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ANNUAL REPORT 1983 INLAND WATERS DIRECTORATE ONTARIO REGION

Canada

Inland Waters Directorate
Ontario Region

ANNUAL REPORT
1983

DEPARTMENT OF THE ENVIRONMENT

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Summary

This report describes the activities and accomplishments of Inland Waters Directorate (IWD), Ontario Region, during 1983. IWD, Ontario Region, is a component of the federal Department of the Environment. As the lead federal agency for water management in the Ontario Region, IWD plans and participates in national and international water management programs to achieve economic and social benefits, while giving full consideration to environmental concerns.

Significant events in Great Lakes matters involving IWD included the release of a Status Report by the Niagara River Toxics Committee, the signing of the Phosphorus Load Reduction Supplement to Annex 3 of the 1978 Canada - U.S. Great Lakes Water Quality Agreement, the holding of public hearings by the IJC regarding the report of the Diversions and Consumptive Uses Study Board and the completion of a one-year intensive water quality surveillance study of Lake Superior.

The Canada-Ontario Flood Damage Reduction Agreement was revised and signed on November 5, 1982. The revised Agreement accommodates the provincial flood plain mapping policies and extends the agreement. Floodrisk areas in several communities along the Lake Nipissing shoreline were designated on March 31, 1983. On August 6, 1983, floodrisk areas along the Kaministiquia River in Thunder Bay from Rosslyn Village to Lake Superior were designated. The first of three study phases in the Muskoka River water management study was completed. An Advisory Committee was established and public meetings were held.

April 1, 1983, marked the beginning of the ninth year of the Canada-Ontario Cost Share Agreement on Water Quantity Surveys. Under this agreement IWD through its Water Resources Branch cooperates with provincial agencies in collecting and publishing streamflow, water level and sediment data on a shared cost basis. As of April 1, 1983, the Branch operated a network of 379 hydrometric stations in the province. To complement basic data collection activities a Hydrology Division was formed in 1983 to enhance services to the water resources community.

The major public information activities of IWD in 1983 consisted of participation in the Regional Public Consultation Conference held in Hamilton in October and displays at the Central Ontario Exhibition in Kitchener during August-September and at a major shopping mall in Guelph during Environment Week in June.

In 1983 IWD, Ontario Region, administered and managed resources amounting to 6.5 million dollars and 87.5 person-years. The resources included operational funding under international and federal-provincial agreements as well as grants and contributions under similar agreements. Significant federal-provincial cost-shared funding administered in 1983 included Canada-Ontario Flood Damage Reduction Agreement funding ($650,000 for 1983-84) and Canada-Ontario Great Lakes Water Quality Agreement funding ($1,200,000 for 1983-84).

A list of 1983 publications and presentations by staff of IWD, Ontario Region, is included in this report.

A French translation of the Annual Report is available on request.

Sommaire

Le présent rapport décrit les activités et les réalisations de la Direction générale des eaux intérieures (DGEI), région de l'Ontario, en 1983. La DGEI, région de l'Ontario, fait partie du ministère fédéral de l'Environnement. La DGEI principal organisme fédéral en matière de gestion des eaux dans la région de l'Ontario, collabore à des programmes nationaux et internationaux de gestion des eaux destinés à procurer des avantages économiques et sociaux, tout en prêtant une grande attention aux questions environnementales.

On retrouve, parmi les évènments marquants qui touchent les Grands lacs et auxquels a participé la DGEI, la publication par le Comité des substances toxiques dans la rivière Niagara d'un rapport provisoire, la signature de l'entente au sujet du supplément sur la réduction de la charge en phosphore figurant à l'Annexe 3 de l'Accord Canada - Etats-Unis de 1978 sur la qualité des Grands lacs, la tenue d'audiences publiques sur le rapport du Bureau d'étude sur la dérivation et la consommation des eaux et l'achèvement de l'étude intensive d'un an sur la qualité de l'eau du lac Supérieur.

L'Accord Canada-Ontario de réduction des dommages causés par les inondations a été révisé et signé le 5 novembre 1982. Cet accord révisé est plus conforme aux politiques provinciales en matière de cartographie des plaines inondables et reconduit l'accord précédent. Des zones inondables dans plusieurs agglomérations le long du lac Nipissing ont été désignées le 31 mars 1983. Le 6 août 1983 on a désigné les zones inondables le long de la rivière Kaministiquia à Thunder Bay de Rosslyn Village au lac Supérieur. On a complété la première des trois phases de l'étude sur le gestion des eaux de la rivière Muskoka. Un comité consultatif a été formé et des audiences publiques ont été tenues.

Le 1er avril 1983 a marqué le début de la huitième année de l'Accord Canada-Ontario à frais partagés sur les relevés hydrométriques. En vertu de cet accord, la DGEI, par l'intermédiaire de sa Direction des ressources en eau, collabore, avec des organismes provinciaux, à la collecte et à la publication, à frais partagés, de données sur les débits, les niveaux d'eau et les sédiments. Au 1er avril 1983, la Direction exploitait un réseau de 379 stations hydrométriques dans la province.

Les actions majeures de la DGEI visant à informer le public ont consisté en: une participation à la conférence régionale de consultation du public, la tenue d'un kiosque d'information à l'Exposition Centrale de l'Ontario de Kitchener en août-septembre ainsi qu'au centre d'achats à Guelph, pendant la semaine de l'environnement.

En 1983, la DGEI, région de l'Ontario, a administré et géré des ressources totalisant 6,50 millions de dollars et 87,5 années-personnes. Ces ressources comportaient des fonds d'exploitation versés en vertu d'accords internationaux et fédéraux-provinciaux, de même que des subventions et des contributions accordées en vertu d'accords semblables. La DGEI a également géré les fonds de l'Accord Canada-Ontario sur la qualité de l'eau des Grands lacs (1 200 000 $) et de l'Accord Canada-Ontario sur la réduction des dommages causés par les inondations (650 000 $ pour 1983-1984), deux ententes à frais partagés.

Le rapport contient également une liste des publications et des rapports présentés par le personnel de la DGEI, de la région de l'Ontario, en 1983.

1.0 Introduction

Inland Waters Directorate (IWD), Ontario Region, is a component of the federal Department of the Environment (DOE). As the lead federal agency for water management in the Ontario Region, IWD plans and participates in national and international water management programs to achieve economic and social benefits, while giving full consideration to environmental concerns.

The primary role of IWD, Ontario Region is related to the gathering and dissemination of water related information and to the explaining and predicting of the behaviour of the quantity and quality of the waters in Ontario with particular emphasis on the Great Lakes and their interconnecting channels. IWD plays a major role in water use planning and management investigations including flood damage reduction programs in cooperation with the province and in addressing international water management problems along the Canada-United States boundary.

The Directorate consists of three Branches: Water Planning and Management Branch, Water Resources Branch and Water Quality Branch.

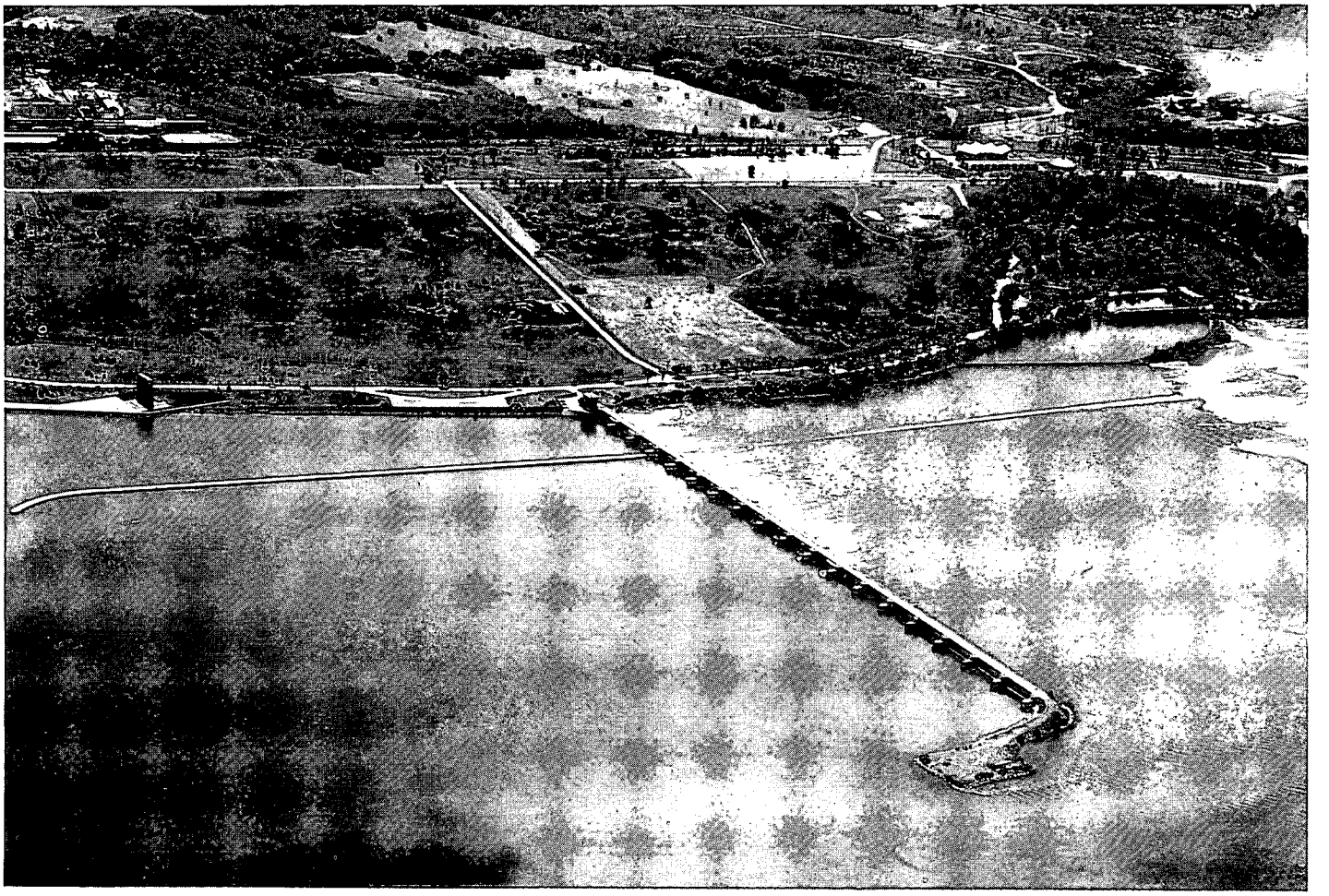
The Water Planning and Management Branch (WP&MB) administers and implements federal, federal-provincial, and international water management projects. The Branch provides technical support to all the International Joint Commission's (IJC) Great Lakes Boards of Control and carries out special studies for IJC Study Boards such as the recently completed Lake Erie Regulation and Great Lakes Diversions and Consumptive Uses Studies. WP&MB also implements federal-provincial water management projects under the Canada Water Act (CWA) relating to flood damage reduction, flood control, and shoreland management. WP&MB reviews federally-initiated and federally-funded projects for environmental impact under the Environmental Assessment and Review Process. The Branch also gathers and evaluates social and institutional information and investigates the socio-economic implications of resource policies and programs.

