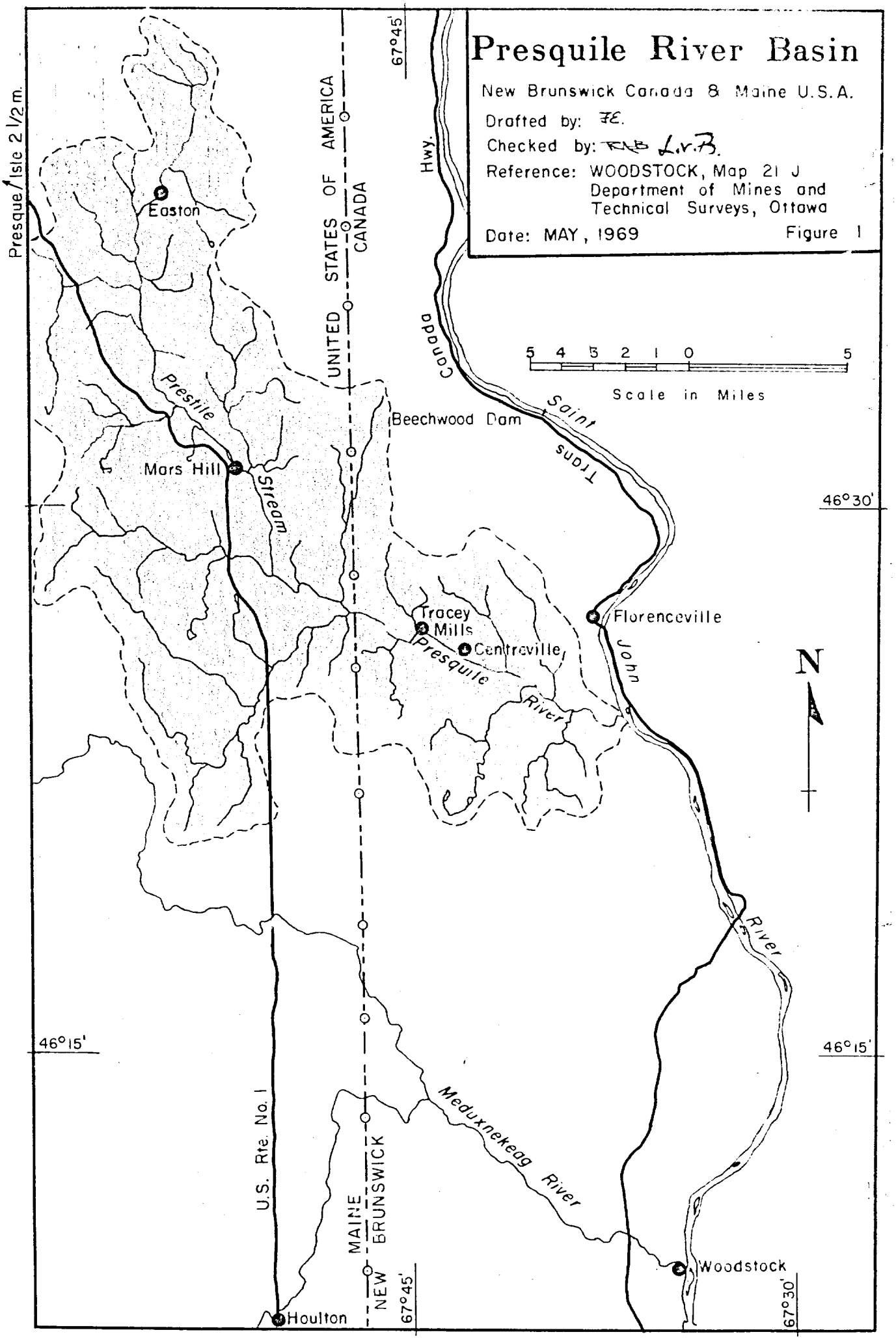
BRIEF

Pollution of the Presquile, a Transboundary River.


Presquile River Basin
New Brunswick Canada & Maine U.S.A.
Drafted by: JE.
Checked by: R.N.B L.V.B.
Reference: WOODSTOCK, Map 21 J
Department of Mines and
Technical Surveys, Ottawa
Date: MAY, 1969
Figure 1
Presque Isle 2 1/2 m.
Easton
Mars Hill
Prestile Stream
UNITED STATES OF AMERICA
CANADA
67°45'
Hwy.
Canada
Saint Johns River
5 4 3 2 1 0 5
Scale in Miles
Beechwood Dam
46°30'
Tracey Mills
Centreville
Presquile River
Florenceville
N
46°15'
U.S. Rte. No. 1
MAINE
NEW BRUNSWICK
Meduxnekeag River
Houlton
Woodstock
67°30'

"POLLUTION OF THE PRESQUILE, A TRANSBOUNDARY RIVER"

A BRIEF TO THE

SECRETARY OF STATE FOR EXTERNAL AFFAIRS

CANADA

FROM THE

PROVINCE OF NEW BRUNSWICK

On the banks of the Presquile. July 5, 1968.

Courtesy - Saunders Studio, Woodstock, N.B.

Frontispiece

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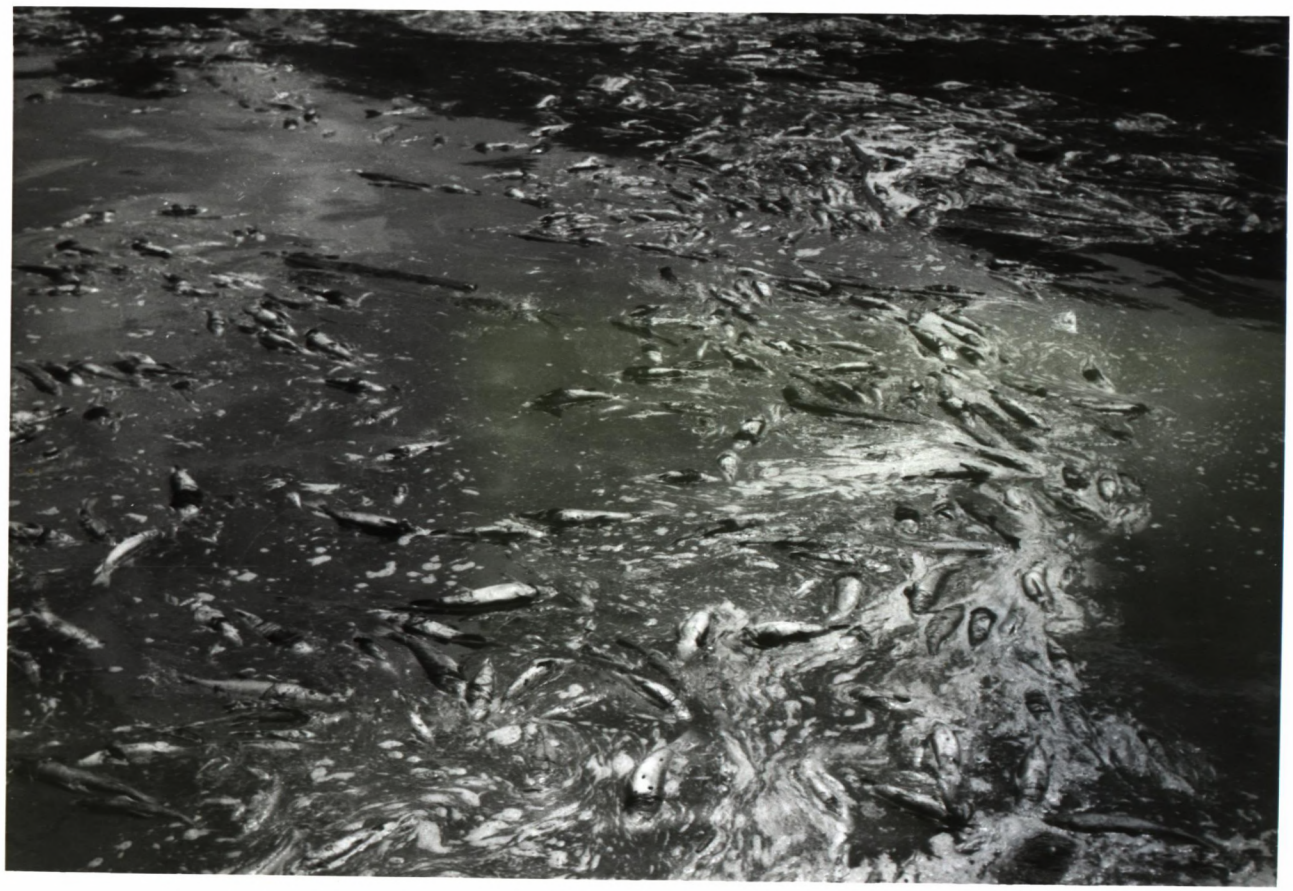


Pool below Tracey Mills. July 3, 1968.

Canada, Department of Fisheries

Photograph 2

POLLUTION OF THE PRESQUILE, A TRANSBOUNDARY RIVER

PRESTILE STREAM, MAINE, U.S.A.
PRESQUILE RIVER, NEW BRUNSWICK, CANADA

INTRODUCTION

The concern of this brief is the pollution of waters flowing from the United States into Canada in the Presquile River. The first purpose of the brief is to present evidence of the pollution and to record the need for diplomatic protests which must bring about effective remedial action in the United States so that pollution of this river ceases. A second purpose is to point out that the system of stream classification adopted by the State of Maine is unacceptable in so far as it permits pollution of transboundary rivers contrary to Article IV of the 1909 Boundary Waters Treaty and contrary to well accepted principles of international law.

The brief is in four parts. The first part describes the Prestile-Presquile River Basin; the second part records the pollution; the third part records the public response and reaction to the pollution as well as the public demands for government action; and the fourth part and the Conclusion describe some of the damages, state the need for remedies, and refer to the unacceptable stream classification system in Maine.

1. Description of the Prestile-Presquile River Basin

The Prestile Stream rises in Maine, north of the community of Easton. It flows south through Mars Hill and veers gently towards the southeast where it crosses the international boundary between the commission monuments number 53 (46°30'19"N, 67°47'11"W) and number 44 (46°25'05"N, 67°47'05"W) on the Maine-New Brunswick North Line. In Canada the stream is known as the Presquile River and it continues its southeasterly course for nearly eleven miles before entering the Saint John River.

Figure 1 (frontispiece) shows a map, on the scale of 1:250,000, of the river basin and is traced from the Canada Department of Mines and Technical Surveys Map 21J.

The total drainage area of the river is approximately 234 square miles. A large part of the area is cleared, settled and under cultivation. The rolling topography varies from elevations of about 1500 feet to less than 200 feet where the river joins the Saint John River. Much of the higher ground is forested and there are some small lakes and swamps.

The mean annual precipitation in the basin is estimated to be about 37 inches and ranges from about $2\frac{1}{2}$ inches per month during the winter to about 4 inches in June, which is normally the wettest month in the year. Snowfall accounts for twenty-five to thirty per cent of the total precipitation.

The mean annual run-off is estimated at 22 inches (1.62 cfs/sq. mi.). A hydrometric station maintained by the Inland Waters Branch of the Canada Department of Energy, Mines and Resources is located on the river near Tracey Mills. Appendix "A" contains a summary of stream flow and water temperature data measured from this site together with a hydrograph of the river and a summary report provided by courtesy of the Inland Waters Branch.

About two miles below the boundary in the Canadian portion of the basin the river flows over a low dam at Tracey Mills where a sawmill was operated for many years. Several homes are located on or near the river banks. A mile and a half below the dam the river passes through the village of Centreville, which is a farming centre for the area. Many of the homes there are located close to the river or on the high bank overlooking it. The river continues for more than six miles before reaching the Saint John River, having flowed past areas of cleared land and tree-lined banks.

The rural population in the valley has always enjoyed the beauty of this small and fairly turbulent river, much of which flows over a rough channel of boulders and cobbles.

The village of Centreville is the main population centre of the valley with a recorded population of 518 persons in the 1966 census. There are nineteen stores and private companies and several of these deal in farm supplies and machinery. There is a high school in the village and junior grade schools are nearby. Total school enrollment (which includes children from outside the village) is 914.

In recent years the main use of the river has been for recreational purposes. It has traditionally been a good trout river and there is evidence of it also being a river for salmon spawning. The following quotation from a Canada Department of Fisheries memorandum by John Machell dated May 1, 1969 and addressed to Mr. John Dalziel provides evidence for the presence of salmon.

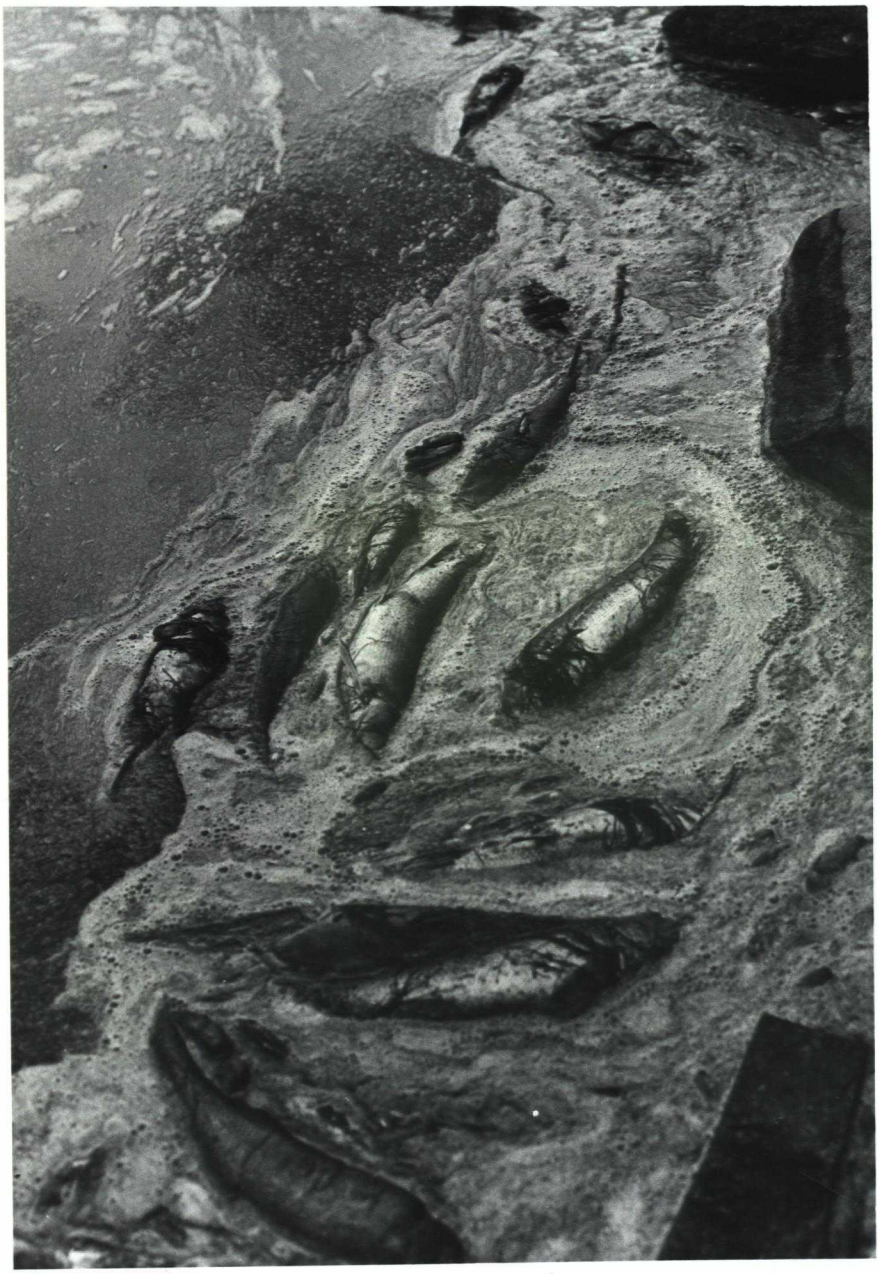
> The Presquile River has been an Atlantic salmon spawning and rearing stream in the lower eight miles. Information on this is obtained from three basic sources.
>
> First, spawning surveys have included spot checks on the Presquile River in 1957, 1960 and 1964. These have shown the use of this river as a spawning area for salmon as far as Tracey Mill Dam. In November of 1964, 120 redds (the spawning bed of a female salmon) were observed between the mouth of the river and Tracey Mill Dam.
>
> Secondly, the electro-fishing census of 1961 established the presence of juvenile salmon populations in the lower section of the Presquile. Subsequent electro-fishing in August 1968 (after the fish kill) in two areas of the river indicated no salmon or speckled trout present.
>
> Lastly, bioassays were conducted in the river in July 16-22, 1965, before the initiation of operations of the beet sugar plant in Maine. These tests were conducted at three stations on the Presquile with a control station in Two Mile Brook. There was no mortality attributable to water quality. Animals used were 3-inch yearling salmon parr.
>
> During this time, maximum and minimum temperatures were taken along with measurements of pH and dissolved oxygen. Temperature ranged from 57° to 76° F; pH 6.5 to 6.7; dissolved oxygen 15.5 - 9.4 ppm.
>
> Surber samples were also taken. Although no data as to exact number of organisms present are available, the organisms were considered "abundant". The general conclusion from this 1965 study was that the Presquile River afforded a suitable habitat for juvenile salmon.

These references to the salmon fishery are merely presented for the record. The trout fishery has always been of far greater interest to anglers and it was as a good trout stream that the Presquile was known locally. The Provincial Government does not have statistical data on the annual trout catch as the Department of Natural Resources has just started to compile trout catch records throughout the Province. However, the river has been restocked with trout regularly and the stocking records of speckled trout from the trout hatchery at Florenceville since 1964 are recorded below in Table 1.

TABLE 1

Year	No.	Size of Trout
1964:	12,500	No. 3 fingerlings
	180	1 year
	250	2 year
1965:	24,400	No. 1 fingerlings
	1,200	No. 2 fingerlings
	180	1 year
1966:	3,920	No. 1 fingerlings
	6,200	No. 2 fingerlings
1968:	1,500	No. 1 fingerlings

Some stocking has also been carried out in a small tributary known as Two Mile Brook.



Dead fish on bank of the Presquile River. July 5, 1968.

Courtesy - Saunders Studio, Woodstock, N. B.

Photograph 3

2. The Record of Pollution

In 1964 the Presquile was a river of satisfactory, though not excellent, water quality. During that year plans were made in Maine for the construction of a Beet Sugar Refinery. In 1965 and 1966 construction of a refinery at Easton (see Figure 1) was carried on. Engineering designs were made to discharge treated effluent into the Prestile. In order to legalize this waste disposal in Maine, legislation was passed (Statutes of Maine, 1965, C. 42, L. D. 1266) which downgraded the water quality classification of the stream from a B class to a D class. Appendix "B" records the stream quality classification in Maine and shows that a class D stream is almost a drain for treated waste disposal. The New Brunswick Government wrote to both the Governor of the State of Maine in Augusta and the Secretary of State for External Affairs in Ottawa to express Provincial concern about this. However, assurances were received from both Augusta and Ottawa that satisfactory waste treatment would be carried out. Copies of this correspondence are included in Appendix "C".

The New Brunswick Water Authority continued to be concerned about the potential threat of pollution on the Presquile and, therefore, a request was made to the Canada Department of National Health and Welfare to carry out a water quality survey of the river to establish the existing water quality prior to the start of industrial waste disposal by the proposed operations in the United States.

The result of this survey was published by the Canada Department of National Health and Welfare in a report entitled "Presquile River, New Brunswick, 1965 Baseline Water Quality". The published report is included in Appendix "D".

Further surveys were carried out in 1966-67 by the same Department. The results of the survey were published in a report entitled "International Presquile River, Water Quality Data 1966-67". The report is enclosed as Appendix "E". The study objective defined on page 1 is as follows:

> The 1966-67 Presquile River Water Quality Study was designed with two objectives: to confirm under similar conditions in 1966 the Baseline Water Quality Data established for the Presquile River in 1965; and in 1967 to demonstrate stream quality, under winter conditions, during initial Beet Sugar production in Maine. The first objective was met, the second only in part. Unfortunately Maine Beet Sugar production was started without the prior knowledge of Canadian regulatory agencies with the result that stream analyses were not instituted in time to monitor the initial short run (January 4th to January 24th) production of beet sugar. Stream quality, under winter flow conditions, was established.

The conclusion of the study on page V was:

> The 1966 Presquile River water quality study confirmed the BASE LINE WATER QUALITY data established for the Presquile River in 1965. There was unusual agreement between analyses conducted in 1965 and those conducted in 1966 for the parameters of dissolved oxygen, biochemical oxygen demand, pH, non-filtrable residue, residue on evaporation, color, turbidity, and complete chemical analyses at selected locations.

Under winter conditions there is a demonstrable deterioration in water quality as evidenced by a dissolved oxygen deficit, significantly higher biochemical oxygen demands, a five-fold increase in color, and an increase in solids concentration. There is some evidence that this deterioration is attributable to initial production of beet sugar in Maine, immediately preceding the survey period. This assumption is not supportable by prior reference data on water quality under winter ice cover.

Water quality, based on the coliform parameter, markedly deteriorated in 1966 as compared to 1965, and the degradation incrementally increased under winter conditions in 1967.

A map showing the location of the seven sampling sites in Canada for the study is attached as Figure 2 with the Appendix.

