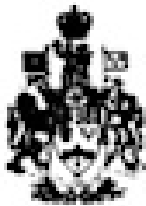


# Great Lakes Water Quality Agreement of 1978

Agreement, with annexes  
and terms of reference,  
between the  
United States of America and Canada

signed at Ottawa  
November 22, 1978



International Joint Commission  
Canada and the United States





## GREAT LAKES WATER QUALITY AGREEMENT OF 1978

<u>ARTICLE</u>	<u>SUBJECT</u>	<u>PAGE</u>
I	Definitions	2
II	Purpose	4
III	General Objectives	4
IV	Specific Objectives	5
V	Standards, Other Regulatory Requirements, and Research	6
VI	Programs and Other Measures	6
VII	Powers, Responsibilities and Functions of the IJC	10
VIII	Joint Institutions and Regional Office	11
IX	Submission and Exchange of Information	12
X	Consultation and Review	12
XI	Implementation	13
XII	Existing Rights and Obligations	13
XIII	Amendment	13
XIV	Entry Into Force and Termination	14
XV	Supersession	14
<u>ANNEX</u>	<u>SUBJECT</u>	<u>PAGE</u>
1	Specific Objectives	17
2	Limited Use Zones	23
3	Control of Phosphorus	25
4	Discharges of Oil and Hazardous Polluting Substances from Vessels	27
5	Discharges of Vessel Wastes	30
6	Review of Pollution from Shipping Sources	31
7	Dredging	33
8	Discharges from Onshore and Offshore Facilities	34
9	Joint Contingency Plan	36
10	Hazardous Polluting Substances	37
	APPENDIX 1 - Hazardous Polluting Substances	39
	APPENDIX 2 - Potential Hazardous Polluting Substances	44
11	Surveillance and Monitoring	46
12	Persistent Toxic Substances	47
	Terms of Reference for the Joint Institutions and the Great Lakes Regional Office	50



**AGREEMENT BETWEEN CANADA AND THE UNITED STATES OF AMERICA  
ON GREAT LAKES WATER QUALITY, 1978**

The Government of Canada and the Government of the United States of America,

Having in 1972 entered into an Agreement on Great Lakes Water Quality;

Reaffirming their determination to restore and enhance water quality in the Great Lakes System;

Continuing to be concerned about the impairment of water quality on each side of the boundary to an extent that is causing injury to health and property on the other side, as described by the International Joint Commission;

Reaffirming their intent to prevent further pollution of the Great Lakes Basin Ecosystem owing to continuing population growth, resource development and increasing use of water;

Reaffirming in a spirit of friendship and cooperation the rights and obligations of both countries under the Boundary Waters Treaty, signed on January 11, 1909, and in particular their obligation not to pollute boundary waters;

Continuing to recognize the rights of each country in the use of its Great Lakes waters;

Having decided that the Great Lakes Water Quality Agreement of April 15, 1972 and subsequent reports of the International Joint Commission provide a sound basis for new and more effective cooperative actions to restore and enhance water quality in the Great Lakes Basin Ecosystem;

Recognizing that restoration and enhancement of the boundary waters can not be achieved independently of other parts of the Great Lakes Basin Ecosystem with which these waters interact;

Concluding that the best means to preserve the aquatic ecosystem and achieve improved water quality throughout the Great Lakes System is by adopting common objectives, developing and implementing cooperative programs and other measures, and assigning special responsibilities and functions to the International Joint Commission;

Have agreed as follows:

## ARTICLE I

### DEFINITIONS

As used in this Agreement:

- (a) "Agreement" means the present Agreement as distinguished from the Great Lakes Water Quality Agreement of April 15, 1972;
- (b) "Annex" means any of the Annexes to this Agreement, each of which is attached to and forms an integral part of this Agreement;
- (c) "Boundary waters of the Great Lakes System" or "boundary waters" means boundary waters, as defined in the Boundary Waters Treaty, that are within the Great Lakes System;
- (d) "Boundary Waters Treaty" means the Treaty between the United States and Great Britain Relating to Boundary Waters, and Questions Arising Between the United States and Canada, signed at Washington on January 11, 1909;
- (e) "Compatible regulations" means regulations no less restrictive than the agreed principles set out in this Agreement;
- (f) "General Objectives" are broad descriptions of water quality conditions consistent with the protection of the beneficial uses and the level of environmental quality which the Parties desire to secure and which will provide overall water management guidance;
- (g) "Great Lakes Basin Ecosystem" means the interacting components of air, land, water and living organisms, including man, within the drainage basin of the St. Lawrence River at or upstream from the point at which this river becomes the international boundary between Canada and the United States;
- (h) "Great Lakes System" means all of the streams, rivers, lakes and other bodies of water that are within the drainage basin on the St. Lawrence River at or upstream from the point at which this river becomes the international boundary between Canada and the United States;
- (i) "Harmful quantity" means any quantity of a substance that if discharged into receiving water would be inconsistent with the achievement of the General and Specific Objectives;
- (j) "Hazardous polluting substance" means any element or compound identified by the Parties which, if discharged in any quantity into or upon receiving waters or adjoining shorelines, would present an imminent and substantial danger to public health or welfare; for this purpose, "public health or welfare" encompasses all factors affecting the health and welfare of man including but not limited to human health, and the conservation and protection of flora and fauna, public and private property, shorelines and beaches;
- (k) "International Joint Commission" or "Commission" means the International Joint Commission established by the Boundary Waters Treaty;

- (l) "Monitoring" means a scientifically designed system of continuing standardized measurements and observations and the evaluation thereof;
- (m) "Objectives" means the General Objectives adopted pursuant to Article III and the Specific Objectives adopted pursuant to Article IV of this Agreement;
- (n) "Parties" means the Government of Canada and the Government of the United States of America;
- (o) "Phosphorus" means the element phosphorus present as a constituent of various organic and inorganic complexes and compounds;
- (p) "Research" means development, demonstration and other research activities but does not include monitoring and surveillance of water or air quality;
- (q) "Science Advisory Board" means the Great Lakes Science Advisory Board of the International Joint Commission established pursuant to Article VIII of this Agreement;
- (r) "Specific Objectives" means the concentration or quantity of a substance or level of effect that the Parties agree, after investigation, to recognize as a maximum or minimum desired limit for a defined body of water or portion thereof, taking into account the beneficial uses or level of environmental quality which the Parties desire to secure and protect;
- (s) "State and Provincial Governments" means the Governments of the States of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Wisconsin and the Commonwealth of Pennsylvania, and the Government of the Province of Ontario;
- (t) "Surveillance" means specific observations and measurements relative to control or management;
- (u) "Terms of Reference" means the Terms of Reference for the Joint Institutions and the Great Lakes Regional Office established pursuant to this Agreement, which are attached to and form an integral part of this Agreement;
- (v) "Toxic substance" means a substance which can cause death, disease, behavioural abnormalities, cancer, genetic mutations, physiological or reproductive malfunctions or physical deformities in any organism or its offspring, or which can become poisonous after concentration in the food chain or in combination with other substances;
- (w) "Tributary waters of the Great Lakes System" or "tributary waters" means all the waters within the Great Lakes System that are not boundary waters;
- (x) "Water Quality Board" means the Great Lakes Water Quality Board of the International Joint Commission established pursuant to Article VIII of this Agreement.

## **ARTICLE II**

### **PURPOSE**

The purpose of the Parties is to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem. In order to achieve this purpose, the Parties agree to make a maximum effort to develop programs, practices and technology necessary for a better understanding of the Great Lakes Basin Ecosystem and to eliminate or reduce to the maximum extent practicable the discharge of pollutants into the Great Lakes System.

Consistent with the provisions of this Agreement, it is the policy of the Parties that:

- (a) The discharge of toxic substances in toxic amounts be prohibited and the discharge of any or all persistent toxic substances be virtually eliminated;
- (b) Financial assistance to construct publicly owned waste treatment works be provided by a combination of local, state, provincial, and federal participation; and
- (c) Coordinated planning processes and best management practices be developed and implemented by the respective jurisdictions to ensure adequate control of all sources of pollutants.

## **ARTICLE III**

### **GENERAL OBJECTIVES**

The Parties adopt the following General Objectives for the Great Lakes System. These waters should be:

- (a) Free from substances that directly or indirectly enter the waters as a result of human activity and that will settle to form putrescent or otherwise objectionable sludge deposits, or that will adversely affect aquatic life or waterfowl;
- (b) Free from floating materials such as debris, oil, scum, and other immiscible substances resulting from human activities in amounts that are unsightly or deleterious;
- (c) Free from materials and heat directly or indirectly entering the water as a result of human activity that alone, or in combination with other materials, will produce colour, odour, taste, or other conditions in such a degree as to interfere with beneficial uses;
- (d) Free from materials and heat directly or indirectly entering the water as a result of human activity that alone, or in combination with other materials, will produce conditions that are toxic or harmful to human, animal, or aquatic life; and
- (e) Free from nutrients directly or indirectly entering the waters as a result of human activity in amounts that create growths of aquatic life that interfere with beneficial uses.

## ARTICLE IV

### SPECIFIC OBJECTIVES

1. The Parties adopt the Specific Objectives for the boundary waters of the Great Lakes System as set forth in Annex 1, subject to the following:
  - (a) The Specific Objectives adopted pursuant to this Article represent the minimum levels of water quality desired in the boundary waters of the Great Lakes System and are not intended to preclude the establishment of more stringent requirements.
  - (b) The determination of the achievement of Specific Objectives shall be based on statistically valid sampling data.
  - (c) Notwithstanding the adoption of Specific Objectives, all reasonable and practicable measures shall be taken to maintain or improve the existing water quality in those areas of the boundary waters of the Great Lakes System where such water quality is better than that prescribed by the Specific Objectives, and in those areas having outstanding natural resource value.
  - (d) The responsible regulatory agencies shall not consider flow augmentation as a substitute for adequate treatment to meet the Specific Objectives.
  - (e) The Parties recognize that in certain areas of inshore waters natural phenomena exist which, despite the best efforts of the Parties, will prevent the achievement of some of the Specific Objectives. As early as possible, these areas should be identified explicitly by the appropriate jurisdictions and reported to the International Joint Commission.
  - (f) Limited use zones in the vicinity of present and future municipal, industrial and tributary point source discharges shall be designated by the responsible regulatory agencies within which some of the Specific Objectives may not apply. Establishment of these zones shall not be considered a substitute for adequate treatment or control of discharges at their source. The size shall be minimized to the greatest possible degree, being no larger than that attainable by all reasonable and practicable effluent treatment measures. The boundary of a limited use zone shall not transect the international boundary. Principles for the designation of limited use zones are set out in Annex 2.
2. The Specific Objectives for the boundary waters of the Great Lakes System or for particular portions thereof shall be kept under review by the Parties and by the International Joint Commission, which shall make appropriate recommendations.
3. The Parties shall consult on:
  - (a) The establishment of Specific Objectives to protect beneficial uses from the combined effects of pollutants; and
  - (b) The control of pollutant loading rates for each lake basin to protect the integrity of the ecosystem over the long term.

