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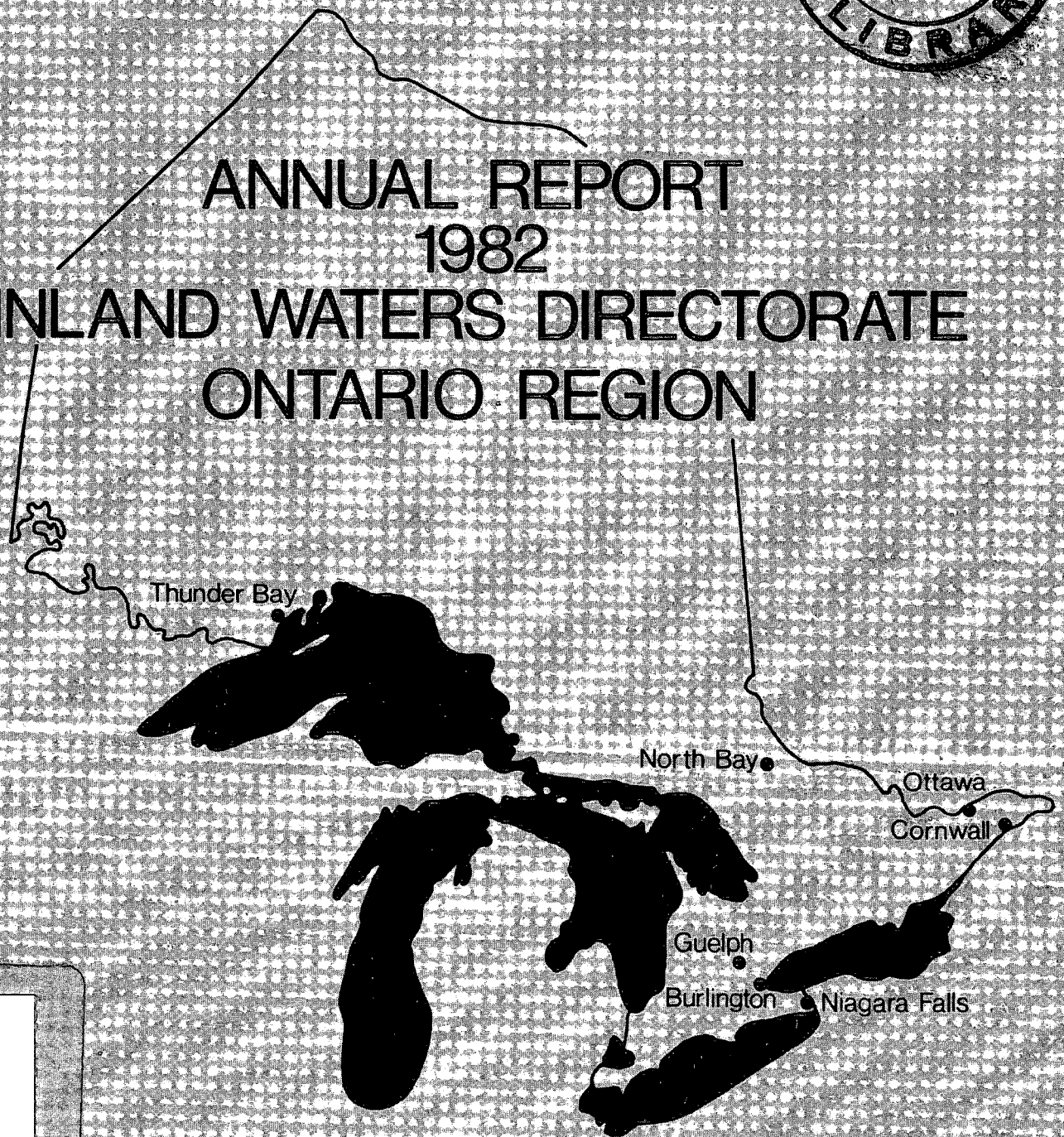
ANNUAL REPORT 1982 INLAND WATERS DIRECTORATE ONTARIO REGION



Canada

Inland Waters Directorate
Ontario Region

ANNUAL REPORT 1982

DEPARTMENT OF THE ENVIRONMENT

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Summary

This report describes the activities and accomplishments of Inland Waters Directorate (IWD), Ontario Region during 1982. 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 signing of the new Canada-Ontario Great Lakes Water Quality Agreement, the holding of public hearings by the IJC regarding the report of the Lake Erie Regulation Study Board, the commissioning of the new Canadian hydro-electric power plant at Sault Ste. Marie and the successful completion of the second year of the two year intensive water quality study of Lake Ontario.

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. The first flood-risk areas designated under the program were designated on August 16, 1982 and were for areas in the town of White River. Later in the year flood-risk areas within the 2200 sq. km. jurisdiction of the Metropolitan Toronto and Region Conservation Authority were designated. Terms of reference were established for a one-year water management study in the Muskoka River watershed which will start in March, 1983.

April 1, 1982 marked the beginning of the eighth 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, 1982 the Branch operated a network of 372 hydrometric stations in the province.

IWD participated in two major public information efforts in 1982, the Regional Public Consultation Program and the Canada Centre for Inland Waters (CCIW) Open House. In the Public Consultation Program public consultation sessions were held in September at four centres across the province. The CCIW Open House, the third of its kind since the opening of the Centre, was held in April and attracted some 20,000 visitors. The Water Quality Branch laboratories were opened to the public during the Open House.

In 1982 IWD, Ontario Region administered and managed resources amounting to 7.37 million dollars and 110.5 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 1982 included Canada-Ontario Great Lakes Water Quality funding ($1,200,000) and Canada-Ontario Flood Damage Reduction Agreement funding ($920,000 for 1982-83).