The Water Resources Branch (WRB) operates and maintains a network of streamflow, water level, and sediment stations throughout Ontario and the Great Lakes system jointly funded with the Province. The Branch publishes annual summaries of the data collected and provides more detailed surface water and sediment information and technical advice for specific projects and programs in the region such as special requests from various IJC Boards of Control, baseline studies and environmental assessments.

The Water Quality Branch (WQB) collects, interprets and disseminates information about the quality of the surface waters of federal interest in Ontario including the Great Lakes — St. Lawrence River System, the Ottawa River, major rivers tributary to Hudson Bay and James Bay and the Rainy and Winnipeg Rivers. The Branch provides technical advice and support to the Water Quality Board of the International Joint Commission and carries out special studies for other international bodies such as the Niagara River Toxics Committee. In addition, water quality studies are carried out in support of the National Water Quality Assessment Program and the Toxic Chemicals and Baseline Studies Programs.

The following is a description of the major program activities and achievements of the Directorate during 1983.

2.0 Great Lakes and St. Lawrence River Basin Water Level Control Program



Flow control structure at Niagara Falls

Human activities and the ecosystem in the Great Lakes — St. Lawrence basin are affected significantly by water level fluctuations in the lakes and their interconnecting channels. The fluctuations of these levels and channel flows have been recognized by the Governments of Canada and the United States as an important boundary water issue, affecting shore erosion, hydro-electric power generation, navigation, recreation, water supply for domestic and industrial purposes and the environment. The International Joint Commission was established in 1909 by the two governments to seek common solutions in their joint interest and in accordance with the agreed rules or principles set out in the Boundary Waters Treaty. This has since led to several international agreements relating to the levels and flows in the Great Lakes — St. Lawrence basin.

The Inland Waters Directorate, Ontario Region, provides assistance and advice to the IJC and other bilateral entities in carrying out the terms of the various agreements between the two countries.

2.1 Great Lakes Boards of Control

The Water Planning and Management Branch (WP&MB) continued to support the IJC's International Lake Superior Board of Control and International St. Lawrence River Board of Control in regulating the outflows of Lake Superior and Lake Ontario. The Branch also supported the IJC's International Niagara Board of Control in water management activities in the Lake Erie — Niagara River area. The significance of IWD's involvement is demonstrated by the fact that IWD provides the chairmen to two of these IJC Boards and two of the Boards' Working Committees. Other support includes secretarial duties and technical studies and operations.

Throughout the year the Branch reviewed the various hydrologic factors, including ice conditions in the rivers, which influence the regulation of Lake Superior and Lake Ontario and provided advice in their regulation. High water supplies kept the water levels of Lake Superior, Michigan,

Huron and Erie above their respective long-term means throughout 1983, while Lake Ontario levels were near normal for most of the year.

The 16-gate Lake Superior Compensating Works on the St. Marys River was constructed more than sixty years ago and is a main component in the facilities used to regulate the outflow of Lake Superior. In early 1982 the Superior Board completed a report on the structural stability of the Compensating Works. In response to the findings of this report, repairs to the Compensating Works have been undertaken and are being monitored.

The commissioning of the new Canadian power plant at Sault Ste. Marie took place in November 1982. More water can now be used for hydro-electric power generation which otherwise would have been utilized by U.S. power plants or discharged through the Compensating Works and into the St. Marys Rapids. During 1983, WP&MB staff participated in the activity of a committee initiated by the IJC to formulate proposals for remedial works to enhance the St. Marys Rapids fishery.

Ongoing Great Lakes level studies and operations include: hydrologic modelling of the Great Lakes, and the use of airborne gamma radiation survey to measure snowpack water equivalence in the Lake Superior basin. To provide ground reference data for this latter project, the WRB collected 200 soil samples and analyzed the samples for moisture content. These projects were carried out in cooperation with other Canadian and United States agencies to determine the feasibility of using real-time data and hydrologic models to forecast basin water supplies and thus, improve the regulation of the Great Lakes.

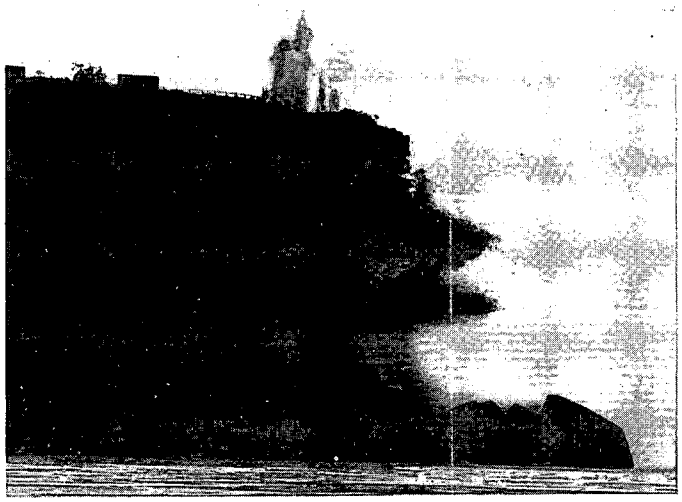
The International Niagara Board of Control was established in 1953 by the IJC following the signing of the 1950 Niagara Treaty between Canada and the United States. This Treaty established flow requirements for Niagara Falls in order to preserve their scenic beauty as well as regulations regarding the diversion of water for power purposes. During 1983 WP&MB monitored the regulation of water levels in the Chippawa — Grass Island Pool which is located upstream of the Falls as well as at the Ashland Avenue Gauge below the Falls.

On July 8, rock blasting took place at Terrapin Point adjacent to the Horseshoe Falls on the U.S. side. The removal of overhanging rock was necessary to re-establish safe viewing conditions for visitors. The Niagara Board provided input to the U.S. Corps of Engineers in the planning stage of this project to ensure maintenance of the Falls scenic spectacle.

The Niagara Board continued to advise the IJC on the operation of the Lake Erie — Niagara River Ice Boom. The boom is installed by Ontario Hydro and New York Power Authority each winter at the head of the Niagara River to protect their power intakes from ice. Local residents have opposed the use of the boom, alleging that its presence prolongs the ice season in the area. The Erie County Legislature in New York took the matter to the U.S. District court in December 1982, with a court decision being handed down in January 1984. The Court ruled that the County cannot raise a constitutional claim of damage to property in court action against the use of the boom. The Court also ruled that the IJC and Ontario Hydro are immune from the suit. It also recognized the 1909 Boundary Waters Treaty between the United States and England which conferred on the IJC power to regulate the boundary waters between Canada and the United States.

Also related to the Lake Erie — Niagara River Ice Boom, was a study completed by the United States National Academy of Science. The Academy's study panel agreed with past Niagara Board study conclusions that the boom's effect on local weather conditions, if any, would be small and difficult to quantify. The panel found no other adverse environmental effects due to the presence of the boom. The panel supported continued use of the boom and recommended slightly modified removal procedures.

WP&MB assisted the International Niagara Committee, established by the Governments of Canada and the United States pursuant to the Niagara Treaty of 1950, in determining the amounts of water available and the amounts used for the various purposes of the Treaty. Weekly power inspections were carried out at the Niagara power plants to ensure accuracy in the reporting of power diversions by the power entities. WP&MB was also involved in examining the existing water transfer arrangement at Niagara between Ontario Hydro and the New York Power Authority (NYPA). During 1983, some 35 million cfs-hours of Canada's share of the Niagara River water were directed to the U.S. power plant to maximize energy production. The Branch provided advice on this subject to officials of IWD-Ottawa and External Affairs. In 1982, NYPA announced



Rock blast at Terrapin Point - PHOTO COURTESY OF U.S. CORPS OF ENGINEERS

a plan to expand its power installation at Niagara Falls. Such an expansion could further complicate the water transfer issue and will warrant continuous close attention by the bilateral Niagara Committee.

