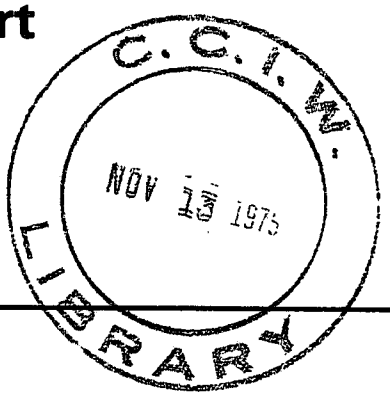
Environment Canada

Environnement Canada

The Canada Water Act
Annual Report

1974 - 1975



Environment Canada | Environnement Canada

The Canada Water Act
Annual Report

1974 - 1975

Cat. No.: En 36-426/1975

CONTRACT # KL327-4-8070
THORN PRESS LIMITED

Minister
Environment Canada

Ministre
Environnement Canada

His Excellency,
The Right Honourable Jules Léger, C.C., C.M.M., C.D.,
Governor General and Commander-in-Chief of Canada.

May it Please Your Excellency:

I have the honour herewith, for the information of Your Excellency and the Parliament of Canada, to present the Annual Report on the Canada Water Act for the fiscal year ended March 31, 1975.

Respectfully submitted,

Jeanne Sauvé

(Mme) Jeanne Sauvé

Deputy Minister
Environment Canada

Sous-ministre
Environnement Canada

The Honourable Jeanne Sauvé, P.C., M.P.,
Minister of the Environment,
Ottawa, Canada.

Dear Madame Sauvé:

I have the honour to submit the Annual Report on the Canada Water Act for the fiscal year ended March 31, 1975.

Respectfully submitted,

J.B. Seaborn
Deputy Minister

TABLE OF CONTENTS

INTRODUCTION

The Canada Water Act was proclaimed on September 30, 1970, to provide for the federal role in managing Canada's water resources, initially under the Department of Energy, Mines and Resources but currently under the Department of the Environment. Section 36 of the Act requires that a report on the operations under the Act be laid before Parliament as soon as possible after the end of each fiscal year. This, the third such report, covers operations to March 31, 1975.

Several federal-provincial agreements considered herein predated the Canada Water Act by brief periods but were drawn up incorporating the underlying philosophy of the Act. Other agreements have been ongoing for longer periods. These, as well as agreements pending, are reported on here because they support the provisions of the Act and are deemed to be covered by the Act. The report also presents a brief résumé of the federal input into water planning and management in Canada designed to regulate nutrients entering rivers and lakes in Canada, to collect data, to establish information systems, to conduct research and other similar programs.

The report first sketches the main provisions of the Act and then briefly discusses some of the more important programs which have been or are expected to be undertaken to meet those provisions. Details of implementation agreements, planning studies, and other cooperative arrangements entered into are given later in the report along with information on the program to regulate nutrient releases and on other programs to improve the federal water management capability.

PROVISIONS OF THE CANADA WATER ACT

Part I of the Act provides for the establishment of formal federal-provincial consultative arrangements for water resources matters (Section 3); and for cooperative agreements with the provinces for the development of comprehensive plans for the management of water resources and for implementation of these plans (Sections 4 - 7). This part also enables the Minister, directly, or in cooperation with any provincial government, institution or person, to conduct research, collect data and establish inventories on any aspect of water research.

Although complex, Part II, simply stated, envisages federal-provincial agreements where water quality has become a matter of urgent national concern. Part II permits the establishment of joint federal-provincial incorporated agencies (although existing federal and provincial corporations might alternatively be used) to plan and implement approved water quality management programs. In carrying out these programs, a variety of tools may be employed, such as the setting of standards backed by the prospect of a heavy fine; effluent discharge fees designed to attach a cost to the discharge of non-toxic wastes, thereby providing an incentive to a discharger to take steps to reduce or eliminate the wastes he discharges; and user fees for wastes treated by facilities owned and operated by the agency.

Part III of the Act provides for the passing of regulations banning the manufacture or import for use or sale in Canada of any cleaning agent or water conditioner that contains a proscribed nutrient in a greater concentration than that prescribed by regulations. It provides one of the principal means of preventing eutrophication of water bodies by restricting the flow of nutrients into these water bodies.

Under Part IV are provisions for the general administration of the Act. In addition, it permits the Minister to establish Advisory Committees (Section 26) and either directly, or in cooperation with any government, institution or person, to undertake public information programs.

Federal-Provincial Consultative Committees

Consultative arrangements for water resource and water quality management with the provinces are provided for in Part I of the Canada Water Act. The purpose of these arrangements is to facilitate the formulation of policies and programs with respect to the water resources throughout Canada and to ensure the optimum use of those resources for the benefit of all

Canadians. Specifically, these arrangements are met through consultative committees which are to maintain continuing consultation on water resource matters and advise on priorities for research, planning, conservation, development, and utilization; to advise on the formulation of water policies and programs; and to facilitate the coordination and implementation of water policies and programs.

Up to the end of 1974-75, only Ontario had declined such an arrangement, with cooperative Canada-Ontario activities being carried out on an informal basis. The Canada-British Columbia Consultative Committee held its first formal meeting in 1974-75. Consultations were also held during the year with Alberta, Saskatchewan, Manitoba, Quebec and Nova Scotia.

To promote the consultative arrangements with the provinces and to exchange views on resource and environmental matters, the Minister of the Environment, the Honourable Jeanne Sauvé, met with her counterparts in almost all provinces during the year.

Implementation Agreements, Planning Studies and Other Cooperative Agreements

When federal-provincial agreement has been reached on the need for a specific water resource program, the respective governments each assign personnel to carry out that program. The agency formed to carry out the program may be a Task Force, Study Board, Implementation Board, Committee, or other agency. The choice of agency depends upon the next step in the program, which may be a pre-planning study, a planning study, an implementation agreement or some other cooperative arrangements. The table on the following page shows a breakdown of current agreements and other cooperative arrangements under the Canada Water Act and indicates the stage each has reached.

