

LAKE ONTARIO TOXICS MANAGEMENT PLAN  
1991 UPDATE  
- EXECUTIVE SUMMARY -

LAKE ONTARIO SECRETARIAT

United States Environmental  
Protection Agency

New York State Department of  
Environmental Conservation

Environment Canada

Ontario Ministry of the  
Environment

## TABLE OF CONTENTS

	<u>Page</u>
I. Introduction	1
II. Goal and Objectives	2
Objective 1: Reductions in Toxic Inputs Driven by Existing and Developing Programs	2
Objective 2: Further Reductions in Toxic Inputs Driven by Special Efforts in Geographic Areas of Concern	3
Objective 3: Further Reductions in Toxic Inputs Driven by Lake-Wide Analysis of Pollutant Fate	3
Objective 4: Zero Discharge	5
III. Scope	7
IV. Management of the Plan	10
V. Public Involvement.	12
VI. Accomplishments to Date	14
i) Ecosystem Objectives	14
ii) Fate of Toxics	16
iii) Standards and Criteria	17
iv) Pollution Prevention	19
VII. 1992 and Beyond	22
Appendix	

I. INTRODUCTION

On February 4, 1987, the Four Parties (Environment Canada, the Ontario Ministry of the Environment, the United States Environmental Protection Agency, and the New York State Department of Environmental Conservation) signed a Declaration of Intent that included a commitment to develop a Toxics Management Plan for Lake Ontario. Shortly thereafter, the Four Parties formed a Lake Ontario Toxics Committee, under the direction of the existing policy level Coordination Committee, to develop the Plan.

A draft Lake Ontario Toxics Management Plan (LOTMP) was presented to the Co-ordination Committee on January 28, 1988. Following an extensive public outreach effort to ascertain the public's views regarding the draft document, the LOTMP was approved by the Four Parties in February 1989.

Progress under the LOTMP has been made in a number of areas since that date. As a consequence the Lake Ontario Secretariat has prepared an update of the LOTMP containing new information on the state of toxic chemical contamination in the lake, plus status reports on the development of fate of toxics models, ecosystem objectives and standards and criteria.

The Lake Ontario Toxics Management Plan 1991 Update is available at repositories listed in Appendix A. The Executive Summary document provides an overview of the Plan, and highlights recent developments.

## II. GOAL AND OBJECTIVES

The goal of the Lake Ontario Toxics Management Plan is a Lake that provides drinking water and fish that are safe for unlimited human consumption, and that allows natural reproduction, within the ecosystem, of the most sensitive native species, such as bald eagles, ospreys, mink and otters.

To achieve this goal four objectives have been identified specific to the reduction of toxic chemical inputs. These are:

### Objective 1: Reductions in Toxic Inputs Driven by Existing and Developing Programs

The LOTMP provides descriptions of the existing and developing programs to control toxics in the United States and Canadian portions of the Lake Ontario drainage basin. Included in the Plan are status reports on the United States and Canadian programs for:

- o Direct Industrial Discharges;
- o Indirect Industrial Discharges;
- o Municipal Discharges;
- o Waste Disposal Sites (active and inactive);
- o Combined Sewer Overflows;
- o Stormwater Discharges;
- o Other Nonpoint Sources;
- o Air Toxics;
- o Spills;
- o Dredging and Dredged Material Disposal;
- o Solid Waste;
- o Sludge Disposal;
- o Ambient Water Monitoring;
- o Stream Classification (U.S. only);
- o Drinking Water; and
- o Zero Discharge of toxic contaminants.

Implementation of these programs has resulted in substantial reductions in the levels of some problem toxics in the Lake over the past two decades. It is anticipated that full program implementation will further reduce the input of toxics in the Lake. Load reduction estimates associated

with this objective will be developed for inclusion in future LOTMP updates, and will provide a baseline in evaluating the need for further reductions. See Table I of the LOTMP 1991 update for a listing of planned actions driven by existing and developing programs.

**Objective 2: Further Reductions in Toxic Inputs Driven by Special Efforts in Geographic Areas of Concern**

Remedial Actions Plans (RAPs) will be completed for seven International Joint Commission recognized Areas of Concern in the Lake Ontario basin: Eighteen Mile Creek, Rochester Embayment, Oswego River, Bay of Quinte, Port Hope, Toronto Waterfront, and Hamilton Harbour. In addition these are two RAPs for the Niagara River. To the extent that the LOTMP identifies additional Areas of Concern, they will be brought to the attention of the individual jurisdictions for appropriate action. The actions taken to address the toxics problems in these Areas of Concern will contribute to the elimination of the toxics problem in the open waters of the Lake.

The LOTMP recognizes the Niagara River as one of the most significant sources of toxics to the Lake. The Four Parties are currently implementing the Niagara River Toxics Management Plan initiated in February 1987, the goal of which is a 50 percent reduction by 1996 in priority toxics as defined under that Plan.

A number of specific steps have been taken to coordinate the Niagara River and Lake Ontario planning efforts. These include the use of a single Coordination Committee to provide policy direction for both Plans, and the use of three joint Niagara River/Lake Ontario technical committees to carry out critical elements of the Plans.

