

C. C. I. W.  
LIBRARY

A REVIEW OF WATER POLLUTION CONTROL  
PROGRAMS ON THE OTTAWA RIVER

by the  
FEDERAL-PROVINCIAL WORKING GROUP ON  
WATER QUALITY IN THE OTTAWA RIVER

Prepared for the Government of Canada and the Provinces of Ontario and  
Quebec by Fisheries and Environment Canada, Ontario Ministry of the  
Environment, and Quebec Environmental Protection Service - May 1978

TABLE OF CONTENTS

Page

Introduction.....1  
Organization of the Working Group and Terms of Reference.....1  
Program Considerations 1976-1977.....2  
Summary of Findings of Task Force No. 1.....3  
Conclusions and Recommendations.....5

APPENDIX I     Federal-Provincial Ottawa River Working Group  
                  - List of Members

APPENDIX II    Review of Municipal and Industrial Pollution  
                  Control Programs on the Ottawa River - Report  
                  by Task Force No. 1

## Introduction

A Working Group of officials of the federal Department of Fisheries and the Environment, the Ontario Ministry of the Environment, and the Environment Protection Services of Quebec was established in May 1976, following a meeting in Quebec City on May 11, 1976, of the Honourable Jean Marchand, the Honourable George Kerr, and the Honourable Dr. Victor Goldbloom, Ministers of the respective Departments. The Ministers agreed that the federal and provincial governments would consult to review water quality management and pollution control programs in the Ottawa River which were being implemented or were proposed and to identify additional measures to be considered by the governments. The Working Group was requested to meet at least twice each year and to report annually to the Ministers.

## Organization of the Working Group and Terms of Reference

Based on the concerns that were discussed by the Ministers on May 11, 1976, officials of the three governments consulted on the Terms of Reference and structuring of the Working Group and agreed that membership on the Working Group should consist of three federal officials and two from each of the Provinces. Chairmanship of the Working Group was assigned to the federal Headquarters member:

Federal: R.H. Millest, Department of Fisheries and the Environment,  
Chairman

L.J.Kamp, Department of Fisheries and the Environment,  
Ontario Region

J. Gravel, Department of Fisheries and the Environment,  
Quebec Region

Ontario: C.E.McIntyre, Ministry of the Environment, Southeast  
Region, Kingston

S. Salbach, Ministry of the Environment, Toronto

Quebec: Y. Pagé, Environment Protection Service, Quebec City

M. Gauvin, Environment Protection Service, Quebec City

The following Terms of Reference were established for the Working Group:

*The Federal-Provincial Working Group on Water Quality in the Ottawa River should consist of Federal and Provincial members and should meet at least once every six months, or more frequently if found to be necessary:*

- 1(a) *To review on-going and proposed federal and provincial industrial and municipal pollution control programs on the Ottawa River and to report to the federal and provincial Ministers responsible for pollution on progress being made in the implementation of such programs and scheduling of additional works;*
- (b) *To consider and present recommendations for changes in existing or proposed programs that the Working Group may consider to be necessary to achieve the Objectives for Water Quality as set out in the 1971 Ontario-Quebec report entitled: "Water Quality and its Control in the Ottawa River";*

#### Program Considerations 1976-1977

In order to carry out the Terms of Reference the Working Group called together a Task Force to review and report on current programs in keeping with the following instructions:

1. To prepare a list of existing and proposed municipal and industrial pollution control programs for direct discharges to the Ottawa River.
2. To examine implementation programs recommended in the 1971 Ontario-Quebec Report on Water Quality in the Ottawa River, compare them with those developed by the Province, and report on current status.
3. To comment on delays in implementation of programs and their effects on loadings to the River.

4. To identify new environmental concerns, including pollution sources, that have surfaced since the 1971 Report.
5. Prepare a report by January 31, 1977.

The report of the Task Force was submitted to the Working Group in March 1977, and has been incorporated into this report of the Working Group as Appendix II. The Working Group has taken the liberty of bringing the findings of the Task Force forward as the basis for its conclusions and recommendations to the Ministers.

#### Summary of Findings of Task Force No. 1

"The following findings are based on a review of the status of water pollution control programs at municipalities and industries discharging effluents directly to the Ottawa River.

(a) Wide differences were noted between the two Provinces in municipal pollution control programs. With the exception of Hawkesbury, all municipalities on the Ontario side are providing some form of treatment prior to discharge of their wastes to the River. The type of treatment varies from waste stabilization ponds at the smaller municipalities to primary or secondary treatment at the larger ones. Phosphorus removal is provided at all the major municipalities with the exception of Pembroke where facilities are to be completed by July 1977. A secondary sewage treatment plant with phosphorus control facilities is to be completed at Hawkesbury in 1978.

On the Quebec side, only three of sixteen municipalities treat their wastes, while the remainder discharge raw waste to the River. In effect, the present status on the Quebec side is the same as that reported in the 1971 Ottawa River Report.<sup>1</sup> The Province has, however, undertaken an extensive sewer construction program in the Hull area and plans to provide secondary treatment with phosphorus removal for the Outaouais Region by the end of 1979. No target

---

<sup>1</sup> Ontario Water Resources Commission and Quebec Water Board, 1971. Water Quality and its Control in the Ottawa River.

dates for treatment at the other municipalities are available at present, as these are low on the list of provincial priorities.

(b) The discharge of oxygen consuming wastes from the pulp and paper industry on the Quebec side has been reduced by approximately 30% from the levels reported in the 1971 Report. On the other hand, the total suspended solids loading from the mills has increased by approximately 35%. However, this increase is questionable, because of doubtful reliability of 1969 suspended solids data.

On the Ontario side, the discharge of suspended solids has been reduced by about 55% while the BOD<sub>5</sub> loading has remained essentially the same.

(c) Municipal pollution control programs have not been entirely successful at preventing bacteriological pollution of the River in the vicinity of Ottawa as evidenced by the closure of beaches during the summer months. This suggests that control of urban drainage and other indirect and diffuse sources of runoff may be necessary.

(d) Programs are currently underway to meet the requirements for BOD<sub>5</sub> and suspended solids as laid down in the Federal Pulp and Paper Regulations and Guidelines by the end of 1980 in Ontario. On the Quebec side, a Parliamentary Commission on Natural Resources and Lands and Forests is addressing pulp and paper mill modernization and pollution control. The proceedings of this Commission will complement present negotiations for pollution control.

(e) It is not possible at this time to estimate the effective reduction in toxicity of pulp mill discharges as a result of their meeting the federal requirements for BOD<sub>5</sub> and suspended solids.

(f) Several industries in addition to the pulp and paper industry contribute organic wastes to the Ottawa River; however, these discharges are considered to be insignificant (BOD<sub>5</sub> loading approximately 0.1% of total entering the River) in comparison to the larger industries and municipalities.

(g) Considerable controversy exists in Canada and elsewhere over the practice of wastewater disinfection using chlorination. This practice is currently employed at several municipal treatment plants discharging to the Ottawa River.

(h) Very little information is available on mercury and PCB concentrations in effluents being discharged to the River. Recent effluent samples from two mills indicated the presence of insignificant quantities of PCB's and mercury levels below the detectable limit. Further monitoring and analysis would be required to adequately assess the quantities and impact of these and other contaminants."

#### Conclusions and Recommendations

1. The lack of municipal sewage treatment for Quebec municipalities discharging to the Ottawa River continues to be a matter of concern. At present, the municipal waste of only 3% of the population on the Quebec side receives treatment of any kind prior to discharge to the River. This total will be increased to approximately 83% on completion of the Outaouais Regional Community treatment system. Municipal programs on the Ontario side are progressing at a much faster pace with 98% of the population presently served by some form of treatment. With the exception of Hawkesbury, where a secondary sewage treatment plant with phosphorus control is scheduled for completion in 1978, all municipalities on the Ontario side presently provide treatment.