A list of 1982 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 1982. 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 évènements marquants qui touchent les Grands lacs et auxquels a participé la DGEI, la signature du nouvel Accord Canada-Ontario sur la qualité de l'eau dans les Grands lacs, la tenue d'audiences publiques sur le rapport du Bureau d'étude sur la régularisation du lac Érié par, la Commission mixte internationale, la mise en service d'une nouvelle usine hydro-électrique à Sault-Ste-Marie et l'achévement de la deuxième année de l'étude intensive de deux ans de la qualité de l'eau du lac Ontario.

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. Le 16 août 1982, certaines parties de la ville de White River étaient désignées comme premières zones inondables dans le cadre du programme. Par la suite, on a désigné des zones inondables sur les 2 200 km² relevant du Metropolitan Toronto and Region Conservation Authority. Le sujet d'une étude d'un an sur la gestion des eaux dans le bassin versant de la rivière Muskoka, qui débutera en mars 1982, a également été déterminé.

Le 1er avril 1982 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 1982, la Direction exploitait un réseau de 372 stations hydrométriques dans la province.

En 1982, la DGEI a participé à deux actions majeures visant à informer le public: le Programme de consultation régionale du public et la Visite libre du Centre canadien des eaux intérieurés (CCEI). Des séances de consultation se sont tenues en septembre dans quatre centres de la province dans le cadre du Programme de consultation du public. La Visite libre, la troisième du genre depuis l'ouverture du Centre, a en lieu en avril et a attiré près de 20 000 personnes. Les laboratoires de la Direction de la qualité des eaux étaient ouverts au public pendant la Visite libre.

En 1982, la DGEI, région de l'Ontario, a adminstré et géré des ressources totalisant 7,37 millions de dollars et 110,5 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 du 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 domma-

ges causés par les inondations (920 000 $ pour 1982-1983), deux ententes à frais partagés.

Le rapport présente également une liste des publications et des rapports présentés par le personnel de la DGEI de la région de l'Ontario en 1982.

La version francaise du Rapport annuel est également disponible sur demande.

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 and interconnecting channels, 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 1982.

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

The Compensating Works on the St. Marys River

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 Lake Superior Board and St. Lawrence Board in regulating the outflows of Lake Superior and Lake Ontario. The Branch also supported the IJC's Niagara Board 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 which influence the regulation of Lake Superior and Lake Ontario and provided advice in their regulation. The 1982 water levels of Lake Superior were below normal until October when record high water supplies caused above normal levels for the rest of the year. The levels of Lakes Michigan, Huron and Erie remained above their respective long-term means throughout 1982, while Lake Ontario levels were near normal for most of the year.

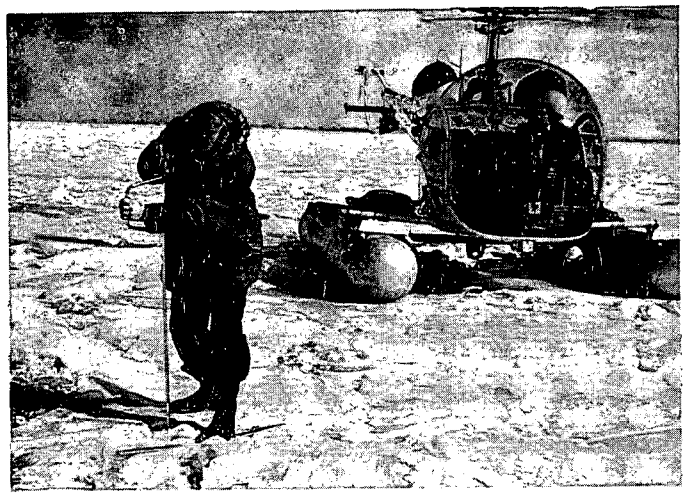
November 23, 1982 marked the commissioning of the new Canadian hydro-electric power plant at Sault Ste. Marie. The new plant increases the Canadian hydro-electric generating capacity at Sault Ste. Marie from 22 megawatts to 54 megawatts, and enables Canada to use, except in times of very high river flow, her full share of the St. Marys River water for power generation purposes. WP&MB's involvement in this power redevelopment has been extensive. The Branch's support to the Superior Board since 1977 included: computer simulation of Lake Superior regulation before and during construction; advice to the IJC which later issued supplementary orders of approval permitting the redevelopment; water quality monitoring; and advice on lake outflows during construction.

The 16-gate Lake Superior Compensating Works on the St. Marys River was constructed some 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 Superior Board also completed a study of the effects of the patterns of gate openings at the Compensating Works on hydro-electric power generation and on flow conditions in the St. Marys Rapids. Branch representatives worked with other department officials to develop a government position with respect to the conservation of the fisheries resources in the Rapids.

Ongoing Great Lakes levels studies include: hydrologic modelling of the Great Lakes, and the use of airborne gamma radiation surveys to measure snowpack water equivalence. The WRB collected soil samples and performed gravimetric analyses as part of the ground support for this latter project. These projects are being 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 1982 WP&MB monitored the regulation of water levels in the Chippawa-Grass Island Pool which is located upstream of the falls. Commencing on April 1, 1982, a new procedure was used to compute the flow over Niagara Falls during the transition hours when Falls flows are changed from 100,000 cubic feet per second (cfs) to 50,000 cfs, or vice versa. This procedure was developed by the Niagara Board and is followed by the Power Entities at Niagara Falls. Branch personnel monitored landfill activities on the shoreline of the Niagara River, and provided advice on possible impacts of such fills on water levels and flows to the IJC and other federal and provincial agencies. Since landfilling in the Niagara River could affect the levels and flows of boundary waters, WP&MB worked closely with IWD-Ottawa and the Province with the aim of providing effective government legislation to control landfill operations. In December, Branch representatives met with Ontario officials to discuss the possibility of extending the local conservation authority's jurisdiction to the international boundary of the river to control future landfill operations.