By 1967 increased pollution of the stream was almost inevitable owing to the presence of industrial processing at Easton where the inadequate treatment works were subject to breakdown from overloading. Permissive legislation in Maine continued. Although the river was reclassified to a C grade in 1968 the time allowed for achieving this classification is 1976.

The first case of massive pollution occurred in 1968 at the beginning of July and was reported by the Canada Department of Fisheries on July 1. The photographs which form part of this brief were taken along the banks of the river during the week of July 2. These illustrate the damage done to the water and the destruction of fish life by this pollution. Reports describing the pollution written by Fishery Officer J.S. Hannah and Field Protection Officer D.O. Jenkins and addressed to Mr. L.C. Ripley, District Protection Officer, are attached in Appendix "F". Also included in Appendix "F" are reports by Mr.

L. C. Ripley to the Regional Director, Department of Fisheries, together with a Departmental letter to the Deputy Minister of the Department of Fisheries. In summary, the reports show that many thousands of fish, mainly suckers, eels and speckled trout, were killed and that their bodies collected along the river banks and in pools where they began to decompose.

Inspections of the river were also carried out for the New Brunswick Water Authority. Memoranda prepared by Mr. B. B. Barnes and Mr. James K. Hayden describing the river and water quality are enclosed as Appendix "G". These reports show that the water had become coloured and turbid as a result of industrial waste pollution and the dissolved oxygen content had fallen to zero in some localities making fish life impossible.

The stream was not constantly monitored in 1968 and therefore it was not possible to record sudden slugs of pollution which tend to emerge from an industrial process such as the one at Easton. Large fish kills could no longer occur because the July 2nd pollution had eliminated most of the fishery in the river and only a few fish had managed to escape into the small tributaries.

During the first five months of 1969 sampling was carried out on several occasions, particularly when reports of discoloured water were received. The sampling results indicate that pollution sufficiently heavy to kill fish occurred on at least three occasions, namely, January 25th, March 5th and March 24th.

Appendix "H" contains a memorandum prepared by Mr. James K. Hayden for the New Brunswick Water Authority that describes the water quality on days when samples were obtained together with some correspondence arising out of reports that the waters were again discoloured.

It is apparent that any steps which have been taken in Maine to improve the water quality are still inadequate. A permissive attitude to pollution continues.

Dying Trout. Presquile River, July 5, 1968.

Courtesy - Saunders Studio, Woodstock, N.B.

Photograph 4

Tracey Mills Dam. July 3, 1968.

Canada, Department of Fisheries.

Photograph 5

Dead and rotting fish - Presquile River. July 5, 1968.

Courtesy - Saunders Studio, Woodstock, N.B.

Photograph 6

3. The Public Response

The photographs in this brief reveal the spectacle of masses of dead fish on the surfaces of the pools of the river and spread along the banks. Biologists classify this as a one hundred per cent fish kill.

The camera could not record the nauseating smell of rotting fish and polluted water which pervaded the entire valley in the warm days of July adding to the justifiable indignation of the people living there. Public response was immediate and it continues.

The first response was to build a small temporary earth dam across the Presquile River to impound the flow of polluted water from the United States into Canada. This served two purposes. One was to impound a sufficient volume of water so that by suddenly breaching the dam an increased flow of water would help to flush the river and its banks so as to wash the masses of dead fish downstream. The second purpose was to inform the public. The builders of this small dam are mature and responsible citizens; some of them are veterans of the 1939-45 war. They have the respect for life and our environment which is the mainstay of government. They saw that violence had been done to their river valley, and being men of both action and of thought, they reacted in a way which would draw direct attention to their problem and which they hoped would start the cleansing of the river banks.

Spreading lime on the banks of the Presquile River to cover fish remains.
July 9, 1968.

Courtesy - Saunders Studio, Woodstock, N.B.

Photograph 7

Cars and crowds assembled on the highway to view the dam construction. July 9, 1968.

Canada, Department of Fisheries

Photograph 8

Dam under construction on the International Boundary.
July 9, 1968

Canada, Department of Fisheries

Photograph 9

The building of the dam was reported by a sympathetic press and radio throughout North America. Appendix "I" shows samples of the press coverage given to this even from as far afield as the Los Angeles Times and the Stars and Stripes in the United States. Press descriptions of the action and letters received by the dam builders show public support for such action. The dam was breached by its builders one day after construction.

Two weeks later a large 9-foot concrete monument commemorating the dam building was placed on the International Boundary between the two Customs Posts. There was a large public turn out on July 28th to mark the ceremony of unveiling the monument which has the following words recorded on a metal plate (see photograph 12):

> This International Monument symbolizes the beginning of the Citizens War on Pollution in Western New Brunswick and Eastern Maine, and marks the site where aroused citizens built an earthen dam to stem the flow of pollution from the Vahlsing Inc. complex in Eastern Maine, 9 July 1968.
> THE WAR CONTINUES.

Another public response was to form a committee, "The Citizens International Pollution Committee", with a membership of about 600 persons from both New Brunswick and Maine. The Committee submitted a Brief to the International Joint Commission at a hearing held in St. Stephen in September 1969, and has written to a number of elected persons including the Prime Minister of Canada. A copy of a letter from the Chairman of the Citizens International Pollution Committee dated May 30th and addressed to the Honourable W.R. Duffie, Minister of Natural Resources, Government of New Brunswick, follows:

I am writing to you as I am President of the Citizens International Pollution Committee. Those of us who live on or near the Presquile River on both sides of the International Boundary were very pleased to hear that the Province is presenting a brief to Ottawa asking for effective upstream pollution control.

The biggest threat from pollution arises at Easton Me., and while we here in New Brunswick have embarked on a rigorous cleanup programme, we find the State of Maine doing nothing to alleviate the condition in the Presquile River. The fact that legislation to upgrade the river was defeated in the Maine State Legislature in April, 1969 is proof of that, and is of great concern to us here.

Our Committee has received wide and spontaneous public support, not only in New Brunswick and Maine but from many states even as far west as California. The letters which we have received reveal the serious concern of many people, both young and old, for the conservation of the quality of our environment.

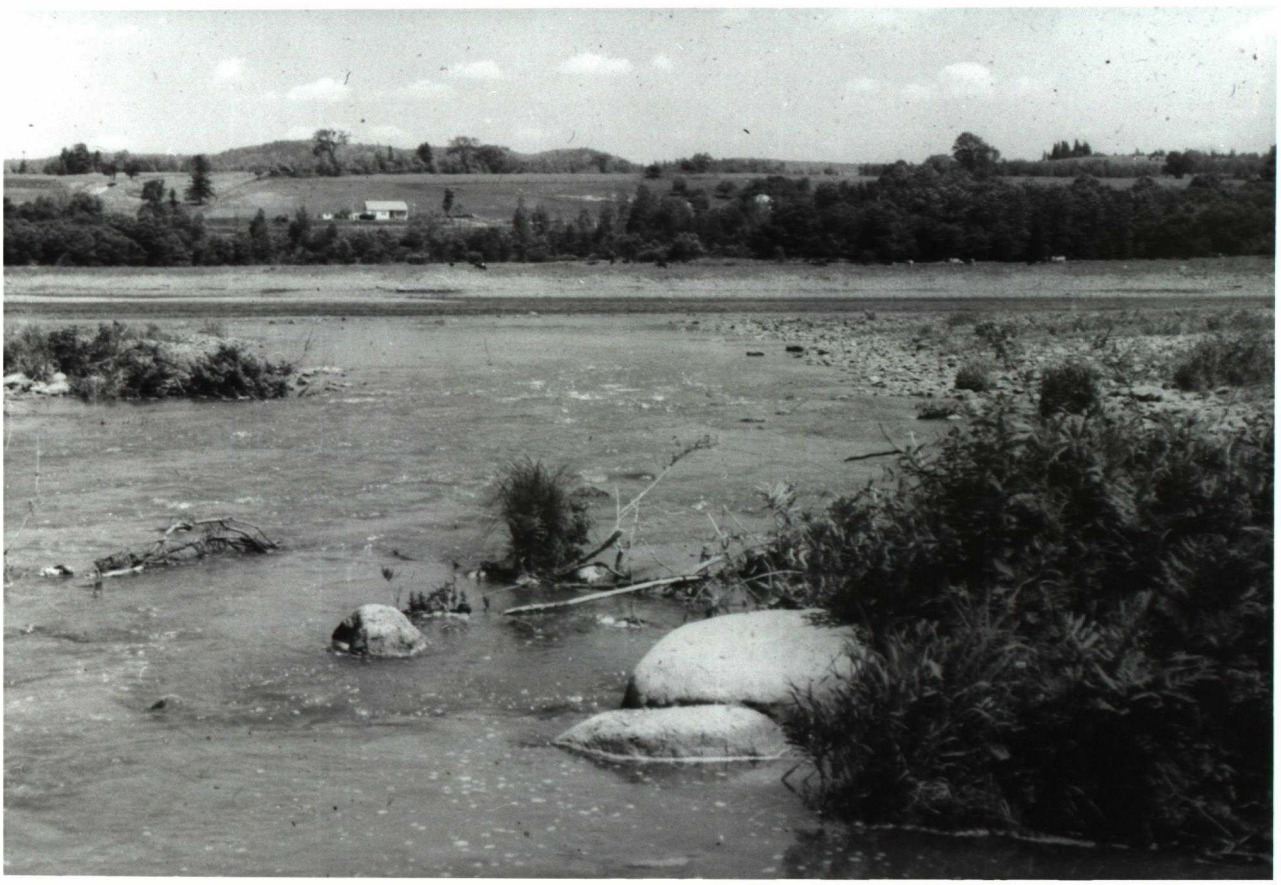
We know that industrial expansion and increased water pollution need not necessarily grow together. Instead we understand that research and technology are continuously devising better control methods. Therefore, it is necessary for governments to insist on better pollution control by wise legislation and by law enforcement through effective administration.

All the efforts of the New Brunswick government to protect our rivers have our strong support.

Yours very truly,

(Sgd.) Robert M. Caines, President,
Citizens International Pollution Committee.

Mayors of some of the communities along the river and members of the Legislature have received requests that effective action be taken by government to prevent this river pollution. It is apparent that this matter is of serious concern to the public.



The mouth of the Presquile River as it enters the Saint John. Foam and high colour were apparent on the river at that time. July 9, 1968

Canada, Department of Fisheries

Photograph 10

Crowds from Canada and the United States at the International Boundary for ceremonies to unveil the Monument to the Presquile Boundary Dam, July 28th, 1968.

Courtesy - Saunders Studio, Woodstock, N. B.

Photograph 11

4. Damages and Remedies

"A river is more than an amenity, it is a treasure", per Holmes J., New Jersey v. New York (1931), 283 U.S. 336, at p. 342. Today on the Presquile River we find that industries in Maine are using the river as an amenity to drain wastes which have received inadequate treatment. In New Brunswick the river is a gem among many treasures and it is being ruined. Where damage has been done remedies are required.

We are seeking immediate and effective water quality control. Therefore no monetary value of the damages is presented here. It should be noted however that the Trail Smelter Case (1949), 3 Int'l. Arb. Awards, 1905, provides a precedent for the establishment of an international tribunal to evaluate damages in a similar case of industrial pollution involving Canada and the United States.

There are four main classes of damage which have occurred. These are:

1. The fish kill. Associated with this are the costs of cleaning up the river and the costs of restoring fish life to the river from new stocks in local fish hatcheries.

2. Riparian land values. Appendix "J" shows the names of all riparian owners on each river bank together with the individual length of riparian ownership. Figure 3 with Appendix "J" shows a map of the entire Canadian portion of the river with the land tenure recorded on it.

3. Increased pollution of the Saint John River. Any increased pollution of the Saint John River adds to the danger of eutrophication of waters and immediate water quality deterioration in the Mactaquac reservoir. This is a combined hydroelectric and recreational water resource development in which more than a hundred million dollars has been invested.

4. Significant personal costs. Examples of these are: (a) costs incurred by persons who had to move temporarily out of their homes when the stench of rotting fish was so serious that evacuation was necessary. (b) Costs for fishermen and children who now have to travel further to other rivers for recreation in the summer.

We require that the United States adhere to the 1909 Boundary Waters Treaty which prohibits the pollution of transboundary streams. Remedial action by full pollution control works in Maine is mandatory. The United States has the technical skills and the financial resources to solve this problem and we expect them to do so.

It is not necessary in this brief to discuss the technicalities of the treatment works which must be installed by industries upstream of our boundary. It is sufficient to state that it would cost far less money for industries to treat their effluent properly on site than for Canada to treat the water at the international boundary and to charge the capital and operating costs to the United States. These costs would run into millions of dollars.

CONCLUSION

Industrial pollution is commonplace today. The disordered use of our rivers and streams for waste disposal is no longer acceptable. Most industries and municipalities have recognized this and have installed or are installing waste treatment facilities. The Maine industries on the Presquile have inadequate waste treatment by our standards. Planned and effective water management and the just allocation of withdrawal and discharge of waters on a basis acceptable to all jurisdictions within the river basin is necessary.

In Maine there is a stream quality classification (see Appendix "B") which permits pollution in some rivers. Such a classification for river basins entirely within Maine is of no concern to New Brunswick; but it is of great concern to New Brunswick where the waters are shared with New Brunswick and where Maine controls the upstream flows. Maine is making a quality classification which allows pollution of rivers which it shares with New Brunswick and this leaves New Brunswick with some of the costs and consequences of such pollution. This is clearly a breach of the 1909 Treaty. Obviously, governments must sit together and jointly work out plans for improving the quality of waters in river basins which are shared by more than one jurisdiction, otherwise serious disputes will arise.

In conclusion:

1. We require immediate remedial action on the Presquile.
2. We do not accept the principle of quality classification of our upstream waters in Maine which brings pollution into our waters.

3. We consider that the Presquile is part of a larger river basin management problem. We are willing to discuss the creation of a Saint John river basin compact involving all the appropriate governments. The purpose of such a compact would be to ensure the proper management of water quality and use in our shared river basins.

Emmett Porter (left) of Mars Hill, Maine and Robert Caines (right)
of Centreville, New Brunswick
installing the plaque which now stands on the International Boundary.

Courtesy - Saunders Studio, Woodstock, N.B.

Photograph 12

APPENDIX "A"

Hydrologic Data on the Presquile River

by

Canada, Department of Energy, Mines & Resources,

Inland Waters Branch

APPENDIX "A"

BY "INLAND WATERS BRANCH"

CANADA, DEPARTMENT OF ENERGY, MINES & RESOURCES

DESCRIPTION OF PRESQUILE RIVER BASIN

The Presquile River is a tributary of the Saint John River, with its confluence near Connell. The total area of the basin to the mouth of the river is 234 square miles.

In 1967, a hydrometric station was installed at Tracey Mills, latitude 46° 26' 16", longitude 67° 44' 41", Station No. 01AJ004 - Figure 1. The area of the drainage basin above the gauge is 187 square miles of which 167 square miles is in Maine and 20 square miles is in New Brunswick.

The topography is rolling with elevations ranging from approximately 275 feet near the gauge to more than 1600 feet at Mars Hill. There are a few small lakes and small areas of swamp. A large part of the basin is cleared and settled. The largest area under forest cover is in the southwest part of the basin.

The bedrock is chiefly limestone, shale, argillite, and volcanic rocks.

HYDROLOGY OF PRESQUILE RIVER BASIN

The mean annual precipitation in the basin is estimated to be about 37 inches and the mean annual runoff about 22 inches. Therefore, the mean annual evapotranspiration is approximately 15 inches.

Based on a mean annual runoff of 22 inches (1.62 cfs/sq. mi.), the discharge at this station would be approximately 300 cfs; and the discharge of the basin to the confluence of the Presquile River with the Saint John River would be approximately 380 cfs.

The hydrographs of the Presquile River at Tracey Mills for the period, November 21st, 1967, to December 31st, 1968, are shown on Figures 2 and 3. They were plotted from provisional daily discharge data, Form R79, copies of which are attached.

Miscellaneous measurements were taken at a site near Centreville with a drainage area of 183 square miles in 1965 and 1966. They are included in the publications titled, Surface Water Data - Atlantic Provinces, for those years.

Various water and air temperatures taken at the gauge at Tracey Mills between the period, June, 1965, to February, 1969, are compiled in Table I. It will be noted that the water temperature range is from 32° to 76° Fahrenheit. (At Station No. 01AK005, North Nashwaaksis Stream near Royal Road, the temperature range is from 32° to 77° Fahrenheit.)

During the period of record, the maximum daily discharge was 2020 cfs on April 15th, 1968; and the minimum daily discharge was 6.3 cfs on October 12th, 13th, and 14th, 1968. The lowest consecutive discharge was 6.5 cfs for a period of seven days.

Flood flows for the Presquile River Basin at Station No. 01AJ004 have been estimated from equations and regional flood ratios taken from the publication titled, Flood Frequency Analysis for the New Brunswick - Gaspe Region, Technical Bulletin No. 9 by E.P. Collier and G. A. Nix, Inland Waters Branch, Department of Energy, Mines and Resources, Ottawa, 1967.

Neglecting the effects of small lakes and swamps, the procedure gives the following flows:

Mean Annual

	Time of Recurrence		
Flood Discharge	10 Years	50 Years	100 Years
4000 cfs	6,400	8,700	9,800
21.4 cfs/sq. mi.	34.3	46.5	52.5

PRESQUILE RIVER AT TRACEY MILLS

Measurements of

Air and Water Temperatures

Date	Air Temperature	Water Temperature
June 16th, 1965	66° F	59° F
July 12th, 1965	74° F	68° F
July 9th, 1966	68° F	64° F
February 17th, 1968	-4° F	32° F
March 31st, 1968	38° F	32° F
April 22nd, 1968	48° F	38° F
April 25th, 1968	49° F	40° F
May 26th, 1968	46° F	45° F
June 25th, 1968	68° F	67° F
August 4th, 1968	74° F	76° F

December 13th, 1968	38° F	32° F
January 21st, 1969	15° F	32° F
February 22nd, 1969	37° F	32° F

TABLE I

DAILY DISCHARGES

PROVISIONAL, SUBJECT TO REVISION

DEPARTMENT OF ENERGY, MINES AND RESOURCES
INLAND WATERS BRANCH – WATER SURVEY OF CANADA

Station Name Puntledge River at Tracy Mills Station No. 08HB002

Daily Gauge Heights in Feet and Daily Discharges in Cubic Feet per Second for the Year 1968

Drainage Area 187 square miles Type of Gauge Manual ☐ Recording ☑

Day	January		February		March		April		May		June	
	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge
1	2.54	165 B	2.54	169 E	2.66	170 B	3.42	1530	1.86	484	5.97	99.4
2	2.50	161 B	2.54	166 E	2.68	174 E	3.52	1500	1.77	435	6.34	98.9
3	2.47	157 B	2.59	161 B	2.62	171 B	3.11	1330	1.69	395	6.42	95.9
4	2.56	149 B	4.14	377 B	2.56	168 B	2.92	1180	1.65	377	6.91	86.2
5	2.53	143 B	4.50	500 B	2.54	165 B	3.11	1330	1.66	382	6.94	92.8
6	2.54	131 B	4.38	461 B	2.52	163 B	3.52	1680	1.58	345	6.89	88.0
7	2.46	137 B	4.10	430 B	2.47	157 B	3.27	1460	1.50	309	6.85	74.0
8	2.42	133 B	4.16	405 B	2.47	155 B	3.27	1460	1.48	284	6.81	66.0
9	2.36	165 B	3.89	386 B	2.47	152 B	3.71	1660	1.38	259	6.79	62.8
10	2.31	126 B	3.82	368 B	2.46	149 B	3.64	1770	1.36	259	6.90	64.0
11	2.25	117 B	3.66	336 B	2.43	146 B	3.34	1520	1.87	255	6.86	76.4
12	2.19	115 B	3.41	309 B	2.38	141 B	3.22	1420	1.70	227	6.89	85.0
13	2.17	112 B	3.25	292 B	2.40	141 B	3.45	1600	1.26	213	6.91	96.8
14	2.12	109 B	3.08	271 B	2.45	142 B	3.54	1950	1.19	188	6.90	84.0
15	2.15	106 B	2.97	255 B	2.42	139 B	3.92	2020	1.18	184	6.90	84.0
16	2.16	104 B	2.91	243 B	2.39	137 B	3.62	1750	1.16	178	6.93	90.6
17	2.14	104.5	2.83	239 B	2.54	135 B	3.41	1580	1.14	171	6.90	87.2
18	2.16	101 B	2.77	220 B	2.85	155 B	3.23	1420	1.19	188	6.91	84.8
19	2.10	101 B	2.68	205 B	3.02	191 B	3.07	1300	1.23	202	6.92	89.4
20	2.15	104.3	2.68	191 B	3.49	239 B	3.35	1530	1.34	243	6.82	88.4
21	2.15	104 B	2.64	181 B	3.75	292 B	3.17	1460	1.28	220	6.93	90.6
22	2.15	104 B	2.62	168 B	3.97	350 B	2.99	1230	1.21	195	6.90	84.0
23	2.13	101 B	2.64	159 B	3.87	332 B	2.69	1000	1.19	188	6.87	78.0
24	2.17	104 B	2.61	149 B	4.01	372 B	2.50	871	1.13	168	6.78	60.4
25	2.18	106 B	2.64	143 B	4.08	400 B	2.51	878	1.09	155	6.76	50.0
26	2.24	109 B	2.63	134 B	3.91	372 B	2.93	1130	1.08	134	6.74	40.0
27	2.26	110 B	2.59	128 B	3.54	341 B	2.83	891	0.98	123	6.72	37.0
28	2.21	108 B	2.57	125 B	3.33	309 B	2.30	742	0.96	115	6.74	40.2
29	2.20	109 B	2.56	120 B	3.56	326 B	2.13	1240	0.92	106	6.82	51.2
30	2.23	106 B			4.23	839 B	1.97	546	0.93	109	6.90	64.7
31	2.27	112 B			3.66	1360 B			1.00	128		
total	445		7,160		8,002		91,195		7,219		2,255.6	
mean	114		247		258		1370		233		75.2	
ac-ft	6830		14,200		15,900		81,700		14,300		4470	
max	165		500		1360		2020		989		99.4	
min	101		104		104		546		106		37.0	

