LaMP UPDATE

LAKE ONTARIO • LAKEWIDE MANAGEMENT PLAN • LE PLAN DE GESTION PANLACUSTRE • DU LAC ONTARIO

LAKE ONTARIO LAKEWIDE MANAGEMENT PLAN UPDATE '99

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Lake Ontario Lakewide Management Plan - An Overview

Welcome to the first edition of the Lake Ontario Lakewide Management Plan (LaMP) Update. The purpose of this LaMP Update is to keep you informed of ongoing restoration and protection activities in the Lake Ontario basin. It addresses efforts implemented by the Four Parties through the LaMP, as well as related programs and initiatives implemented by our partners.

As many of you are aware, the Four Parties, consisting of the U.S. Environmental Protection Agency Region 2 (EPA), Environment Canada (EC), the Ontario Ministry of the Environment (MOE), and the New York State Department of Environmental Conservation (NYSDEC) are working in partnership to restore and protect Lake Ontario. In May of 1998, after consultation with other natural resource agencies and the public, the Four Parties finalized the Stage 1 LaMP for Lake Ontario.

The Stage 1 LaMP identifies the problems (known as beneficial use impairments) that exist lakewide in Lake Ontario, and the chemical, physical, and biological causes of these impairments. It also includes a binational work plan which identifies the activities that LaMP partners will be undertaking over the next three years towards the restoration of beneficial uses of the Lake.

LAKEWIDE BENEFICIAL USE IMPAIRMENTS	LAKEWIDE CRITICAL POLLUTANTS & OTHER FACTORS CAUSING IMPAIRMENTS
RESTRICTIONS ON FISH AND WILDLIFE CONSUMPTION	PCBS, DIOXINS, MIREX, MERCURY, DDT
DEGRADATION OF WILDLIFE POPULATIONS	PCBS, DIOXIN, DDT
BIRD OR ANIMAL DEFORMITIES OR REPRODUCTIVE PROBLEMS	PCBS, DIOXIN, DDT
LOSS OF FISH AND WILDLIFE HABITAT	LAKE LEVEL MANAGEMENT, EXOTIC SPECIES, PHYSICAL LOSS, MODIFICATION AND DESTRUCTION OF HABITAT

* Dieldrin is also included on the Lake Ontario LaMP List of Critical Pollutants although it is not directly associated with a use impairment.

The Four Parties, through the LaMP, are working to restore these beneficial uses by reducing the amount of Critical Pollutants in the Lake Ontario ecosystem and by addressing the biological and physical factors that have been identified. The ecosystem goals of the Lake Ontario LaMP are:

✓That the Lake Ontario ecosystem should be maintained and as necessary restored or enhanced to support self-reproducing diverse biological communities.

✓That the presence of contaminants shall not limit the uses of fish, wildlife, and waters of the Lake Ontario basin by humans and shall not cause adverse health effects in plants & animals.

✓That we as a society recognize our capacity to cause great changes in the ecosystem and conduct our activities with responsible stewardship for the Lake Ontario basin.

The Binational LaMP addresses issues that are lakewide in nature and require binational actions to resolve. We depend upon the continued success of the Remedial Action Plans (RAPs) and other geographically-targeted efforts to address issues of local

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Habitat Restoration Initiatives - Partnership in Action

On both sides of the border, habitat restoration activity has been proceeding in collaboration with many partners. Below are two examples of how stakeholders from all sectors of society have worked together to make change happen.

Habitat restoration partnership in action; sorting beachgrass.
[photo: S. Bonanno, Nature Conservancy]

Oshawa Second Marsh

D.Forder, EC

Nestled between the urban setting of the City of Oshawa and the shores of Lake Ontario, Second Marsh is one of the few remaining coastal wetlands in the area that provides habitat for fish and wildlife. This 123 hectare wetland is home to a variety of wetland plant species and provides recreational and educational opportunities for the local community. The health of Second Marsh has been in decline since the early 1930's due to a combination of human activities including alterations upstream of the marsh which have increased sedimentation and turbidity.

In response to the stresses on the wetland, Friends of Second Marsh, a community-based action group, and partners from all sectors, implemented the Second Marsh Management Plan and rehabilitation initiatives were undertaken. These partners include the Great Lakes 2000 Cleanup Fund, Environment Canada, Ontario Ministry of the Environment, Ontario Ministry of Natural Resources, City of Oshawa, Central Lake Ontario Conservation Authority, Ducks Unlimited Canada, Ontario Federation of Anglers and Hunters, Durham Board of Education, Trent University, Waterfront

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• Lake Ontario Lakewide Management Plan - An Overview

• Habitat Restoration Initiatives - Partnership in Action

The Lake Ontario LaMP Stage 1 is available on the following websites:
www.cciw.ca/glimr/lakes/ontario/
or
www.epa.gov/glnpo/lakeont/

Lake Ontario Lakewide Management Plan - An Overview

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concern, and will support these efforts whenever possible. The Lake Ontario LaMP and RAPs are only examples of the many programs that exist with the goal of restoring and protecting natural resources in the Lake Ontario basin. It is through the success of our cooperative efforts with these programs and many others that we have already seen dramatic and measurable improvements in the Lake Ontario ecosystem. For example, the herring gull populations are fully recovered after having had significant reproductive problems because of toxic chemicals such as DDT and PCBs. The number of Lake Ontario basin bald eagle nesting territories has steadily grown from 2 nests in 1984 to 8 nests in 1999. There is increasing evidence that lake trout are reproducing naturally in Lake Ontario and that lake sturgeon, lake herring and deep water sculpin are returning.