The Niagara Board also advised the IJC on the operation of the Lake Erie-Niagara River Ice Boom. The boom is installed by the Power Entities each winter at the head of the Niagara River to protect their power intakes from ice. Local



Taking ice thickness measurements on Lake Erie

residents have opposed the use of the boom, alleging that its presence prolongs the ice season in the area. Although past studies conducted by the Board and other researchers have not identified any significant effects, the Erie County Legislature in New York took the matter to court in December 1982. WP&MB will monitor closely the developments in this case. Other Niagara Board activities included a review of New York State's application to carry out remedial works at Terrapin Point, located next to the Horseshoe Falls and the results of the 1982 current-meter measurements taken in the lower Niagara River.

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. A report on the history of the Welland Canal diversion and the power diversion at Decew Falls was completed. WP&MB was also involved in examining the existing water transfer arrangement at Niagara between Ontario Hydro and the Power Authority of the State of New York (PASNY). The Branch provided advice on this subject to officials of IWD-Ottawa and External Affairs. In early 1982, PASNY announced a plan to expand its power installation at Niagara Falls. Such an expansion could further complicate the water transfer issue and will warrant close attention by the Niagara Committee.

The St. Lawrence Board completed a study concerning the alleged adverse effects of the operation of the St. Lawrence Seaway and Power Project on the lands belonging to the St. Regis Band of Mohawk Indians.

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. A precise levelling survey has been planned for 1983 to update the International Great Lakes Datum. 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 needs to be updated because of the continuous, but uneven movement of the Earth's crust.

2.2 *Investigative and Engineering Boards*

In 1980, 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. During 1982, the Hydraulics Committee conducted its study of the hydraulic data being collected on the Great Lakes and in the connecting channels, while the Hydrology Committee studied the types of hydrometeorological data collected on land. Two comprehensive station directories were prepared describing the hydrometeorological stations. The Board also reviewed the data needs of about forty agencies in Canada and the United States. Preparation of the Committees' final reports have begun. The study findings thus far show that improvement is needed in the speed of transmission of data to users by automating the data collecting stations. In addition, several more hydrometeorological stations are required in ungauged areas.

In May, the International Lake Erie Regulation Study Board completed its last phase of the study program by mailing about 2500 copies of the Board's 4th newsletter to the public. In November, the IJC held public hearings regarding the Board's findings and recommendations. Presentations were made by IWD-Ontario Region representatives at these hearings. The study, completed in 1981 with extensive IWD input, concluded that Lake Erie regulation would not be economically feasible, and that reductions in shoreline flood and erosion damages can best be achieved by proper coastal zone management and a better public understanding of the factors causing lake level fluctuations. The public was generally receptive to the Board's report at the IJC hearings. The IJC will be submitting a report to the Governments of Canada and the United States on this matter.

2.3 *Great Lakes and Interconnecting Channels Water Levels Monitoring*

The Water Resources Branch worked in close collaboration with the U.S. Army Corps of Engineers regarding flow measurements on the Great Lakes Interconnecting Channels. Field work and data analyses continued regarding the verification of the revised stage-discharge relationship (rating curve) for the Ashland Avenue Gauge. This gauge is used to determine the flow over Niagara Falls. Computations and analyses were completed for flows in the lower part of the rating curve which were measured in the fall of 1981. Results were subsequently reported to the International Joint Commission's Niagara Board in March. During October, additional discharge measurements were taken on the lower Niagara River at Robert Moses Cableway, to further verify the upper middle part of the rating curve. Seven measurements were taken in the range of 85,000 to 110,000 cfs flow.

A Memorandum of Understanding was signed between DOE and Department of Fisheries and Oceans regarding the ownership, operation and maintenance of a network of Tides and Water Level stations. In the Great Lakes and St. Lawrence River system, Water Resources Branch operated 34 stations owned by the Canadian Hydrographic Service for the purposes of providing data for navigation and water management. A Regional Committee was formed and met once to discuss implementation of the new Memorandum of Understanding and program plans for 1982-83.

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 of the basin are situated adjacent to the Great Lakes and rely on them 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 which formalized the intent on behalf of both countries to prevent further deterioration of the Great Lakes and provided the basis for improving existing water quality. This intent was reaffirmed by the signing of a new agreement on November 22, 1978. 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. IWD 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) the defining and continual refining of water quality objectives; and
(d) identifying new and emerging pollution problems.

Within Canada, 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 1981-82 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 on July 12, 1982 and is effective to March, 1985. The new agreement continues cost-shared programs up to a maximum annual federal 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 1982 which was presented to the IJC at its November, 1982 meeting with the Board in Windsor, Ontario. The 1982 Report was essentially an update of the Board's comprehensive 1981 Report. As such it included an update of eutrophication and selected toxic contaminant issues from a whole-lake perspective, a course of action for implementing specific program-oriented toxic substances recommendations presented in its 1981 report and developments in phosphorus control programs. The Report also contained the Board's evaluation of the adequacy of remedial measures currently in place, or proposed, to correct the environmental problems of the 18 Class "A" areas of concern identified in the 1981 Report.

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

The Water Quality Branch completed the second year of a two-year intensive surveillance project on Lake Ontario. This project will provide a detailed assessment of water quality in Lake Ontario, as part of the IJC Great Lakes International Surveillance Plan.

Ten water quality surveillance cruises were carried out in the period March-November 1982 by the Canadian research ship CSS Limnos. The Water Quality Branch provided shipboard analytical support for three cruises and carried out the shore labs analysis for all ten cruises. One thousand and ninety-one samples were analyzed on board

ship by WQB and another 5,269 were brought back to the Branch's main laboratory in Burlington where additional tests were performed.