Agreements calling for joint comprehensive water resources management planning in the Saint John basin in New Brunswick, the Okanagan basin in British Columbia and the Qu'Appelle basin in Saskatchewan were entered into prior to the coming into force of the Canada Water Act, but were developed to meet the intent of the Act. These agreements called for studies of current uses and future supplies needed by municipal, industrial, agricultural and other water users. Matters relating to water quality and water quantity were also studied, along with international implications where applicable. Plans for water use took account of ecological and aesthetic values and the needs and desires of the people affected. The final Basin Management Plan for the Saint John River basin was nearing completion in

TABLE 1 STATUS OF PRINCIPAL IMPLEMENTATION AGREEMENTS,

PLANNING STUDIES AND OTHER COOPERATIVE ARRANGEMENTS UNDER THE CANADA WATER ACT

IMPLEMENTATION AGREEMENTS

Under Negotiation	New during 1974-75	Ongoing during 1974-75	Completed
Okanagan basin Qu'Appelle basin Saint John basin	Peace-Athabasca Delta	Fraser River Flood Control Program Southwestern Ontario Dyking Metro-Toronto (CWCAA)*	Upper Thames (CWCAA)* 1975

PLANNING STUDIES

Under Negotiation	New during 1974-75	Ongoing during 1974-75	Completed
Lake Winnipeg Athabasca basin Shubenacadie-Stewiacke basin	Souris basin Flow Regulation - Montreal Region	Canada-Ontario Agreement on Lower Great Lakes Water Quality Lake Winnipeg, Churchill and Nelson Rivers Churchill River (Saskatchewan) Fraser River Upstream Storage St.Lawrence River Water Quality Northern Ontario Water Resources Flood Hazard Mapping Pilot Project	Peace-Athabasca Delta (1972) Saskatchewan-Nelson basin (1973) Okanagan basin (1973) Qu'Appelle basin (1973) Saint John basin (1975) Canada-Ontario Great Lakes Shore Damage Survey (1975)

OTHER COOPERATIVE ARRANGEMENTS

Under Negotiation	New during 1974-75	Ongoing during 1974-75	Completed
	Data collection; federal-provincial cost-sharing agreements Lower Saskatchewan Basin Task Force (pre-planning)	Mackenzie Basin Intergovernmental Liaison Committee Prairie Provinces Master Agreement on Apportionment	

* Canada Water Conservation Assistance Act

1974-75 and a federal-provincial coordinating group was working towards implementation. The Okanagan and Qu'Appelle studies were completed during the previous year and agreements to ensure implementation of the recommendations are under negotiation. An agreement with Saskatchewan and Manitoba to conduct a comprehensive study of the Souris River basin was signed in 1974, and the study is in progress.

Although water quality has been a major consideration for all comprehensive basin studies, it is the paramount consideration in the case of the Canada-Ontario Lower Great Lakes Agreement and also in the Canada-Quebec Agreement on the St. Lawrence River. The latter agreement was initiated in 1972 under the terms of a Statement of Intent and has continued thereafter through a formal agreement. The former, signed in 1971 as a necessary step in the evolution of a similar Great Lakes agreement between Canada and the United States, provides funds through CMHC to accelerate municipal waste treatment programs, including nutrient removal from the Lake Erie and Lake Ontario drainage basins; negotiations are continuing to extend the period of the agreement and to extend financial provisions to include the upper Great Lakes; the agreement also calls for the two governments to share equally expenditure of $6 million for waste treatment research and treatability studies for phosphorus removal at municipal waste water treatment plants. The subsequent signing of the Canada-United States Agreement on Great Lakes Quality, in April 1972, marked a major turning point in water quality control of the Great Lakes. In addition to water quality objectives and pollution controls, a number of studies are being undertaken to reduce costs of pollution control, to reduce pollution from shipping, and to establish specific water quality objectives for waste heat, radioactivity and many toxic substances.

Several federal-provincial programs involve more than one province. Noteworthy because of the major geographic area covered are the Prairie Provinces Master Agreement on Apportionment and the program of the Mackenzie Basin Intergovernmental Liaison Committee. The former, an agreement between the federal government and the three prairie provinces, marks a milestone in the administration of water resources of the prairie region by setting forth the principals for apportionment of water between the three provinces and by providing for the resolution of disputes. The latter, involving Alberta, British Columbia, Saskatchewan, and the two territories, was formed to gather information on the Mackenzie River basin, with the intent of determining what further studies should be undertaken.

Major water resource developments often have ecological and environmental consequences which not only affect other water uses but also affect the very livelihood of people within the area of development. In keeping with the broad management role envisaged by the Canada Water Act, detailed impact studies have been undertaken for Lake Winnipeg and the Churchill and Nelson Rivers, and for the Churchill River in Saskatchewan. Similar impact studies were completed for the Peace-Athabasca Delta and implementation of remedial actions recommended to preserve the delta are entering a new stage.

Guidelines for federal policy on floods and flood control were prepared early in the year, followed by steps to initiate a national flood damage reduction program. Reflecting in part the intent in the flood damage program, Canada signed a formal agreement with Quebec in March 1975 to examine the means to reduce the frequency of flooding as well as extreme low water levels of the Montreal region water bodies.

Although increased importance was placed on flood control and flood damage reduction during 1974-75, several important programs predate this new thrust. One of the most significant of these programs is the Fraser River Flood Control Program which began in 1968. This is a planning, design and implementation program, including assessment of upstream storage, for flood protection and control of water resources. Another program, ongoing since 1973, protects agricultural land from flooding in southwestern Ontario caused by storm damage and abnormally high water levels on Lake Erie and Lake St. Clair . As well, a pilot project on flood hazard mapping, begun in 1973, was continued, with the intent of reducing potential flood damages in urban areas of Canada and of developing methods of improving public understanding in the area of flood hazard.

A number of areas involving joint water resource undertakings have been identified in discussions of the consultative committees. A Task Force completed a review of the requirements, costs and scheduling of a program to carry out a water quality study of Lake Winnipeg and an agreement between Canada and Manitoba, including cost sharing arrangements, was being negotiated; a draft agreement was prepared and was in the final stages of review by Canada and Alberta to initiate a planning program leading to development of a framework plan for water resource management in the Athabasca River basin; a Canada-Nova Scotia Task Force has recommended a program to develop a comprehensive framework plan focusing on water quality and quantity objectives and complementary development and resource use strategies in the

Shubenacadie-Stewiacke River basin; in Saskatchewan, a Canada-Saskatchewan Task Force is expected to report in mid-1975 on the need for water-related studies in the lower Saskatchewan basin.

