

1972-03-01

# Forty-First Progress Report to the International Joint Commission: Lake Superior-Lake Huron- Lake Erie Board and Lake Erie-Lake Ontario Board

Lake Superior-Lake Huron-Lake Erie Board

Lake Erie-Lake Ontario Board

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1972-03-01

# Forty-First Progress Report to the International Joint Commission: Lake Superior-Lake Huron- Lake Erie Board and Lake Erie-Lake Ontario Board

Lake Superior-Lake Huron-Lake Erie Board

Lake Erie-Lake Ontario Board

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FORTY-FIRST PROGRESS REPORT  
TO THE  
INTERNATIONAL JOINT COMMISSION

U.S. ENVIRONMENTAL PROTECTION AGENCY  
GREAT LAKES NATIONAL PROGRAM OFFICE  
536 SOUTH CLARK STREET  
CHICAGO, IL 60605

LAKE SUPERIOR-LAKE HURON-LAKE ERIE BOARD

St. Marys River  
St. Clair River  
Lake St. Clair  
Detroit River

LAKE ERIE-LAKE ONTARIO BOARD

Niagara River

Advisory Boards to the International Joint Commission  
on Control of Pollution of Boundary Waters

March 1972

1972



FORTY-FIRST PROGRESS REPORT

TO THE

INTERNATIONAL JOINT COMMISSION

March 1972

International Joint Commission  
United States of America  
and  
Canada

Particulars:

LAKE SUPERIOR-LAKE HURON-LAKE ERIE BOARD

Presented herewith to the Advisory Boards on Control of the Great Lakes Connected to the

- St. Marys River
- St. Clair River
- Lake St. Clair
- Detroit River

The report presents the quality surveillance during 1971 for the St. Marys, St. Clair and Detroit Rivers, collected by the Michigan Water Resources Commission, the Ontario Water Resources Commission, and the Michigan District Office of the Environmental Protection Agency, and for the Niagara River, collected by the New York Department of Environmental Conservation.

LAKE ERIE-LAKE ONTARIO BOARD

- Niagara River

The report also presents the status of municipal and industrial pollution abatement programs in Canada and the United States.

Respectfully submitted,

A. V. Prince

Chairman

Executive Director

Francis F. New

Chairman

V. S. Cannon

Advisory Boards to the International Joint Commission  
on Control of Pollution of Boundary Waters

March 1972



INTERNATIONAL JOINT COMMISSION

ADVISORY BOARD ON CONTROL OF POLLUTION OF BOUNDARY WATERS

March 1972

MEMORANDUM

International Joint Commission  
United States and Canada

Director, Great Lakes Basin  
Department of Environment  
Ottawa, Ontario

Special Manager  
Ontario Water Resources Commission  
Toronto, Ontario

Gentlemen:

Presented herewith is the Forty-first Progress Report of the Advisory Boards on Control of Pollution of Boundary Waters for the Great Lakes Connecting Channels.

The report presents the results of water quality surveillance during 1971 for the St. Marys, St. Clair and Detroit Rivers, collected by the Michigan Water Resources Commission, the Ontario Water Resources Commission, and the Michigan District Office of the Environmental Protection Agency, and for the Niagara River, collected by the New York Department of Environmental Conservation, the Ontario Water Resources Commission and the Rochester Field Office of EPA. Data for the Buffalo River, collected by the Buffalo Sewer Authority, were used in the analysis of Niagara River water quality problems.

The report also presents the status of municipal and industrial pollution abatement programs in Canada and the United States.

Respectfully submitted,

---

A. T. Prince  
Chairman  
Canadian Section

---

Francis T. Mayo  
Chairman  
U. S. Section



INTERNATIONAL JOINT COMMISSION

ADVISORY BOARDS ON CONTROL OF POLLUTION OF BOUNDARY WATERS

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- 1 Lakes Superior-Huron-Erie Board
- 2 Lakes Erie-Ontario Board





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FORTY-FIRST PROGRESS REPORT  
ADVISORY BOARDS ON CONTROL OF POLLUTION  
OF BOUNDARY WATERS

MARCH 1972

LAKES SUPERIOR-HURON-ERIE BOARD  
WATER QUALITY SURVEILLANCE

SUMMARY

Generally, water quality in the St. Marys River remains in good condition. However, phenol concentrations, as in previous years, did not conform to IJC objectives. Highest values were observed near the Canadian shore downstream from Algoma Steel Corporation.

Coliform densities were generally similar to those observed in 1970, and conformed with IJC objectives.

Total iron concentrations conformed with IJC objectives except for one sampling station near the United States shore on the upper river.

Chlorides, phosphorus and nitrogen values were comparable to 1970 data.

Water quality in the St. Clair for 1971 was improved over 1970, as indicated by lower coliform densities, and phenol and iron concentrations.

While phenols did not conform with IJC objectives at all sampling ranges, coliform densities and iron concentrations conformed with IJC objectives at all ranges.

Chlorides, phosphorus, nitrogen and dissolved solids values were comparable to 1970 data.

Improvement was noted in the Detroit River in 1971 for phenol, phosphorus and nitrogen values.

Coliform densities showed no significant improvement over 1970 and conformance with IJC objectives was obtained only at the head of the river. A satisfactory explanation was not available for both the U. S. and Canadian shores of the lower river. The Board agreed that the agencies responsible for surveillance should further examine the data and revise sampling procedures if necessary, prior to the 1972 sampling season.

Phenol concentrations showed significant improvement over 1970, although conformance with IJC objectives is still not achieved in the lower river.

Iron concentrations generally did not conform with IJC objectives although some improvement was noted on the United States side below Rouge River.

Chlorides and dissolved solids values were generally comparable with 1970 data.



## ST. MARYS RIVER

### Introduction

The 1971 water quality data on the St. Marys River was collected from nine ranges. The U.S. Environmental Protection Agency sampled six of the ranges up to nine times per range, while the Ontario Water Resources Commission sampled seven of the ranges six times per range. The locations of the ranges sampled and the locations of municipal and industrial waste outfalls to the St. Marys River are shown in Figure 1.

Samples were also taken during a study of the effect on the river of the gates at the rapids between the U.S. and Canadian locks.

The 1971 water quality data for the four ranges (SMU 5.6, SMD 2.0, SMD 5.3W and SMD 8.5E) are compared to the IJC objectives and to data of previous years. The 1971 data for key ranges on the river are summarized in comparison with the IJC objectives in Table 1. Graphs are used to illustrate important areas in which the objectives are exceeded.

### Total Coliform Bacteria Densities

Existing IJC Objective: median value not to exceed 2,400 organisms/100 ml.

Recommended New IJC Objective: monthly geometric mean not to exceed 1,000 organisms/100 ml.

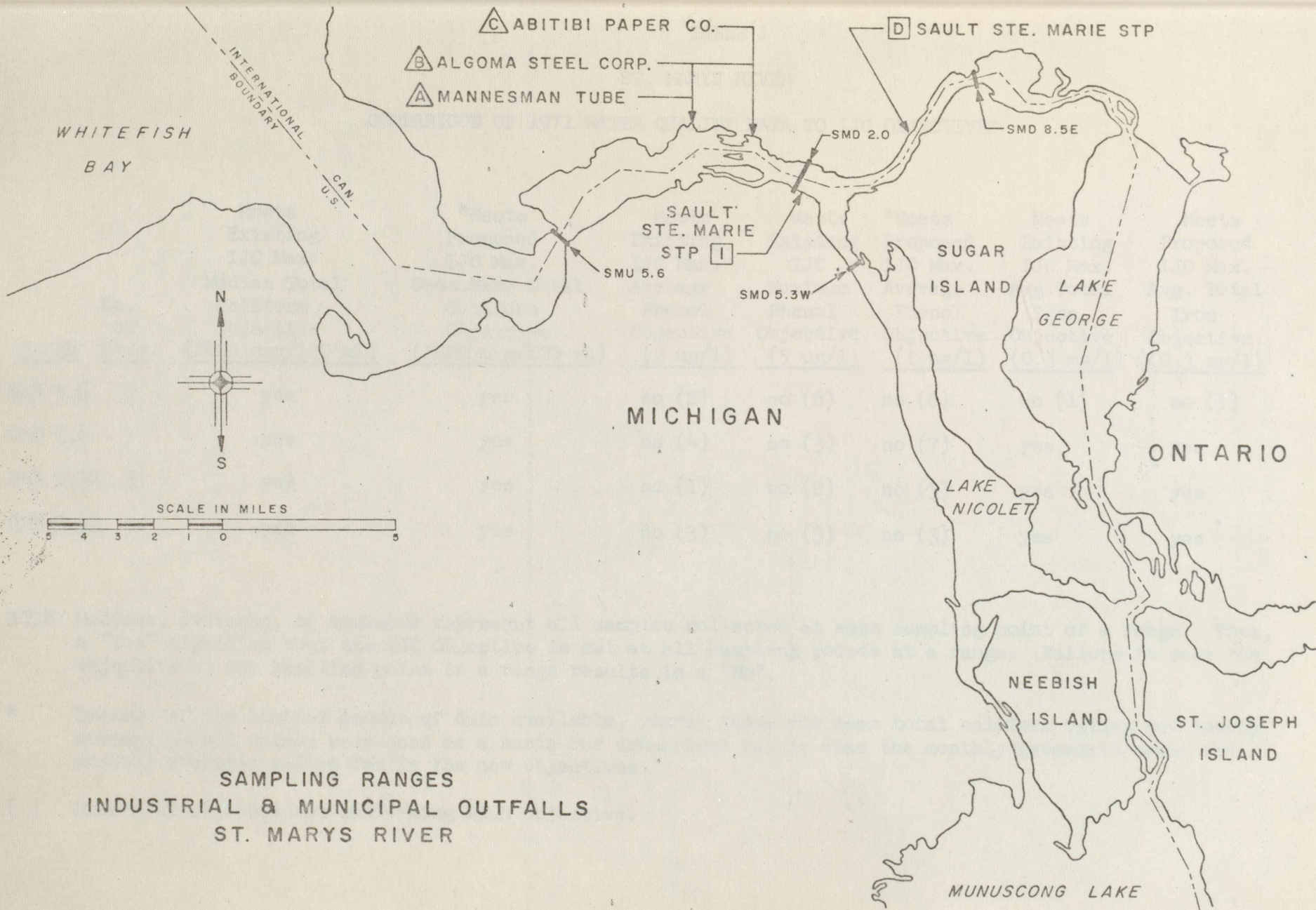
All median and geometric mean coliform densities for the four ranges of the river conformed with IJC objectives during 1971. Values were generally of the same magnitude as in 1970. The highest values were found near the U.S. and Canadian shores of the ranges downstream from the locks. The maximum value for 1971 was 6,100 organisms/100 ml near the Canadian shore of SMD 8.5E. The highest median value of 720 organisms/100 ml was found at the same station.

### Fecal Coliform Bacteria Densities

Recommended IJC Objective: monthly geometric mean not to exceed 200 organisms/100 ml.

All geometric mean densities for fecal coliform on the St. Marys River conformed with the recommended IJC objective in 1971. Upstream of the locks, individual values were 1 to 36 organisms/100 ml. In the area downstream of the locks, maximum values were slightly higher, particularly along both shorelines. The area of highest concentration on the river was near the Canadian shore of SMD 8.5E, where a maximum of 270 organisms/100 ml was found. This area did not, however, fail to conform with the recommended objective for geometric mean values.





SAMPLING RANGES  
INDUSTRIAL & MUNICIPAL OUTFALLS  
ST. MARYS RIVER

FIGURE 1



TABLE 1

## ST. MARYS RIVER

## COMPARISON OF 1971 WATER QUALITY DATA TO IJC OBJECTIVES

Range	No. of Stas.	Meets Existing IJC Max. Median Total Coliform Objective (2400 org/100 ml)	*Meets Proposed IJC Max. Geom. Mean Total Coliform Objective (1000 org/100 ml)	Meets Existing IJC Max. Average Phenol Objective (2 ug/l)	Meets Existing IJC . Maximum Phenol Objective (5 ug/l)	*Meets Proposed IJC Max. Average Phenol Objective (1 ug/l)	Meets Existing IJC Max. Avg. Total Iron Objective (0.3 mg/l)	Meets Proposed IJC Max. Avg. Total Iron Objective (<0.3 mg/l)
SMU 5.6	6	yes	yes	no (2)	no (6)	no (6)	no (1)	no (1)
SMD 2.0	7	yes	yes	no (4)	no (3)	no (7)	yes	yes
SM 5.3W	3	yes	yes	no (1)	no (2)	no (3)	yes	yes
SMD 8.5E	3	yes	yes	no (3)	no (3)	no (3)	yes	yes

NOTE: Medians, averages, or maximums represent all samples collected at each sampling point of a range. Thus, a "Yes" signifies that the IJC Objective is met at all sampling points at a range. Failure to meet the objective at any sampling point in a range results in a "No".

\* Because of the limited amount of data available, yearly geometric mean total coliform values and yearly average phenol values were used as a basis for comparison rather than the monthly geometric means and monthly averages called for in the new objectives.

( ) Number of stations not conforming with objective.



## Phenol Concentrations

Existing IJC Objective: average value not to exceed 2 ug/l; maximum value not to exceed 5 ug/l.

Recommended New IJC Objective: average monthly value not to exceed 1 ug/l.

An increase in phenol concentrations in 1971 was noted at range SMU 5.6 near the head of the St. Marys River (Figure 2). Data from 1970 showed an average less than 1 ug/l across the range; while the 1971 average was 2.5 ug/l. Three of the stations had average values of 3 ug/l. Yearly fluctuations in phenol concentrations have occurred in previous years, the last being in 1969. There is no apparent reason for the situation, except that ships use this area for anchoring until the locks are available. The maximum value found for SMU 5.6 in 1971 was 8 ug/l. All stations exceeded the recommended new objective.

Further downstream, phenol concentrations remain at the same levels as in 1970, with ranges SMD 2.0 and SMD 8.5E exceeding all phenol objectives. The highest concentrations in 1971 were found near the Canadian shore of SMD 2.0, with an average of 16 ug/l and maximum of 25 ug/l (Figure 2).

## Total Iron Concentrations

Existing IJC Objectives: not to exceed 0.3 mg/l.

Recommended New IJC Objective: **not to exceed 0.3 mg/l.**

During 1971, the iron concentrations on the St. Marys River generally met both the existing and recommended objectives. The only exception on the four primary ranges occurred near the U.S. shore of SMU 5.6, where an average of 0.4 mg/l and a maximum of 1.4 mg/l were found (Figure 3). In 1970 SMU 5.6 conformed with the objectives, whereas two of the 17 ranges did not conform with the existing objective and ~~two did not conform~~ with the recommended objective. Downstream from the locks, averages were generally from 0.05 to 0.15 mg/l.

## Chloride Concentrations

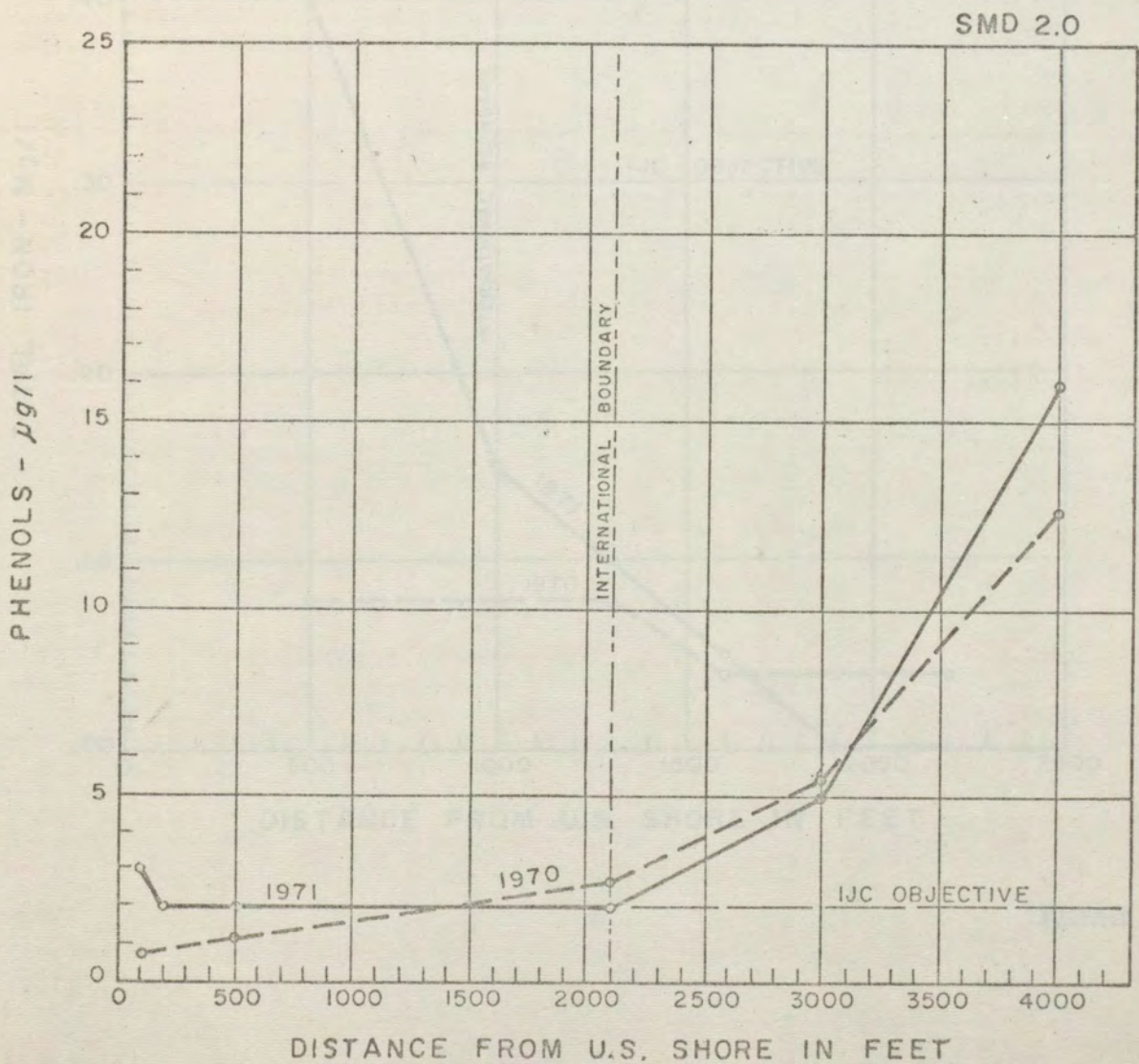
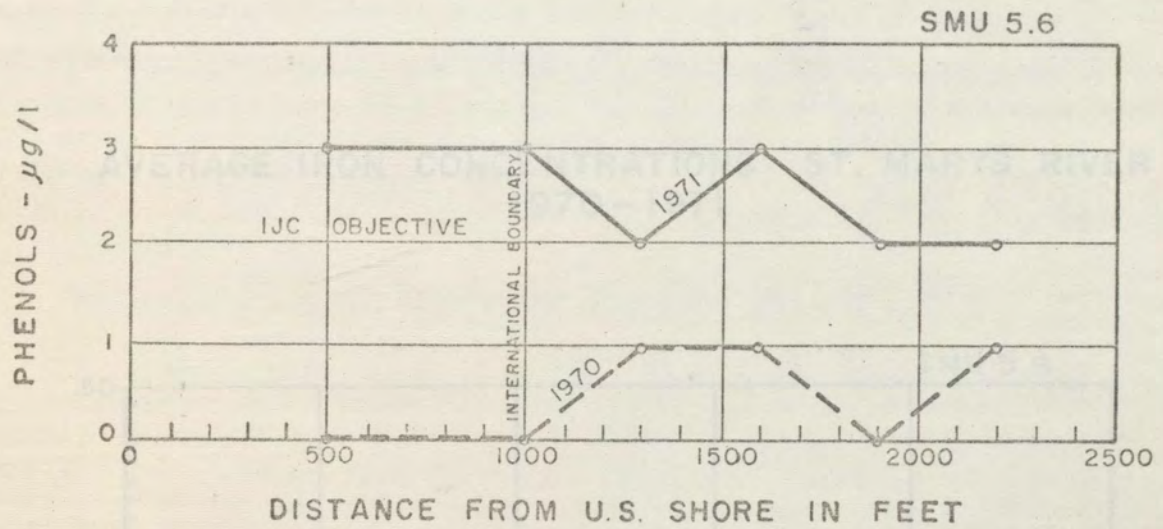
Data for 1971 for chlorides showed an average of 2 mg/l at all of the stations on the four primary ranges. This figure is in line with data from previous years. Maximum values in 1971 were 4 mg/l or less for all ranges.