## ARTICLE V

### STANDARDS, OTHER REGULATORY REQUIREMENTS, AND RESEARCH

1. Water quality standards and other regulatory requirements of the Parties shall be consistent with the achievement of the General and Specific Objectives. The Parties shall use their best efforts to ensure that water quality standards and other regulatory requirements of the State and Provincial Governments shall similarly be consistent with the achievement of these Objectives. Flow augmentation shall not be considered as a substitute for adequate treatment to meet water quality standards or other regulatory requirements.
2. The Parties shall use their best efforts to ensure that:
  - (a) The principal research funding agencies in both countries orient the research programs of their organizations in response to research priorities identified by the Science Advisory Board and recommended by the Commission; and
  - (b) Mechanisms be developed for appropriate cost-effective international cooperation.

## ARTICLE VI

### PROGRAMS AND OTHER MEASURES

1. The Parties shall continue to develop and implement programs and other measures to fulfil the purpose of this agreement and to meet the General and Specific Objectives. Where present treatment is inadequate to meet the General and Specific objectives, additional treatment shall be required. The programs and measures shall include the following:
  - (a) Pollution from Municipal Sources. Programs for the abatement, control and prevention of municipal discharges and urban drainage into the Great Lakes System. These programs shall be completed and in operation as soon as practicable, and in the case of municipal sewage treatment facilities no later than December 31, 1982. These programs shall include:
    - (i) Construction and operation of waste treatment facilities in all municipalities having sewer systems to provide levels of treatment consistent with the achievement of phosphorus requirements and the General and Specific Objectives, taking into account the effects of waste from other sources;
    - (ii) Provision of financial resources to ensure prompt construction of needed facilities;
    - (iii) Establishment of requirements for construction and operating standards for facilities;
    - (iv) Establishment of pre-treatment requirements for all industrial plants discharging waste into publicly owned treatment works where such industrial wastes are not amenable to adequate treatment or removal using conventional municipal treatment processes;
    - (v) Development and implementation of practical programs for reducing pollution from storm, sanitary, and combined sewer discharges; and

- (vi) Establishment of effective enforcement programs to ensure that the above pollution abatement requirements are fully met.
- (b) Pollution from Industrial Sources. Programs for the abatement, control and prevention of pollution from industrial sources entering the Great Lakes System. These programs shall be completed and in operation as soon as practicable and in any case no later than December 31, 1983, and shall include:
  - (i) Establishment of waste treatment or control requirements expressed as effluent limitations (concentrations and/or loading limits for specific pollutants where possible) for all industrial plants, including power-generating facilities, to provide levels of treatment or reduction or elimination of inputs of substances and effects consistent with the achievement of the General and Specific Objectives and other control requirements, taking into account the effects of waste from other sources;
  - (ii) Requirements for the substantial elimination of discharges into the Great Lakes System of persistent toxic substances;
  - (iii) Requirements for the control of thermal discharges;
  - (iv) Measures to control the discharge of radioactive materials into the Great Lakes System;
  - (v) Requirements to minimize adverse environmental impacts of water intakes;
  - (vi) Development and implementation of programs to meet industrial pre-treatment requirements as specified under sub-paragraph (a) (iv) above; and
  - (vii) Establishment of effective enforcement programs to ensure the above pollution abatement requirements are fully met.
- (c) Inventory of Pollution Abatement Requirements. Preparation of an inventory of pollution abatement requirements for all municipal and industrial facilities discharging into the Great Lakes System in order to gauge progress toward the earliest practicable completion and operation of the programs listed in sub-paragraphs (a) and (b) above. This inventory, prepared and revised annually, shall include compliance schedules and status of compliance with monitoring and effluent restrictions, and shall be made available to the International Joint Commission and to the public. In the initial preparation of this inventory, priority shall be given to the problem areas previously identified by the Water Quality Board.
- (d) Eutrophication. Programs and measures for the reduction and control of inputs of phosphorus and other nutrients, in accordance with the provisions of Annex 3.
- (e) Pollution from Agricultural, Forestry and Other Land Use Activities. Measures for the abatement and control of pollution from agricultural, forestry and other land use activities including:
  - (i) Measures for the control of pest control products used in the Great Lakes Basin to ensure that pest control products likely to have long-term deleterious effects on the

quality of water or its biota be used only as authorized by the responsible regulatory agencies; that inventories of pest control products used in the Great Lakes Basin be established and maintained by appropriate agencies; and that research and educational programs be strengthened to facilitate integration of cultural, biological and chemical pest control techniques;

- (ii) Measures for the abatement and control of pollution from animal husbandry operations, including encouragement to appropriate agencies to adopt policies and regulations regarding utilization of animal wastes, and site selection and disposal of liquid and solid wastes, and to strengthen educational and technical assistance programs to enable farmers to establish waste utilization, handling and disposal systems;
  - (iii) Measures governing the hauling and disposal of liquid and solid wastes, including encouragement to appropriate regulatory agencies to ensure proper location, design, and regulation governing land disposal, and to ensure sufficient, adequately trained technical and administrative capability to review plans and to supervise and monitor systems for application of wastes on land;
  - (iv) Measures to review and supervise road salting practices and salt storage to ensure optimum use of salt and all-weather protection of salt stores in consideration of long-term environmental impact;
  - (v) Measures to control soil losses from urban and suburban as well as rural areas;
  - (vi) Measures to encourage and facilitate improvements in land use planning and management programs to take account of impacts on Great Lakes water quality;
  - (vii) Other advisory programs and measures to abate and control inputs of nutrients, toxic substances and sediments from agricultural, forestry and other land use activities; and
  - (viii) Consideration of future recommendations from the International Joint Commission based on the Pollution from Land Use Activities Reference.
- (f) Pollution from Shipping Activities. Measures for the abatement and control of pollution from shipping sources, including:
- (i) Programs and compatible regulations to prevent discharges of harmful quantities of oil and hazardous polluting substances, in accordance with Annex 4;
  - (ii) Compatible regulations for the control of discharges of vessel wastes, in accordance with Annex 5;
  - (iii) Such compatible regulations to abate and control pollution from shipping sources as may be deemed desirable in the light of continuing reviews and studies to be

undertaken in accordance with Annex 6;

- (iv) Programs and any necessary compatible regulations in accordance with Annexes 4 and 5, for the safe and efficient handling of shipboard generated wastes, including oil, hazardous polluting substances, garbage, waste water and sewage, and for their subsequent disposal, including the type and quantity of reception facilities and, if applicable, treatment standards; and
- (v) Establishment by the Canadian Coast Guard and the United States Coast Guard of a coordinated system for aerial and surface surveillance for the purpose of enforcement of regulations and the early identification, abatement and clean-up of spills of oil, hazardous polluting substances, or other pollution.
- (g) Pollution from Dredging Activities. Measures for the abatement and control of pollution from all dredging activities, including the development of criteria for the identification of polluted sediments and compatible programs for disposal of polluted dredged material, in accordance with Annex 7. Pending the development of compatible criteria and programs, dredging operations shall be conducted in a manner that will minimize adverse effects on the environment.
- (h) Pollution from Onshore and Offshore Facilities. Measures for the abatement and control of pollution from onshore and offshore facilities, including programs and compatible regulations for the prevention of discharges of harmful quantities of oil and hazardous polluting substances, in accordance with Annex 8.
- (i) Contingency Plan. Maintenance of a joint contingency plan for use in the event of a discharge or the imminent threat of a discharge of oil or hazardous polluting substances, in accordance with Annex 9.
- (j) Hazardous Polluting Substances. Implementation of Annex 10 concerning hazardous polluting substances. The Parties shall further consult from time to time for the purpose of revising the list of hazardous polluting substances and of identifying harmful quantities of these substances.
- (k) Persistent Toxic Substances. Measures for the control of inputs of persistent toxic substances including control programs for their production, use, distribution and disposal, in accordance with Annex 12.
- (l) Airborne Pollutants. Programs to identify pollutant sources and relative source contributions, including the more accurate definition of wet and dry deposition rates, for those substances which may have significant adverse effects on environmental quality including the indirect effects of impairment of tributary water quality through atmospheric deposition in drainage basins. In cases where significant contributions to Great Lakes pollution from atmospheric sources are identified, the Parties agree to consult on appropriate remedial programs.

- (m) Surveillance and Monitoring Implementation of a coordinated surveillance and monitoring program in the Great Lakes System, in accordance with Annex 11, to assess compliance with pollution control requirements and achievement of the Objectives, to provide information for measuring local and whole lake response to control measures, and to identify emerging problems.

2. The Parties shall develop and implement such additional programs as they jointly decide are necessary and desirable to fulfil the purpose of this Agreement and to meet the General and Specific Objectives.

## **ARTICLE VII**

### **POWERS, RESPONSIBILITIES AND FUNCTIONS OF THE INTERNATIONAL JOINT COMMISSION**

1. The international Joint Commission shall assist in the implementation of this Agreement. Accordingly, the Commission is hereby given, by a Reference pursuant to Article IX of the Boundary Waters Treaty, the following responsibilities:

- (a) Collation, analysis and dissemination of data and information supplied by the Parties and State and Provincial Governments relating to the quality of the boundary waters of the Great Lakes System and to pollution that enters the boundary waters from tributary waters and other sources;
- (b) Collection, analysis and dissemination of data and information concerning the General and Specific Objectives and the operation and effectiveness of the programs and other measures established pursuant to this Agreement;
- (c) Tendering of advice and recommendations to the Parties and to the State and Provincial Governments on problems of and matters related to the quality of the boundary waters of the Great Lakes System including specific recommendations concerning the General and Specific Objectives, legislation, standards and other regulatory requirements, programs and other measures, and intergovernmental agreements relating to the quality of these waters;
- (d) Tendering of advice and recommendations to the Parties in connection with matters covered under the Annexes to this Agreement;
- (e) Provision of assistance in the coordination of the joint activities envisaged by this Agreement;
- (f) Provision of assistance in and advice on matters related to research in the Great Lakes Basin Ecosystem, including identification of objectives for research activities, tendering of advice and recommendations concerning research to the Parties and to the State and Provincial Governments, and dissemination of information concerning research to interested persons and agencies;

(g) Investigations of such subjects related to the Great Lakes Basin Ecosystem as the Parties may from time to time refer to it.