**Objective 3: Further Reductions in Toxic Inputs Driven by Lake-Wide Analysis of Pollutant Fate**

Mathematical models have been developed to relate toxic inputs or loadings to Lake Ontario system response. Using these models it is possible to estimate the lake response to changes in loadings in terms of the resulting concentrations of priority toxics in the water column, sediment and biota. In theory, mathematical models can be used to provide the technical basis for establishing load reduction levels or targets required in order to achieve desired conditions in

the ambient environment. Critical to this approach is a thorough knowledge of existing loads. At present, the degree of uncertainty of the models does not permit their being used in setting final load reduction targets (see Fate of Toxics, pg 16).

A preliminary identification of major municipal, industrial and tributary loadings to Lake Ontario has been undertaken. Municipal and industrial sources have been ranked based on wastewater flow while tributaries have been ranked based on total flow, wastewater flow in the tributary basin, and number of waste disposal sites in the tributary basin.

The Plan's preliminary conclusion is that the most significant potential sources of toxics in Lake Ontario are:

- o The Niagara River (including the entire Great Lakes drainage basin upstream of the Niagara River);
- o Inputs from ten other Lake Ontario geographic sources and tributaries(RAP areas\*);
  - Hamilton Harbour (Ontario)\*
  - Oswego River (New York)\*
  - Genesee River (New York)
  - Twelve Mile Creek (Ontario)
  - Welland Canal (Ontario)
  - Eighteen Mile Creek (New York)\*
  - Black River (New York)
  - Trent River (Ontario)
  - Humber River (Ontario)
  - Don River (Ontario)
- o Inputs from fifteen municipal facilities (twelve in Ontario and three in New York) and two industrial facilities (one in Ontario and one in New York) that discharge directly to the Lake; and
- o Atmospheric deposition for some chemicals.

These conclusions are, however, quite general. Total load by source needs to be quantitatively defined. The LOTMP at present contains first estimates of loads and a commitment to improve the loadings estimates.

Since 85% of the hydrologic flow to the lake comes from the Niagara River, actions taken under the Niagara River Toxic Management Plan to reduce loadings to that river are key to the success of the Lake Ontario Plan.

For accomplishments under objective 3, see page 14.

Objective 4: Zero Discharge

There are limits to how effective current end-of-pipe control programs can be in further reducing pollutant discharge. We must give greater consideration to opportunities for source reduction. This will enable us to move towards our objective of zero discharge of toxics to Lake Ontario.

Significant zero discharge-related activities are currently being undertaken in the United States and Canada. In the United States nation-wide initiatives include:

- o The development of more stringent technology-based limits for direct and indirect industrial discharges that take advantage of advances in technology;
- o The evaluation of emerging technologies for the reduction, stabilization or destruction of hazardous waste under the Superfund Innovative Technologies Evaluation (SITE) program;
- o The requirement that hazardous waste treatment, storage and disposal facilities perform waste minimization reviews; and
- o Requirements for the re-testing of active ingredients in commercial pesticides.
- o The development of an antidegradation policy that places a ceiling on the discharge of persistent toxic substances at their current levels.

For pollution prevention initiatives driven by the LOTMP, please refer to pages 21-22.

In Canada, zero discharge-related activities currently being undertaken include:

- o The Great Lakes/St. Lawrence Pollution Prevention Initiative;
- o The development of stringent technology-based limits for direct and indirect industrial discharges that take advantage of improved treatment technologies;
- o The development of waste management programs related to reduction, reuse, recycling and recovery (4Rs) for municipal and industrial wastes;

- o The development of household hazardous waste collection programs;
- o The implementation of the pesticides management components of the "Food Systems 2002" Program;
- o Research programs aimed at developing innovative techniques to control hazardous contaminants;
- o Implementation of the Canadian Environmental Protection Act; and
- o The initiation of the Environmentally Friendly Products Program.



III. SCOPE

Geographic: The Lake Ontario drainage basin is shown in Figure 1. Toxics released within the drainage basin have the potential to enter Lake Ontario. In addition, the lake receives inputs from sources outside of the drainage basin via atmospheric transport. Toxics also enter the lake via the Niagara River from sources upstream within the Great Lakes basin.

The Lake Ontario Toxics Management Plan addresses the toxics problems encountered in the open waters of the Lake. For purposes of the Plan:

- o Nearshore areas and embayments are included as part of the Lake,
- o Tributaries, including the Niagara River, are treated as point source inputs to the Lake, and
- o The St. Lawrence River is treated as an output from the Lake, and is, therefore, outside the scope of the Plan.

The characterization of the toxics problem in Lake Ontario has been revised in the LOTMP 1991 Update, and incorporates new data regarding the presence of toxics in the ambient environment and their effects (see Appendix II of the Plan).

Chemical: The Plan focuses priority attention on nine chemicals :

LOTMP Priority Toxics

PCBs	DDT and metabolites
Dioxin (2,3,7,8 - TCDD)	Octachlorostyrene
Chlordane	Hexachlorobenzene
Mirex	Dieldrin
Mercury	

This chemical-by-chemical approach is most useful in moving quickly to implementation in the context of existing law and

regulation. However, it is recognized that the ecosystem approach is most useful as a check on the effectiveness of the chemical-by-chemical approach. Both approaches will be used within the LOTMP.

As a first step in implementing the chemical-by-chemical approach to toxics control in Lake Ontario, the Lake Ontario Toxics Committee developed a system for categorizing toxics. The categories are shown in Table I.

Available ambient water column and fish tissue data were assembled and reviewed in relation to applicable standards, criteria and guidelines. As shown in Table II, ambient data were available for forty-two chemicals. These are category I chemicals.