Despite the progress that has been made, we still have a long way to go. Contaminant levels continue to impair beneficial uses, and habitat loss and exotic species continue to be a problem. We will continue to depend heavily on existing and future partnerships forged at the federal, state, provincial, and local level to achieve our goals. It is the combined efforts of all of these programs, through the formation of effective partnerships at all levels, which will enable the successful restoration and protection of the Lake Ontario ecosystem. Essential to the success of our efforts is public involvement. We continue our commitment to improving our involvement with the public. We are committed to our annual public meeting, and are continuing to increase the membership of the Lake Ontario LaMP Lakewide Advisory Network, which will enable us to better inform you of our progress and assure your involvement in our efforts on a regular basis.

The articles contained within this LaMP Update describe some of the activities currently being undertaken in the Lake Ontario basin by the Four Parties and our partners, and are intended to highlight progress towards achieving the goals of the binational work plan which have taken place since the Stage 1 Problem Definition document was issued in May, 1998. Some of these activities are collaborative activities between the Four Parties while some are actions being implemented separately but in parallel. You will also find included an identification of the activities that the Four Parties plan to undertake in the near future (i.e., over the next year) towards achievement of Lake Ontario LaMP goals and implementation of the work plan. Names and points of contact are provided for each topic. We encourage you to use this contact information or to contact the numbers provided on page 11 to obtain more detailed information or to find out about upcoming activities. We encourage you to involve yourself in actions to improve the Lake Ontario basin ecosystem, and look forward to working in partnership with you to restore and protect Lake Ontario.

Habitat Restoration Initiatives - Partnership in Action

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Regeneration Trust, General Motors of Canada Limited and many others.

Habitat restoration activities have concentrated on improving habitat for fish and birds.

Log barriers were installed to facilitate plant growth by limiting wind and wave action and an emergent and submergent plant community is developing behind one of these barriers. Techniques have been implemented to prevent wildlife from consuming newly planted vegetation. Fish migration has been improved by the removal of a log jam and root-wads and cribs were designed and constructed to improve fish habitat. An original outlet to Lake Ontario was restored and islands were created to redirect flow and provide habitat. One of these islands has become the only known breeding site for at least 40 pairs of common terns in Durham Region. Artificial nesting platforms for osprey were erected and actions have taken place to control purple loosestrife.

The activity has not gone unnoticed. The promotion of the project in the community has fostered a sense of stewardship and now school groups, residents and tourists are visiting the Marsh for its aesthetic and educational values. Volunteers, a key component of the Second Marsh Project, have devoted their time to planting aquatic vegetation and building a secondary trail. Others assisted with the monitoring program by listening for calling birds and amphibians, calculating vegetation cover, and sampling water quality. Teachers and students from Durham Region also helped by growing wetland seedlings for planting.

An important component of the project is information sharing and technology transfer. Many of the lessons learned as well as the monitoring protocols that have been developed, are being used in other projects on Lake Ontario.

The Second Marsh Project is taking a proactive step in managing the Marsh by implementing a watershed stewardship program. The purpose of this program is to improve the quality of water entering the Marsh by encouraging landowners upstream to adopt environmentally sound land management practices. The Project is finalizing a strategy to guide future goals and objectives of the Management Plan.

Sandy Pond Beach Natural Area

S. Bonanno,

NATURE CONSERVANCY CENTRAL & WESTERN NY CHAPTER

In New York State, a broad range of public and private partners have worked together to conserve highly significant dune and wetland habitats along 17 miles of eastern Lake Ontario shoreline. The ecological function of the dunes is to shelter the wetlands and protect them from being encroached upon by blowing sand and by high energy wave action from Lake Ontario. The fragile dune barrier is threatened by sand loss caused by a variety of harmful activities.

Numerous private holdings lie amidst 6,500 acres of land protected as a state park, three NYSDEC wildlife management areas, a state unique area, and three Nature Conservancy preserves. Collaborating through The Ontario Dune Coalition, agencies, conservation organizations, local and county governments, and private landowners convened a Coordinated Dune Management Conference in October 1998. As one important outcome, the group will expand a pilot Dune Steward program to station seasonal stewards on all public access beaches. The Nature Conservancy will manage the program, which aims to encourage willing compliance with use guidelines and address problems in a comprehensive, cross-agency fashion.

Stewards have also worked with The Friends of Sandy Pond Beach, NY State Parks, DEC, private landowners, and The Nature Conservancy to restore about five acres of degraded dunes on four protected sites and two private sites with the rare native Champlain beachgrass. With advice and support from the United States Department of Agriculture, NY Natural Heritage Program, and the University of Vermont, The Friends will expand that effort in 1999, with native material cultured by local farmers to supply local needs.

Other recent efforts include development of an interactive dune education website, developed by NY Sea Grant, the Nature Conservancy and local school districts (www.cce.cornell.edu/seagrant/dune/dune.html). In addition, four NY universities and a Canadian agency have undertaken research to define the sources, transport, and fate of sandy sediments that supply the beaches, to explain apparent sand loss and make informed management decisions. Researchers are working with Coalition members, the US Army Corps of Engineers, and the shoreline towns of Sandy Creek, Richland, and Ellisburg.

- Habitat Restoration Initiatives - Partnership in Action
- Status of Lake Ontario Benthos

Status of Lake Ontario Benthos *S. Lozano, USEPA; F. Luckey, USEPA*

Benthic macroinvertebrates are small insect-like organisms that live in the bottom sediments of the Lake. Although they are rarely seen, they provide an important source of food for many types of fish including lake trout. Studies of Lake Ontario benthic organisms have been underway since the release of the Lake Ontario Stage 1 LaMP report and have given us a better understanding of the major factors affecting these organisms.