Because the Canada Water Conservation Assistance Act was repealed when the Canada Water Act came into force, the agreements entered into under the former Act are also briefly reported on.

Ontario and Canada completed a joint survey of the Ontario shoreline of the St. Lawrence River and Great Lakes to assess high water and storm damage to the shoreline. This project will provide vital information needed for shoreline management on the Great Lakes. In northern Ontario, the shared Northern Ontario Water Resources programs to study the quantity and quality of water draining into James and Hudson Bays and to assess the possibilities for its development, were largely completed.

Studies are under way to solve major water quality problems in the mining region of northeastern New Brunswick so that valuable fisheries and aquatic environments, particularly in the Miramichi, Nepisiguit and Restigouche River systems, can be protected. An engineering consulting firm was engaged in the period 1970 to 1972 to manage a program of mine waste control; the same firm is currently managing a pilot plant treatment project under way at a mine site in northeastern New Brunswick. This pilot plan project, which is being financially supported by the Brunswick Mining and Smelting Company, the Province of New Brunswick and Environment Canada, was completed, and a draft report on the project has been prepared.

Water Quality Management

No water quality management areas, as defined under Part II of the Canada Water Act, have been set up. However, there are a number of areas covered by federal-provincial agreements under the Act, such as areas in the Great Lakes basin and the St. Lawrence River, where water quality is one of the main concerns. While these agreements do not provide for the establishment of agencies under Part II of the Act, they nevertheless have the same basic objectives of maintaining and improving water quality. As has already been pointed out, the federal government, in concert with provincial governments, has also initiated the development of comprehensive water resources management plans, including a water quality management strategy for certain river basins such as the Qu'Appelle, Okanagan and Saint John.

Nutrients

In many of Canada's resort lakes, particularly in Ontario, Quebec and British Columbia, the water quality has been deteriorating rapidly due to the effects of eutrophication (over enrichment). Extensive manifestations of this problem are found in such lakes as Lake Erie, Lake Ontario, the Qu'Appelle Lakes and Okanagan Lake. Recognizing that nutrients, particularly phosphates, are major contributors to the process of eutrophication, a program of phosphate discharge control, and control of phosphate in detergents has been under way since 1970. In areas where eutrophication is a serious problem, removal of nutrients is also accomplished through the use of sewage treatment plants. The control of phosphate in detergents under the Canada Water Act is reported on later herein.

ACTIVITIES RELATED TO THE CANADA WATER ACT

Reorganization

Until fiscal year 1971-72, a large part of the organization negotiating and administering federal-provincial water agreements was based in Ottawa. This is changing, however, with the formal setting up of Regional Directorates in the Pacific and Yukon, Western and Northern, Ontario, Quebec and Atlantic Regions. The concept of decentralization has been embarked upon to place those responsible for regional functions in closer contact with the people and regions they serve.

Water Resources Research Support

A program was initiated in 1968 to provide for an expansion of water resources research in the natural and social sciences, with emphasis on water management issues. The program fosters the development of knowledge and expertise of university staff in water research problems and provides opportunities for graduate students to participate, thus augmenting the supply of trained personnel available. In 1974-75, this program involved grants totalling $1,000,000 shared by 20 universities.

Other Activities

Not to be overlooked in the review of operations under the Canada Water Act are data collection, research, and economic analysis which are seldom objectives in themselves but which are indispensible tools in effective water planning and management. These are briefly reported on herein. Others not dealt with here but worthy of mention are studies carried out to improve understanding of glaciology, groundwater and mathematical modelling, to name only a few.

SUMMING UP

To date, much has been accomplished in the cooperative management of Canada's water resources under the provisions of the Canada Water Act. The attainment of a satisfactory level of achievement has called for consultation and close cooperation between all concerned. The fact that many water management problems in Canada are interjurisdictional in nature has made joint involvement of both the federal and provincial governments the only effective way of meeting such problems.

Following proclamation of the Canada Water Act, it was expected that the greatest effort would initially be directed towards joint water resources planning studies, with implementation being confined mainly to those programs already under way. This has proved true but, with the passing of time, the number of planning studies brought to completion is growing and, as shown in the table earlier, the number of new implementation agreements under way or under negotiation is taking on new significance.

Experience to date provides grounds for optimism that effective joint approaches will continue to be mounted to give the federal and provincial governments the capability of combining their jurisdictional responsibilities to manage Canada's water resources for optimum economic and social benefit and to preserve the water environment for future use.

PRINCIPAL FEDERAL-PROVINCIAL COOPERATIVE ARRANGEMENTS UNDER THE CANADA WATER ACT

IMPLEMENTATION AGREEMENTS

PLANNING STUDIES

OTHER COOPERATIVE ARRANGEMENTS

REGULATING NUTRIENT INPUTS

IMPROVING THE FEDERAL WATER MANAGEMENT CAPABILITY

PRINCIPAL FEDERAL-PROVINCIAL COOPERATIVE ARRANGEMENTS UNDER THE CANADA WATER ACT

IMPLEMENTATION AGREEMENTS

1. PEACE-ATHABASCA DELTA

Entities: CANADA
ALBERTA
SASKATCHEWAN

Objective: To remedy the low water problems of the Peace-Athabasca Delta by constructing a submerged rock weir on the Rivière des Rochers.

Prior Action: During the period January 1971-July 1972, a study group was established to investigate and report on the extent of low water levels in Lake Athabasca, the causes of the low water conditions, and the resulting effect on the delta and the local inhabitants. The study group completed its investigation in eighteen months. A summary report was published in 1972 and a technical report was published in 1973. As a result of the study, remedial action for the preservation of the delta was taken in 1971 with the construction of a temporary rock-fill dam on the western arm of the Quatre Fourches to improve water levels in the park portion of the delta. Further remedial action, consisting of a short diversion of the Athabasca River to prevent it from joining the Embarras River and thus flowing directly into the delta during floods, was undertaken in 1972. A more permanent remedy to the problems of the delta, a submerged rock weir on the Rivière des Rochers, was recommended in the technical report. An implementation board was established and a test quarrying program, required for design of the structure, was completed.