Although agreement was reached previously among the Hull-Outaouais Regional Community, the Province of Quebec, and the National Capital Commission for funding the completion of the Hull-Outaouais collector sewers and sewage treatment plant, failure to award treatment plant construction contracts has seriously delayed this program. In addition to the significant impact of the continuing discharge of untreated sewage to the Ottawa River, delay in making the necessary arrangements for the completion of the project may well result in escalation of the project costs.

*It is strongly recommended that priority be given to the completion of the Hull-Outaouais sewage collection and treatment project to effective-*

*ly control pollution from this major urban source. It is further recommended by the federal and Ontario governments that phosphorus removal be installed as an integral part of the treatment system.*

It should be noted that opinion of the Working Group on the need for phosphorus removal was not unanimous. Quebec agreed, however, that the need should be reconsidered.

2. The tabulation of municipal sewage treatment plant loadings to the Ottawa River as given in the Task Force Report (Appendix II) indicates that discharges from small municipalities, many of which are not treated on the Quebec side, do not likely have a major effect on the quality of the water in the River as a whole. However, there can be no doubt that they give rise to localized impairment of water quality which is reflected in bacterial contamination and depression of dissolved oxygen in the immediate vicinity of such discharges.

*Although priority must be given to the provision of adequate sewage treatment at the large municipalities along the River, it is recommended that plans be prepared and a 5-year implementation schedule set out for the installation of treatment facilities at all sewered municipalities along the River.*

3. The Ontario Ministry of the Environment requires that all sewage treatment plants with a capacity of greater than one million gallons per day meet an effluent objective of 1 mg/l total phosphorus. In addition, smaller plants are required to provide phosphorus removal where local conditions dictate. There is no comparable province-wide policy on phosphorus removal in the Province of Quebec.

*In view of the preliminary findings of the Water Quality Study of the St. Lawrence River (now nearing completion) that nutrient loadings to the Ottawa River contribute substantially to algae growths in Lake of Two Mountains and, indeed, in the downstream waters of the St. Lawrence*



*River, it is recommended that phosphorus removal be required for sewage treatment plants along the Ottawa River with a capacity greater than one million gallons per day and for smaller plants where local conditions dictate.*

4. Localized bacterial pollution continues to minimize the contact recreational use of the Ottawa River in the Ottawa area. Surveys have indicated that contaminated storm sewer discharges and general urban runoff contribute significantly to such contamination.

*It is recommended that efforts by the Provinces, the Regional Municipalities, and local municipalities be strengthened to identify and control the sources of such contamination to return local recreational areas of the Ottawa River to their full usefulness as quickly as possible.*

5. The implementation of effluent control programs by the pulp and paper mills located along the River has proceeded in response to Federal Pulp and Paper Regulations and Guidelines promulgated under the Fisheries Act and Provincial Regulations and Guidelines. The three governments have agreed that the Federal control requirements, as set out in the Pulp and Paper Regulations and Guidelines, shall serve as minimum requirements for control, however, in most cases these limits were not as stringent as the objectives set out in the 1971 report.

*It is recommended that the Ontario and Quebec governments establish compatible control requirements, including the setting of target loadings and compliance dates, for the pulp and paper mills discharging directly to the Ottawa River, with the Federal control requirements, as set out in the Pulp and Paper Regulations and Guidelines, remaining as minimum requirements.*

6. During the review of pulp and paper industry programs, it was recognized that the validity of effluent data, particularly for Biochemical Oxygen

Demand (BOD<sub>5</sub>) and Suspended Solids was, at times, questionable. It was difficult, therefore, to accurately assess improvements in performance in the industry during the last six to eight years.

*It is recommended that effluent quality and quantity surveys be strengthened at all pulp and paper mills by agencies of the three governments to adequately determine the degree of conformity, with the federal Regulations and Guidelines as a baseline for control. Such surveys should be repeated at least annually. Where it is confirmed that the requirements of the Regulations are not being met, action should be taken by the respective Province under the terms of appropriate legislation to enforce compliance.*

7. The limiting of the present study and report to the review of existing municipal and industrial pollution control activities has made it virtually impossible for the Working Group to comment in any more than general terms on the effectiveness of control measures in improving water quality in the River and how that quality relates to the Objectives for Water Quality that were set out in the 1971 Ontario-Quebec Report. When one considers the substantial expenditures on pollution control along the River and the loss of value that is suffered by users of the River as a result of continuing pollution, it would seem logical that appropriate emphasis be placed on monitoring and surveillance of pollution discharges and of receiving water quality to permit assessment of the effectiveness of existing pollution control programs.

*It is recommended that the appropriate federal and provincial agencies collaborate in a review and revision, as may be found necessary by the three parties, of effluent and water quality monitoring and surveillance programs to provide reliable data for assessment of pollution control program effectiveness. In considering revisions to the monitoring and surveillance program, attention should be given to the measurement of key pollution parameters, including biota, sediments, toxicity, and hazardous materials such as PCB's and mercury, and for the free exchange of data among the three governments.*

## FEDERAL-PROVINCIAL OTTAWA RIVER WORKING GROUP

## List of Members

FEDERAL

Mr. R.H. Millest (Chairman)\*  
 Director, Water Quality Branch  
 Environment Canada  
 Ottawa, K1A 0E7  
 Tel: 997-1526

Mr. E.R. Watt (Secretary)  
 Surveys Officer  
 Water Quality Branch  
 Environment Canada  
 Ottawa, K1A 0E7  
 Tel: 997-3422

Mr. L. Kamp  
 Director, Technical Services  
 Ontario Region  
 Environmental Protection Service  
 Environment Canada  
 River Road Laboratories  
 River Road, Ottawa  
 K1A 1C8  
 Tel: 998-3420

Mr. J. Gravel  
 Regional Director General  
 Quebec Region  
 Environmental Protection Service  
 Environment Canada  
 2020 University Street  
 Montreal, Quebec H3A 2A5  
 Tel: 283-7377

\* Effective May 1, 1978  
 Mr. W.K. Sharpe (Chairman)  
 Director, Water Pollution Programs Branch  
 Environmental Protection Service  
 Environment Canada  
 Ottawa, K1A 1C8  
 Tel: 997-1513

QUEBEC

M. Y. Pagé, Directeur  
 Connaissance de la qualité du milieu  
 Service de la protection de  
 l'environnement  
 2360, chemin Ste-Foy  
 Ste-Foy (Québec) G1V 4H2  
 Tel: 643-2006

M. M. Gauvin, Directeur  
 Disposition des eaux et de déchets  
 industriels  
 Environnement industriel  
 2360, chemin Ste-Foy  
 Ste-Foy (Québec) G1V 4H2  
 Tel:

ONTARIO

Mr. S. Salbach  
 Supervisor of Planning and  
 Coordination  
 Water Resources Branch  
 Ministry of the Environment  
 135 St. Clair Avenue West  
 4th Floor  
 Toronto, Ontario M4V 1P5  
 Tel: 965-6954

Mr. C.E. McIntyre  
 Director, Southeast Region  
 Regional Operations  
 Ministry of the Environment  
 133 Dalton Street  
 P.O. Box 820  
 Kingston, Ontario  
 Tel: 549-4000

APPENDIX II

REVIEW OF MUNICIPAL AND INDUSTRIAL  
POLLUTION CONTROL PROGRAMS ON THE OTTAWA RIVER

by

TASK FORCE # 1

FEDERAL-PROVINCIAL OTTAWA RIVER WORKING GROUP

OTTAWA, ONTARIO  
MARCH, 1977

TABLE OF CONTENTS

	<u>Page</u>
List of Tables.....	ii
List of Figures.....	ii
1. SUMMARY OF FINDINGS.....	1
2. INTRODUCTION.....	3
3. MUNICIPAL POLLUTION CONTROL PROGRAMS.....	4
3.1 Ontario.....	4
3.2 Quebec.....	7
3.3 Discussion of Municipal Control Programs.....	10
4. INDUSTRIAL POLLUTION CONTROL PROGRAMS.....	12
4.1 Ontario.....	12
4.2 Quebec.....	14
4.3 Discussion of Industrial Control Programs.....	14
5. OTHER ENVIRONMENTAL CONSIDERATIONS.....	18
5.1 Influence of Tributaries.....	18
5.2 Wastewater Disinfection.....	18
5.3 Inputs from Diffuse Sources.....	19
5.4 Other Contaminants.....	20
References.....	21
Appendix A - Task Force Membership.....	22
Appendix B - Financial Arrangements for Municipal Sewage Treatment Facilities.....	23

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Municipal Discharges to the Ottawa River - Ontario.....	6
2	Municipal Discharges to the Ottawa River - Quebec.....	8
3	Major Industries Discharging to the Ottawa River.....	15

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
1	The Ottawa River.....	5
2	Total BOD <sub>5</sub> and Suspended Solids Loadings to the Ottawa River from the Pulp and Paper Industry.....	17

## 1. SUMMARY OF FINDINGS

The following findings are based on a review of the status of water pollution control programs at municipalities and industries discharging effluents directly to the Ottawa River.