The potential for contaminants in lake bottom sediments to impact the health and reproduction of benthic organisms has been a major concern of US and Canadian researchers. Populations of benthic organisms have declined significantly since the 1960s. Contaminants, declining nutrient levels, changes in fish populations and exotic species are all factors that may have played a role in these historical changes. In order to gain a better understanding of current contaminant impacts on benthic organisms, sediment samples were collected throughout Lake Ontario. Pollution sensitive benthic organisms were then exposed to these sediments under laboratory conditions to evaluate sediment toxicity. Preliminary results show that contaminant concentrations in lake bottom sediments pose little to no toxicity to these sensitive test organisms. Sediment samples were also analyzed for PCBs, dioxins and other contaminants. The completion of these analyses will provide a better understanding of the distribution of toxic contaminants in bottom sediments. Localized impacts of toxic contaminants on benthic organisms have been documented in some Lake Ontario Areas of Concern where relatively higher levels of contamination are present. These problems are being addressed through local Remedial Action Plans.

Samples have also been collected to better understand the recent changes in the populations and distribution of benthic organisms throughout the lake. The invasion of the zebra mussel (Dreissena polymorpha) in the late 1980s has resulted in major population changes in native benthic organisms. A more recent arrival, the Quagga mussel (Dreissena Bugensis) is capable of living in deeper waters than the zebra mussels. Both types of mussels are referred to here as "zebra" mussels. Zebra mussels get their food by filtering large amounts of water to remove microscopic plants (phytoplankton) and other organic material present in the water. They are extremely efficient at what they do and leave little in the way of nutrients for other benthic organisms. Although this has resulted in dramatic improvement in water clarity, populations of native benthic organisms have generally declined and most Lake Ontario fish cannot eat zebra mussels. As a result, the nutrients captured by the zebra mussels remain trapped on the lake bottom and do not contribute to the production of healthy fish populations.

One of the most significant changes that is occurring is seen in populations of a small shrimp-like organism (Diporeia) which has made up more than 50% of the benthic organisms in the Lake with a few thousand organisms present per square meter of lake bottom. A decade after the zebra mussel invasion, fewer than 10 of these organisms can be found per square meter in waters up to 200 meters deep. This is a bad sign for the health of young lake trout and other fish that are dependent on this organism as a food source. However, some less important native benthic species have benefited from the zebra mussel invasion. Population increases have been seen in some shallow water (<10 m) native benthic organisms that are well suited to living on a lake bottom covered with zebra mussels and can feed on the mussel's waste products. Fish that feed on these organisms are benefiting from the increase in these benthic populations.

The impacts of the zebra mussel filtering effects have been most pronounced in the near shore waters (less than 100 m in depth). It remains to be seen how far out into the Lake these effects will extend. This highlights the need for continued research. Additional studies of Lake Ontario benthic organisms, phytoplankton, zooplankton are underway to develop a better understanding of these dramatic changes that are occurring in Lake Ontario's foodweb.

• Lake Ontario Critical Pollutant Track Down Strategies

• Ontario Tributary Monitoring Program

Lake Ontario Critical Pollutant Track Down Strategies

F. Luckey, USEPA

The next stage of the Lake Ontario LaMP process will emphasize the identification and control of sources of lakewide critical pollutants. Given the vast scale of the Lake Ontario watershed it can be hard to know where to start. Existing monitoring programs do not give us a complete picture of all critical pollutant problems so the LaMP needs to do more to identify all significant sources of critical pollutants. Review of historical land use information and strategic environmental sampling can help locate contaminant "hot spots" that require special attention. The following examples of contaminant track down sampling illustrate some of the approaches the LaMP can use to identify critical pollutant sources.

Black River PCB Track Down

During the mid 1980s Canadian researchers monitoring Lake Ontario water quality identified elevated PCBs at the mouth of the Black River in eastern New York. New York State monitoring of fish at the river mouth found elevated PCBs in fish tissue. There was little question that the Black River was being impacted by a source of PCBs. The river is more than 70 miles long with numerous hydroelectric dams, paper mills and other potential PCB sources making it difficult to know where to start to look for the source.

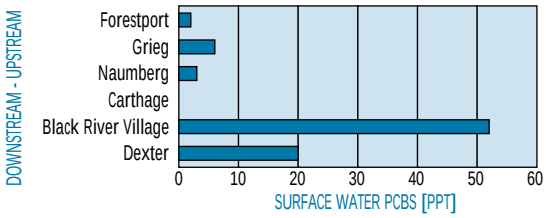


Figure 1. Use of water sampling to locate Black River PCB source area.

Water samplers able to detect low levels of contaminants were placed downstream of suspected source areas along the length of the river. PCB concentrations were found to dramatically increase between two villages (Fig. 1). Follow-up sampling indicated a PCB source was in the vicinity of the Carthage/West Carthage sewage treatment plant. The plant's wastewater was sampled and found to have elevated concentrations of PCBs. Based on this information, the sewage treatment plant received a one million dollar grant from New York State to improve its treatment system in order to help meet the LaMP's pollution reduction objectives. Sampling of wastewater in sewers "upstream" of the treatment plant is underway to find the origin of the PCB inputs to the system.

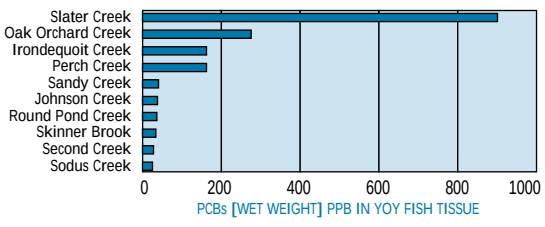


Figure 2. Using YOY fish samples to screen watersheds for contaminant problems.

