efforts to remediate the impact of dams and other barriers
- Expedite ongoing sediment cleanups in the Saginaw and Pine rivers
- Implement watershed management plans to reduce nutrients and sediment in tributaries
- Secure funding through the U.S. Department of Agriculture's Conservation Reserve Enhancement Program
- Implement a nonindigenous invasive species control plan

Contact: Jim Bredin, Michigan Office of the Great Lakes, 517-335-4232, bredinj@state.mi.us; James Schardt, U.S. EPA-GLNPO, 312-353-5085, Schardt.James@epamail.epa.gov; www.deq.state.mi.us/ogl/huron.html



LAKE ST. CLAIR

Often referred to as the "sixth Great Lake," Lake St. Clair is a vitally important resource shared by the United States and Canada. The lake is heavily used for recreational purposes and provides critical habitat for fish and migrating waterfowl. The St. Clair

River delta is the largest coastal delta in the Great Lakes and home to many rare animal and plant species.

Lake St. Clair has suffered from serious human-related impacts for decades. Nonpoint source pollution, combined sewer overflows and leaking septic systems have caused beach closures and threatened public health. Shoreline modifications and agricultural activities have altered natural habitat and dramatically reduced wetland acreage. Industrial discharges have contributed heavy metals, PCBs and other toxic pollutants to the lake and its sediments, leading to consumption advisories for several fish species. Aquatic nuisance species — such as the zebra mussel — have substantially altered the lake's ecosystem.

A December 1999 conference, *Lake St. Clair: Its Current State and Future Prospects*, showcased concerns over the lake's health and the need for a binational framework for managing it. In response, the Great Lakes Commission has proposed a Lake St. Clair Management Initiative. As conceived, the initiative will have a locally driven, binational orientation that builds upon and strengthens existing efforts on both sides of the border. The initiative will elevate the profile of the lake and help the binational Lake St. Clair community secure resources for development and implementation of a comprehensive management plan for the lake.

In follow-up to the conference, the U.S. EPA, Environment Canada, Michigan Department of Environmental Quality and Ontario Ministry of the Environment have agreed to address Lake St. Clair under the umbrella of the Four Agency Letter of Commitment, signed by the agencies in April 1998. This agreement identifies roles and responsibilities for the three binational AOCs for which the agencies share responsibility (Detroit, St. Clair and St. Marys rivers). This approach will enable the agencies to address the entire St. Clair River-Lake St. Clair-Detroit River corridor as one ecosystem and coordinate with existing structures, including the RAPs.

Contact: Mike Donahue, Great Lakes Commission, 734-665-9135, mdonahue@glc.org