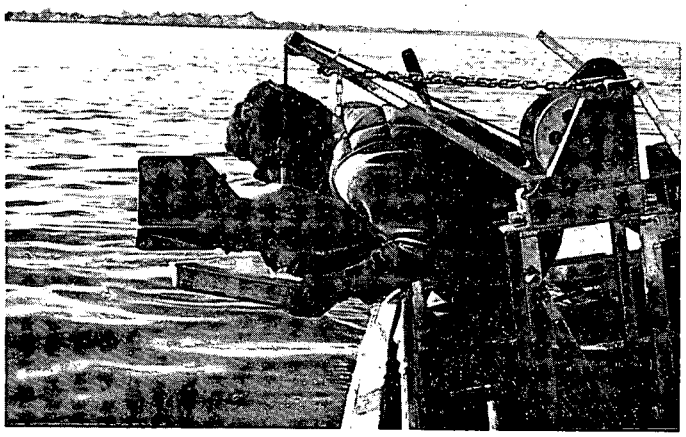
3.3 Interconnecting Channels Water Quality

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 into and out of Lake Ontario. These loadings are provided annually to the IJC for inclusion in its Great Lakes Water Quality reports.

Biweekly sampling of suspended sediments for toxic contaminants at the Niagara-on-the-Lake site continued. A report summarizing the organic contaminants detected in water and suspended sediments at Niagara-on-the-Lake for the 1979-81 period was presented at the International Association for Great Lakes Research Conference in May. It will be published soon in a special issue of the Journal of Great Lakes Research.

Collection of young-of-the-year Spot-tail Shiners was completed at about ten locations throughout the upper and lower sections of the Niagara River. Through a cooperative effort with the Ontario Ministry of the Environment, these samples were collected and will be analyzed to determine differences in contaminant concentrations in fish from the upper and lower reaches of the river. These samples will be analyzed for PCB's, organochlorines, pAH's, trace metals and dioxin and screened for other compounds.

Suspended sediment and water samples were also collected monthly from the St. Lawrence River at Wolfe Island to determine the presence of any organic pollutants which may be leaving the Lake Ontario system. These samples will be analyzed for PCB's, organochlorines, chlorobenzenes, PAH's, CHN and trace metals.



Sampling for suspended sediments in the Niagara River

Several attempts were also made to collect Spot-tail Shiners near the Wolfe Island site. However, no Spot-tails were found and young-of-the-year Yellow Perch were collected in late October from a site (Button Bay) near Wolfe Island. These fish will be analyzed for organic contaminants and screened for new compounds.

3.4 Niagara River Toxic Contaminants

Several special surveys were completed in the Niagara River area during the past year as part of the continuing commitment to the Niagara River Toxic Committee.

A special survey was conducted in August to monitor the effects of the discharge of one of the holding ponds of SCA Corporation to the Niagara River. During the discharge water quality samples of the pond were obtained from Environmental Protection Service, Ontario Region and were analyzed for trace metals, nutrients and organics. A grid of nine stations was also sampled, using the CSS Advent, in the immediate vicinity of the discharge diffuser, to monitor any local changes which could occur to the water quality of the Niagara River during the discharge.

A survey of the Hyde Park-Bloody Run Creek area of the Niagara River was completed on August 25, 1982. The survey was designed to monitor background contamination by organic contaminants before the U.S. remedial program, which was to start in early September, 1982, was undertaken. The samples will be analyzed for trace metals, chlorobenzenes, dioxin and chlorophenols.

As part of the continuing commitment to the problem of toxic contaminants in the Niagara River, several joint WQB-New York Department of Environmental Conservation sampling undertakings were completed during the past year. The most notable of these was the frequent exchange of samples from the suspended sediment sampling programs being conducted at both ends of the Niagara River. The results of these exchanges will be used to assess analytical compatibility of the laboratories involved.

3.5 Atmospheric Loadings

IWD 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 to the Great Lakes. Two additional stations were established on the north shore of Lake Superior in preparation for the 1983 Lake Superior Intensive Surveillance Project. Sampling for organic contaminants in atmospheric precipitation began on a trial basis this year with the development of a prototype organic precipitation sampler.

3.6 *Phosphorus Management*

Annex 3 of the 1978 Great Lakes Water Quality Agreement specified total phosphorus target loads for each of the Great Lakes. These loads when confirmed will be used as 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 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 investigating the feasibility of utilizing historical water quality and quantity data for planning phosphorus loading reductions in the Thames River Basin. By integrating the historical information available, attempts are being made to define the temporal and spatial variability of phosphorus loads along the river system and to assess various management alternatives. A report is expected early in 1983 for presentation to the Thames River Implementation Committee.

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 Environmental 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 for high flow and low flow events over the year on the mainstem of the Avon River. A final report is to be published in 1983.

The management of soil erosion and the associated delivery of sediment (and related contaminants) to a water course 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 initiated by WP&MB for a southwestern Ontario watershed. An instream approach of estimating sediment delivery was also used to validate the screening model. Fall storm runoff in twelve subwatersheds was intensively monitored 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 *Analytical Laboratory Support*

The Water Quality Branch analytical laboratory provided analytical support to 86 studies and projects of the Department of the Environment, and other federal agencies.

A total of 22,400 samples consisting of water, sediment, precipitation, fish and other aquatic biota were analyzed for 263,000 tests.

During the year the following analytical methods evaluation and adaptation work was carried out: (a) comprehensive method for the analysis of chlorinated dioxins and dibenzofurans, and (b) improved method for the analysis of silver in Great Lakes waters.

3.8 *International and Interprovincial Rivers*

The Water Quality Branch continued to monitor four sampling stations in Northwestern Ontario. Two stations are located on the Rainy River, one on the Winnipeg River and one on the English River. Water samples were collected every two weeks from these locations and were analyzed for physical parameters, major ions, nutrients and metals. Organochlorine pesticides and PCB samples were collected on a monthly basis between May and October.