Screening Watersheds for Contaminant Problems Using Young-of -the-Year Fish

Young-of-the-year fish (YOY) have long been used by Canadian and US contaminant monitoring programs to study trends in major Great Lakes rivers and harbors. These small minnow-like fish are collected and analyzed when they are approximately one year old and provide a snapshot of the types and levels of contaminants present in their local environment.

YOY can also be used to screen tributaries to identify watersheds with contaminant problems. YOY were collected from several tributary mouths along the south shore of the Lake for which there was little information on contaminant inputs. The results showed surprisingly high levels of PCBs in YOY fish in a creek within the Rochester Area of Concern (Fig. 2). Follow up sampling is underway at different points along this creek to locate the PCB source.

It is important to note that the contaminant problems identified by these examples would not have been identified through routine monitoring programs. Contaminant track down methods provide the LaMP with an important tool to achieve the virtual elimination of critical pollutants in the Lake Ontario basin.

Ontario Tributary Monitoring Program

H. Biberhofer, EC; D. Boyd, MOE

Similar to the work being conducted by the USEPA on the US side of Lake Ontario, Canadian agencies continue to examine potential sources of critical pollutants that may be contributing to the impairment of lakewide beneficial uses.

[photo: C. Strand, Environment Canada]

During the period from July 1997 to March 1998, the Ontario Ministry of the Environment and Environment Canada conducted a joint survey of critical pollutants in six Canadian tributaries to Lake Ontario. Sampling consisted of wet and dry weather samples using large-volumes and enhanced analytical protocols to improve characterization of chemicals that require low level detection limits.

The water quality of tributary flows into Lake Ontario reflects the influence of point and non-

point sources within the entire tributary watershed. While the relative volumes of flow from these rivers and streams are very small when compared to the Niagara River, these tributary inputs have the potential to degrade water quality in the narrow littoral zone of the lake, representing about 23% of the Lake's surface area (SOLEC 1996). The six tributaries that were monitored are: Twelve Mile Creek, Twenty Mile Creek, the Credit River, Humber River, Ganaraska River and Trent River.

Analysis of the results is in progress. A preliminary review indicates the following findings. None of the samples contained levels of chromium, mercury, mirex or any other organochlorine pesticides above the provincial water quality objectives for the protection of aquatic life. Depending on the location, total PCB was detected at median concentrations between 3 and 5 ng/l. Previous biomonitoring data for sportfish and juvenile fish clearly show a downward trend of PCB concentrations over the last two decades. The influence of urban land use on water quality is particularly apparent in the monitoring results for PAH. Median PAH concentrations were higher at the more urbanized Credit River and Humber River sites than at the other, less urbanized monitoring sites. Analyses for critical pesticides, such as DDT and its metabolites and dieldrin, showed low level detections at most locations, at levels well below the provincial objectives.

Additional sampling of tributaries may be required in the year 2000 to confirm some of these findings. The next steps will be determined once the analysis is completed.

Check It Out!

The Lake Ontario LaMP has a
website.

Read about the Lake and LaMP activities; find reports and fact sheets; and learn about upcoming meetings and opportunities to participate!

Find it at either:
www.cciw.ca/glimr/lakes/ontario/
or
www.epa.gov/glnpo/lakeont/

- Ontario Tributary Monitoring Program
- Lake Ontario Fish Community Objectives

Lake Ontario Fish Community Objectives

R. Lange, NYSDEC

The Lake Ontario fish community has undergone profound changes since European colonization of adjoining lands, including the loss or depletion of a number of native species due to the cumulative effects of habitat destruction, overfishing, pollution and interactions with non-native species. Recognizing the need for coordinated management to rehabilitate productive fisheries, state, federal, provincial and tribal agencies formulated *A Joint Strategic Plan for the Management of Great Lakes Fisheries* in 1981 (revised in 1997) under the auspices of the Great Lakes Fishery Commission. Among the strategies identified in this plan is the preparation of Fish Community Objectives for each of the Great Lakes, to be prepared by Lake Committees that are comprised of representatives from each of the agencies that exercise fisheries' management authority for each of the lakes.

The Lake Ontario Committee, which consists of representatives from the New York State Department of Environmental Conservation and the Ontario Ministry of Natural Resources, has recently revised Fish Community Objectives for Lake Ontario following a review of the status of the Lake Ontario ecosystem by scientists and extensive public participation that identified the preferences of fishery stakeholders. The objectives describe desirable fish community structure for three broad habitat zones: near shore, offshore pelagic and offshore benthic.

The objectives provide a common framework for each agency to develop and implement complementary fishery management programs for Lake Ontario, and serve as an interface with other environmental planning initiatives, including Remedial Action Plans and the Lake Ontario Lakewide Management Plan.

Lake Ontario Fish Community Objectives are considered to be dynamic in recognition of significant changes that are underway in the Lake Ontario ecosystem. The Lake Ontario Committee will evaluate progress toward meeting the Lake Ontario Fish Community Objectives and make necessary revisions at least every five years.