## Phosphorus Concentrations

Little variation in total phosphorus concentrations between the head of the river and ranges downstream from the locks was encountered in 1971. The average value was 0.014 mg/l at head and mouth ranges. This is similar to 1970 levels. Values were higher than the average near the U.S. shore on several ranges.

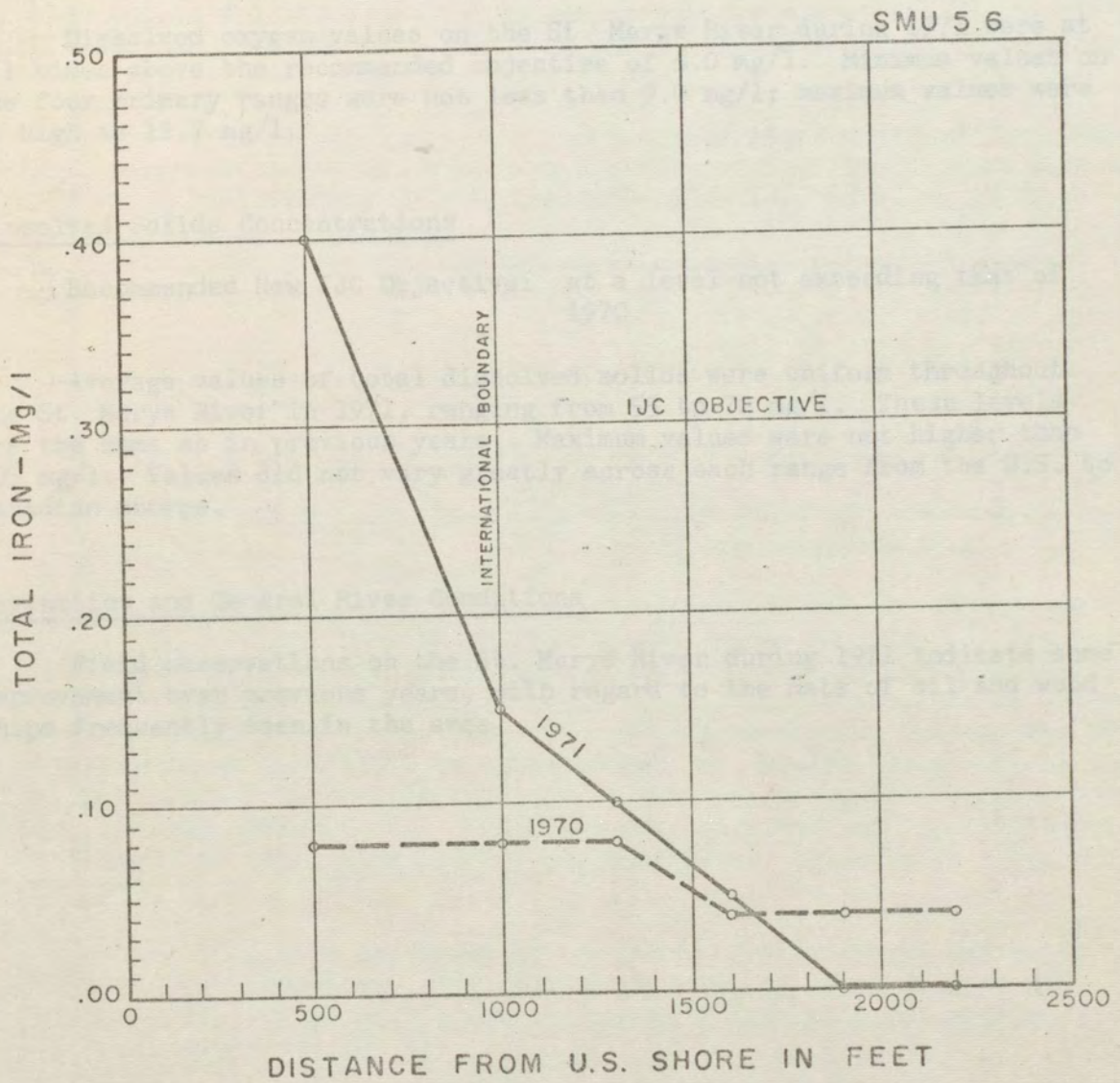


# AVERAGE PHENOL CONCENTRATIONS - ST. MARYS RIVER 1970 - 1971





AVERAGE IRON CONCENTRATIONS ST. MARYS RIVER  
1970-1971





### Total Nitrogen Concentrations

Total nitrogen concentrations remained constant from the head of the St. Marys River to the ranges downstream from the locks. The average at range SMU 5.6 was 0.43 mg/l, while the downriver ranges had averages from 0.39 to 0.53 mg/l. These figures are generally the same as 1970 average values. No particularly high values were encountered at any specific location on the river; total nitrogen values were generally the same across each range. Maximum values were on the order of 1.1 mg/l.

### Dissolved Oxygen

Recommended New IJC Objective: not less than 6.0 mg/l.

Dissolved oxygen values on the St. Marys River during 1971 were at all times above the recommended objective of 6.0 mg/l. Minimum values on the four primary ranges were not less than 9.0 mg/l; maximum values were as high as 12.7 mg/l.

### Dissolved Solids Concentrations

Recommended New IJC Objective: at a level not exceeding that of 1970.

Average values of total dissolved solids were uniform throughout the St. Marys River in 1971, ranging from 55 to 70 mg/l. These levels are the same as in previous years. Maximum values were not higher than 105 mg/l. Values did not vary greatly across each range from the U.S. to Canadian shores.

### Aesthetics and General River Conditions

Field observations on the St. Marys River during 1971 indicate some improvement over previous years, with regard to the mats of oil and wood chips frequently seen in the area.



## ST. CLAIR RIVER

### Introduction

In 1971, the Ontario Water Resources Commission (OWRC) sampled seven ranges six times while the EPA Michigan District Office (MIDO) sampled nine ranges six times. The locations of the sampling ranges, along with the industrial and municipal outfalls, are shown on Figure 4.

In addition to the regular sampling surveys, the OWRC conducted three aerial surveillance flights of the St. Clair River to spot possible waste spills and to assess the general aesthetic conditions of the river. Both the OWRC and the MWRC continued their regular programs of sampling stream tributaries to the St. Clair River.

The 1971 water quality data are compared to existing and recommended IJC objectives to see if objectives are met. Comparison is also made with 1970 water quality data to note improvement or loss in water quality. A comparison of the 1971 data with the objectives appears in Table 2. Data for ranges where water quality has shown a change over previous years are presented graphically.

### Total Coliform Bacteria Densities

Existing IJC Objective: median value not to exceed 2,400 organisms/100 ml.

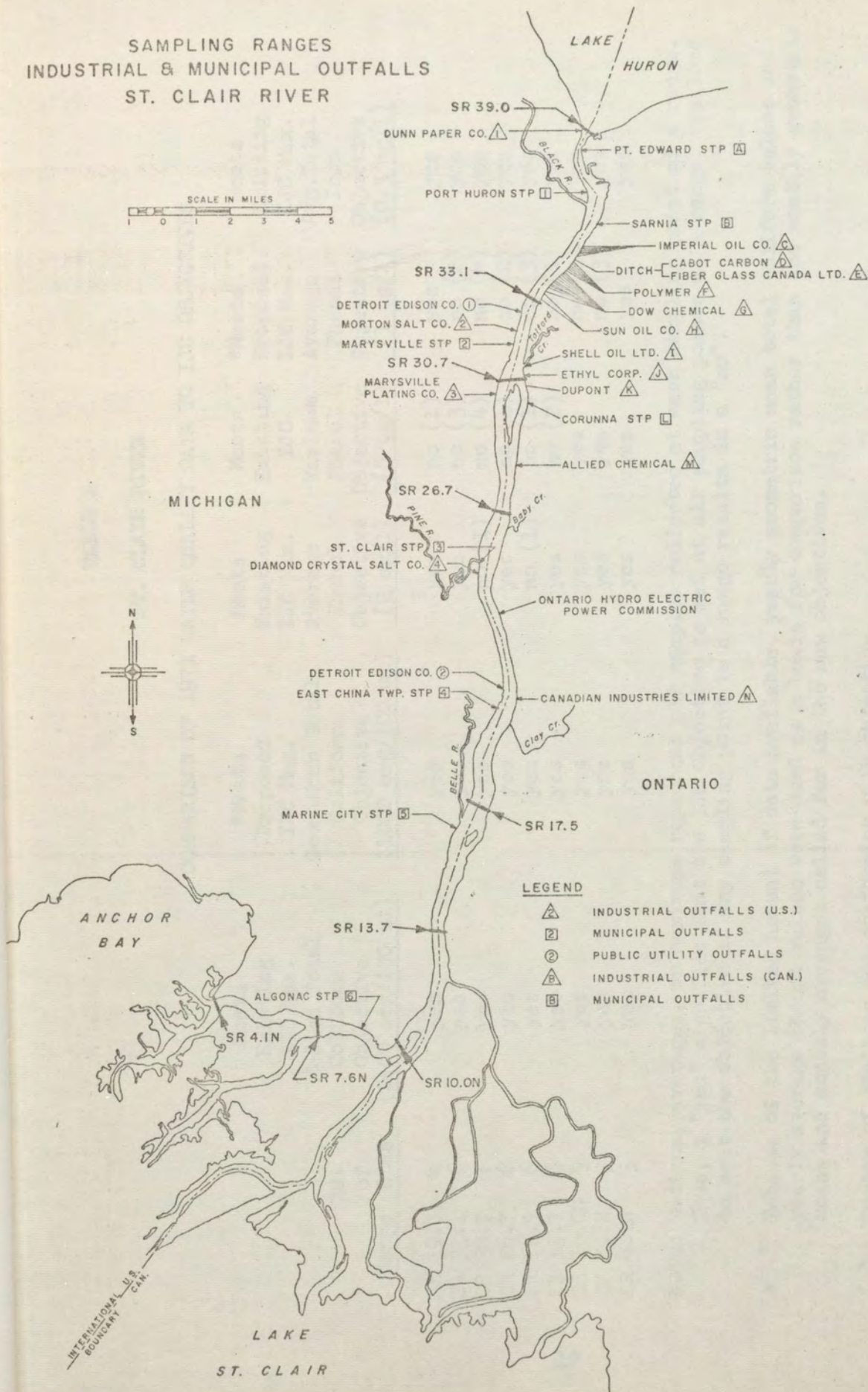
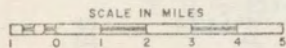
Recommended New IJC Objective: monthly geometric mean not to exceed 1,000 organisms/100 ml.

Total coliform bacteria densities conformed with the objectives for median and geometric mean values on all ranges in 1971. At the head of the river, median and geometric mean values were less than 20 organisms/100 ml. Densities downstream to range SR 13.7 at Roberts Landing increased gradually along both shorelines; the effects of Sarnia, Ontario and Port Huron, Michigan contribute to these increases. Median and geometric mean values continued to conform with the objectives, being generally no more than 300 organisms/100 ml. Individual samples along both shorelines were sometimes as high as 5,000 organisms/100 ml, but only in isolated instances.

From SR 13.7 to the mouth of the river, little change was noted in total coliform densities. The objectives were conformed with at all ranges; median and geometric mean values were generally not greater than 300 to 400 organisms/100 ml.



# SAMPLING RANGES INDUSTRIAL & MUNICIPAL OUTFALLS ST. CLAIR RIVER



### LEGEND

- ▲ INDUSTRIAL OUTFALLS (U.S.)
- MUNICIPAL OUTFALLS
- ② PUBLIC UTILITY OUTFALLS
- ▲ INDUSTRIAL OUTFALLS (CAN.)
- MUNICIPAL OUTFALLS



TABLE 2

## ST. CLAIR RIVER

## COMPARISON OF 1971 WATER QUALITY DATA TO IJC OBJECTIVES

	No. of Range Stas.	Meets Existing IJC Max. Median Total Coliform Objective (2400 org/100 ml)	*Meets Proposed IJC Max. Geom. Mean Total Coliform Objective (1000 org/100 ml)	Meets Existing IJC Max. Average Phenol Objective (2 ug/l)	Meets Existing IJC Maximum Phenol Objective (5 ug/l)	*Meets Proposed IJC Max. Average Phenol Objective (1 ug/l)	Meets Existing IJC Max. Avg. Total Iron Objective (0.3 mg/l)
SR 39.0	4	yes	yes	yes	no (1)	yes	yes
SR 33.1	6	yes	yes	yes	no (3)	no (2)	yes
SR 30.7	7	yes	yes	no (1)	no (4)	no (4)	yes
SR 26.7	6	yes	yes	yes	no (1)	no (2)	yes
SR 17.5	6	yes	yes	no (1)	no (1)	no (3)	yes
SR 13.7	6	yes	yes	yes	no (2)	no (1)	yes
SR 10.0N	3	yes	yes	yes	yes	no (2)	yes
SR 7.6N	3	yes	yes	yes	yes	no (3)	yes
SR 4.1N	3	yes	yes	yes	yes	yes	yes

NOTE: Medians, averages, or maximums represent all samples collected at each sampling point of a range. Thus, a "yes" signifies that the IJC Objective is met at all sampling points at a range. Failure to meet the objective at any sampling point in a range results in a "no".

\* Because of the limited amount of data available, yearly geometric mean total coliform values and yearly average phenol values were used as a basis for comparison rather than the monthly geometric means and monthly averages called for in the new objectives.

( ) Number of stations not conforming with objective.



### Fecal Coliform Bacteria Densities

Recommended New IJC Objective: monthly geometric mean not to exceed 200 organisms/100 ml.

The St. Clair River conformed with the recommended objective for fecal coliform densities at all ranges in 1971. Values at the head of the river were less than 10 organisms/100 ml. Densities increased downstream of Sarnia, Ontario along the Canadian shore, where individual values, as high as 520 organisms/100 ml, were found. These values did not, however, result in failure to conform with the monthly objective. In the lower portion of the river, densities were less than 150 organisms/100 ml for individual values, making geometric mean values conform with the recommended objective.

### Phenol Concentrations

Existing IJC Objective: average value not to exceed 2 ug/l; maximum value not to exceed 5 ug/l.

Recommended New IJC Objective: average monthly value not to exceed 1 ug/l.

In 1971, seven out of nine ranges had average values of 2 ug/l or less, compared with only nine of twenty-three in 1970. The only ranges exceeding 2 ug/l were SR 30.7 and SR 17.5, with only the station nearest the Canadian shore not in conformance with the objective (Figure 5). In 1971, six of nine ranges exceeded the maximum value of 5 ug/l, compared with fourteen of twenty-three in 1970. Two of nine ranges, SR 39.0 and SR 4.1N, met the recommended objective compared with six of twenty-three ranges in 1970. Generally, phenol concentrations showed an improvement over 1970 values.

### Total Iron Concentrations

Existing IJC Objective: not to exceed 0.3 mg/l.