2. In the discharge of its responsibilities under this Reference, the Commission may exercise all of the powers conferred upon it by the Boundary Waters Treaty and by any legislation passed pursuant thereto including the power to conduct public hearings and to compel the testimony of witnesses and the production of documents.

3. The Commission shall make a full report to the Parties and to the State and Provincial Governments no less frequently than biennially concerning progress toward the achievement of the General and Specific Objectives including, as appropriate, matters related to Annexes to this Agreement. This report shall include an assessment of the effectiveness of the programs and other measures undertaken pursuant to this Agreement, and advice and recommendations. In alternate years the Commission may submit a summary report. The Commission may at any time make special reports to the Parties, to the State and Provincial Governments and to the public concerning any problem of water quality in the Great Lakes System.

4. The Commission may in its discretion publish any report, statement or other document prepared by it in the discharge of its functions under this Reference.

5. The Commission shall have authority to verify independently the data and other information submitted by the Parties and by the State and Provincial Governments through such tests or other means as appear appropriate to it, consistent with the Boundary Waters Treaty and with applicable legislation.

6. The Commission shall carry out its responsibilities under this Reference utilizing principally the services of the Water Quality Board and the Science Advisory Board established under Article VIII of this Agreement. The Commission shall also ensure liaison and coordination between the institutions established under this Agreement and other institutions which may address concerns relevant to the Great Lakes Basin Ecosystem, including both those within its purview, such as those Boards related to Great Lakes levels and air pollution matters, and other international bodies, as appropriate.

## **ARTICLE VIII**

### **JOINT INSTITUTIONS AND REGIONAL OFFICE**

1. To assist the International Joint Commission in the exercise of the powers and responsibilities assigned to it under this Agreement, there shall be two Boards:

(a) Great Lakes Water Quality Board which shall be the principal advisor to the Commission. The Board shall be composed of an equal number of members from Canada and the United States, including representatives from the Parties and each of the State and Provincial Governments; and

(b) Great Lakes Science Advisory Board which shall provide advice on research to the Commission and to the Water Quality Board. The Board shall further provide advice on scientific matters referred to it by the Commission, or by the Water Quality Board in consultation with the Commission. The Science Advisory Board shall consist of managers

of Great Lakes research programs and recognized experts on Great Lakes water quality problems and related fields.

2. The members of the Water Quality Board and the Science Advisory Board shall be appointed by the Commission after consultation with the appropriate government or governments concerned. The functions of the Hoards shall be as specified in the Terms of Reference appended to this Agreement.

3. To provide administrative support and technical assistance to the two Boards, and to provide a public information service for the programs, including public hearings, undertaken by the International Joint Commission and by the Boards, there shall be a Great Lakes Regional Office of the International Joint Commission. Specific duties and organization of the Office shall be as specified in the Terms of Reference appended to this Agreement.

4. The Commission shall submit an annual budget of anticipated expenses to be incurred in carrying out its responsibilities under this Agreement to the Parties for approval. Each Party shall seek funds to pay one-half of the annual budget so approved, but neither Party shall be under an obligation to pay a larger amount than the other toward this budget.

## **ARTICLE IX**

### SUBMISSION AND EXCHANGE OF INFORMATION

1. The International Joint Commission shall be given at its request any data or other information relating to water quality in the Great Lakes System in accordance with procedures established by the Commission.

2. The Commission shall make available to the Parties and to the State and Provincial Governments upon request all data or other information furnished to it in accordance with this Article.

3. Each Party shall make available to each other at its request any data or other information in its control relating to water quality in the Great Lakes System.

4. Notwithstanding any other provision of this Agreement, the Commission shall not release without the consent of the owner any information identified as proprietary information under the law of the place where such information has been acquired.

## **ARTICLE X**

### CONSULTATION AND REVIEW

1. Following the receipt of each report submitted to the Parties by the International Joint Commission in accordance with paragraph 3 of Article VII of this Agreement, the Parties shall consult on the recommendations contained in such report and shall consider such action as may be appropriate, including:

- (a) The modification of existing Objectives and the adoption of new Objectives;
- (b) The modification or improvement of programs and joint measures; and

- (c) The amendment of this Agreement or any Annex thereto.

Additional consultations may be held at the request of either Party on any matter arising out of the implementation of this Agreement.

2. When a Party becomes aware of a special pollution problem that is of joint concern and requires an immediate response, it shall notify and consult the other Party forthwith about appropriate remedial action.

3. The Parties shall conduct a comprehensive review of the operation and effectiveness of this Agreement following the third biennial report of the Commission required under Article VII of this Agreement.

## **ARTICLE XI**

### **IMPLEMENTATION**

1. The obligations undertaken in this Agreement shall be subject to the appropriation of funds in accordance with the constitutional procedures of the Parties.

2. The Parties commit themselves to seek:

- (a) The appropriation of the funds required to implement this Agreement, including the funds needed to develop and implement the programs and other measures provided for in Article VI of this Agreement, and the funds required by the International Joint Commission to carry out its responsibilities effectively;
- (b) The enactment of any additional legislation that may be necessary in order to implement the programs and other measures provided for in Article VI of this Agreement; and
- (c) The cooperation of the State and Provincial Governments in all matters relating to this Agreement.

## **ARTICLE XII**

### **EXISTING RIGHTS AND OBLIGATIONS**

Nothing in this Agreement shall be deemed to diminish the rights and obligations of the Parties as set forth in the Boundary Waters Treaty.

## **ARTICLE XIII**

### **AMENDMENT**

1. This Agreement, the Annexes, and the Terms of Reference may be amended by agreement of the Parties. The Annexes may also be amended as provided therein, subject to the requirement that such amendments shall be within the scope of this Agreement. All such amendments to the Annexes shall be confirmed by an exchange of notes or letters between the Parties through diplomatic channels which shall specify the effective date or dates of such amendments.

2. All amendments to this Agreement, the Annexes, and the Terms of Reference shall be communicated promptly to the International Joint Commission.

**ARTICLE XIV**  
ENTRY INTO FORCE AND TERMINATION

This Agreement shall enter into force upon signature by the duly authorized representatives of the Parties, and shall remain in force for a period of five years and thereafter until terminated upon twelve months' notice given in writing by one of the Parties to the other.

**ARTICLE XV**  
SUPERSESION

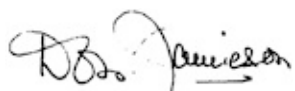
This Agreement supersedes the Great Lakes Water Quality Agreement of April 15, 1972, and shall be referred to as the "Great Lakes Water Quality Agreement of 1978".

IN WITNESS WHEREOF the undersigned representatives, duly authorized by their respective Governments, have signed this Agreement.

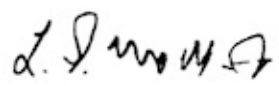
DONE in duplicate at Ottawa in the English and French languages, both versions being equally authentic, this 22<sup>nd</sup> day of November, 1978.

EN FOI DE QUOI, les représentants soussignés, dûment autorisés par leur Gouvernement respectif, ont signé le présent Accord.

FAIT en double exemplaire à Ottawa en français et en anglais, chaque version faisant également foi, ce 22<sup>ème</sup> jour de novembre 1978.



For the Government of Canada  
Pour le Gouvernement du Canada



For the Government of the United States of America  
Pour e Gouvernement des Etats-Unis d'Amérique





# ANNEX 1

## SPECIFIC OBJECTIVES

These Objectives are based on available information on cause/effect relationships between pollutants and receptors to protect the recognized most sensitive use in all waters. These Objectives may be amended, or new Objectives may be added, by mutual consent of the Parties.

### I. CHEMICAL

#### A. Persistent Toxic Substances

##### 1. Organic

##### (a) Pesticides

###### Aldrin/Dieldrin

The sum of the concentrations of aldrin and dieldrin in water should not exceed 0.001 microgram per litre. The sum of concentrations of aldrin and dieldrin in the edible portion of fish should not exceed 0.3 microgram per gram (wet weight basis) for the protection of human consumers of fish.

###### Chlordane

The concentration of chlordane in water should not exceed 0.06 microgram per litre for the protection of aquatic life.

###### DDT and Metabolites

The sum of the concentrations of DDT and its metabolites in water should not exceed 0.003 microgram per litre. The sum of the concentrations of DDT and its metabolites in whole fish should not exceed 1.0 microgram per gram (wet weight basis) for the protection of fish-consuming aquatic birds.

###### Endrin

The concentration of endrin in water should not exceed 0.002 microgram per litre. The concentration of endrin in the edible portion of fish should not exceed 0.3 microgram per gram (wet weight basis) for the protection of human consumers of fish.

###### Heptachlor/Heptachlor Epoxide

The sum of the concentrations of heptachlor and heptachlor epoxide in water should not exceed 0.001 microgram per litre. The sum of the concentrations of heptachlor and heptachlor epoxide in edible portions of fish should not exceed 0.3 microgram per gram (wet weight basis) for the protection of human consumers of fish.

###### Lindane

The concentration of lindane in water should not exceed 0.01 microgram per litre

for the protection of aquatic life. The concentration of lindane in edible portions of fish should not exceed 0.3 microgram per gram (wet weight basis) for the protection of human consumers of fish.

#### Methoxychlor

The concentration of methoxychlor in water should not exceed 0.04 microgram per litre for the protection of aquatic life.

#### Mirex

For the protection of aquatic organisms and fish-consuming birds and animals, mirex and its degradation products should be substantially absent from water and aquatic organisms. Substantially absent here means less than detection levels as determined by the best scientific methodology available.

#### Toxaphene

The concentration of toxaphene in water should not exceed 0.008 microgram per litre for the protection of aquatic life.

### (b) Other Compounds

#### Phthalic Acid Esters

The concentration of dibutyl phthalate and di(2-ethylhexyl) phthalate in water should not exceed 4.0 micrograms per litre and 0.6 microgram per litre, respectively, for the protection of aquatic life. Other phthalic acid esters should not exceed 0.2 microgram per litre in waters for the protection of aquatic life.