Status: Detailed design of the submerged rock weir was completed and a contract for its construction, to commence in the summer of 1975, was awarded.

2. LOWER FRASER VALLEY FLOOD CONTROL PROGRAM

Duration of Program: 1968 to 1978.

Entities and Funding: CANADA.....50% (Study costs and
BRITISH COLUMBIA...50% construction costs)

The federal government has increased its contribution to the Flood Control Program and Storage Studies from $18,000,000 to $30,500,000 and B.C. has agreed to increase its share by the same amount.

Objective: To provide protection from flooding of land in the lower

reaches of the Fraser River Valley and other areas upstream by rehabilitating existing dykes, constructing new dykes, increasing river bank protection, and improving internal drainage facilities.

Status: Three flood control projects have been virtually completed (Kent, Oak Hills, Matsqui) and three others (Delta, Richmond, Chilliwack) are under construction; the design of several other projects is well advanced. Federal expenditures to 31 March 1975 totalled $10.3 million.

3. SOUTHWESTERN ONTARIO DYKING

Duration of Study: March 1974 to September 1978

Entities and Funding:

CANADA	Department of the Environment Department of Agriculture	45%
ONTARIO	.....	45%
Municipalities and/or Conservation Authorities	.....	10%

Objective: To provide for the construction and reconstruction of dykes and associated control works for protection of agricultural lands in the southwestern Ontario Counties of Essex and Kent, and the Regional Municipality of Niagara.

Prior Commitment: For the purpose of this Agreement, the program shall include the cost of completing the work in excess of $2,700,000 undertaken pursuant to the Agreement made on 30 May 1973 between Canada (The Minister of Regional Economic Expansion) and Ontario for the repair and construction of dykes protecting agricultural land in the Townships of Harwick, Pelee and Mersea.

Status: Payment of $2,000,000 has been made to cover portions of the work completed to date in Pelee, Mersea and Harwick townships. These three projects should be completed in the spring, along with those in the Regional Municipality of Niagara. Some projects have been expanded and one project added within the same counties.

4. CANADA WATER CONSERVATION ASSISTANCE ACT - CWCAA (Repealed)

Pursuant to the CWCAA agreements, Canada has contributed financially towards the construction of major control and conservation projects. No new construction was started during the year. The Upper Thames Agreement expired on January 24, 1975 and therefore the Metro-Toronto Agreement is the only active agreement remaining under the CWCAA. Approximately 34 acres of reservoir land was acquired at a cost of $90,000 during the year for a flood control and conservation project in the Metro-Toronto conservation area. Canada's share was about $22,500.

5. SAINT JOHN RIVER

Entities: CANADA
NEW BRUNSWICK

Objective: Comprehensive water planning and management of the Saint John River Basin.

Status: A number of studies related to long-term basin management have been conducted. Results of these studies were used to provide the data base for a framework plan in Summer 1973. The final basin management plan was essentially completed in 1974-75 and a federal-provincial coordinating group was working toward implementation.

6. OKANAGAN RIVER

Entities: CANADA
BRITISH COLUMBIA

Objective: To implement recommendations arising from the 1969-74 Okanagan Basin Study carried out under the Canada Water Act.

Status: An Implementation Task Force, formed in 1974, is drawing up a federal-provincial agreement to ensure implementation of the recommendations of the Okanagan Basin Study. The agreement is expected to be ratified in mid-1975 and will be retroactive to January 1975.

7. QU'APPELLE RIVER

Entities: CANADA
SASKATCHEWAN

Objective: To implement recommendations arising from the Qu'Appelle Basin Study carried out under the Canada Water Act.

Status: The Department of Regional Economic Expansion is acting as this project's co-ordinator. An Interim Implementation Board has been established and is working toward an agreement on implementation of the summary report's recommendations. The Board is also reviewing implementation programs currently under way which will become eligible for retroactive funding under the proposed agreement.

QU'APPELLE (Supplementary)

Duration of Study: July 1972 to March 1973

Entities and Funding: CANADA $35,000
SASKATCHEWAN $35,000

Objective: To develop a plan 1) for flood control and flood plain management along Wascana Creek throughout the City of

Regina, and 2) to reduce water pollution, maintain stable water levels, and provide flood control and flood plain management along the Moose Jaw River throughout the city of Moose Jaw.

Arrangement: The Saskatchewan Department of Environment conducted the Wascana Creek Studies, while Environment Canada carried out the Moose Jaw River Studies.

Status: The studies were completed in 1973 and summary reports dealing with Wascana Creek and the Moose Jaw River were released on February 15 and March 1, 1974, respectively. Implementation of report recommendations is now being negotiated between the Province of Saskatchewan and the cities of Regina and Moose Jaw. Some recommendations have already been implemented in Regina. Federal funding is subject to finalization of the Qu'Appelle Implementation Agreement.

PLANNING STUDIES

8. CANADA-ONTARIO AGREEMENT ON LOWER GREAT LAKES WATER QUALITY

Duration of Study: August 1971 to December 1975

Entities and Funding: CANADA
ONTARIO

1. Entities each to provide $3 million for feasibility studies and joint sewage treatment technology research.

2. CMHC to loan up to $167 million (increased to $210 million in 1974-75) for sewage treatment facilities (under the National Housing Act); Ontario to provide $83 million.

Objective: To provide a basis for implementing the Canada-U.S. Agreement on Great Lakes Water Quality in the basins of Lake Erie and Lake Ontario, by reaching agreement on water quality objectives, acceleration of investment in sewage treatment facilities and research into treatment technology. Negotiations are proceeding to extend the period of the agreement and to extend financial provisions to include the upper Great Lakes.

Status: A Canada-Ontario Review Board was set up to administer the agreement. The Wastewater Technology Centre at the Canada Centre for Inland Waters conducted studies on phosphate removal by chemical addition to existing wastewater treatment plants, on chemical sludge treatment and disposal, and on the effects of NTA on phosphorus removal. In a research program aimed at reducing the cost of phosphorus removal for municipal treatment plants in the lower Great Lakes, 42 contracts have been let to private firms and universities for carrying out studies on waste treatment

processes. In conjunction with Ontario, some 60 projects have been undertaken, with the majority now almost completed. The studies on phosphorus removal techniques were completed and the technology developed was incorporated with the treatment plant construction program. The program is now concentrating on land disposal of sewage sludges and on methods for reducing pollution from storm and combined sewer systems.