Recommended New IJC Objective: **not to exceed 0.3 mg/l.**

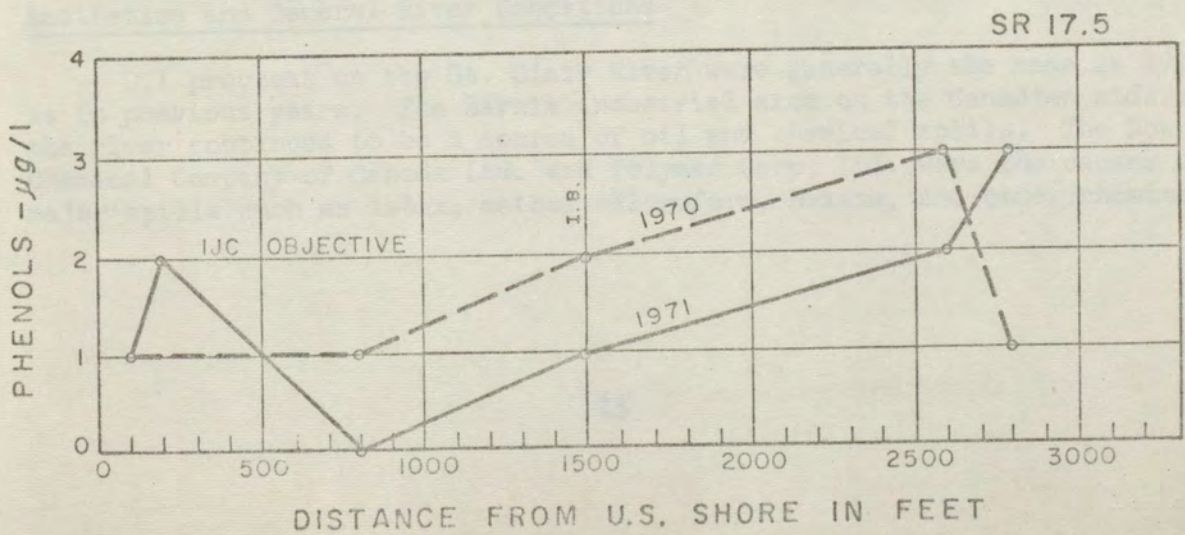
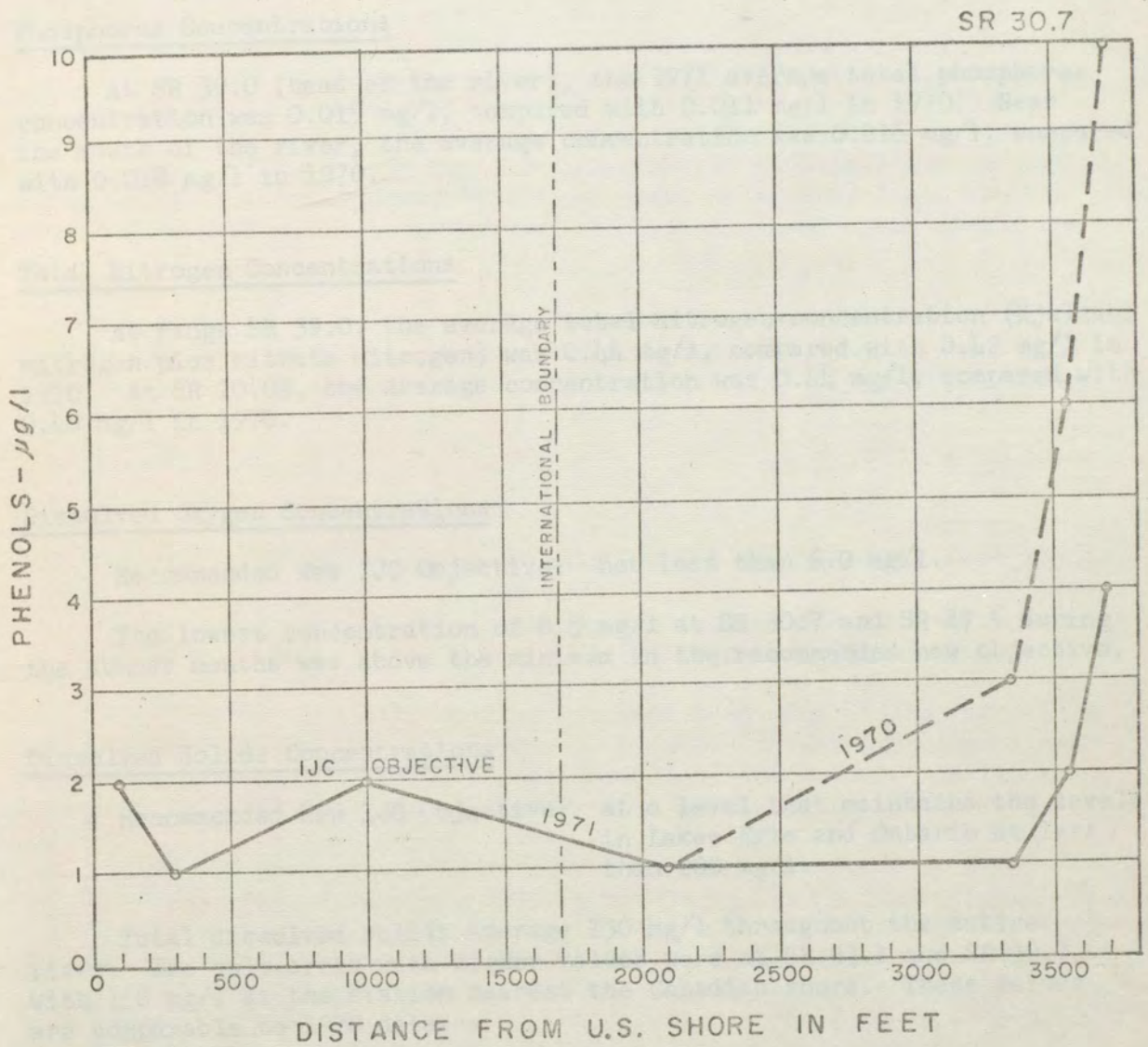
All nine ranges met the existing and recommended IJC objectives. This is an improvement over 1970. In 1970, only 14 of 23 ranges met the existing objective and ~~only 12 of 23 met~~ the recommended objective. In 1971, the highest average values were 0.2 mg/l on five stations along the U.S. shore, as compared to 1970 when several stations had an average of 0.4 mg/l.

### Chloride Concentrations

Average 1971 chloride concentrations are similar to 1970 data, with values of 6 mg/l at the head of the river and 7 to 8 mg/l at the lower waters of the river. Below Dow Chemical of Canada, Ltd., at the station nearest the Canadian shore at SR 33.1, average chloride concentrations



# AVERAGE PHENOL CONCENTRATIONS - ST. CLAIR RIVER 1970 - 1971





were 28 mg/l. The concentrations decreased gradually downriver until at SR 17.5 the concentration was 10 mg/l. Generally, concentrations were greater at shore stations than mid river stations.

#### Phosphorus Concentrations

At SR 39.0 (head of the river), the 1971 average total phosphorus concentration was 0.015 mg/l, compared with 0.011 mg/l in 1970. Near the mouth of the river, the average concentration was 0.016 mg/l, compared with 0.018 mg/l in 1970.

#### Total Nitrogen Concentrations

At range SR 39.0, the average total nitrogen concentration (Kjeldahl nitrogen plus nitrate nitrogen) was 0.44 mg/l, compared with 0.42 mg/l in 1970. At SR 10.0N, the average concentration was 0.44 mg/l, compared with 0.48 mg/l in 1970.

#### Dissolved Oxygen Concentrations

Recommended New IJC Objective: not less than 6.0 mg/l.

The lowest concentration of 8.6 mg/l at SR 30.7 and SR 17.5 during the summer months was above the minimum in the recommended new objective.

#### Dissolved Solids Concentrations

Recommended New IJC Objective: at a level that maintains the levels in Lakes Erie and Ontario at less than 200 mg/l.

Total dissolved solids average 130 mg/l throughout the entire river. The only areas with higher values were at SR 33.1 and SR 30.7, with 150 mg/l at the station nearest the Canadian shore. These values are comparable to 1970 data.

#### Aesthetics and General River Conditions

Oil problems on the St. Clair River were generally the same in 1971 as in previous years. The Sarnia industrial area on the Canadian side of the river continued to be a source of oil and chemical spills. The Dow Chemical Company of Canada Ltd. and Polymer Corp. Ltd. were the causes of major spills such as latex, methyl chloroform, hexane, and other chemicals.



## DETROIT RIVER

### Introduction

The Detroit River water quality data for 1971 were collected from ten IJC ranges. The OWRC and the MWRC sampled each range six times, giving a total of twelve samples per station. The locations of the ranges sampled are shown on Figure 6. The locations of municipal and industrial waste outfalls to the Detroit River are shown on Figures 7 and 8. The OWRC and the MWRC also conducted aerial surveillance flights during the year.

The 1971 water quality data are compared to the IJC objectives and to data of previous years. A comparison of the 1971 data with the objectives appears in Table 3. Graphs are used to illustrate areas in which the IJC objectives are exceeded.

### Total Coliform Bacteria Densities

Existing IJC Objective: median value not to exceed 2,400 organisms/100 ml.

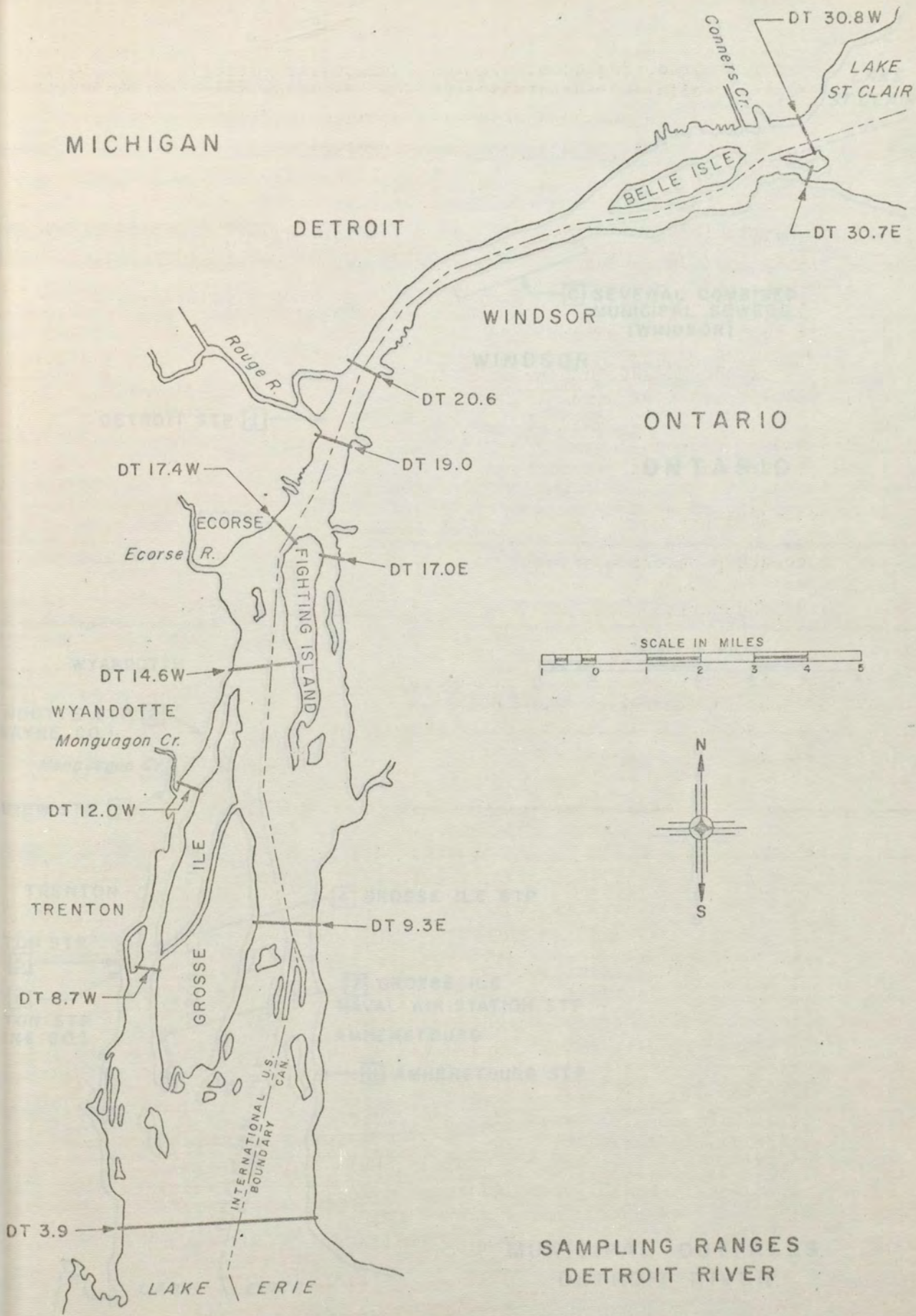
Recommended New IJC Objective: monthly geometric mean not to exceed 1,000 organisms/100 ml.

The 1971 median total coliform densities at many of the ranges did not conform with the IJC objectives. This shows little improvement over 1970 data; only ranges DT 30.8W and DT 30.7E at the head of the river conformed with the existing and recommended objectives.

A problem with high coliform concentrations continues to exist along the Canadian shore of DT 20.6, where a median of 18,000 organisms/100 ml, a geometric mean of 21,000 organisms/100 ml, and maximum values as high as 280,000 organisms/100 ml were found (Figure 9). Combined sewer overflows from Windsor contribute to this problem. Values as high as 110,000 organisms/100 ml were encountered along the U.S. shore of DT 20.6, although the median values conformed with the objective. High values continued on downstream ranges DT 19.0, DT 17.0E, and DT 14.6W (Figure 9). This can be attributed to the Detroit sewage treatment plant effluent. Values as high as 100,000 to 300,000 organisms/100 ml were found near the U.S. and Canadian shores; the existing and recommended objectives were not conformed with in these areas.

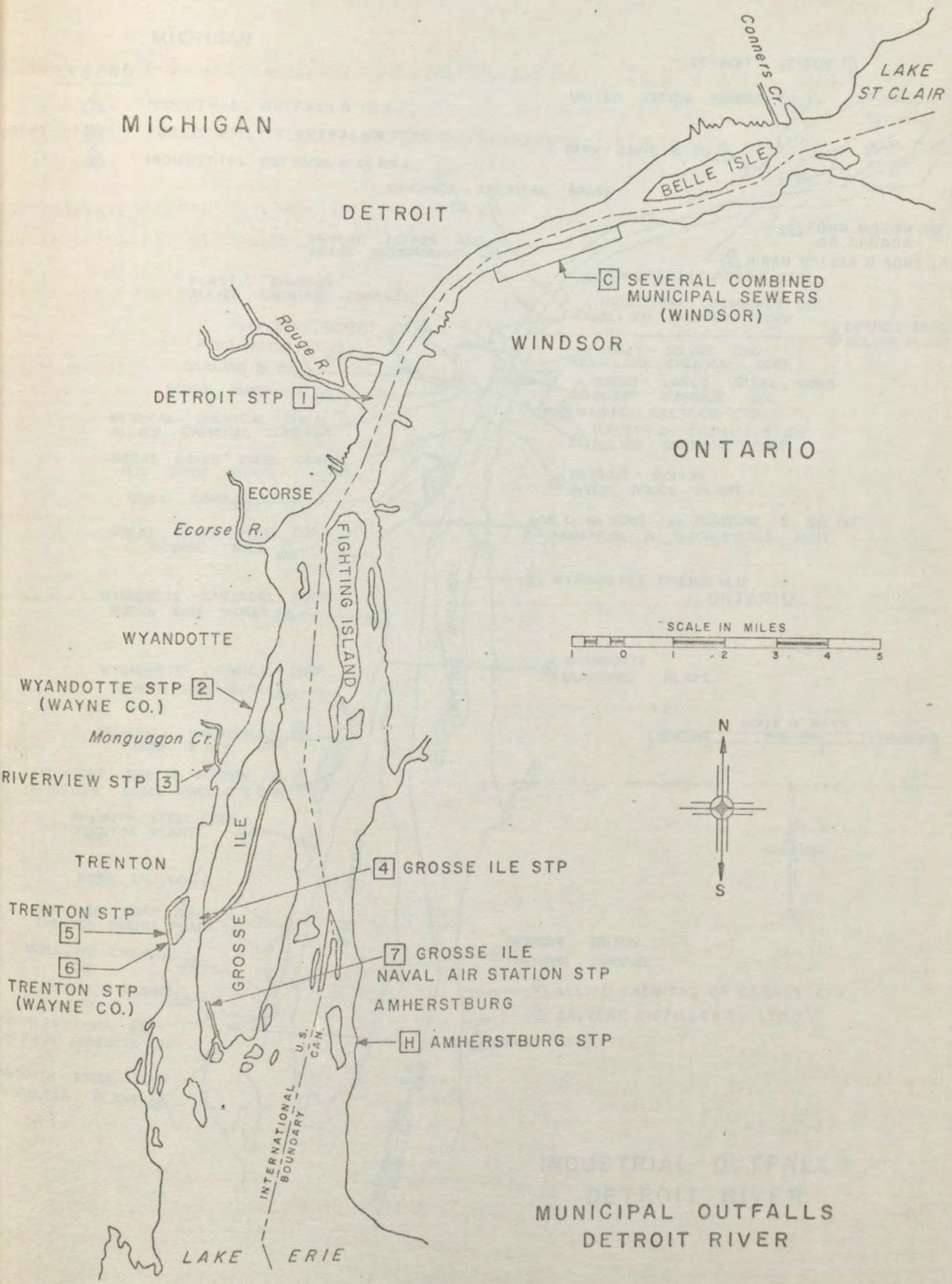
In the Trenton Channel, values remained high. Median values up to 4,900 organisms/100 ml, geometric mean values up to 5,700 organisms/100 ml and maximum values as high as 280,000 organisms/100 ml were found in 1971. Median values are improved when compared to data previous to 1970.





SAMPLING RANGES  
DETROIT RIVER







MICHIGAN

LEGEND

- ② INDUSTRIAL OUTFALLS (U.S.)
- ② PUBLIC UTILITY OUTFALLS
- Ⓐ INDUSTRIAL OUTFALLS (CAN.)

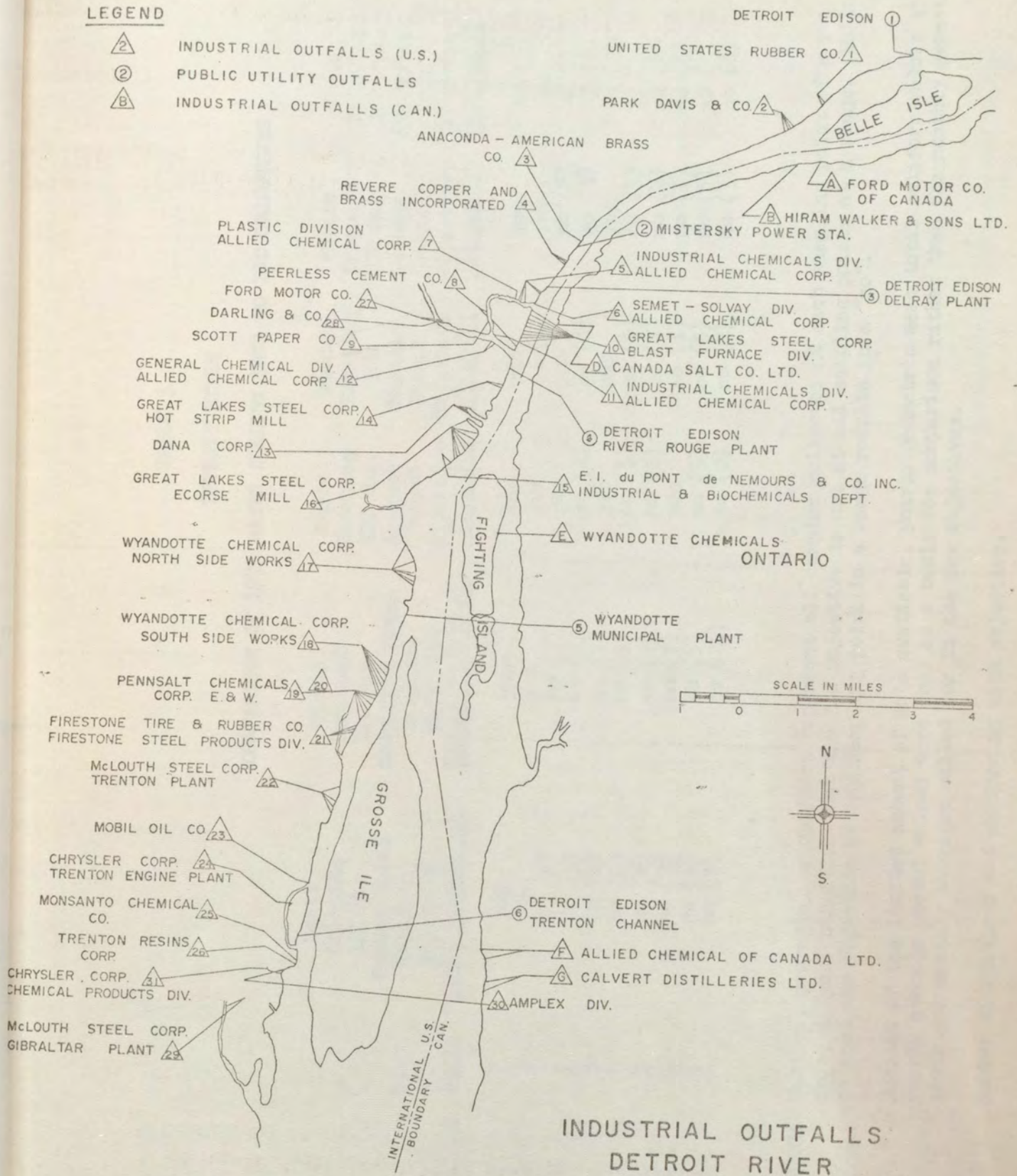




TABLE 3

## DETROIT RIVER

## COMPARISON OF 1971 WATER QUALITY DATA TO IJC OBJECTIVES

Range	No. of Stns.	Meets Existing IJC Max. Median Total Coliform Objective (2400 org/100 ml)	*Meets Proposed IJC Max. Geom. Mean Total Coliform Objective (1000 org/100 ml)	Meets Existing IJC Max. Average Phenol Objective (2 ug/l)	Meets Existing IJC Maximum Phenol Objective (5 ug/l)	*Meets Proposed IJC Max. Average Phenol Objective (1 ug/l)	Meets Existing IJC Max. Avg. Total Iron Objective (0.3 mg/l)
30.2W	7	yes	yes	yes	yes	yes	no (3)
30.7E	3	yes	yes	yes	no (1)	yes	yes
20.3	3	no (1)	no (2)	yes	yes	no (2)	no (3)
19.0	3	no (3)	no (4)	no (1)	no (2)	no (3)	no (2)
17.0E	3	no (1)	no (2)	yes	yes	yes	no (3)
14.6W	6	no (2)	no (5)	no (5)	no (5)	no (5)	no (5)
12.3W	4	no (2)	no (2)	no (3)	no (4)	no (4)	no (4)
9.3E	7	no (2)	no (7)	yes	no (1)	no (1)	no (5)
3.7W	5	no (1)	no (5)	no (5)	no (5)	no (5)	no (5)
3.9	11	no (7)	no (11)	no (2)	no (3)	no (3)	no (8)

NOTE: Medians, averages, or maximums represent all samples collected at each sampling point of a range. Thus, a "yes" signifies that the IJC Objective is met at all sampling points at a range. Failure to meet the objective at any sampling point in a range results in a "no".