#### Polychlorinated Biphenyls (PCBs)

The concentration of total polychlorinated biphenyls in fish tissues (whole fish, calculated on a wet weight basis), should not exceed 0.1 microgram per gram for the protection of birds and animals which consume fish.

#### Unspecified Organic Compounds

For other organic contaminants, for which Specific Objectives have not been defined, but which can be demonstrated to be persistent and are likely to be toxic, the concentrations of such compounds in water or aquatic organisms should be substantially absent, i.e., less than detection levels as determined by the best scientific methodology available.

## 2. Inorganic

### (a) Metals

#### Arsenic

The concentrations of total arsenic in an unfiltered water sample should not exceed 50 micrograms per litre to protect raw waters for public water supplies.

#### Cadmium

The concentration of total cadmium in an unfiltered water sample should not exceed 0.2 microgram per litre to protect aquatic life.

#### Chromium

The concentration of total chromium in an unfiltered water sample should not exceed 50 micrograms per litre to protect raw waters for public water supplies.

#### Copper

The concentration of total copper in an unfiltered water sample should not exceed 5 micrograms per litre to protect aquatic life.

#### Iron

The concentration of total iron in an unfiltered water sample should not exceed 300 micrograms per litre to protect aquatic life.

#### Lead

The concentration of total lead in an unfiltered water sample should not exceed 10 micrograms per litre in Lake Superior, 20 micrograms per litre in Lake Huron and 25 micrograms per litre in all remaining Great Lakes to protect aquatic life.

#### Mercury

The concentration of total mercury in a filtered water sample should not exceed 0.2 microgram per litre nor should the concentration of total mercury in whole fish exceed 0.5 microgram per gram (wet weight basis) to protect aquatic life and fish-consuming birds.

#### Nickel

The concentration of total nickel in an unfiltered water sample should not exceed 25 micrograms per litre to protect aquatic life.

#### Selenium

The concentration of total selenium in an unfiltered water sample should not exceed 10 micrograms per litre to protect raw water for public water supplies.

#### Zinc

The concentration of total zinc in an unfiltered water sample should not exceed 30 micrograms per litre to protect aquatic life.

(b) Other Inorganic Substances

Fluoride

The concentration of total fluoride in an unfiltered water sample should not exceed 1200 micrograms per litre to protect raw water for public water supplies.

Total Dissolved Solids

In Lake Erie, Lake Ontario and the International Section of the St. Lawrence River, the level of total dissolved solids should not exceed 200 milligrams per litre. In the St. Clair River, Lake St. Clair, the Detroit River and the Niagara River, the level should be consistent with maintaining the levels of total dissolved solids in Lake Erie and Lake Ontario at not to exceed 200 milligrams per litre. In the remaining boundary waters, pending further study, the level of total dissolved solids should not exceed present levels.

B. Non-Persistent Toxic Substances

1. Organic Substances

(a) Pesticides

Diazinon

The concentration of diazinon in an unfiltered water sample should not exceed 0.08 microgram per litre for the protection of aquatic life.

Guthion

The concentration of guthion in an unfiltered water sample should not exceed 0.005 microgram per litre for the protection of aquatic life.

Parathion

The concentration of parathion in an unfiltered water sample should not exceed 0.008 microgram per litre for the protection of aquatic life.

Other Pesticides

The concentration of unspecified, non-persistent pesticides should not exceed 0.05 of the median lethal concentration on a 96-hour test for any sensitive local species.

(b) Other Substances

Unspecified Non-Persistent Toxic Substances and Complex Effluents

Unspecified non-persistent toxic substances and complex effluents of municipal, industrial or other origin should not be present in concentrations which exceed 0.05 of the median lethal concentration in a 96-hour test for any sensitive local species to protect aquatic life.

### Oil and Petrochemicals

Oil and petrochemicals should not be present in concentrations that:

- (i) can be detected as visible film, sheen or discolouration on the surface;
- (ii) can be detected by odour;
- (iii) can cause tainting of edible aquatic organisms; and
- (iv) can form deposits on shorelines and bottom sediments that are detectable by sight or odour, or are deleterious to resident aquatic organisms.

### 2. Inorganic Substances

#### Ammonia

The concentration of unionized ammonia ( $\text{NH}_3$ ) should not exceed 20 micrograms per litre for the protection of aquatic life. Concentrations of total ammonia should not exceed 500 micrograms per litre for the protection of public water supplies.

#### Hydrogen Sulfide

The concentration of undissociated hydrogen sulfide should not exceed 2.0 micrograms per litre to protect aquatic life.

### C. Other Substances

#### 1. Dissolved oxygen

In the connecting channels and in the upper waters of the Lakes, the dissolved oxygen level should not be less than 6.0 milligrams per litre at any time; in hypolimnetic waters, it should be not less than necessary for the support of fish life, particularly cold water species.

#### 2. pH

Values of pH should not be outside the range of 6.5 to 9.0, nor should discharge change the pH at the boundary of a limited use zone more than 0.5 units from that of the ambient waters.

#### 3. Nutrients

##### Phosphorus

The concentration should be limited to the extent necessary to prevent nuisance growths of algae, weeds and slimes that are or may become injurious to any beneficial water use. (Specific phosphorus control requirements are set out in Annex 3.)

#### 4. Tainting Substances

- (a) Raw public water supply sources should be essentially free from objectionable taste and odour for aesthetic reasons.

- (b) Levels of phenolic compounds should not exceed 1.0 microgram per litre in public water supplies to protect against taste and odor in domestic water.
- (c) Substances entering the water as the result of human activity that cause tainting of edible aquatic organisms should not be present in concentrations which will lower the acceptability of these organisms as determined by organoleptic tests.

## II. PHYSICAL

### A. Asbestos

Asbestos should be kept at the lowest practical level and in any event should be controlled to the extent necessary to prevent harmful effects on human health.

### B. Temperature

There should be no change in temperature that would adversely affect any local or general use of the waters.

### C. Settleable and Suspended Solids, and Light Transmission

For the protection of aquatic life, waters should be free from substances attributable to municipal, industrial or other discharges resulting from human activity that will settle to form putrescent or otherwise objectionable sludge deposits or that will alter the value of Secchi disc depth by more than 10 per cent.

## III. MICROBIOLOGICAL

Waters used for body contact recreation activities should be substantially free from bacteria, fungi, or viruses that may produce enteric disorders or eye, ear, nose, throat and skin infections or other human diseases and infections.

## IV. RADIOLOGICAL

The level of radioactivity in waters outside of any defined source control area should not result in a TED<sub>50</sub> (total equivalent dose integrated over 50 years as calculated in accordance with the methodology established by the International Commission on Radiological Protection) greater than 1 millirem to the whole body from a daily ingestion of 2.2 litres of lake water for one year. For dose commitments between 1 and 5 millirem at the periphery of the source control area, source investigation and corrective action are recommended if releases are not as low as reasonably achievable. For dose commitments greater than 5 millirem, the responsible regulatory authorities shall determine appropriate corrective action.

## ANNEX 2

### LIMITED USE ZONES

1. The Parties, in consultation with the State and Provincial Governments, shall take measures to define and describe all existing and future limited use zones, and shall prepare an annual report on these measures. The measures shall include:
  - (a) Identification and quantitative and qualitative description of all point source waste discharges (including tributaries) to boundary waters;
  - (b) Delineation of boundaries for limited use zones assigned to identified discharges;
  - (c) Assessment of the impact of the proposed limited use zones on existing and potential beneficial uses; and
  - (d) Continuing review and revision of the extent of limited use zones to achieve maximum possible reduction in size and effect of such zones in accordance with improvements in waste treatment technology.
  
2. Limited use zones within the boundary waters of the Great Lakes System shall be designated for industrial discharges, and for municipal discharges in excess of 1 million gallons per day before January 1, 1980, in accordance with the following principles:
  - (a) The boundary of a limited use zone shall not transect the international boundary.
  - (b) The size, shape and exact location of a limited use zone shall be specified on a case-by-case basis by the responsible regulatory agency. The size shall be minimized to the greatest possible degree, being no larger than that attainable by all reasonable and practicable effluent treatment measures.
  - (c) Specific Objectives and conditions applicable to the receiving water body shall be met at the boundary of limited use zones.
  - (d) Existing biological, chemical, physical and hydrological conditions shall be defined before considering the location of a new limited use zone or restricting an existing one.
  - (e) Areas of extraordinary natural resource value shall not be designated as limited use zones.
  - (f) Limited use zones shall not form barriers to migratory routes of aquatic species or interfere with biological communities or populations of important species to a degree which damages the ecosystem, or diminishes other beneficial uses disproportionately. Routes of passage for specific organisms which require protection and which would normally inhabit or pass through limited use zones shall be assured either by location of the zones, or by design of conditions within the zones.
  - (g) Conditions shall not be permitted within the limited use zones which:

- (i) are rapidly lethal to important aquatic life;
  - (ii) cause irreversible responses which could result in detrimental post-exposure effects; or
  - (iii) result in bioconcentration of toxic substances which are harmful to the organism or its consumers.
- (h) Concentrations of toxic substances at any point in the limited use zone where important species are physically capable of residing shall not exceed the 24-hour LC<sub>50</sub>.
- (i) Every attempt shall be made to insure that the zones are free from:
- (i) objectionable deposits;
  - (ii) unsightly or deleterious amounts of flotsam, debris, oil, scum and other floating matter;
  - (iii) substances producing objectionable colour, odour, taste or turbidity; and
  - (iv) substances and conditions or combinations thereof at levels which produce aquatic life in nuisance quantities that interfere with other uses.
- (j) Limited use zones may overlap unless the combined effects exceed the conditions set forth in other guidelines.
- (k) As a general condition, limited use zones should not overlap with municipal and other water intakes and recreational areas. However, knowledge of local effluent characteristics and effects could allow such a combination of uses.

3. Candidate areas for designation as limited use zones shall be reported, in all available detail, by the responsible regulatory agencies to the International Joint Commission. Within 60 days, the Commission may comment upon the extent of the area proposed for designation as a limited use zone, or any other aspect or measure to promote the attainment of the General and Specific Objectives of this Agreement. The responsible regulatory agency will take the comments of the Commission into account prior to making a formal designation of the area as a limited use zone. If no comment is received from the Commission within 60 days, it may be assumed that the Commission agrees with the proposed designation.

4. The Parties shall consult to develop more definitive procedures to delineate the extent of individual limited use zones and to develop scientific guidelines for determining the maximum portions of the boundary waters of each of the Great Lakes and connecting channels which may be occupied by limited use zones.