Lake Ontario Contaminant Mass Balance Modeling

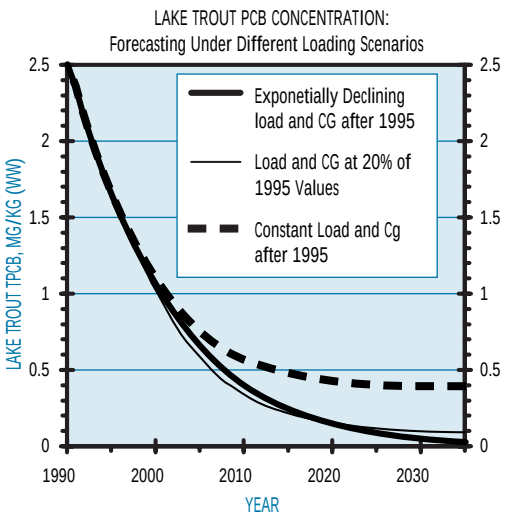
J. V. DePinto, Great Lakes Program, University at Buffalo

• Lake Ontario Contaminant Mass Balance Modeling

A group of researchers associated with the New York Great Lakes Research Consortium and supported by USEPA Region 2, have begun a multi-year project to improve the existing mass balance computer models that can predict how toxic contaminants move and bioaccumulate (accumulate in living organisms) in the Niagara River/Lake Ontario system, and what ultimately becomes of these contaminants (the fate of the contaminants).

A specific goal of this project is to assist the Lake Ontario LaMP by providing LaMP managers with a tool that aids in addressing specific management questions with more confidence. Some of the management questions include: What is the relative significance of each major type of source discharging toxic contaminants into Lake Ontario? How will contaminant levels in the lake and its biota respond to changes in contaminant loads and how long will it take? What is the effect of toxic contaminants in the sediments? Can observed trends in toxic contaminants over time be explained?

The first year of the project focused on acquiring data and developing a baseline model for Lake Ontario (referred to as LOTOX1) . Time was also spent analyzing both the data and the model to identify possible improvements. During the second year of the project, the research team developed a revised version of the Lake Ontario model (referred to as LOTOX2). The revised version has improved temporal and spatial resolution (i.e. can address the management questions at smaller time intervals and for smaller segments of the lake). The researchers also calibrated this version of the model by comparing the model output with data on suspended solids and PCB concentrations in the lake. This means that the concentrations of solids and PCBs calculated by the model accurately reflect the concentrations of solids and PCBs measured in the lake, given the conditions under which the data was collected. The research team then used the improved model to predict future PCB concentrations in Lake Ontario fish, water and sediments, under various scenarios of hypothetical future PCB loadings.



LOTOX2 Prediction of lake trout total PCB concentration in Lake Ontario after 1995 under different loading scenarios

The results of these studies provide important insights into the possible effects of PCB load reductions beyond what has already been achieved. The load reductions are reflected in the response of the lake, including how much the PCB concentrations in the lake decrease, and the response time (how long it takes). The figure shows the forecasts for levels of PCBs in lake trout under three different PCB loading scenarios: 1) Assuming no further load reductions. The loadings input to the model are held constant at recent (i.e. 1995) levels. This includes the atmospheric gas-phase PCB concentration (Cg). 2) Assuming the load continues to decrease at the same rate it has been decreasing. The load and Cg input to the model are decreased at the same rate that has been observed over the past 15 years. The rate of decrease is expressed using an exponential factor (0.125 per year). 3) Assuming an immediate load reduction, and then a constant load. In this case, the loads input to the model are instantaneously decreased to 20% of their values in 1995, and then held constant at the new level.

The key insights gained from comparing these loading scenarios are that continued PCB load reductions are expected to produce in-lake benefits, in this case exemplified by lower PCB concentrations in lake trout; but also that it will take some time for those benefits to be realized (see figure on this page).

The scenarios indicate the importance of historical PCB loads in determining the rate of decline in PCB concentrations in response to load reductions. As illustrated in the figure, the results suggest that it will take 10-20 years for the benefits of PCB load reductions to be realized. As the load is held constant, PCB concentrations in the lake trout stop declining (i.e. achieve a steady state) after about 20 years. However, the benefits of the load reductions become apparent after about ten years, the point at which the lines in the figure have diverged substantially. This delayed response is due primarily to the fact that the lake sediments act as a reservoir for the contamination. Over time, the more contaminated sediments, reflecting the higher historical loading, are buried under newer, cleaner sediment.

But despite the fact that PCB concentrations in fish are still responding to the historical inputs of PCBs, the results suggest the importance of banning PCB production and use in the 1970s. The figure illustrates the substantial decline in PCB concentrations in the lake because of the large reductions in load over the past 15-20 years. On average, lake trout in Lake Ontario today have PCB levels below 2 ppm (parts per million). Furthermore, the scenarios indicate that continued load reductions will produce additional benefits to the lake, as reflected in the differences in the ultimate lake trout PCB concentrations among the scenarios.

During the coming year, the research team has plans to further develop the model to learn more about other Lake Ontario LaMP critical pollutants (DDT and its metabolites, mirex/photomirex, dioxins/furans, mercury, and dieldrin). Some of these contaminants may not demonstrate the same behavior as described above for PCBs, since they may behave differently in the environment and have different historical and current patterns of loading.

Since there is limited data for the other Lake Ontario LaMP critical pollutants, it will be difficult to get similarly accurate results from the model. Therefore, the research team will compile all loading data for these pollutants over the next year. By improving the data, the research team can be more confident in the results of the model. Updating the data for the critical pollutants will also help the Lake Ontario LaMP Workgroup develop a Stage II (a schedule of load reductions) document.