In addition to the weekly and monthly advice to the St. Lawrence River Board, regarding the regulation of Lake Ontario, WP&MB also monitored ice conditions in the St. Lawrence river for the Board. WP&MB provided the Regulation Representative of the Board who served as On-Site Representative to act for the Board in emergencies in providing technical advice as required. In the fall of 1983, the IJC approved peaking and ponding operations for a 5-year period. These operations permit the Moses-Saunders Hydro-Electric Plants to better meet the load requirement.

WP&MB supported the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data, by undertaking chairman and secretarial duties. Branch representatives coordinated data with United States officials pertaining to the Great Lakes water levels, outflows and supplies in a manner prescribed by the Coordinating Committee. By year end, the precise levelling survey was completed in connection with the update of the International Great Lakes Datum (IGLD). The datum defines a reference plane for the water levels of the Great Lakes relative to sea level. This datum was last established for the year 1955, but requires updating because of the continuous, but uneven movement of the Earth's crust. New elevations for the Great Lakes benchmarks, based on the IGLD (1980), will be computed by 1986.

In September, WP&MB staff prepared a presentation for, and attended a meeting of, the Canada-U.S. Centre for Legislative Exchange. The meeting, attended by a panel of U.S. Congressmen, centered its discussion on winter navigation and related bilateral isssues in the Great Lakes.

2.2 *Investigative and Engineering Boards*

In 1979, the IJC established the International Great Lakes Technical Information Network Board to examine and provide advice and recommendations on unmet hydraulic, hydrologic and meteorological data needs in order to improve the data collection network in the Great Lakes region. The Canadian Chairmen of the Board and its two committees are from WP&MB. Preparation of the Committees' final reports were virtually complete by year end. The study findings thus far show that improvement is needed in the speed of transmitting of data to users by automating the data collecting stations. In addition, new hydrometeorological stations are required in certain areas.

In July, the IJC held public hearings regarding the findings and conclusions of the International Great Lakes Diversions and Consumptive Uses Study Board. The study was completed in 1981, with extensive support from IWD-Ottawa and IWD-Ontario Region. The Board concluded that existing diversions should not be manipulated to alleviate extreme high or low water levels in the Great Lakes. It also pointed out that projected increases in consumptive uses were large and the effect on future levels and flows would be significant. The controversial subject of Great Lakes diversions once again sparked headlines in Canadian newspapers.

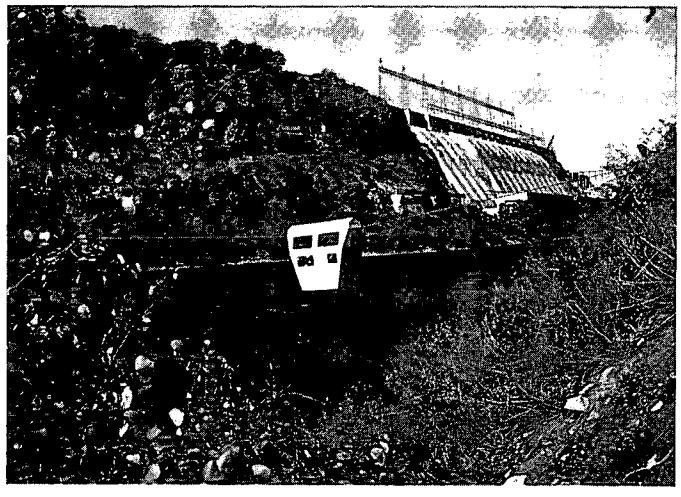
In November, the IJC completed its report to Governments on the subject of limited regulation of Lake Erie. Conclusions and recommendations in the report are the same as those of the Lake Erie Study Board, and specifically, that Lake Erie regulation is not practical. WP&MB provided extensive support to this study during the years 1977-81.

2.3 *Great Lakes and Interconnecting Channels Water Levels Monitoring*

The WRB and the U.S. Army Corps of Engineers conducted a joint discharge measurement program in April on the Niagara River at the Robert Moses Cableway for verification of the 1981 Ashland Avenue gauge rating for Maid-of-the-Mist Pool outflow. Seven measurements were taken in the 5730 cms range. The results confirmed the continued validity of the rating in that range.

The WRB, with assistance from the U.S. Army Corps of Engineers, conducted eleven discharge measurements in the Canadian Power Canal at Sault Ste. Marie, Ontario, in August and October to verify the accuracy of the flowmeters in the new Francis H. Clerque Generating Station. A report will be submitted to the Lake Superior Board of Control early in 1984.

The WRB conducted a series of water level measurements in the lock on the Canadian Navigation Canal at Sault Ste. Marie to determine leakage through the lock. The data were analyzed and results were reported to Parks Canada, the operator of the canal.



Cableway on Niagara River upstream of power plants

3.0 Great Lakes Basin Water Pollution Program

The Great Lakes represent 80 percent of North America's supply of surface freshwater. They sustain life, commerce, industry, and recreation for an estimated 7 million Canadians and 30 million Americans. One out of every three Canadians live in the basin and one-half of all manufactured goods of the country are generated there. The major urban centres in the basin rely on the Great Lakes for a ready source of water for domestic and industrial use and as assimilators of their wastes. The Great Lakes are thus a priceless resource of vital importance to all facets of life and activity in the Great Lakes Basin. The quality of their waters is a basic concern to Canada in general and the Ontario Region in particular.

On April 15, 1972, the Canadian and U.S. governments signed the Great Lakes Water Quality Agreement to prevent further deterioration of the Great Lakes and to provide a basis for improving existing water quality. A new agreement was signed on November 22, 1978. Whereas the 1972 Agreement placed its emphasis on the control of phosphorus, the new Great Lakes Water Quality Agreement emphasizes control of pollution from toxic substances and the control and prevention of pollution from industrial and municipal sources. Numerical water quality objectives for some 40 substances have been specified in the new Agreement. The IJC has been given the responsibility to overview the progress of the two governments in the implementation of the Agreement. Inland Waters Directorate, Ontario Region provides extensive membership and scientific support to the Boards and Committees assisting the IJC in its responsibilities under the Agreement. It also is a major participant in the federal response to the requirements of the Agreement. Inland Waters Directorate activities related to the Agreement include:

(a) monitoring and surveillance of pollution loadings to the lakes, conditions in the lakes, and lake-related activities to ensure the water quality objectives are being met and to determine the effectiveness of remedial measures;

(b) providing advice on the effectiveness of control policies and measures;

(c) defining and continual refining of water quality objectives; and

(d) identifying new and emerging pollution problems.

The Governments of Canada and Ontario signed the Canada-Ontario Agreement on Great Lakes Water Quality (COA) in 1971 which was extended in 1976 for a further five years. This Agreement provides the instrument for the cooperation of the two jurisdictions in clean-up efforts in the Great Lakes and for Ontario's coordination and cooperation with government agencies in the United States. The Canada-Ontario Agreement also provides for the cost-sharing of provincial surveillance activities on a 50-50 basis. In the 1982-83 fiscal year Canada's share of surveillance costs under the Canada-Ontario Agreement amounted to $1,200,000. The Director of IWD, Ontario Region is a member of the Review Board which is responsible for overseeing the implementation of the COA.

In recognition of the added responsibilities for Canada under the 1978 Canada-U.S. Agreement, Canada and Ontario initiated the renegotiation of the Canada-Ontario Agreement in 1979. The revised Canada-Ontario Agreement which reflects the new requirements of the 1978 Canada-U.S. Agreement was signed in July 12, 1982 and is effective to March, 1985. The new agreement continues cost-shared programs up to a maximum contribution of $1,200,000. In addition, $65,000,000 of federal funds have been made available to the province for the period 1982-85 to assist in the completion of municipal sewage facilities construction to meet the requirements of the 1978 Canada-U.S. Agreement.

3.1 IJC Water Quality Board

Inland Waters Directorate continued to provide extensive support to the IJC Water Quality Board and its committees. Staff of IWD, Ontario Region serve on the Board, the Board's Water Quality Programs Committee and Surveillance Work Group. IWD, Ontario Region personnel were also extensively involved in the preparation of the Water Quality Board's Annual Report for 1983 which was presented to the IJC at its November, 1983 meeting with the Board in Indianapolis, Indiana. The 1983 Report focused on eutrophication and toxic chemicals as the two major system-wide environmental quality problems of the Great Lakes.

The report also pointed out major changes in the environmental conditions or status of remedial programs in the 18 Class "A" areas of concerns identified in 1981 and updated information on point and non-point sources of pollution to the lakes.

During 1983 IWD, Ontario Region personnel participated extensively on a number of Lake Task Forces responsible for preparing Surveillance Plans for each of the Great Lakes. These individual lake plans, many of which are expected to be implemented in 1984, will be put together by the Surveillance Work Group in the form of a revised Great Lakes International Surveillance Plan (GLISP). The current version of the GLISP was first published in 1980. It is anticipated that the revised GLISP will be finalized in 1985.

3.2 Canada-U.S. Open Lake Surveillance and Analysis

Lake Ontario

Work has started on data analysis of the 1981-82 intensive surveys of the lake. This is expected to be completed in 1984. A predictive model of Lake Ontario Water Quality was evaluated by WQB staff and returned to the research staff of the National Water Research Institute for further modifications.