Because, as already noted, the Canada-Ontario Agreement is being undertaken to provide a basis for implementing the Canada-U.S. Agreement on Great Lakes Water Quality in the basins of Lake Erie and Lake Ontario, a brief outline of activities under the latter Agreement is also provided.

CANADA-U.S. AGREEMENT ON GREAT LAKES WATER QUALITY

Duration of Study: April 1972 - common water quality objectives must be implemented and pollution control facilities and regulatory requirements completed or in the process of implementation by December 31, 1975.

Entities and Funding: CANADA
UNITED STATES

Commitments: By 1975, Canada and Ontario are to carry out a $250 million program administered under the National Housing Act to construct municipal sewage treatment facilities in the lower Lakes area; negotiations are proceeding to extend the program to the upper Great Lakes; the U.S. is expected to pay out approximately $2 billion for similar facilities in the Great Lakes basin.

Objective: To improve the quality of the water in the areas of the Great Lakes now suffering from pollution and to ensure that Great Lakes water quality will be protected in the future.

Arrangement: The International Joint Commission was given primary responsibility for overseeing implementation of this international water quality agreement. The Commission has established a number of Boards, Committees and Reference Groups to carry out the various provisions of the agreement. These include: the Great Lakes Water Quality Board, the Research Advisory Board, the Upper Lakes Reference Group, and the Pollution from Land Use Activities Reference Group.

Status: Specific major research and monitoring projects undertaken in 1974; seven major ship cruises on Lake Huron, the North Channel and Georgian Bay for water and sediment data collection; one toxic materials survey on Lake Huron, Georgian Bay and Lake Superior to obtain base-line data on the concentrations of pesticides and polychlorinated biphenyls in the Upper Great Lakes; a program to determine atmos-

pheric loadings to the Great Lakes with emphasis on the Upper Lakes in 1974; evaluation of impact and dispersal of effluent from a pulp and paper mill on Lake Superior; surveillance programs of the lower Great Lakes and connecting channels to assess the impact of major pollution control measures now being implemented; initial assessment of priorities and plans to control pollution from land drainage sources; development of a research program on methods of minimizing the environmental impact of disposal of polluted dredged sediments; physical, chemical and biological projects to provide a scientific basis for water quality objectives for waste heat and radioactivity, and for some of the toxic substances listed in the agreement and; special studies of distribution and sources of asbestos-like fibres in Lake Superior water and sediments.

9. ST. LAWRENCE RIVER WATER QUALITY AGREEMENT

Duration of Study: May 1972 to 1977

Entities and Funding: CANADA.....50%
QUEBEC.....50%
- (The Statement of Intent called for a total expenditure of $400,000 in 1972-73, while a further $3,500,000 has been authorized under the formal agreement)

Objective: To prepare a comprehensive water quality plan of the St. Lawrence River from the end of the international section near Cornwall, down to the Gulf of St. Lawrence.

Arrangement: The program in 1972 was initiated on the basis of a Statement of Intent, pending a formal agreement. The program in subsequent years has been authorized under a formal agreement.

Status: The study program undertaken in the Cornwall-Varennes reach in 1972-73 was extended to cover the Varennes-Montmagny reach in 1973-74, with some overlapping in the Cornwall-Varennes reach; in 1974-75, the program was extended to cover the Montmagny-Saguenay River reach, with overlapping in the Cornwall-Montmagny reach.

10. LAKE WINNIPEG, CHURCHILL AND NELSON RIVERS

Duration of Study: August 1971 to June 1975

Entities and Funding: CANADA .....up to $1 million
MANITOBA.....up to $1 million

Objective: To determine the effects that 1)regulation of Lake Winnipeg, 2) diversion from the Churchill River and 3) development

of hydro-electric potential of the Churchill River Diversion Route are likely to have on other water and related resource uses and to make recommendations for enhancing the overall benefits, due consideration being given to the protection of the environment.

Status: The study is in its final stages. A final report will be completed by the end of June 1975.

11. CHURCHILL RIVER (Saskatchewan-Manitoba)

Duration of Study: February 1973 to June 1975

Entities and Funding:

CANADA	$1,250,000
SASKATCHEWAN	$1,075,000
MANITOBA	$ 175,000

Objective: To assess the social, economic and environmental impacts of: developing two hydro-electric sites on the Churchill River in Saskatchewan (the Iskwatam and Pita sites), designating an area of the basin in Saskatchewan as a national park, developing provincial parks in the Manitoba portion of the basin, and evaluating the options open to Saskatchewan upon expiration of the Island Falls and Whitesand Dam licences.

Status: The Churchill River Study Agreement was signed in late 1973 by Canada, Saskatchewan and Manitoba and a study board established. Field work is completed for all study sectors, and sector leaders are now in the process of drafting final reports. The final Study Report is due in June, 1975.

12. FRASER RIVER UPSTREAM STORAGE STUDY

Duration of Study: February 1971 to mid 1975.

Entities and Funding:

CANADA	$500,000
BRITISH COLUMBIA	$500,000

Included in funds for LOWER FRASER VALLEY CONTROL PROGRAM

Objective: To develop an integrated plan for further flood protection, utilization and control of the water resources of the basin, with particular emphasis on flood protection for the lower reaches of the Fraser River Valley, through use of dykes, upstream storage reservoirs and diversions.

Status: Field investigations and studies of hydrology, flood benefits, project costs, sedimentation, navigation, and ecological and environmental considerations are complete and some reports are in draft form. Reservoir regulation studies have been completed and overall project evaluation was continuing. Work was under way on the final report.

13. NORTHERN ONTARIO WATER RESOURCES STUDIES

Duration of Study: 1966 to March 1975

Entities and Funding:
CANADA .....(Approx. $3,000,000)
ONTARIO.....(funding unknown)

Objective: To study the quantity and quality of water resources draining into James Bay and Hudson Bay in Ontario and to assess the possibilities for their future development.

Arrangement: Ontario was given responsibility for hydrologic and water quality studies, while Canada was made responsible for engineering feasibility and cost studies required for an assessment of alternative possibilities for utilizing the waters concerned. Socio-economic studies were shared.