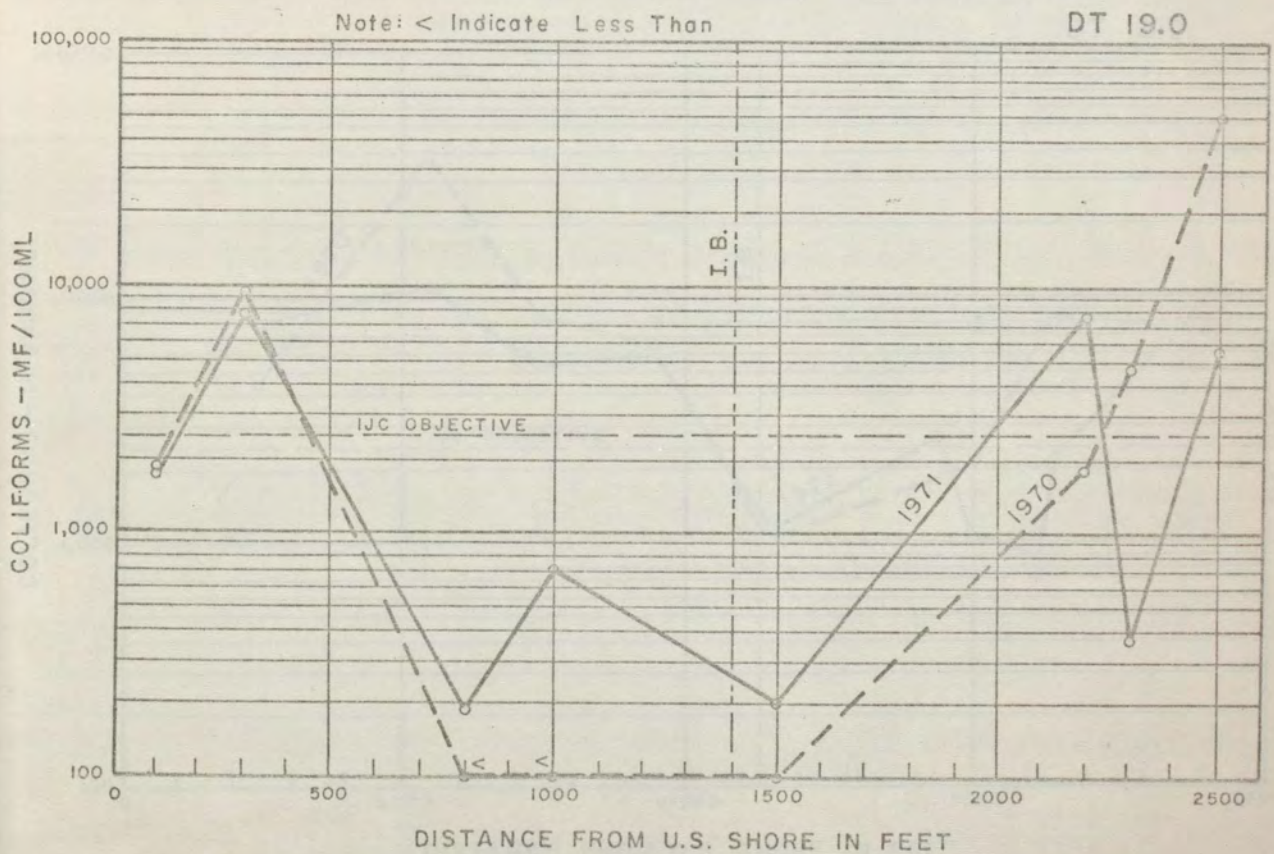
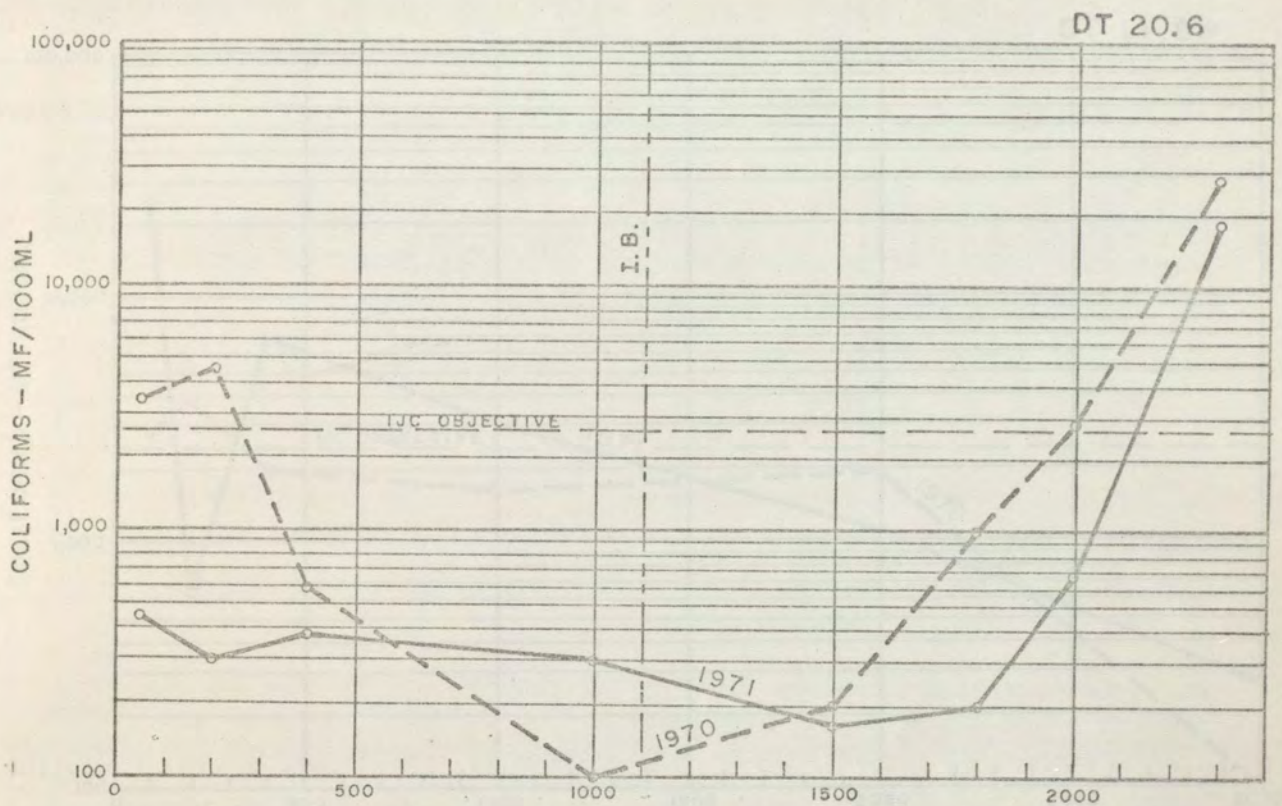
\* Because of the limited amount of data available, yearly geometric mean total coliform values and yearly average phenol values were used as a basis for comparison rather than the monthly geometric means and monthly averages called for in the new objectives.

( ) Number of stations not conforming with objective.

MEDIAN (GEOMETRIC MEAN) DENSITIES - DETROIT RIVER 1970-1971



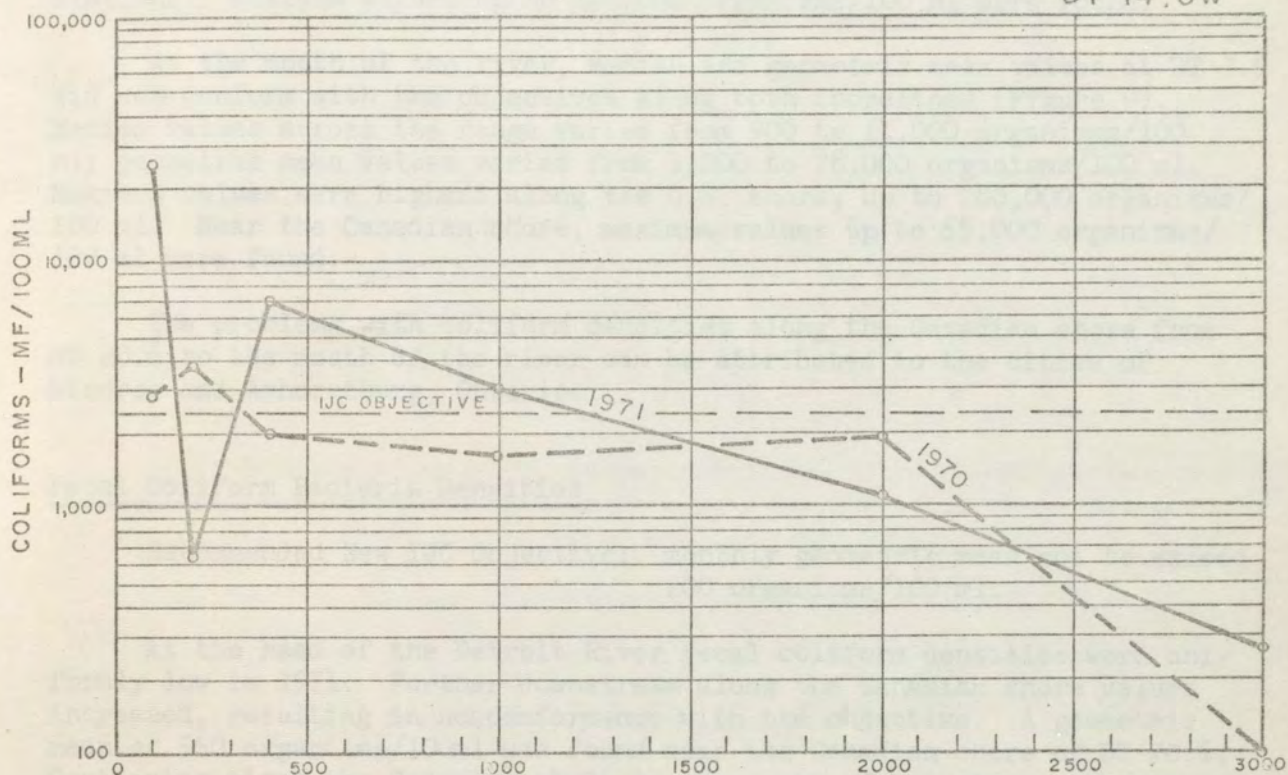
# MEDIAN COLIFORM DENSITIES - DETROIT RIVER 1970 - 1971



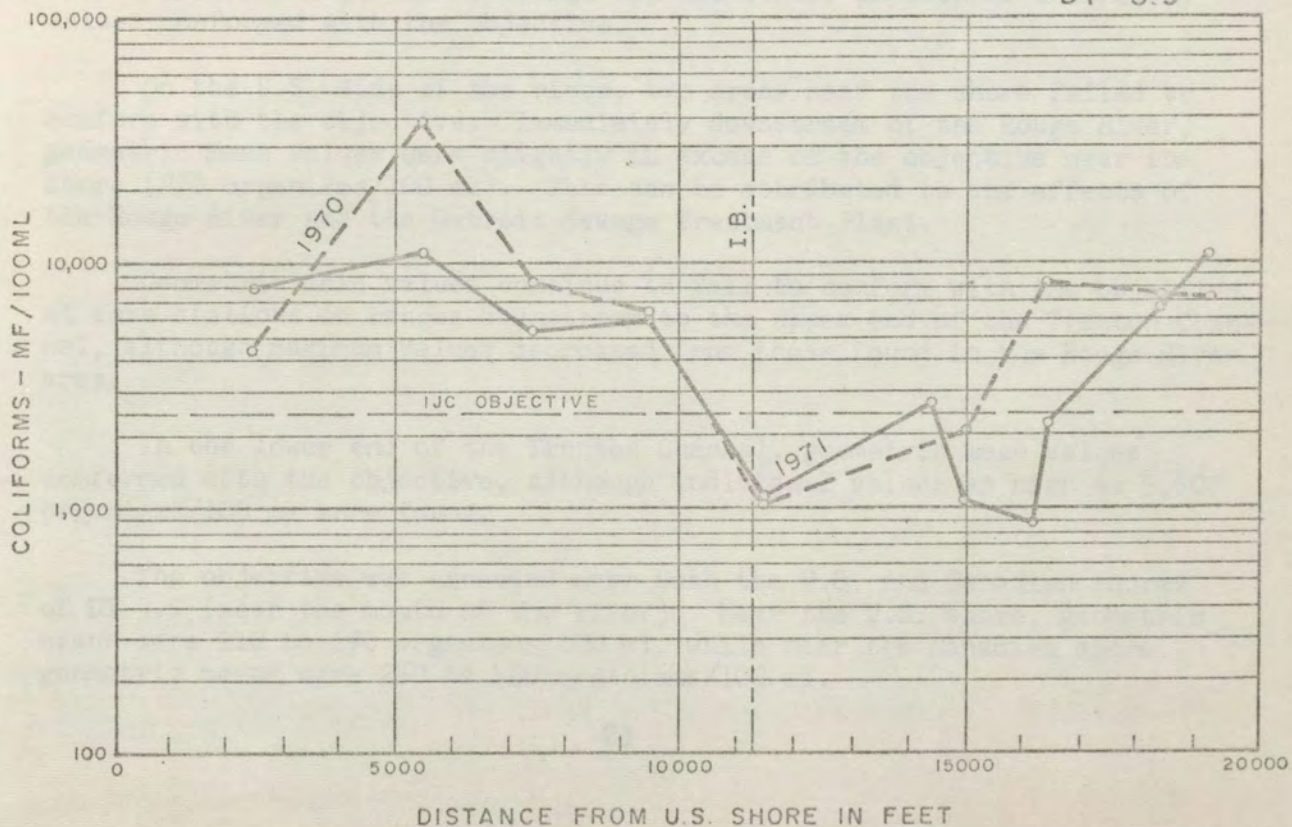


# MEDIAN COLIFORM DENSITIES - DETROIT RIVER 1970 - 1971

DT 14.6W



DT 3.9



DISTANCE FROM U.S. SHORE IN FEET



Along the Canadian shore at DT 9.3E, 1971 coliform densities were lower than those at DT 17.0E further upstream. Median values still did not conform with the objective on several stations, however. Geometric mean values did not conform with the recommended objective on any of the stations. Maximum values up to 170,000 organisms/100 ml were found.

At the mouth of the river, median and geometric mean values at DT 3.9 did not conform with the objectives along both shorelines (Figure 9). Median values across the range varied from 900 to 11,000 organisms/100 ml; geometric mean values varied from 1,200 to 78,000 organisms/100 ml. Maximum values were highest along the U.S. shore, up to 280,000 organisms/100 ml. Near the Canadian shore, maximum values up to 65,000 organisms/100 ml were found.

The problems with coliform densities along the Canadian shore from DT 20.6 to the mouth of the river can be attributed to the cities of Windsor and Amherstburg, Ontario.

#### Fecal Coliform Bacteria Densities

Recommended New IJC Objective: monthly geometric mean not to exceed 200 organisms/100 ml.

At the head of the Detroit River fecal coliform densities were uniformly low in 1971. Further downstream along the Canadian shore values increased, resulting in nonconformance with the objective. A geometric mean of 560 organisms/100ml was found near the Canadian shore of DT 20.6. Continuing along the Canadian shore to the mouth of the river, ranges were above the objective; geometric means were 350 to 400 organisms/100 ml at stations nearest shore. This can be attributed to discharges from the cities of Windsor and Amherstburg. In the center portion of the river, values conformed with the objective.

On the U.S. side of the river, two areas near the shore failed to conform with the objective. Immediately downstream of the Rouge River, geometric mean values were slightly in excess of the objective near the shore (220 organisms/100 ml). This can be attributed to the effects of the Rouge River and the Detroit Sewage Treatment Plant.

Geometric mean values continue to fail to conform with the objective at some stations on ranges downstream to the upper end of the Trenton Channel, although maximum values decreased from those found in the Rouge River area.

In the lower end of the Trenton Channel, geometric mean values conformed with the objective, although individual values as high as 5,600 organisms/100 ml were found.

The objective was exceeded near both the U.S. and Canadian shores of DT 3.9 (near the mouth of the river). Near the U.S. shore, geometric means were 210 to 690 organisms/100 ml, while near the Canadian shore geometric means were 250 to 420 organisms/100 ml.



## Phenol Concentrations

Existing IJC Objective: average value not to exceed 2 ug/l; maximum value not to exceed 5 ug/l.

Recommended New IJC Objective: average monthly value not to exceed 1 ug/l.

Significant improvement can be observed in 1971 phenol concentrations on the Detroit River, when compared to previous years data. Upstream of the Rouge River, values did not exceed the average or maximum objectives; average values were 1 ug/l or less.

At DT 19.0, immediately downstream from the Rouge River, values increased slightly. Several stations averaged above 2 ug/l, with the highest average being 8 ug/l (Figure 10). Values for DT 17.0E on the Canadian side of the river were well within the objectives, averaging 1 ug/l or less.