Water Quality Branch staff had a large part to play in the preparation of the Lake Ontario Surveillance Plan. This plan is currently being reviewed by the IJC Surveillance Work Group.

Lake Huron

The Lake Huron Intensive Report was completed during 1983. It is now undergoing final revisions before publication in early 1984. The Lake Huron Surveillance Plan was also completed during 1983. It too, is undergoing a final review by the IJC Surveillance Work Group.

A report describing the water quality conditions in Lake Huron during 1980 was presented at the International Association of Great Lakes Research Conference held in Oswego, N.Y. during May.

Lake Superior

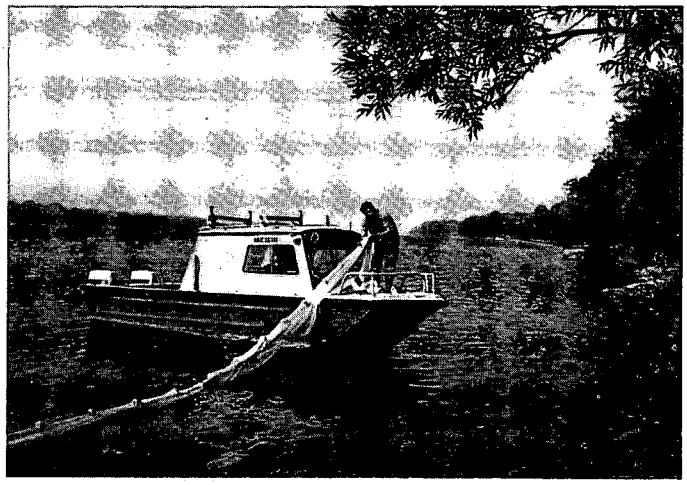
Four Lake Superior water quality surveillance cruises were carried out in the period May-October 1983 by the Canadian research ship CSS Limnos. This fulfilled IWD's commitments to the IJC Great Lakes International Surveillance Plan for an intensive year study in Lake Superior. Water Quality Branch Central Laboratory provided shipboard analytical support and carried out shore laboratory analyses for all four cruises. Additional water samples were collected for metal and asbestos analyses which will be performed by the United States Environmental Protection Agency (USEPA).

3.3 Interconnecting Channels Water Quality

Water quality monitoring continued in the Niagara and St. Lawrence Rivers. Automatic water samplers at Niagara-on-the-Lake and Wolfe Island collected daily water samples for nutrients and weekly samples for organics, major ions, trace metals and radioactivity to determine chemical loadings in-to and out of Lake Ontario. Results of the analysis are provided annually to the IJC for inclusion in its Great Lakes Water Quality Report.

Biweekly sampling of suspended sediments for toxic contaminants at the Niagara-on-the-Lake site continued. In the fall of 1983, a second Niagara River station was established at Fort Erie to determine the types and quantities of materials entering the Niagara River via Lake Erie.

A summary of all Water Quality Branch activities on the Niagara River over the last 6 years was prepared as were major contributions to the Niagara River Toxics Committee Report.



Sampling for Spot-tail Shiners on the St. Lawrence River

3.4 Niagara River Toxic Contaminants

The Niagara River Toxics Project, a joint Canada/United States investigation of toxic chemicals in the Niagara River was initiated in 1981. The Toxics Project has three objectives:

1. To identify sources of toxic pollutants entering the Niagara River.
2. To recommend control programs where necessary.
3. To recommend long term water quality monitoring programs for the Niagara River that will allow evaluations of the effectiveness of control programs.

A Canada/United States Niagara River Toxics Committee (NRTC) was formed to oversee and coordinate the project.

IWD, Ontario Region has been extensively involved in the work of the NRTC and its subcommittees. The Director, IWD, Ontario Region is Canadian Co-Chairman of the NRTC, while other IWD, Ontario Region staff chair or participate on the various NRTC sub-committees. During 1983, a Status Report on the Niagara River Toxics Project was prepared and released in February. By the end of the year, preparations had begun for the final report which is due for completion in 1984.

Three special surveys were conducted on the Niagara River during 1983 to investigate potential sources of contamination to the river. The Hyde Park-Bloody Run Creek area was revisited in May, to continue the monitoring of toxic chemical inputs to the Niagara River from this source.

In addition, two special surveys using newly developed sampling equipment were completed near the S-area dumpsite in May and November. These surveys were coordinated by the office of the Regional Director-General for Ontario and the results will be available through his office. A complete survey of toxics analyses was conducted on the S-area samples including pesticides, PCBs, chlorobenzenes, dioxins, dibenzofurans and chlorophenols.

Also, a six week test of continuous sampling for contaminants was conducted at Niagara-on-the-Lake. It is anticipated that this new sampling technology can be implemented on the Niagara River during 1984.

3.5 Atmospheric Loadings

WQB continued to operate a network of 16 precipitation chemistry stations as part of the IJC Great Lakes International Surveillance Plan to measure and report on atmospheric loadings. Two additional stations were established on the north shore of Lake Superior for the 1983 Lake Superior Intensive Surveillance Project. Field testing of a prototype precipitation organic sampler is underway. Snow core samples were also collected for organic analyses during the winter months to augment data from the precipitation sampler.

3.6 Phosphorus Management

Annex 3 of the 1978 Great Lakes Water Quality Agreement specifies total phosphorus target loads for each of the Great Lakes. These loads have recently been confirmed by the signing in October of the Phosphorus Load Reduction Supplement to the Annex. This forms the basis for the establishment of load allocations and compliance schedules for the two countries. In order for Canada to meet the target loads in the most efficient and effective manner, it is very important to monitor progress in the control of phosphorus inputs as reduction efforts are implemented and to use this information for planning any further reductions.

WP&MB has undertaken a preliminary study of the Thames River basin to investigate the feasibility of utilizing historical water quality and quantity data for planning phosphorus loading reductions. By integrating the historical information available, attempts were made to define the temporal and spatial variability of phosphorus loads along the river system, and to assess various management alternatives. A report was completed and will be distributed early in 1984.

An investigation into biologically available phosphorus (P) was undertaken by WP&MB as part of a larger water quality management demonstration project (Stratford-Avon River Environment Management Project). As earlier studies indicated that the area exhibited severe water quality problems due to both urban and rural inputs of phosphorus, an instream evaluation of the transmission and alterations of biologically available 'P' forms from the various sources (point and non-point) was initiated. Sampling of suspended sediments for biologically available phosphorus was undertaken during 1982 for high and low flow events on the mainstem of the Avon River. The results have been analyzed and final report is to be published in early 1984.

The management of soil erosion and the associated delivery of sediment (and related contaminants) to a watercourse requires a tool which will assist in the efficient and effective application of remedial measures. The verification and calibration of a screening model, developed by the Lands Directorate to identify priority management areas of non-point source erosion, was undertaken by WP&MB. During 1983, which was the second year of a three year program, spring melt and fall storm runoff was intensively monitored in twelve subwatersheds for both sediment and phosphorus loadings. This essential data base will be used to evaluate and calibrate several types of sediment yield models currently being developed for non-point source erosion management.

3.7 International and Interprovincial Rivers

The Water Quality Branch continued to sample at four stations in Northwestern Ontario as part of its commitment to monitor international and interprovincial waters. Two stations are located on the Rainy River, one on the Winnipeg River and one on the English River. Water samples were collected bi-weekly from these locations and analyzed for physical parameters, major ions, nutrients and metals. Samples were collected on a monthly basis for the analysis of organochlorine pesticides and PCBs.

Water Quality Branch staff participated in a multi-agency task force which included Ontario Ministry of the Environment, United States Environmental Protection Agency and the Minnesota Pollution Control Agency to finalize the "Proposed Study Plan for the Rainy River". The Branch continued to provide advice to the International Rainy River Pollution Control Board throughout the year.

Water Quality Branch staff participated in a Technical Work Group to draft a monitoring plan for the interprovincial section of the Ottawa River. The revised plan was submitted to the Ottawa River Coordinating Committee. Branch staff provided advice to the Ottawa River Objectives Subcommittee in 1983.

4.0 Flood Damage Reduction Program

The federal government is committed to alleviating human suffering and minimizing damage caused by floods through strategies such as identifying high flood-risk areas, discouraging new investments in these areas, and participating in traditional flood reduction measures where these offer the best solution.

The Inland Waters Directorate, through its Water Planning and Management Branch, is involved with the Province of Ontario in a program to reduce flood damages. The Department, on behalf of the federal government, signed an Agreement with the Province of Ontario on March 31, 1978, to provide funding for flood-risk areas and other flood damage reduction measures. The Agreement was revised on November 5, 1982 to accomodate the provincial floodplain management policies, by allowing a two-zone floodway-flood fringe concept and recognizing special policy areas, where under certain conditions a lower level of flood protection could be allowed. The term of the current Agreement runs to March 31, 1985 for flood-risk mapping and to March 31, 1990 for other measures. Costs are shared equally with a total cost for the program of $9.2 million. The total expenditure under the program as of March 31, 1983 was $5,841,836.36; the flood-risk mapping component accounted for $5,408,922.07 and the other measures component for $432,194.29. Projected expenditure for the fiscal year 1983-84 is $1.3 million.

4.1 Flood-Risk Mapping

The mapping of the flood-risk areas is the primary function of the Program. The majority of mapping studies are implemented through the local conservation authorities and municipalities. In 1983, projects were in progress in 19 conservation authorities, as well as several municipalities where no organized conservation authority exists.

