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# **The Canada Water Act**

## **Annual Report**

### **1996-1997**



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# The Canada Water Act

## Annual Report

### 1996-1997



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Minister of the Environment



Ministre de l'Environnement

Ottawa, Canada K1A 0H3

Her Excellency  
The Right Honourable Adrienne Clarkson, C.C., C.M.M., C.D.  
Governor General of Canada  
1 Sussex Drive  
Ottawa ON K1A 0A1

Your Excellency:

I respectfully submit to Your Excellency and to the Parliament of Canada the annual report on operations under the *Canada Water Act* for the fiscal year 1996-97.

Yours sincerely,

David Anderson, P.C., M.P.



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## A. INTRODUCTION

The *Canada Water Act*, proclaimed on September 30, 1970, provides the framework for joint federal-provincial management of Canada's water resources. Section 38 of the Act (*Revised Statutes of Canada, 1985*) requires that a report on operations under the Act be laid before Parliament after the end of each fiscal year. This, the twenty-fifth report, covers operations to March 31, 1997.

In addition to reporting on joint federal-provincial undertakings, the report describes other federal activities under the Act, including water research, water conservation and public information programs. Highlights include the completion of a digital resource database for the wetlands of Cape Breton Island under the Canada-Nova Scotia Water/Economy Agreement (details on page 4), assessment of the impacts of zebra mussels on nutrient cycling by the National Water Research Institute (page 8), and the development of ecosystem indicators for the Mackenzie River basin by the National Hydrology Research Institute (page 9).

The following is a summary of the major provisions of the Act:

### Provisions of the Canada Water Act

Part I of the Act provides for the establishment of federal-provincial consultative arrangements for water resource matters (Section 4) and for cooperative agreements with the provinces to develop and implement plans for the management of water resources (Sections 5, 6 and 8). Section 7 enables the Minister, directly, or in cooperation with any provincial government, institution, or person, to conduct research, collect data, and establish inventories associated with water resources.

Part II envisages federal-provincial management agreements where water quality has become a matter of urgent national concern. It permits the joint establishment and use of federal or provincial incorporated agencies to plan and implement approved water quality management programs. The provisions of this Part have never been used.

Part III, which provides for regulating the concentration of nutrients in cleaning agents and water conditioners, was incorporated into the *Canadian Environmental Protection Act* (CEPA) by a proclamation on June 30, 1988. Information concerning the regulation of nutrients is reported in the CEPA annual report to Parliament.

Part IV contains provisions for the general administration of the Act. In addition, Part IV provides for inspection and enforcement, allows the Minister to establish advisory committees and permits the Minister, either directly or in cooperation with any government, institution or person, to undertake public information programs.

## **B. HIGHLIGHTS, 1996-97**

### **B-1. REPORT ON PART I OF THE ACT: COMPREHENSIVE WATER RESOURCE MANAGEMENT**

#### **1. Federal-Provincial Programs**

##### **1.1 Apportionment, Monitoring and Survey Programs**

###### Collection of Water Quantity Data

A reduction of 35% in federal funding for the hydrometric monitoring program, planned over fiscal years 1995-96 to 1997-98 inclusive, was in the second year of implementation. The reduction is being met by streamlining overhead costs, by increasing efficiency through the modernization\* of operations, and by discontinuing federally funded stations which do not directly address the department's needs (unless external funding is secured). By year end, a total of 445 stations across Canada (about 15% of the 1994-95 network) had been closed.

Complete modernization of the field technology was achieved in New Brunswick and the Northwest Territories and significant progress made in all other provinces and Yukon Territory. An agreement was concluded with Quebec to modernize the network in Quebec over a period of three years, from April 1, 1996 to March 31, 1999. In exchange for Environment Canada funding the modernization, the province agreed to continue operation of all the stations in the province.

###### Water Quality Monitoring Agreements

Several of the activities covered by the Canada-Quebec Water Quality Monitoring Agreement are similar to those being undertaken under the federal-provincial St. Lawrence Action Plan (Vision 2000). Consequently, Environment Canada indicated its intention in May 1995 to terminate the Agreement. Following discussions, the Coordinating Committee ceased its activities; no funds were allocated during 1996-97.