(a) Wide differences were noted between the two provinces in municipal pollution control programs. With the exception of Hawkesbury, all municipalities on the Ontario side are providing some form of treatment prior to discharge of their wastes to the river. The type of treatment varies from waste stabilization ponds at the smaller municipalities to primary or secondary treatment at the larger ones. Phosphorus removal is provided at all the major municipalities with the exception of Pembroke where facilities are to be completed by July 1977. A secondary sewage treatment plant with phosphorus control facilities is to be completed at Hawkesbury in 1978.

On the Quebec side, only three of sixteen municipalities treat their wastes, while the remainder discharge raw waste to the river. In effect, the present status on the Quebec side is the same as that reported in the 1971 Ottawa River report.<sup>1</sup> The Province has, however, undertaken an extensive sewer construction program in the Hull area and plans to provide secondary treatment with phosphorus removal for the Outaouais Region by the end of 1979. No target dates for treatment at the other municipalities are available at present, as these are low on the list of provincial priorities.

(b) The discharge of oxygen consuming wastes from the pulp and paper industry on the Quebec side has been reduced by approximately 30% from the levels reported in the 1971 report. On the other hand, the total suspended solids loading from the mills has increased by approximately 35%. However, this increase is questionable, because of doubtful reliability of 1969 suspended solids data.

On the Ontario side, the discharge of suspended solids has been reduced by about 55% while the BOD<sub>5</sub> loading has remained essentially the same.

(c) Municipal pollution control programs have not been entirely successful at preventing bacteriological pollution of the river in the vicinity of Ottawa as evidenced by the closure of beaches during the summer months. This suggests that control of urban drainage and other indirect and diffuse sources of runoff may be necessary.

(d) Programs are currently underway to meet the requirements for BOD<sub>5</sub> and suspended solids as laid down in the Federal Pulp and Paper Regulations and Guidelines by the end of 1980 in Ontario. On the Quebec side, a Parliamentary Commission on Natural Resources and Lands and Forestry is addressing pulp and paper mill modernization and pollution control. The proceedings of this Commission will complement present negotiations for pollution control.

(e) It is not possible at this time to estimate the effective reduction in toxicity of pulp mill discharges as a result of their meeting the federal requirements for BOD<sub>5</sub> and suspended solids.

(f) Several industries in addition to the pulp and paper industry contribute organic wastes to the Ottawa River; however, these discharges are considered to be insignificant (BOD<sub>5</sub> loading approximately 0.1% of total entering the river) in comparison to the larger industries and municipalities.

(g) Considerable controversy exists in Canada and elsewhere over the practice of wastewater disinfection using chlorination. This practice is currently employed at several municipal treatment plants discharging to the Ottawa River.

(h) Very little information is available on mercury and PCB concentrations in effluents being discharged to the river. Recent effluent samples from two mills indicated the presence of insignificant quantities of PCB's and mercury levels below the detectable limit. Further monitoring and analysis would be required to adequately assess the quantities and impact of these and other contaminants.



2. INTRODUCTION

As a result of ministerial discussions in Quebec City on May 11, 1976, a Federal-Provincial Working Group was established to jointly pursue the implementation of water quality improvement programs in the Ottawa River basin. This report presents the findings of a review by a Task Force of the Working Group. The terms of reference assigned to the Task Force were:

1. Prepare a list of existing and proposed municipal and industrial pollution control programs for direct discharges to the Ottawa River. (Note urban drainage - but will not provide loading at this time.)
2. Examine implementation programs recommended in the 1971 report, compare them with those developed by the provinces and report on current status.
3. Comment on delays in implementation of programs and their effects on the loadings to the river.
4. Identify new environmental concerns including pollution sources that have surfaced since the 1971 report.
5. Prepare report by January 31, 1977.

Following a comparison and review of the current status of municipal and industrial pollution control programs with those reported in the 1971 report "Water Quality and Its Control in the Ottawa River Basin", a number of other environmental concerns which have surfaced since the 1971 report are identified.

### 3. MUNICIPAL POLLUTION CONTROL PROGRAMS

There are 28 municipalities discharging wastes directly to the Ottawa River, twelve on the Ontario side and sixteen on the Quebec side. These are listed in Tables 1 and 2 respectively, along with serviced population figures for 1969 and 1976, BOD<sub>5</sub> and phosphorus loadings, type of treatment provided including disinfection and target loadings for BOD<sub>5</sub> as recommended in the 1971 report. The locations of the municipalities are shown in Figure 1. Financial arrangements for municipal treatment facilities are presented in Appendix B.

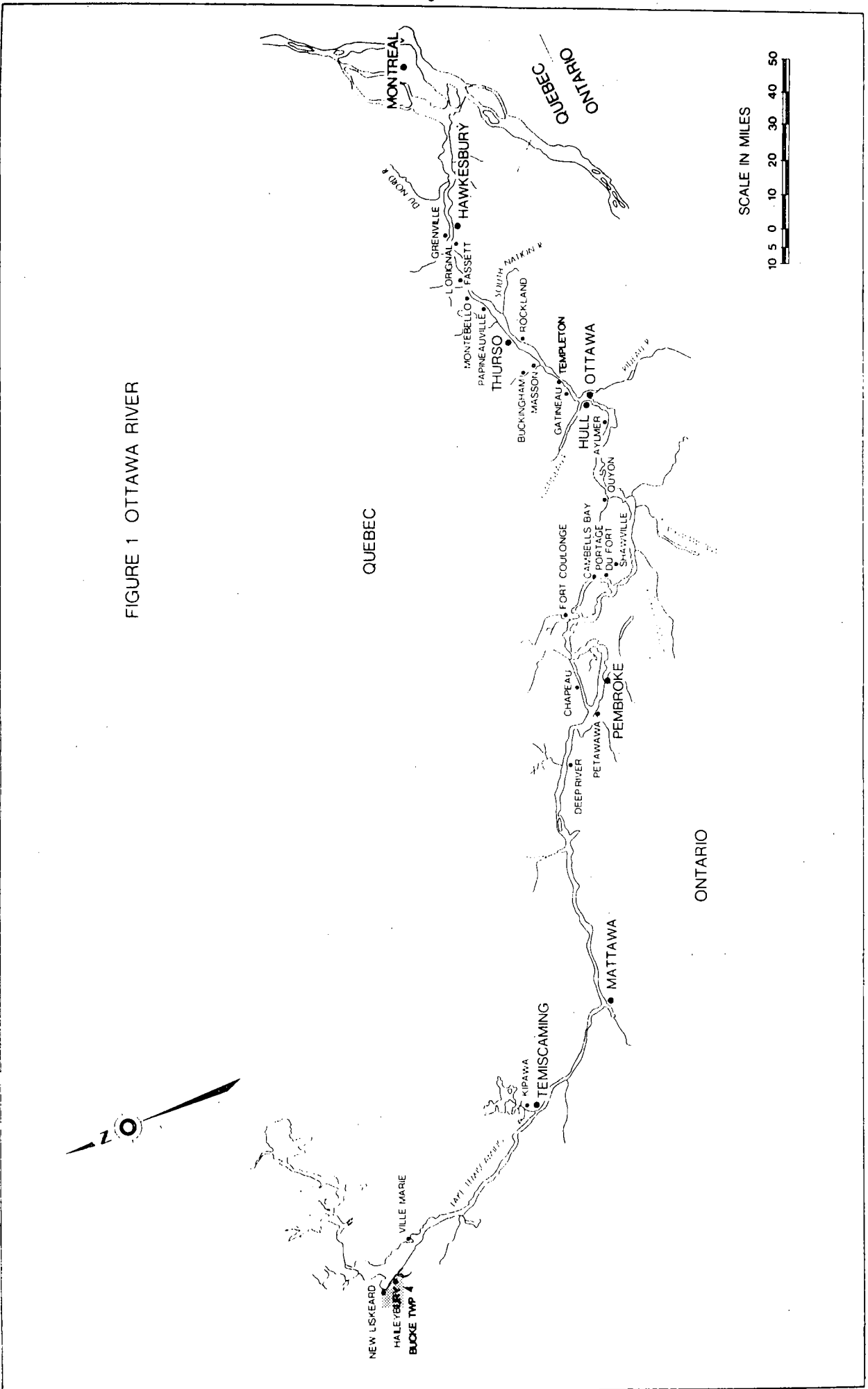
The BOD<sub>5</sub> and phosphorus loadings were calculated using treatment plant records or estimated on the basis of population statistics where plant records were not available or where no treatment existed. Comments on the status of pollution control programs in each of the provinces are presented below.