Upon completion of flood-risk mapping, the Ministers of Environment Canada and Ontario Natural Resources may agree to designate the identified flood-risk areas. The policies of the Agreement come into effect upon designation. These policies put limitations on:

1. placing federal or provincial government buildings or structures in the flood-risk areas;
2. funding from government sources for new buildings or structures placed in the flood-risk area and subject to flood damage risk;
3. eligibility for flood disaster assistance of buildings or structures placed in the flood-risk area after designation and which are vulnerable to flood damage.

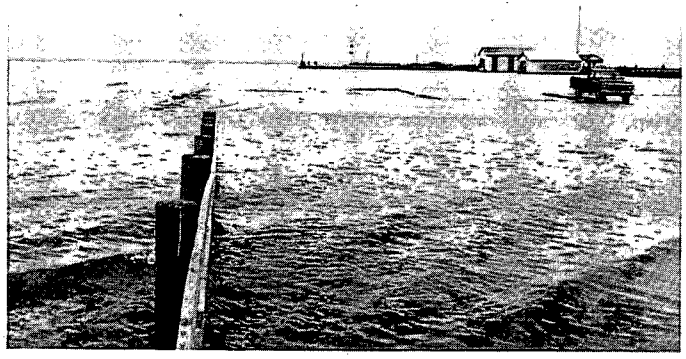
As well, the two governments will encourage local municipalities to adopt Official Plan Policies and zoning restrictions on development in the flood-risk area.

Flood-risk areas in several communities along the Lake Nipissing shoreline, as well as Sturgeon Falls on the Sturgeon River, Wolsely and Eighteen Mile Bay on the French River and Powassin on the South River, were designated on March 31, 1983. All these areas were based on the 100-year flood elevations for Lake Nipissing and other streams. On August 6, flood risk areas along the Kaministiquia River from Rosslynn Village to Lake Superior in Thunder Bay were designated. This designation is also to the one in 100-year flood level.

Work commenced on the preparation of public information maps on an Authority-wide basis for the Essex Region Conservation Authority and Lower Trent Conservation Authority. Following technical approval, preparation of public information flood risk maps were initiated for Atikokan River at Atikokan, Thessalon River at Thessalon, Spanish River and Darkie Creek at Espanola, Ottawa River at Petawawa and McNab, Montreal River at Elk Lake and Jackfish River at Hornepayne. Designations for these areas were scheduled for the fiscal year 1983/84. However, with the undertaking of their flood plain management Criteria Review, the Province has chosen not to proceed with these designations until the Criteria Review is finalized.

At the request of the Technical Subcommittee, WP&MB conducted hydrologic/hydraulic analysis for the Black and Beaver Creek watershed. Initially, the hydrologic/hydraulic analysis carried out by a consultant had produced unrealistic design flows and flood levels, as the commonly used technical procedures were not appropriate in this case.

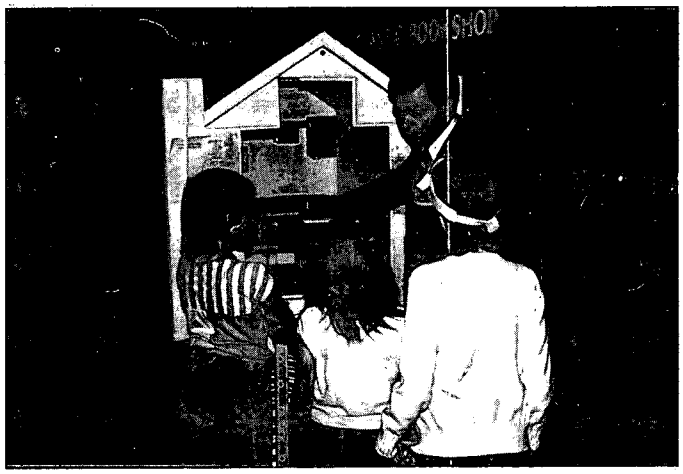
In cooperation with the Canadian Department of Fisheries and Oceans and the Ontario Ministry of Natural Resources, a project was undertaken to delineate the flood and erosion hazard zones along the Lake Huron shoreline under the jurisdiction of the Maitland Valley Conservation Authority. IWD's component of the project was the delineation of the erosion hazard zone around the approximately 100 gullies that extend inland from the lakeshore. About one-half of



Flooding at North Bay, Ontario

this had been completed by year-end. The maps prepared through this project will be used in the development and implementation of a shore zone management plan for the area.

An important part of the Flood Damage Reduction Agreement is the provision of information to the public and other government departments on the nature of the Program, the extent of flood risk areas, and government policies that are applied to designated areas. During the year, the Steering Committee and Technical Subcommittee explained the Program to a number of conservation authorities. Open Houses were held in Thunder Bay and Atikokan to explain the flood risk maps and program implications. Extensive use was made of information brochures, public information display panels and audio-visual presentations.



Demonstrating automatic hydrometric data recording equipment during Environment Week, Guelph, Ontario

4.2 Other Flood Damage Reduction Measures

In April 1983, the Steering Committee initiated a comprehensive water management study in the Muskoka River watershed. The first of three study phases was completed in the fall and addressed land-use planning, economic profiles, and identification of flood prone lands. An Advisory Committee, consisting of locally elected public officials, was established to provide direction and input to the study process. Public meetings were held in Huntsville, Dorset and Port Carling to incorporate public input in identification of management alternatives. The study is to be completed by mid-1984 at a cost of $130,000.

During the year, topographic mapping and hydrologic model development were completed for the comprehensive flood damage centre analysis study in the Credit River watershed. A Regional Flood Frequency Analysis Study for Ontario streams was also initiated by WP&MB. The study is being carried out with some assistance from National Hydrology Research Institute (NHRI), WRB, Ontario Region and WP&MB in Ottawa.

5.0 Water Management Data Program

The ever increasing demand for water and the multiplicity of its uses have produced a growing need for better and more efficient management of this most precious resource. The systematic collection and compilation of water resources data is essential for the wise management of Ontario water resources. It is vital to activities such as the regulation of individual and industrial consumption, irrigation, hydroelectric power generation, recreation, flood-risk mapping and flood forecasting, engineering studies, pollution control and environmental assessments. The objective of the Water Management Data Program is to provide the basic water quantity and quality data on a timely, accurate and comprehensive basis to meet Canada's responsibilities under Federal-Provincial Agreements and to serve the national interest. Inland Waters Directorate is extensively involved in meeting this objective and ensuring that the data user's needs are met.

The fluctuation of the water levels of the Great Lakes affects many users. An important activity is the preparation by Water Planning and Management Branch of a six-month forecast of Great Lakes water levels on a monthly basis for distribution to the public. Forecasts of ice formation on the St. Lawrence River are also made during the early winter of each year. Throughout 1983, IWD responded to numerous requests from the public and other government agencies for information related to water levels and flows in the Great Lakes System.

5.1 Hydrometric and Sediment Surveys

The Water Survey of Canada Division of the WRB continued to operate a network of hydrometric and sediment stations under the terms of the Canada/Ontario Cost Share Agreement on Water Quantity Surveys. Other participants in the Agreement are the Ontario Ministry of Environment (OMOE), the Ontario Ministry of Natural Resources (OMNR) and Ontario Hydro. The terms of the Agreement ensure a coordinated approach to data collection by the four agencies and ensure that national standards are met for measurement and computation procedures, and for equipment and instrumentation. The terms of the Agreement require that all hydrometric stations be classified on the basis of national guidelines and that the station costs be shared between the parties according to the classifications. The terms of the Agreement are implemented by appointed Administrators and by a Canada/Ontario Coordinating Committee which has representatives from the four agencies.

As of April 1, 1983, the Water Resources Branch of IWD, Ontario Region operated a total of 379 hydrometric stations in Ontario. In addition, there are 68 hydrometric stations in the extreme northwest part of the province which are operated by the Water Resources Branch of IWD, Western and Northern Region. These stations are operated by the Western and Northern Region because of their close proximity to its Winnipeg District office.

During the year, the WRB took approximately 2350 discharge measurements at the 379 hydrometric stations. The Branch processed the data from all stations which it operated and also processed data from 55 stations operated by other agencies in the Cost-Share Agreement.

Of the 379 hydrometric stations operated by the WRB on April 1, 148 were classified as Federal stations, 27 as Federal-Provincial stations and 194 as Provincial stations. As per the terms of the Cost-Share Agreement, construction and operating costs for Federal stations are funded entirely by Canada, Federal-Provincial stations are cost shared 50/50, and Provincial stations are funded by the province. For all stations, Canada, as the operating party in Ontario is responsible for providing and paying the total cost of the water level recording equipment at all stations while the requesting agency pays for the purchase, installation, and operation of specialized equipment at those stations operated by the Province. For the fiscal year ending March 31, 1983, the shareable cost for construction, maintenance and operation of the hydrometric and sediment networks in Ontario was $1,622,000 of which $749,200, or approximately 45%, was recovered from the province.

No major operating problems occurred during the year, however, a number of minor problems were experienced at some hydrometric stations. Long periods of cloud cover in some areas caused inadequate solar panel output and resulted in temporary equipment failure at some stations with data collection platforms (DCPs). Vandalism was a problem at some hydrometric stations due to theft of equipment and supplies and damage to equipment and structures. Heavy weed growth during low water levels in the summer caused backwater conditions at a number of stations. Lightning struck one station and caused considerable damage.