## ANNEX 3

### CONTROL OF PHOSPHORUS

1. The purpose of the following programs is to minimize eutrophication problems and to prevent degradation with regard to phosphorus in the boundary waters of the Great Lakes System. The goals of phosphorus control are:
  - (a) Restoration of year-round aerobic conditions in the bottom waters of the Central Basin of Lake Erie;
  - (b) Substantial reduction in the present levels of algal biomass to a level below that of a nuisance condition in Lake Erie;
  - (c) Reduction in present levels of algal biomass to below that of a nuisance condition in Lake Ontario including the International Section of the St. Lawrence River;
  - (d) Maintenance of the oligotrophic state and relative algal biomass of Lakes Superior and Huron;
  - (e) Substantial elimination of algal nuisance growths in Lake Michigan to restore it to an oligotrophic state; and
  - (f) The elimination of algal nuisance in bays and in other areas wherever they occur.
  
2. The following programs shall be developed and implemented to reduce input of phosphorus to the Great Lakes:
  - (a) Construction and operation of municipal waste treatment facilities in all plants discharging more than one million gallons per day to achieve, where necessary to meet the loading allocations to be developed pursuant to paragraph 3 below, or to meet local conditions, whichever are more stringent, effluent concentrations of 1.0 milligram per litre total phosphorus maximum for plants in the basins of Lakes Superior, Michigan, and Huron, and of 0.5 milligram per litre total phosphorus maximum for plants in the basins of Lakes Ontario and Erie.
  - (b) Regulation of phosphorus introduction from industrial discharges to the maximum practicable extent.
  - (c) Reduction to the maximum extent practicable of phosphorus introduced from diffuse sources into Lakes Superior, Michigan, and Huron; and reduction by 30 per cent of phosphorus introduced from diffuse sources into Lakes Ontario and Erie, where necessary to meet the loading allocations to be developed pursuant to paragraph 3 below, or to meet local conditions, whichever are more stringent.
  - (d) Reduction of phosphorus in household detergents to 0.5 per cent by weight where necessary to meet the loading allocations to be developed pursuant to paragraph 3 below,

or to meet local conditions, whichever are more stringent.

- (e) Maintenance of a viable research program to seek maximum efficiency and effectiveness in the control of phosphorus introductions into the Great Lakes.

3. The following table establishes phosphorus loads for the base year (1976) and future phosphorus loads. The Parties, in cooperation with the State and Provincial Governments, shall within eighteen months after the date of entry into force of this Agreement confirm the future phosphorus loads, and based on these establish load allocations and compliance schedules, taking into account the recommendations of the International Joint Commission arising from the Pollution from Land Use Activities Reference. Until such loading allocations and compliance schedules are established, the Parties agree to maintain the programs and other measures specified in Annex 2 of the Great Lakes Water Quality Agreement of 1972.

Basin	1976 Phosphorus Load in Metric Tonnes Per Year	Future Phosphorus Load in Metric Tonnes Per Year
Lake Superior	3600	3400*
Lake Michigan	6700	5600*
Main Lake Huron	3000	2800*
Georgian Bay	630	600*
North Channel	550	520*
Saginaw Bay	870	440**
Lake Erie	20000	11000**
Lake Ontario	11000	7000**

\* These loadings would result if all municipal plants over one million gallons per day achieved an effluent of 1 milligram per litre of phosphorus.

\*\* These loadings are required to meet the goals stated in paragraph 1 above.

## ANNEX 4

### DISCHARGES OF OIL AND HAZARDOUS POLLUTING SUBSTANCES FROM VESSELS

1. Definitions. As used in this Annex:
  - (a) "Discharge" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting or dumping; it does not include unavoidable direct discharges of oil from a properly functioning vessel engine;
  - (b) "Harmful quantity of oil" means any quantity of oil that, if discharged from a ship that is stationary into clear calm water on a clear day, would produce a film or a sheen upon, or discolouration of, the surface of the water or adjoining shoreline, or that would cause a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shoreline;
  - (c) "Oil" means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, oil sludge, oil refuse, oil mixed with ballast or bilge water, and oil mixed with wastes other than dredged material;
  - (d) "Tanker" means any vessel designed for the carriage of liquid cargo in bulk; and
  - (e) "Vessel" means any ship, barge or other floating craft, whether or not self-propelled.
2. General Principles. Compatible regulations shall be adopted for the prevention of discharges into the Great Lakes System of harmful quantities of oil and hazardous polluting substances from vessels in accordance with the following principles:
  - (a) The discharge of a harmful quantity of oil or hazardous polluting substance shall be prohibited and made subject to appropriate penalties; and
  - (b) As soon as any person in charge has knowledge of any discharge of harmful quantities of oil or hazardous polluting substances, immediate notice of such discharge shall be given to the appropriate agency in the jurisdiction where the discharge occurs; failure to give this notice shall be made subject to appropriate penalties.
3. Oil. The programs and measures to be adopted for the prevention of discharges of harmful quantities of oil shall include:
  - (a) Compatible regulations for design, construction, and operation of vessels based on the following principles:
    - (i) Each vessel shall have a suitable means of containing on board cargo oil spills caused by loading or unloading operations;
    - (ii) Each vessel shall have a suitable means of containing on board fuel oil spills caused by loading or unloading operations, including those from tank vents and overflow pipes;

- (iii) Each vessel shall have the capability of retaining on board oily wastes accumulated during vessel operation;
  - (iv) Each vessel shall be capable of off-loading retained oily wastes to a reception facility;
  - (v) Each vessel shall be provided with a means for rapidly and safely stopping the flow of cargo or fuel oil during loading, unloading or bunkering operations in the event of an emergency;
  - (vi) Each vessel shall be provided with suitable lighting to adequately illuminate all cargo and fuel oil handling areas if the loading, unloading or bunkering operations occur at night;
  - (vii) Hose assemblies used on board vessels for oil loading, unloading, or bunkering shall be suitably designed, identified, and inspected to minimize the possibility of failure; and
  - (viii) Oil loading, unloading, and bunkering systems shall be suitably designed, identified, and inspected to minimize the possibility of failure; and
- (b) Programs to ensure that merchant vessel personnel are trained in all functions involved in the use, handling, and stowage of oil and in procedures for abatement of oil pollution.

4. Hazardous Polluting Substances. The programs and measures to be adopted for the prevention of discharges of harmful quantities of hazardous polluting substances carried as cargo shall include:

- (a) Compatible regulations for the design, construction, and operation of vessels using as a guide the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk as established through the Inter-Governmental Maritime Consultative Organization (IMCO), including the following requirements:
  - (i) Each vessel shall have a suitable means of containing on board spills caused by loading or unloading operations;
  - (ii) Each vessel shall have a capability of retaining on board wastes accumulated during vessel operation;
  - (iii) Each vessel shall be capable of off-loading wastes retained to a reception facility;
  - (iv) Each vessel shall be provided with a means for rapidly and safely stopping the flow during loading or unloading operations in the event of an emergency; and
  - (v) Each vessel shall be provided with suitable lighting to adequately illuminate all cargo handling areas if the loading or unloading operations occur at night;
- (b) Identification of vessels carrying cargoes of hazardous polluting substances in bulk, containers, and package form, and of all such cargoes;

- (c) Identification in vessel manifests of all hazardous polluting substances;
- (d) Procedures for notification to the appropriate agency by the owner, master or agent of a vessel of all hazardous polluting substances; and
- (e) Programs to ensure that merchant vessel personnel are trained in all functions involving the use, handling, and stowage of hazardous polluting substances; the abatement of pollution from such substances; and the hazards associated with the handling of such substances.

5. Additional Measures. Both Parties shall take, as appropriate, action to ensure the provision of adequate facilities for the reception, treatment, and subsequent disposal of oil and hazardous polluting substances wastes from all vessels.

## ANNEX 5

### DISCHARGES OF VESSEL WASTES

1. Definitions. As used in this Annex:
  - (a) "Discharge" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, and dumping;
  - (b) "Garbage" means all kinds of victual, domestic, and operational wastes, excluding fresh fish and parts thereof generated during the normal operation of the ship and liable to be disposed of continually or periodically;
  - (c) "Sewage" means human or animal waste generated on board ship and includes wastes from water closets, urinals, or a hospital facility;
  - (d) "Vessel" means any ship, barge or other floating craft, whether or not self-propelled; and
  - (e) "Waste water" means water in combination with other substances, including ballast water and water used for washing cargo holds, but excluding water in combination with oil, hazardous polluting substances, or sewage.
2. General Principles. Compatible regulations shall be adopted governing the discharge into the Great Lakes System of garbage, sewage, and waste water from vessels in accordance with the following principles:
  - (a) The discharge of garbage shall be prohibited and made subject to appropriate penalties;
  - (b) The discharge of waste water in amounts or in concentrations that will be deleterious shall be prohibited and made subject to appropriate penalties; and
  - (c) Every vessel operating in these waters that is provided with toilet facilities shall be equipped with a device or devices to contain, incinerate, or treat sewage to all adequate degree, appropriate penalties shall be provided for failure to comply with the regulations.
3. Critical Use Areas. Critical use areas of the Great Lakes System may be designated where the discharge of waste water or sewage shall be limited or prohibited.
4. Containment Devices. Regulations may be established requiring a device or devices to contain the sewage of pleasure craft or other classes of vessels operating in the Great Lakes System or designated areas thereof.
5. Additional Measures. The Parties shall take, as appropriate, action to ensure the provision of adequate facilities for the reception, treatment, and subsequent disposal of garbage, waste water, and sewage from all vessels.

## ANNEX 6

### REVIEW OF POLLUTION FROM SHIPPING SOURCES

1. Review. The Canadian Coast Guard and the United States Coast Guard shall continue to review services, systems, programs, recommendations, standards, and regulations relating to shipping activities for the purpose of maintaining or improving Great Lakes water quality. The reviews shall include:

- (a) Review of vessel equipment, vessel manning, and navigation practices or procedures, and of aids to navigation and vessel traffic management, for the purpose of precluding casualties which may be deleterious to water quality;
- (b) Review of practices and procedures regarding waste water and their deleterious effect on water quality;
- (c) Review of practices and procedures, as well as current technology for the treatment of vessel sewage; and
- (d) Review of current practices and procedures regarding the prevention of pollution from the loading, unloading, or on board transfer of cargo.