Further downstream at DT 14.6W, the increase in phenol concentrations continued, with averages up to 6 ug/l and maximums up to 20 ug/l being reported. These levels are about the same as in 1970.

The Trenton Channel showed marked improvement in phenol concentrations, as compared to 1970. Average values for 1971 data were 4 to 5 ug/l compared with 4 to 25 ug/l in 1970 (Figure 10). Although still being above the objectives, these figures do show the effects of improved treatment at the Woodhaven Mobil Oil Corp. Refinery.

Phenol values east of Grosse Ile, range DT 9.3E conformed with the existing objectives. Average values were 2 ug/l or less for all stations.

Near the mouth of the river (range DT 3.9), all stations conformed with the objectives except for the two stations nearest the U.S. shore (Figure 10). The averages for the two stations were 5 and 3 ug/l, with maximum values of 10 ug/l reported.

## Total Iron Concentrations

Existing IJC Objective: not to exceed 0.3 mg/l.

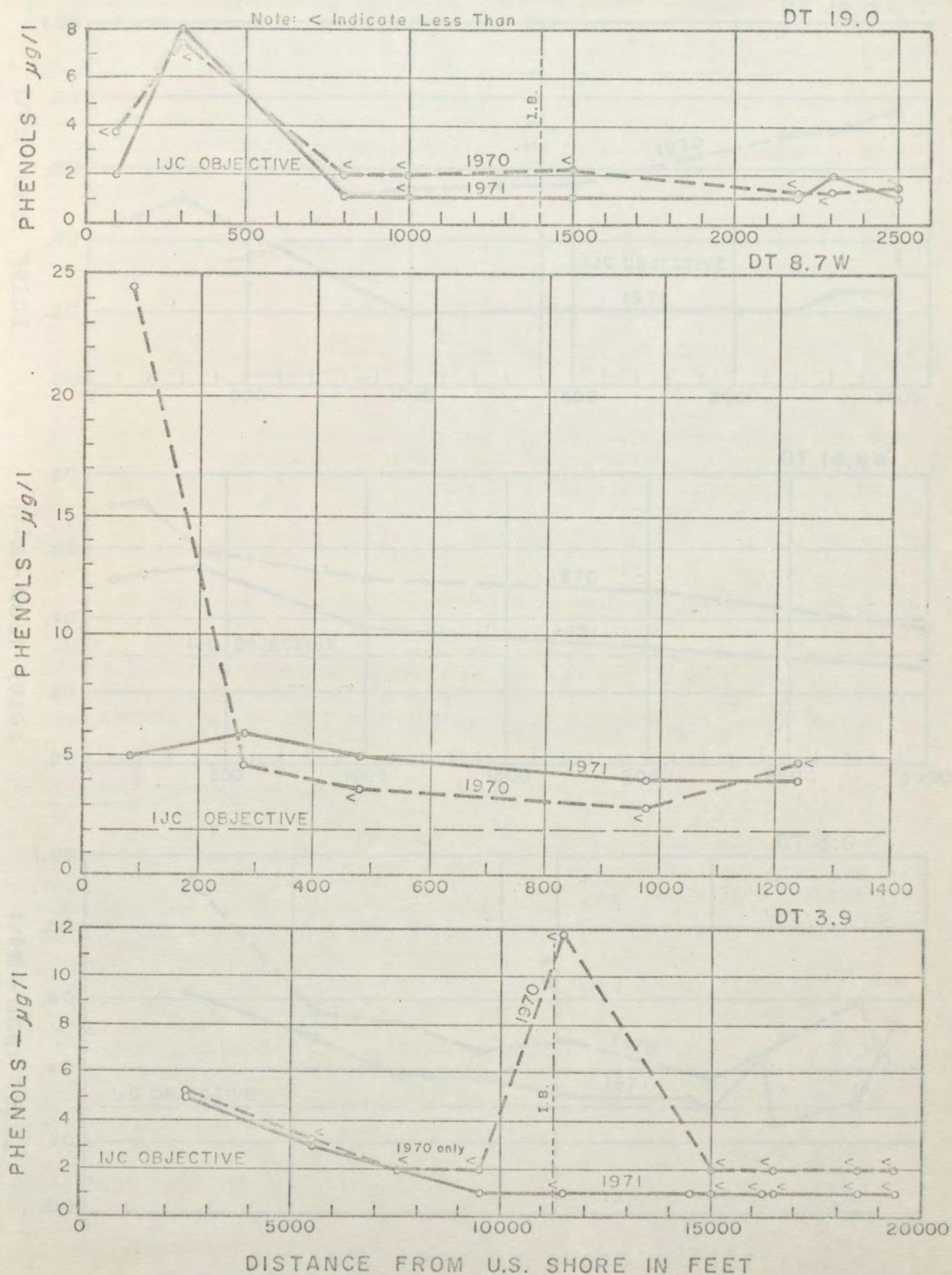
Recommended New IJC Objective: ~~not less than~~ <sup>not to exceed</sup> 0.3 mg/l.

Only one range, DT 30.7E, on the Detroit River was within the existing objective for total iron in 1971. Concentrations entering the head of the river from Lake St. Clair at DT 30.8W did not conform with the objective as in previous years, with average values up to 0.35 mg/l and maximum values as high as 1.2 mg/l. Downstream at DT 20.6, the same general levels exist, which is a slight improvement over 1970 data.

Below the Rouge River some improvement over 1970 results can be seen, particularly near the U.S. shore (Figure 11). In this area, average values from 0.7 to 1.0 mg/l in 1970 have been reduced to 0.4 to 0.5 mg/l. This can be attributed to more efficient spent acid control at the Ford Motor Company, Rouge Plant.

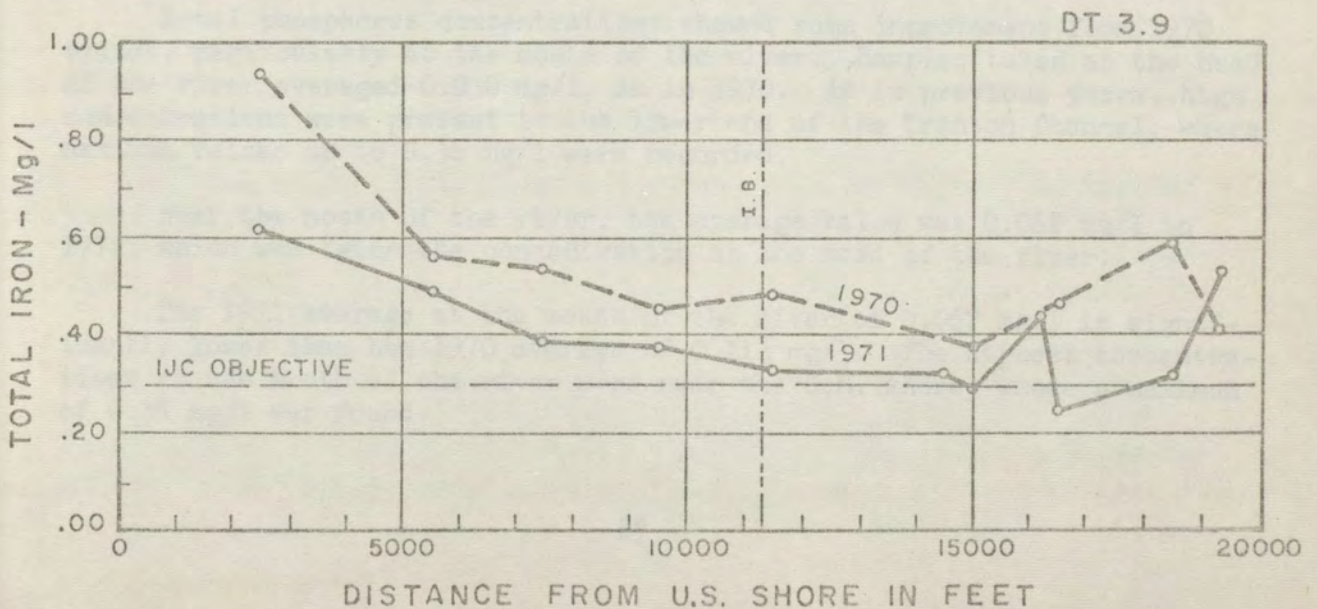
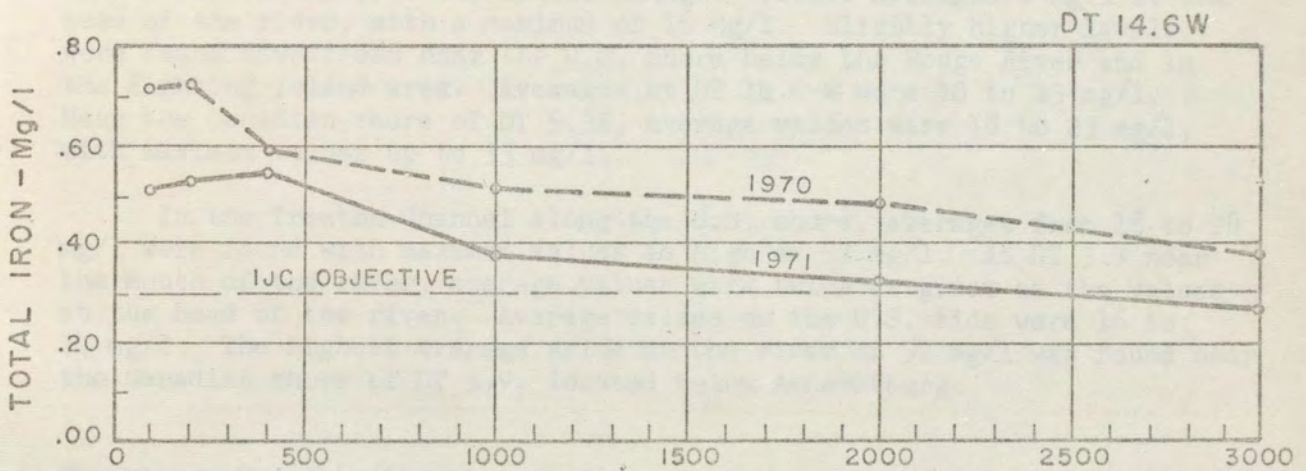
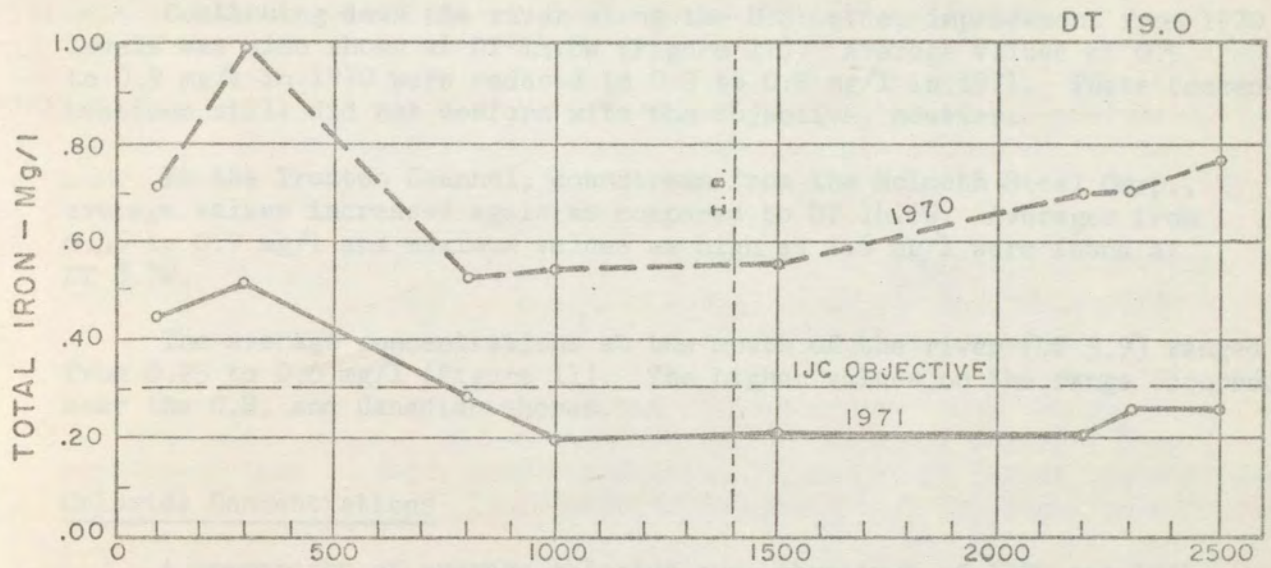


# AVERAGE PHENOL CONCENTRATIONS - DETROIT RIVER 1970 - 1971





# AVERAGE IRON CONCENTRATIONS - DETROIT RIVER 1970 - 1971





In the Canadian waters of DT 17.0E and DT 9.3E, values in 1971 continued to exceed the objective, averaging 0.3 to 0.5 mg/l.

Continuing down the river along the U.S. side, improvement from 1970 levels was also shown at DT 14.6W (Figure 11). Average values of 0.5 to 0.9 mg/l in 1970 were reduced to 0.3 to 0.5 mg/l in 1971. These concentrations still did not conform with the objective, however.

In the Trenton Channel, downstream from the McLouth Steel Corp., average values increased again as compared to DT 14.6W. Averages from 0.45 to 0.9 mg/l and maximum values as high as 1.6 mg/l were found at DT 8.7W.

The average concentrations at the mouth of the river (DT 3.9) ranged from 0.25 to 0.6 mg/l (Figure 11). The higher values on the range occurred near the U.S. and Canadian shores.

### Chloride Concentrations

A comparison of average chloride concentrations of 1970 and 1971 on the Detroit River shows little change. Values averaged 9 mg/l at the head of the river, with a maximum of 16 mg/l. Slightly higher levels were found downstream near the U.S. shore below the Rouge River and in the Fighting Island area. Averages at DT 14.6 W were 10 to 13 mg/l. Near the Canadian shore of DT 9.3E, average values were 18 to 23 mg/l, with maximum values up to 33 mg/l.

In the Trenton Channel along the U.S. shore, averages from 18 to 28 mg/l were found with maximum values as high as 52 mg/l. At DT 3.9 near the mouth of the river, average values were twice as great as the values at the head of the river. Average values on the U.S. side were 16 to 24 mg/l. The highest average value on the river of 52 mg/l was found near the Canadian shore of DT 3.9, located below Amherstburg.

### Phosphorus Concentrations

Total phosphorus concentrations showed some improvement from 1970 values, particularly at the mouth of the river. Samples taken at the head of the river averaged 0.030 mg/l, as in 1970. As in previous years, high concentrations were present in the lower end of the Trenton Channel, where maximum values up to 0.34 mg/l were recorded.

Near the mouth of the river, the average value was 0.062 mg/l in 1971, which was twice the concentration at the head of the river.

The 1971 average at the mouth of the river of 0.062 mg/l is significantly lower than the 1970 average of 0.112 mg/l. The highest concentrations at the mouth of the river were near the U.S. shore, where a maximum of 0.35 mg/l was found.



### Total Nitrogen Concentrations

The 1971 average total nitrogen concentration of 0.45 mg/l at the head of the Detroit River is essentially the same as in 1970. The average level rose to 0.59 mg/l at the mouth of the river. This is a decrease from the 1970 average of 0.72 mg/l. Highest values on DT 3.9 were near the U.S. shore. As in the case of other parameters, high values were found in the lower end of the Trenton Channel, where maximum values of 2.0 mg/l were found.

### Dissolved Oxygen

Recommended New IJC Objective: not less than 6.0 mg/l.

During 1971, the entire Detroit River conformed with the objective for dissolved oxygen. In the summer, minimum values of 6.3 to 6.9 mg/l were found from DT 14.6, thru the Trenton Channel to DT 3.9 at the stations nearest the U.S. shore. The lowest value of 6.3 mg/l was found near the U.S. shore of DT 3.9.

### Total Dissolved Solids

Recommended New IJC Objective: a level consistent with maintaining the levels in Lake Erie less than 200 mg/l.

Total dissolved solids entering the head of the Detroit River averaged 120 to 140 mg/l in 1971, which is the same as in previous years. Maximum values were 170 mg/l or less. At the mouth of the river, average values were 130 to 240 mg/l, with the higher concentrations found near the U.S. (170 mg/l) and Canadian (240 mg/l) shores. These data at the mouth of the river were somewhat lower than in 1970 (140 to 270 mg/l).

### Aesthetics and General River Conditions

On the Detroit River, some improvement in aesthetic conditions was noted along the U.S. shore, upstream from the Rouge River. The discharges of rendering plant wastes which were once a common occurrence from one sewer line was not observed this year.

At the mouth of the Rouge River, the main outfall of the Detroit primary sewage treatment plant continues to discolor the river with a discharge of large quantities of sewage solids and industrial waste products.

Downstream from the Rouge River, red discoloration due to iron discharges has shown a great improvement over the past several years. In the area of the Great Lakes Steel Corp. Plants, especially Ecorse Rolling Mill, further improvement in iron levels is still necessary to meet the objectives.



Oil continues to be a reoccurring problem along the U.S. shore downstream from the Rouge River. The Ford Motor Company, Great Lakes Steel Corp. Plants, U.S. Army Corp of Engineering-Engineering Project, and Mc-Iouth Steel Corp. Plants all contribute to this problem.

#### Detroit River

A. A second filter unit has been in continuous operation since June at the "Valleys" of the Canadian power canal. This unit is used to remove traces of micro-organic contaminants in the river water.

2. Water Monitoring - Routine samples of industrial and municipal discharges were taken in 1971. Detailed composite sampling was also carried out at the outfalls of Algoma Steel Corporation and the Alchibi Paper Company. As part of the ORE's stream monitoring program, samples are taken weekly at four locations in the main river and at the mouth of the tributary, Post River.

#### St. Clair River

Water Monitoring - The robot water quality monitor is continuing operation in the St. Clair River as follows: construction of the major water chemical industries.

Water Monitoring - In addition to river sampling, composite and grab samples of industrial and municipal discharges were carried out. The following tributary streams sampling sites are: St. Clair River and Lake St. Clair were monitored on a monthly basis; Lake St. Clair, Little River, North Drain, Warming Drain, Five Creek, Fox River, Belle River, Racine River, Thames River, Wilbury Creek, Tappin's Creek, Newburgh Creek, Dutchess Creek, Duder Creek, Ash River, Eschbach River, Bear Creek, County River, Dixon, and Telford Creek.

Water Monitoring - Investigations continued in the St. Clair River and Lake St. Clair.

#### Detroit River

Water Monitoring - In addition to the river monitoring, industrial and municipal discharges to the Detroit River were sampled. The following tributaries on the Canadian side of the Detroit River were monitored on a monthly basis: Huron Creek and Canal River.

Weekly sampling continued for the Detroit River in 1971.

Investigations on the Great Lakes were carried out in order to formulate recommendations on proposed dredging projects.

#### Michigan Water Resources Commission

##### Great Lakes Tributary Sampling Program

Weekly samples were taken at all major Great Lakes Tributaries. Composite channel observations were carried out in this program. Included the major tributaries and their rivers. Monthly



## OTHER STUDIES

### Ontario Water Resources Commission

#### St. Marys River

A. A carbon filter unit has been in continuous operation since June at the "tailrace" of the Canadian power canal. This unit is used to measure levels of micro-organic contaminants in the river water.