Flooding was not a widespread problem during 1983, although local storms caused high water levels and flows in some areas. Record high discharge measurements were obtained at several hydrometric stations. At the other end of the scale, water levels and flows were relatively low throughout most of Ontario during the latter part of the summer resulting in record low discharges and water levels at a number of hydrometric stations.

Two internal reports were prepared regarding network operations, namely "Evaluation of Nitrogen Cylinders, Purchase or Rental" and "Summary of DCP Activities in Ontario Region".

The WRB operated a network of 12 continuous and 2 seasonal recording sediment stations during the year. In addition, six northern stations were sampled on a miscellaneous basis. A fully operational sediment laboratory in Guelph supported this activity. Approximately 1140 suspended sediment samples, 22 bed material samples, and 160 dissolved solids samples were analyzed. Types of analyses included total sediment concentration, bottom withdrawal, hydrometer and sieving. A comprehensive review of the Ontario sediment network was completed and three internal reports were prepared, namely "Ontario Region Sediment Network Review", "North Magnetawan River at Pickerel Lake, — A Sediment Station Review", and "Ontario Region Miscellaneous Sediment Station Network Proposal". Reports were also prepared on sediment yield in the Ontario Region and the cost of sediment analysis.

During 1983, the WRB operated 11 data collection platforms (DCP) at remote hydrometric stations for the retransmission of data by satellite. Nine stations were operated on behalf of the Ontario Ministry of Natural Resources and 2 on behalf of OMNR and Ontario Hydro. A program to install 35 DCPs at other remote sites over a 5 year period was also initiated as part of a national federal effort. Seven Bristol DCPs were acquired in late 1983 with installation to be completed in 1984.

The WRB conducted snow course surveys at four locations in Northern Ontario during March. Snow depth and water equivalent were measured. The data are utilized for flow forecasting by Ontario Hydro, Ontario Ministry of Natural Resources, and Canada Department of Public Works.

In January 1983, the Canada/Ontario Coordinating Committee sponsored a two-day workshop on hydrometric data collection and compilation methods. WRB staff made a number of presentations on topics such as discharge measurement, installation and maintenance of equipment, and computation techniques.

The WRB sponsored a one-week survival training course at North Bay in February and hosted a two-day DCP training session at North Bay in December. At the DCP workshop staff of the WRB and Bristol Aerospace Ltd. provided instruction on the operation and maintenance of the new Bristol DCPs.

5.2 Construction and Maintenance

Construction activities for 1983 consisted of the installation of seven new hydrometric gauging stations (four with walk-in shelters and three with a "Guelph" shelter), the relocation of six hydrometric stations and the upgrading of two hydrometric stations. Two DCPs were installed during the year on behalf of the Ontario Ministry of Natural Resources.

A number of field and site investigations were conducted for new hydrometric stations, relocation of hydrometric stations, and major repairs and renovations. Minor repairs and maintenance such as upgrading and repairing electrical services, installing thermostats to regulate gauge house heating systems, repairing weirs and controls damaged during spring freshet, and repairs to cableways, intakes, and damaged shelters were also carried out.

5.3 Data Control, Publication and Distribution

During 1983, the WRB answered 560 requests for technical data, advice, and information related to the hydrometric and sediment station network. Some 4090 station years of record were distributed, comprising 217 requests for historical record, 155 requests for current record, and 91 requests for other related information. Stream flow data from two hydrometric stations (Saugeen River near Port Elgin and Missinaibi River at Mattice) were reported on a monthly basis to the United States Geological Survey (USGS). The USGS incorporates these data in their regional hydrologic analyses and publishes the results in the "National Water Conditions Bulletin".

The annual publications "Surface Water Data — Ontario, 1982" and "Sediment Data — Canadian Rivers, 1981" were published and distributed.

The 1982/83 Data Users Summary for Ontario was completed and distributed to all Regional and Headquarters offices of the WRB.

A major review of the hydrometric network of the Severn River in the Washago area was carried out. As a result of the review, flows through the Trent-Severn Waterway Lock 42 will be published and the outflow of Lake Couchiching (including Lock 42 flows and the flow in the Severn River below Washago) will be published.

The WRB Regional office in Guelph acquired a new EDP system in 1983. The major components of the new system are a Digital Equipment Corporation PDP 11/44 minicomputer and a Gentian Electronics Ltd. hi-state digitizer. A Calcomp 1012 drum plotter was ordered and is to be delivered in early 1984. The entire system is expected to be operational shortly after renovations to the office are completed in early 1984. The new system is intended to make the computation of hydrometric data more efficient, to expand the Branch's abilities in data handling and analysis, and to provide access to a storage bank of real-time data.

5.4 Tides and Water Level Network

In addition to the regular hydrometric stations operated under the Canada/Ontario Cost Share Agreement, WRB continued to operate 34 water level gauges on the Great Lakes and St. Lawrence River System on behalf of the Canadian Hydrographic Services (CHS) of the Department of Fisheries and Oceans (DFO). These gauges are part of the DFO network of tides and water level gauges which provide data for navigation and water management purposes. Under the terms of a memorandum of understanding with DFO, IWD operates and maintains these gauges and publishes the data from them in its surface water data publications. DFO retains ownership of the gauges, operates and maintains specialized equipment for navigational applictions , processes the data, and publishes weekly and monthly reports and bulletins on water levels.

5.5 Hydrologic Studies

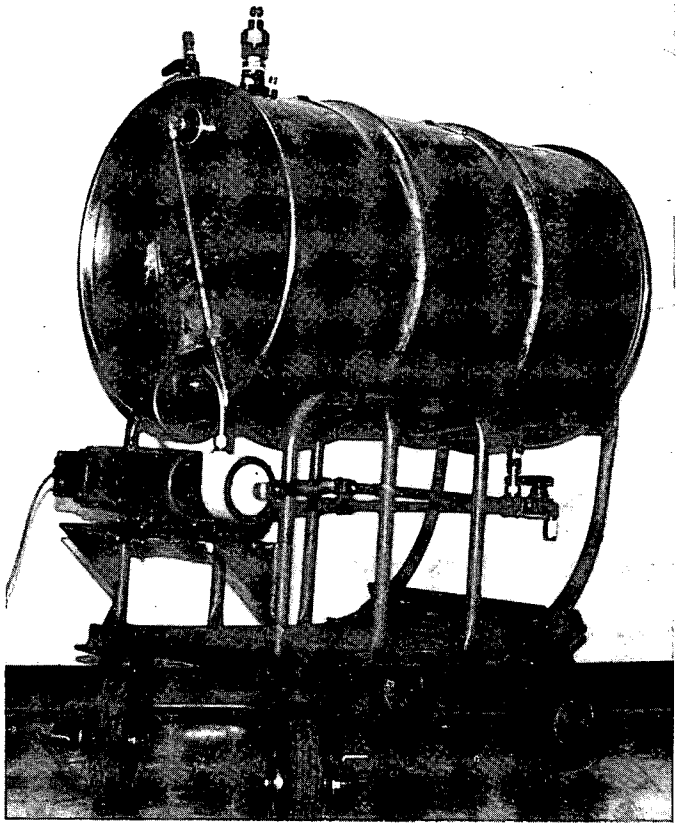
The WRB has been restructured in order to strengthen the analytical and interpretive capabilities of the Branch in data and information synthesis and to strengthen the network evaluation and planning capabilities of the Branch. The result was the creation of a Hydrology Division. Staffing of positions in the Hydrology Division has commenced and will be completed in 1984.

Hydrologic studies will be conducted to estimate hydrometric data at ungauged locations and missing data at gauged locations. Hydrometric data will be analyzed and interpreted to derive hydrologic information such as flood frequency curves at gauged and ungauged locations. Hydrologic studies will also be carried out to optimize the number of hydrometric stations, the distribution of the stations, and the operation of the stations. The results of these studies, when implemented, will enhance the overall efficiency of hydrometric data collection activities in Ontario.

6.0 Toxic Chemicals Program

The deleterious effects of toxic materials such as mercury, lead and PCBs on the environment are of major concern considering the ultimate impacts on the welfare and health of society. The presence of these substances in the environment may seriously affect plant and animal life, including humans. Contaminated water is limited in its use unless costly pretreatment is employed. Contaminated fish, birds, and other animals may become unfit for human consumption resulting in unemployment and loss of revenue for some industries. There may also be serious adverse effects on recreational activities and industries, including sport fishing, swimming and hunting.

The federal government has recognized the very serious problem toxic substances pose. As a result it enacted the Environmental Contaminants Act in December, 1975. The Act represented a major step forward in dealing with toxic chemicals nation-wide.



The APLE (Aqueous Phase Liquid-Liquid Extractor) Sampler

A survey was conducted near the mouth of the Moose River by WQB to investigate the potential availability of heavy metals bound to suspended sediments as a result of estuarine mixing. In addition, water samples were collected at the outflow of several creeks in the Moose River Basin to assess mobilization of trace metals in these wetland areas.

Further testing of a large volume Aqueous Phase Liquid-Liquid Extractor (APLE) was undertaken in April (1983). Results indicated that this extraction system can quantitatively extract a wide range of trace organic contaminants from natural waters. Owing to the large volumes extracted, contaminants can be detected at levels two orders of magnitude below traditional detection limits. Analyses of samples collected in the lower Great Lakes region using the APLE in conjunction with a centrifuge have indicated that most of the organochlorine pesticides are present in the aqueous phase rather than in the suspended sediment fraction.