#### 3.1 Ontario

As shown in Table 1, all municipalities in Ontario, with the exception of Hawkesbury, treat their wastes prior to discharging them to the river. The type of treatment varies from waste stabilization ponds at the smaller municipalities to primary or secondary treatment at the larger ones. Although no treatment is currently provided at Hawkesbury, a secondary sewage treatment plant with phosphorus removal is presently under construction and is scheduled for completion in 1978.

The main changes in the municipal systems on the Ontario side since 1969 include the extension of sewer services and expansion of treatment facilities in the Regional Municipality of Ottawa-Carleton, the expansion of the waste stabilization ponds serving New Liskeard and Rockland, the installation of extended aeration at L'Orignal and the addition of a seasonal discharge waste stabilization pond at Bucke Township. Phosphorus removal has also been added at a number of the major municipalities.

FIGURE 1 OTTAWA RIVER



SCALE IN MILES  
10 5 0 10 20 30 40 50





The current policy of the Ontario Ministry of the Environment on phosphorus removal requires facilities to control phosphorus at sewage treatment plants with a capacity of more than one million gallons per day. The effluent objective is 1 mg/l total phosphorus. The deadline for compliance for municipalities along the Ottawa River was December 31, 1976. By that date, all major municipalities with the exception of Pembroke were in compliance. For economic reasons Pembroke was unable to comply with the requirement; however, a government grant was recently awarded to the municipality for extension of its sewage treatment plant. This extension will include phosphorus removal equipment which is expected to be operational by July 1977.

As indicated in Table 1, the total phosphorus loading to the river from municipal waste treatment plants in Ontario has been reduced by approximately 75% since 1969. This reduction can be attributed to the provincial phosphorus control program and to the federal policy of 1970 calling for a reduction in the phosphorus content of detergents. Under the terms of the Canada Water Act, the federal government in 1970 passed a regulation which limited the phosphorus content in laundry detergents to 8.7% by weight. In 1973 this regulation was revised to restrict the phosphorus content to 2.2% by weight.

The total BOD<sub>5</sub> loading for 1969 from the municipalities listed in Table 1 was estimated at 20,360 kg/day (44,890 lbs/day). By 1976 this loading had been reduced by 50% to 10,170 kg/day (22,420 lbs/day). In most cases, the 1976 municipal BOD<sub>5</sub> loadings in Ontario compare favorably or are substantially lower than the permissible loadings presented in the 1971 report. The only exceptions are: Ottawa-Carleton which exceeds the 1971 BOD<sub>5</sub> permissible loading by 13%, and Pembroke and Hawkesbury which have shown no improvement since 1969. The new sewage treatment plants scheduled for these municipalities are expected to meet the permissible loadings.

### 3.2 Quebec

The status of municipal waste treatment on the Quebec side has changed little since 1969. At that time only three of the sixteen municipalities listed

TABLE 2. MUNICIPAL DISCHARGES TO THE OTTAWA RIVER - QUEBEC

Municipality	Population Served		800 <sub>5</sub> Loading Kg/day (lbs/day)		Phos. Loading Kg/day (lbs/day)		Type of Treatment		1977 Target Loading 800 <sub>5</sub> Kg/c (lbs/d)	1976 Chlorination Status	Comments
	1969 <sup>a</sup>	1976	1969	1976	1969	1976	1969	1976			
Ville-Marie	2,400	2,020	186 (410)	156 (343)	10 (23)	5 (10)	None	None	54 (120)	-	Low priority. Sewers - separate and combined.
	2,800	2,210	215 (475)	170 (376)	12 (27)	5 (11)	None	None	64 (140)	-	Low priority. Sewers - combined.
Chapeau	562	500	43 (96)	38 (85)	2 (5)	1 (2)	None	None	14 (30)	-	Low priority. Sewers - separate, no storm sewers.
	1,815	1,648	8 (18)	20 (45)	4 (9)	2 (5)	SP	SP	41 (90)	Nil	Sewers - separate, partial storm sewers.
Campbell's Bay	1,150	1,250	91 (200)	100 (220)	5 (11)	3 (6)	None	None	27 (60)	-	Low priority. Sewers - separate, no storm sewers.
	1,800	1,750	23 (50)	23 (50)	4 (9)	2 (5)	EA	EA	41 (90)	Year-Round	Sewers - separate, storm sewers.
Pontiac (Quyon)	834	400	63 (140)	31 (68)	4 (8)	1 (2)	None	None	18 (40)	-	Low priority. Sewers - separate, no storm sewers.
	9,500	19,100	708 (1,560)								
Aylmer <sup>b,c</sup>	50,500	65,100	4,536 (10,000)	11,453 (25,250)	444 (980)	440 (970)	None	None	2,336 (5,150)	Year-Round in 1979	Aylmer, Hull and Gatineau to be served by secondary treatment (activated sludge) with phosphorus removal (1 mg/l) by end of 1979. Sewers - combined and separate plus storm sewers.
	53,016	65,100	2,515 (5,545)								
Buckingham <sup>d</sup>	2,915	13,046	224 (495)	1,006 (2,218)	13 (28)	29 (65)	None	None	63 (150)	-	Low priority. Sewers - combined and separate.
	3,694	3,150	285 (628)	268 (590)	16 (35)	7 (16)	None	None	86 (190)	-	Low priority. Sewers - combined.
Papineauville	1,384	1,370	12 (26)	16 (35)	3 (7)	2 (4)	AS	AS	32 (70)	Year-Round	Sewers - separate, partial storm sewers.
	1,500	1,250	116 (255)	109 (240)	6 (14)	3 (6)	None	None	36 (80)	-	Proposed secondary treatment. Sewers combined and separate, no storm sewers.
Fasset	525	623	41 (90)	68 (106)	2 (5)	1 (3)	None	None	14 (30)	-	Proposed secondary treatment. Sewers - separate, no storm sewers.
	1,500	1,500	116 (255)	88 (195)	6 (14)	4 (8)	None	None	36 (80)	-	Low priority. Sewers - separate, storm sewers.
QUEBEC TOTALS	125,895	180,017	9,182 (20,243)	13,527 (29,821)	531 (1,175)	505 (1,113)			2,567 (6,320)		

<sup>a</sup>As reported in 1971 Ottawa River Report.  
<sup>b</sup>Reported separately as Aylmer and Deschênes in 1971 report.  
<sup>c</sup>Reported separately as Gatineau, Pt-Gatineau, Templeton in 1971 report.  
<sup>d</sup>Reported separately as Angers and Nysson in 1971 report.