Water Quality Branch staff participated in a multi-agency task force with Ontario Ministry of the Environment, United States Environmental Protection Agency and the Minnesota Pollution Control Agency to draft the "Proposed Study Plan for the Rainy River, 1982-83". The Branch continued to provide technical advice to the International Rainy River Pollution Control Board during 1982.

A new portable continuous-flow centrifuge system was tested this year on the Ottawa River. Suspended solids were collected at two sites, Carillon and Chat's Falls on a monthly basis between May and October. The solids will be analyzed for a variety of trace organic contaminants.

As part of the Toxic Chemicals Measurement Program, a bottom sediment survey was completed in July 1982 for the Ottawa River. A total of 35 stations were sampled from upstream of Lake Timiskaming to the Ontario-Quebec boundary at Carillon. The sediments will be analyzed for trace organic contaminants and metals.

4.0 Great Lakes Shore/Coastal Zone Management Program

The high water levels and accompanying storms which occurred on the Great Lakes in 1972-73 caused severe flood and erosion damages along much of the lower Great Lakes shoreland. Subsequently, efforts were undertaken by the Department of Fisheries and Oceans, Environment Canada and the Ontario Ministry of Natural Resources (OMNR) to reduce the potential extent of these damages in the future.

Data on shoreland erosion have been collected for a number of years by the Department of Fisheries and Oceans, with the assistance of Canada Water Act funding from IWD and funds from OMNR. The final report on this data collection and analysis program was completed and distributed by DFO during 1982.

In previous years, a number of brochures and two slide-tape shows were prepared on the many problems and hazards of living in the shore zone. Distribution of the brochures and the slide-tape shows continued during 1982. Presentations utilizing these information sources were made at workshops, meetings, conferences and the Canada Centre for Inland Waters (CCIW) Open House.

A report to the Ministers of the three sponsor agencies on the activities and accomplishments of this program over the period 1976-1982 was completed and distributed. This program will terminate on March 31, 1983.

5.0 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 the mapping of flood-risk areas and other flood damage reduction measures. The Agreement was revised on November 5, 1982 to accommodate 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 Agreement was also extended 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. Of this amount, $8 million is to be spent on flood risk mapping and $1.2 million is for other measures. The total expenditure under the program as of March 31, 1982 was $4,319,487; the flood-risk mapping component accounted for $3,922,150 and the other measures component for $397,337. Projected expenditure for the fiscal year 1982-83 is $1.5 million.

In accordance with the Agreement, the program is administered by a Steering Committee, which includes representatives from IWD, Ontario Region and Headquarters. Two members of the Water Planning and Management Branch are members of the Technical Subcommittee, which undertakes technical aspects of the program.

5.1 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 1982, projects were in progress in 19 conservation authorities, as well as several municipalities where no 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 of federal or provincial government buildings or structures in the flood-risk area;

2) funding from government sources for new buildings or structures placed in the flood-risk area and subject to flood damage and;

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 the Town of White River were the first to be designated in Ontario on August 16. The White River flood-risk areas were defined under a two-zone floodway/flood fringe concept, with the 100-year flood being used for delineating the floodway. Late in the year flood-risk areas within the 2200 sq. km jurisdiction of the Metropolitan Toronto and Region Conservation Authority were also designated. This December 9 designation encompassed nine water courses in four Regional and 24 local municipalities. Thirty-one flood damage centres were identified on the public information maps. These are flood-risk areas that are already developed and where special policies may be applied. Work commenced on the preparation of the public information maps for the 26 km reach of the Kaministikwia River at Thunder Bay and for the flood-risk areas in the French River/Lake Nipissing/Sturgeon River watershed,

for which mapping was completed in 1982. Designations for these areas are scheduled for March 1983.

An important part of the Flood Damage Reduction Agreement is the provision of information to the public 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 published an information brochure on the Canada/Ontario Program entitled "A New Approach to an Old Problem" in both English and French versions. Extensive use was made of this new brochure, as well as the federal brochure "Cutting Our Flood Losses", public information display panels and audio-visual presentations.

Public information material prepared for the Flood Damage Reduction Program

5.2 Other Flood Damage Reduction Measures

In April 1982, the Steering Committee initiated a comprehensive flood damage centre analysis study in the Credit River watershed. The major thrust of this investigation is to identify the major flood centres, evaluate the potential for flood damages, and identify structural and non-structural flood control alternatives including flood forecasting measures. The study is to be completed in 1984 at a cost of $300,000.

Late in the year, the Steering Committee approved the terms of reference for undertaking a water management study in the Muskoka River watershed. This three phase study, will commence in March 1983, and is proposed to be completed in one year. The objective of the study is to identify means for the reduction of future flood damages and risk to loss of life recognizing the competing water uses in the highly tourist-oriented Muskoka River watershed.

A Regional Flood Frequency Analysis Study for Ontario streams was also approved by the Steering Committee and initiated by WP&MB. A significant amount of work on this project is being carried out in-house by the Branch with the assistance of WP&MB in Ottawa.

6.0 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, such as the utilization and regulation of individual and industrial consumption, irrigation, hydro and recreational uses, flood-risk mapping and flood forecasting, industrial and commercial uses, engineering considerations, 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 meet user needs.

The fluctuation of the water levels of the Great Lakes affect 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.

A "Guelph" Shelter housing hydrometric data measurement equipment

6.1 Hydrometric and Sediment Surveys

The Water Resources Branch is responsible for the construction, operation and maintenance of a network of hydrometric and sediment stations under the terms of a cost-share agreement with the province. The total number of active stations varies with the availability of resources and/or program needs and priorities. As of April 1, 1982, the Branch operated a network of 372 hydrometric stations at an estimated cost of $3,240. per station with normal accessibility and $6,710. per station with aircraft accessibility, and con-

tinued its processing and publishing responsibilities for an additional 61 stations which are operated by other agencies.