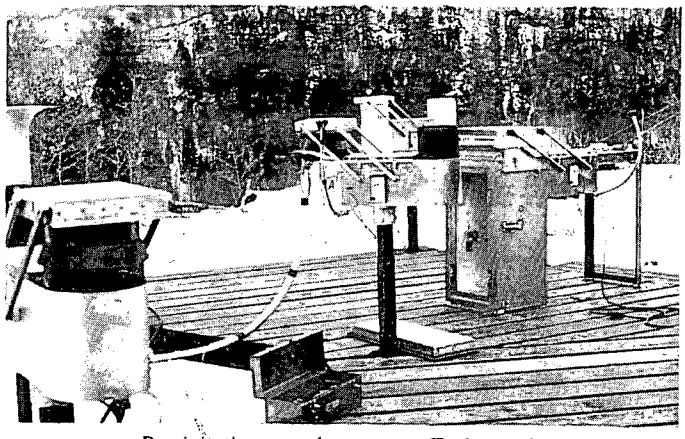
During June of 1983, Water Planning and Management Branch carried out a telephone survey to determine the level of awareness and degree of concern about the Niagara River Toxics problem within the population of communities along the Canadian side of the Niagara River. The results of this survey show high levels of awareness of the toxic contamination problem in the Niagara River and Lake Ontario. Concern about water pollution runs deep in the Niagara area, with 73% of the respondents considering it to be a serious problem in their community. A report on this survey entitled "A Survey of Attitudes Towards Water Quality in Communities Along the Canadian Side of the Niagara River" was completed and released by the Minister in December 1983.

7.0 Long Range Transport of Airborne Pollutants Program

The problem of long range transport of airborne pollutants (LRTAP) has been identified as an issue of major concern to both Canada and the United States. Reports of studies conducted by two IJC reference groups, the Upper Lakes Reference Group and Pollution from Land Use Activities Reference Group (PLUARG) have indicated that the issue of long range transport of airborne pollutants with its transboundary pollution implications was of great concern requiring immediate attention. Recognizing the problems LRTAP could bring to the Great Lakes Basin ecosystem, Article VI of the 1978 Canada-U.S. Great Lakes Water Quality Agreement specified the need to increase monitoring activities.

The long range transport of airborne pollutants such as acid rain is having serious adverse effects on both the aquatic and terrestrial ecosystems in eastern North America. Acid precipitation has its greatest effect on the waters and soils of the Precambrian Shield region which have only limited capacity for neutralizing the acid in the rain. Soil impoverishment through leaching of important nutrient elements by acid precipitation has the potential of reducing the yield from forests in this region. Several lakes in the Haliburton - Muskoka area of south-central Ontario have lost up to 75% of their buffering capacity in the last 10 years. It has been estimated that there are about 48,000 lakes in Ontario that could be adversely affected if acid loadings remain constant or increase over the next 10 to 20 years. This trend in aquatic environmental degradation poses serious threats to the social and economic well-being of Canadians.

The Water Resources Branch collected hydrometric data from six hydrometric stations in the Turkey Lakes area in support of the National Water Research Institute and the



Precipitation sampler array at Turkey Lake

Turkey Lakes Watershed Program. The objective of this latter study is to determine how an acid sensitive lake system responds to acidic precipitation.

The Water Planning and Management Branch provided advisory and analytical services for this program in cooperation with other government agencies. Assistance was provided during the year in the review and assessment of benefits and costs associated with the long range transport of airborne pollutants. A discussion paper on alternative economic perspectives regarding environmental management and LRTAP was prepared and sent to the Intergovernmental Affairs Directorate in Ottawa, Research on alternative methodologies for assessing the economic aspects of LRTAP control strategies was undertaken. A study proposal based on this research was submitted under the LRTAP Program for review by the Royal Society of Canada. Other similar proposals were submitted for inclusion in the LRTAP Cabinet Submission.

8.0 Environmental Assessment Program

Under this Environmental Conservation Service multi-directorate program, IWD, Ontario Region provides direct support to the Federal Environmental Assessment and Review Process (EARP) in ensuring that environmental effects, particularly effects on water resources, are taken into account early in the planning of projects involving federal interests and funding and that appropriate measures are taken to minimize environmental impacts of the projects. IWD usually assumes lead agency responsibilities for evaluation of predominantly water-related development projects and provides advice on water concerns to other lead services on other projects. IWD has membership on the Regional Screening and Coordinating Committee (RSCC) which provides the focus for EARP-related activities in Ontario Region.

During 1983, a number of continuing projects followed through various stages of environmental evaluation and review. The IWD-led review of Gananoque Light and Power Company's proposed Rideau-Cataraqui River diversion and subsequent RSCC recommendation that an Initial Environmental Evaluation (IEE) be prepared by the proponent ultimately resulted in the abandonment of the project. In reaching this decision, Gananoque Light and Power considered the proposal uneconomical in the face of the additional work required to answer the large number of concerns identified with the project. The Keating Channel (Toronto) flood control/dredging project involved Water Planning and Management Branch in the review of the Final Environmental Assessment and related technical appendices prior to the initiation of provincial environmental hearings (not yet underway). IWD-OR also participated in consultations and review revisions of the Ontario Ministry of Transportation and Communication's proposed HWY 406 (Welland-Thorold) extension and crossings of the Old Welland Canal. In connection with the Welland Canal, again, Public Works Canada submitted a package of redevelopment projects for federal lands along the Old Welland Canal. Water quality conditions and water circulation that is already restricted have been the prime focus of concerns stemming from potential development proposals for the area.

The continuation of the Canada/Ontario Eastern Ontario Subsidiary Agreement involved further participation of IWD-OR as representative of Environment Canada on the South Nation River Basin Development (SNRBD) Subcommittee and the Drainage Petition Review Committee (DPRC). The SNRBD Subcommittee completed its finalization of the basin study report and the preparation of a general distribution document for members of the public. A ministerial response was also prepared to concerns expressed by the Township of Cambridge (South Nation River Basin) regarding landslide hazards and the availability of federal assistance programs. The geotechnical background report of the South Nation River Basin study identified the area in question as prone to earth flow due to the prevelance of unstable leda clays.

On the DPRC activities focused on the few controversial agricultural drains that remained unresolved. The most important of these the Glen Elbe Drain near Brockville, Ontario was still unresolved by year-end. Ministerial responses were prepared to several citizens concerned about the potential environmental impacts of the Glen Elbe Drain.

Included among other environmental assessment projects reviewed and evaluated during the year were: a provincial class environmental assessment for water management projects of Conservation Authorities; generic IEE outline for maintenance dredging of the Rideau Canal between Kingston and Ottawa (Parks Canada); proposal to dispose of municipal sludge (through mixing with industrial wastes and land reclamation) on Fighting Island, Ontario (City of Detroit); and provincial urban drainage policy.

In the late summer of 1983, winter navigation and season extension on the Great Lakes was resurrected as a potential implementation project through introduction of a 1983 Omnibus Water Resources Bill in the U.S. Congress. While currently being debated in Congress, this action sparked increased attention on the Canadian side. Water Planning and Management Branch prepared background material on associated environmental impacts of winter navigation and actively participated in a meeting of Canadian and U.S. Legislators in Ottawa (sponsored by the Center for Legislative Exchange) on transportation in the Great Lakes — St. Lawrence Seaway. IWD-OR was also assigned lead responsibility to draft a report on the winter navigation issue for the RSCC and DOE Ontario Region. The latter work is due for completion in early 1984.

During the year the Ontario RSCC initiated action to review and formalize its Terms of Reference. IWD-OR actively participated and contributed to consultations and formulation of these terms of reference.

9.0 Baseline Studies Program

The baseline studies program is an ECS multi-directorate program which endeavours to provide the information or knowledge base required for evaluating the effects of various activities on environmental resources of specific geographic areas or the effects of particular development cycles, such as the nuclear fuel cycle. IWD, Ontario Region, participates together with other ECS and DOE services in baseline studies identified as priority areas by the Regional Director General - DOE/Ontario Region.

Oshawa Second Marsh has been the focus of effort under the baseline studies program over the last several years. During 1983 spring sampling of water chemistry and sediment transport was undertaken to continue the previous year's program. Essentially, however, the project was completed with the publication of the final integrative baseline study report.

A new baseline study dealing with wetlands conservation in Southern Ontario was initiated in 1983, with the participation of Lands Directorate, Canadian Wildlife Service and IWD-OR. The intention of the study was to identify and evaluate remaining wetlands, as well as to derive screening mechanisms to prevent inadvertent degradation or loss of wetlands through federal policies or programs. IWD-OR undertook to review past federal policies and programs and their role in contributing to wetland loss in Southern Ontario. This work is scheduled for completion in 1984.

Measuring streamflow through a culvert at Oshawa Second Marsh

10.0 Management and Administration

In 1983, the Directorate administered and managed resources amounting to 6.5 million dollars and 87.5 person years. The resources included operational funding under international and federal-provincial agreement as well as grants and contributions under similar agreements. Significant federal-provincial cost-shared funding administered in 1983 included the Canada-Ontario Great Lakes Water Quality funding ($1,200,000) and the Canada-Ontario Flood Damage Reduction Agreement funding ($650,000 for 1983-84).