2. Consultation. Representatives of the Canadian Coast Guard and the United States Coast Guard, and other interested agencies, shall meet at least annually to consider this Annex. A report of this annual consultation shall be furnished to the International Joint Commission prior to its annual meeting on Great Lakes water quality. The purpose of the consultation shall be to:

- (a) Provide an interchange of information with respect to continuing reviews, ongoing studies, and areas of concern;
- (b) Identify and determine the relative importance of problems requiring further study; and
- (c) Apportion responsibility, as between the Canadian Coast Guard and the United States Coast Guard, for the studies, or portions thereof, which were identified in subparagraph 2(b) above.

3. Studies. Where a review identifies additional areas for improvement, the Canadian Coast Guard and the United States Coast Guard, and other interested agencies, will undertake a study to establish improved procedures for the abatement and control of pollution from shipping sources, and will:

- (a) Develop a brief study description which will include the nature of the perceived problem, procedures to quantify the problem, alternative solutions to the problem, procedures to determine the best alternative, and an estimated completion date;
- (b) Transmit study descriptions to the International Joint Commission and other interested agencies;

- (c) Transmit the study, or a brief summary of its conclusions, to the International Joint Commission and other interested agencies; and
- (d) Transmit a brief status report to the International Joint Commission and other interested agencies if the study is not completed by the estimated completion date.

4. Responsibility. Responsibility for the coordination of the review, consultation, and studies is assigned to the Canadian Coast Guard and the United State Coast Guard.

## ANNEX 7

### DREDGING

1. There shall be established, under the auspices of the Water Quality Board, a Subcommittee on Dredging. The Subcommittee shall:
  - (a) Review the existing practices in both countries relating to dredging activities, as well as the previous work done by the International Working Group on Dredging, with the objective of developing, within one year of the date of entry into force of this Agreement, compatible guidelines and criteria for dredging activities in the boundary waters of the Great Lakes System;
  - (b) Maintain a register of significant dredging projects being undertaken in the Great Lakes System with information to allow for the assessment of the environmental effects of the projects. The register shall include pertinent statistics to allow for the assessment of pollution loadings from dredged materials to the Great Lakes System;
  - (c) Encourage the exchange of information relating to developments of dredging technology and environmental research.
2. The Subcommittee shall identify specific criteria for the classification of polluted sediments of designated areas of intensive and continuing dredging activities within the Great Lakes System. Pending development of criteria and guidelines by the Subcommittee, and their acceptance by the Parties, the Parties shall continue to apply the criteria now in use by the regulatory authorities; however, neither Party shall be precluded from applying standards more stringent than those now in use.
3. The Parties shall continue to direct particular attention to the identification and preservation of significant wetland areas in the Great Lakes Basin Ecosystem which are threatened by dredging and disposal activities.
4. The Parties shall encourage research to investigate advances in dredging technology and the pathways, fate and effects of nutrients and contaminants of dredged materials.
5. The Subcommittee shall undertake any other activities as the Water Quality Board may direct.

## ANNEX 8

### DISCHARGES FROM ONSHORE AND OFFSHORE FACILITIES

1. Definitions. As used in this Annex:
  - (a) "Discharge" means the introduction of polluting substances into receiving waters and includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting or dumping; it does not include continuous effluent discharges from municipal or industrial treatment facilities;
  - (b) "Harmful quantity of oil" means any quantity of oil that, if discharged into clear calm waters on a clear day, would produce a film or sheen upon, or discolouration of the surface of the water or adjoining shoreline, or that would cause a sludge or emulsion to be deposited beneath the surface of the water or upon the adjoining shoreline;
  - (c) "Facility" includes motor vehicles, rolling stock, pipelines, and any other facility that is used or capable of being used for the purpose of processing, producing, storing, disposing, transferring or transporting oil or hazardous polluting substances, but excludes vessels;
  - (d) "Offshore facility" means any facility of any kind located in, on or under any water;
  - (e) "Onshore facility" means any facility of any kind located in, on or under, any land other than submerged land;
  - (f) "Oil" means oil of any kind or in any form, including, but not limited to petroleum, fuel oil, oil sludge, oil refuse, and oil mixed with wastes, but does not include constituents of dredged spoil.
2. Principles. Regulations shall be adopted for the prevention of discharges into the Great Lakes System of harmful quantities of oil and hazardous polluting substances from onshore and offshore facilities in accordance with the following principles:
  - (a) Discharges of harmful quantities of oil or hazardous polluting substances shall be prohibited and made subject to appropriate penalties;
  - (b) As soon as any person in charge has knowledge of any discharge of harmful quantities of oil or hazardous polluting substances, immediate notice of such discharge shall be given to the appropriate agency in the jurisdiction where the discharge occurs; failure to give this notice shall be made subject to appropriate penalties.
3. Programs and Measures. The programs and measures to be adopted shall include the following:
  - (a) Review of the design, construction, and location of both existing and new facilities for their adequacy to prevent the discharge of oil or hazardous polluting substances;

- (b) Review of the operation, maintenance and inspection procedures of facilities for their adequacy to prevent the discharge of oil or hazardous polluting substances;
- (c) Development and implementation of regulations and personnel training programs to ensure the safe use and handling of oil or hazardous polluting substances;
- (d) Programs to ensure that at each facility plans and provisions are made and equipment provided to stop rapidly and safely, contain, and clean up discharges of oil or hazardous polluting substances; and
- (e) Compatible regulations and other programs for the identification and placarding of containers, vehicles and other facilities containing, carrying or handling oil or hazardous polluting substances; and, where appropriate, notification to appropriate agencies of vehicle movements, maintenance of a registry, and identification in manifests of such substances to be carried.

4. Implementation.

- (a) Each Party shall submit a report to the International Joint Commission outlining its programs and measures, existing or proposed, for the implementation of this Annex within six months of the date of entry into force of this Agreement.
- (b) The report shall outline programs and measures, existing or proposed, for each of the following types of onshore and offshore facilities:
  - (i) land transportation including rail and road modes;
  - (ii) pipelines on land and submerged under water;
  - (iii) offshore drilling rigs and wells;
  - (iv) storage facilities both onshore and offshore; and
  - (v) wharves and terminals with trestle or underwater pipeway connections to land and offshore island type structures and buoys used for the handling of oil or hazardous polluting substances.
- (c) The report shall outline programs and measures, existing or proposed, for any other type of onshore or offshore facility.
- (d) Upon receipt of the reports, the Commission, in consultation with the Parties, shall review the programs and measures outlined for adequacy and compatibility and, if necessary, make recommendations to rectify any such inadequacy or incompatibility it finds.

## ANNEX 9

### JOINT CONTINGENCY PLAN

1. The Plan. The "Joint Canada-United States Marine Pollution Contingency Plan for the Great Lakes (CANUSLAX)" adopted on June 20, 1974, shall be maintained in force, as amended from time to time. The Canadian Coast Guard and the United States Coast Guard shall, in cooperation with other affected parties, identify and provide detailed Supplements for areas of high risk and of particular concern in augmentation of CANUSLAK. It shall be the responsibility of the United States Coast Guard and the Canadian Coast Guard to coordinate and to maintain the Plan and the Supplements appended to the Plan.
2. Purpose. The purpose of the Plan is to provide for coordinated and integrated response to pollution incidents in the Great Lakes System by responsible federal, state, provincial and local agencies. The Plan supplements the national, provincial and regional plans of the Parties.
3. Pollution Incidents.
  - (a) A pollution incident is a discharge, or an imminent threat of discharge of oil, hazardous polluting substance or other substance of such magnitude or significance as to require immediate response to contain, clean up, and dispose of the material.
  - (b) The objectives of the Plan in pollution incidents are:
    - (i) To develop appropriate preparedness measures and effective systems for discovery and reporting the existence of a pollution incident within the area covered by the Plan;
    - (ii) To institute prompt measures to restrict the further spread of the pollutant; and
    - (iii) To provide adequate cleanup response to pollution incidents.
4. Funding. The costs of operations of both Parties under the Plan shall be borne by the Party in whose waters the pollution incident occurred, unless otherwise agreed.
5. Amendment. The Canadian Coast Guard and the United States Coast Guard are empowered to amend the Plan subject to the requirement that such amendments shall be consistent with the purpose and objectives of this Annex.

## ANNEX 10

### HAZARDOUS POLLUTING SUBSTANCES

1. The Parties shall:
  - (a) Maintain a list, to be known as Appendix 1 of this Annex (hereinafter referred to as Appendix 1), of substances known to have toxic effects on aquatic and animal life and a risk of being discharged to the Great Lakes System;
  - (b) Maintain a list, to be known as Appendix 2 of this Annex (hereinafter referred to as Appendix 2), of substances potentially having such effects and such a risk of discharge, and to give priority to the examination of these substances for possible transfer to Appendix 1;
  - (c) Ensure that these lists are continually revised in the light of growing scientific knowledge; and
  - (d) Develop and implement programs and measures to minimize or eliminate the risk of release of hazardous polluting substances to the Great Lakes System.
2. Hazardous polluting substances to be listed in Appendix 1 shall be determined in accordance with the following procedures:
  - (a) Selection of all hazardous substances for listing in Appendix 1 shall be based upon documented toxicological and discharge potential data which have been evaluated by the Parties and deemed to be mutually acceptable.
  - (b) Revisions to Appendix 1 may be made by mutual consent of the Parties and shall be treated as amendments to this Annex for the purposes of Article XIII of this Agreement.
  - (c) Using the agreed selection criteria, either Party may recommend at any time a substance to be added to the list in Appendix 1. Such substance need not previously the recommendation will have 60 days to review the associated documentation and either reject the proposed substance or accept the substance pending completion of appropriate procedural or domestic regulatory requirements. Cause for rejection must be documented and submitted to the initiating Party and may be the basis for any further negotiations.
3. The criteria to be applied to the selection of substances as candidates for listing in Appendix 1 are:
  - (a) Acute toxicological effects, as determined by whether the substance is lethal to:
    - (i) One—half of a test population of aquatic animals in 96 hours or less at a concentration of 500 milligrams per litre or less; or
    - (ii) One—half of a test population of animals in 14 days or less when administered in a single oral dose equal to or less than 50 milligrams per kilogram of body weight; or

- (iii) One-half of a test population of animals in 14 days or less when dermally exposed to an amount equal to or less than 200 milligrams per kilogram body weight for 24 hours; or
- (iv) One-half of a test population of animals in 14 days or less when exposed to a vapour concentration equal to or less than 20 cubic centimeters per cubic meter in air for one hour; or
- (v) Aquatic flora as measured by a maximum specific growth rate or total yield of biomass which is 50 per cent lower than a control culture over 14 days in a medium at concentrations equal to or less than 100 milligrams per litre.