B. Input Monitoring - Routine samples of industrial and municipal discharges were taken in 1971. Detailed composite sampling was also carried out at the outfalls of Algoma Steel Corporation and the Abitibi Paper Company. As part of the OWRC's stream monitoring program, samples are taken monthly at four locations in the main river and at the mouth of the tributary, Root River.

#### St. Clair River

Robot Monitoring - The robot water quality monitor is continuing operation in the St. Clair River at Corunna, downstream of the major petro chemical industries.

Input Monitoring - In addition to river sampling, composite and grab sampling of industrial and municipal discharges were carried out. The following tributary streams emptying into the St. Clair River and Lake St. Clair were monitored on a monthly basis; Lake St. Clair, Little River, Parent Drain, Manning Drain, Pike Creek, Puce River, Belle River, Ruscom River, Thames River, Tilbury Creek, Baptiste Creek, Newbiggin Creek, Dingman Creek, Deder Creek, Avon River, Sydenham River, Bear Creek, County River Ditch, and Talford Creek.

Mercury investigations continued in the St. Clair River and Lake St. Clair.

#### Detroit River

Input Monitoring - In addition to the river monitoring, industrial and municipal discharges to the Detroit River were sampled. The following tributaries on the Canadian side of the Detroit River were monitored on a monthly basis: Turkey Creek and Canal River.

Mercury sampling continued in the Detroit River in 1971.

Investigations on the three rivers were carried out in order to formulate recommendations on proposed dredging projects.

### Michigan Water Resources Commission

#### Great Lakes Tributary Monitoring Program

Monthly samples were taken at all major Great Lakes Tributaries. Connecting channel tributaries which were monitored in this program included the Rouge, Clinton, Belle, Pine, and Black Rivers. Twenty



water quality parameters were measured monthly with 18 other parameters measured at varying frequencies.

#### Pesticide and PCB Monitoring

As part of a statewide monitoring effort during 1971, concentrations of chlorinated hydrocarbon pesticides and polychlorinated biphenyls (PCB's) were checked in composite water samples from the St. Marys River at Sault Ste. Marie, the St. Clair River at Port Huron, and the upper Detroit River. Three major tributaries to the St. Clair and Detroit Rivers were also sampled: 1. Black River, 2. Clinton River and 3. Rouge River. Samples were obtained on a quarterly basis except the St. Marys River which was sampled once. In addition to the river monitoring, 14 municipal water intakes on the connecting waters were sampled as well as discharges from large municipal wastewater treatment plants. Further study was conducted particularly on the Detroit WWTP interceptors to identify point sources of PCB's entering that system.

#### Reporting by Industries

Two new routine reporting programs were started in 1971. Monthly operating reports are now made to the Michigan Water Resources Commission by all major industrial plants. These reports include daily averages for all significant materials discharged. Also, all industries and commercial establishments are required to file an annual report with the Water Resources Commission listing any usage or discharge of "critical materials." The list of "critical materials" includes 74 ions, compounds, or classes of compounds which could cause serious damage to the aquatic environment.

#### Detroit Industrial Outfalls Sampling

Over 100 industrial intakes and outfalls in and near the Detroit Area were sampled 4 times each during 1971. The parameters analyzed for were determined on an individual basis, depending on the type of industry.

#### Environmental Protection Agency - Michigan District Office

##### St. Marys River

Proposed Dredging - The Michigan District Office (MIDO) of EPA cooperated with the U.S. Bureau of Sport Fisheries and Wildlife in a survey of the channel east of Neebish Island during the week of May 17. The study provided preliminary data to evaluate a proposed dredging project in the area, before and after completion.

Dissolved Oxygen Survey - The EPA-MIDO carried out a special dissolved oxygen (DO) survey in the East Channel in August. The survey, involving depth sampling, was initiated due to a statement at the IJC Shore Property Subcommittee of the Levels Board that low DO's had been found in the East Channel, especially Little Lake George. The data from this survey showed high DO values in this area and were similar to DO data in other areas of the river.



## EPA-MIDO (continued)

### St. Clair River and Lake St. Clair

Mercury Deposits - At the request of the U. S. Army Corps of Engineers, the EPA-MIDO collected bottom samples for mercury analyses in the area of the cutoff from the St. Clair River to Lake St. Clair. The data showed the mercury concentrations were generally 50% lower than in 1970. However, the levels are still high enough that the bottom material cannot be deposited into open waters.

### Detroit River and Lake Erie

The EPA-MIDO continued mercury investigations in the Detroit River and Lake Erie to further define the extent of mercury concentrations in these areas.

## COMBINED AGENCY STUDIES

### St. Marys River

River Monitoring - A survey was conducted on August 3 to 7 to determine the effect of minimum gate openings of the compensating works on water quality and waste dispersion characteristics in the St. Marys River. Participating in the study were the Ontario Water Resources Commission, Canadian Federal Department of the Environment, Michigan Department of Natural Resources and the EPA.

### Depth Studies

In 1971, the MIDO collected samples from the St. Marys River at different depths. The OWRC collected samples from the St. Marys River, St. Clair River, and the Detroit River at different depths. An examination of the data from these samples showed no consistent correlation between depth and concentration of ammonia nitrogen, organic nitrogen, nitrate nitrogen, total phosphorus, dissolved ortho-phosphorus, total coliform, fecal coliform, phenol, chloride, total iron, dissolved solids, or cyanide. These results verify the results of a 1965 EPA study.



## OIL AND OTHER MATERIALS INCIDENTS

A total of seven oil and other materials incidents were reported for the St. Marys River in 1971, none of which were of major importance. Three cases involved minor oil slicks of unknown origin, with ships in the vicinity being suspected in one instance. Two cases involved iron and solids discharges, probably from Algoma Steel. In one case, the Abitibi Paper Company discharged larger than normal amounts of floating solids. The remaining incident involved alleged discharges of sewage from cabins in Pt. Louis area; investigation revealed no pollution problem.

Thirty reports of spills involving oil or other materials were received in 1971 on the St. Clair River. Of the 30 cases, 14 cases involved oil spills, while the remaining 16 involved other materials such as chemicals, solids, etc. Twenty-one of the spills originated from known industrial sources, three from other types of known sources, and the remaining six from unknown sources.

During 1971, 63 oil or other material spills were reported on the Detroit River. Forty-six cases were other materials, such as chemicals, solids, etc. Of the 63 cases, 29 originated from known industrial sources, 8 from other types of known sources, and the remaining 26 from unknown causes.

Some of the more significant cases merit discussion in more detail.

January 24, 1971 - a spill of caustic material to a tributary of the Detroit River from the McLouth Steel Plant at Gibraltar, Michigan caused the loss of an estimated 50,000 fish. Although the MWRC recommended a fine of \$20,000, the court conviction resulted in a fine of \$500.

July 2, 1971 - Algoma Steel, Sault Ste. Marie, Ontario, reported an overflow of suspended solids and iron to the St. Marys River. No apparent effect on the river was noted.

August 27, 1971 - the International Contingency Plan was mobilized to deal with an oil spill which resulted from the collision of the M/V Transmichigan and the M/V Netuno at the head of the St. Clair River. A relatively minor amount of damage to the environment and to property resulted from the spill.

October 2, 1971 - an equipment failure at Polymer Corporation, Ltd., Sarnia, Ontario resulted in the loss of 17,000 gallons of hexane to the St. Clair River. Shipping was stopped for a short period and water users downstream were notified. No apparent effects of the spill were noted on the river.

November 7, 1971 - an unknown quantity of methyl chloroform was lost to the St. Clair River from Dow Chemical of Canada, Ltd. due to an over-filling error by an operator. Dikes and alarms are being installed to prevent future incidents.



STATUS OF MUNICIPAL AND INDUSTRIAL  
POLLUTION ABATEMENT PROGRAMS

ST. MARYS RIVER

ONTARIO

Municipal

City of Sault Ste. Marie

In 1961, an 8.0-mgd primary type sewage treatment facility along with the necessary trunk and collector system was built to serve the city as well as parts of Korah and Tarentorus townships.

Flows somewhat in excess of the design capacity have been experienced at this plant for the past two years. These are due mainly to extension of sewer services, however, infiltration and storm waters resulting from a combined sewer system in the downtown area create excess flows at the treatment plant.

At present plans to expand the existing plant to 12.0 mgd have been prepared and given preliminary approval by the Ontario Municipal Board (OMB). Final design is expected to begin shortly after which time tenders for construction costs will be called. It is anticipated that the facilities will be completed in late 1972 or early 1973.

Industrial

Algoma Steel Corporation Limited, Sault Ste. Marie

Company plans regarding the installation of a new thickener for blast furnace wastes are being reconsidered with a view to the development of an alternative proposal involving in-plant controls and modifications or additions to existing settling facilities.

Abitibi Paper Company Limited - Sault Ste. Marie

This Company has replied to the letter from the Chairman of the Canadian Section indicating the economic difficulties currently faced by this plant.

Sulphite pulping operations ceased on January 13, 1972. Paper production using kraft finish commenced on January 22, 1972. The reductions in BOD, dissolved solids and suspended solids anticipated from this change have yet to be confirmed by analysis.

Primary treatment facilities are to be in operation by the end of 1974 under the terms of a recently revised Ministerial Order if the mill continues operations.



Domtar Chemicals Ltd. - Sault Ste. Marie

Wastes from this plant are now disposed to municipal sanitary sewers.

MICHIGAN

Municipal

City of Sault Ste. Marie

The Michigan Water Resources Commission has approved the plan for improved wastewater treatment submitted by the City. The concurrence of the Environmental Protection Agency is still being sought.

Industrial

None.

ST. CLAIR RIVER - LAKE ST. CLAIR

ONTARIO

Municipal

Village of Point Edward

The 0.57-mgd primary type treatment servicing the village was constructed in 1961. Effluent quality from this plant has been very good and since the community has been essentially fully developed, no expansion is expected in the foreseeable future.

It should be noted that phosphorus removal facilities are scheduled to be constructed during 1973.

City of Sarnia

In 1961, construction of the 8.0-mgd primary sewage treatment plant as well as the necessary collector sewers was completed. Since then collector system expansion and system improvements have paralleled the growth of the city.

At present, the effluent discharged from the treatment facilities meets OWRC objectives.

Future plans include a sewer separation program to be undertaken by the city as well as a phosphorus removal program which is scheduled for completion by 1973.



### Moore Twp.

#### Police Village of Corunna

This community is presently served by a 0.32 mgd-secondary sewage treatment plant built in 1963. The effluent from this plant is of exceptionally good quality and is well within the Commission's objectives. Phosphorus removal facilities are scheduled for this plant by the end of 1973.

#### Village of Courtright

The Village of Courtright is presently served by individual septic tank and pit privy systems. In some instances, malfunctioning field tile systems or illicit connections to storm sewers allow inadequately treated wastes to reach the river. Guided by Commission recommendations that some type of waste treatment facilities be provided, the village applied for a provincially-financed sewage scheme. A project requesting a 0.15-mgd secondary treatment plant along with the necessary collector system has been developed and accepted by the municipal officials. When approval by the OMB is granted, final design will begin.

Construction of this system which will include phosphorus removal facilities is expected during 1973.

### Sombra Twp.

#### Police Village of Sombra

#### Police Village of Port Lambton

These two communities are presently served by individual septic tank field tile systems. A few privies still exist. Because of malfunctioning septic tank systems and problems with storm drainage, the Commission recommended a centralized treatment facility for each community.

The Township requested provincial assistance for the development and construction of treatment facilities for the above mentioned communities.

The 13.5-acre lagoon system for the Police Village of Sombra and a 15-acre lagoon for the Police Village of Port Lambton have been developed and approved by the municipality. Upon approval by the OMB, final design will begin and tenders will be called. Completion of these projects is expected by 1973, and will include phosphorus removal facilities.

### Tilbury (North) Township

#### Police Village of Stoney Point

The review of the cost rate structure for the 12-acre lagoon by the municipality has led to revision of the project. A provincially-financed 26-acre lagoon and sewer collector system is now proposed.



Seasonal waste discharge to Little Creek is proposed as opposed to the previously planned continuous discharge directly to Lake St. Clair.

#### Town of Belle River

A 0.4-mgd secondary treatment plant with the necessary trunk and collectors is presently being developed under a provincially-financed scheme.

Malfunctioning septic tanks and improper connection to storm drains in the area necessitated the sewage treatment program. At present, the project is being studied by the OMB and upon acceptance, the final design will begin. Completion is expected in 1973 and will include phosphorus removal facilities.

#### Town of Tecumseh

#### Village of St. Clair Beach

The above noted municipalities are presently negotiating with the City of Windsor on the feasibility of having their domestic wastes treated at the Windsor-Little River plant. A provincially-financed program for the construction of the trunk sewers and necessary collectors have been tentatively accepted by the communities and only the approval from the City is awaited.

#### Industrial

#### Imperial Oil Enterprises Ltd. - Sarnia

Projects for improved oil removal are proceeding on schedule. The new API separator installation has been completed; air flotation facilities for treatment of ballast waters are scheduled for completion in March 1972, and the installation of air flotation facilities for treatment of desalter brine has recently been approved.

The Company has also submitted plans for OWRC approval to provide for treatment for improved segregation of waste flows and expanded biological treatment facilities.

Long-term plans extending into 1975 call for additional oil removal facilities, waste segregation and terminal treatment facilities to control losses of dissolved organics and taste and odour producing substances.

Installation of the lime settling system for the Utility Plant which was originally scheduled for late 1971 is now scheduled for completion in 1972.

Also, alternatives to deep well disposal for high strength wastes are being actively investigated.

#### Mueller Limited - Sarnia

In-plant changes to a small electroplating line have been completed



and results indicate that the wastewater is suitable for discharge to municipal sanitary sewers. Negotiations between the Company and the City of Sarnia to expedite this are continuing.

Fiberglass Canada Limited - Sarnia

In-plant controls have been implemented to reduce phenol losses and others are proposed which should result in a waste discharge of acceptable quality.

Polymer Corporation Limited - Sarnia

Air flotation facilities for oil removal have now been installed at this plant.

Approval has been given to the replacement of spray condensers by surface condensers in a latex process unit to reduce oil losses.

Filtration facilities have been added to an existing treatment unit to further reduce latex losses.

Dow Chemical of Canada, Limited - Sarnia

Hydrolyzer bottoms, formerly a major source of high alkalinity and aesthetic problems from this plant are now being treated.

Proposals have been presented by the Company for the conversion of all caustic chlorine manufacturing to the diaphragm cell process, thus, eliminating the mercury cells. Elimination of mercury and significant reductions in chloride losses are anticipated from this change which is tentatively scheduled for early 1973.

Construction of a sanitary sewage collector system to serve 70 percent of the plant population is to be completed by August 1972 when the sewage flows will be discharged to the municipal sewerage system.

A staged program to be complete in 1975 will bring about complete handling of the remaining sanitary flows with haulage to the municipal sewerage system from the present septic tank facilities.

Sun Oil Company Limited - Sarnia

Construction of an impoundment basin for spills have been completed.

Air flotation facilities for the treatment of bilge and ballast wastes have been completed.

Plans for the construction of additional biological treatment facilities for phenolic wastes are expected from the Company very soon.



Shell Canada Limited - Township of Moore

Application for approval of facilities to provide treatment for phenolic wastes currently disposed in a deep well has been received. These facilities are scheduled for completion by late 1972.

Ethyl Corporation of Canada Limited - Township of Moore

The Company has placed in operation a hydrolyzer and API separator for treatment of heavy ends from its Ethyl Chloride Unit. Preliminary indications are that this system is performing satisfactorily.

Du Pont of Canada Limited - Township of Moore

The OWRC has approved proposed modifications to the Company's waste disposal system to further control the discharge of suspended solids in the form of polyethylene pallets. Construction is essentially complete.

Allied Chemical Canada, Ltd. - Township of Moore

A recent OWRC report identified batch dumping of spent caustic from acid gas scrubbing as a problem at this plant. The Company advised of plans to modify the process to substantially reduce the amount of caustic used.

Ontario Hydro - Lambton Generating Station

Plans for treatment and disposal of coal pile leachate, air heater washings and water treatment plant backwash waters have been approved and the necessary installations completed.

Canadian Industries Limited - Township of Sombra

Ion exchange facilities to treat ammonia condensate wastes have recently been completed.

MICHIGAN

Municipal

City of Algonac

The City's stipulation calls for start of construction by July 1, 1971 and completion of secondary treatment facilities and 80% phosphorus removal by June 1, 1972. The City has requested an extension of the completion date to September 1972. Preliminary plans have been approved and final plans and specifications are being prepared. Further Commission action is expected.

The Water Resources Commission approved the Official Plan for the St. Clair County Department of Public Works (City of Algonac and Townships of Ira and Clay) at its October 1971 meeting. The new treatment facility will serve all three governmental units.



Clay Township, St. Clair County

Clay Township is under Final Order to provide collection and subsequent treatment of domestic sewage by June 1972.

With regard to legal action between the Township and the Water Resources Commission, the Township may soon be in a position to consider the entry of a Consent Judgement in this case. The trial originally scheduled for September 24, 1971, and later adjourned to November by the court was adjourned to a date to be scheduled in 1972.

At the Commission's request, the Attorney General's Office is now seeking a court order that would set a specific and immediate schedule for abatement of pollution for the Township mainland with a somewhat extended program for Harsens Island. The settlement for Harsens Island would require a report to be filed by a specific time setting forth alternate methods for abatement of pollution from island sources, and would contain requirements which would prevent further development on the island if such development did not include state approved waste disposal facilities.

Cottreville Township, St. Clair County

This new collection system was connected to the Marine City sewerage system in November 1971.

East China Township, St. Clair County

The final plans and specifications for the proposed expansion and upgrading of the existing secondary treatment plant, including phosphorus removal, are nearly complete.

Fort Gratiot Township, St. Clair County

Fort Gratiot Township is under Final Order adopted February 18, 1971, to provide collection sewers. Plans and specifications are nearly complete and will be submitted before March 1, 1972. Wastes will be treated by the City of Port Huron. The Township is in the advance stages of preparing their financing and rate ordinances.

Ira Township, St. Clair County

Ira Township is under Final Order to provide for sewage collection by August 1972. Wastes will be treated by the City of Algonac in its improved and expanded facilities.

City of Marine City

Construction of the secondary treatment and phosphorus removal facilities is in final stages and is expected to be operational by March 1972.

City of Marysville

A Final Order of Determination was adopted against the City of June 25, 1971.



Final plans and specifications have been approved. Construction will begin in the Spring of 1972.

#### City of Port Huron

A Final Order of Determination was adopted against the City of January 22, 1971. The plans and specifications are scheduled for completion by March 1, 1972, with construction bids to be taken in May 1972.

At its December 1971 meeting, the Water Resources Commission adopted an Official Plan for the Port Huron area. The plan calls for a regional wastewater treatment facility to be located at the existing Port Huron site which would provide service to the City, to Fort Gratiot Township, and to Port Huron Township.