Status: The federal responsibility for field and office studies was met and reported upon in a series of reports. A summary report on the work was prepared for public distribution. The provincial responsibility is expected to be completed in 1975.

14. FLOOD-HAZARD MAPPING - A national Pilot-Project Program

Duration of Program: June 1973 to March 1976

Entities and Funding: (1974-1975)
MONTREAL.....(up to $ 3,000)
NEW BRUNSWICK.....(up to $28,500)
ONTARIO.....(up to $ 2,000)
MANITOBA.....(up to $10,000)
SASKATCHEWAN.....(up to $12,500)

Objective:
1. To reduce potential flood damages in urban areas of Canada.
2. To experiment with various cartographic and photographic means of improving public understanding in the area of flood hazards.

Status: Five pilot projects are under way. Two projects, in Fredericton, N.B., and Moose Jaw, Sask., are well advanced, while the three others, at Sault Ste. Marie and Oshawa, in Ont., and Carman, in Man., have not progressed as far because they did not get under way until late in 1973.

15. SOURIS RIVER

Duration of Study: October 1974-1977

Entities and Funding:
CANADA 50%
SASKATCHEWAN.....29%
MANITOBA 21%

Total funding $1,050,000

Objective: To formulate a framework plan for the management of the water and related resources of the basin.

Status: The Study Agreement was signed on October 28, 1974 and a Study Board and Study Director have been named. Work is currently proceeding on the water quality, hydrology and public involvement sectors, with the balance of studies to commence in the spring of 1975.

16. FLOW REGULATION, MONTREAL REGION

Duration of Study: June 1974 to March 31, 1976

Entities and Funding: CANADA.....50%
QUEBEC.....50%

Objective: To examine the means of reducing the frequency of flooding as well as extreme low water levels of the Montreal region water bodies.

Arrangement: The study was initiated on the basis of an exchange of correspondence which called for a work-sharing arrangement within the regular programs of the concerned agencies. A total expenditure of $600,000 for outside consulting services has been authorized under a formal agreement signed on March 17, 1975.

Status: The Committee on Flow Regulation, Montreal region, is conducting the various studies required to fulfil its mandate. An interim report will be submitted by February 1st, 1976, and the final report will be submitted by March 31st, 1976.

17. LAKE WINNIPEG

Entities and Funding: CANADA
MANITOBA
(Total funding proposed $2.9 million; cost sharing arrangements are being negotiated)

Objective: A study of Lake Winnipeg for the purpose of identifying beneficial uses of Lake Winnipeg, water quality criteria needed for such uses, and the need for more data on tributary inflows; identifying present and future contaminants and methods of controlling contaminant inflows; and developing a predictive model and determining alternative approaches to managing the water's quality.

Status: A Task Force has been established to negotiate and develop a draft agreement. That work is nearing completion.

18. ATHABASCA RIVER (Proposed)

Entities and Funding: CANADA..... 50%
ALBERTA..... 50%
Proposed funding $3 million

Objective: To initiate a general planning program leading to the development of a framework plan for water resource management in the Athabasca River basin.

Status: Initial discussions on this program were held at the Environment Ministers' Conference in March, 1974. A draft Agreement has been prepared and is in the final stages of review by the respective governments. The program would form the first of two phases in development of a framework plan for water resource management. Close co-ordination would be maintained with the Canada-Alberta Oil Sands Environmental Research Program, making use of information from the latter when considering management alternatives.

19. SHUBENACADIE-STEWIACKE RIVER

Duration of Study: Two and one-half years

Entities and Funding: CANADA.....50%
NOVA SCOTIA.....50%

Funding proposed $730,000

Objective: To (a) examine critical problems affecting the water resources and the interrelationships of these problems; (b) develop proposals for interim measures to control critical problems and to maintain options for future action; and (c) develop a comprehensive framework plan focusing on water quality and quantity objectives and complementary development and resource use strategies.

Status: A joint task force recommended a program which was accepted with minor changes by the Canada-Nova Scotia Consultative Committee on November 29, 1974. The program has been approved by the Interdepartmental Committee on Water and is under final review by the two governments.

OTHER COOPERATIVE ARRANGEMENTS

20. PRAIRIE PROVINCES MASTER AGREEMENT ON APPORTIONMENT

Duration of Study: Continuing -- Agreement signed October 30, 1969.

Entities and Funding: CANADA
ALBERTA
MANITOBA
SASKATCHEWAN
(Funding to be borne one half by Canada and one sixth by each of the provinces)

Objective: The equitable apportionment of interprovincial prairie waters flowing eastward. The agreement and subsidiary agreements ensure one half the natural eastward flow of waters arising in or flowing through Alberta for Saskatchewan, and one half the eastward flow arising in or flowing through Saskatchewan for Manitoba.

Arrangement: Schedule C provides for the reconstitution of the Prairie Provinces Water Board, whose responsibility is to oversee and report on apportionment of waters flowing from one province into another province; to take under consideration comprehensive planning, water quality management and other management problems referred to it by the entities concerned; to recommend appropriate action to investigate such matters; and to submit recommendations for resolution of the problems.

Status: The Board's standing Committee on Hydrology is overseeing studies on the development of methods for determining natural flows for apportionment purposes, and the development of procedures to meet streamflow forecasting requirements on interprovincial streams. The Board has initiated action through its standing Committee on Water Quality on the review and update of the PPWB Water Quality Objectives. A Board Committee is presently studying the effect of apportionment on water rights issued in the southern prairies. In addition, studies of apportioning westward flowing streams is in progress, along with a study of the mechanisms necessary to administer the agreement.

21. MACKENZIE BASIN INTERGOVERNMENTAL LIAISON COMMITTEE

Duration of Study: January 1973 -

Entities: CANADA .....Dept. of the Environment, Ministry of Transport, and Dept. of Indian and Northern Affairs representing the Yukon and NWT
ALBERTA
BRITISH COLUMBIA
SASKATCHEWAN

Objective: To exchange information on potential water-related developments in the basin and to formulate a program to gather data on the basin's water and related resources, with the intent of determining what further studies may be undertaken in the basin.