Day	July		August		September		October		November		December	
	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge
1	0.87	40.0	0.76	28.5	0.84	24.0	0.70	7.6	0.74	26.7	1.67	93.0 B
2	0.85	37.6	0.80	35.5	0.85	28.0	0.69	7.5	0.73	25.7	1.52	80.9 B
3	0.94	55.0	0.83	36.9	0.82	25.1	0.66	7.4	0.71	24.6	1.40	69.5
4	0.78	45.0	0.79	30.0	0.83	26.5	0.72	8.7	0.71	23.6	1.37	64.5
5	0.77	39.5	0.77	29.9	0.82	29.0	0.79	9.3	0.70	22.5	1.46	74.4
6	0.76	35.0	0.75	27.8	0.82	62.8	0.69	7.5	0.68	20.7	2.06	88.8 B
7	0.75	30.0	0.74	27.8	0.86	69.5	0.68	7.2	0.67	19.8	1.92	254 B
8	0.71	26.5	0.75	27.8	0.82	49.0	0.66	7.0	0.68	19.9	1.73	208 B
9	0.78	26.0	0.75	27.8	0.84	80.0	0.59	6.8	0.71	23.6	1.65	153 B
10	V.	26.5	0.77	29.2	0.87	200	0.79	6.8	0.67	19.8	1.50	132 B
11	0.64	17.7	0.77	29.9	0.83	120	0.58	6.5	0.70	22.5	2.60	288 B
12	0.66	18.9	0.76	29.8	0.83	108	0.57	6.3	0.69	21.6	2.80	349 B
13	0.67	19.8	0.76	29.8	0.87	105	0.57	6.3	0.83	41.8	1.59	174 B
14	0.66	18.9	0.77	29.5	0.87	89.5	0.57	6.3	1.09	109	2.41	107 B
15	0.66	18.9	0.80	33.0	0.80	79.0	0.58	6.5	1.19	89.4	1.65	175 B
16	0.70	26.5	0.78	30.9	0.91	106	0.61	7.0	1.08	78.0	2.35	290 B
17	0.75	27.5	0.80	33.5	0.87	97.5	0.61	7.0	0.97	55.7	2.29	417
18	0.74	26.7	0.89	44.3	0.87	96.5	0.62	7.2	0.90	47.5	2.20	350
19	1.44	141	0.90	45.5	0.84	75.0	0.61	7.0	1.26	96.6	2.00	317
20	1.23	95.4	0.85	39.3	0.90	108	0.60	6.9	1.98	130 B	1.89	260 B
21	1.00	60.0	0.83	38.0	0.89	92.0	1.01	61.5	1.79	109 B	1.78	227 B
22	0.91	41.5	0.82	35.5	0.79	82.0	1.14	141	1.74	89.48	1.69	204 B
23	0.75	30.9	0.80	33.0	0.77	72.0	1.17	87.6	1.24	78.6 B	1.68	189
24	0.77	29.9	0.80	33.0	0.80	82.5	0.97	71.3	1.11	72.8 B	1.67	192
25	0.74	26.5	0.85	39.3	0.78	82.0	0.90	95.5	1.07	70.5	1.79	189 B
26	0.75	25.7	1.05	67.5	0.80	73.0	1.05	67.5	1.14	69.8 B	2.32	278 B
27	0.78	24.6	0.97	48.0	0.77	82.0	1.01	64.7	1.10	62.5 B	2.30	468 B
28	0.71	23.6	0.91	39.6	0.74	82.0	0.92	48.4	1.09	59.2 B	2.24	460 B
29	0.74	32.0	0.87	43.7	0.73	93.0	0.87	41.8	0.96	91.3 B	2.21	430 B
30	0.81	34.8	0.86	43.0	0.70	76.0	0.82	35.5	1.19	66.0 B	2.65	477 B
31	0.76	28.5	0.84	26.8			0.78	30.9			2.44	437 B
total	1,156.4		1,050.9		509.4		815.3		1,682.0		5,616.4	
mean	37.3		33.9		17.0		26.3		54.1		182	
ac-ft	2290		2080		1,010		1620		3220		11,200	
max	141		67.5		24.0		141		130		917	
min	16.0		26.8		7.6		6.3		18.9		64.5	

For the Year or ~~For the Period~~ (to)

Maximum ~~instantaneous~~ daily discharge, 2020 cfs at G.H. ft at on April 15

Minimum ~~instantaneous~~ daily discharge, 6.3 cfs at G.H. ft at on October 12-14

Mean discharge, 219. cfs Total discharge, 159,000 ac-ft

"B" – Ice conditions

Backwater condition due to weed effect June 1 To December 31

Computed from Table No. 1 dated April 15 69 from January 1 to December 31 Total discharge 80,000. cfs-days

Accuracy. Good except during periods of weed effect and ice conditions which are poor.

Maximum ~~instantaneous~~ daily gauge height, ft at on

Minimum ~~instantaneous~~ daily gauge height, ft at on

	January to March		April to October		November to December		Summary
	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge	
Computed by Date	Staff	W.D. Sullivan May 6/69	Staff	W. Byers May 6/69	Staff	W.D. Sullivan May 6/69	W. Byers May 6/69
Checked by Date	G. Cann Mar 25/69	W. Byers May 6/69	G. Cann Mar 28/69	W.D. Sullivan May 6/69	G. Cann Mar 28/69	W. Byers May 6/69	G. Cann May 6/69

Approved by Date

R79 (Dec 67)

DAILY DISCHARGES

DEPARTMENT OF ENERGY, MINES AND RESOURCES
INLAND WATERS BRANCH – WATER SURVEY OF CANADA

[illegible]

Station Name [illegible] at [illegible] Mills   Station No. 01A[illegible]

Daily Gauge Heights in Feet and Daily Discharges in Cubic Feet per Second for the Year 1967   Drainage Area 187 square miles   Type of Gauge: Manual ☐ Recording ☑

Day	January Gauge Height	January Discharge	February Gauge Height	February Discharge	March Gauge Height	March Discharge	April Gauge Height	April Discharge	May Gauge Height	May Discharge	June Gauge Height	June Discharge
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
total												
mean												
ac-ft												
max												
min												

Day	July Gauge Height	July Discharge	August Gauge Height	August Discharge	September Gauge Height	September Discharge	October Gauge Height	October Discharge	November Gauge Height	November Discharge	December Gauge Height	December Discharge
1											1.75	395
2											1.70	363
3											1.67	[illegible]
4											1.57	309
5											1.56	309
6											1.67	318
7											1.67	332
8											1.63	309
9											1.51	296
10											1.53	305
11											1.80	345
12											1.81	321
13											1.90	489
14											1.86	440
15											1.76	386
16											2.02	368
17											2.42	350
18											2.41	318
19											1.95	301
20											1.67	298
21									1.92	275 A	1.69	318
22									1.74	284	1.55	292
23									1.40	267	1.57	271
24									V	1080	1.82	251
25									3.27	1460	2.40	239
26									2.62	958	2.48	227
27									2.37	787	2.25	213
28									2.17	662	2.22	202
29									1.97	546	2.38	191
30									1.93	461	2.48	181
31											2.55	175
total												9504
mean												307
ac-ft												18,900
max												489
min												175

For the Year or For the Period (to)

Maximum instantaneous / daily discharge, cfs at G.H. ft at on

Minimum instantaneous / daily discharge, cfs at G.H. ft at on

Mean discharge, cfs   Total discharge, ac-ft

A - Manual gauge
Ice Conditions November 30 To December 31
V - Subdivided

Computed from Table No. 1 dated April 15/69 from November 30 to December 31   Total discharge cfs-days

Accuracy Fair.

Maximum instantaneous / daily gauge height, ft at on

Minimum instantaneous / daily gauge height, ft at on

	January to		to		November 21 to December 31		Summary
	Gauge Height	Discharge	Gauge Height	Discharge	Gauge Height	Discharge	
Computed by / Date					Staff	[illegible] May 6/69	
Checked by							

DEPARTMENT OF ENERGY, MINES AND RESOURCES

INLAND WATERS BRANCH–WATER SURVEY OF CANADA

HYDROGRAPH FOR Presquile River at Tracey Mills Station No. 01AJ004 R187 (9-67)

for: year ending September 30, 1968 Drainage Area = 187 sq mi

1967 | 1968

OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER

5 10 15 20 25

2000
1000 cfs
500
200
100
10

cfs
500
400
300
200
100
70
60
50
40
30
20
19
10
7.6

Dam Breach

Plotted by J.W.L. Checked by G.S. Approved by _____ Date _____

W.C.S.

G9–10164

Fig. 2

DEPARTMENT OF ENERGY, MINES AND RESOURCES - WATER RESOURCES BRANCH

HYDROGRAPH Prepared Presquile River at Tracey Mills Station No. 01AJ004

for year ending September 30, 1969

1968 | 1969

OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER

cfs

600 500 400 300 200 100 90 80 70 60 50 40 30 20 10 9 8 7 6 5 4 3 2 1

5 10 15 20 25

OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER

Plotted by W.B. Checked by G.S Approved by Date May 6/69

R187 (2-67)

G9-10065

Fig 3

APPENDIX "B"

Standards of Classification of Fresh Waters in Maine

Water and Air Environmental

Improvement Commission

Maine

APPENDIX "B"

WATER AND AIR ENVIRONMENTAL IMPROVEMENT COMMISSION
REVISED STATUTES OF 1964
STATE OF MAINE, U.S.A.
TITLE 38 CHAPTER 3
(As Amended)
EFFECTIVE, OCTOBER 7, 1967

Sec. 363 - Standards of Classification of fresh waters.

The commission shall have 4 standards for the classification of fresh surface waters.

Class A shall be the highest classification and shall be of such quality that it can be used for recreational purposes, including bathing, and for public water supplies after disinfection. The dissolved oxygen content of such waters shall not be less than 75% saturation or as naturally occurs, and contain not more than 100 coliform bacteria per 100 milliliters.

These waters shall be free from sludge deposits, solid refuse and floating solids such as oils, grease or scum. There shall be no disposal of any matter or substance in these waters which would impart color, turbidity, taste or odor other than that which naturally occurs in said waters, nor shall such matter or substance alter the temperature or hydrogen-ion concentration of these waters or contain chemical constituents which would be harmful or offensive to humans or which would be harmful to animal or aquatic life. No radioactive matter or substance shall be permitted in these waters other than that occuring from natural phenomena.

There shall be no discharge of sewage or other wastes into water of this classification and no deposits of such material on the banks of such waters in such a manner that transfer of the material into the waters is likely. Such waters may be used for log driving or other commercial purposes which will not lower its classification.

Class B, the 2nd highest classification, shall be divided into 2 designated groups as B-1 and B-2.

B-1. Waters of this class shall be considered the higher quality of the Class B group and shall be acceptable for recreational purposes, including bathing, for use as potable water supply after adequate treatment and for a fish and wildlife habitat. The dissolved oxygen of such waters shall be not less than 75% of saturation, subject, however, to normal natural variations, and not less than 5 parts per million at any time and contain no more than 300 coliform bacteria per 100 milliliters.

These waters shall be free from sludge deposits, solid refuse and floating solids such as oils, grease or scum. There shall be no disposal of any matter or substance in these waters which imparts color, turbidity, taste or odor which would impair the usages ascribed to this classification nor shall such matter or substance alter the temperature or hydrogen-ion concentration of these waters so as to render such waters harmful to fish or other acquatic life. There shall be no disposal of any matter or substance that contains chemical constituents which are harmful to humans, animals or aquatic life or which adversely affect any other water use in this class. No radioactive matter or substance shall be permitted in these waters which would be harmful to humans, animal or aquatic life, and there shall be no disposal of any matter or substance which would result in radionuclide concentrations in edible fish or other aquatic life thereby rendering them dangerous for human consumption. These waters shall be free of any matter or substance which alters the composition of bottom fauna, which adversely affects the physical or chemical nature of bottom material, or which interferes with the propagation of fish.

There shall be no disposal of sewage, industrial wastes or other wastes in such waters, except those which have received treatment for the adequate removal of waste constituents including, but not limited to, solids, color, turbidity, taste, odor or toxic material, such that these treated wastes will not lower the standards or alter the usages of this classification, nor shall such disposal of sewage or waste be injurious to aquatic life or render such dangerous for human consumption.

B-2. Waters of this class shall be acceptable for recreational purposes including bathing, for industrial and potable water supplies after adequate treatment, and for a fish and wildlife habitat. The dissolved oxygen of such waters shall not be less than 60% of saturation, subject, however, to normal natural variations, and not less than 5 parts per million at any time, and contain no more than 1,000 coliform bacteria per 100 milliliters.

These waters shall be free from sludge deposits, solid refuse and floating solids such as oils, grease or scum. There shall be no disposal of any matter or substance in these waters which imparts color, turbidity, taste or odor which would impair the usages ascribed to this classification, nor shall such matter or substance alter the temperature or hydrogen-ion concentration of the waters so as to render such waters harmful to fish or other aquatic life. There shall be no disposal of any matter or substance that contains chemical constituents which are harmful to humans, animal or aquatic life, or which adversely affect any other water use in this class. No radioactive matter or substance shall be permitted in these waters which would

be harmful to humans, animal or aquatic life, and there shall be no disposal of any matter or substance which would result in radio-nuclide concentrations in edible fish or other aquatic life thereby rendering them dangerous for human consumption. These waters shall be free of any matter or substance which alters the composition of bottom fauna, which adversely affects the physical or chemical nature of bottom material, or which interferes with the propagation of fish.

There shall be no disposal of sewage, industrial wastes or other wastes in such waters except those which have received treatment for the adequate removal of waste constituents including, but not limited to, solids, color, turbidity, taste, odor or toxic material, such that these treated wastes will not lower the standards or alter the usages of this classification, nor shall such disposal of sewage or waste be injurious to aquatic life or render such dangerous for human consumption.

Class C waters, the 3rd highest classification, shall be of such a quality as to be satisfactory for recreational boating and fishing, for a fish and wildlife habitat and for other uses except potable water supplies and swimming, unless such waters are adequately treated.

The dissolved oxygen content of such waters shall not be less than 5 parts per million for trout and salmon waters, subject, however, to normal natural variations, and not less than 4 parts per million for non-trout and non-salmon waters, subject, however, to normal natural variations. The numbers of coliform bacteria allowed in these waters shall be only those amounts which will not, in the determination of the commission, indicate a condition harmful to the public health or impair any usages ascribed to this classification.

These waters shall be free from sludge deposits, solid refuse and floating solids such as oils, grease or scum. There shall be no disposal of any matter or substance in these waters which imparts color, turbidity, taste or odor which would impair the usages ascribed to this classification, nor shall such matter or substance alter the temperature or hydrogen-ion content of the waters so as to render such waters harmful to fish or other aquatic life. There shall be no disposal of any matter or substance that contains chemical constituents which are harmful to humans, animal or aquatic life or which adversely affect any other water use in this class. No radioactive matter or substance shall be permitted in these waters which would be harmful to humans, animal or aquatic life and there shall be no disposal of any matter or substance which would result in radio-nuclide concentrations in edible fish or other aquatic life thereby rendering them dangerous for human consumption.

There shall be no disposal of sewage, industrial wastes or other wastes in such waters, except those which

have received treatment for the adequate removal of waste constituents including, but not limited to, solids, color, turbidity, taste, odor or toxic material, such that these treated wastes will not lower the standards or alter the usages of this classification, nor shall such disposal of sewage or waste be injurious to aquatic life or render such dangerous for human consumption.

Class D waters shall be assigned only where a higher water classification cannot be attained after utilizing the best practicable treatment or control of sewage or other wastes. Waters of this class may be used for power generation, navigation and industrial process waters after adequate treatment. Dissolved oxygen of these waters shall not be less than 2.0 parts per million, subject, however, to normal natural variations, and shall always be present. The numbers of coliform bacteria allowed in these waters shall be only those amounts which will not, in the determination of the commission, indicate a condition harmful to the public health or impair any usages ascribed to this classification.

These waters shall be free from sludge deposits, solid refuse and floating solids such as oils, grease or scum. There shall be no disposal of any matter or substance in these waters which imparts color, turbidity, taste or odor which would impair the usages ascribed to this classification, nor shall such matter or substance alter the temperature or hydrogen-ion concentration of the waters to impair the usages of this classification. There shall be no disposal of any matter or substance that contains chemical constituents which are harmful to humans or which adversely affect any other water use in this class. No radioactive matter or substance shall be permitted in these waters which would be harmful to humans, animal or aquatic life and there shall be no disposal of any matter or substance which would result in radio-nuclide concentrations in edible fish or other aquatic life thereby rendering them dangerous for human consumption.

There shall be no disposal of sewage, industrial wastes or other wastes in such waters, except those which have received treatment for the adequate removal of waste constituents including, but not limited to, solids, color, turbidity, taste, odor or toxic material, such that these treated wastes will not lower the standards or alter the usages of this classification. Treated wastes discharging to these waters shall not create a public nuisance as defined in Title 17, section 2802, by the creation of odor-producing sludge banks and deposits or other nuisance conditions.

With respect to all classifications hereinbefore set forth, the commission may take such actions as may be appropriate for the best interests of the public, when it finds that such classification is temporarily lowered due to abnormal conditions of temperature or stream flow.

APPENDIX "C"

Correspondence on the Presquile River between

(i) Premier Louis J. Robichaud of New Brunswick

and Governor John H. Reed of Maine

(ii) Premier Louis J. Robichaud and the Secretary

of State for External Affairs,

together with a

United States Department of State Aide-Memoire

February 19, 1965.

My dear Governor Reed:

I have just learned with pleasure that legislation is being introduced to the Maine Legislature authorizing the construction of a large beet-sugar refinery at Easton, Maine; but I am much concerned over reports that the effluent from this plant is to be discharged without treatment into the Prestile Stream which is tributary to the Presquile and Saint John Rivers in New Brunswick.

This commendable development should be a boon to northern Maine, but I feel I must stress our interest in adequate treatment of industrial wastes to minimize pollution on the upper reaches of the Saint John River.

The pollution abatement programs of the State of Maine Water Improvement Commission and the New Brunswick Water Authority have resulted in the construction of a number of sewage and industrial treatment plants in the watershed of the Saint John River on both sides of the border. Any unrestricted discharge of industrial waste, such as that from the proposed beet-sugar refinery, could largely nullify the beneficial effect of these facilities and would be a severe setback to the pollution control plans of both Maine and New Brunswick. I believe that the greatest care must be exercised by both our governments in ensuring adequate treatment of industrial wastes and in selecting sites which afford suitable receiving waters for the treated effluents. We, in New Brunswick, have insisted that <u>all</u> new industrial

.....2

developments must hold their pollutants at an approved low level, and we are gradually bringing about improvements at established plants.

It is my earnest hope that you and the Legislature of the State of Maine will take all possible steps to ensure that proper treatment facilities are installed at the new beet-sugar refinery, and that every effort will be made through the State of Maine Water Improvement Commission to minimize industrial and domestic pollution on the upper reaches of the Saint John River and its tributaries.

With kindest personal regards, I am

Yours sincerely,

LOUIS J. ROBICHAUD

The Honourable John H. Reed,
Governor, State of Maine,
AUGUSTA, Maine.

STATE OF MAINE
OFFICE OF THE GOVERNOR
AUGUSTA

JOHN H. REED
GOVERNOR

March 5, 1965

Honorable Louis J. Robichaud
Premier of New Brunswick
Fredericton, New Brunswick
Canada

Dear Louis:

Thank you for your letter of recent date relative to the proposed sugar beet refinery in Easton, Maine. We are hopeful details will be worked so this will become a reality.

In regard to the waste from the plant I understand there will be no solid residue or odor. There is a large amount of pollution treatment equipment to be installed.

I have discussed this particular matter today with a German engineer from the Krupp works who has been responsible for 24 installations. He assures me this plant will be as effectively equipped to handle the discharge as any he has seen.

I can understand your concern and we certainly want to cooperate so that there will be no increase in your problem on the St. John.

With warm personal regards.

Sincerely,

John H. Reed
Governor

JHR:iv

Mar.12 - photostat sent to Dr. John Bates FYI "May I have your comments, please". From the Premier.

April 20, 1965.

Dear Mr. Martin:

I have recently had occasion to exchange correspondence with Governor Reed of the State of Maine with respect to the passage of certain legislation by that State. The legislation referred to is entitled "An Act to Promote the Production of Sugar Beets in the State and Reclassifying Certain Waters in Aroostook County" (H.P. 928 - L.D. 1266). I have expressed pleasure at the possibility of the construction of a large beet-sugar refinery which will, no doubt, have a very beneficial effect on the economy of Aroostook County, Maine. However, I am also concerned with the possibility of a significant increase in the pollution load of the Prestile Stream on which the refinery is to be located and which is part of the great Saint John system. As you know, we have initiated an active pollution abatement program through our Water Authority on the Saint John and other provincial rivers and any large increment of industrial pollution from the State of Maine will largely negate our efforts in the Province.