IWD, Ontario Region, staff took part in the Regional Public Consultation Conference sponsored by Environment Canada. Called "Environmental Challenges: 1983" the conference was held October 27-29, 1983, at the Hamilton Convention Centre. Attendance at the conference ranged from 200 - 800 people over the 3 days and included representatives from all levels of government, universities, industry and public interest groups as well as the general public. A staff member of IWD, Ontario Region, chaired one of the sessions called "Water Quality — Lake Ontario". As a follow-up to the conference IWD, Ontario Region, participated in the preparation of department responses to the resolutions/recommendations which arose out of the conference discussions.

IWD Display at the Central Ontario Exhibition, Kitchener, Ontario

IWD, Ontario Region, hosted a public information display at a shopping mall in Guelph during Canadian Environment Week, June 5 - 12. The display included equipment used in hydrometric and sediment surveys along with reports, brochures, and posters describing water quality monitoring, the flood damage reduction program, and other IWD activities. Many brochures and reports were given out during the display and during visits to schools, churches, and other interested groups in the Guelph area.

IWD, Ontario Region, also hosted a public display at the Central Ontario Exhibition in Kitchener during August 30 - September 5. Approximately 3,000 people visited the display to discuss water related matters with IWD staff and/or to browse through the equipment, posters, and publications. Many reports, brochures, and souvenirs depicting IWD activities were given out.

The WRB, Ontario Region, held a branch workshop in Guelph on November 29 and 30, 1983. The purpose of the workshop was to give all WRB staff a better understanding of IWD and WRB goals and activities, and to provide training in specific WRB activities. Presentations were made by the Director of WRB, members of the Canada/Ontario Coordinating Committee, representatives from the Environmental Protection Service and the University of Guelph, and staff of the WRB, Ontario Region.

11.0 Publications and Presentations

Water Planning and Management Branch

L. J. D'Amore and Associates Ltd., "Study of Trends in Canadian Environmental and Water Issues Concerning Ontario and the Great Lakes Region". Submitted to Inland Waters Directorate, Ontario Region in fulfillment of Contract No. OSE82-00221, July, 1983.

Muir, T., "Human Development of the Lake Ontario Basin - Past, Present and Future". A lecture presented at the Plenary Session of the International Association for Great Lakes Research, Annual Meeting. Oswego, New York, May 24, 1983.

Muir, T., "Alternative Views of Economy and Environmental Management". A discussion paper prepared for the LRTAP Program. November, 1983.

Perks, A., S. Moin and S. Taylor, "Flood Hazard Mapping of Flat Regions". Paper presented at the 6th Hydrotechnical Conference, Canadian Society of Civil Engineering, Ottawa, June 1983.

Sudar, A., and C. Jones, "A Survey of Attitudes Towards Water Quality in Communities Along the Canadian Side of the Niagara River". Inland Waters Directorate, Ontario Region, Burlington, October, 1983.

Water Planning & Management Branch, "The Effects of Landfills in the Niagara River on the Water Levels of Lake Erie." Internal Report, Inland Waters Directorate, Ontario Region, Burlington, Ontario, 1983.

Water Quality Branch

El-Shaarawi, A. H., S. R. Esterby and K. W. Kuntz, "A Statistical Evaluation of Trends in the Water Quality of the Niagara River". J. Great Lakes Res. 9(2):234-240,1983.

Kuntz, K. W., "Niagara River Chemical Loadings to Lake Ontario - 1981". Internal Report, Water Quality Branch, Ontario Region, Burlington, 1983.

Kuntz, K. W., "Variations in Contaminant Concentrations at the Mouth of the Niagara River in November 1980". Internal Report, Water Quality Branch, Ontario Region, Burlington, 1983.

Kwiatkowski, R. E. and M. A. T. Neilson, "Lake Ontario Surveillance Data, 1968-1980". Technical Bulletin No. 126. Inland Waters Directorate, Ottawa, 1983.

McCrea, R. C., J. D. Fischer and K. W. Kuntz, "Partitioning of Organochlorine Pesticides and PCB's in the Lower Great Lakes Region". Presented at the 26th Conference on Great Lakes Research, Oswego, N.Y. May 23-26, 1983.

McCrea, R., "Development of an Aqueous Phase Liquid-Liquid Extractor". Internal Report, Water Quality Branch, Inland Waters Directorate, Ontario Region, Burlington, Ontario, 1983.

McCrea, R. and J. Fischer, "Construction and Operation of a Continuous Sampling System for Organochlorine Contaminants in Natural Waters". Internal Report, Water Quality Branch, Ontario Region, Burlington, 1983.

Neilson, M. A. T., "Report on the Status of the Open Waters of Lake Ontario". Internal Report, Water Quality Branch, Ontario Region, Burlington, Ontario, 1983.

Neilson, M. A. T., R. J. J. Stevens, J. Hodson, "Documentation of the Averaging Lake Data by Regions (ALDAR) Program". Accepted by IWD Technical Report Series, 1983.

Stevens, R. J. J., M. A. T. Neilson and N. D. Warry, "Nutrient Chemistry of Lake Huron, 1980". Presented at the 26th Conference on Great Lakes Research. Oswego, N.Y. May 23-26, 1983.

Water Resources Branch

Canada/Ontario Coordinating Committee, "Annual Report, 1982/83, Canada/Ontario Cost Sharing Agreement for Water Quantity Surveys, October, 1983".

Water Resources Branch, "Annual Construction Report 1982-83: Field Investigations, Construction, Upgrading and Maintenance of Hydrometric Stations for Ontario Region". Internal Report, Guelph, Ontario, 1983.

Water Resources Branch, "Surface Water Data, Ontario, 1982". Ottawa, 1982.

Water Resources Branch, "Great Lakes Inflow Gauging Network Evaluation Report".
A Report to the I.G.L.T.I.N.B., 1983.

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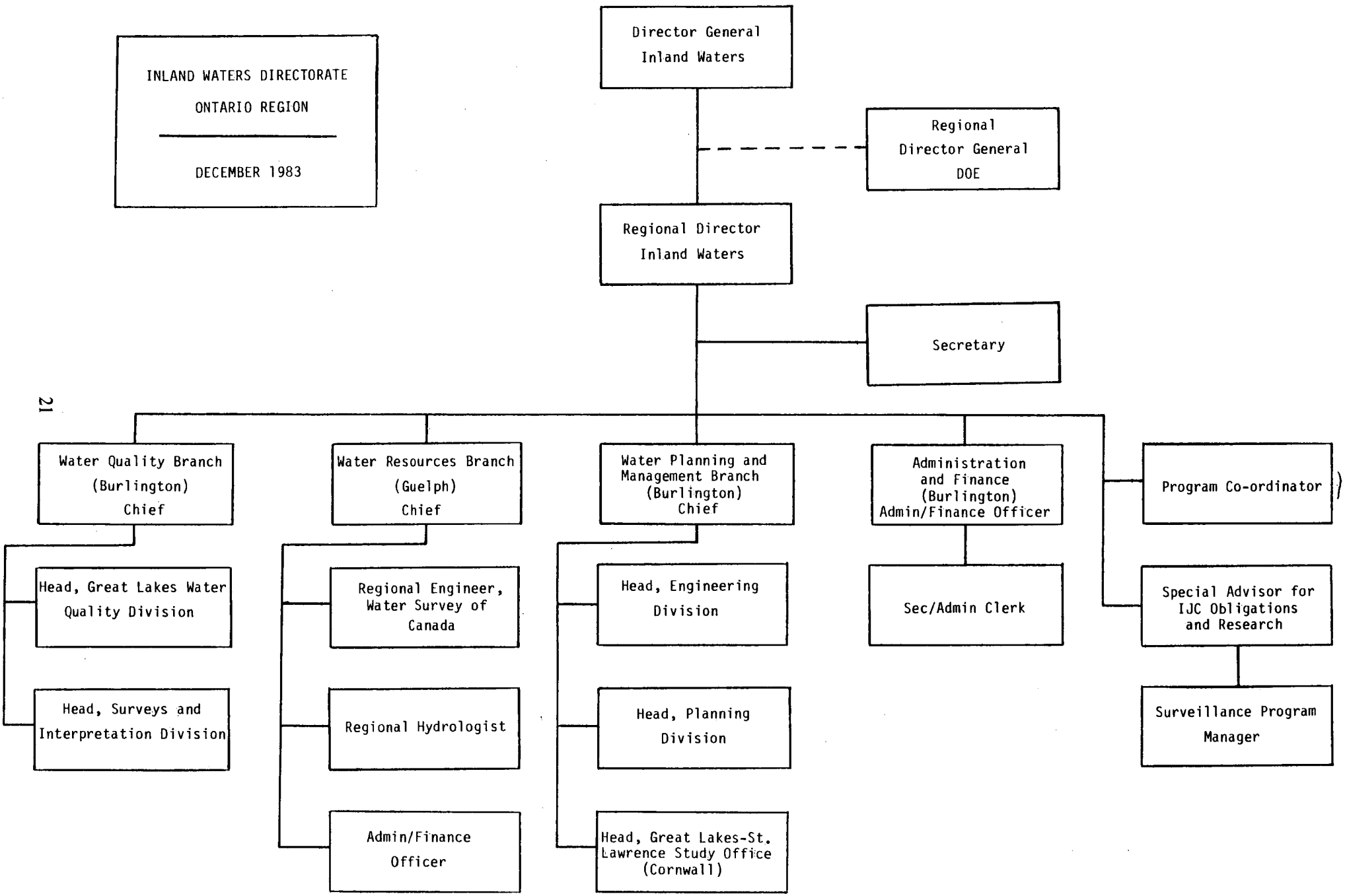

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