- o Five (5) chemicals exceeded enforceable standards in the water column, fish tissue or both (Category IA);
- o Four (4) chemicals exceeded more stringent, but unenforceable, criteria or guidelines in the water column, fish tissue or both (Category IB);
- o Seventeen (17) chemicals were found only at levels at or below the most stringent standard, criterion or guideline (Category IC);
- o Two (2) chemicals were analyzed with detection limits too high to allow a comparison with standards, criteria or guidelines (Category ID); and
- o Twelve (12) chemicals had no standards, criteria or guidelines with which to compare the available ambient data (Category IE).

Ambient Lake Ontario data were, however, not available for most chemicals. As a first step in implementing the chemical-by-chemical approach for these chemicals, an ad hoc work group looked at point source data, sediment data, tributary water column data and data for other biota as the basis for establishing evidence of presence in, or input to the Lake:

- o One hundred (100) additional chemicals showed evidence of presence or input (Category IIA); and
- o There is no evidence of presence or input of any other chemicals (Category IIB).

The categorization system relies heavily on ambient water column and fish tissue data because ambient standards and

criteria are available for these media. Ambient data for other media (e.g., sediment data) play a more limited role in the categorization process because there are no standards or criteria for these media. The system, however, is flexible enough to use this other ambient data as standards and criteria become available.

Toxics are categorized within the LOTMP in order to provide a logical basis for determining appropriate actions. Different actions are appropriate for chemicals in different categories:

- o For toxics which exceed enforceable standards, control programs will be enhanced and implemented.
- o For toxics which exceed unenforceable criteria, enforceable standards will be developed.
- o For toxics which are found at levels equal to or less than the most stringent criterion, no short-term water quality-based actions are required.
- o For toxics which were analyzed with detection limits too high to allow a comparison with standards and criteria, analysis using a more sensitive analytical protocol or a surrogate monitoring technique will be conducted.
- o For toxics which have no standards or criteria with which to compare available ambient data, standards and criteria will be developed.
- o For toxics for which there is evidence of presence in or input to the Lake, but no ambient data, ambient data will be developed.
- o For toxics for which there is no evidence of presence in or input to the Lake, no short-term water quality-based actions are necessary.

The Categorization Committee has recently completed an update of the categorization for the Niagara River. The first updated categorization of chemicals for Lake Ontario will be available in early 1992.

IV. MANAGEMENT OF THE PLAN

Management Structure: Two management committees and four working level committees make up the LOTMP management structure. All committees include Four Party representation. The Management structure is shown schematically in Figure 2. Terms of Reference for each of the working level committees are contained in Appendix C of the Plan:

- o The Lake Ontario Coordination Committee provides policy direction during implementation and revision of the Lake Ontario Toxics Management Plan.
- o The Lake Ontario Secretariat has day-to-day operating responsibility during the implementation and revision of the Plan.
- o An Ecosystem Objectives Work Group, has been established by Canada and the United States under the Great Lakes Water Quality Agreement. The Work Group has been directed to assign priority to development of objectives and indicators for Lake Ontario.
- o A joint Niagara River/Lake Ontario Categorization Committee periodically updates the chemical-by-chemical categorization of toxics in the Niagara River and Lake Ontario.
- o A joint Niagara River/Lake Ontario Standards and Criteria Committee reviews existing and developing environmental criteria of the Four Parties and recommends methods by which the Parties can develop a consistent set of adequately protective, legally enforceable standards.
- o A joint Niagara River/Lake Ontario Fate of Toxics Committee develops and applies mathematical models relating toxic inputs to River and Lake responses.

Management Approach: From the beginning, it has been the intention of the Four Parties to meet the commitments in the LOTMP by:

- o Aggregating existing, readily available information;
- o Defining a logical approach to gathering additional, essential information;

- o Developing a management framework within which to make commitments for the cleanup of the Lake;
- o Proceeding directly to implementation whenever possible;  
and
- o Establishing increasingly stringent commitments to toxics control, over time, as our level of understanding improves.

V. PUBLIC INVOLVEMENT

An extensive public outreach effort continues to be a major element of the LOTMP. Objectives of this effort are:

- o To ensure that all sectors of the population affected by the Plan, including the public, interest groups, industrial associations, municipalities, news media and elected officials, are informed of the Plan and its progress; and
- o To provide for the involvement of these groups in the implementation phases of the Plan, in formulating changes or modifications to the Plan as the work progresses, and also in the preparation of regular updates to the Plan.

The opportunity for public participation is provided in various ways and at a number of levels within the LOTMP:

- o The Coordination Committee conducts regular business meetings in public. Meetings are held at a minimum of once per year.
- o Documents to be discussed at Coordination Committee meetings are distributed or otherwise made available to the public in advance of meetings.
- o The Secretariat holds public workshops in advance of Coordination Committee meetings, the purpose of which are to solicit public input prior to finalizing recommendation to the Coordination Committee. The Secretariat prepares a public responsiveness document that summarizes the views expressed at these workshops and the response of the Four Parties.
- o Public members have been added to each of the working level committees, and function as full committee members. Allowance has also been made for members of the public to participate as corresponding members on working level committees.
- o Issue specific workshops are held as the need arises to discuss topics of lakewide interest. Past workshops have featured invited specialists to participate in a public forum on such topics as the development of ecosystem objectives for Lake Ontario.