Status: The Committee has established a Task Force on Information to gather and compile information on the basin in a "reference binder"; to develop a hydrologic model; to determine conflicts of legislation in the basin, including the advantage offered by a Basin Board; to develop a central depository for the lodging of information and data; and to determine basic research needs. A comprehensive Canada Water Act Study is under consideration.

22. LOWER SASKATCHEWAN BASIN TASK FORCE

Duration: September 1974 to May 1975

Entities: CANADA
SASKATCHEWAN
LOWER SASKATCHEWAN BASIN ASSOCIATION

Objective: To examine the need for water-related studies in the lower Saskatchewan basin.

Status: The Task Force is expected to report in mid 1975.

23. NUTRIENTS

The Federal Government first launched a program for the control of phosphorus in laundry detergents when phosphates from this source were identified as a significant contributor to the degradation of Canadian water resources.

The first Phosphorus Concentration Control Regulations for laundry detergents were written under the Nutrient Control provisions of the Canada Water Act, (Part III) and came into force on August 1, 1970. Initially, the Regulations limited laundry detergent phosphorus content to 20% by weight expressed as phosphorus pentoxide (P_2O_5). During the period when this limit was in force, various complementary research, abatement and compliance activities were initiated. The most important of these was the inspection program under which companies who manufactured and/or imported detergents were visited and samples of their products were taken for phosphorus analysis at departmental chemical laboratories.

Although some minor infractions of the regulations were observed during this period, they were found to be primarily due to defects in new quality control systems. However, once detected, all such problems were quickly corrected without recourse to legal action.

The impact of implementing this initial 20% limitation on phosphorus content in laundry detergents has been estimated at a 22% reduction in the amount of phosphorus discharged from all detergent sources (from 57,200,000 pounds to 44,000,000 pounds per annum).

On January 1, 1973, a further reduction in the amount of phosphorus permitted in laundry detergents came into force. On that date, the maximum permissible amount of phosphorus was lowered to 5% by weight, expressed as P_2O_5. The impact of this further limitation on phosphorus content in laundry detergent, when combined with the earlier limitation, is estimated to have reduced the annual amount of phosphorus discharged by 80% (from 57,200,000 pounds to 11,000,000 pounds).

During 1973, the inventory of detergent manufacturers and importers was updated and a new round of sample collection visits was begun. Shortly after sampling started, however, it was discovered that the prescribed method of analysis in the Phosphorus Concentration Control Regulations was not reliable at the new reduced phosphorus levels. Consequently, a full national sampling was postponed until a suitable modification of the method could be developed. In the interim, light sampling of the major manufacturers' products and phosphorus analysis by an unofficial method were carried out.

By the late fall of 1973, the development of a suitable modification to the prescribed method of phosphorus analysis had been completed. Consequently, the first full national sampling under the new regulations was begun in early 1974.

Additionally, Phosphorus Concentration Control activities were re-organized through the formation of a network of regionally-based

Canada Water Act Inspectors during 1973-74. The new network was designed to improve the national collection of samples and up-date of the manufacturer's and importer's inventory as well as to provide more direct day to day contact with regional manufacturers and the public.

Under the new system, two national sampling rounds for laundry detergents have been completed, more than 500 samples of cleaning compounds have been analysed, and several violations of the new regulations have been detected. These initial violations were characterized by small manufacturers who were apparently unaware of, or misinterpreted, some aspects of the new regulations and technically became violators as a result. While in some instances products indicated to be in violation were formally seized by Canada Water Act Inspectors, in all instances, whether product seizures were involved or not, the companies concerned quickly rectified the situations and remained in compliance thereafter. Consequently no prosecutions were recommended or undertaken as a result of these initial violations. It should also be noted that none of the large Canadian manufacturers or nationally advertized laundry detergent brands, which make up the bulk of the Canadian retail sales, was involved in the above violations.

In addition to the regular laundry detergent analysis, a variety of other cleaning compounds, which are not presently regulated, have been analysed for informational purposes. Analysis of these non-regulated products will be continued through 1976, together with the regular national sampling and analysis of laundry detergents.

Reformulation of laundry detergents to comply with the phosphorus limit has resulted in the use of large quantities of alternative builders. By far the most common substitute is nitrilotriacetic acid (NTA). The resulting presence of this synthetic substance in the Canadian environment, and more specifically in drinking water, is the subject of a continuing nationwide monitoring program to ensure that NTA concentrations in the environment stay as low as predicted. A fourth round of sampling of municipal water supplies was initiated in January 1975. The supplies at about 200 municipalities will be tested for NTA and metals concentrations.

Biodegradation of NTA in the environment has been demonstrated by the many samples taken from drinking water supplies and from lake, river, marine and ground waters. To date 2,000 samples have been analyzed. In most samples, NTA concentrations were below the normal detection level of 10 parts per billion (ppb), with a few samples, also highly contaminated by other substances, producing readings up to 50 ppb. The latter level is still several orders of magnitude less than concentrates which had earlier raised concerns for public health.

24. THE CANADA CENTRE FOR INLAND WATERS

Founded on the concept that no one discipline can alone produce practical solutions to water environment problems, the Centre has developed into a multi-disciplinary water studies institute concerned with Canada's fresh water resources. Its main program began as an endeavour to improve the quality of water in the Great Lakes, but this activity has broadened to cover all aspects of lakes, water and waste treatment research, hydraulic problems of special importance in Canada's cold climate, and related social studies. In 1974, in recognition of its outstanding world reputation in water research, the Centre was named as the World Health Organizations' International Collaboration Centre for Surface and Groundwater Quality.

25. WATER RESOURCES DATA SYSTEMS

Document Reference Centre (WATDOC)

Containing references to numerical data and document literature in the water resource field, published and unpublished, WATDOC is being developed as a national document reference centre on economics, technical and sociological research, management reports, political and news issues, and legislation, to provide planners, researchers, and managers in federal and provincial governments, universities and industry, with support in water research and in water resource planning and management functions. In addition to expansion of the data base itself, activities in the centre are directed towards establishing effective communications between the various government and university water research centres. Participants, who come from every level of government, university, research laboratory and private enterprise, are encouraged to contribute information in their field of specialty.

As well as developing its own unique Canadian data bases, WATDOC also provides access to other environmentally related files produced by U.S. commercial tape services. The system has also been integrated with various legal data bases of the Canada Department of Justice and the British Columbia Attorney General's Office. From coast to coast, all data bases are being accessed directly over standard telephone lines.