The sharing of responsibilities and costs for these surveys evolved over a long period of time and was given formal status in the 1975 Canada-Ontario Federal-Provincial Cost Share Agreement on Water Quantity Surveys. A joint Canada-Ontario federal-provincial coordinating committee with representatives from the Water Resources Branch, the Ontario Ministry of Environment, the Ontario Ministry of Natural Resources, and Ontario Hydro, meets regularly to establish the respective cost-sharing in accordance with whether the stations are of federal or provincial interest, or of joint interest. Of the total of 372 stations involved, 144 stations were designated as Federal, 37 stations as Federal-Provincial, and 191 stations as Provincial.

Lower than normal temperatures in January and February caused above average problems at gauges. Wells, intakes and orifices were frozen and gas leaks occurred in bubbler systems. Streamflows were slightly below normal for the first two months of the year.

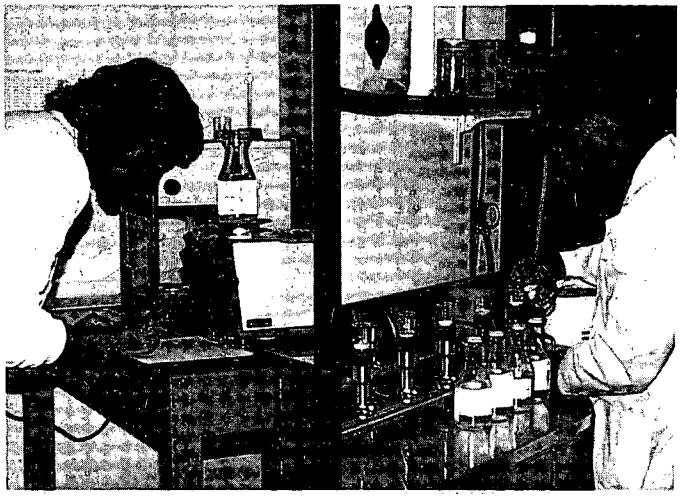
Heavy rains in late March and early April pushed most streams in South-Central Ontario to high water stages, and enabled field staff to obtain many discharge measurements in the high flow range. Serious flooding, however, was minimal. The northern regions experienced above normal temperatures and below normal precipitation, resulting in a very mild spring freshet. Rivers quickly receded to summer levels.

Unseasonable weather and a number of heavy showers and thunder storms plagued farmers and garden growers during the month of June. Streamflows reflected the weather patterns very closely, with flows in the high ranges being recorded in some areas of Southern Ontario. Below normal temperatures and above normal rainfall combined to create autumn-like conditions during most of August. Water levels were generally slightly above normal except for those locations which experienced minor flooding after intense rainfalls. In the Kitchener-Waterloo area, 67.4 mm of rain fell on August 4th, which resulted in some local flooding.

Late fall and early winter were marked by above average temperatures and precipitation. Rivers and streams reflected these conditions and remained open with the exception of some minor anchor ice at some locations.

A network of 12 continuous sediment stations was operated during the year and an additional six northern stations were sampled at random intervals. A fully operational sediment laboratory in Guelph supported this activity during 1982. Approximately 1,510 suspended sediment, 2 bed material, 12 bedload and 260 dissolved solids samples were analyzed. Types of analyses included total sediment concentration, bottom withdrawal, hydrometer and sieving. Included in the above total were 135 total sediment concentrations, 2 hydrometer and 12 bedload analyses done in support of the Oshawa Second Marsh Study. Over 276 analyses were done for the Maitland Valley Conservation Authority sediment studies and another 23 analyses were done in support of the Avon River Project. In addition, a total of 363 soil samples and 30 litter samples were analyzed for soil moisture content for the Lake Superior Gamma Ray ground sampling project.

During the year, WRB, Ontario Region operated and maintained 13 GOES Data Collection Platforms (DCP) on behalf of the Ontario Ministry of Natural Resources, Conservation Authorities Branch. Plans have been completed for a five-year program to install 34 DCP's at remote gauging stations in Northern Ontario. Installations are expected to begin in 1983-84.



The Sediment Laboratory of the Water Resources Branch, Guelph

6.2 *Construction*

Construction activities for 1982 consisted of the installation of eight new hydrometric gauging stations (seven with walk-in shelters and one with a "Guelph" shelter), the relocation of two hydrometric stations and the upgrading of another five hydrometric stations. In addition, 41 field and site investigations were made for new hydrometric stations, relocation of hydrometric stations and major repairs and renovations. Minor repairs and maintenance such as updating and repairing electrical services, installing thermostats to regulate the gauge house heating system, repairing weirs and controls damaged during spring freshet, and repairs to cableways, intakes and damaged shelters were also carried out.

6.3 *Training*

In July, WRB hosted four representatives from Brazil who attended a training workshop sponsored by the World Meteorological Organization. The visitors represented various Brazilian agencies involved in hydrology and water

resources planning and management. The visit included a field trip to several hydrometric stations, demonstrations of field and office equipment, and a tour of CCIW.

A Regional Workshop was held in Guelph on November 2 and 3, 1982. Guest speakers from Headquarters and outside the Branch gave presentations on such topics as river ice, micro-hydro projects, data telemetry systems, Acid Rain and the role of the Hydrology Division in the Water Resources Branch.