I have been assured that there will be adequate effluent treatment facilities installed. However, we are concerned that it was considered necessary to downgrade

.....2

the Prestile Stream from a B1 or B2 Classification to a Class D by the legislation referred to above in order that the effluent from the refinery could be accepted. We understand that, under the State of Maine Classification, a stream rated as Class B is suitable for recreational purposes and as industrial and potable water supplies after adequate treatment. Class D, on the other hand, is the lowest classification and is considered as primarily devoted to the transportation of sewage and industrial wastes.

As this is an international problem, we felt the need of drawing it to your attention with the thought that you may wish to convey our concern to Federal authorities in the United States. We understand that the refinery will be largely federally financed and, since the federal government is initiating a massive attack on pollution of interstate rivers with a program running into billions of dollars over the next few years, we are certain that they would exert every effort to ensure that the maximum possible degree of treatment is realized at this plant located on international waters.

Your cooperation in bringing this to the attention of the appropriate officials in Washington would be greatly appreciated.

Yours sincerely,

LOUIS J. ROBICHAUD

The Honourable Paul Martin
Secretary of State for External Affairs
OTTAWA.

The Secretary of State for External Affairs
Canada

Ottawa, August 18, 1965

My Dear Premier,

In my absence on May 5, 1965, the Acting Minister, Mr. Drury, as requested in your letter to me of April 20, 1965, agreed to take up with the U.S. authorities in Washington the possibility of pollution of the Saint John River by waste from a proposed sugar beet refinery to be located on Prestile Stream in Maine.

I am enclosing for your information a copy of an Aide-Memoire on this subject dated July 13, 1965 which our Embassy in Washington has received from the U.S. State Department.

While I am not proposing to take any further action on this subject until I have the comments of the Department of National Health on the Aide-Memoire, I should be grateful to know of any further developments that may have come to your attention. As you know, the Department of National Health undertook a survey of water quality in the area concerned at the request of New Brunswick this summer, and the results of that survey, when available, should be helpful in assessing the situation.

Yours sincerely,

Paul Martin

The Hon. Louis J. Robichaud, Q.C.,
Premier of New Brunswick,
Fredericton, N.B.

(Copy)

AIDE-MEMOIRE

The information contained in the Canadian Embassy's aide-memoire of May 24, 1965, concerning legislation in the State of Maine reducing the use classification of the Prestile Stream from Class B to Class D, as well as the concern expressed that effluents might represent significant pollution of that Stream and the St. John River, was conveyed to the Governor of the State of Maine.

In response to the Department's communication, the Governor of Maine has stated that a very significant recovery from Class D is anticipated before water crosses the international boundary. The Governor further stated that he wished to "assure our Canadian neighbors that their interest in this waterway will be protected."

Department of State,

Washington.

July 13, 1965.

APPENDIX "D"

Canada, Department of National Health and Welfare

Report on Presquile River, 1965.

Base Line Water Quality

SURVEY REPORT

PRESQUILE RIVER
NEW BRUNSWICK
1965
BASE LINE WATER QUALITY

BY THE

PUBLIC HEALTH ENGINEERING DIVISION
DEPARTMENT OF NATIONAL HEALTH AND WELFARE

ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, 1966
82

SURVEY REPORT

PRESQUILE RIVER
NEW BRUNSWICK

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BASE LINE WATER QUALITY

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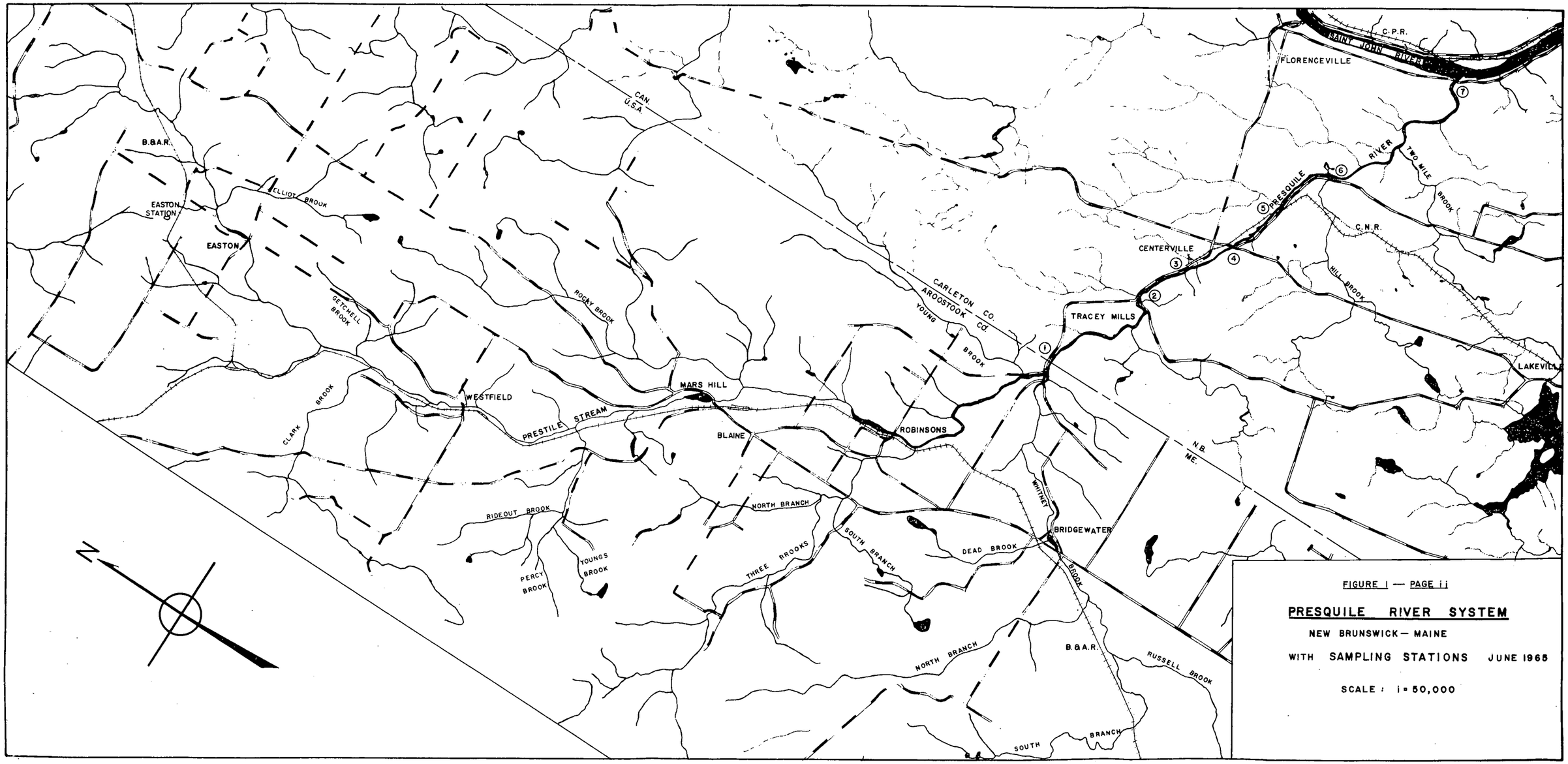

FIGURE I — PAGE ii

PRESQUILE RIVER SYSTEM

NEW BRUNSWICK — MAINE

WITH SAMPLING STATIONS JUNE 1965

SCALE : 1 = 50,000

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WATER QUALITY STUDY

FOREWORD

This report provides analytical reference data on Presquile River water quality as of June, 1965, as measured by the parameters of biochemical oxygen demand, dissolved oxygen, pH, color, turbidity, total solids, non-filtrable residue, coliform bacteria, and selected chemical characteristics.

The study was designed to provide a reference datum from which any future change in river conditions, and pollution contributed to the river system, can be evaluated by the above physical, chemical, and biological parameters.

Relevant analytical techniques, together with the necessary technical data and graphs are set out to facilitate water quality evaluations and comparisons in years subsequent to 1965.

SYNOPSIS:

Since a surface stream is subject to constant change, in terms of movement, stage, season and adjacent land usage, water quality is only a relative term and when represented by analytical data is only applicable to the period of study. However, this base line analytical data is necessary in evaluating stream conditions and changes in water quality.

A predominant condition of many current surface water classification systems is a "case-by-case" stipulation based on requirements for beneficial water use, and other variables. This system precludes the establishment of rigid water quality standards, and classification systems, applicable to all surface streams.

This report avoids any attempt at classifying the Presquile River on the basis of rigid water quality requirements. Instead, the report sets out base line water quality data as determined by several parameters. Where applicable quality objectives, or criteria, have previously been established by the International Joint Commission, for other boundary waters, the pertinent objectives have been shown for comparison purposes.

HISTORICAL BACKGROUND:

In March, 1965, the New Brunswick Water Authority conveyed to the Public Health Engineering Division, Department of National Health and Welfare, expressions of anxiety for the future water quality of the Presquile River in New Brunswick.

This concern arose as a result of an application by Maine Sugar Industries, Inc., Easton, Maine, to the State of Maine Water Improvement Commission, for permission to discharge beet sugar waste from the daily slicing of 4,000 tons of beets to the waters of the Prestile Stream. The application, if approved, would have the effect of downgrading the existing "B-1" classification of the Prestile Stream to the "D" classification. A synopsis of the State of Maine surface water classification follows on page vii. Potential degradation of existing water quality along the contiguous reaches of the Presquile River in New Brunswick becomes a definite likelihood as a result of downgrading water quality along the Prestile Stream in Maine.

In view of this potentiality the New Brunswick Water Authority requested assistance from the Public Health Engineering Division in establishing existing water quality, or base line values, along the Presquile River. Comparisons of base line values with water quality at any future date will enable evaluations to be made for changes in water quality.

SURFACE WATER CLASSIFICATION - STATE OF MAINE:

Primary control of water pollution in the State of Maine is exercised by the Water Improvement Commission. Under State statutes the Commission is charged with the responsibility for making recommendations to the legislature with respect to the classification of rivers, waters and sections thereof within the State, based on reasonable standards of quality and use.

Four standards have been established by the Commission for the classification of surface waters in Maine. These classifications are summarized as follows:

"Class A shall be the highest classification and shall be of such quality that it can be used for bathing and for public water supplies after disinfection, and the dissolved oxygen content of such waters shall not be less than 75% saturation and contain not more than 100 coliform bacteria per 100 milliliters.

"There shall be no discharge of sewage or other wastes into water of this classification and no deposits of such material on the banks of such waters in such a manner that transfer of the material into the waters is likely. Such waters may be used for log driving or other commercial purposes which will not lower its classification.

"Class B, the second highest classification, shall be divided into two designated groups as B-1 and B-2.

"B-1. Waters of this class shall be considered the higher quality of the Class B group and shall be acceptable for recreational purposes and after adequate treatment for use as a potable water supply. The dissolved oxygen of such waters shall be not less than 75% of saturation and contain no more than 300 coliform bacteria per 100 milliliters.

"There shall be no disposal of sewage or industrial wastes in such waters except those which have received adequate treatment to prevent lowering of the standards for this classification, nor shall such disposal of sewage or waste be injurious to aquatic life or render such dangerous for human consumption.

"B-2. Waters of this class shall be acceptable for recreational boating, fishing, industrial and potable water supplies after adequate treatment. The dissolved oxygen of such waters shall not be less than 60% of saturation and contain no more than 1,000 coliform bacteria per 100 milliliters.

"There shall be no disposal of sewage or industrial waste in such waters to lower its classification nor shall such disposal of sewage or waste be injurious to aquatic life or dangerous for human consumption.

"Class C, the third highest classification, shall be of such a quality as to be satisfactory for recreational boating, fishing and other uses except potable water supplies and swimming, unless adequately treated to meet standards.

"Waters of this classification shall be free from scums, slicks, odors and objectionable floating solids, and shall be free from chemicals and other conditions inimical to aquatic life. The dissolved oxygen content of such waters shall not be less than 5 parts per million for trout and salmon waters and not less than 4 parts per million for non-trout and non-salmon waters.

"The Commission may take such action as may be appropriate for the best interests of the public when it finds that a "C" classification is temporarily lowered due to abnormal conditions of temperature and stream flow for that season involved.

"Class D waters, the lowest classification, shall be considered as primarily devoted to the transportation of sewage and industrial wastes without causing a public nuisance as defined in Chapter 141, Section 6, by the creation of odor producing sludge banks and deposits or other nuisance condition and such waters shall contain dissolved oxygen at all times. During a period of temporary reduction in the dissolved oxygen content in this class water, due to abnormal conditions of temperature of stream flow for the particular season involved, the Commission, provided a nuisance condition has not been created in such water and in the opinion of the Commission is not likely to be created during such season, shall take no action to reduce the amount of pollution from any source which is allowed in such class water under normal conditions.

"With respect to "C" and "D" classifications, the number of coliform bacteria, or amounts of toxic wastes or chemicals discharged into said waters shall be only those amounts which will not, in the determination of the Commission, be harmful to the public health".

The Prestile Stream was included with surface waters classified as Class B-1, the second highest classification, as of September 2, 1965.

AREA DESCRIPTION:

The Prestile Stream, with headwaters in the State of Maine, flows across the International Boundary in the area of Centerville, west-central New Brunswick.

The contiguous New Brunswick section of this stream is designated as the Presquile River (Canada National Topographic Series - 1:50,000). Ten miles from the International Boundary the Presquile River empties into the Saint John River.

In the State of Maine the Prestile Stream, and its tributary system, drains a watershed area of 168 square miles. In the Province of New Brunswick the Presquile River drains a surface area of 15 square miles. The total watershed area of this system is in the order of 183 square miles.

At Tracey Mills, New Brunswick, 2.6 miles from the International Boundary, a low level dam impounds the Presquile River for private power generation. The small reservoir area provides limited potential for regulating stream flow. The impoundment will however tend to smooth out sharp variations in water quality

by settling suspended matter and decreasing coliform bacteria concentrations. Potential detrimental effects of this impoundment include a reduction in dissolved oxygen concentration and heavy algae production.

Downstream from the Tracey Mills impoundment the average width of the Presquile River approximates 50 feet. There is little variation in cross-sectional depth which at mid channel, in June, is generally less than two feet. A gradient in the order of 7.5 feet per mile develops a moderate stream velocity. These factors of stream depth, velocity and channel roughness induce considerable turbulance and effect complete lateral, vertical and longitudinal mixing over the final 7.5 mile stretch of the Presquile River.

Agriculture is the predominant industry throughout the watershed area, both in Maine and New Brunswick. Potatoes have represented the principal crop for many years. Secondary processing of agricultural crops has been introduced in the basin within recent years following the erection of a potato processing plant at Easton, Maine, the site of the proposed beet sugar refinery. In addition to beets other vegetable crops have been introduced in very recent years in an effort to supplement farming incomes.

In New Brunswick the recreational potential of the Presquile River is primarily limited to trout fishing. Good seasonal runs are experienced over the stretch of water between the Saint John River and Tracey Mills.

ANALYTICAL STANDARDS

All physical, chemical, and biological determinations were conducted in compliance with instructions contained in "Standard Methods for the Examination of Water and Wastewater", Eleventh Edition, 1960.

For those determinations where alternative analytical procedures are noted in the foregoing edition the following methods were utilized; for dissolved oxygen, the Alsterburg (Azide) modification of the Winkler method; for biochemical oxygen demand, the dilution technique.

Confirmed Most Probable Numbers (MPN's) of coliform bacteria per 100 ml. of water were determined (Bacto-Lauryl Tryptose Broth, with five tubes in each of three or more consecutive decimal dilutions, incubation at 35.5°C. for 24 and 48 hours, and confirmation of all positive cultures in Bacto-Brilliant Green Bile Broth, with incubation at 35.5°C. for 48 hours).

ABBREVIATIONS

B.O.D.	Biochemical Oxygen Demand
c.f.s.	cubic feet per second
D.O.	Dissolved Oxygen
mg/l	milligrams per litre
M.P.N.	Most Probable Number
p.p.m.	parts per million
pH	Hydrogen-ion Concentration
<	less than
>	greater than
%	per cent

PRESQUILE RIVER

SAMPLING STATIONS

STATION	LOCATION
No. 1	Presquile River (mid-point), at International Boundary
No. 2	Highway bridge (mid-point) at Tracey Mills, 2.6 miles from International Boundary
No. 3	Presquile River (mid-point), 3.7 miles from International Boundary below Tracey Mills
No. 4	Highway bridge (mid-point) at Centerville, 4.6 miles from International Boundary
No. 5	Rail bridge (mid-point), 5.6 miles from International Boundary
No. 6	Highway bridge (mid-point), 6.8 miles from International Boundary
No. 7	Highway bridge (mid-point), 10.1 miles from International Boundary

LIST OF ILLUSTRATIONS

LIST OF TABLES

ACKNOWLEDGEMENTS

Special acknowledgement is made to the agencies of provincial and federal government who rendered valuable assistance in the conduct of this study. They are as follows:

New Brunswick Water Authority
Fredericton, New Brunswick

Water Resources Branch
Department of Northern Affairs and National Resources
Halifax, Nova Scotia

Meterological Branch
Department of Transport
Moncton, New Brunswick

Public Health Engineering Division - (Laboratory)
Department of National Health and Welfare
Ottawa, Ontario

PRESQUILE RIVER

STUDY OBJECTIVE

The 1965 Presquile River study was designed to monitor and establish water quality, or base line values for specific water constituents, at fixed sampling points on the river system. Any future change in water quality, and pollution loading contributed to the river, can be evaluated by comparison with the physical, chemical and biological parameters utilized.

A valid comparison is of course dependent upon the employment of identical sampling techniques, indices and analytical standards. Every effort was directed towards recording and establishing factors for future comparison.

Factors such as basin precipitation, water temperature and river stage, separately and in combination, affect the assimilation of pollutants and the analytical data recorded. Data on these variables is shown in all instances.

STUDY PROGRAM

The study program was designed to establish existing or base line water quality data through the employment of accepted physical, chemical and biological parameters. Analytical determinations in support of the program were conducted over the inclusive period June 16-25, 1965.

Seven fixed sampling stations were established at approximately equally distant intervals on the ten mile river length from the International Boundary to the Saint John River.

This reach of the Presquile River, with the exception of one small impoundment 2.6 miles from the border, has little variation in cross-sectional width and depth. Channel roughness induces considerable turbulance which in turn effects complete lateral, vertical and longitudinal mixing. In consideration of these factors cross-sectional sampling ranges were not established.

Sampling, at all fixed stations, was conducted at mid-stream and mid-depth.

Analytical data was compiled at all sampling stations for levels of biochemical oxygen demand, dissolved oxygen, pH, color, turbidity, total solids, non-filtrable residue, coliform bacteria and selected chemical characteristics. Additionally, one complete chemical analysis was conducted at three representative stations.

To determine variations in dissolved oxygen concentration, that may occur over a daily cycle, a 24-hour sampling program was conducted at two locations. Temperature and dissolved oxygen were determined at hourly intervals and the oxygen saturation index was computed.

BASIN RAINFALL

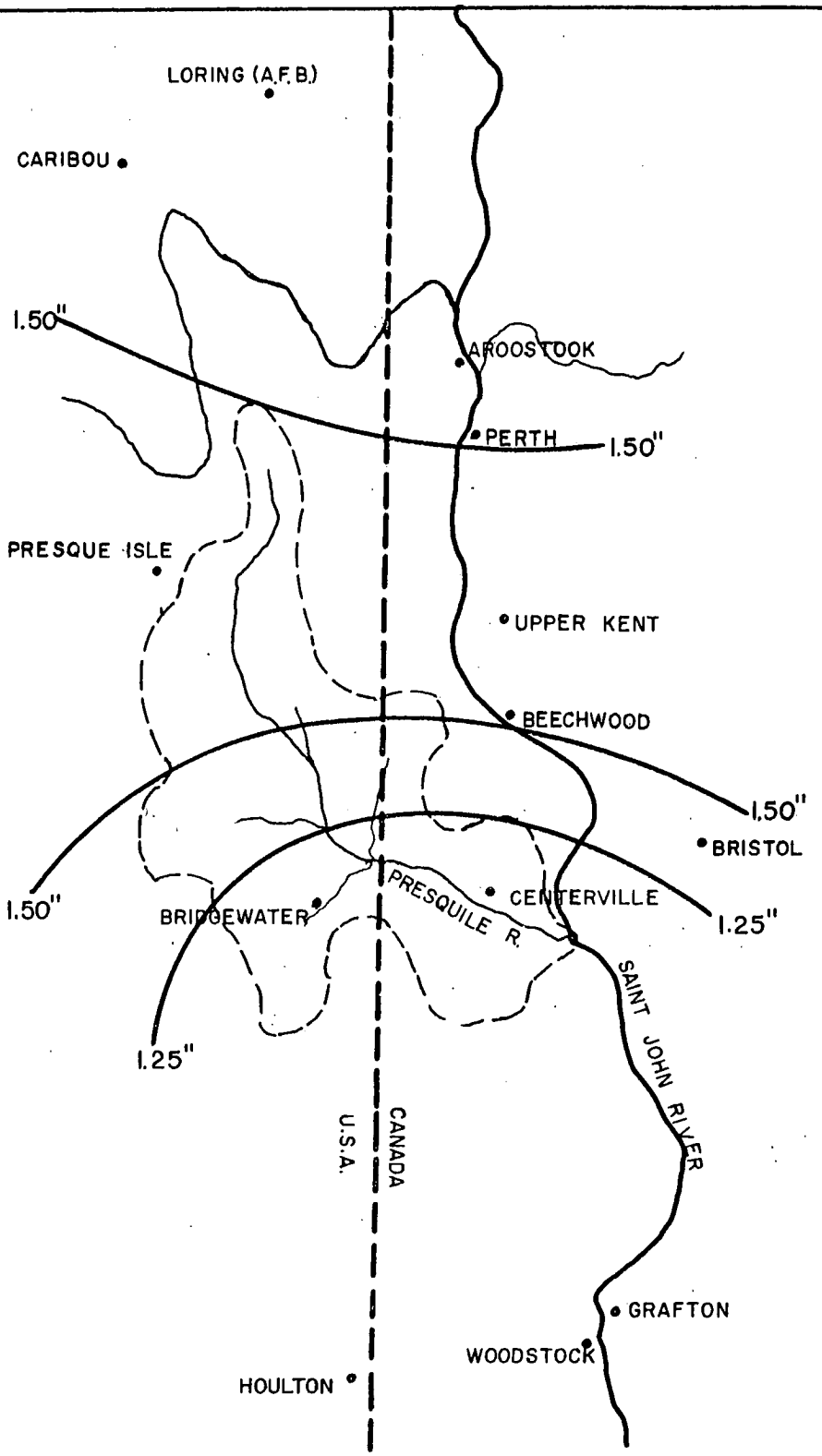
Only scattered rainshowers fell during the survey period. This pattern of rainfall did not affect run-off and produced no significant variation in water quality data.