The Great Lakes Binational Toxics Strategy

R. Cestaric, USEPA

• The Great Lakes Binational Toxics Strategy

The Great Lakes Binational Toxics Strategy (BNS) was developed in keeping with the objective of the Great Lakes Water Quality Agreement to restore and protect the Great Lakes basin. Signed on April 7, 1997 by the U.S. and Canada, the Strategy targets persistent, toxic and bioaccumulative substances in the Great Lakes for designated reductions within a ten-year time frame. The BNS was developed cooperatively by the U.S. and Canada, with input from states, provinces, industry, environmental groups and other stakeholders. These groups are working together to identify ways to virtually eliminate from the Great Lakes the targeted substances. The level one substances (i.e. those previously identified by governments) are dioxins/furans, mercury, PCBs, hexachlorobenzene, benzo(a)pyrene, alkyl lead, octachlorostyrene, and certain canceled or restricted pesticides (aldrin/dieldrin, chlordane, DDT, mirex and toxaphene).

The goals and objectives of the Binational Toxics Strategy are compatible with those of the Lake Ontario LaMP because the list of BNS target pollutants includes all of the LaMP critical pollutants. Contaminant reduction efforts initiated under the BNS will directly support the LaMP's goals to virtually eliminate Lake Ontario critical pollutants. Unlike the Lake Ontario LaMP, which has a limited geographic focus on critical pollutant sources within the Lake Ontario basin, the BNS includes the entire Great Lakes basin and also will seek to reduce sources of atmospheric contamination located outside the Great Lakes basin. The BNS aims to reduce current releases of target pollutants from a range of industrial, manufacturing and agricultural activities through voluntary actions. The LaMP also supports the development of voluntary actions, but in addition includes a strong focus on the identification and control of contaminant problems related to historical releases of critical pollutants.

Examples of partnerships and actions underway through the Binational Toxics Strategy include:

Grants were provided to the National Wildlife Federation (NWF), Great Lakes United, and the Council of Great Lakes Industries to assist with both Strategy implementation and reduction activities. NWF, for example, is involved with on-the-ground mercury reduction projects in the hospital/medical sector. These groups are also working with their constituencies both in the Great Lakes basin and beyond, to raise awareness, document toxic reductions, and spur actions to implement the Strategy.

In 1998, EPA and the American Hospital Association signed an agreement to virtually eliminate mercury-containing hospital wastes and to reduce total hospital waste one-third by 2005. In partnership with the Ontario Hospital Association, a pollution prevention training program has been delivered to over 80 Ontario hospitals. Several have signed-on to develop action plans for the reduction of mercury under Pollution Probe's MERC challenge.

Three northwest Indiana steel mills entered into an agreement with U.S. EPA to reduce the use of mercury at their facilities. The companies agreed to inventory all of the mercury in use at their facilities and to develop specific reduction plans that include equipment substitutions, target purchasing practices and employee education.

The U.S. chlor-alkali industry voluntarily committed to reduce mercury use 50 percent by 2005. The industry reported that their use of mercury fell by one-quarter during 1996-1997.

The Canadian Automotive Manufacturers Pollution Prevention Project, begun in 1992, reports voluntary reductions of toxic substances annually. To date, 333,000 tonnes have been removed from the waste streams.

In the General Motors Southern Ontario PCB destruction demonstration that uses a new gas phase reduction process, PCBs in 90 tonnes of liquid, 800 tonnes of solid material/equipment and 180 tonnes of contaminated soils have been destroyed to date. Ambient air monitoring conducted by the Ontario Ministry of the Environment show PCBs below detectable levels during the destruction process.

Under the Binational Toxics Strategy, the jurisdictions have accepted challenges of reaching significant milestones on the path to virtual elimination. Confirmation that five bioaccumulative pesticides, alkyl-lead and octachlorostyrene are no longer released from current industrial, manufacturing and agricultural activities in the Great Lakes basin was reported in three challenge reports released in 1998. These reports as well as the 1998 BNS progress report can be found on the BNS website at http://www.epa.gov/glnpo/p2.html.

Remedial Action Plans

Remedial Action Plans (RAPs) were called for by the 1987 amendments to the Great Lakes Water Quality Agreement, signed by the federal governments of the United States and Canada. The federal governments, in cooperation with state and provincial governments, committed to develop and implement RAPs in 43 Areas of Concern (AOCs). The RAP process strives to identify environmental problems (beneficial use impairments); identify pollutants causing the problems; identify the sources of the pollutants; recommend and implement remedial activities to restore the beneficial uses and document progress towards restoration. The ultimate goal, therefore, is to restore the area's beneficial uses and be able to delist the AOC. Read on to find out about what's happening with some of the Lake Ontario RAPs. You can also find information on the following websites: www.cciw.ca/glimr/program-RAPs.html or www.great-lakes.net/places/aoc/ontaoc.html.

- Remedial Action Plans
- Eighteenmile Creek
- Rochester Embayment
- Oswego River
- Toronto
- Hamilton Harbour
- Port Hope Harbour
- Bay of Quinte

Eighteenmile Creek (NY)

Currently the RAP is continuing the investigation and assessment of creek sediments; evaluating possible sources of PCBs and other contaminants; remediating inactive hazardous waste sites in the area; monitoring the creek; improving combined sewer overflows (CSOs) and continuing surveillance activities. Implementation activities include: sediment core sampling; an investigation of the hazardous waste site at Williams Street Island and an evaluation of potential contaminant sources within the sewer system in the City of Lockport, NY.

Rochester Embayment (NY)

Monroe County Department of Health takes the lead role in implementing the RAP. Currently the oversight committees are developing delisting criteria and tracking implementation activities: establishing a lawn care education program; establishing a pollution prevention program for auto recyclers; maximizing phosphorus removal at small wastewater treatment plants; creating a water quality education collaborative organization and establishing a phosphorus loading goal.