Treatment Abbreviations:  
 SP - Stabilization Pond  
 EA - Extended Aeration  
 AS - Activated Sludge

in Table 2 had treatment of any kind. The level of treatment provided was secondary in each case. The situation is still the same. However, the Hull region, which is the major source of municipal waste on the Quebec side, is included in an NCC arrangement with the provinces to provide for clean-up of municipal pollution in the National Capital Region. Most of the program in the Hull region has been directed at the extension of major sewer networks to connect outlying areas and at the construction of trunk sewers to eliminate the direct discharges to the river. These will later be connected to a central sewage treatment plant at Templeton which is scheduled for completion by the end of 1979. In the meantime, without the benefit of treatment, the discharge of untreated wastes has increased from this area.

No date for treatment of municipal wastes is available for other Quebec municipalities that discharge directly to the Ottawa River as these areas are considered by the province to be of lower priority than other areas in their jurisdiction.

The total BOD<sub>5</sub> loading to the river from Quebec municipalities in 1969 was 9182 kg/day (20,243 lbs/day). In 1976 this loading had increased by 47% to 13,600 kg/day (29,800 lbs/day) and is largely attributed to the greater population in the Outaouais region.

The provincial government in Quebec has not set a province wide limit for phosphorus concentration in municipal effluents. Limits are set by individual municipalities and are generally based on receiving water quality. As phosphorus loadings were not available for municipal discharges, estimates for 1969 were made based on an average per capita daily consumption of 100 gallons of water and phosphorus concentrations for raw and secondary effluents of 9.5 and 5 mg/l respectively. The 1976 loadings were based on lower concentrations to reflect the federal governments control of phosphorus content in laundry detergents. Based on these estimates, it appears as though the total phosphorus loading to the Ottawa River from municipalities in Quebec has remained essentially the same since 1969.

### 3.3 Discussion of Municipal Control Programs

Based on the preceding, it is apparent that wide differences exist between the two provinces in the status of the municipal pollution control programs. The Province of Ontario has placed high priority on municipal pollution control including phosphorus removal and consequently all major municipalities discharging directly to the Ottawa River will provide treatment by the end of 1978.

On the Quebec side, the priority for municipal pollution control in the Ottawa River basin has been low with little change anticipated in the near future. The only exception is in the Hull area where the Outaouais regional system is expected to be completed in 1979.

The requirements for control of municipal wastewater discharges are based on the need to protect receiving waters (which may be used for municipal water supply and recreation) from bacteriological contamination, enrichment due to discharge of nutrients, reduction of aesthetic values, and excessive oxygen depletion due to oxygen consuming wastes. In the case of the Ottawa River, it is highly unlikely that the municipal discharges, with the possible exception of the Ottawa-Hull area, would have a marked effect on the dissolved oxygen levels in the river; however, the other protection needs do apply as several municipalities draw their water supply from the river and because the river has great potential for water based recreation such as swimming, boating, water-skiing, etc. Unfortunately, the existing municipal pollution control programs which are aimed at controlling point sources of pollution and which have been based to a great extent on achieving the  $BOD_5$  and suspended solids loadings given in the 1971 report, have not been entirely successful in preventing bacteriological pollution of the river in the vicinity of Ottawa. This is evidenced by the closure of beaches almost every summer. The recurring problem suggests that indirect, and to a great extent uncontrolled, discharges (eg. urban drainage, illegal sewer connections, plant by-passes etc.) to the river contribute to bacteriological pollution. If the river is to be kept open for swimming, these discharges need to be controlled at least during the summer months. Because of



the potential for interprovincial contamination, both provinces should implement their clean-up programs simultaneously, to the extent possible, to ensure effective and expedient clean-up of the river.

The Province of Ontario's requirement for phosphorus removal was based on the need to protect the river from nuisance growths of algae and other aquatic weeds which detract from its aesthetic value and could cause excessive oxygen sags (algal blooms). As described earlier, the provincial phosphorus control programs are not consistent. It would therefore be appropriate to re-examine the provincial programs with a view to making them compatible.

#### 4 INDUSTRIAL POLLUTION CONTROL PROGRAMS

The major industrial waste source to the Ottawa River is the pulp and paper industry which accounts for more than 90% of the total BOD<sub>5</sub> and suspended solids loadings to the river. In 1969 there were eight mills operating in the basin, six of which were located in Quebec. The total BOD<sub>5</sub> discharge to the river was estimated at 510,345 kg/day (1,125,300 lbs/day). The shutdown of sulphite pulping operations at the E.B. Eddy Mill in Hull and the Canadian International Paper Company, Gatineau in 1969 significantly reduced BOD<sub>5</sub> loadings from these sources although discharge from paper making processes and mechanical pulping was maintained. The total BOD<sub>5</sub> loading to the river in 1976 was 448,470 kg/day (988,700 lbs/day), which indicates a reduction of 12% in total BOD<sub>5</sub> loading to the river since 1969. The relative BOD<sub>5</sub> contributions in 1976 from the Quebec and Ontario mills were 61% and 39% respectively. The CIP Kipawa Mill at Temiscaming closed down in 1971 but was reopened in late 1973 by Tembec Forest Products.

In addition to the pulp and paper industry, there are several other industries discharging wastes to the Ottawa River. These wastes, however, are less significant than those from the pulp and paper industry. The status of programs on the Ontario and Quebec sides is described below.

##### 4.1 Ontario

There are two mills on the Ontario side of the Ottawa River: the CIP Mill at Hawkesbury, with a production capacity of 260 tons/day, and the E.B. Eddy Mill in Ottawa with a production capacity of 220 tons/day. The former, which is an ammonia base dissolving grade sulphite pulp mill, is the major single source of BOD<sub>5</sub> input to the river on the Ontario side. The company has been ordered by the Ontario Ministry of the Environment to install facilities to recover at least 90% of the spent sulphite liquor by the end of 1980. The BOD<sub>5</sub> loading will not be reduced to that recommended in the 1971 report, but is expected to meet the Environment Canada requirement. The 1976 BOD<sub>5</sub> loading was calculated to be 170,550 kg/day (376,000 lbs/day). A comparison of this value

with the average value obtained from the 1971 report indicates an increase of 65% in BOD<sub>5</sub> loading to the river from this source. This increase is felt to be somewhat misleading as total production at the mill has not changed significantly to account for the increase. Changes in product mix have in the past, caused great fluctuations in the BOD<sub>5</sub> loading to the river and the reliability of earlier data is questionable.

The suspended solids discharge which totalled 3,080 kg/day (6,800 lb/day) for 1976 meets both federal and provincial requirements. Other objectionable characteristics of the effluent include a substantial amount of nitrogen in the form of free ammonia (12,000 kg/day), high coloration, low pH, and toxic substances. The company has been requested to file a report with the Ministry of the Environment on its proposal to treat bleach plant effluent and other waste streams.

The second major industrial waste source on the Ontario side, E.B. Eddy Company in Ottawa, contributed 2270 kg/day (5,000 lbs/day) BOD<sub>5</sub> and 3630 kg/day (8000 lbs/day) suspended solids to the river in 1976. The suspended solids from the board mill do not meet Environment Canada requirements and the Ontario Ministry of the Environment plans to order the company to meet these regulations. There is a probability that this mill will not close down within the next few years although the National Capital Commission at an earlier date announced its intention to purchase the property.

The effective reduction in the toxicity of mill wastes after implementation of the federal regulations and guidelines for BOD<sub>5</sub> and suspended solids cannot be determined at this time, however, the matter is to be studied by the province in 1981. BOD reduction may reduce the potential toxicity of ammonia discharged from ammonia pulping mills.

In order to provide baseline data for a study of toxicity as well as control programs, a routine effluent monitoring program for toxic materials and other deleterious substances would be useful at each of the mills.

Several other industries contribute organic waste to the Ottawa River. The discharge of BOD<sub>5</sub> from these industries in Ontario amounts to 0.1%

of the total entering the river and is, therefore, insignificant compared to the contribution from the larger industries and municipalities.