Total rainfall on the basin in June was slightly less than the ten year average (1.75") at 1.25" to 1.50" (see Table 1).

TABLE NO. 1

PRESQUILE RIVER BASIN RAINFALL

1965 June	Presquile	Caribou	Aroostook	Perth	Upper Kent	Beechwood	Bristol	Centreville	Bridgewater
1	.01	T	-	-	-	-	-	-	T
2	-	.02	-	-	-	-	-	-	-
3	T	T	.12	.23	-	.11	.08	.10	-
4	.29	.53	.57	.54	-	.92	.63	.47	.46
5	.52	.14	.02	.02	-	.01	.03	-	.32
6	-	T	-	-	-	-	-	-	-
7	-	.12	.14	.11	-	.14	.10	.10	-
8	.21	.15	.10	.05	-	T	-	.01	.05
9	-	.05	.20	.23	-	-	-	T	-
10	.16	.08	.28	.11	-	.05	.06	.07	.03
11	.11	T	-	-	-	-	-	T	T
12	-	-	-	-	-	-	-	-	-
13	.25	.02	T	.04	-	.18	.20	.19	.13
14	.01	T	T	.02	-	-	.02	T	.05
15	-	T	T	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-
21	-	.03	-	-	.43	.04	.11	.10	-
22	-	-	-	-	-	-	-	-	-
23	-	.02	-	.02	-	-	T	-	-
24	.03	.03	-	.03	.06	.02	.04	-	.08
25	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	.17	-	-
29	.11	.06	-	.05	-	.08	.04	.08	.07
30	.01	-	-	-	-	-	-	-	T
TOTAL	1.71	1.25	1.43+	1.45		1.55	1.48	1.10	1.19



PRESQUILE BASIN
TOTAL RAINFALL
JUNE 1965

RIVER STAGE AND DISCHARGE

Two existing impoundments on the river system, one on the Presquile Stream at Easton, Maine, utilized as an industrial water supply, the second at Tracey Mills, New Brunswick, utilized for private power generation, do not have reservoir capacities capable of regulating stream flow. These reservoirs are however capable of varying the pattern of stream flow over short periods. Current flows on the Presquile River are therefore dependent upon rainfall and resulting run-off.

A proposed enlargement of the Easton, Maine, impoundment will have a potential capacity to regulate stream flows at some future date. A projected low level storage dam two miles in length, will have sufficient capacity to impound the total average run-off from the contributary watershed, approximately 20 square miles.

The Water Resources Branch, Department of Northern Affairs and National Resources, does not maintain a permanent gauging station on the Presquile River. Stage and discharge data for the June survey period were obtained from a temporary gauge installed by the Water Resources Branch.

POLLUTION SOURCES

Presquile River water quality was influenced by domestic sewage and industrial effluents as of the 1965 study date.

TABLE NO. 2

PRESQUILE RIVER

MEAN DAILY DISCHARGE (c.f.s.)

(GAUGE STATION - TRACEY MILLS, N.B.)

Date (1965)	Discharge (c.f.s.)
June 4	192.0
June 15	128.0
June 16	123.0
June 17	123.0
June 18	107.0
June 21	101.0
June 22	94.6
June 23	94.5
June 24	88.5
June 25	84.5
July 12	26.2

In Maine industrial effluents are contributed to the Prestile Stream by the Vhalsing, Inc., potato processing plant at Easton. Wastes produced by this vegetable processing complex are accorded secondary treatment but the system is overloaded and subject to breakdown.

The one sewered municipality on the watershed, Mars Hill, Maine, (contrib. pop. <1,000) provides primary treatment for domestic sewage. Sewage effluent is discharged to the Prestile Stream.

In New Brunswick pollution is restricted to <20 individual household sewer outfalls, mainly in the area of Centerville. One small sawmill was operating adjacent the Presquile River at Tracey Mills. No other industry was established along the New Brunswick reach of the river.

Surface run-off from farm lands on both sides of the border undoubtedly affects water quality. Agricultural chemicals, including pesticides and herbicides, are extensively employed throughout this agricultural district and represent potentially toxic pollutants.

CHEMICAL INDICES OF QUALITY

The concentration of pollutants in surface streams primarily depends upon two variables: the amount of specific polluting substance, and the volume of diluting water.

Future comparisons of water quality based on the chemical, physical and biological data recorded here must be

related to the stage and discharge of the Presquile River, measured at Tracey Mills, New Brunswick.

Biochemical Oxygen Demand

This parameter, measuring the rate of oxygen utilization, provides an indirect measurement for the amount of decomposable organic material carried in the water.

A British Royal Commission (1913) recommended the following surface water classifications, based on the 5-day B.O.D. test: "very clean" - 1 p.p.m.; "clean" - 2 p.p.m.; "fairly clean - 3 p.p.m.; "doubtful" - 5 p.p.m., "bad" - 10 p.p.m.

In 1965 the Presquile River could be classified "fairly clean", based on the above British standards. Median B.O.D. values fall between 2.0 and 3.0 p.p.m. at all sampling stations.

Dissolved Oxygen

There are two main sources of dissolved oxygen in natural waters, direct solution from the atmosphere, commonly called reaeration, and solution of the oxygen produced by the activity of green plants. Aerobic decomposition of organic matter in surface waters requires some fraction of this oxygen. Therefore one of the first indications of the presence of organic pollution is a drop in the dissolved oxygen concentration.

The 1913 British Royal Commission on Sewage Disposal considered that the dissolved oxygen content of a river should not fall below 60 per cent of saturation, in the summer, if

nuisance was to be avoided. Many water authorities employing surface water classification standards in 1965 require waters in the highest classification to have a dissolved oxygen content of not less than 75 per cent saturation.

In the 1965 study period dissolved oxygen levels at all sampling locations along the Presquile River exceeded 75 per cent saturation and approached 100 per cent saturation.

Photosynthesis, a natural process whereby green algae convert carbon dioxide to oxygen under the influence of sunlight, undoubtedly had an effect on oxygen levels although early morning sampling was practised to minimize interference.

There was visual evidence of extensive algae growth throughout the river system. Surface run-off carrying agricultural chemicals from adjacent farm lands, in conjunction with sewage and industrial effluent, provide the necessary nutrients to sustain the heavy algae production.

Sampling was conducted at two locations to determine the effect of photosynthesis on the oxygen balance of the stream. At Tracey Mills, immediately below the impounding reservoir, dissolved oxygen approaches equilibrium at 100 per cent saturation. This condition could be anticipated since a relatively unpolluted reservoir, not fully saturated and exposed to the air, will dissolve additional oxygen and tend to approach saturation. In the absence of turbulent surface aeration, and heavy growth of aquatic vegetation, no further solution is possible.

Below Tracey Mills any oxygen deficit will tend to be

overcome by the mechanism of reaeration. The rough river bottom in this section induces considerable turbulance. Additionally this reach of river is covered with a heavy growth of green aquatic plants and algae. Since these green plants produce roughly 2.5 times as much oxygen during their growth as the weight of carbon in their tissue a net gain in dissolved oxygen was predictable during daylight hours. Sampling at Centerville (Stn. 4) confirmed dissolved oxygen values reaching 165 per cent saturation during the period of mid-day sunshine.

The reverse process of respiration, whereby oxygen is taken in and carbon dioxide given off by the green aquatic vegetation, produced an oxygen deficit during the hours of darkness. Dissolved oxygen levels fell to a low of 60 per cent saturation during this period.

Chemical Analyses

A full range of organic and inorganic analyses was conducted on representative water samples from three locations along the Presquile River. This data is shown on Table 17.

Additionally, daily analyses were conducted for the following selected chemical constituents: Orthophosphate (as PO_4); Nitrate Nitrogen (as N); and Nitrate (as NO_3).

There are no mandatory chemical standards for surface waters. The included analytical data is presented only as a reference on water quality during the study period and as an indicator of the stream condition.

BIOLOGICAL INDICES OF QUALITY

Coliform Bacteria

This bacterial group is employed as an indicator of sewage pollution because the normal environment of the coliform group is the intestines of warm blooded animals. The presence of coliform bacteria indicates the waters are probably contaminated by human or animal excreta.

Stream criteria and objectives, based on organisms of the coliform group, are extremely variable and are generally related to uses involving sanitary hazards such as water supply, bathing and other recreational uses. The parameter is a distinct category separate from oxygen balance and the two seldom overlap.

Where classification standards have been established for the above higher usages coliform limits are generally restricted to a concentration of not more than 100 per 100 milliliters.

Coliform classification standards in excess of the above limit are usually a maximum for certain specific instances, usually influenced by local conditions, and should not be interpreted as rigid standards.

Quantitive analyses for coliform bacteria in the limited June, 1965, sampling period indicate that the Presquile River must be regarded as relatively unpolluted and based on this parameter, acceptable for all multi-use purposes. Median coliform levels were less than 80 per 100 ml. at all sampling locations.

PHYSICAL INDICES OF QUALITY

Solids

Suspended solids represent one of the commonest forms of pollution in surface streams, being present in sewage and most industrial wastes. This form of solids, either organic or inorganic in character, tends to respectively undergo oxidation with a resulting depletion of oxygen and silt up the stream bed. Control agencies commonly specify that suspended solids must not exceed 30 p.p.m., as a minimum standard.

During the 1965 study period the Presquile River carried a suspended solids (non-filtrable residue) load in the order of 4 p.p.m. The total solids (residue on evaporation) load was considerably higher, at a median level of 200 p.p.m.

Color and Turbidity

Color and turbidity are reported together because of their related effects on each other. Exceptionally pure natural waters are generally colorless and have no turbidity. Turbidity is caused by organic and inorganic solids in suspension and both color and turbidity may therefore be considered as indices of water quality.

The median color value at all sampling locations on the Presquile River was 13, with very minor variation from this median at individual sampling points.

Turbidity levels are consistently low and uniform on the river reach. At Stn. 1, just inside the border the median turbidity value was 2.5 units. At Stn. 7, near the Saint John River junction, the median turbidity value was also 2.5 units.

pH

Unpolluted rivers in New Brunswick are generally slightly alkaline and have pH values above 7.0. The Presquile River falls in this general category with a median pH of 8.0 This pH value is uniform over the river reach as evidenced by mean pH values at Station 1 (8.2), and Station 7, (8.2).

Since most bacteria are killed in a markedly acid environment this favourable alkaline condition of the river probably promotes the rate at which this stream undergoes self-purification.

TABLE NO. 3

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 1 LOCATION: International Border

Date 1965	Time A.D.T.	D.O. ppm	Temp. °C.	D.O. % Sat.	B.O.D. ppm	pH	Color	M.P.N.
June 16	0945	11.0	14.5	107	2.8	8.5	10	-
June 17	1010	11.0	17.0	113	3.0	8.6	10	-
June 18	0740	8.7	15.0	85	2.8	8.2	17	220
June 21	0950	10.9	20.0	118	1.0	8.4	10	79
June 22	0840	9.1	21.0	101	1.1	-	7	79
June 23	0915	8.5	22.0	96	2.2	8.5	13	49
June 24	0745	7.2	20.0	78	1.1	7.7	15	--
June 25	0545	7.0	18.0	73	2.0	7.5	-	-

TABLE NO. 4

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 2

LOCATION: Highway Bridge
Tracey Mills

Date 1965	Time A.D.T.	D.O. ppm	Temp. °C.	D.O. % Sat.	B.O.D. ppm	pH	Color	M.P.N.
June 16	1015	9.4	14.0	90	3.3	8.0	15	-
June 17	1030	9.0	17.0	93	3.1	8.2	15	-
June 18	0800	9.5	18.0	100	3.0	8.6	15	49
June 21	0930	9.1	21.0	101	1.9	8.5	15	23
June 22	0915	9.0	23.0	103	2.5	-	10	33
June 23	0935	8.5	23.0	96	1.8	8.5	20	13
June 24	0820	8.5	21.0	95	2.2	8.5	18	-
June 25	0500	9.6	19.0	102	3.6	8.6	-	-

TABLE NO. 5

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 3

LOCATION: 3.7 miles from International Boundary (below Tracey Mills)

Date 1965	Time A.D.T.	D.O. ppm	Temp. °C.	D.O. % Sat.	B.O.D. ppm	pH	Color	M.P.N.
June 16	1025	11.5	16.0	166	3.0	8.8	10	-
June 17	1045	13.2	19.0	181	3.9	9.1	15	-
June 18	0815	9.6	18.0	101	3.5	8.7	13	130
June 21	1010	13.4	22.0	152	2.4	9.0	17	49
June 22	0925	10.7	23.0	123	2.2	-	7	33
June 23	0955	10.0	23.0	115	1.7	8.9	15	350
June 24	0835	6.8	21.0	76	1.6	8.3	17	-
June 25	0525	6.4	18.0	68	1.8	7.9	-	-

TABLE NO. 6

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 4 LOCATION: Highway Bridge Centerville

Date 1965	Time A.D.T.	D.O. ppm	Temp. °C.	D.O. % Sat.	B.O.D. ppm	pH	Color	M.P.N.
June 16	1035	15.2	17.0	157	2.7	8.9	10	-
June 17	1100	15.9	19.0	169	3.5	9.1	10	-
June 18	0825	9.4	18.0	99	3.6	8.7	17	49
June 21	0900	10.0	21.0	111	2.9	8.7	12	13
June 22	0935	10.3	23.0	118	2.9	-	7	49
June 23	1020	9.9	23.0	114	2.4	8.6	15	130
June 24	0850	6.7	21.0	75	2.1	7.9	14	-
June 25	0430	6.0	17.0	62	2.0	7.4	-	-

TABLE NO. 7

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 5

LOCATION: Rail bridge, 5.6 miles from International Boundary

Date 1965	Time A.D.T.	D.O. ppm	Temp. °C.	D.O. % Sat.	B.O.D. ppm	pH	Color	M.P.N.
June 16	1045	17.5	18.0	184	3.1	9.1	15	-
June 17	1110	17.7	20.0	192	3.7	9.3	15	-
June 18	0835	10.6	18.0	111	3.2	8.6	15	49
June 21	0845	9.8	21.0	109	2.1	8.6	12	33
June 22	0950	11.0	23.0	126	2.5	-	10	130
June 23	1035	10.2	23.0	117	2.0	8.5	17	350
June 24	0905	6.3	21.0	70	3.1	8.1	15	-
June 25	0510	7.7	18.0	81	2.0	7.4	-	-

TABLE NO. 8

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 6

LOCATION: Highway bridge, 6.8 miles from International Boundary

Date 1965	Time A.D.T.	D.O. ppm	Temp. °C.	D.O. % Sat.	B.O.D. ppm	pH	Color	M.P.N.
June 16	1100	14.7	18.0	155	3.5	9.0	5	-
June 17	1125	14.2	20.0	154	4.0	9.1	15	-
June 18	0850	9.2	17.0	95	3.4	8.3	12	70
June 21	0820	8.0	20.0	87	2.2	8.1	7	33
June 22	1005	9.7	22.0	110	2.3	-	10	33
June 23	1050	10.0	21.0	111	3.0	8.3	15	49
June 24	0920	7.1	21.0	79	1.8	7.9	15	-
June 25	0600	5.4	18.0	57	2.3	7.7	-	-

TABLE NO. 9

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 7

LOCATION: Highway Bridge at Connell

Date 1965	Time A.D.T.	D.O. ppm	Temp. °C.	D.O. % Sat.	B.O.D. ppm	pH	Color	M.P.N.
June 16	0920	11.9	14.0	114	1.7	8.3	5	-
June 17	0900	10.4	15.0	102	3.2	8.2	10	-
June 18	0915	10.8	16.0	108	2.7	8.3	10	17
June 21	1030	11.4	22.0	129	2.2	8.6	7	13
June 22	1035	10.1	23.0	116	1.7	-	13	4.5
June 23	1115	10.6	19.5	118	1.7	8.1	17	7.8
June 24	0940	7.4	21.0	82	2.2	8.0	15	-
June 25	0615	8.0	18.0	84	2.3	7.7	-	-

TABLE NO. 10

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 1 LOCATION: International Boundary

Date 1965	Time A.D.T.	Turb.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	T.S.	S.S.
June 16	0945	2.3	1.4	0.82	3.6	191	4.0
June 17	1010	2.0	1.2	0.69	3.0	189	1.2
June 18	0740	3.2	1.1	0.79	3.5	197	4.4
June 21	0950	3.3	1.2	0.52	2.3	210	4.8
June 22	0840	1.0	1.6	0.57	2.5	195	5.6
June 23	0915	2.5	1.2	0.29	1.3	197	6.8
June 24	0545	2.5	1.6	0.57	2.5	214	6.8

Note:

Turb. - Turbidity
PO_4 - ~~Or~~thophosphate as PO_4 in mg/l
$NO_3(N)$ - Nitrate Nitrogen as N in mg/l
$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l
T.S. - Total Residue in mg/l
S.S. - Non-filtrable Residue in mg/l

TABLE NO. 11

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 2

LOCATION: Hwy. Bridge - Tracey Mills

Date 1965	Time A.D.T.	Turb.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	T.S.	S.S.
June 16	1015	1.3	1.5	0.62	2.7	191	3.2
June 17	1030	3.2	1.3	0.45	2.0	185	2.8
June 18	0800	2.1	1.0	0.57	2.5	186	4.0
June 21	0930	4.5	1.2	0.34	1.5	220	4.0
June 22	0915	2.0	1.4	0.33	1.5	198	6.4
June 23	0935	7.0	1.2	0.27	1.2	202	0.8
June 24	0820	8.5	1.2	0.29	1.3	212	3.6

Note:

Turb. - Turbidity
PO_4 - Orthophosphate as PO_4 in mg/l
$NO_3(N)$ - Nitrate Nitrogen as N in mg/l
$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l
T.S. - Total Residue in mg/l
S.S. - Non-filtrable Residue in mg/l

TABLE NO. 12

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 3

LOCATION: 3.7 miles from International Boundary (below Tracey Mills)

Date 1965	Time A.D.T.	Turb.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	T.S.	S.S.
June 16	1025	2.0	1.2	0.46	2.0	179	2.4
June 17	1045	2.3	1.3	0.41	1.8	187	1.6
June 18	1015	2.1	1.0	0.44	1.9	183	1.6
June 21	1010	3.3	1.0	0.20	0.9	197	4.4
June 22	0925	2.5	1.2	0.22	1.0	203	6.4
June 23	0955	9.0	1.0	0.20	0.9	206	2.8
June 24	0835	4.5	1.2	0.23	1.0	212	3.2

Note:

Turb. - Turbidity
PO_4 - Orthophosphate as PO_4 in mg/l
$NO_3(N)$ - Nitrate Nitrogen as N in mg/l
$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l
T.S. - Total Residue in mg/l
S.S. - Non-filtrable Residue in mg/l

TABLE NO. 13

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 4

LOCATION: Hwy. Bridge Centerville

Date 1965	Time A.D.T.	Turb.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	T.S.	S.S.
June 16	1035	2.0	1.2	0.34	1.5	175	0.8
June 17	1100	1.7	1.0	0.45	2.0	185	2.0
June 18	0825	3.3	1.0	0.41	1.8	186	2.4
June 21	0900	3.5	0.8	0.21	0.9	187	4.8
June 22	0935	2.0	1.2	0.29	1.3	208	8.0
June 23	1020	7.0	1.0	0.15	0.7	207	-
June 24	0850	3.5	1.2	0.20	0.9	206	2.8

Note:

Turb. - Turbidity
PO_4 - ~~Or~~thophosphate as PO_4 in mg/l
$NO_3(N)$ - Nitrate Nitrogen as N in mg/l
$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l
T.S. - Total Residue in mg/l
S.S. - Non-filtrable Residue in mg/l