Oswego River (NY)

Habitat restoration was identified as the key activity which needs to be addressed in order to move the RAP forward in the implementation process. The Remedial Advisory Committee will be focusing on the recommendations, next step remedial strategies, and restoration/protection criteria for the Area of Concern.

Toronto (Ontario)

Implementation of the RAP is well underway with municipalities and local interest groups leading the way. Progress is being made across the AOC: levels for most organic chemicals are declining in fish, water and sediment; the Eastern Beaches are now open almost all the time; and as a result of extensive habitat restoration efforts, species of fish and wildlife are returning to areas previously severely degraded.

Hamilton Harbour (Ontario)

Major successes have been the opening of Bayfront Park and re-opening of beaches in the west end; the installation of 4 combined sewer overflow tanks; construction of habitat, public walkways and lookouts; achievement of initial goals for phosphorus, ammonia and suspended solids by the second-largest waste water treatment plant discharging into the harbour; marsh restoration at Cootes Paradise; and involvement of hundreds of landowners in a watershed stewardship program.

Port Hope Harbour (Ontario)

Port Hope Harbour is part of a town-wide radioactive waste contamination problem. Clean up of the Harbour will therefore be guided by the overall Port Hope clean-up effort. In March, 1999 a study on the conceptual design of a low level radioactive waste storage facility was submitted to Port Hope Council. Council endorsed the study and indicated that they would be sending the report formally to the federal Minister of Natural Resources for approval.

Bay of Quinte (Ontario)

Implementation of many of the recommendations in the Stage 2 document of the RAP have been, or are currently being implemented. Nearly 20,000 hectares of farmland has been converted from conventional to conservation tillage to prevent erosion and reduce nutrient run-off; phosphorus inputs from all rural sources have been lowered by nearly 9,000 kg annually; sewage treatment plants bordering the Bay of Quinte have reduced phosphorus loads by nearly 50% of 1986 levels; and 40 kilometers of shoreline habitat have been restored.

Lake Ontario LaMP Public Involvement

M. O'Brien; EC & M. Gadoua, NYSDEC

Public involvement and partnerships are key to the success of the Lake Ontario LaMP. Achieving the goals of the LaMP depends, in part, on greater public awareness, local community actions, and partnership between governments, the private sector and the public. In the Lake Ontario LaMP Stage 1, the Four Parties committed to an active public involvement program that includes three levels of involvement:

- Partnerships (or Basin Teams) to promote understanding and connections;
- A mailing network to keep people informed; and
- Binational Forums to discuss key decisions or issues

This format was based upon input from the public, that guided the Four Parties toward a structure that would provide various opportunities for people to learn about the Lake Ontario LaMP; stay informed about progress and participate in LaMP activities. Below is a summary of individual agency and binational partnership development and public involvement efforts:

USEPA/NYSDEC:

During the past two years, NYSDEC with support from USEPA, met with regional agencies, groups and organizations in the Lake Ontario basin to decide how to effectively exchange information and coordinate regional and Lake Ontario LaMP actions. These meetings ultimately lead to the creation of the Lake Ontario Regional Partners group.

Specifically, the Lake Ontario Regional Partners group comprises partners responsible for planning and implementing water quality/watershed management actions in the Lake Ontario basin including: Regional staff from NYSDEC, NYS Department of Health, NYS Department of State, NYS Department of Agriculture and Markets, Regional Planning and Development Boards, Finger Lakes-Lake Ontario Watershed Protection Alliance, Natural Resources Conservation Service, NYS Soil and Water Conservation Committee. The ultimate goal is to have partners working more effectively, sharing resources, avoiding duplication and maximizing opportunities for connecting and/or coordinating activities in NYS's Lake Ontario basin.

NYSDEC and USEPA have distributed information about the Lake Ontario LaMP and related water quality and habitat programs available to our Lake Ontario Regional Partners group as well as RAP committees, angler groups, natural resource organizations etc. Earlier this year, a letter from the NYSDEC and USEPA offered staff time to meet with partners to discuss LaMP activities and possible connections to local/regional efforts.

EC/MOE:

In Canada, efforts have centered around expanding partnerships with other agencies involved in programs closely related to LaMP efforts as well as with agencies responsible for watershed management. Meetings have been held with the Department of Fisheries and Oceans, the Ontario Ministry of Natural Resources and the Ontario Ministry of Agriculture, Food and Rural Affairs in an effort to see how we can work more closely together.

Connections have been made with watershed groups, most notably the Toronto-based Waterfront Regeneration Trust and conservation authorities in the Lake Ontario region, with a view to examining how they can contribute to technical efforts in the LaMP. We are also looking to enlist their support in getting LaMP messages out to the individuals and organizations that they communicate with on a regular basis.

An example of the latter is the linkage with the Lower Trent Conservation Authority in their Big Cleanup Trailer summer tour. The trailer, containing a number of displays promoting awareness of environmental issues, was taken to a variety of local events around the Bay of Quinte in eastern Ontario. The Lake Ontario LaMP had a display space in the trailer which enabled us to spread the message about the LaMP through the exhibit and to distribute printed materials to the public.

Members of the LaMP team have made presentations at regular meetings of some of these other organizations in order to educate their members about the LaMP.

Binational:

Some highlights of binational public involvement efforts:

- The Lake Ontario LaMP has a Home Page! Check our website for information about the LaMP and public involvement activities.
- The Four Parties produced an informative brochure about the Lake Ontario LaMP that is available for your information and distribution to your group or organization.
- The Four Parties hold annual public meetings to present information and progress related to both the Lake Ontario LaMP and the Niagara River Toxics Management Plan (NRTMP).