During the year, Environment Canada was also engaged in discussion of its responsibilities under the Canada-Manitoba Water Quality Monitoring Agreement. Officials planned to meet with Manitoba Environment in the summer of 1997 to discuss future water quality monitoring programs and the implications of federal budget reductions. Opportunities for federal-provincial shared water quality sampling and laboratory analysis will be explored along with activities related to

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\* In the context of the hydrometric program, "modernization" refers to the replacement of outdated analogue technology with digital loggers and sensors, the provision of real-time communication technology at all sites and the development and implementation of software for receiving and computing the data in real-time.

terrestrial ecosystem assessments.

Under the Canada-British Columbia Water Quality Monitoring Agreement, the major federal-provincial activities carried out during the year included data assessment, network redesign, and renegotiation of the water quality monitoring schedules. Water quality data from 64 long-term federal and federal-provincial monitoring stations were assessed during 1995-96 and 1996-97 and reported as a series of Canada-British Columbia "state of water quality" reports.

#### Prairie Provinces Water Board (PPWB)

During the year, the Board recommended two changes to the Master Agreement on Apportionment. The first would modify the apportionment period for streams crossing the Saskatchewan-Manitoba boundary from the water year (April 1 to March 31) to the calendar year. This basis would be consistent with the apportionment period already used along the Alberta-Saskatchewan boundary. The second recommendation was to amend the definition of "watercourse" to clarify that inter-provincial lakes are subject to apportionment. There are 101 inter-provincial lakes situated on the Alberta-Saskatchewan and Saskatchewan-Manitoba boundaries. A formal amending agreement will be required to implement the recommendations.

The Committee on Water Quality has agreed that an empirical analysis of nutrient-plant relationships in prairie rivers should be carried out. While much research has been done on nutrients in standing water, there is insufficient understanding of the effects of nutrients in rivers. As an initial step in the analysis, the committee will evaluate existing data in 1997-98 to determine the feasibility of establishing nutrient water quality objectives.

In recognition of the growing need to collaborate on methodologies to determine instream flow needs, the Board agreed to establish an Instream Flow Needs Committee. The committee will hold its first meeting in 1997-98.

The PPWB sponsored a western water forum in March 1997. The forum, which was held in Edmonton, brought together 25 senior water managers from across Western Canada, including the Yukon and Northwest Territories, to discuss water-related activities of mutual interest and opportunities to cooperate.

Further information on PPWB activities is available upon request. Please contact the Prairie Provinces Water Board at the address on page 13.

## **1.2 Water Management Programs**

### Canada-Nova Scotia Water/Economy Agreement

The objective of this four-year agreement, signed in June 1994, is to encourage



joint federal and provincial efforts to integrate water resource management into economic decision making. During the third year of the Agreement, watershed management projects were supported in 17 areas of the province as a way to promote community participation in identifying polluted areas and undertaking remediation. Research was conducted on the opportunities for construction of artificial wetlands as a beneficial management practice in the disposal of agricultural and municipal wastes. In addition, a digital resource database for the wetlands of Cape Breton Island was completed for potential use in the environmental assessment process when determining the impacts of proposed developments on wetlands and related wildlife.

#### Canada - Prince Edward Island Water Annex

The Annex was signed on January 30, 1996 under the 1994 Federal-Provincial Framework Agreement for Environmental Cooperation in Atlantic Canada. Achievements during the second year of the Annex included the development of an application of the soil and water assessment model for evaluating the impacts of climate change and land practices; and the completion of the second part of a study to develop a GIS\*-based system for predicting soil erosion risk (in partnership with Agriculture and Agri-Food Canada).