TABLE NO. 14

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 5

LOCATION: Rail bridge, 5.6 miles from International Boundary

Date 1965	Time A.D.T.	Turb.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	T.S.	S.S.
June 16	1045	2.7	1.0	0.31	1.4	184	4.2
June 17	1110	2.3	1.0	0.31	1.4	203	3.2
June 18	0835	3.5	0.6	0.32	1.4	221	5.2
June 21	0845	3.5	1.0	0.15	0.7	198	0.8
June 22	0950	2.0	1.1	0.15	0.7	197	8.8
June 23	1035	12.0	1.2	0.12	0.5	210	-
June 24	0905	1.6	1.0	0.01	Trace	209	3.2

Note:

Turb. - Turbidity
PO_4 - Orthophosphate as PO_4 in mg/l
$NO_3(N)$ - Nitrate Nitrogen as N in mg/l
$NO_3(NO_3)$ - Nitrage as NO_3 in mg/l
T.S. - Total Residue in mg/l
S.S. - Non-filtrable Residue in mg/l

TABLE NO. 15

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 6

LOCATION: Highway bridge, 6.8 miles from International Boundary

Date 1965	Time A.D.T.	Turb.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	T.S.	S.S.
June 16	1100	1.8	0.9	0.29	1.3	176	3.2
June 17	1125	2.0	0.5	0.31	1.4	189	4.0
June 18	0850	2.1	0.8	0.32	1.4	226	11.6
June 21	0820	2.5	0.6	0.15	0.7	195	1.2
June 22	1005	4.0	1.0	0.17	0.8	196	10.0
June 23	1050	5.0	1.0	0.12	0.5	205	0.8
June 24	0920	3.0	1.2	0.21	0.9	209	5.6

Note:

Turb. - Turbidity
PO_4 - Orthophosphate as PO_4 in mg/l
$NO_3(N)$ - Nitrate Nitrogen as N in mg/l
$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l
T.S. - Total Residue in mg/l
S.S. - Non-filtrable Residue in mg/l

TABLE NO. 16

PRESQUILE RIVER

ANALYTICAL DATA

STATION NO.: 7

LOCATION: Hwy. Bridge at Connell

Date 1965	Time A.D.T.	Turb.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	T.S.	S.S.
June 16	0920	1.3	0.8	0.24	1.1	176	3.6
June 17	0900	1.0	0.4	0.20	0.9	179	-
June 18	0915	2.0	0.4	0.15	0.7	182	2.8
June 21	1030	1.6	0.6	0.04	0.2	199	-
June 22	1035	2.5	0.8	0.10	0.4	200	4.4
June 23	1115	7.5	1.0	0.14	0.6	208	-
June 24	0940	2.6	1.2	0.17	0.8	236	3.2

Note:

Turb. - Turbidity
PO_4 - Orthophosphate as PO_4 in mg/l
$NO_3(N)$ - Nitrate Nitrogen as N in mg/l
$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l
T.S. - Total Residue in mg/l
S.S. - Non-filtrable Residue in mg/l

TABLE NO. 17

CHEMICAL ANALYSIS

PRESQUILE RIVER

Constituents, in milligrams per Litre	Stn. 1	Stn. 4	Stn. 7
pH	7.4	7.5	7.6
Hardness (EDTA) as $CaCO_3$	165.2	160.6	160.0
Alkalinity - Phenolpthalien as $CaCO_3$	nil	nil	nil
- Total as $CaCO_3$	147.5	144.5	145.8
Iron (Fe) (Total)	0.10	0.16	0.08
Manganese (Mn) Total	N.D.	0.08	0.10
Color (Hazen)	10	15	10
Turbidity	2.0	2.5	1.7
Calcium (Ca)	58.2	56.8	56.6
Magnesium (Mg)	4.8	4.5	4.5
Sodium (Na)	4.1	3.5	3.5
Bicarbonate as CO_3	88.5	86.7	87.5
Carbonate ($C\Theta_3$)	nil	nil	nil
Sulphate (SO_4)	10.6	9.6	9.1
Chloride (Cl)	9.2	8.5	7.7
Nitrate (NO_3)	2.7	0.9	0.9
Fluoride (F)	0.16	0.28	0.24
Silica (SiO_2)	1.5	1.0	1.2
Filtrable Residue on Drying at 105°C	211	199	199
Loss on Ignition (1 hr. at 600°C.)	46	42	44
Nitrate Nitrogen (N)	0.16	0.21	0.20
Nitrate Nitrogen (N)	0.030	0.023	0.034

TABLE NO. 18

PRESQUILE RIVER

24 HOUR SAMPLING

STATION: 2 LOCATION: Tracey Mills

Time A.D.T.	Temp. °C.	D.O. p.p.m.	D.O. % Sat.
1000	21.0	8.5	95
1100	21.0	8.3	92
1200	21.5	8.7	98
1300	21.5	9.0	101
1400	21.5	9.4	105
1500	22.0	10.5	119
1600	22.0	10.2	116
1700	22.0	9.9	112
1800	22.0	8.1	92
1900	21.0	7.9	88
2000	21.0	7.9	88
2100	21.0	8.0	89
2200	20.0	8.0	87
2300	20.0	8.2	89
2400	20.0	9.0	98
0100	18.0	9.5	100
0200	18.0	9.1	96
0300	18.0	9.6	101
0400	19.0	9.5	101
0500	19.0	9.6	102
0600	21.0	9.3	103
0700	21.0	9.2	102
0800	21.0	9.3	103
0900	21.0	8.9	99

TABLE NO. 19

PRESQUILE RIVER

24 HOUR SAMPLING

STATION: 4

LOCATION: Hwy. Bridge Centerville

Time A.D.T.	Temp. °C.	D.O. p.p.m.	D.O. % Sat.
0930	21.0	7.7	86
1030	21.0	8.8	98
1130	21.0	9.7	108
1230	22.0	10.8	123
1330	24.0	12.3	145
1430	24.0	12.9	152
1530	25.0	13.4	160
1630	25.0	13.9	165
1730	24.5	13.2	156
1830	24.0	12.1	143
1930	23.0	11.0	126
2030	22.0	9.6	109
2130	21.0	8.4	93
2230	19.0	7.2	77
2330	18.0	5.6	59
0030	17.0	5.8	60
0130	17.0	5.8	60
0230	17.0	5.9	61
0330	16.0	5.9	59
0430	17.0	6.0	62
0530	17.0	6.1	63
0630	18.0	6.3	66
0730	18.0	7.1	75
0830	18.0	8.4	89

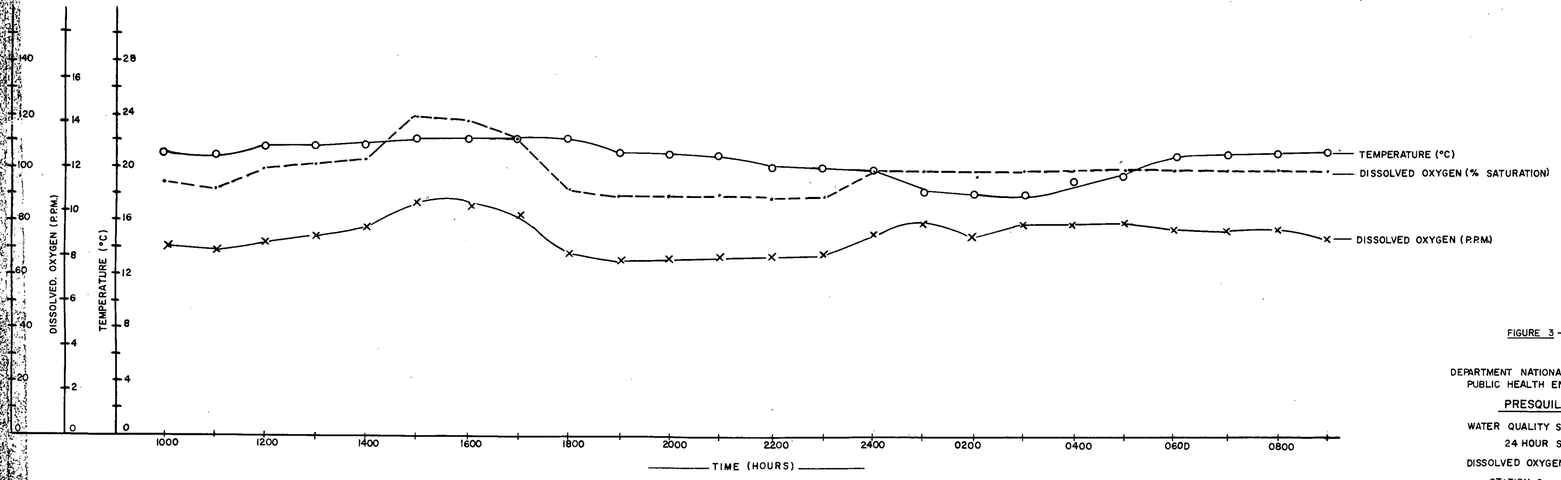


FIGURE 3 — PAGE 31

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY JUNE 1965
24 HOUR SAMPLING
DISSOLVED OXYGEN — TEMPERATURE
STATION 2 TRACEY MILLS

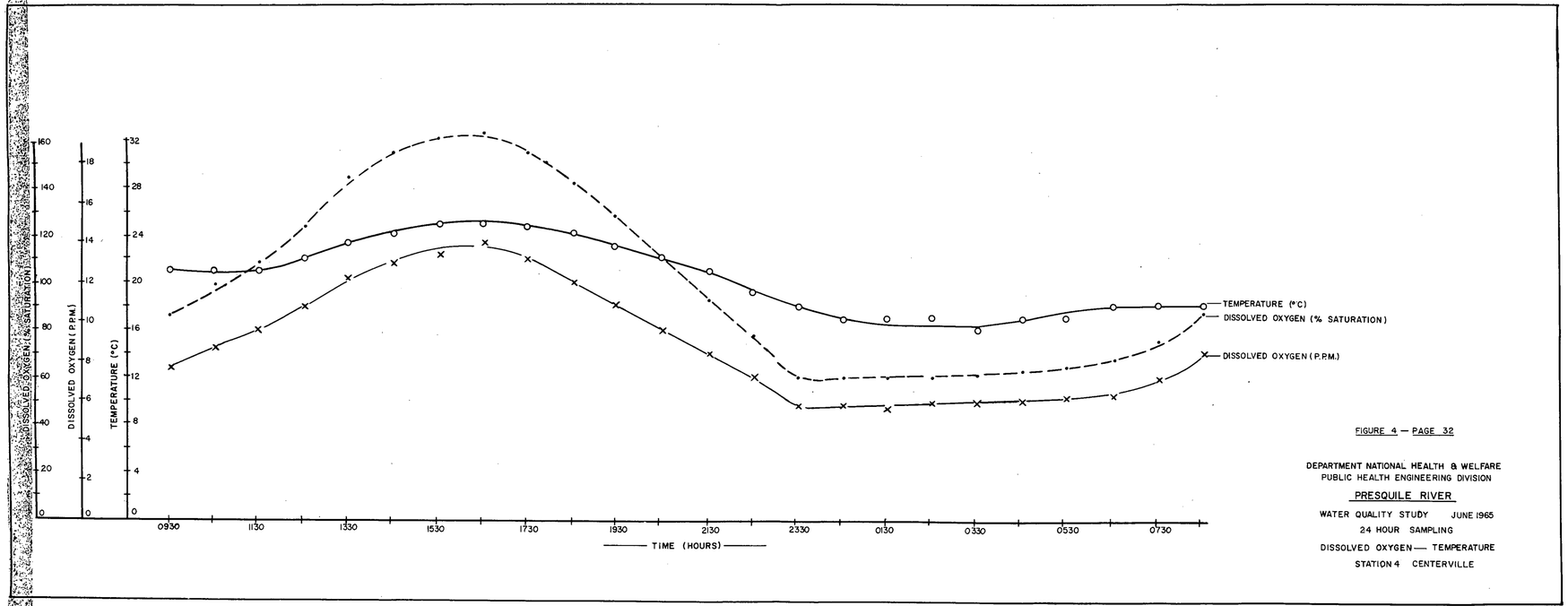


FIGURE 4 — PAGE 32

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY JUNE 1965
24 HOUR SAMPLING
DISSOLVED OXYGEN — TEMPERATURE
STATION 4 CENTERVILLE

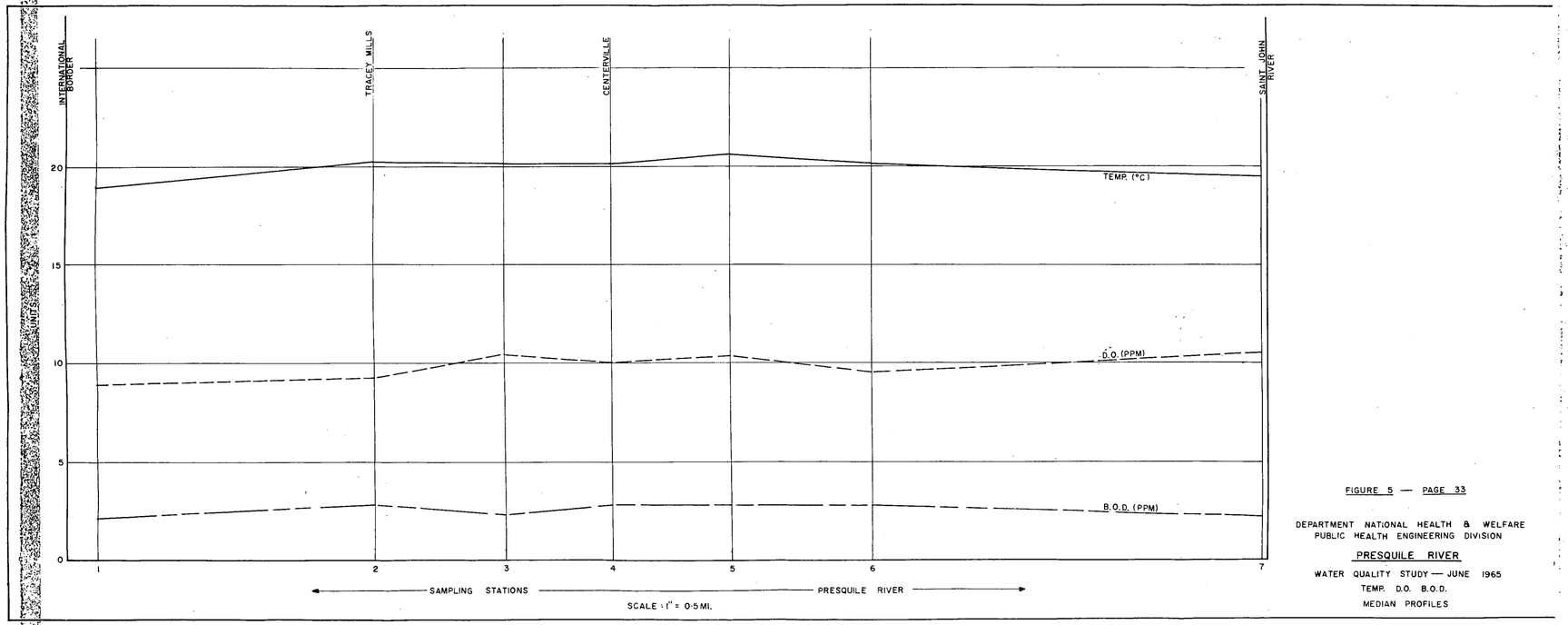


FIGURE 5 — PAGE 33

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY — JUNE 1965
TEMP. D.O. B.O.D.
MEDIAN PROFILES

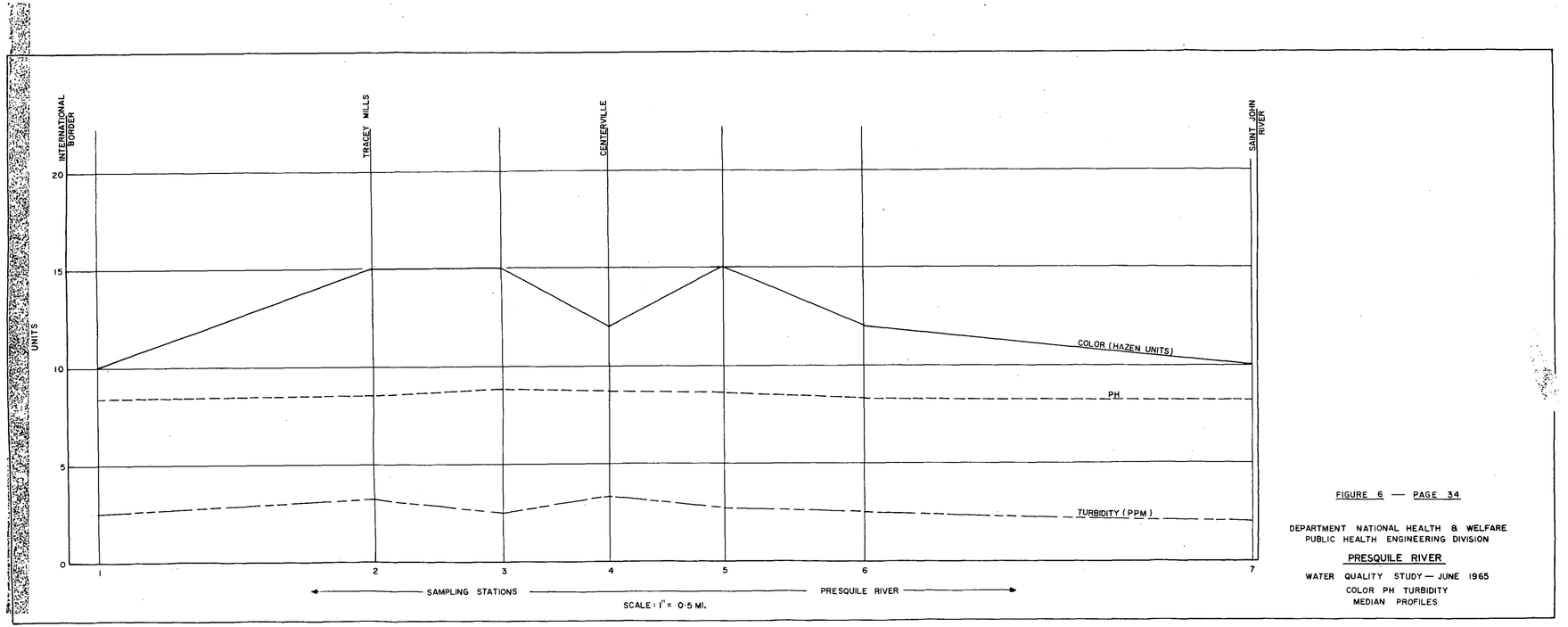


FIGURE 6 — PAGE 34

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY — JUNE 1965
COLOR PH TURBIDITY
MEDIAN PROFILES

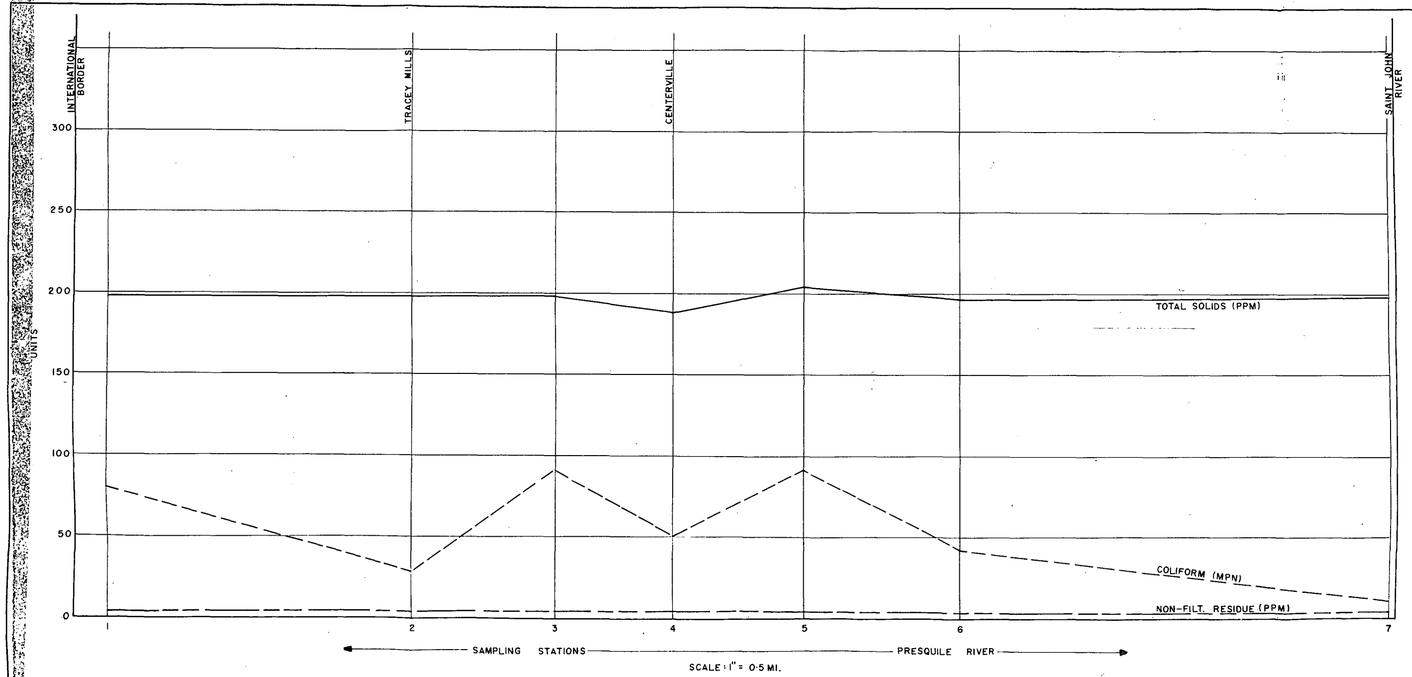


FIGURE 7 — PAGE 35

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY — JUNE 1965
TOTAL SOLIDS COLIFORM NON-FILT. RESIDUE
MEDIAN PROFILES