- o The Secretariat also periodically requests that Lake Ontario issues be placed on the agenda of Remedial Action Plan (RAP) Citizens Advisory Committee meetings as relevant issues arise. This takes advantage of the existing RAP process bringing together an already identified, concerned public, including all stakeholders. It also builds on the fact that work being undertaken in Areas of Concern is an integral part of the Lake Ontario Toxics Management Plan, and addresses an often voiced concern regarding coordination of the RAP and Lake Ontario planning efforts.

VI. ACCOMPLISHMENTS TO DATE

A number of accomplishments have been made under the LOTMP since its signing in February 1989. Four items of particular note are highlighted within the LOTMP 1991 Update. These are:

- o Development of ecosystem goals and objectives for Lake Ontario.
- o Development of mass balance models for Lake Ontario to relate toxic loadings to the response of the ecosystem.
- o Completion of a review of Four Party standards and criteria applicable to Lake Ontario.
- o Development of Pollution Prevention initiatives under the LOTMP.

(i) Ecosystem Objectives:

The Lake Ontario Coordinating Committee called on the Ecosystem Objectives Work Group (EOWG) to develop ecosystem objectives for Lake Ontario. The EOWG reports to the Binational Objectives Development Committee, which has been established by Canada and the United States in response to the Great Lakes Water Quality Agreement commitment to develop ecosystem, chemical specific and human health objectives.

The first indicators of ecosystem health for any of the Great Lakes were designed for Lake Superior, a cold water, low productivity ecosystem. The Secretariat concluded that it is necessary to design objectives specific to Lake Ontario.

After extensive discussion and a public workshop, EOWG submitted a report to the Secretariat in May 1990, proposing a framework for Lake Ontario ecosystem objectives with three overarching goals :

- o The Lake Ontario ecosystem should be maintained, and as necessary restored or enhanced, to support self-reproducing diverse biological communities.
- o The presence of contaminants shall not limit the use of fish, wildlife and waters of the Lake Ontario basin by



humans and shall not cause adverse health effects in plants and animals.

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

To attain these goals, EOWG also recommended five specific ecosystem objectives. Three of these objectives specifically address the goal of the LOTMP:

#### Aquatic Communities

The waters of Lake Ontario shall support diverse, healthy, reproducing and self-sustaining communities in dynamic equilibrium, with an emphasis on native species.

#### Wildlife

The perpetuation of a healthy, diverse and self-sustaining wildlife community that utilizes the lake for habitat and/or food shall be ensured by attaining and sustaining the waters, coastal wetlands and upland habitats of the Lake Ontario basin in sufficient quality and quantity.

#### Human Health

The waters, plants and animals of Lake Ontario shall be free from contaminants and organisms resulting from human activities at levels that affect human health or aesthetic factors such as tainting, odor and turbidity.

The EOWG also proposed the following two additional ecosystem objectives:

#### Habitat

Lake Ontario offshore and nearshore zones and surrounding tributary, wetland and upland habitats shall be of sufficient quality and quantity to support ecosystem objectives for health, productivity and distribution of plants and animals in and adjacent to Lake Ontario.

### Stewardship

Human activities and decisions shall embrace environmental ethics and a commitment to responsible stewardship.

The EOWG has established technical subcommittees to develop quantitative indicators for each objective. Preliminary results are expected by early 1992.

#### (ii) Fate of Toxics

Theoretically, mathematical models of pollutant fate are capable of relating pollutant inputs to levels of toxic contaminants in the ambient water column, sediment and biota. Models can therefore be used to estimate the magnitude of loadings reduction necessary to achieve certain target levels in the lake system and the lag time between load reduction and system response.

The Lake Ontario Fate of Toxics Committee (FOTC) has developed two initial mathematical models of pollutant fate for Lake Ontario. An independent peer review of the models concluded that pending calibration and verification, both models accurately reflect current knowledge of mass balance processes in Lake Ontario, and that the model predictions are in substantial agreement with one another.

The FOTC has recommended to the LOTMP Secretariat that, based on its modeling effort to date:

- o Load response relationships from the models can be used to establish the direction of toxics reduction strategies;
- o Given estimates of current loadings of chemicals in question, the predicted steady-state and dynamic concentrations in water, sediment, and biota can be estimated along with the estimated uncertainty;
- o Given lake-wide average target concentrations in water, sediment or fish, a target load can be estimated along with the estimated uncertainty; and
- o Because of the degree of uncertainty associated with model output, it is not recommended that these models be used to establish final or legal quantitative target loadings.

To improve the utility of the models, the FOTC recommended that additional data are required in four areas:

- o A data set to calibrate the model,
- o A data set to verify the model,
- o Ambient baseline data to reduce variability in model parameters, and
- o Improved loading estimates.

Work to refine, calibrate and verify the two models will continue.

(iii) Standards and Criteria

Achievement of the LOTMP Goal will ultimately require achievement of the Plan's fourth and most ambitious objective : zero discharge.

However, considering the current environmental status of the Lake, the Four Parties also recognize the practical value of achieving our third objective which is load reductions required to meet a consistent set of adequately protective ambient criteria. The achievement of these criteria will constitute a significant interim milestone on the way to achieving virtual elimination.

Stated most generally, the charge to the LOTMP Standards and Criteria Committee is to assist the Four Parties in developing a consistent set of adequately protective criteria for the Niagara River and Lake Ontario. Other elements of the Plan, such as more stringent treatment standards based on improvements in technology and pollution prevention, will be relied on to move us beyond these criteria towards virtual elimination.