To provide participants with international coverage, exchange agreements for information and related services have been negotiated and are being implemented with the U.S. Department of Interior and the Environmental Protection Agency. Similar agreements with other non-Canadian centres are under discussion.

National Water Quality Data Bank (NAQUADAT)

NAQUADAT, a data storage and processing system for water quality data, has been operational since 1970. It has been designed to accept chemical, physical, bacteriological, biological and hydrometric data relevant to water quality for surface waters, groundwaters, wastewaters and sediments.

The system stores data collected since 1961 by various federal government agencies and is also used by provincial water agencies in Alberta, Manitoba and New Brunswick. A program is now available which permits the transfer of data from the Canada Centre For Inland Waters' Star data system to the NAQUADAT system. The Government of the State of Sao Paulo, Brazil, is in the process of adopting this system for its use in the water pollution field.

Surface Water Data

This system contains all of the stream discharge and sediments data collected across Canada, except for Quebec data which have been similarly automated by a provincial agency. Increased automation of the data has improved the scheduling of computation and publishing of data to the extent that processing time has been reduced from about three years to slightly over one year. The data are now more readily accessible to users either in published form or on magnetic tape for computer processing.

Groundwater Data Storage, Processing and Retrieval (GOWN)

GOWN is a computerized system developed to enlarge the scope and flexibility of the retrieval functions and to develop capability to deal with interconnected groundwater and surface water systems. Some data are stored in the system, but they are there simply as working material for the development of the system's capabilities for data processing and presentation.

26. DATA COLLECTION

Programs for the systematic collection and compilation of data on streamflow, water levels, sediment transport, groundwater, water quality, and related information on glaciers, snow and ice predated the Canada Water Act but have continued to expand in support of water management basin studies such as that on Lake Winnipeg, and the Churchill and Nelson Rivers.

During the closing months of fiscal year 1974-75, Canada and the provinces signed Memoranda of Agreement to share the costs of water quantity surveys. To be implemented on April 1, 1975, the total cost of $8,760,200 in 1975-76 will be shared as follows: Canada $7,004,100; the provinces $1,756,100. The agreements have the objective of maintaining a viable and efficient national water quantity survey and of giving recognition to joint federal and provincial responsibilities in this activity. Joint federal-provincial Coordinating Committees are to be established in each province to be responsible for planning and reviewing water quantity survey networks to ensure the maintenance of standards. The agreements may be terminated by either party on March 31 of any year, provided that 18 months notice is given.

Because of the vast distances in Canada, and the remoteness of many data collection stations, new methods and techniques are being explored to record data automatically, to be more selective in the data collected, to improve upon the quality of the data, to employ more sophisticated systems such as earth satellites to retransmit data signalled from remote areas, and to reduce the time between collecting field data and making it available to the user.

The principal water resource data collection agency is the Water Survey of Canada. Through a system of seven main offices and a large number of sub-offices, the Water Survey currently reports on 2,500 water quantity stations maintained throughout the country for the collection of data on streamflow, water levels and sediment transport in rivers. Some 250 of these stations serve as part of the 500 national water quality stations which serve to monitor the quality of water mainly in the Atlantic, Western and Pacific Regions. During the year, the water quality surveys were being re-examined with a view to implementing special investigations of regional and local water quality problems.

The Canada Centre for Inland Waters carries out an important data collection program on the Great Lakes. In 1974, major data systems mounted on ships, towers, buoys, barges, etc. were deployed mainly to measure trends and changes in water quality.

Supplemental Surface Water Sampling (in addition to the existing National Water Quality Sampling Program)

In order to determine the distribution and concentrations of minor elements and biocides in the waters of major streams in Western Canada, samples are being collected and analyzed for 16 major elements, 12 chlorinated hydrocarbon insecticides, 5 phenoxy type herbicide acids and 2 chemicals of the polychlorinated biphenyl group. The study was initiated in 1971 and will continue over a 5-year period.

During 1974, an extensive environmental survey of the Shubenacadie River was undertaken to collect data on water quality and water quantity, with the intent of relating these data to physical and socio-economic factors.

27. SOCIO-ECONOMIC STUDIES

These studies are undertaken to ensure that the social and economic goals contained in, or implied by, the Canada Water Act are being attained. These studies are discussed under the following:

Social Studies

Appearing in the preamble to the Canada Water Act, is the statement..."the demands on the water resources of Canada are increasing rapidly and more knowledge is needed of the nature, extent and distribution of those resources and of the present and future demands"... Significant strides have been taken in meeting this challenge by using the first issue of the Canada Water Year Book to present the data base established during a study of national water needs in 1973. Furthermore, descriptions and estimates of the demand-supply balance of Canada's water resources, regionally and nationally, are continuing under review for updating at intervals in the near future.

The Act allows the Minister to formulate comprehensive water resource plans based upon the examination of a full range of reasonable alternatives, and taking into account views expressed at public hearings and otherwise by persons likely to be affected by the implementation of such plans. In support of the comprehensive planning process, contributions were made in the form of socio-economic, institutional

and inter-jurisdictional studies. The integration of public information and participation techniques and methodologies with the water planning process were further explored with a view to establishing guidelines for their use in river basin studies.

Notable federal-provincial cooperation prevailed in continuing and expanding the program to identify and map flood hazards. The resulting information, made readily available, will assist the public in rationalizing their use of flood plains and coastal lowlands.

Economic Analysis Studies

Inherent in the Canada Water Act are certain economic goals, such as the maximization of the total value of all water uses to the public, the resolution of conflicts among water uses on an economic basis and the selection of optimum policy instruments to effect water management policies. Economic Analysis Studies are directed towards such goals and, while the economic services provided are often national in scope, they are also employed in regional and local (river basin) studies. These services include the defining of economic research techniques applicable to water resource planning and management and the provision of essential background data, benefit-cost assessments of various water development projects, development of methodologies for estimating the dollar values of damages resulting from water pollution, collection of data and forecasts of current and future water requirements, development of water use questionnaires for water use surveys and preparation of an inventory of municipal waste treatment facilities, assessment of the values of water uses, provision of advice to meet the needs in the areas of water management and policy statements, and other related services.