#### Canada-Quebec Studies on Sustainable Development of Water Resources

The Canada-Quebec Agreement Respecting Flood-Risk Mapping Applied to Floodplain Preservation and Sustainable Development of Water Resources contains a provision for special studies. Five sustainable development projects undertaken during the final two years of program activities were completed on March 31, 1997. The aim of these projects was to facilitate the development of new approaches for integrated management in floodplain regions. The main areas of activity included ecological mapping, digitizing the hydrographic limits of certain watersheds, and a pilot project creating an integrated system for decision-makers concerned with river basin management and developments in the floodplain. A review and assessment of the achievements of the mapping program was also conducted.

#### Northern River Basins Study Agreement

This agreement, signed by Canada, Alberta and the Northwest Territories in 1991, assessed the cumulative effects of industrial, agricultural, municipal and other development on the aquatic ecosystems of the Peace, Athabasca, and Slave river systems. The final report with key findings and recommendations was transmitted to Ministers in June 1996. A joint governmental response to the recommendations is expected in mid-1997.

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\* Geographic Information System

### Fraser River Action Plan (FRAP)

The Fraser River Action Plan was initiated by the federal government in June 1991 to develop strategies which will reduce pollution of ecosystems, restore environmental productivity, and build a cooperative management program for the river basin based on the principles of sustainability. With seven-year and six-year mandates, respectively, Environment Canada and Fisheries and Oceans Canada have jointly managed and funded FRAP and its various water research and cooperative activities.

In May 1992, Canada, British Columbia, and local governments concluded an Agreement Respecting the Fraser Basin Management Program. The Agreement, which expires in May 1997, brings together a broad spectrum of interests including four levels of government, and has been a key vehicle for establishing FRAP partnerships.

FRAP has successfully complemented British Columbia's efforts to create water quality objectives for the entire Fraser Basin. As of March 31, 1997 provisional water quality objectives were in place for the Nechako and Thompson sub-basins. Draft objectives for the main stem, from the headwaters at Moose Lake to Hope reached the approval stage, and draft objectives for the stretch from Hope to the estuary were developed.

Research under the Fraser River Action Plan will be completed in 1997-98. This will include studies on the fate and effects of contaminants in the river, and their important relationship with the transport of sediment. Also, FRAP has conducted substantial research, together with British Columbia, concerning nutrient management on Lower Fraser Valley farms. Due to the intense level of agriculture in this area, particularly poultry production, nitrogen levels are often out of balance, leading to surface water and groundwater pollution. The research offers appropriate solutions to this problem.

A final report will be prepared during 1997-98, including a detailed examination of the advancement of basin knowledge, and the formulation of recommendations.

### **1.3 Flood Damage Reduction Program**

Under agreements signed with nine provinces, the respective governments were in agreement not to engage in, nor provide assistance to undertakings vulnerable to flood damage in designated flood risk areas. During the year, six new designations were approved across Canada. The mapping and designation of these additional flood-risk areas brought the total coverage to approximately 953 communities, with 317 designated areas since the inception of the program in 1975 (see summary, by province or jurisdiction, on page 12). All cost-shared mapping activities will be completed by early 1998-99.

The flood-risk mapping provisions of the Canada-Quebec Agreement Respecting Flood-Risk Mapping Applied to Floodplain Preservation and Sustainable Development of Water Resources expired on March 31, 1997. The general policy provisions of the Agreement remain in effect until March 31, 2002.

The flood-risk mapping provisions of the Canada-Alberta Agreement Respecting Flood Damage Reduction and Flood-Risk Mapping in Alberta expired on March 31, 1997. The general policy provisions of the Agreement remain in effect until March 31, 1999.

The policy provisions of the Canada-Ontario Agreement on Flood-Risk Mapping and Other Flood Damage Reduction Measures expired on March 31, 1997.

## **2. Water Research**

### **2.1 St. Lawrence Centre (SLC)**

Under the St. Lawrence Vision 2000 action plan, the St. Lawrence Centre has carried out a number of major studies since 1993 on the quality of the water and the ecosystem of the St. Lawrence River. The SLC is also involved in ecotoxicological research and developmental activities to assess the potential impact of various chemical mixtures on the St. Lawrence environment.