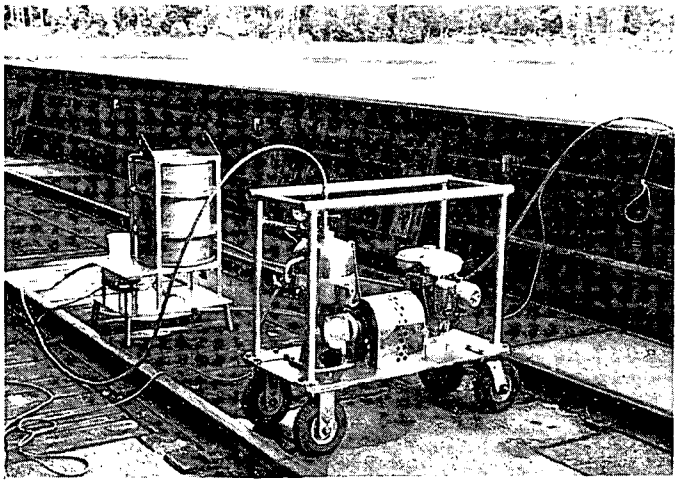
6.4 *Data Control, Publications and Distribution*

During 1982, 610 requests for technical data, advice and information were answered. Some 5,440 station years of record were provided, comprising of 227 requests for historical data, 270 requests for current data, and 113 requests for other information.

The annual publication "Surface Water Data, Ontario — 1981" was published and distributed.

Work on the compilation of "Extremes in Water Levels" for selected discharge stations neared completion, with publication anticipated by mid-1983.

In late 1982, the Data Control Section, Ottawa, accepted a tender from Digital Equipment of Canada to supply eight minicomputer systems to the Water Resources Branch for use in its regional offices across Canada. The new EDP systems are 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. The unit for Ontario Region is expected to be in operation by mid-1983.



Sampling equipment for organic contaminants, Ottawa River

7.0 Toxic Chemicals Program

The deleterious effects of toxic materials such as mercury, dioxins and PCB's on the environment are of major concern considering their 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 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.

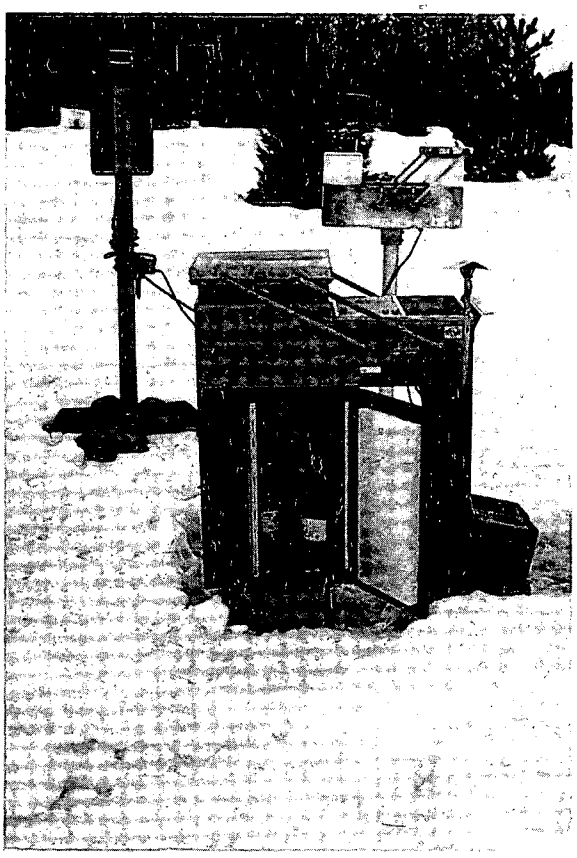
Two reports have been prepared detailing results of the contaminant-ecosystem study carried out in the five major rivers of the Hudson Bay Lowland. As a follow-up, a survey was conducted in August (1982) to investigate the fate of trace organic contaminants in the Moose River Basin. Water samples were collected from a variety of wetland types to assess the impact of atmospheric inputs. In addition, bottom sediment and various plants were collected in the Moose River Estuary to determine whether contaminants are precipitated and subsequently accumulated as a result of estuarine mixing.

Five rivers in the Hudson Bay Lowlands were sampled every two weeks for a variety of chemical variables, including major ions, nutrients, PCB's and organic contaminants.

Water Planning and Management Branch completed a draft report entitled, "The Niagara River Toxics Problem in an Economic Context". This report outlines the economic aspects of the toxics issue and the subject is discussed in terms of the technology available for removal of toxics from industrial wastewater, advanced treatment of drinking water and the impact of pollution controls on industry and the economy in the Niagara Region. Canadian government actions which have been taken and measures that could be taken are also summarized.

8.0 Long Range Transport of Airborne Pollutants Program

The problem of long range transport of airborne pollutants (LRTAP) and the lack of related information 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 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



Sampler for organic contaminants in precipitation

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 substances 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 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 susceptible lakes in Ontario that could be adversely affected if acid loadings remain constant or increase over the next 10 to 20 years. The resulting trend in aquatic environmental degradation poses serious threats to the social and economic well-being of Canadians.

The Water Quality Branch provided field assistance and laboratory analytical support to two national networks, the Canadian network for Sampling Precipitation (CANSAP) and the Canadian network for Sampling Organic Compounds (CANSOC). The 49 CANSAP stations are designed to provide information on the area and seasonal variations in the concentration levels and deposition rates of inorganic chemical species in precipitation across Canada. The 12 CANSOC stations are aimed at identifying the presence of persistent organic contaminants in precipitation. About 500 precipitation samples from these networks were analyzed during the year for a variety of inorganic and organic compounds. The WQB's computerized national water quality data bank (NAQUADAT) is used to store the data from both networks. The CANSOC network was discontinued in the latter part of the year. It is expected that this network, in some modified form, will resume operations in 1983.

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 Turkey Lakes Watershed Program. One of the six is a new station constructed in the summer of 1982.

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 costs associated with the long range transport of airborne pollutants.

9.0 Environmental Assessment Program

Under this 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 1982, the Water Planning and Management Branch continued its lead agency role in the DOE, Ontario Region review of Gananoque Light and Power Company's proposal to divert water from the Rideau River into the Cataraqui system at Newboro. The initial environmental review of the project cited numerous concerns which subsequent responses from the consultants for the project's proponent failed to adequately address. Follow-up review and consultation with other services and provincial agencies led to the RSCC endorsement that an Initial Environmental Evaluation be formally required.