In its March 1990 report on the water quality criteria of Lake Ontario and the Niagara River, the Standards and Criteria Committee evaluated:

- o The water column criteria of the Four Parties, both those developed for the protection of aquatic resources, and those developed for the protection of human health; and
- o The fish tissue criteria of the Four Parties, both those developed for the protection of wildlife, and those developed for the protection of human health.

Recommendations contained in the report were reviewed by both the Niagara River and Lake Ontario Secretariats and were presented at the Niagara River Coordination Committee meeting of September 19, 1990.

Some of the Four Party decisions arising from this process which are of importance to the LOTMP are as follows :

- o Site-specific investigations should be considered to evaluate the toxicity of aluminium and iron in lieu of the use of ambient chemical criteria.

Recognizing that the existing criteria for aluminium and iron may not be sufficiently detailed, the Four Parties will request the Binational Objectives Development Committee - Chemical Objectives Work Group to evaluate the existing criteria for these two metals and to develop criteria for them that take into consideration site-specific influences on their toxicity. In preparation for this binational effort, DEC and EPA will initiate discussions of this issue on the U.S. side through the Great Lakes Water Quality Initiative.

- o The Ontario Ministry of the Environment (MOE) should evaluate whether its proposed procedures for setting water quality objectives are sufficient to fulfill the human health goals of the two management plans. Following evaluation of its procedures, MOE should consider establishing water column criteria for protection of human health for Category IA and IB substances, which currently are DDT, dieldrin, PCBs, PAHs and tetrachloroethylene.

EPA and DEC water column criteria-setting procedures for the protection of human health from carcinogens are based on conservative cancer risk assumptions and incorporate exposures through drinking water and fish consumption. It is acknowledged that there may be more sensitive endpoints.

The MOE criteria for the substances evaluated in the Standards and Criteria Committee report were set for the protection of aquatic life. New MOE procedures for setting surface water quality objective allow for consideration of available fish consumption advisories. These objectives may be useful in setting an interim

targets under the toxics management plan, that is, the removal of fish advisories for the waterbody. These targets would be consistent with the overall goal of the Plan, namely to provide fish that are safe for unlimited human consumption.

In order for the Four Parties to make progress towards consistent standards and criteria, it is important that Canada have water column criteria for the protection of human health. MOE and Environment Canada will work with Health and Welfare Canada (HWC) to document the methodology used in established Canadian fish tissue contaminant guidelines. The first priority for setting these criteria will be the LOTMP\NRTMP Category IA and IB chemicals, and the second priority will be the Category IE chemicals.

- o DEC should consider the need for human health criteria based on fish consumption for DDT, dieldrin and PCBs. DEC is now developing such criteria for PCBs and will evaluate the need for such criteria for dieldrin and DDT through the Great Lakes Water Quality Initiative.
- o All agencies should consider the need for establishing criteria for Category IE substances.

The Secretariats will request the Standards and Criteria Committee to priority rank the Category IE chemicals, starting with the Niagara River categorization, based on the MOE toxicity ranking system. The Secretariats will request the Binational Objectives Development Committee : (1) to identify any existing standards or criteria for these prioritized chemicals that may be applicable to the Niagara River or Lake Ontario; and (2) to develop one criterion value for the chemicals. The Four Parties will then make recommendations for criteria development by the individual agencies.

#### iv) Pollution Prevention

The LOTMP recognizes that there are limits to how effective current end-of-pipe control programs can be in further reducing pollutant discharge and that greater consideration must be given to opportunities for source reduction. The Four Parties have developed Pollution Prevention proposals to encourage waste minimization in both the U.S. and Canadian sides of the Niagara River and Lake Ontario Basin.

The key objectives of the U.S. plans are to:

- o Determine how industrial facilities located in the Niagara River/Lake Ontario basin can better apply pollution prevention techniques to reduce their releases of toxic chemicals to air, land, and water; and
- o Develop a joint industry/governmental initiative on pollution prevention.

The key objectives of the Canadian initiatives are to:

- o Facilitate and highlight government-industry cooperation in achieving source control and zero discharge of toxic substances under the LOTMP;
- o Increase industry and municipal awareness of existing non-regulatory programs of MOE and EC that support source control and attainment of zero discharge;
- o Identify opportunities for partnership or information sharing leading to the development and implementation of pollution prevention projects; and
- o Provide a visible means of documenting and tracking progress of specific commitments made to source control and zero discharge within the Lake Ontario/Niagara River geographic context.

The Secretariat will coordinate the two plans to ensure consistency and maximize technology transfer between the two countries. Specific programs include:

- o EPA Region II commitment in the National Pollution Prevention Strategy for a 33% reduction of TRI releases of targeted pollutants into all media by 1992, and a 50% reduction by 1995;
- o DEC's requirement for progressive reduction in toxic chemicals generated by key SPDES permittees;
- o DEC's fugitive emission regulation for a 50% reduction of all unregulated air releases from a 1987 baseline; and
- o Canada's Great Lakes/St. Lawrence Pollution Prevention Initiative for all sectors of society outlining targets and schedules for the reduction of toxic substance use, manufacture, generation and discharge.

Programs for Lake Ontario under the Initiative include:

- o A study of small quantity hazardous waste generators being undertaken by the City of Hamilton; and
- o Community Action Plans to improve the effectiveness of community involvement in solving environmental problems. Communities will set their own targets through combined actions of individuals, business and government.