Research included the following major projects:

#### Presence and Transport of Chemical Contaminants

- Mass balance study of chemical contaminants in the St. Lawrence river system between Cornwall and Quebec City during which some 100 substances were analyzed.
- Chemical characterization and study of the transport and deposition of suspended matter in the Cornwall-Massena region.
- Study of the evolution of water bodies in the Montreal area and the impact on urban pollution.
- Chemical characterization of the effluent and effluent plume from the wastewater treatment plant of the Montreal Urban Community, including the analysis of PAHs, PCBs, mercury, and other contaminants.
- Monitoring of chemical contamination in the St. Lawrence River at Quebec City.

#### Effects of Chemical Pollution on the Ecosystem

- Development of bio-indicators (benthos, periphyton) to assess the effect of chemical contaminants, and to monitor changes.
- Assessment of the degree of contamination in fish, mussels, and plants in the Montreal, Quebec City, and Saguenay regions.

- Establishing a profile of the pathological condition of fish in the Quebec City area where more than 3000 specimens were analyzed.
- Study of urban pollution impact on periphyton and phytoplankton communities.
- Overseeing the monitoring of acid precipitation in some 40 lakes in Quebec as part of the national LRTAP\* program, and conducting related research activities.

#### St. Lawrence Biodiversity

- Analysis of the response of periphyton and phytoplankton communities to the effects of municipal effluent discharges.
- Analysis of the short-term and long-term variation in the diversity of fish species in the St. Lawrence River, with Quebec City as the reference site.
- Monitoring of the propagation of zebra and quagga mussels in the St. Lawrence River and a few of its major tributaries, together with study of their reproductive cycle and larval drift.

## **2.2 Research Institutes**

Environment Canada's water research institutes conduct ecosystem-based science programs in support of major river basin programs, and initiatives in the sustainable management of natural resources.

### **2.2.1 National Water Research Institute (NWRI)**

Research included the following highlights:

#### Scientific Research on Water Issues

Significant research was conducted on a variety of water-related issues, including investigations on toxic chemicals. NWRI is at the forefront of world research into the chemistry, effects and management of pulp and paper mill effluents, and is developing methods to detect the presence of endocrine disrupting compounds. With respect to atmospheric issues, NWRI monitored atmospheric deposition of contaminants such as persistent organochlorine compounds, continued to investigate the effects of UV-B radiation on biological communities, and developed an integrated assessment model for predicting lake chemistry and ecosystem effects of acid rain emissions under various scenarios.

#### Partnerships and Analytical Support across Canada

The Institute continues to support *Canada Water Act* activities across the nation through the provision of analytical services and advice to regional offices. This support is intended to ensure that analytical activities are nationally consistent, accurate and cost-effective.

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\* Long-Range Transport of Airborne Pollutants

Partnership activities included studies conducted for regional programs such as Great Lakes 2000 (details below), the Fraser River Action Plan, the Atlantic Coastal Action Program, and the Arctic Environmental Strategy. As part of the Fraser River Action Plan, reports on the establishment of ecosystem health-based management objectives using benthic invertebrates were completed. A computer-based analytical model for assessing conditions and setting conservation goals and restoration targets, is scheduled for completion in 1998.

NWRI also initiated a study on avian botulism in the Canadian prairies, with participation by scientists from a number of Canadian universities, and with funding and other support provided by Ducks Unlimited.

### Great Lakes 2000

Many important activities were undertaken, including the following examples:

- studies related to the development of Remedial Action Plans for Hamilton Harbour, St. Lawrence River, Severn Sound, and the Bay of Quinte,
- development of potential biological sediment guidelines for the Great Lakes.
- inventories of pollutants found in stormwater management ponds in the metropolitan Toronto area.
- examination of the causes and impacts of changing Lake Erie water quality.
- continuation of a study on the occurrence of nonylphenol (NP) in the aquatic environment.
- assessment of the impacts of zebra mussels on nutrient cycling as part of the information base necessary for the development of a lakewide management plan (LaMP).
- examination of the role of groundwater in transporting contaminants (Smithville contaminated site in the Niagara Peninsula), and its role in transporting septic-system derived nutrients to surface water bodies (Point Pelee National Park).