• Lake Ontario LaMP Public Involvement

Lake Ontario Lakewide Management Plan - Next Steps

B. Spinweber, USEPA

The binational work plan identifies the activities that the Four Parties plan to take towards additional development of source reduction strategies and other actions to restore all of the beneficial uses of Lake Ontario. Some of the work plan items are already being implemented, as can be seen by the information provided in this LaMP Update. We would like to give you a better idea of activities planned for the next year and encourage your support and involvement in our public consultation activities. What follows is a summary of the next steps that the Four Parties are planning to take in the short-term.

• Lake Ontario Lakewide Management Plan - Next Steps

Reducing Inputs of Critical Pollutants and Other Pollutants

The Stage 1 Lake Ontario LaMP identifies 6 Critical Pollutants (PCBs, DDT, mirex, dioxins/furans, mercury, and dieldrin) as causing use impairments or likely to cause use impairments because they exist in the water, sediments or biota at levels that exceed U.S. or Canadian standards and criteria. The Four Parties, working through the LaMP, are committed to reducing the inputs of these chemicals, as well as other, similar chemicals that are persistent (remaining in the water, sediment, and biota for long periods of time) and bioaccumulative (accumulating in aquatic organisms to levels that are harmful to human health).

Over the next year, the Four Parties will keep working towards reducing inputs of these pollutants. In the U.S., EPA and NYSDEC will continue to implement its source trackdown program (see article by Fred Luckey, pg. 4) in order to further identify sources of Critical Pollutants. They will analyze the findings of this sampling and work with local facilities and communities to reduce the inputs from these sources. In Canada, Environment Canada and MOE will analyze results from their tributary monitoring study, and develop appropriate actions based upon the findings of that study.

In September of 1997 and 1998, workshops were held to update resource managers and scientists in the U.S. and Canada on the improvements made to the mass balance models for Lake Ontario (see Joe DePinto's article on page 6). The Four Parties are currently exploring opportunities to work together to enhance these models so that they can be used with more confidence to make decisions and estimate the success of our remedial efforts.

Updating Lakewide Beneficial Use Impairments

Scientists from the Four Parties are currently coordinating with their partners at the federal, state/provincial, and local level to compile information on the current status of Bald Eagles, colonial waterbirds, and mink and otter populations throughout the Lake Ontario basin. The Lake Ontario LaMP Workgroup will utilize this information to determine what steps, if any, are necessary to further reduce contaminant levels affecting these populations. Similarly, work is ongoing to further assess the chemical impacts on benthos, phytoplankton and zooplankton populations. This information will be used to produce revised binational use impairment assessments over the next year. Updating our knowledge of the factors adversely impacting these populations will enable us to identify actions to address these factors.

Managing Biological/Physical Factors

In the U.S., EPA has approached the New York State Interagency Wetlands Task Force to convey the goals of the Lake Ontario LaMP and offer assistance in wetland restoration activities in New York State. To this end, EPA is organizing a planning meeting for federal, state, local, and non-profit entities dealing with habitat issues in the Lake Ontario basin. This meeting will enable the transfer of information regarding habitat needs and ongoing restoration projects, identify potential funding sources, and allow EPA to promote the Lake Ontario LaMP goals and role of the LaMP in habitat protection activities.

In Canada, Environment Canada and the Ontario Ministry of the Environment will continue to work with the Department of Fisheries and Oceans and the Ontario Ministry of Natural Resources, to further define priority issues and actions that can be undertaken to restore fish and wildlife habitat. The Great Lakes Wetlands Conservation Action Plan and the Conservation Authority Shoreline and Watershed Management Plans are critical to LaMP goals.

Developing Ecosystem Objectives and Indicators

Draft ecosystem objectives are provided in the Stage 1 LaMP, and were also presented to the public at the State of the Lakes Ecosystem Conference (SOLEC) held in October, 1998. Over the next year, the Lake Ontario LaMP Workgroup, in consultation with the Lake Ontario Committee of Fisheries Managers, the U.S. Fish and Wildlife Service, and the Canadian Wildlife Service, will further develop the draft wildlife and benthic indicators and propose them to focus groups of the public for review and comment. Pelagic indicator development will be a longer process which will link in with the Lake Ontario Committee's Fish Community Objectives setting exercise. The development of ecosystem objectives and indicators in conjunction with the public will assure that we have a mechanism to measure the success of our efforts which is acceptable to all interested stakeholders in the Lake Ontario basin.

Facilitating Public Involvement

As specified in the Stage 1 LaMP, public involvement efforts are focused towards the Lake Ontario Lakewide Advisory Network. Newsletters, fact sheets, and other appropriate communications are forwarded to those on the Lake Ontario LaMP mailing list as new information or updates become available. (Fact sheets conveying the status of Bald Eagles, colonial waterbirds, and mink and otter populations are currently being prepared.) The Lake Ontario LaMP Public Involvement Committee will continue to seek to improve and expand our partnerships with entities already in the Lake Ontario basin (see article by Marna Gadoua and Marlene O'Brien, pg. 9). We also look to reach a broad segment of the population by improving the binational LaMP website.

Additionally, significant decision points in the LaMP process (such as the development of indicators for Lake Ontario) may call for a public forum or subject-specific, targeted focus groups to reach more of the stakeholders in the basin.

Reporting

This LaMP Update serves as the Four Parties' annual status report and we plan to provide an Update for the next public meeting in 2000. It is our intent to have a Binational Draft Stage 2 LaMP for Lake Ontario ready for review by the public in the fall of the year 2000.

Should you have questions on any of the articles please contact the author:

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