There are now a number of U.S. pollution prevention activities developed specifically in response to the LOTMP:

- o Targetting facilities emitting into any medium the 18 priority toxics found in the Niagara River or Lake Ontario water column or fish tissues at levels in excess of the Four Parties' most stringent criteria. Facilities identified are targetted for inspection and pollution prevention evaluations in 1991/92;
- o A proposal for battery recycling to remove sources of lead and mercury for incinerators and landfills in Erie County; and
- o A proposal to promote pollution prevention practices within the drainage area of the Buffalo Sewer Authority.
- o A joint project between DEC and the Research Foundation of SUNY for a community collection program, public education and school curricula programs to reduce hazardous wastes in Niagara, Monroe and Jefferson Counties, N.Y.

## VII. 1992 AND BEYOND

The LOTMP has thus far relied heavily on existing and developing pollution control and prevention programs of the Four Parties. For this reason the plan has not yet imposed incremental costs on the regulatory community. However the LOTMP calls for the development of interim and final load reduction targets as strategies for achieving the goal of the Plan. These targets may well require additional initiatives on behalf of the Four Parties, and where this is the case, alternative control and prevention options will be evaluated and an attempt will be made to estimate their costs and benefits.

Pollution control and prevention programs of the Four Parties initiated outside of the LOTMP will continue, as will the activities of the LOTMP working level committees. Additional emphasis in 1991 will also be placed on requirements for improving inputs to the Lake Ontario mass balance model:

- o improved source identification;
- o improved loadings estimates; and
- o improved fate of toxics modeling.

Already, using the extensive data base produced under the NRTMP and the existing fate of toxics models, it is possible to predict that, for certain toxics, the 50 percent reduction commitment contained within the Niagara River Toxics Management Plan may not be sufficient to meet the most stringent ambient criteria in Lake Ontario. Work will continue in 1992 to refine these predictions and to develop load reduction targets for the inputs to Lake Ontario.

### LOTMP expansion into a Lakewide Management Plan (LAMP)

To expand the Plan into a LaMP, the Four Parties need to develop a strategy for the LaMP process. This would include a schedule to carry out the following activities:

- o identify the lake's beneficial use impairments;
- o designate critical pollutants contributing to the impairments;
- o identify the sources of the critical pollutants;
- o develop plans to reduce inputs; and
- o assess the degradation of habitat.



Table I  
Categories of Toxics

I. Ambient Data Available

- A. Exceeds enforceable standard
- B. Exceeds a more stringent, but unenforceable criterion
- C. Equal to or less than most stringent criterion
- D. Detection limit too high to allow complete categorization
- E. No criterion available

II. Ambient Data Not Available

- A. Evidence of presence in or input to the Lake
- B. No evidence of presence in or input to the Lake

TABLE II  
 Categorization of Toxics Based on Ambient Data  
 (Category I Toxics)

Chemical	Fish Tissue	Water Column	Summary
PCBs*	A	A	A(FT, WC)
dioxins* (2,3,7,8-TCDD)	A	D	A(FT)
chlordane	A	C	A(FT)
mirex* (mirex + photomirex)	A	NI	A(FT)
mercury	A	NI	A(FT)
DDT + metabolites*	B	B	B(FT, WC)
octachlorostyrene	B	NI	B(FT)
hexachlorobenzene*	B	B	B(FT, WC)
dieldrin*	B	B	B(FT, WC)
hexachlorocyclohexanes (including lindane + alpha-BHC)	C	C	C(FT, WC)
heptachlor/heptachlor epoxide	C	C	C(FT, WC)
aldrin	C	NI	C(FT)
endrin	C	C	C(FT, WC)
1,2-dichlorobenzene	NI	C	C(WC)
1,3-dichlorobenzene	NI	C	C(WC)
1,4-dichlorobenzene	NI	C	C(WC)
1,2,3-trichlorobenzene	NI	C	C(WC)
1,2,4-trichlorobenzene	NI	C	C(WC)
1,3,5-trichlorobenzene	NI	C	C(WC)
1,2,3,4-tetrachlorobenzene	NI	C	C(WC)
copper	NI	C	C(WC)
nickel	NI	C	C(WC)
zinc	NI	C	C(WC)
chromium	NI	C	C(WC)
lead	NI	C	C(WC)
manganese	NI	C	C(WC)

NI No data available after initial review  
 FT Based on fish tissue data  
 WC Based on water column data  
 \* IJC critical pollutant