## **2.2.2 National Hydrology Research Institute (NHRI)**

Research included the following highlights:

### Impacts of Forestry on Aquatic Ecosystems

A four-year research program in Prince Albert National Park was completed and the final report delivered. Working with the Prince Albert Model Forest Association and Parks Canada, researchers have detailed how harvesting affects the forest's natural ability to regulate its own water supply and micro-climate. As part of the program, a new computer simulation was developed to permit visualization of hydrological impacts of forest clearing using "virtual clearcutting." This model can be applied in research to determine the impacts of a changing climate on forest hydrology.

### Remote Sensing in Hydrology

With partners from the United States (National Aeronautics and Space Administration), and from Natural Resources Canada, NHRI organised the Third International Workshop on Remote Sensing in Hydrology. This international forum deals with developments in the use of remote sensing in hydrological research. Many of the papers related to the international Global Energy and Water Cycle Experiment (GEWEX), an initiative in which Environment Canada has a key role.

### Peace-Athabasca Delta Technical Studies

The final report of the Peace-Athabasca Delta Technical Studies program was released. Much of the work conducted within this program was carried out by NHRI and the Prairie and Northern Region. The most significant result of the studies was the identification of the role of flooding in maintaining the ecosystem, with the analysis separating the downstream effects of British Columbia Hydro's W.A.C. Bennett Dam from possible indications of climate change. One of the report's recommendations proposes the development of an ecosystem management plan for the Delta.

### Ecosystem Indicators for the Mackenzie River Basin

Working with partners, NHRI has developed a matrix of ecosystem maintenance indicators for the Mackenzie River Basin that can be used to predict ecosystem responses to changes in hydrology such as occur when flow is altered – for example, by water diversion or river regulation. The method uses hydrological and biological data, but also relies on traditional knowledge gathered from aboriginal communities. These indicators promise to be a valuable tool in the quest for a resource management approach that balances ecosystem health and economic development.

## **B-2. REPORT ON PART II OF THE ACT: WATER QUALITY MANAGEMENT**

There were no activities conducted during the year pursuant to Part II of the *Canada Water Act*.

## **B-3. REPORT ON PART IV OF THE ACT: PUBLIC INFORMATION PROGRAM**

The public education program expanded its presence on the Internet. The Freshwater site, part of Environment Canada's Green Lane, provides basic information and comprehensive educational materials such as *A Primer on Fresh Water*, and the full text of the *Canada Water Act*, *Canada Water Act Annual Report*, and *Federal Water Policy*. Links to specific issues at other governmental and non-governmental sites across the country are being regularly updated and expanded. The Web site can be accessed at: <http://www.ec.gc.ca/water/index.htm>

Partnerships continued to play a major role in public information activities. In the fall of 1996, Environment Canada was an active participant in WaterCan's Water Festival at the Museum of Civilization in Hull, Quebec. Other events included the World Congress of the International Union for Conservation of Nature and Natural Resources - World Conservation Union (IUCN) held in Montreal, and World Water Day celebrations held both at the Biosphere, Montreal and at the headquarters location of the Regional Municipality of Ottawa-Carleton.

Environment Canada continued the promotion of the international Blue Thumb Project and associated web site in Canada by providing a French language version for world audiences. Numerous other educational products were adapted for inclusion in an Environment Canada CD-ROM entitled *Conserving Canada's Natural Legacy*. Finally, a Speaker's Kit on water efficiency, consisting of 33 slides and accompanying notes, was produced. Copies of the Speaker's Kit are loaned out free to community groups, educators, youth organizations and other interested persons.

For more information on these products, contact the Inquiry Centre at the address listed on page 13.