In 1969, the largest industrial contributor of chromium to the Ottawa River was Haley Industries at Haley Station. The chromium levels were reduced from 40 mg/l to 0.42 mg/l by the installation of a treatment system in 1974. In Hawkesbury, the wastes from smaller industries will be treated when the secondary sewage treatment plant is constructed in 1978.

#### 4.2 Quebec

The pulp and paper industry is the major source of BOD<sub>5</sub> and suspended solids on the Quebec side. As is the case on the Ontario side, the waste input from the smaller industries is relatively small. The names of the pulp and paper mills together with estimates of their BOD<sub>5</sub> and suspended solids loadings are given in Table 3.

In general, there has been a 30% reduction in BOD<sub>5</sub> loadings to the river from the operating mills on the Quebec side since 1969. This has resulted from the shutdown of two sulphite pulping operations, as well as implementation of provincial programs. The maximum permissible BOD<sub>5</sub> and suspended solids loadings for each mill based on the Federal regulations and guidelines are given in Table 3. As with mills on the Ontario side, the effective reduction in the toxicity of mill wastes after implementation of these regulations and guidelines for BOD<sub>5</sub> and suspended solids, cannot be determined at this time.

#### 4.3 Discussion of Industrial Control Programs

The existing industrial pollution control programs, which are basically aimed at meeting the Federal Pulp and Paper Regulations and Guidelines by 1978 and 1980 for non-sulphite and sulphite mills respectively, are not expected to meet the target loadings recommended in the 1971 report. The 1971 loading targets were derived from waste assimilation models and represented the best available judgements at that time. Based on the federal control requirements the reduction in BOD<sub>5</sub> and suspended solids to be achieved by 1980 are shown graphically on Figure 2.

TABLE 3 - MAJOR INDUSTRIES DISCHARGING TO THE OTTAWA RIVER

Industry	Type	Production tons/day		800 <sub>5</sub> Loading kg/day (lbs/day)		Suspended Solids kg/day (lbs/day)		Target Loadings kg/day (lbs/day)		Comments
		1969*	1976**	1969*	1976**	1969**	1976**	800 <sub>5</sub>		
								1971 Report	E.C. Regs	
PAPRIQ E. E. Eddy Company Ottawa	Paper Mill Speciality Paper and Boards	180	220	2,540 (5,600)	2,270 (5,000)	11,430 (25,200)	3,630 (8,000)	1,100 (2,425)	2,270 (5,000)	Clarifier on speciality paper mill effluent installed in 1974. SS from board mill excessive. Control order may be initiated. Control order requesting recovery of spent sulphite liquor by end of 1980.
		230	260	102,960 (227,000)	170,550 (376,000)	4,080 (9,000)	3,080 (6,800)	22,680 (50,000)	75,500 (166,500)	
Canadian International Paper Markesbury	Sulphite Mill Dissolving Pulp	410	480	105,500 (232,600)	172,820 (381,000)	15,510 (34,200)	6,710 (14,800)	23,780 (52,425)	77,770 (171,500)	To conform with E.C. Regs by end of 1980. Program approved in principle by S.P.E.Q.
		360	380	175,085 (386,000)	179,170 (395,000)	37,280 (82,200)	68,040 (150,000)	36,290 (80,000)	84,370 (186,000)	
QUEBEC Tembec (1973) C.I.P., Kipawa (1969)	Sulphite Mill Dissolving Pulp	450	540	16,330 (36,000)	11,340 (25,000)	7,710 (17,000)	10,610 (23,400)	16,330 (36,000)	26,130 (57,600)	To conform with E.C. Regs by end of 1978. Primary and secondary in operation.
		580	410	45,490 (100,300)	3,860 (8,500)	33,110 (73,000)	9,620 (21,200)	18,860 (41,580)	3,860 (8,500)	
Consol. Bathurst Portage du Fort E. E. Eddy Company Hull	Kraft	1,500	1,600	127,910 (282,000)	45,810 (101,000)	39,370 (86,800)	68,040 (150,000)	32,660 (72,000)	45,810 (101,000)	To conform with E.C. Regs by end of 1978. No treatment at present.
		390	380	22,700 (50,200)	21,140 (46,500)	11,520 (25,400)	9,750 (21,500)	9,070 (20,000)	11,610 (25,600)	
Can. Int. Paper Gatineau James MacLaren Hasson	Sulphite Mechanical (1972)	290	250	17,330 (38,200)	14,330 (31,500)	3,540 (7,800)	11,790 (26,000)	11,790 (26,000)	15,380 (33,900)	To conform with E.C. Regs by end of 1980. No treatment at present.
		3,570	3,560	404,845 (892,700)	275,650 (607,700)	132,530 (292,200)	177,850 (392,100)	125,000 (275,580)	187,160 (412,610)	
THURSO Thurso P & P Thurso	Kraft	3,980	4,040	510,345 (1,125,300)	448,470 (988,700)	148,040 (326,400)	184,560 (406,900)	148,780 (328,005)	264,930 (584,100)	To conform with E.C. Regs by end of 1978. Partial primary treatment in operation.
		3,570	3,560	404,845 (892,700)	275,650 (607,700)	132,530 (292,200)	177,850 (392,100)	125,000 (275,580)	187,160 (412,610)	
GRAND TOTALS										

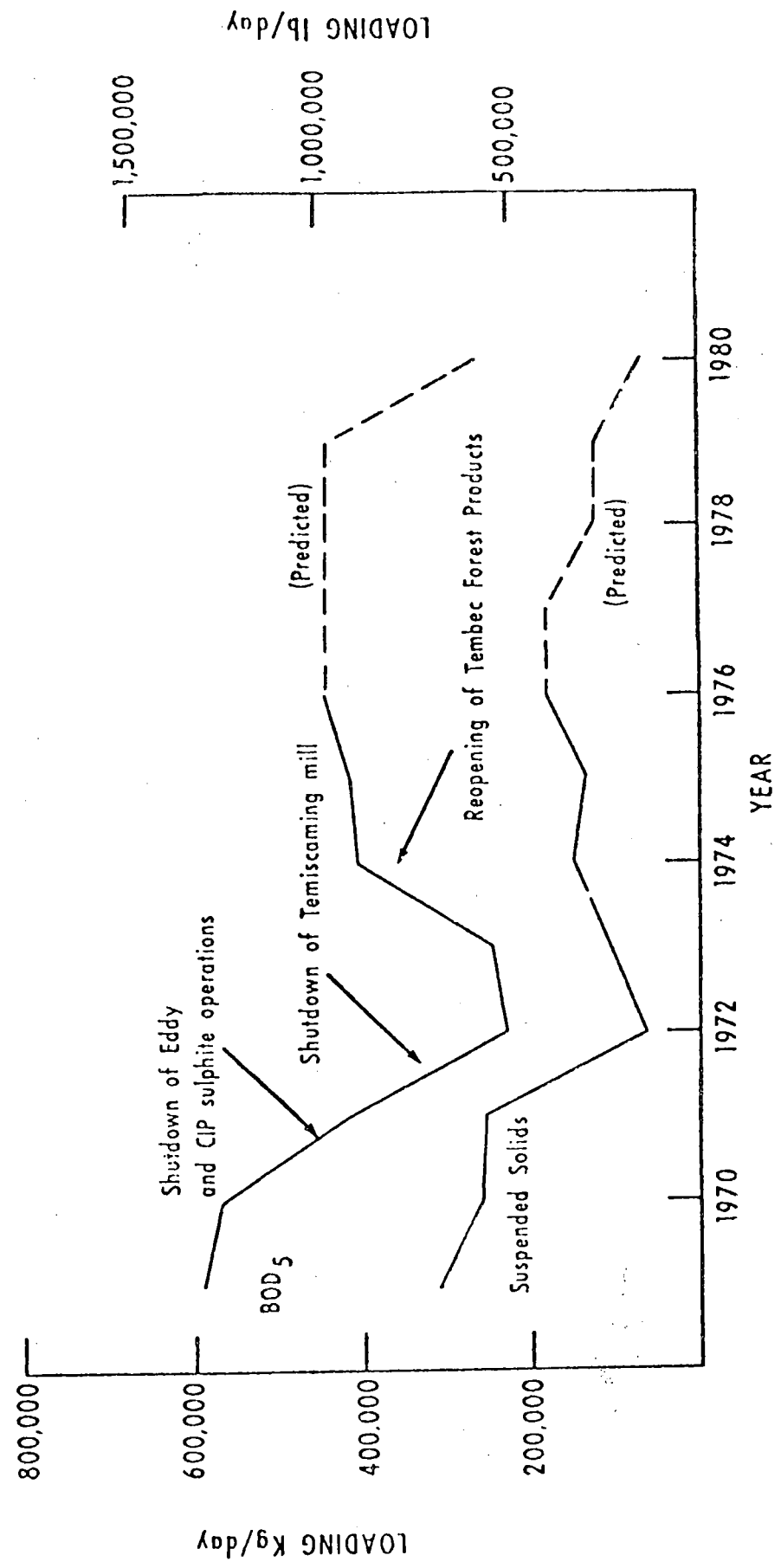
\* As reported in 1971 Ottawa River Report  
 \*\* Average value for the year 1976