(b) Risk of discharge into the Great Lakes System, as determined by:

- (i) Gathering information on the history of discharges or accidents;
- (ii) Assessing the modal risks during transport and determining the use and distribution patterns;
- (iii) Identifying quantities manufactured or imported.

4. Potentially hazardous polluting substances to be listed in Appendix 2 of this Annex shall be determined in accordance' with the following procedures:

- (a) Either Party may add new substances to Appendix 2 by notifying the other in writing that the substance is considered to be a potential hazard because of documented information concerning aquatic toxicity, mammalian and other vertebrate toxicity, phytotoxicity, persistence, bio-accumulation, mutagenicity, teratogenicity, carcinogenicity, environmental translocation or because of documented information on risk of discharge to the environment. The documentation of the potential hazard and the selected criteria upon which it is based will also be submitted.
- (b) Removal of substances from Appendix 2 shall be by mutual consent of the Parties.
- (c) The Parties shall give priority to the examination of substances listed in Appendix 2 for possible transfer to Appendix 1.

5. Programs and measures to control the risk of pollution from transport, storage, handling and disposal of hazardous polluting substances are contained in Annexes 4 and B.

## APPENDIX 1

### HAZARDOUS POLLUTING SUBSTANCES

Acetaldehyde	Ammonium Sulfamate
Acetic Acid	Ammonium Sulfide
Acetic Anhydride	Ammonium Sulfite
Acetone Cyanohydrin	Ammonium Tartrate
Acetyl Bromide	Ammonium Thiocyanate
Acetyl Chloride	Ammonium Thiosulfate
Acrolein	Amyl Acetate
Acrylonitrile	Aniline
Aldrin	Antimony Pentachloride
Allyl Alcohol	Antimony Potassium Tartrate
Allyl Chloride	Antimony Tribromide
Aluminum Sulfate	Antimony Trichloride
Ammonia	Antimony Trifluoride
Ammonium Acetate	Antimony Trioxide
Ammonium Benzoate	Arsenic Disulfide
Ammonium Bicarbonate	Arsenic Pentoxide
Ammonium Bichromate	Arsenic Trichloride
Ammonium Bifluoride	Arsenic Trioxide
Ammonium Bisulfite	Arsenic Trisulfide
Ammonium Carbamate	Barium Cyanide
Ammonium Carbonate	Benzene
Ammonium Chloride	Benzoic Acid
Ammonium Chromate	Benzonitrile
Ammonium Citrate, Dibasic	Benzoyl Chloride
Ammonium Fluoborate	Benzyl Chloride
Ammonium Fluoride	Beryllium Chloride
Ammonium Hydroxide	Beryllium Fluoride
Ammonium Oxalate	Beryllium Nitrate
Ammonium Silicofluoride	Butyl Acetate

Butylamine	Cupric Acetate
Butyric Acid	Cupric Acetoarsenite
Cadmium Acetate	Cupric Chloride
Cadmium Bromide	Cupric Nitrate
Cadmium Chloride	Cupric Oxalate
Calcium Arsenate	Cupric Sulfate
Calcium Arsenite	Cupric Sulfate, Ammoniated
Calcium Carbide	Cupric Tartrate
Calcium Chromate	Cyanogen Chloride
Calcium Cyanide	Cyclohexane
Calcium Dodecylbenzenesulfonate	2,4-D Acid
Calcium Hydroxide	2,4-D Esters
Calcium Hypochlorite	Dalapon
Calcium Oxide	DDT
Captan	Diazinon
Carbaryl	Dicamba
Carbon Disulfide	Dichlobenil
Chlordane	Dichlone
Chlorine	Dichlorvos
Chlorobenzene	Dieldrin
Chloroform	Diethylamine
Chlorosulfonic Acid	Dimethylamine
Chlorpyrifos	Dinitrobenzene (mixed)
Chromic Acetate	Dinitrophenol
Chromic Acid	Diquat
Chromic Sulfate	Disulfoton
Chromous Chloride	Diuron
Cobaltous Bromide	Dodecylbenzenesulfonic Acid
Cobaltous Formate	Endosulfan
Cobaltous Sulfamate	Endrin
Coumaphos	Ethion
Cresol	Ethylbenzene

Ethylenediamine	Lead Sulfide
EDTA	Lead Thiocyanate
Ferric Ammonium Citrate	Lindane
Ferric Ammonium Oxalate	Lithium Chromate
Ferric Chloride	Malathion
Ferric Fluoride	Maleic Acid
Ferric Nitrate	Maleic Anhydride
Ferric Sulfate	Mercuric Cyanide
Ferrous Ammonium Sulfate	Mercuric Nitrate
Ferrous Chloride	Mercuric Sulfate
Ferrous Sulfate	Mercuric Thiocyanate
Formaldehyde	Mercurous Nitrate
Formic Acid	Methoxychlor
Fumaric Acid	Methyl Mercaptan
Furfural	Methyl Methacrylate
Guthion	Methyl Parathion
Heptachlor	Mevinphos
Hydrochloric Acid	Mexacarbate
Hydrofluoric Acid	Monoethylamine
Hydrogen Cyanide	Monomethylamine
Isoprene	Naled
Isopropanolamine Dodecylbenzenesulfonate	Naphthalene
Kelthane	Naphthenic Acid
Lead Acetate	Nickel Ammonium Sulfate
Lead Arsenate	Nickel Chloride
Lead Chloride	Nickel Hydroxide
Lead Fluoborate	Nickel Nitrate
Lead Fluoride	Nickel Sulfate
Lead Iodide	Nitric Acid
Lead Nitrate	Nitrobenzene
Lead Stearate	Nitrogen Dioxide
Lead Sulfate	Nitrophenol (mixed)

Paraformaldehyde	Sodium Fluoride
Parathion	Sodium Hydrosulfide
Pentachlorophenol	Sodium Hydroxide
Phenol	Sodium Hypochlorite
Phosgene	Sodium Methylate
Phosphoric Acid Phosphorus	Sodium Nitrite
Phosphorus Oxychloride	Sodium Phosphate, Dibasic
Phosphorus Pentasulfide	Sodium Phosphate, Tribasic
Phosphorus Trichloride	Sodium Selenite
Polychlorinated Biphenyls	Strontium Chromate
Potassium Arsenate	Strychnine
Potassium Arsenite	Styrene
Potassium Bichromate	Sulfuric Acid
Potassium Chromate	Sulfur Monochloride
Potassium Cyanide	2,4,5-T Acid
Potassium Hydroxide	2,4,5-T Esters
Potassium Permanganate	TDE
Propionic Acid	Tetraethyl Lead
Propionic Anhydride	Tetraethyl Pyrophosphate
Pyrethrins	Toluene
Quinoline	Toxaphene
Resorcinol	Trichlorfon
Selenium Oxide	Trichlorophenol
Sodium	Triethanolamine Dodecylbenzenesulfonate
Sodium Arsenate	Triethylamine
Sodium Arsenite	Trimethylamine
Sodium Bichromate	Uranyl Acetate
Sodium Bifluoride	Uranyl Nitrate
Sodium Bisulfite	Vanadium Pentoxide
Sodium Chromate	Vanadyl Sulfate
Sodium Cyanide	Vinyl Acetate
Sodium Dodecylbenzenesulfonate	Xylene (mixed)

Xylenol

Zinc Acetate

Zinc Ammonium Chloride

Zinc Borate

Zinc Bromide

Zinc Carbonate

Zinc Chloride

Zinc Cyanide

Zinc Fluoride

Zinc Formate

Zinc Hydrosulfite

Zinc Nitrate

Zinc Phenolsulfonate

Zinc Phosphide

Zinc Silicofluoride

Zinc Sulfate

Zirconium Nitrate

Zirconium Potassium Fluoride

Zirconium Sulfate

Zirconium Tetrachloride

## APPENDIX 2

### POTENTIAL HAZARDOUS POLLUTING SUBSTANCES

Acridine	Cobaltous Fluoride
Allethrin	Copper
Aluminum Fluoride	Crotoxyphos
Aluminum Nitrate	Cupric Carbonate
Ammonium Bromide	Cupric Citrate
Ammonium Hypophosphite	Cupric Formate
Ammonium Iodide	Cupric Glycinate
Ammonium Pentaborate	Cupric Lactate
Ammonium Persulfate	Cupric Para-amino Benzoate
Antimony Pentafluoride	Cupric Salicylate
Antimycin A	Cupric Subacetate
Arsenic Acid	Cuprous Bromide
Barban	Demeton
Benfluralin	Dibutyl Phthalate
Bensulide	Dicaphon
Benzene Hexachloride	2,4-Dinitrochlorobenzene
Beryllium Sulfate	p-Dinitrocresol
Butifos	Dinocap
Cadmium	Dinoseb
Cadmium Cyanide	Dioxathion
Cadmium Nitrate	Dodine
Captafol	EPN
Carbophenothion	Gold Trichloride
Chlorflurazole	Hexachlorophene
Chlorothion	Hydrogen Sulfide
Chlorpropham	m-Hydroxybenzoic Acid
Chromic Chloride	p-Hydroxybenzoic Acid
Chromium	Hydroxylamine
Chromyl Chloride	2-Hydroxyphenazine-1-Carboxylic Acid

Lactonitrile	Propyl Alcohol
Lead Tetraacetate	Pyridyl Mercuric Acetate
Lead Thiosulfate	Rotenone
Lead Tungstate	Silver
Lithium Bichromate	Silver Nitrate
Malachite Green	Silver Sulfate
Manganese Chloride, Anhydrous	Sodium Azide
MCPA	Sodium 2-Chlorotoluene-5-Sulfonate
Mercuric Acetate	Sodium Pentachlorophenate
Mercuric Chloride	Sodium Phosphate, Monobasic
Mercury	Sodium Sulfide
Metam-Sodium	Stannous Fluoride
p-Methylamino-Phenol	Strontium Nitrate
2-Methyl-Napthoquinone	Sulfoxide
Neburon	Temephos
Nickel Formate	Thallium
Phenylmercuric Acetate	Thionazin
n-Phenyl Naphthylamine	1,2,4-Trichlorobenzene
Phorate	Uranium Peroxide
Phosphamidon	Uranyl Sulfate
Picloram	Zinc Bichromate
Potassium Azide	Zinc Potassium Chromate
Potassium Cuprocyanide	Zirconium Acetate
Potassium Ferricyanide	Zirconium Oxychloride