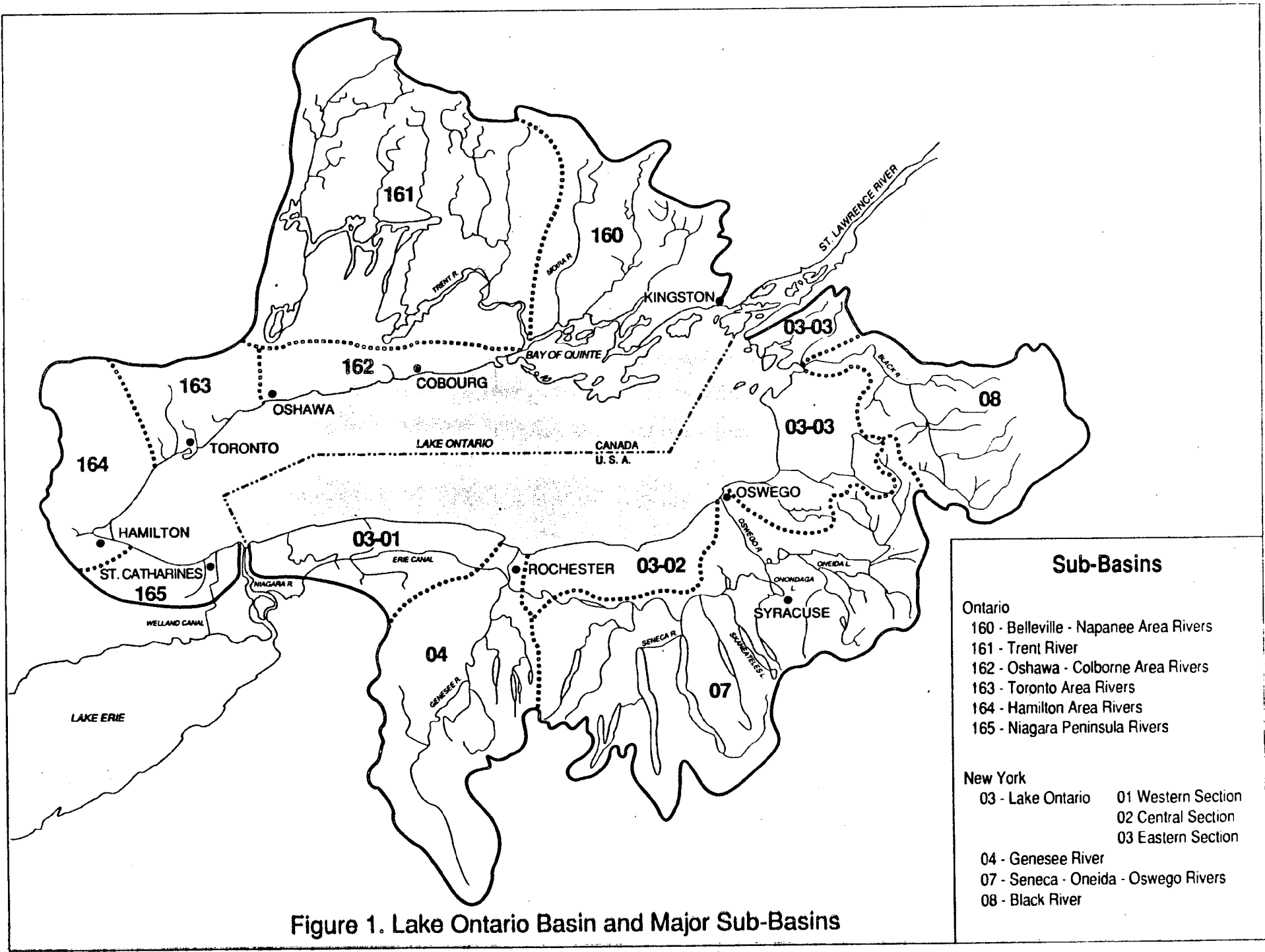
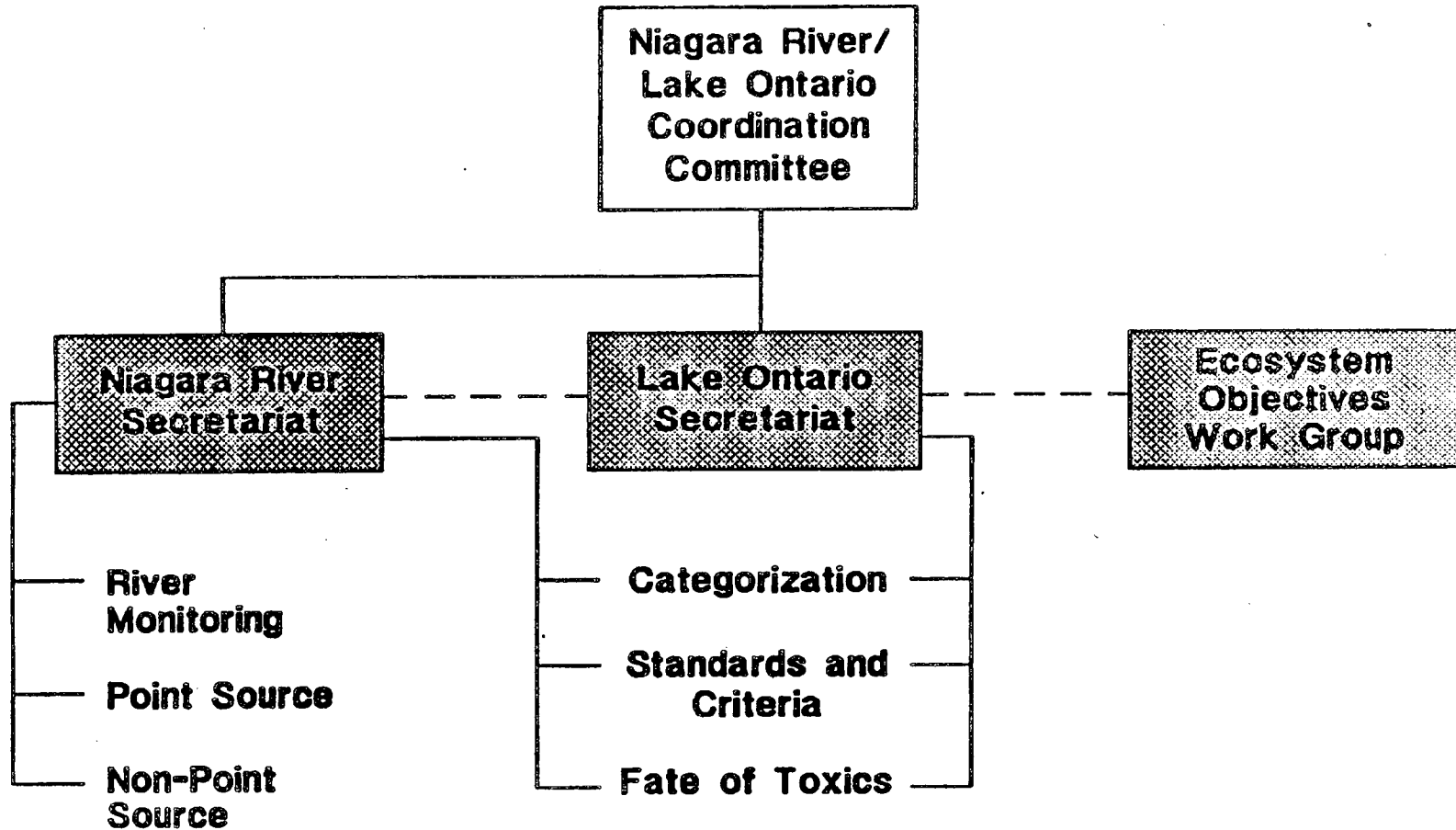