**C. TABLE 1: STATUS OF CANADA WATER ACT AGREEMENTS**

<b>Apportionment, Monitoring and Survey Programs</b>		
<b>Under Negotiation in 1996-97</b>	<b>New in 1996-97</b>	<b>Ongoing in 1996-97</b>
	<ul style="list-style-type: none"> <li>• Canada-Quebec Protocol on Administrative Arrangements under the Canada-Quebec Agreement on Hydrometric and Sedimentological networks in Quebec.</li> </ul>	<ul style="list-style-type: none"> <li>• Water quantity surveys with all provinces*, and with INAC for Yukon and the Northwest Territories.</li> <li>• Prairie Provinces Water Board.</li> <li>• Water quality monitoring agreements with British Columbia, Quebec, Newfoundland, New Brunswick, Manitoba, Prince Edward Island*, Yukon, and the Northwest Territories.</li> <li>• Ottawa River Regulation Planning Board.</li> </ul>
<b>Water Management Programs</b>		
<b>Under Negotiation in 1996-97</b>	<b>New in 1996-97</b>	<b>Ongoing in 1996-97</b>
<ul style="list-style-type: none"> <li>• Mackenzie River Basin Transboundary Waters Master Agreement.</li> <li>• Water annexes with New Brunswick, Newfoundland, and Nova Scotia. **</li> </ul>		<ul style="list-style-type: none"> <li>• Water Annex with Prince Edward Island**</li> <li>• Water/Economy Agreement with Nova Scotia.</li> <li>• Agreement with Ontario Respecting the Great Lakes Basin Ecosystem.</li> <li>• Canada-Quebec Studies on Sustainable Development of Water Resources</li> <li>• Agreement Respecting the Fraser Basin Management Program.</li> <li>• Mackenzie River Basin General Agreement.</li> <li>• Yukon and Alsek River Basins Agreement.</li> </ul>
<b>Flood Damage Reduction Program</b>		
<b>Under Negotiation in 1996-97</b>	<b>New in 1996-97</b>	<b>Ongoing in 1996-97</b>
<ul style="list-style-type: none"> <li>• New General Agreement with New Brunswick</li> </ul>		<ul style="list-style-type: none"> <li>• Agreement on policies with Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Nova Scotia, Ontario, Quebec and Saskatchewan.</li> <li>• Mapping Agreement with British Columbia, and Alberta.</li> <li>• Maintenance Agreement with New Brunswick.</li> </ul>

\* Water quantity and quality monitoring arrangements with Prince Edward Island were incorporated into the Water Annex signed in 1996 (listed in this table under Water Management Programs).

\*\* Water annexes may be signed pursuant to the Framework Agreement for Environmental Cooperation in Atlantic Canada (concluded by Canada, New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island in 1994).



**D. TABLE 2: SUMMARY OF DESIGNATIONS UNDER THE FLOOD DAMAGE REDUCTION PROGRAM\***

<b>PROVINCE / JURISDICTION</b>	<b>NUMBER OF DESIGNATIONS APPROVED IN 1996-97</b>	<b>NUMBER OF DESIGNATIONS TO DATE</b>	<b>NUMBER OF COMMUNITIES DESIGNATED TO DATE**</b>
	<b>TOTAL: 6</b>	<b>TOTAL: 317</b>	<b>TOTAL: 953</b>
<b>ALBERTA</b>	2	14	16
<b>BRITISH COLUMBIA</b>	3	80	205
<b>ABORIGINAL LANDS***</b>	---	---	---
<b>MANITOBA</b>	---	17	24
<b>NEW BRUNSWICK</b>	1	13	88
<b>NEWFOUNDLAND</b>	---	16	24
<b>NORTHWEST TERRITORIES</b>	---	9	9
<b>NOVA SCOTIA</b>	---	5	20
<b>ONTARIO</b>	---	102	273
<b>QUEBEC</b>	---	44	274
<b>SASKATCHEWAN</b>	---	17	20

\* Updated to March 31, 1997. Prince Edward Island and the Yukon Territory did not join the program.

\*\* One designation can cover one or more communities in a flood-risk area; the numbers are approximate.

\*\*\* The Memorandum of Understanding between Environment Canada and Indian and Northern Affairs Canada for the mapping of flood risks on Aboriginal lands expired on March 31, 1995. Some 40 reserves or communities were mapped with the full cooperation of Band Councils. The procedure of designation was not part of this arrangement.