Target Loadings  
 1971 Report - Permissible value from 1971 Ottawa River Report  
 E.C. Regs - Environment Canada Pulp and Paper Regulations and Guidelines

The differences between the 1971 loading targets and the federal requirements could be a source of concern and confusion to the industry. In light of these differences, there is a need for the provinces and the federal government to review the existing control programs with an aim to establish compatible and equitable control programs and implementation schedules.

During the assessment of the industrial waste inputs to the river, a number of questions were raised regarding the validity of BOD<sub>5</sub> and suspended solids loadings to the river as well as the lack of information on other contaminants. To answer and avoid such concerns, the existing surveillance and monitoring programs should be reviewed and revised as necessary to ensure reliable data for future assessment of control programs.

FIGURE 2 - TOTAL BOD<sub>5</sub> AND SUSPENDED SOLIDS LOADINGS TO THE OTTAWA RIVER FROM THE PULP AND PAPER INDUSTRY



-1978 and 1979 loadings assume compliance with EC regulations and guidelines for non-sulphite mills and current loadings for sulphite mills  
-1980 loadings assume compliance with EC regulations and guidelines for cell mills  
-Loadings are based on data supplied by the Canadian Pulp and Paper Association

5 OTHER ENVIRONMENTAL CONSIDERATIONS

5.1 Influence of Tributaries

Several municipalities such as Arnprior, Chalk River, Renfrew and Plantagenet discharge municipal wastes to tributaries of the Ottawa River. These do not contribute any noticeable impairment to the Ottawa River because of the high dilution factor.

The Arnprior sewage treatment plant (6819 m<sup>3</sup>/day - primary plant - 1.5 mgd) discharges a short distance up the Madawaska River. The BOD<sub>5</sub> loading from this plant was 980 kg/day (2,160 lbs/day) in 1976. The outfall is downstream of the recently constructed dam and hydroelectric plant at Arnprior. In order to ensure the maintenance of satisfactory water quality conditions in the short reach of river from the sewage treatment plant outfall to the Ottawa River, Ontario Hydro is required to flush the river daily. The long term impact of this mode of operation is being assessed by the Ontario Ministry of the Environment.

5.2 Wastewater Disinfection

Considerable controversy currently exists over the desirability of the current practice (historically established) of wastewater disinfection in Canada. Agencies and individuals whose interests or responsibilities are primarily concerned with the management or protection of aquatic ecosystems have clearly demonstrated the deleterious effects associated with disinfectant residuals, notably chlorine and its compounds. On the other hand, those persons concerned with public health protection prophesy that needless human health risk would be associated with any curtailment of current disinfection practices. Also, the production of chlorinated organic chemicals, some of which may be carcinogenic, during the disinfection of drinking water as well as effluents has been identified as a potential public health concern in the U.S. and elsewhere.

Although all of the above concerns may not be significant in the Ottawa River basin, it would be advisable to review overall disinfection policies



in light of the findings of studies currently being carried out by various agencies.

### 5.3 Inputs from Diffuse Sources

The bulk of material inputs to the Ottawa River from diffuse sources, such as land drainage, enter via tributary rivers and streams. It is anticipated that such inputs will be dealt with by another task force of the Ottawa River Working Group.

The contribution of nutrients, organics, solids, heavy metals, etc. from direct overland drainage to the Ottawa River from diffuse sources such as agricultural activities, mining, etc. are probably insignificant.

One diffuse source that may have a measurable impact on water quality is urban storm drainage from large municipalities in the Ottawa-Hull area. Although no studies have been carried out to determine the effects of storm water runoff on the water quality of the Ottawa River, recent literature on the subject of storm drainage plus experience on the Rideau River have indicated that there is significant contamination potential in storm drainage from urban areas. The contaminants of most concern are bacteria, oxygen consuming material (BOD), suspended solids and nutrients. A Federal-Provincial Task Force on Storm Water Management in Ontario has been established and is currently reviewing the storm water problem in Ontario with a view to coming up with recommendations regarding storm water treatment.

Another source of possible contamination of the river which has surfaced since the 1971 Ottawa River Report is snow dumping. Through studies carried out during the winters of 1973 and 1974 for an Ontario Ministry of the Environment Technical Task Force on Snow Disposal, it became evident that snow falling on municipal roadways accumulates contaminants such as oxygen demanding organic material, oil, dissolved salts, chlorides, lead, particulate matter, litter and often domestic garbage. Direct disposal of this contaminant laden snow into

lakes or watercourses can create degraded water quality conditions. As a result of the Task Force findings the Ontario Ministry of the Environment adopted the following policy<sup>5</sup>:

"Snow removed from roadways should not be dumped directly into Ontario's watercourses, nor should such snow be disposed of on ice covered rivers or lakes.

If circumstances preclude the disposal of snow on approved land sites or disposal by other acceptable means, the approval of the Ontario Ministry of the Environment is required prior to dumping directly to a watercourse."

Other studies such as those by Oliver<sup>2,3</sup> on the Rideau River have demonstrated high concentrations of lead in river sediments downstream from a snow dumping site. It is felt, however, that limited controlled dumping of fresh snow to the Ottawa River does not have an adverse effect on river quality.

#### 5.4 Other Contaminants

Fairly extensive studies of heavy metal concentrations in sediments downstream from the City of Ottawa were carried out by Oliver in 1971 and 1972<sup>2,3</sup>. Results of these studies indicated that sediments downstream from pulp and paper mills contained high amounts of mercury (2.09 ppm, 1.47 and 2.70) in relation to the background concentration level of 0.28 ppm<sup>3</sup>. The high levels are attributable to the former use by the industry of mercurial slimicides. This practice was discontinued in the spring of 1971. During the period 1972 to 1974 a steady decrease in mercury concentrations in sediments was noted in studies conducted by the University of Ottawa and National Research Council<sup>4</sup>.

Recent surveys of the effluent from CIP Hawkesbury and the Thurso Pulp and Paper Mill indicated that mercury levels were below the detectable limit. The same survey at the Thurso mill indicated the presence of 0.04 ppb (0.005 lb/day) of Arochlor 1254/1260 with Arochlor 1242 not being detectable.

REFERENCES

- (1) Ontario Water Resources Commission and Quebec Water Board. 1971. Ottawa River Basin, Water Quality and its Control in the Ottawa River.
- (2) Oliver, B.G. and J. Kinrade. 1972. Heavy Metal Concentrations in Ottawa River and Rideau River Sediments. Inland Waters Branch, Dept. of the Environment, Ottawa, Scientific Series No. 14.
- (3) Oliver, B.G. and H. Agemian. 1974. Further Studies on the Heavy Metal Levels in Ottawa and Rideau River Sediments. Inland Waters Directorate, Water Quality Branch, Ottawa, Scientific Series No. 37.
- (4) University of Ottawa National Research Council of Canada. 1976. Ottawa River Project. Distribution and Transport of Pollutants in Flowing Water Ecosystems, Report No. 3.
- (5) Ontario Ministry of the Environment. 1975. Guidelines for Snow Disposal and Deicing Operations in Ontario.