IWD, Ontario Region maintained its active participation

representing Environment Canada on the South Nation River Basin Development Subcommittee, one of a number of such federal-provincial committees established to oversee the implementation of the Canada/Ontario Eastern Ontario Subsidiary Agreement (EOSA). IWD also provided a member on the Drainage Petition Review Committee which screened drainage proposals for funding under the EOSA. An ad hoc regional work group consisting of representatives from the Lands Directorate, the Canadian Wildlife Service and IWD was formed to review the drainage proposals from an Environment Canada perspective. Over 50 drains were reviewed during the year by the work group as well as an equal number of engineering reports relating to drainage proposals. Guidance and assistance were provided in the preparation of the South Nation River Basin study report, hydrologic modelling, the study of social impacts of flooding at Plantagenet, and the review of a proposal for additional channelization at Chesterville. IWD recommended that this latter channelization project not be funded on the basis of benefit/cost.

Water Planning and Management Branch was extensively involved in technical and environmental reviews of the Keating Channel (Toronto) dredging project. The Branch contributed to the formulation of a DOE, Ontario Region position based on its review of the Keating Channel environmental assessment.

Following expressions of concern by the Sault Ste. Marie Conservation Authority and local officials about the effects that dredging in the St. Marys River has had on flows, sedimentation and water quality in the Lake George Channel, WP&MB undertook an extensive review of historical data for evidence of such effects. A draft report documenting this review was prepared.

Included among the many other environmental assessment projects reviewed and evaluated during the year were: a sewage disposal proposal for Shoal Lake Indian Band 39A cottage development; recreational development proposal for federal lands along the Old Welland Canal; Ontario MTC projects for HWY 406 (Welland) extension and QEW/Skyway (Burlington) improvements and reconstruction; Ontario Hydro Class Environmental Assessments for Small Hydro Facilities, Remote Energy Facilities, and proposal for site erosion protection on the Mississaugi River; U.S. Army Corps of Engineers study on Connecting Channels and Harbours and maintenance dredging of navigation channels in the St. Clair River; provincial guidelines for harvesting of aquatic plants; and the Ontario MNR Strategic Plan for the Niagara Region.

In terms of other related work, IWD provided review and recommendations on Environmental Conservation Service environmental screening guidelines, Ontario Region's outlook on economic development and environmental issues and a program evaluation of EARP in DOE. Background information on Winter Navigation Season Extension was provided to the Ontario RSCC and an EARP display was exhibited during the CCIW Open House.

Measuring Streamflow through a culvert in the Oshawa Second Marsh area

10.0 Baseline Studies Program

The baseline studies program is an integrated DOE 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 DOE services in baseline studies identified as priority areas by the Regional Director General-DOE/Ontario Region.

As in the previous year, the major baseline study component during 1982 continued to be the Oshawa Second Marsh Study. This baseline study was designed to provide the information required to allow management of the marsh as a viable habitat and natural area, as well as to help in the evaluation of potentially adverse effects on the marsh from development pressures, such as the proposed Oshawa Harbour expansion.

Spring sampling of water chemistry and sediment transport was undertaken in April of 1982, as a continuation of the previous year's sampling program. WRB compiled a report on the sediment budget of Oshawa Second marsh which is to be interfaced with sediment quality data being analyzed by WP&MB. An interim report on sediment quality was prepared in the spring of 1982. A final water and sediment quantity/quality report is in preparation for use in the final Oshawa Second Marsh Baseline Study Report being coordinated by Lands Directorate. WP&MB also completed a detailed map of watersheds supplying Oshawa Second Marsh for the final report.

11.0 Management and Administration

In 1982, the Directorate administered and managed resources amounting to 7.37 million dollars and 110.5 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 1982 included the Canada-Ontario Great Lakes Water Quality funding ($1,200,000) and the Canada-Ontario Flood Damage Reduction Agreement funding ($920,000 allocated for 1982-83).

Branches of IWD, Ontario Region located at CCIW participated in the CCIW Open House 1982 held April 22-25. The Water Quality Branch prepared a display describing its water quality monitoring activities in Ontario. Both bulk and automatic precipitation samplers were put on display. The Branch also opened up its 7th floor analytical laboratories for visitors to the Open House. The Water Planning and Management Branch display described its activities in Great Lakes management, flood damage reduction and environmental assessment. A popular feature of the display was the Water Quality Gamble lottery and associated sticker and brochure. Over 20,000 visitors attended the Open House over the four-day period.

Staff of IWD, Ontario Region also participated in the DOE Regional Public Consultation Program for 1982. Five public consultation sessions were held in September — one each in Kingston (Sept. 9), London (Sept. 21) and Sudbury (Sept. 23) and two in Toronto (Sept. 27-28). The sessions consisted of an afternoon open house followed by a formal evening session with workshops on various issues. IWD, Ontario Region participated in all sessions.

IWD, Ontario Region held its regional seminar on Nov. 3, 1982 at CCIW. The seminar was intended to give all staff of IWD, Ontario Region a better understanding of IWD goals and activities. In addition to presentations from each of the regional Branches of IWD, talks were given by the Director General, IWD; the Regional Director General, DOE and the Director, Water Quality Branch. A general discussion period took place at the end of the seminar.

12.0 Publications and Presentations

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Clarke, T.C., "A Philosophical Look at Environmental and Natural Resource Problems". A lecture to graduate students University of Toronto, Institute of Environmental Science.

Moin, S., "Canada/Ontario Flood Damage Reduction Program — Inspection Procedures for Quality Control". Paper presented at a seminar of Engineering Consultants and Mapping Industry, Toronto, March, 1982.

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13.0 Organization Chart