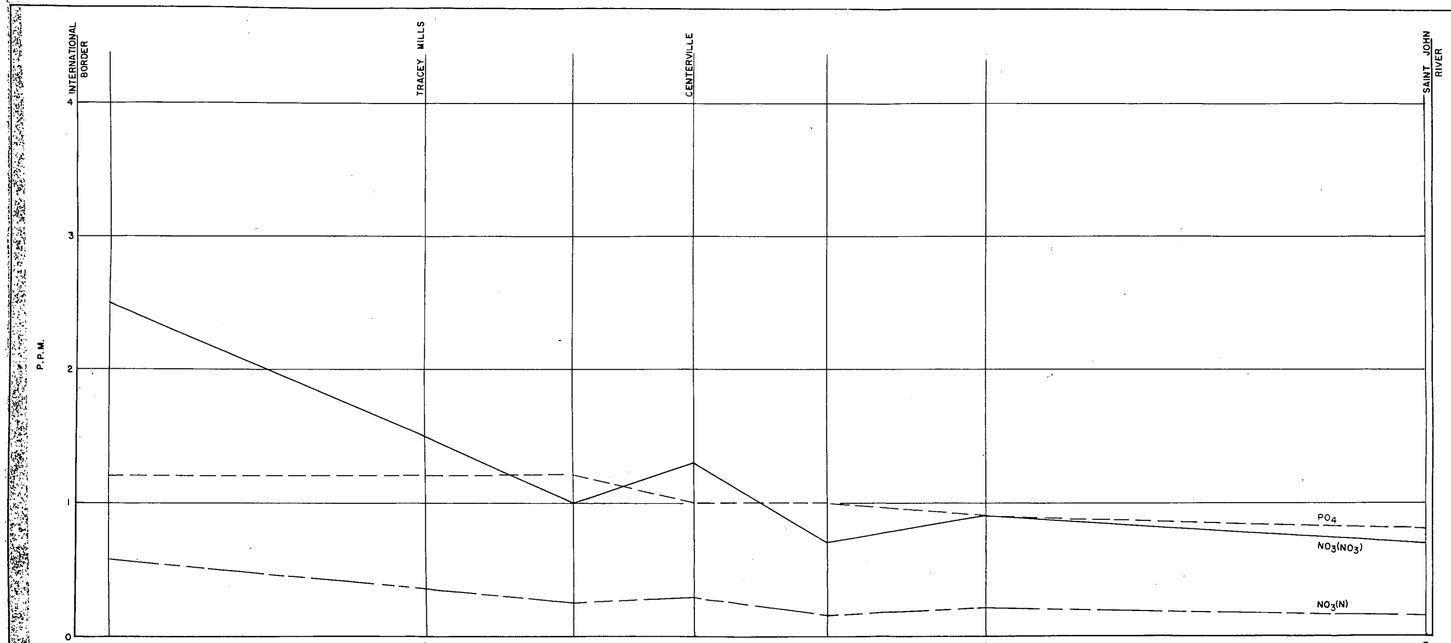


FIGURE 8 — PAGE 36

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY — JUNE 1965
PO_4 $NO_3(NO_3)$ $NO_3(N)$
MEDIAN PROFILES

APPENDIX "E"

Canada, Department of National Health and Welfare

Report on International Presquile River

Water Quality Data 1966 - 67.

Figure 2. Sampling Locations.

PRESQUILE RIVER BASIN
NEW BRUNSWICK — CANADA

SCALE 1:50,000
1.25 inches = 1 mile approximately

1 0 1 2 3

③ — Sampling Points

67°45' 67°40' 67°30'

46°25'

UNITED STATES OF AMERICA
CANADA

Tracey Mills
Dam
PRESQUILE RIVER
Centreville
East Centreville
Florenceville
Connell
NORTH NASHWAAK RIVER
ST. JOHN RIVER
Emery L.
Ketch L.

M.N. T.N.

Drafted by: JE.
Checked by: ~~RAB~~ L.v.B.
Reference: FLORENCEVILLE 21 J/5
East and West halves
Department of Mines and
Technical Surveys, Ottawa
Date: MAY, 1969 Figure 2

SURVEY REPORT

INTERNATIONAL

PRESQUILE RIVER

NEW BRUNSWICK

WATER QUALITY DATA

1966 – 1967

BY THE

PUBLIC HEALTH ENGINEERING DIVISION

DEPARTMENT OF NATIONAL HEALTH AND WELFARE

ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, 1967
82

SURVEY REPORT

INTERNATIONAL

PRESQUILE RIVER

NEW BRUNSWICK

WATER QUALITY DATA

1966 - 1967

BY THE

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DEPARTMENT OF NATIONAL HEALTH AND WELFARE

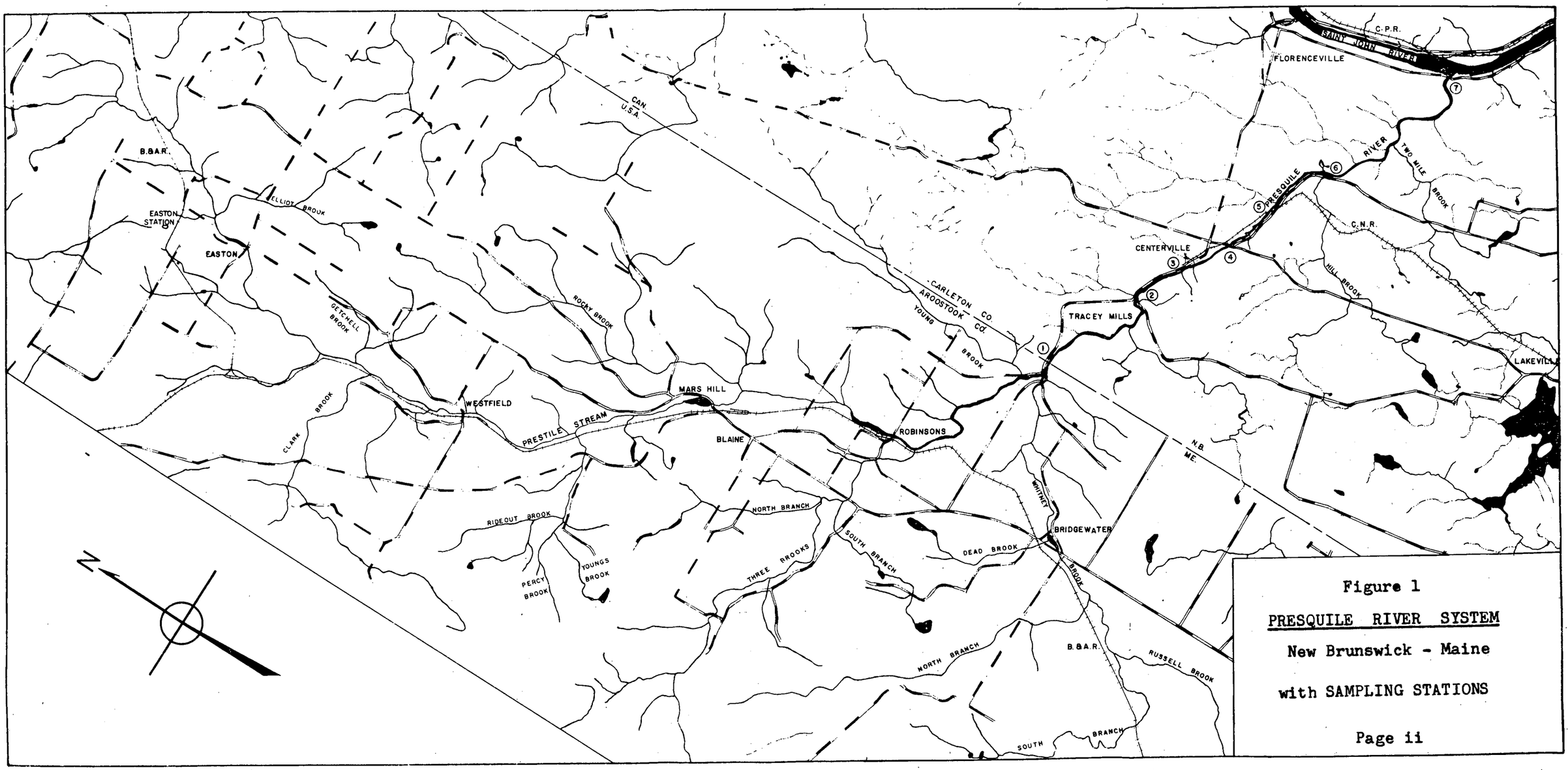

Figure 1

PRESQUILE RIVER SYSTEM

New Brunswick - Maine

with SAMPLING STATIONS

TABLE OF CONTENTS

WATER QUALITY STUDY

APPENDIX

FOREWORD

This report provides analytical reference data on Presquile River water quality under summer flow conditions as of June-July, 1966, and winter flow conditions as of February, 1967.

Water quality was measured by the parameters of biochemical oxygen demand, dissolved oxygen, pH, color, turbidity, nonfiltrable residue (suspended solids), residue on evaporation (total solids), coliform bacteria, and selected chemical constituents.

The study was primarily designed to provide supplementary reference data to a BASE LINE WATER QUALITY study conducted on the Presquile River, by the Public Health Engineering Division, under summer flow conditions in June, 1965. Secondly, water quality was initially established under winter flow conditions in February, 1967.

Comparison of analytical data on physical, chemical, and biological parameters permits an evaluation of changes in river quality and pollution contributed to the river system.

CONCLUSIONS

The 1966 Presquile River water quality study confirmed the BASE LINE WATER QUALITY data established for the Presquile River in 1965. There was unusual agreement between analyses conducted in 1965 and those conducted in 1966 for the parameters of dissolved oxygen, biochemical oxygen demand, pH, non-filtrable residue, residue on evaporation, color, turbidity, and complete chemical analyses at selected locations.

Under winter conditions there is a demonstrable deterioration in water quality as evidenced by a dissolved oxygen deficit, significantly higher biochemical oxygen demand, a five fold increase in color, and an increase in solids concentration. There is some evidence that this deterioration is attributable to initial production of beet sugar, in Maine, immediately preceeding the survey period. This assumption is not supportable by prior reference data on water quality under winter ice cover.

Water quality, based on the coliform parameter, markedly deteriorated in 1966 as compared to 1965, and the degradation incrementally increased under winter conditions in 1967.

DATA SYNOPSIS

GENERAL

1. All sampling points for the summer study of 1966 and the following winter study of 1967 were identically located on sites reported for the 1965 Presquile River BASE LINE WATER QUALITY study.
2. Water quality was measured by selected physical, chemical and biological parameters, with all analytical determinations conducted in compliance with instructions set out in "Standard Methods for the Examination of Water and Wastewater", Twelfth Edition, 1965.

SUMMER FLOW - 1966

3. Rainfall on the Presquile River basin, in June, 1966, was slightly higher than the ten year average (1.75") and exceeded basin rainfall for the comparison survey month of June, 1965 (1.50"). Total rainfall in June, 1966, varied between 1.75" and 2.50".
4. River discharge during the June, 1966, survey period (avg. daily discharge 136 c.f.s.), exceeded river discharge recorded for the comparable June, 1965 survey period (avg. daily discharge 102 c.f.s.).
5. Water temperatures during the June, 1966, survey period (avg. daily 16.3° C.) were lower than water temperatures recorded for the June, 1965, survey period (avg. daily 18.6° C.).
6. Dissolved oxygen in the river system varied between 83 and 160 percent saturation.

SUMMER FLOW - 1966 (Cont'd)

7. Biochemical oxygen demand varied between a minimum of 1.55 p.p.m. and a maximum of 3.15 p.p.m.

8. A significant degradation in quality, based on the coliform parameter, occurred in 1966. One hundred percent of the samples collected exceeded an M.P.N. value of 108, compared to 32% of 1965 samples exceeding an M.P.N. of 50.

WINTER FLOW - 1967

9. Previous data on Presquile River water quality, under winter ice cover, is not available.

10. River discharge during the February, 1967, survey period averaged 41 c.f.s.

11. Dissolved oxygen varied between a minimum of 2 and a maximum of 44 percent saturation. The maximum value was found in an open water stretch below the dam at Tracey Mills.

12. Biochemical oxygen demand varied between a minimum of 7 p.p.m. and a maximum of 80 p.p.m.

13. Quality, based on the coliform parameter, deteriorated under winter conditions. Mean coliform concentrations varied from a low of 700 M.P.N. to a high of 1,600+ M.P.N. and 100 percent of the samples exceeded 280 M.P.N.

14. Non-filtrable residue (suspended solids) preceptibly increased under winter conditions. Residue on evaporation increased, on the average, by 25 percent.

ANALYTICAL STANDARDS

All physical, chemical, and biological determinations were conducted in compliance with instructions contained in "Standard Methods for the Examination of Water and Wastewater", Twelfth Edition, 1965.

For those determinations where alternative analytical procedures are noted in the foregoing edition the following methods were utilized; for dissolved oxygen, the Alsterburg (Azide) modification of the Winkler method; for biochemical oxygen demand, the dilution technique.

Confirmed Most Probable Numbers (MPN's) of coliform bacteria per 100 ml. of water were determined (Bacto-Lauryl Tryptose Broth, with five tubes in each of three or more consecutive decimal dilutions, incubation at 35.5°C. for 24 and 48 hours, and confirmation of all positive cultures in Bacto-Brilliant Green Bile Broth, with incubation at 35.5°C. for 48 hours).

ABBREVIATIONS

B.O.D.	Biochemical Oxygen Demand
c.f.s.	cubic feet per second
D.O.	Dissolved Oxygen
mg/l	milligrams per litre
M.P.N.	Most Probable Number
p.p.m.	parts per million
pH	Hydrogen-ion Concentration
<	less than
>	greater than
%	per cent

PRESQUILE RIVER

SAMPLING STATIONS

STATION	LOCATION
No. 1	Presquile River (mid-point), at International Boundary
No. 2	Highway bridge (mid-point) at Tracey Mills, 2.6 miles from International Boundary
No. 3	Presquile River (mid-point), 3.7 miles from International Boundary below Tracey Mills
No. 4	Highway bridge (mid-point) at Centerville, 4.6 miles from International Boundary
No. 5	Rail bridge (mid-point), 5.6 miles from International Boundary
No. 6	Highway bridge (mid-point), 6.8 miles from International Boundary
No. 7	Highway bridge (mid-point), 10.1 miles from International Boundary

LIST OF ILLUSTRATIONS

LIST OF TABLES

ACKNOWLEDGEMENTS

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Water Resources Branch
Department of Northern Affairs and National Resources
Halifax, Nova Scotia

Meteriological Branch
Department of Transport
Moncton, New Brunswick

Public Health Engineering Division - (Laboratory)
Department of National Health and Welfare
Ottawa, Ontario

WATER QUALITY STUDY

HISTORICAL BACKGROUND:

In March, 1965, the New Brunswick Water Authority conveyed to the Public Health Engineering Division, Department of National Health and Welfare, expressions of anxiety for the future water quality of the Presquile River in New Brunswick.

This concern arose as a result of an application by Maine Sugar Industries, Inc., Easton, Maine, to the State of Maine Water Improvement Commission, for permission to discharge beet sugar refinery effluent from a daily processing of 4,000 tons of beets, to the waters of the Prestile Stream in Maine. The approved application had the effect of downgrading the existing "B-1" classification of the Prestile Stream to a "D" classification. (A synopsis of the State of Maine surface water classification is attached as Appendix "A").

Potential degradation of existing water quality along the contiguous reaches of the Presquile River in New Brunswick becomes a definite likelihood as a result of downgrading water quality along the Prestile Stream in Maine.

STUDY OBJECTIVE:

The 1966-1967 Presquile River water quality study was designed with two objectives: to confirm under similar conditions in 1966 the BASE LINE WATER QUALITY data established for the Presquile River in 1965; and in 1967 to demonstrate stream quality, under winter conditions, during initial beet sugar production in Maine.

The first objective was met, the second only in part. Unfortunately Maine beet sugar production was started without the prior knowledge of Canadian regulatory agencies with the result that stream analyses were not instituted in time to monitor the initial short run (Jan. 4 - Jan. 24) production of beet sugar. Stream quality, under winter flow conditions, was established.

AREA DESCRIPTION:

The Prestile Stream, with headwaters in the State of Maine, flows across the International Boundary in the area of Centerville, west-central New Brunswick.

In the State of Maine the Prestile Stream, and its tributary system, drains a watershed area of 168 square miles. In the Province of New Brunswick the Presquile River drains a surface area of 15 square miles. The total watershed area of this system is in the order of 183 square miles.

At Tracey Mills, New Brunswick, 2.6 miles from the International Boundary, a low level dam impounds the Presquile River for private power generation. The small reservoir area provides limited potential for regulating stream flow. The impoundment will however tend to smooth out sharp variations in water quality by settling suspended matter and decreasing coliform bacteria concentrations. Potential detrimental effects of this impoundment include a reduction in dissolved oxygen concentration and heavy algae production.

Downstream from the Tracey Mills impoundment the average width of the Presquile River approximates 50 feet. There is little variation in cross-sectional depth which at mid-channel, in June, is generally less than two feet. A gradient in the order of 7.5 feet per mile develops a moderate stream velocity. These factors of stream depth, velocity and channel roughness induce considerable turbulance and effect complete lateral, vertical and longitudinal mixing over the final 7.5 mile stretch of the Presquile River.

Agriculture is the predominant industry throughout the watershed area, both in Maine and New Brunswick. Potatoes have represented the principal crop for many years. Secondary processing of agricultural crops has been introduced in the basin within recent years following the erection of a potato processing plant at Easton, Maine, the site of the proposed beet sugar refinery. In addition to beets other vegetable crops have been introduced in very recent years in an effort to supplement farming incomes.

In New Brunswick the recreational potential of the Presquile River is primarily limited to trout fishing. Good seasonal runs are experienced over the stretch of water between the Saint John River and Tracey Mills.

BASIN RAINFALL:

Basin rainfall, varying as to area between 1.75" and 2.50" during the 1966 survey, exceeded the 10 year average (1.75") for that period. During the similar 1965 study period basin rainfall averaged 1.50".

Only scattered rainshowers fell immediately preceeding or during any sampling period. This rainfall pattern did not produce any quick run-off or significant variations in water quality data.

RIVER DISCHARGE:

Stage and discharge data were obtained from a temporary gauge installed by the Water Resources Branch, Department of Northern Affairs and National Resources. A permanent gauging station has never been established on the Presquile River and long term flow data is therefore unavailable.

The higher rainfall experienced in 1966 was reflected in slightly higher river flows over that recorded for the comparable study period in 1965.

In 1965 river discharge, over the period of sampling, averaged 102 c.f.s. For the comparable sampling period in 1966 river discharge averaged 136 c.f.s.

POLLUTION SOURCES:

Presquile River water quality was influenced by domestic sewage and industrial effluents as of the 1966-1967 study date.

In Maine industrial effluents are contributed to the Prestile Stream by the Valshing, Inc., potato processing plant at Easton. Wastes produced by this vegetable processing complex are accorded secondary treatment but the system is overloaded and subject to breakdown.

Maine Sugar Industries, Inc., owners and operators of the beet sugar refinery constructed in late 1966, also discharge production wastes to the treatment system operated by the

Valshing, Inc., potato processing complex.

The one sewered municipality on the watershed, Mars Hill, Maine, (contrib. pop. <1,000) provides primary treatment for domestic sewage. Sewage effluent is discharged to the Prestile Stream.

In New Brunswick pollution is restricted to less than 20 individual household sewer outfalls, mainly located in the Tracey-Centerville area. One small sawmill was operating adjacent the Presquile River at Tracey Mills. No other industry was established along the New Brunswick reach of the river.

Surface run-off from farm lands on both sides of the border undoubtedly affects water quality. Agricultural chemicals, including pesticides and herbicides, are extensively employed throughout this agricultural district and represent potentially toxic pollutants.

CHEMICAL INDICES OF QUALITY:

Biochemical Oxygen Demand:

Base line values for biochemical oxygen demand, as determined in 1965, were confirmed by the comparable 1966 survey. Mean 1965 B.O.D. values fell between 2.0 and 3.0 at all sampling stations, in 1966 between 1.55 and 3.15 p.p.m.

Winter values for B.O.D., as determined in February, 1967, are significantly higher. Mean values at the five stations sampled fell between 8 and 73 p.p.m. The high value was found at the International Boundary and from this point the biochemical oxygen demand decreased to the lower value at the point of discharge with the Saint John River.

These winter values for B.O.D. possibly represent normal stream conditions under ice cover. Prior analytical data, under comparable conditions, is not available. Alternatively there is evidence that the concentration of B.O.D. was significantly increased by initial production of beet sugar, and effluent discharge, in January. A published reference to analytical data compiled by the Maine Water Improvement Commission late in January confirms this latter assumption.

Dissolved Oxygen:

In the 1965 summer study period dissolved oxygen concentration at all sampling stations along the Presquile River exceeded 75 percent saturation. The comparable 1966 study indicated a minimum level of 84 percent saturation.