APPENDIX A  
TASK FORCE MEMBERSHIP

Ontario

Mr. J. Ralston - Ontario Ministry of the Environment, Toronto  
Mr. J. Pruner - Ontario Ministry of the Environment, Cornwall

Quebec

Dr. H.C. Lavallée - Services de la Protection de l'Environnement, Ste. Foy  
Mr. P. Dugré - Services de la Protection de l'Environnement, Ste. Foy

Federal

Mr. V. Niemela (Chairman) - Environmental Protection Service, Ottawa  
Mr. S. Munro - Environmental Protection Service, Toronto  
Mr. G. Mezzetta - Environmental Protection Service, Montreal

APPENDICES

APPENDIX B  
FINANCIAL ARRANGEMENTS FOR MUNICIPAL  
SEWAGE TREATMENT FACILITIES

Federal aid through the Central Mortgage and Housing Corporation is made available to assist municipalities and municipal sewerage/water supply corporations to finance eligible sewerage and water supply projects. Through this mechanism loans may be made in an amount not exceeding two-thirds of the eligible cost of the project as determined by CMHC. In addition, CMHC may forgive payment of the loan to a maximum of 25% of the principal amount of the loan and 25% of the accrued interest at the date of completion of the project. Grants are also available for projects in respect of which no loan has been made by CMHC. They may not exceed 25% of the amount of the maximum loan that could have been made by CMHC for the project.

Under these arrangements loans and grants for treatment facilities and collector sewers have totalled 20.1 million and 21.0 million dollars for the Provinces of Ontario and Quebec respectively. Tables A1 and A2 present breakdowns of the loan/grant amounts by date and municipality for the two provinces. The individual dollar values as well as the totals represent the actual loan portion of the dollars spent. No adjustment has been made to account for the inflation factor resulting from expenditures being made in different years. It must be pointed out, therefore, that although the total assistance provided to both provinces from this source is in the range of \$20 million, the expenditures are not directly comparable as the majority of the municipal works on the Ontario side were installed in the 1960's while Quebec only recently began to take advantage of this assistance. Naturally, work such as the Outaouais Regional system which is currently under construction will be much more costly than similar works constructed at an earlier date because of increasing labour and material costs.

In addition to funding through CMHC, federal funds through the National Capital Commission have been directed to improving overall sanitary sewage and pollution control disposal facilities within the National Capital Region. Since

1971, a total of \$10,000,000 from this source has been contributed to the Outaouais Regional sewage system in Quebec. The total estimated cost of the system, which is to be completed in 1979, is \$120,000,000. The costs are being shared equally by the Province of Quebec, the Outaouais Regional Community and the National Capital Commission. The contribution of each party is therefore expected to total in the range of \$40,000,000 over the duration of the project.

On the Ontario side of the Ottawa River, under the terms of a 1972 tripartite agreement with the Province of Ontario and the Regional Municipality of Ottawa-Carleton, the NCC has contributed about \$14,000,000 for Phase 1 of treatment facilities for the Regional Municipality of Ottawa-Carleton. This represents one-third of the total costs associated with expansion of the Green's Creek and Watt's Creek sewage treatment plants and collector sewers for south Ottawa and Lynwood. Phase 2 of this agreement has a total estimated cost of \$38,000,000 which is to be shared equally by the three parties.

TABLE A1. CMHC FINANCIAL ASSISTANCE TOWARD MUNICIPAL SEWAGE TREATMENT

Municipality	Approval Date of Loan/Grant	Loan/Grant	Loan/Grant Amount (\$)*	Eligible Cost of Project (\$)*	Project Type
<u>Ontario</u>					
New Liskeard	-	-	-	-	
Bucke Township	24- 7-69	L	69,002	103,503	Stabilization pond and collector
Haleybury	30- 8-67	L	320,945	481,417	Plant and collector
Mattawa	11-10-62	L	137,216	205,824	Stabilization pond and collector
	27-11-68	L	30,189	45,284	Wet well
Petawawa	21-12-72	L	252,563(e)	378,844(e)	Collector
Pembroke	15- 9-66	L	392,603	588,905	Collector
	24- 9-68	L	708,757	1,063,135	Plant and collector
	22- 8-74	L	886,667(e)	-	Collector
	9-10-74	L	49,612	74,418	Collector
	20- 5-76	G	11,167(e)	-	Collector
Nepean	19-10-67	L	61,121	91,681	Plant
	30-11-67	L	282,154	423,231	Collector
	10-12-70	L	47,423	71,135	Collector
	20- 5-71	L	40,863	61,295	Collector
	2- 9-71	L	934,000	1,401,000	Plant and collector
	12-12-74	L	613,336(e)	-	
	23-12-71	L	600,000	900,000	Collector
	22-11-73	L	588,604	882,906	Collector
	12-12-74	L	613,336(e)	920,004(e)	Collector
Ottawa-Carleton	21- 3-61	L	6,990,108	-	Plant and collector
	21- 3-61	L	82,375	-	Collector
	29-12-61	L	221,226	-	Collector
	20-12-62	L	359,612	-	Collector
	30- 5-63	L	225,100	-	Collector
	17-10-63	L	1,753,005	-	Collector



TABLE A1. CMHC FINANCIAL ASSISTANCE TOWARD MUNICIPAL SEWAGE TREATMENT (Cont'd)

Municipality	Approval Date of Loan/Grant	Loan/Grant	Loan/Grant Amount (\$)	Eligible Cost of Project (\$)	Project Type
	6- 2-64	L	602,837	-	Collector
	6- 2-64	L	806,270	-	Collector
	29-12-65	L	120,655	-	Collector
	12- 7-67	L	233,252	-	Collector
	27-11-68	L	269,162	-	Collector
Rockland	28- 2-64	L	63,399	95,099	Plant and collector
L'Orignal	14- 6-73	L	427,333	641,000	Plant and collector
	3- 5-76	L	367,885	551,827	Plant and collector
Hawkesbury	6- 3-75	L	1,166,070(e)	1,749,105(e)	Plant
ONTARIO TOTAL			<u>20,127,847</u>		

(e) - estimated value

\* - Dollar values represent actual loan dollars spent. No common dollar value has been applied to account for inflationary trend.

TABLE A2. CMHC FINANCIAL ASSISTANCE TOWARD MUNICIPAL SEWAGE TREATMENT

Municipality	Approval Date of Loan/Grant	Loan/Grant	Loan/Grant Amount (\$)*	Eligible Cost of Project (\$)*	Project Type
Quebec					
Fort Coulonge	23- 3-61	L	46,848	70,272	Plant and collector
Shawville**	-	-	-	-	-
Hull, City	25- 5-72	L	82,328(e)	123,492(e)	Collector
Outaouais Reg.	16-12-71	L	1,400,000(e)	2,100,000(e)	Collector
	21-12-72	L	3,700,000(e)	5,550,000(e)	Collector
	13-12-73	L	2,800,000	4,200,000	Collector
	20-12-73	L	3,600,000(e)	5,400,000(e)	Collector
	28-11-74	L	3,600,000(e)	5,400,000(e)	Collector
	28-11-74	L	3,400,000(e)	5,100,000(e)	Collector
	29-12-76	G	1,875,000(e)	7,500,000(e)	Collector
Angers	25- 4-74	L	56,000	-	Collector
Templeton	26- 4-73	L	200,000	-	Collector
Papineauville	30- 4-64	L	108,058	162,087	Plant and Collector
	19- 5-66	L	29,465	44,198	Collector
	12-12-74	L	77,252	115,878	Collector
QUEBEC TOTAL			\$20,974,951		

(e) - estimated value

\* - Dollar values represent actual loan dollars spent. No common dollar value has been applied to account for inflationary trend.

\*\* - Prior to commencement of CMHC Assistance Program