#### Port Huron Township

A Final Order of Determination was adopted against the Township on April 23, 1971.

The Township states that they plan to proceed with their own wastewater treatment facilities to consist of a collection system and stabilization lagoons. They have requested an extension of time for submission of plans until May 15, 1972. The Water Resources Commission has determined their plan to be inconsistent with the official Regional Plan, the request was denied, and the matter has been referred to the Attorney General for appropriate enforcement action.

#### City of St. Clair

The City is behind schedule in meeting the terms of their Final Order of Determination which called for start of construction by November 1, 1971. The City has requested extensions of their abatement schedule. The Water Resources Commission has tabled action pending discussion with the Environmental Protection Agency on the proposed extended performance dates.

#### St. Clair Township, St. Clair County

Construction plans have been approved for a sanitary sewer system to serve an area of the Township located between the cities of St. Clair and Marysville. Part of this system will be connected to the St. Clair sewerage system and part will be connected to the Marysville sewerage system. It is anticipated that construction will commence in 1972.

#### Industrial

No changes in the status of industries discharging to the St. Clair River.



## DETROIT RIVER

### ONTARIO

#### Municipal

##### City of Windsor

###### Westerly Plant

The 24-mgd primary treatment plant presently serving the City commenced operation in April of 1970. At this time, only a portion of the city was served with the necessary trunk and collectors required to transfer wastes to the plant. Since that time, the city has been actively constructing the major trunk sewers required. The Western, Grand Marais, and Lennox trunk sewers are essentially complete and the sub-trunks and collectors are being tied into these.

Phosphorus removal facilities are scheduled for this plant in 1973 and long range plans call for additional capacity and a higher degree of treatment to be provided.

###### Little River Plant

This 4.0-mgd secondary sewage plant was built in 1962 and served the community of Riverside. Since then, the city annexed this area and the plant now serves additional areas. The effluent discharged is well within the OWRC requirements. Phosphorus removal has been scheduled for 1973. Future plans call for an extension to 8.0-mgd capacity.

###### Town of Amherstburg

Construction of the municipality owned 1.0-mgd primary plant serving the town was completed in November 1967. Shortly after, however, flow records indicated the plant was operating very close to hydraulic capacity. The municipality is presently studying the feasibility of sewer separation and/or treatment plant expansion. Effluent requirements fall within OWRC objectives even though the plant is at hydraulic capacity. Phosphorus removal is scheduled for 1973.

#### Industrial

##### Ford Motor Company of Canada Limited - Windsor

Waste treatment facilities for the Windsor foundry have been completed.

Additional spill prevention facilities at the Windsor Engine Plant are under active consideration.

The provision of dyking and conversion to natural gas (with a stand-by oil-fired generator) at the powerhouse has been completed and has reduced the potential for oil losses.



BASF - Wyandotte Corporation - Township of Sandwich West

The construction of a secondary settling area and submerged outfall at Fighting Island has been completed.

Meetings have been held with the Company concerning possible alterations to the retaining dykes intended to improve the Island's aesthetic appearance. The report of the Company's consultant on this work is expected in April 1972.

Allied Chemical Canada, Ltd. - Township of Anderdon

New dyking on impoundment basins for the soda ash plant is under construction.

Application for approval of facilities for the control of fluoride losses from the Genetron plant have been submitted to the OWRC.

Calvert of Canada Limited - Amherstburg

Negotiations are underway with the Company concerning improvements of waste flows recommended in the recent OWRC report on a survey of industrial wastes from the plant.

MICHIGAN  
Municipal

City of Detroit

Construction is proceeding on the program of expansion and upgrading of wastewater treatment facilities. Twelve contracts have been completed at the wastewater treatment works, 29 are currently under construction, and 11 more are scheduled for award in the spring of 1972.

Since the dates of the construction schedule called for in the original Stipulation were not met, a Final Order of Determination was adopted by the Water Resources Commission on May 21, 1971. The Order establishes a new schedule of phased improved treatment performances with full completion of all facilities by August 1, 1976.

One provision of the Final Order states that the discharge shall not contain more than 1,000 total coliform organisms per 100 milliliters as determined by the monthly geometric mean density of the coliform content of samples collected and tested at least once daily after June 15, 1971. Facilities for this phase of the project were completed and placed in operation and are performing satisfactorily.

Other provisions of the Order state that after December 31, 1971, the discharge would not contain more than 500,000 pounds per day of oxygen consuming substances, not more than 600,000 pounds per day of suspended solids, and not more than 44 percent of the total phosphorus found in the influent to the treatment facilities. The discharge was satisfactorily meeting the restriction on oxygen consuming substances, but was not quite meeting restrictions on suspended solids and phosphorus removal.



The full scale plant addition of polymers began on February 1, 1972. This together with the existing addition of waste pickle liquor, is expected to bring suspended solids and phosphorus loads into compliance with restrictions of the Final Order of Determination.

#### Grosse Ile Township, Wayne County

A Final Order of Determination was adopted against the Township on February 18, 1971. Phosphorus removal facilities were completed and placed in operation during 1971. The plant is still in a period of operational adjustment.

#### City of Riverview

The City is still in default of its Stipulation. Corrective action is being delayed by a suit against Wayne County by the City of Southgate (see Southgate and Wyandotte). The Official Plan calls for connecting to the City of Wyandotte sewerage system. Riverview and the Wayne County Board of Public Works have prepared a draft of a service contract but are unable to execute the contract because of the court injunction.

#### Cities of Southgate and Wyandotte

Plans have now been submitted and are under review. The City of Southgate has, however, filed suit against Wayne County arguing (1) that rate increases cannot be used to prefinance projects, (2) that the County cannot extend sewer services without the vote of citizens of the municipalities involved, and (3) that the Board of Public Works does not have the right to manage the system. Because of the pending court action, bonds cannot be sold to finance this project.

#### City of Trenton

The Stipulation between the Water Resources Commission and the City dated June 7, 1966, was amended to include the Monsanto Company's allowable BOD discharge. The City began collecting, treating, and disposing of wastewater from the Monsanto Company, Trenton Resins Plant during 1971.

#### Wayne County, Wyandotte Plant and Trenton Plant

A Final Order of Determination was adopted against the County on March 18, 1971. Construction for the Trenton portion of the project is approximately 40 percent complete.

Plans for the Wyandotte portion of the project are approximately 80 percent complete. A lawsuit by the City of Southgate in October 1970 has prevented the County from proceeding with plans to sell a bond issue in 1971 to finance this project.

#### Industrial

In 1966, the nineteen industries having a direct waste discharge to the Detroit River, or a discharge having an impact on the water quality



of the river, were the subject of Michigan Water Resources Commission action to obtain improved treatment. The voluntary abatement programs initiated at that time were formalized by signed Stipulations containing firm control schedules. The following is a summary of the present compliance status of these industries:

Industries which have completed improved treatment facilities and are presently in compliance with the terms of the original Stipulation.

Allied Chemical Corporation, Solvay Process Division (Operations have been terminated)

Allied Chemical Corporation, Semet-Solvay Division

American Cement Corporation (Production operations have been terminated at the Jefferson Ave. Plant)

Darling and Company

E. I. duPont deNemours and Company, Inc. (Operations have been terminated)

Ford Motor Company - River Rouge Plants

McLouth Steel Corporation

Mobil Oil Corporation, Trenton

Monsanto Company - Trenton Plant (now known as "Inorganic Chemicals Division")

Monsanto Company - Trenton Resins Plant (now known as "Plastic Products & Resins Division")

Revere Copper and Brass, Inc.

Scott Paper Company

Wyandotte Chemicals Company - North Works (now known as "B.A.S.F. Wyandotte Corporation North Works")

Wyandotte Chemicals Company - South Works (now known as "B.A.S.F. Wyandotte Corporation South Works")

Industries which are in partial or substantial compliance with their original or revised Stipulation or Order.

Firestone Tire and Rubber Company, Firestone Steel Products Division

Although terms of the original Stipulation are being met, a problem of excessive concentrations of soluble oil has developed. While the amounts involved have little or no impact on the water quality of the Detroit River, meetings between the company and staff of the Water Resources Commission have been held to establish a program to correct this problem.



National Steel Corporation, Great Lakes Steel Division -- 80"  
Hot Strip Mill

Terms of the Stipulation are not consistently being met because of frequent upsets resulting in excessive oil discharges. Meetings between the Company and staff of the Water Resources Commission have been held to establish a corrective program.

National Steel Corporation, Great Lakes Steel Division -- Ecorse  
Rolling Mill

Construction of soluble oil treatment facilities was not completed by the November 30, 1971 date called for in the revised Stipulation due to extended equipment delivery dates. Construction is approximately 50 percent complete. The Water Resources Commission directed staff to hold a joint meeting with the Company and the Environmental Protection Agency to establish a revised date for completion of construction. The meeting was held and a Final Order of Determination adopted on February 17, 1972. Completion is now required by June 30, 1972.

National Steel Corporation, Great Lakes Steel Division -- Blast  
Furnace Division, River Rouge

The terms of the new and extended dates of the Stipulation are being met. Construction of a third thickener is proceeding. The Stipulation calls for completion of construction by May 1, 1972. This facility will eliminate discharges of excessive quantities of solids and oil films.

Pennwalt Corporation - East Plant

Although the terms of the Stipulation are being met with regard to suspended solids and chlorides, a problem exists because of discharges of excessive quantities of iron which exceed the IJC objective of 17 mg/l in effluents. Staff of the Water Resources Commission have scheduled meetings with the Company to establish a program to correct the iron problem. Voluntary abatement is expected.

Pennwalt Corporation - West Plant

Although the terms of the Stipulation are being met, a continuous-flow bioassay conducted on the effluent from this plant in June 1971, showed that the effluent had a high toxicity to fish, showed extreme variations in conductivity and pH, at times had extremely high ammonia-nitrogen concentrations, and had noticeable amounts of surface oil. Voluntary abatement is expected.

Other Industrial Developments

Ford Motor Company - River Rouge Plants

Additional treatment facilities to upgrade treatment of the



Specialty Foundry wastes were completed and placed in operation in 1971. Final improvements to gate 11 oil removal facilities are still awaiting completion of the U. S. Army Corps of Engineers River Rouge flood control project.

#### Pennwalt Corporation - West Plant

The Michigan Water Resources Commission at its June 25, 1971 meeting made an Order of Determination for a proposed new use of the Detroit River by the Pennwalt Corporation. The new use entails the discharge of approximately 132,700 gallons per day of process waste and cooling and condensing water from a new chemical processing operation to be located in the southwest corner of the existing Wyandotte West Plant. Discharge will be to the Detroit River through the sewer system serving the Wyandotte East Plant. Restrictions on oil, suspended solids, pH, cyanide and free chlorine are established by the Order for this discharge.

#### McLouth Steel Corporation

An amendment to the existing Order of Determination was made by the Michigan Water Resources Commission at its January 22, 1971 meeting after staff surveillance showed significant cyanide discharges in the Company's effluent. This amendment sets a restriction of 0.1 milligram per liter of cyanide on McLouth's discharge which is now being met.

#### Monsanto Company - Trenton Resins Plant

A new Stipulation was signed on November 11, 1971 rescinding the existing Stipulation between the Water Resources Commission and the Monsanto Company dated March 30, 1966. The new Stipulation states that at no time in the future shall the Company discharge any oxygen consuming substances to the Detroit River but shall instead continue to discharge these to the City of Trenton's sewage disposal facilities.

### INDUSTRIAL AND COMMERCIAL SURVEILLANCE FEES

Rules for the implementation of Act 200, Public Acts of 1970 were adopted in October 1971 by the Water Resources Commission. Over 30,000 Michigan industries and commercial establishments were sent critical material reporting forms in November 1971. The forms, which must be completed annually, provide information on Toxic and critical materials that the companies use or produce in their operations. The mailing was to be received by all companies which discharge wastes to waters of the State, either directly or by way of municipal sewerage systems.

The information in returned forms was also evaluated to assess fees in accordance with the adopted administrative rules. The Commission approved the assessments in a special January 31, 1972 meeting and the billings were made on February 1, 1972. The \$750,000 in fees are to be paid by March 1, 1972. The money will be used in increased state monitoring of streams and industrial and commercial effluents.



LAKES ERIE-ONTARIO BOARD  
WATER QUALITY SURVEILLANCE

SUMMARY

Water quality in the Niagara River remains essentially unchanged compared to 1970. Quality generally does not conform to IJC objectives for total coliform, phenols and iron. Problem areas in the Upper River are mostly on the U. S. side. In the Lower River quality is generally uniform due to complete mixing.

The most significant improvement noted in 1971 was a 60 percent reduction in phenol values for the Buffalo River, as compared to 1969 data.

NIAGARA RIVER

Introduction

The following discussion is based on surveillance data collected by the Ontario Water Resources Commission, the Buffalo Sewer Authority, the New York Department of Environmental Conservation, and the Environmental Protection Agency, Rochester, New York. Sampling ranges for the Buffalo River are shown in Figure 12, and for the Niagara River on Figure 13.

Total Coliform Bacteria Densities

Existing IJC Objective: Median value not to exceed  
2,400 organisms/100 ml.

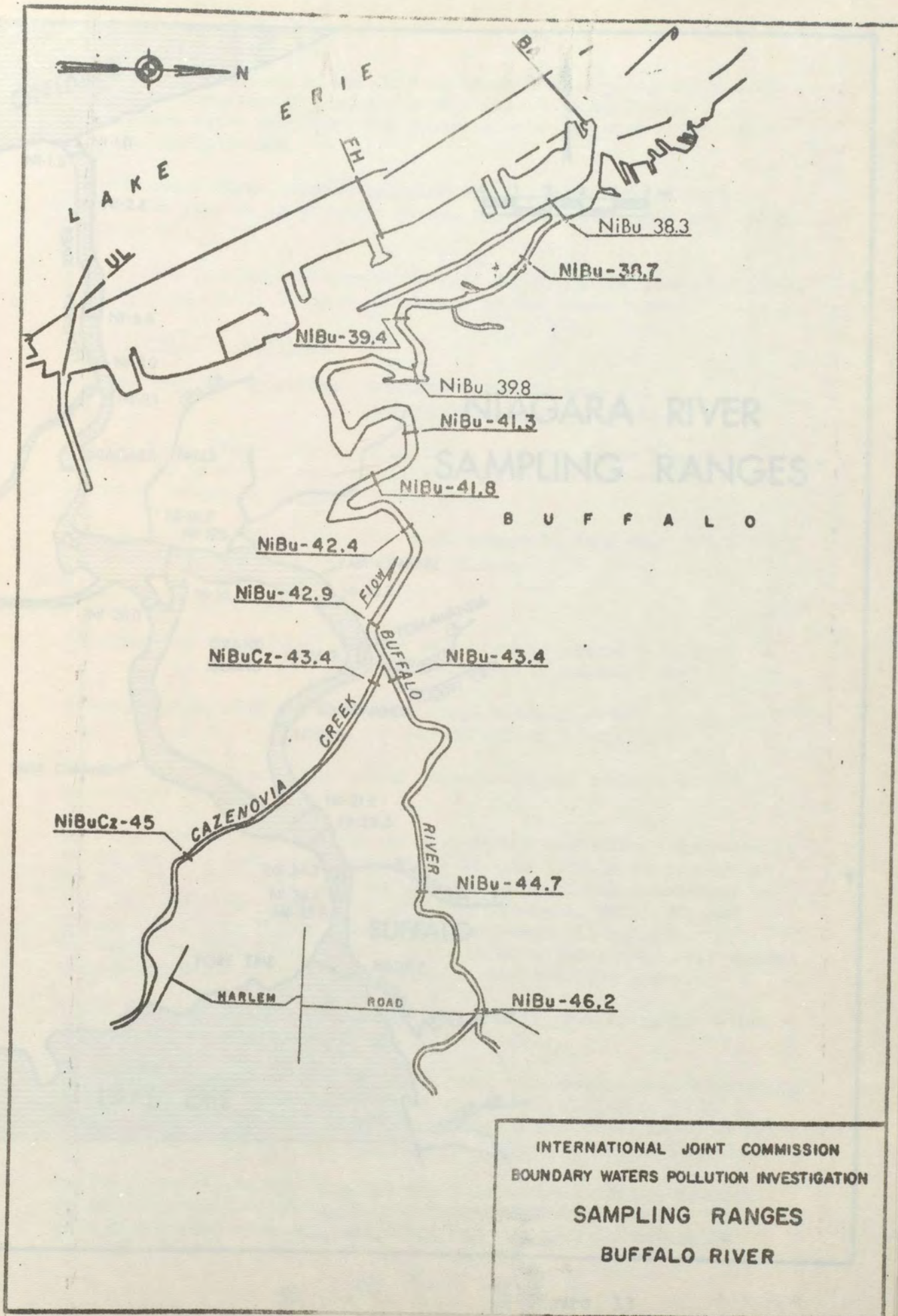
Recommended New IJC Objective: Monthly geometric mean not to  
exceed 1,000 organisms/100 ml.

The data indicate that the bacteriological quality of the Niagara River has remained relatively the same in recent years. The median coliform densities in the water entering the river from Lake Erie is consistently below 100/100 ml. In the Upper River (between Lake Erie and the Falls) Canadian waters generally conform to the IJC objectives, while U. S. waters, particularly near the shore, do not.

In Canadian waters, coliform densities are generally below a few hundred/100 ml. Near the U. S. shore, densities are in excess of 1,000/100 ml at all ranges, and in excess of 2,400/100 ml at most locations.