## ANNEX 11

### SURVEILLANCE AND MONITORING

1. Surveillance and monitoring activities shall be undertaken for the following purposes:
  - (a) Compliance. To assess the degree to which jurisdictional control requirements are being met.
  - (b) Achievement of General and Specific Objectives. To provide definitive information on the location, severity, areal or volume extent, frequency and duration of non-achievement of the Objectives, as a basis for determining the need for more stringent control requirements.
  - (c) Evaluation of Water Quality Trends. To provide information for measuring local and whole lake response to control measures using trend analyses and cause/effect relationships, and to provide information which will assist in the development and application of predictive techniques for assessing impact of new developments and pollution sources. The results of water quality evaluations will be used for:
    - (i) assessing the effectiveness of remedial and preventative measures and identifying the need for improved pollution control;
    - (ii) assessing enforcement and management strategies; and
    - (iii) identifying the need for further technology development and research activities.
  - (d) Identification of Emerging Problems. To determine the presence of new or hitherto undetected problems in the Great Lakes Basin Ecosystem, leading to the development and implementation of appropriate pollution control measures.
2. A joint surveillance and monitoring program necessary to ensure the attainment of the foregoing purposes shall be developed and implemented among the Parties and the State and Provincial Governments, The Great Lakes International Surveillance Plan contained in the Water Quality Board Annual Report of 1975 and revised in subsequent reports shall serve as a model for the development of the joint surveillance and monitoring program.
3. The program shall include baseline data collection, sample analysis, evaluation and quality assurance programs (including standard sampling and analytical methodology, inter-laboratory comparisons, and compatible data management) to allow assessments of the following:
  - (a) Inputs from tributaries, point source discharge, atmosphere, and connecting channels;
  - (b) Whole lake data including that for nearshore areas such as harbours and embayments, general shoreline and cladophora growth areas), open waters of the Lakes, fish contaminants, and wildlife contaminants; and
  - (c) Outflows including connecting channels, water intakes and outlets.

## ANNEX 12

### PERSISTENT TOXIC SUBSTANCES

1. Definitions. As used in this Annex:
  - (a) "Persistent toxic substance" means any toxic substance with a half-life in water of greater than eight weeks;
  - (b) "Half-life" means the time required for the concentration of a substance to diminish to one-half of its original value in-a lake or water body;
  - (c) "Early warning system" means a procedure to anticipate future environmental contaminants (i.e., substances having an adverse effect on human health or the environment) and to set priorities for environmental research, monitoring and regulatory action.
  
2. General Principles.
  - (a) Regulatory strategies for controlling or preventing the input of persistent toxic substances to the Great Lakes System shall be adopted in accordance with the following principles:
    - (i) The intent of programs specified in this Annex is to virtually eliminate the input of persistent toxic substances in order to protect human health and to ensure the continued health and productivity of living aquatic resources and man's use thereof;
    - (ii) The philosophy adopted for control of inputs of persistent toxic substances shall be zero discharge.
  - (b) The Parties shall take all reasonable and practical measures to rehabilitate those portions of the Great Lakes System adversely affected by persistent toxic substances.
  
3. Programs. The Parties, in cooperation with the State and Provincial Governments, shall develop and adopt the following programs and measures for the elimination of discharges of persistent toxic substances:
  - (a) Identification of raw materials, processes, products, involving by-products, waste sources and emissions involving persistent toxic substances, and quantitative data on the substances, together with recommendations on handling, use and disposition. Every effort shall be made to complete this inventory by January, 1982;
  - (b) Establishment of close coordination between air, water and solid waste programs in order to assess the total input of toxic substances to the Great Lakes System and to define comprehensive, integrated controls;
  - (c) Joint programs for disposal of hazardous materials to ensure that these materials such as pesticides, contaminated petroleum products, contaminated sludge and dredge spoils and industrial wastes are properly transported and disposed of. Every effort shall be made to implement these programs by 1980.

4. Monitoring. Monitoring and research programs in support of the Great Lakes International Surveillance Plan should be established at a level sufficient to identify:

- (a) Temporal and spatial trends in concentration of persistent toxic substances such as PCB, mirex, DDT, mercury and dieldrin, and of other substances known to be present in biota and sediment of the Great Lakes System;
- (b) The impact of persistent toxic substances on the health of humans and the quality and health of living aquatic systems;
- (c) The sources of input of persistent toxic substances; and
- (d) The presence of previously unidentified persistent toxic substances.

5. Early Warning System. An early warning system consisting of, but not restricted to, the following elements shall be established to anticipate future toxic substances problems:

- (a) Development and use of structure-activity correlations to predict environmental characteristics of chemicals;
- (b) Compilation and review of trends in the production, import, and use of chemicals;
- (c) Review of the results of environmental testing on new chemicals;
- (d) Toxicological research on chemicals, and review of research conducted in other countries;
- (e) Maintenance of a biological tissue bank and sediment bank to permit retroactive analysis to establish trends over time;
- (f) Monitoring to characterize the presence and significance of chemical residues in the environment;
- (g) Development and use of mathematical models to predict consequence of various loading rates of different chemicals
- (h) Development of a data bank for storage of information on physical/chemical properties, toxicology, use and quantities in commerce of known and suspected persistent toxic substances.

6. Human Health. The Parties shall establish action levels to protect human health from the individual and interactive effects of toxic substances.

7. Research. Research should be intensified to determine the pathways, fate and effects of toxic substances aimed at the protection of human health, fishery resources and wildlife of the Great Lakes Basin Ecosystem. In particular, research should be conducted to determine:

- (a) The significance of effects of persistent toxic substances on human health and aquatic life;

- (b) Interactive effects of residues of toxic substances on aquatic life, wildlife, and human health; and
- (c) Approaches to calculation of acceptable loading rates for persistent toxic substances, especially those which, in part, are naturally occurring.

## TERMS OF REFERENCE

FOR: THE JOINT INSTITUTIONS AND THE GREAT LAKES REGIONAL OFFICE

1. Great Lakes Water Quality Board
  - (a) This Board shall be the principal advisor to the International Joint Commission with regard to the exercise of all the functions, powers and responsibilities (other than those functions and responsibilities of the Science Advisory Board pursuant to paragraph 2 of these Terms of Reference) assigned to the Commission under this Agreement. In addition, the Board shall carry out such other functions, related to the water quality of the boundary waters of the Great Lakes System, as the Commission may request from time to time.
  - (b) The Water Quality Board, at the direction of the Commission, shall:
    - (i) Make recommendations on the development and implementation of programs to achieve the purpose of this Agreement;
    - (ii) Assemble and evaluate information evolving from such programs;
    - (iii) Identify deficiencies in the scope and funding of such programs and evaluate the adequacy and compatibility of results;
    - (iv) Examine the appropriateness of such programs in the light of present and future socio-economic imperatives; and
    - (v) Advise the Commission on the progress and effectiveness of such programs and submit appropriate recommendations.
  - (c) The Water Quality Board, on behalf of the Commission, Shall undertake liaison and coordination between the institutions established under this Agreement and other institutions and jurisdictions which may address concerns relevant to the Great Lakes Basin Ecosystem so as to ensure a comprehensive and coordinated approach to planning and to the resolution of problems, both current and anticipated.
  - (d) The Water Quality Board shall report to the Commission periodically as appropriate, or as required by the Commission, on all aspects relating to the operation and effectiveness of this Agreement.
2. Great Lakes Science Advisory Board
  - (a) This Board shall be the scientific advisor to the Commission and the Water Quality Board.
  - (b) The Science Advisory Board shall be responsible for developing recommendations on all matters related to research and the development of scientific knowledge pertinent to the identification, evaluation and resolution of current and anticipated problems related to Great Lakes water quality.

- (c) To effect these responsibilities the Science Advisory Board shall:
  - (i) Review scientific information in order to:
    - (a) examine the impact and adequacy of research and the reliability of research results, and ensure the dissemination of such results;
    - (b) identify additional research requirements;
    - (c) identify specific research programs for which international cooperation is desirable; and
  - (ii) Advise jurisdictions of relevant research needs, solicit their involvement and promote coordination.
- (d) The Science Advisory Board shall seek analyses, assessments and recommendations from other scientific, professional, academic, governmental or intergovernmental groups relevant to Great Lakes Basin Ecosystem research.
- (e) The Science Advisory Board shall report to the Commission and the Water Quality Board periodically as appropriate, or as required by the Commission, on all matters of a scientific or research nature relating to the operation and effectiveness of this Agreement.

3. The Great Lakes Regional Office

- (a) This Office, located at Windsor, Ontario, shall assist the Commission and the two Boards in the discharge of the functions specified in subparagraph (b) below.
- (b) The Office shall perform the following functions:
  - (i) Provide administrative support and technical assistance for the Water Quality Board and the Science Advisory Board and their sub-organizations, to assist the Boards in discharging effectively the responsibilities, duties and functions assigned to them.
  - (ii) Provide a public information service for the programs, including public hearings, undertaken by the Commission and its Boards.
- (c) The Office shall be headed by a Director who shall be appointed by the Commission in consultation with the Parties and with the Co-Chairmen of the Boards. The position of Director shall alternate between a Canadian citizen and a United States citizen. The term of office for the Director shall be determined in the review referred to in subparagraph (d) below.
- (d) The Parties, mindful of the need to staff the Great Lakes Regional Office to carry out the functions assigned the Commission by this Agreement, shall, within six months from the date of entry into force of this Agreement, complete a review of the staffing of the Office. This review shall be conducted by the Parties based upon recommendations of the

Commission after consultation with the Co-Chairmen of the Boards. Subsequent reviews may be requested by either Party, or recommended by the Commission, in order to ensure that the staffing of the Regional Office is maintained at a level and character commensurate with its assigned functions.

- (e) Consistent with the responsibilities assigned to the Commission, and under the general supervision of the Water Quality Board, the Director shall be responsible for the management of the Regional Office and its staff in carrying out the functions described herein.
- (f) The Co-Chairmen of the Boards, in consultation with the Director, will determine the activities which they wish the Office to carry out on behalf of, or in support of the Boards, within the current capability of the Office and its staff. The Director is responsible to the Co-Chairmen of each Board for activities carried out on behalf of, or in support of such Board, by the Office or individual staff members.
- (g) The Commission, in consultation with the Director, will determine the public information activities to be carried out on behalf of the Commission by the Regional Office.
- (h) The Director shall be responsible for preparing an annual budget to carry out the functions of the Boards and the Regional Office for submission jointly by the two Boards to the Commission for approval and procurement of resources.