Figure 1. Lake Ontario Basin and Major Sub-Basins

Figure 2

# MANAGEMENT STRUCTURE



## APPENDIX

### Availability of LOTMP

A bibliography is maintained of technical reports and data developed during the implementation of the Plan. The bibliography and its updates are periodically distributed to those on the LOTMP mailing lists. In addition, relevant educational and informational materials will be incorporated into this bibliography as they are developed and become available. All materials developed under the LOTMP are available to the public at designated repositories. In addition to the information provided in this summary document the LOTMP 1990 Update contains :

- o a list of planned actions driven by special efforts of the Parties in Areas of Concern, as well as a brief status of progress within each Area of Concern (Updated 1990);
- o a description physical and socio-economic characteristics of the Lake Ontario basin (Unchanged since 1989);
- o an initial identification of sources of contaminants to the Lake Ontario (Unchanged since 1989);
- o an overview description of existing pollution control and pollution prevention activities of the Parties (Unchanged since 1989).

Repositories where this information will be available are listed below:

#### **United States**

U.S. Environmental Protection Agency  
Public Information Office  
Carborundum Centre  
345 Third Street, Suite 530  
Niagara Falls, New York 14303  
(716) 285-8842

#### **New York State Department of Environmental Conservation Regional Offices:**

NYSDEC - Region 6  
317 Washington Street  
Watertown, New York 13601  
(315) 785-2244

NYSDEC - Region 7  
7481 Henry Clay Boulevard  
Liverpool, New York 13088  
(315) 428-4497

NYSDEC - Region 8  
6274 E. Avon-Lima Road  
Avon, New York 14414  
(716) 226-2466

NYSDEC - Region 9  
600 Delaware Avenue  
Buffalo, New York 14202  
(716) 847-4550

**University Libraries:**

SUNY Brockport  
Drake Library  
Brockport, New York 14420

Collection Division Office  
Butlers Library  
SUNY Buffalo  
1300 Elmwood Avenue  
Buffalo, New York 14222

Science and Engineering  
Library  
Capen Hall  
SUNY Center Buffalo  
Buffalo, New York 14214

Archives Moon Library  
SUNY Environmental Science  
and Forestry  
Syracuse, New York 13210

Penfield Library  
SUNY Oswego  
Oswego, New York 13126

**Non-Profit Organization:**

Atlantic States Legal Foundation Inc.  
658 West Onondaga Street  
Syracuse, New York  
13204 USA  
(315) 475-1170

**Canada**

Great Lakes Environment  
Office  
Environment Canada  
25 St. Clair Ave. East  
Toronto, Ontario  
M4T 1M2  
(416) 973-8632

Communications Branch  
Ontario Ministry of the  
Environment  
135 St. Clair Ave. West  
Toronto, Ontario  
M4V 1P5  
(416) 323-4571

MOE Regional Office  
Central Region  
7 Overleu Boulevard  
Toronto, Ontario  
M4H 1A8

MOE Regional Office  
South Eastern Region  
Kingston Region  
133 Dalton Avenue  
Kingston, Ontario  
K7L 4X6

MOE Regional Office  
West Central Region  
Hamilton Regional Office  
12th Floor  
119 King Street, West  
Hamilton, Ontario  
L8N 3Z9

Intergovernmental Relations  
Office  
Ontario Ministry of the  
Environment  
135 St. Clair Ave. West  
Toronto, Ontario  
M4V 1P5  
(416) 323-5097

International Joint  
Commission  
100 Ouellette Avenue  
Windsor, Ontario  
N9A 6T3

International Joint  
Commission  
100 Metcalfe Street  
Ottawa, Ontario  
K1P 5M1

Regional Municipality of  
Niagara  
P O Box 1042  
Thorold, Ontario  
L2V 4T7  
(416) 685-1571

#### University Libraries

Queens University  
Kingston, Ontario  
K7L 3N6

University of Toronto  
Toronto, Ontario  
M5S 1A4

McMaster University  
Hamilton, Ontario  
L8S 4L6