U. S. sources of bacteriological contamination to the Upper River include: the Buffalo River; sewage treatment plants at Buffalo, the Town of Tonawanda, the Town of Grand Island, the City of Tonawanda, and the City of North Tonawanda; the discharge from Cayuga Creek

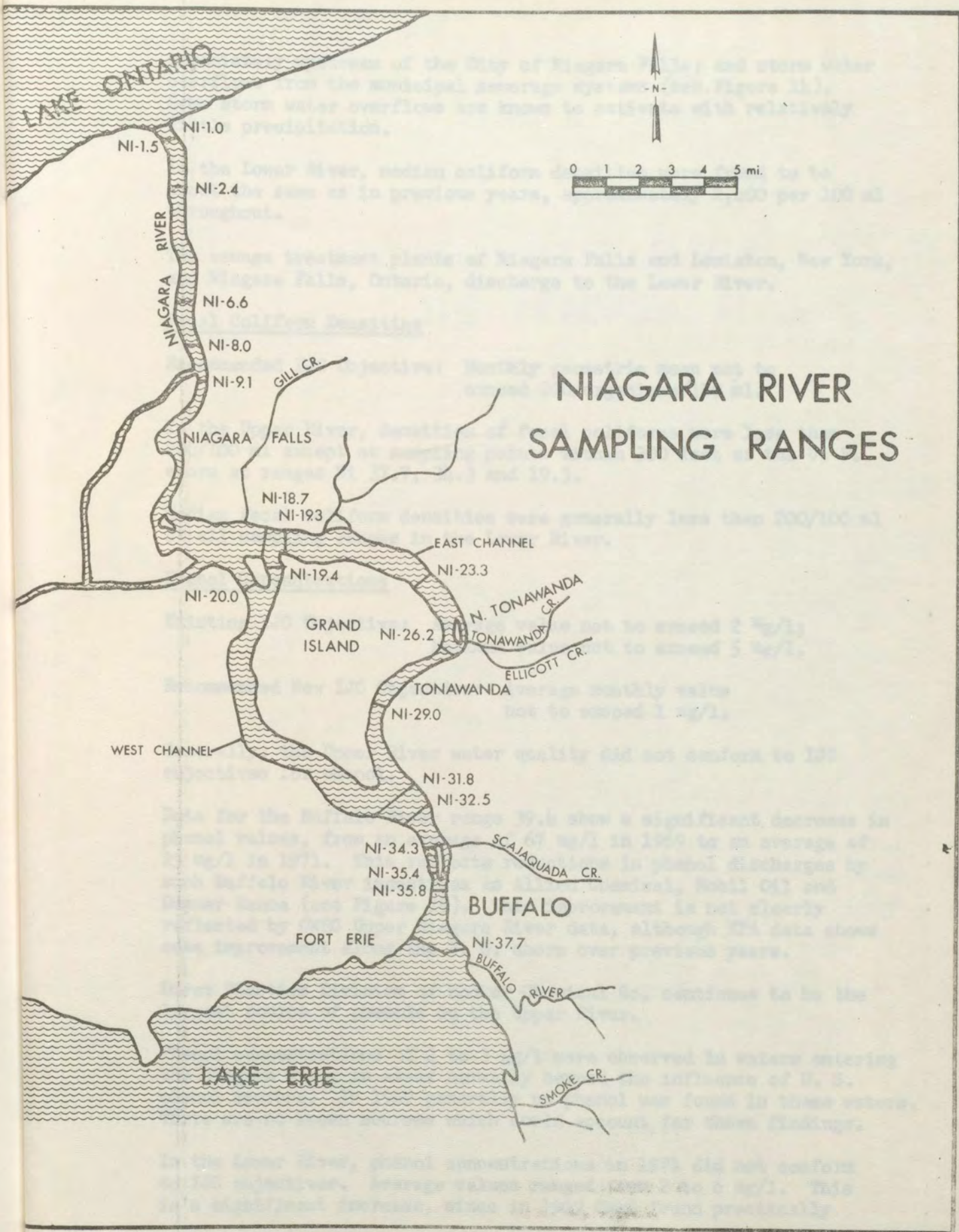




INTERNATIONAL JOINT COMMISSION  
 BOUNDARY WATERS POLLUTION INVESTIGATION  
**SAMPLING RANGES**  
**BUFFALO RIVER**

Figure 12







immediately upstream of the City of Niagara Falls; and storm water overflows from the municipal sewerage systems (see Figure 14). Some storm water overflows are known to activate with relatively little precipitation.

In the Lower River, median coliform densities were found to be about the same as in previous years, approximately 2,400 per 100 ml throughout.

The sewage treatment plants of Niagara Falls and Lewiston, New York, and Niagara Falls, Ontario, discharge to the Lower River.

#### Fecal Coliform Densities

Recommended IJC Objective: Monthly geometric mean not to exceed 200/organisms/100 ml.

In the Upper River, densities of fecal coliforms were less than 200/100 ml except at sampling points within 300 feet of the U. S. shore at ranges Ni 37.7, 34.3 and 19.3.

Median fecal coliform densities were generally less than 200/100 ml at all sampling ranges in the Lower River.

#### Phenol Concentrations

Existing IJC Objective: Average value not to exceed 2 ug/l;  
Maximum value not to exceed 5 ug/l.

Recommended New IJC Objective: Average monthly value not to exceed 1 ug/l.

Generally, the Upper River water quality did not conform to IJC objectives for phenol.

Data for the Buffalo River range 39.4 show a significant decrease in phenol values, from an average of 67 ug/l in 1969 to an average of 25 ug/l in 1971. This reflects reductions in phenol discharges by such Buffalo River industries as Allied Chemical, Mobil Oil and Donner Hanna (see Figure 15). This improvement is not clearly reflected by OWRC Upper Niagara River data, although EPA data shows some improvement along the U. S. shore over previous years.

Durez Plastics Division of Hooker Chemical Co. continues to be the largest source of phenols on the Upper River.

Phenol concentrations of 2 to 3 ug/l were observed in waters entering the Niagara River in areas normally beyond the influence of U. S. phenol sources. In 1969 generally no phenol was found in these waters. There are no known sources which could account for these findings.

In the Lower River, phenol concentrations in 1971 did not conform to IJC objectives. Average values ranged from 2 to 6 ug/l. This is a significant increase, since in 1969 OWRC found practically





# MUNICIPAL WASTE DISCHARGES TO THE NIAGARA RIVER

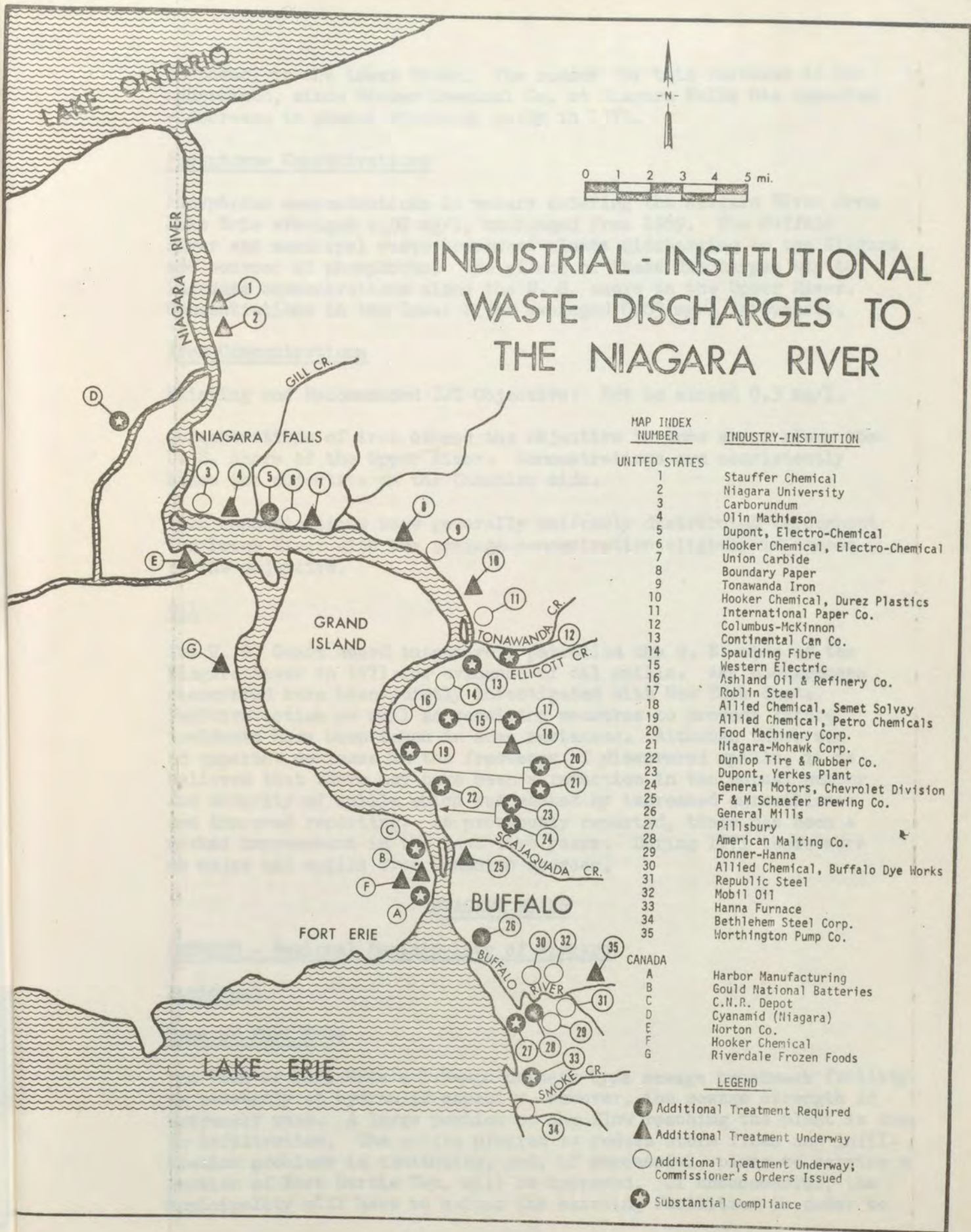
MAP INDEX NUMBER	MUNICIPALITY
<b>UNITED STATES</b>	
1	Village of Lewiston
2	City of Niagara Falls
3	Town of Grand Island S.D. #2
4	City of North Tonawanda
5	City of Tonawanda
6	Town of Tonawanda
7	Town of Grand Island S.D. #1
8	Buffalo Sewer Authority
9	City of Lackawanna
10	Cheektowaga STP #3
11	Cheektowaga STP #5
12	West Seneca
<b>CANADA</b>	
A	Fort Erie
B	Village of Chippewa
C	Niagara Falls
C <sub>1</sub>	McLeod Road
C <sub>2</sub>	Stanley Ave.

**LEGEND**

- Additional Treatment Required
- ▲ Additional Treatment Underway
- Additional Treatment Underway; Commissioner's Orders Issued
- ★ Substantial Compliance

Figure 14







no phenol in the Lower River. The reason for this increase is not understood, since Hooker Chemical Co. at Niagara Falls has reported a decrease in phenol discharge early in 1971.

#### Phosphorus Concentrations

Phosphorus concentrations in waters entering the Niagara River from Lake Erie averaged 0.02 mg/l, unchanged from 1969. The Buffalo River and municipal waste treatment plants discharging to the Niagara are sources of phosphorus. The effect of these discharges was to increase concentrations along the U. S. shore in the Upper River. Concentrations in the Lower River averaged 0.03 mg/l throughout.

#### Iron Concentrations

Existing and Recommended IJC Objective: Not to exceed 0.3 mg/l.

Concentrations of iron exceed the objective in some areas along the U. S. shore of the Upper River. Concentrations are consistently below the objective on the Canadian side.

Iron concentrations were generally uniformly distributed throughout the Lower River with the average concentration slightly in excess of the objective.

#### Oil

The U. S. Coast Guard intensively patrolled the U. S. side of the Niagara River in 1971 for evidence of oil spills. Any occurrences discovered have been jointly investigated with New York State. Punitive action as well as requiring measures to prevent future incidents have been taken in some instances. Although there was no apparent decrease in the frequency of discovered spills, it is believed that there may have been a reduction in the actual number and severity of spills which was masked by increased surveillance and improved reporting. As previously reported, there has been a marked improvement in the last five years. During 1971 there were no major oil spills from Canadian sources.

### NIAGARA RIVER

#### ONTARIO - Regional Municipality of Niagara

##### Municipal

##### Town of Fort Erie

The Town of Fort Erie's 1.8-mgd primary type sewage treatment facility is presently at hydraulic capacity, however, the sewage strength is extremely weak. A large portion of the flow reaching the plant is due to infiltration. The active program to reduce storm flows and infiltration problems is continuing, and, if successful, plans to service a portion of East Bertie Twp. will be approved. If unsuccessful, the municipality will have to expand the existing facilities in order to



accept the wastes from Bertie Twp. Phosphorus removal is scheduled for 1975 at this location.

### City of Niagara Falls

#### Stamford Plant

The 10-mgd primary type treatment plant presently serving the city was built in 1963. A trunk sewer program in the city will connect various unserved areas to this plant. When these trunk sewers are completed (proposed completion 1973), wastes from municipal treatment facilities serving the Chippawa area as well as the Stanley and McLeod Road settling tanks will be treated at the Stamford plant.

Phosphorus removal facilities are scheduled for 1975.

#### Chippawa Plant

This 0.3-mgd secondary type treatment plant was built originally to handle wastes from the Village of Chippawa. Over the years, it has become hydraulically overloaded and will be phased out when the trunk sewers, which will transfer these wastes to the Stamford plant, are built. Tentative completion date for these trunk sewers is 1973.

### Town of Niagara-on-the-Lake

#### Virgil

A proposal for a trunk sewer to connect this community to the Niagara-on-the-Lake lagoon is presently being prepared by a consulting firm. If accepted, completion of this project is expected by 1973.

#### St. Davids and Queenston

The Regional Municipality is considering the construction of a trunk sewer and collector system to transfer wastes from these communities to the Niagara Falls Stamford plant. These two areas are presently served by individual septic tank systems.

### Industrial

#### Gould National Batteries - Fort Erie

Chemical treatment and filtration facilities for control of lead and suspended solids have been completed. The OWRC will be evaluating the performance of these facilities.

#### Hooker Chemical Nanaimo Ltd. - Fort Erie

Phenol contaminated reactor wash waters have been segregated from the waste discharge. This modification will be evaluated by the OWRC.



## NEW YORK

The abatement status on the Niagara River is basically the same as reported in the Niagara River Pollution Abatement Report of 1971. However, New York has withdrawn the municipality of Niagara Falls, Grand Island and Lewiston from EPA because of commitment of pre-financing of the Federal share to other priorities as determined by the State. Funding on going projects continues as scheduled for 1972.

## RECENT DEVELOPMENTS IN PHOSPHORUS CONTROL

### ONTARIO

As a result of the 1970 International Joint Commission recommendation, the Provincial Government has embarked on a phosphorus removal program which will ultimately provide phosphorus removal facilities for every seweraged municipality in Ontario.

In August 1971, a Canada-Ontario Agreement was signed, securing funding for an accelerated program of pollution control in the Lower Great Lakes. Under this Agreement, financial assistance has been made available to municipalities in the Lower Great Lakes Basin to meet the cost of the essential treatability studies associated with phosphorus removal.

The Ontario Water Resources Commission, through its Division of Research, has been involved with advanced waste treatment since 1964. Consequently, the technical implementation of the phosphorus removal program could be initiated immediately.

To date, preliminary treatability studies have been conducted or are underway at 66 sewage treatment plants in Ontario situated in the Great Lakes drainage basin. These studies are essential in establishing the optimum chemical and point of addition in preparation for the installation of permanent phosphorus removal processes at these plants. Because of the dependency of the process on attendant conditions, each plant must be individually assessed. Such services are carried out in cooperation with municipal personnel and consulting engineering representatives. In the future, the work may be done entirely by outside consultants or available technical staff in the employ of municipalities.

After completing preliminary treatability tests, some 25 municipalities have proceeded with temporary installations to implement full-scale phosphorus removal. Essentially these full-scale studies confirm the suitability of the existing treatment plant facilities to the addition of phosphorus removal processes without major capital costs. Some of these full-scale studies are proceeding as joint ventures of the municipality and the Commission while others are being carried out entirely by the municipality with Commission staff available in an advisory capacity.



At the same time as the municipalities are assessing their individual phosphorus removal requirements, the OWRC is engaged in studies intended to refine the technology of phosphorus removal through continuing research and experience.

Basically, these studies being conducted by the OWRC may be divided into three categories involving: a full-scale permanent nutrient removal facility, a number of full-scale temporary installations, and several new techniques on the more non-conventional treatment processes.

A full-scale permanent nutrient removal facility has been established at Newmarket for research and demonstration purposes following successful trials of the lime treatment process at Richmond Hill. The facility has been operational since early spring of this year with phosphorus reductions now averaging better than 85%. Suspended solids and biochemical oxygen demand reductions are both in excess of 95%. Considerable emphasis is presently being placed on sludge handling and treatment processes associated with the lime sludge. Studies have recently been initiated on combining nitrogen removal with the phosphorus removal process.

Research studies are also being conducted at a number of treatment plants involving full-scale temporary phosphorus removal facilities. These investigations are aimed at establishing chemical process criteria for phosphorus removal at various types of treatment systems currently in use in the Province. These systems range from primary and conventional activated sludge plants to oxidation ditches and aerated lagoons. Results of these studies will have general application and are intended to optimize treatment processes and minimize capital and operating costs.

To avoid discharge of phosphorus in the receiving waters from waste stabilization ponds, a full-scale study of land disposal of its effluent was conducted in 1971. Effluent was sprayed directly onto land by means of overhead sprinklers. An extensive monitoring program was carried out to evaluate the efficacy of the soil as a treatment system for effluents and to trace any possible contamination of groundwater for bacterial or viral pathogens. Groundwater percolate samples showed a high removal of phosphorus and nitrogen. No viral pathogens which were present in the effluent have been found in the groundwater in the sprayed area. All neighbouring wells monitored showed no significant changes.

Other work includes chemical addition for precipitation of phosphorus within a seasonal lagoon, with phosphorus removal from lagoons and similar simplified systems now being a technical possibility.

Some investigations involve the re-use of industrial waste by-products such as waste pickle liquor from the steel industry, waste carbide lime from the acetylene processes and waste alum sludges from water treatment plants.



In its studies, the Division of Research invites as much participation by outside representatives as possible and in this way hopes to pass on information to other concerned individuals and agencies even as it is being obtained. Many studies are carried out in cooperation with consulting firms, private industries, other governmental agencies and universities. Close liaison is maintained with the Canada Department of the Environment in all this work.

#### MICHIGAN

Act 226, Public Acts of 1971 rules that after July 1, 1972, no cleaning agent which contains phosphorus in any form in excess of 8.7% by weight can be sold or distributed in Michigan.

#### NEW YORK

Legislation passed in 1971 requires that all household cleaning products containing in excess of 8.7% phosphorus by weight of all ingredients, be plainly labelled. This law also prohibits after December 31, 1971, the sale of household cleaning products containing in excess of 8.7% phosphorus by weight. A complete ban takes effect June 1, 1973, on all such products which contain more than a trace of incidental concentration of phosphorus compounds.

#### INDIANA

A bill signed into law last April prohibited the use as well as sale of detergents containing over 12% phosphate by weight or volume, effective January 1, 1972 and the limit was to be decreased to 3% at the start of 1973. However, a regulation adopted by the State's Stream Pollution Control Board (SPC 13) and signed by the governor on December 8, allows wholesalers to dispose of their stocks of detergents containing more than 12% phosphate by weight or volume until April 1, 1972 and permits the retail sale and use of such products until July 1, 1972. After the aforementioned dates, the provisions of the 1971 Public Law 174 will be fully enforced. Additionally, a bill introduced in December would repeal the 1971 detergent law which refers to "phosphate" and, in its place, establishes the maximum "phosphorus" levels for detergents at 8.7% by weight, the regulation to become effective six months after its passage.

#### OHIO

Bills before legislative committees would restrict the phosphorus content of detergents -- House Bill 107 and Senate Bill 358. Ordinances have been passed in Akron and several Cleveland area communities initially restricting phosphorus levels to 8.7% and to zero in 1972.

#### PENNSYLVANIA

Each house of the General Assembly approved a detergent bill last August -- House Bill 1220 and Senate Bill 812 -- and they have been referred to the other body for action. While not identical, both bills would limit the amount of phosphorus in detergents to 8.7% by weight.