Higher flows and colder water temperatures restricted algae production in June, 1966. Photosynthesis was indicated but not to the extent shown in 1965. With the advent of average water temperatures in July, and low summer flows, extensive algae growth occurred. Sampling at Centerville (Stn. 4) confirmed dissolved oxygen concentrations reaching 160 percent saturation. A maximum of 165 percent saturation was reached in June, 1965.

Sampling over a 24-hour period indicated the reverse process of respiration, whereby oxygen is taken in and carbon dioxide is given off by green aquatic vegetation, produced an oxygen deficit during the hours of darkness. A minimum dissolved oxygen concentration of 83 percent saturation occurring in 1966 compared to 60 percent in 1965.

Chemical Analyses:

A full range of organic and inorganic analyses was conducted on representative water samples from three locations along the Presquile River. This data is shown on Tables 3 and 4.

Additionally daily analyses were conducted for the following selected chemical constituents: Orthophosphate (as PO_4); Nitrate Nitrogen (as N); and Nitrate (as NO_3).

There are no mandatory chemical standards for surface waters. The included analytical data is presented only as a reference on water quality during the study period and as an indicator of the stream condition.

Under summer flow conditions there is unusual agreement between analyses conducted in 1965 and those conducted in 1966. Under winter flow conditions in February 1967 certain differences are detectable, specifically higher concentrations of sodium, sulphate, chloride, and nitrate (NO_3).

BIOLOGICAL INDEX OF QUALITY:

Coliform Group:

Quantitative analyses for coliform bacteria in the limited June, 1965, sampling period indicated that the Presquile River was relatively unpolluted and could be classified, on the basis of the coliform parameter, as acceptable for all multi-use purposes. Mean coliform M.P.N. values were less than 80 per 100 ml. at all sampling stations and 68 percent of all samples had a coliform M.P.N. of less than 50.

Sampling in the comparable 1966 summer period indicated a very significant degradation of quality, again based on the coliform parameter. Mean coliform concentrations, for all stations, varied between a low of 300 M.P.N. and a high of 925 M.P.N. and 100 percent of the samples exceeded 108 M.P.N.

Quality, as based on the coliform parameter, continued to deteriorate under the winter conditions of February, 1967. Mean coliform concentrations varied from a low of 700 M.P.N. to a high of 1,600 + M.P.N. and 100 percent of the samples exceeded 280 M.P.N.

PHYSICAL INDICES OF QUALITY:

Solids:

In the 1965 survey period the Presquile River carried a non-filtrable residue (suspended solids) concentration in the order of 4 p.p.m. A comparable concentration was indicated in the 1966 summer period. Residue on evaporation of the respective periods was in the order of 200 p.p.m.

Under 1967 winter conditions non-filtrable residue perceptibly increased. Concentrations doubled, on the average, at the four sampling stations employed. Residue on evaporation increased, on the average, by 25 percent.

Color - Turbidity and pH:

Color and turbidity values remained consistently low in the 1966 summer period and uniformly compared with base line values indicated for these parameters in 1965.

Under 1967 winter conditions color and turbidity values significantly increased, color in the order of 10 to 50 and turbidity from 2.5 to 15.

pH values, at all sampling stations, has consistently remained at or near 7.3.

TABLE 1

PRESQUILE RIVER

BASIN RAINFALL

JUNE 1966	5	6	7	8	9	10	Total for Month
Presque Isle	0	.05	.27	.02	0	.07	1.70
Bridgewater	0	.10	.50	.15	T	.07	2.31
Perth	0	.21	.15	.02	0	.64	1.49
Aroostook	0	.33	.14	0	0	.61	1.80
Beechwood	T	.17	.18	.03	0	.44	1.23
Centerville	0	.20	.34	.29	0	.30	2.33

JULY 1966	25	26	27	28	29	30	Total for Month
Presque Isle	T	.14	0	0	.16	0	4.06
Bridgewater	Not Available						
Perth	.04	.15	0	.07	1.45	0	6.06
Aroostook	.25	.12	0	.05	.78	0	5.02
Beechwood	.08	.17	0	0	.39	0	4.28
Centerville	.30	.25	0	.03	.06	0	4.50

TABLE 2

PRESQUILE RIVER

MEAN DAILY DISCHARGE (c.f.s.)

(GAUGE STATION - TRACEY MILLS, N.B.)

Date (1966)	Discharge (c.f.s.)
June 5	151
June 6	175
June 7	165
June 8	208
June 9	170
July 25	59.4
July 26	57.2
July 27	74.5
July 28	57.9
July 29	57.1
July 30	57.5
Date (1967)	
Feb. 15	41.0
Feb. 21	41.0
Feb. 22	41.0

TABLE 3

CHEMICAL ANALYSIS

PRESQUILE RIVER
(June - 1966)

Constituents, in milligrams per Litre	Stn. 1	Stn. 4	Stn. 7
pH	7.4	7.4	7.5
Hardness (EDTA) as $CaCO_3$	155.2	161.0	163.2
Alkalinity - Phenolphthalien as $CaCO_3$	nil	nil	nil
- Total as $CaCO_3$	140.2	146.3	148.4
Iron (Fe) (Total)	0.18	0.17	0.20
Manganese (Mn) Total	0.12	0.09	0.12
Color (Hazen)	15	10	10
Turbidity	2.0	2.5	1.7
Calcium (Ca)	53.2	55.4	55.1
Magnesium (Mg)	4.2	4.5	4.5
Sodium (Na)	4.7	4.9	5.0
Bicarbonate as CO_3	90.4	89.3	87.4
Carbonate (CO_3)	nil	nil	nil
Sulphate (SO_4)	10.1	9.4	9.6
Chloride (Cl)	9.4	9.7	9.8
Nitrate (NO_3)	2.10	1.40	0.90
Floride (F)	0.16	0.17	0.15
Silica (SiO_2)	1.5	1.0	1.1
Total Dissolved Solids (Determined)	210	225	223
Nitrate Nitrogen (N)	0.12	0.20	0.21
Nitrite Nitrogen (N)	0.03	0.03	0.02

TABLE 4

CHEMICAL ANALYSIS

PRESQUILE RIVER

(February - 1967)

Constituents, in milligrams per Litre	Stn. 1	Stn. 4	Stn. 7
pH	7.3	7.4	7.3
Hardness (EDTA) as $CaCO_3$	120.0	154.2	140.0
Alkalinity - Phenolphthalien as $CaCO_3$	nil	nil	nil
- Total as $CaCO_3$	114.2	169.2	147.3
Iron (Fe) (Total)	0.40	0.28	0.44
Manganese (Mn) Total	0.14	0.36	0.26
Color (Hazen)	60	50	50
Turbidity	27	22	12
Calcium (Ca)	41.4	53.3	50.0
Magnesium (Mg)	3.5	5.1	3.6
Sodium (NA)	13.2	30.7	22.8
Bicarbonate as CO_3	68.6	101.5	88.4
Carbonate (CO_3)	nil	nil	nil
Sulphate (SO_4)	18.0	23.5	19.5
Chloride (Cl)	9.2	18.9	14.8
Nitrate (NO_3)	0.09	0.31	0.44
Fluoride (F)	0.26	0.14	0.14
Silica (SiO_2)	12.4	12.2	10.4
Total Dissolved Solids (Determined)	189	280	231
Nitrate Nitrogen (N)	0.02	0.07	0.2
Nitrite Nitrogen (N)	1.2	0.92	1.8

TABLE 5

PRESQUILE RIVER

24 HOUR SAMPLING
(June 24, 1966)

STATION: 2 LOCATION: Tracey Mills

Time A.D.T.	Temp. °C.	D.O. p.p.m.	D.O. % Sat.
1000	14.0	9.6	92
1100	14.0	9.8	94
1200	14.5	10.0	97
1300	14.5	10.1	98
1400	15.5	10.1	100
1500	15.5	10.1	100
1600	16.0	10.3	103
1700	16.0	10.3	103
1800	15.5	10.2	100
1900	14.5	10.1	99
2000	15.0	10.1	99
2100	15.0	10.0	98
2200	14.5	9.9	96
2300	14.0	9.7	93
2400	14.0	9.7	93
0100	14.0	9.6	92
0200	14.0	9.4	90
0300	13.5	9.5	90
0400	13.0	9.5	90
0500	13.5	9.5	90
0600	13.0	9.4	89
0700	13.0	9.6	91
0800	13.0	9.4	89
0900	13.5	9.6	92

TABLE 6

PRESQUILE RIVER

24 HOUR SAMPLING
(June 24, 1966)

STATION: 4 LOCATION: Hwy. Bridge Centerville

Time A.D.T.	Temp. °C.	D.O. p.p.m.	D.O. % Sat.
0930	14.0	12.2	118
1030	14.0	12.4	120
1130	15.0	12.4	119
1230	16.0	13.2	129
1330	17.0	13.4	134
1430	16.5	13.5	139
1530	16.0	12.9	131
1630	15.0	11.5	115
1730	15.5	11.0	102
1830	15.0	10.0	98
1930	14.5	9.5	92
2030	14.5	10.2	99
2130	14.5	9.7	94
2230	14.0	8.8	85
2330	14.0	8.7	84
0030	14.5	8.6	84
0130	14.5	8.6	84
0230	14.0	8.7	84
0330	14.0	8.6	83
0430	13.5	8.8	84
0530	13.5	8.8	84
0630	13.5	8.8	84
0730	13.5	8.7	84
0830	13.5	11.0	105

TABLE 7

PRESQUILE RIVER

ANALYTICAL DATA (Solids & Nutrients)

DATE 1967	FLOW c.f.s.	PO_4 STATIONS 1	2	5	7	$NO_3(N)$ STATIONS 1	2	5	7	$NO_3(NO_3)$ STATIONS 1	2	5	7	TOTAL SOLIDS STATIONS 1	2	5	7	SUSP. SOLIDS. STATIONS 1	2	5	7
Feb.15	41	0.54	2.32	1.92	1.75	0.04	0.03	0.03	0.03	0.22	0.21	0.11	0.30	391	255	252	235	24.0	5.0	5.0	6.1
Feb.21	41	0.54	2.22	1.45	1.22	0.03	0.03	0.03	0.01	0.16	0.13	0.13	0.44	355	271	274	247	10.5	6.0	5.0	7.5
Feb.22	41	0.61	2.05	1.84	1.66	0.04	0.04	0.03	0.06	0.20	0.20	0.11	0.27	361	266	272	268	22.0	6.0	8.3	18.6
Mean	41	0.57	2.19	1.70	1.54	0.04	0.03	0.03	0.03	0.19	0.18	0.12	0.34	369	264	266	250	19.0	6.0	6.1	10.7

PO_4 - Orthophosphate in mg/l.

$NO_3(N)$ - Nitrate nitrogen in mg/l.

$NO_3(NO_3)$ - Nitrate ion in mg/l.

TOTAL SOLIDS - Total residue in mg/l.

SUSP. SOLIDS - Non-filtrable residue in mg/l.

TABLE 8

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 1 LOCATION: International Boundary

Date 1966	Time A.D.T.	Flow c.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen	Turbidity	M.P.N.
June 7	1005	165	9.8	13.5	98	2.85	7.6	10	4.0	-
June 8	1020	208	10.3	13.5	103	2.10	7.9	10	4.6	630
June 9	0940	170	10.0	13.5	100	2.20	7.8	10	6.0	760
July 27	1010	74.5	10.9	17.0	112	-	8.1	10	-	520
July 27	2010	-	8.9	17.5	89	3.00	8.3	10	-	-
July 28	0800	57.9	9.4	17.0	94	-	8.5	10	-	700
July 28	2020	-	8.8	17.5	88	2.85	8.5	10	-	-
Min.	-	57.9	8.8	13.5	88	2.10	7.6	10	4.0	520
Max.	-	208	10.9	17.5	112	3.00	8.5	10	6.0	760
Mean	-	136	9.7	15.6	98	2.60	8.1	10	5.0	653

TABLE 9

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 2

LOCATION: Highway Bridge
Tracey Mills

Date 1966	Time A.D.T.	Flow c.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen	Turbidity	M.P.N.
June 7	1015	165	9.5	13.0	95	2.10	7.7	10	7.0	-
June 8	0800	208	9.4	13.0	94	2.00	7.7	10	8.5	940
June 9	0955	170	9.7	13.0	97	2.10	7.7	10	6.0	1200
July 27	1025	74.5	15.0	21.0	160	-	8.1	10	-	940
July 27	2020	-	8.8	21.0	88	2.35	8.3	10	-	-
July 28	0800	57.9	9.9	20.0	107	-	8.8	10	-	620
July 28	2030	-	8.9	20.0	89	2.55	8.8	10	-	-
Min.	-	57.9	8.8	13.0	88	2.00	7.7	10	6.0	620
Max.	-	208	15.0	21.0	160	2.55	8.8	10	8.5	1200
Mean	-	136	10.2	17.3	104	2.20	8.2	10	7.2	925

TABLE 10

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 3

LOCATION: 3.7 miles from International Boundary (below Tracey Mills).

Date 1966	Time A.D.T.	Flow c.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen	Turbidity	M.P.N.
June 7	1025	165	9.9	13.5	99	2.50	7.6	10	5.0	-
June 8	0900	208	11.7	13.5	112	2.25	8.0	10	5.0	450
June 9	1005	170	11.9	14.0	115	2.65	8.0	10	4.0	440
July 27	1035	74.5	15.0	21.0	160	-	8.5	10	-	460
July 27	2030	-	9.4	21.0	104	1.75	8.5	10	-	-
July 28	0845	57.9	9.7	20.0	105	-	8.6	10	-	500
July 28	2035	-	8.9	20.0	89	1.75	8.6	10	-	-
Min.	-	57.9	8.9	13.5	89	1.75	7.6	10	4.0	440
Max.	-	208	15.0	21.0	160	2.65	8.6	10	5.0	500
Mean	-	136	10.9	17.6	112	2.18	8.3	10	4.3	463

TABLE 11

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 4 LOCATION: Highway Bridge Centerville

Date 1966	Time A.D.T.	Flow c.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen	Turbidity	M.P.N.
June 7	1035	165	9.2	13.5	92	2.15	7.9	10	3.3	-
June 8	0730	208	8.7	13.5	87	1.90	7.7	10	5.0	480
June 9	1015	170	12.1	14.0	117	2.00	8.0	10	5.0	390
July 27	1045	74.5	12.8	21.0	138	-	9.1	10	-	420
July 27	2035	-	9.6	21.0	106	2.25	9.1	10	-	-
July 28	0855	57.9	9.0	19.0	90	-	8.3	10	-	440
July 28	2040	-	8.8	20.0	88	2.70	8.3	10	-	-
Min.	-	57.9	8.7	13.5	87	1.90	7.9	10	3.3	390
Max.	-	208	12.1	21.0	138	2.70	9.1	10	5.0	480
Mean	-	136	10.0	17.4	103	2.20	8.3	10	4.4	433

TABLE 12

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 5

LOCATION: Rail Bridge, 5.6 miles from International Boundary

Date 1966	Time A.D.T.	Flow c.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen	Turbidity	M.P.N.
June 7	1055	165	11.0	13.5	105	3.15	7.9	10	2.9	-
June 8	0950	208	13.5	14.0	131	2.30	8.0	10	4.0	610
June 9	1035	170	14.4	14.0	140	2.45	8.2	10	5.0	200
July 27	1100	74.5	15.0	21.0	160	-	9.2	10	-	350
July 27	2040	-	9.2	21.0	102	2.45	9.2	10	-	-
July 28	0905	57.9	10.8	19.0	114	-	8.2	10	-	600
July 28	2045	-	8.6	20.0	86	2.65	8.2	10	-	-
Min.	-	57.9	8.6	13.5	86	2.30	7.9	10	2.9	200
Max.	-	208	15.0	21.0	160	3.15	9.2	10	5.0	610
Mean	-	136	11.8	17.5	120	2.60	8.4	10	4.0	440

TABLE 13

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 6

LOCATION: Highway Bridge, 6.8 miles from International Boundary

Date 1966	Time A.D.T.	Flow c.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen	Turbidity	M.P.N.
June 7	1045	165	10.7	13.5	102	2.45	7.9	10	3.3	-
June 8	0940	208	12.4	13.5	119	1.95	8.1	10	6.0	310
June 9	1025	170	13.2	14.0	128	2.55	8.2	10	3.0	800
July 27	1110	74.5	12.6	19.5	133	-	9.4	10	-	720
July 27	2045	-	8.8	19.5	88	1.55	9.4	10	-	-
July 28	0915	57.9	9.5	19.0	101	-	8.3	10	-	720
July 28	2050	-	8.6	19.0	86	1.90	8.5	10	-	-
Min.	-	57.9	8.6	13.5	86	1.55	7.9	10	3.0	310
Max.	-	208	13.2	19.5	133	2.55	9.4	10	6.0	800
Mean	-	136	10.8	16.9	108	2.08	8.5	10	4.1	638

TABLE 14

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 7 LOCATION: Highway Bridge at Cannell

Date 1966	Time A.D.T.	Flow c.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen	Turbidity	M.P.N.
June 7	0900	165	10.6	13.5	101	2.05	8.0	10	2.9	-
June 8	1050	208	12.3	14.0	119	1.95	8.5	10	6.0	108
June 9	1105	170	12.9	14.5	126	2.60	8.5	10	1.5	360
July 27	0930	74.5	11.0	14.5	107	-	9.4	10	-	350
July 27	1930		8.4	15.0	84	2.65	9.4	10	-	-
July 28	0800	57.9	9.5	17.0	95	-	8.0	10	-	380
July 28	2000		8.9	17.5	89	1.90	8.0	10	-	-
Min.	-	57.9	8.4	13.5	84	1.90	8.0	10	1.5	108
Max.	-	208	12.9	17.5	126	2.65	9.4	10	6.0	380
Mean	-	136	10.5	15.1	103	2.23	8.5	10	3.5	300

TABLE 15

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 1 LOCATION: International Boundary

Date 1967	Time A.S.T.	Flow d.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen)	Turbidity	M.P.N.
Feb. 15	0945	41	0.3	0	2	80	6.9	60	22	>1,600
Feb. 21	1115	41	0.4	0	3	66	7.0	60	17	>1,600
Feb. 22	0945	41	0.4	0	3	74	7.0	60	25	>1,600
Mean	-	41	3.3	0	2.3	73	7.0	60	21	>1,600

TABLE 16

PRESQUILE RIVER

ANALYTICAL DATA

STATION:2

LOCATION: Highway Bridge, Tracey Mills

Date 1967	Time A.S.T.	Flow d.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen)	Turbidity	M.P.N.
Feb. 15	1000	41	5.7	0	39	44	7.3	50	15	1,600
Feb. 21	1130	41	5.9	0	40	27	7.2	50	15	>1,600
Feb. 22	1005	41	6.5	0	44	23	7.3	40	15	1,600
Mean	-	41	6.0	0	41	31	7.3	47	15	1,600+

TABLE 17

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 3

LOCATION: 3.7 miles from International Boundary (below Tracey Mills)

Date 1967	Time A.S.T.	Flow d.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen)	Turbidity	M.P.N.
Feb. 15	1020	41	1.7	0	12	-	7.2	60	15	920
Feb. 21	1145	41	1.8	0	12	-	7.2	60	15	920
Feb. 22	1025	41	2.1	0	14	-	7.2	60	15	920
Mean	-	41	1.9	0	13	-	7.2	60	15	920

TABLE 18

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 4

LOCATION: Highway Bridge Centerville

Date 1967	Time A.S.T.	Flow c.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen)	Turbidity	M.P.N.
Feb. 15	1045	41	1.0	0	7	16	7.2	60	17	1,600
Feb. 21	1205	41	0.9	0	6	20	7.2	60	15	1,600
Feb. 22	1055	41	1.1	0	8	16	7.3	60	15	920
Mean	-	41	1.0	0	7	17	7.2	60	16	1,370

TABLE 19

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 5

LOCATION: Rail Bridge, 5.6 miles from International Boundary

Date 1967	Time A.S.T.	Flow d.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen)	Turbidity	M.P.N.
Feb. 15	1105	41	0.4	0	3	15	7.3	60	15	>1,600
Feb. 21	1225	41	0.5	0	3	15	7.3	60	14	1,600
Feb. 22	1120	41	0.5	0	3	15	7.2	60	14	920
Mean	-	41	0.5	0	3	15	7.3	60	14	920+

TABLE 20

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 6

LOCATION: Highway Bridge, 6.8 miles from International Boundary

Date 1967	Time A.S.T.	Flow d.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen)	Turbidity	M.P.N.
Feb. 15	1125	41	1.7	0	12	-	7.3	60	19	920
Feb. 21	1255	41	2.2	0	15	-	7.3	60	15	280
Feb. 22	1145	41	2.2	0	15	-	7.3	60	14	920
Mean	-	41	2.0	0	14	-	7.3	60	16	700

TABLE 21

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 7

LOCATION: Highway Bridge at Cannell

Date 1967	Time A.S.T.	Flow d.f.s.	D.O. p.p.m.	Temp. °C.	D.O. %Sat.	B.O.D. p.p.m.	pH	Color (hazen)	Turbidity	M.P.N.
Feb. 15	1140	41	3.4	0	23	9	7.3	60	14	920
Feb. 21	1330	41	3.3	0	23	7	7.3	60	13	280
Feb. 22	1230	41	3.3	0	23	7	7.3	60	13	920
Mean	-	41	3.3	0	23	8	7.3	60	13	700

TABLE 22

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 1 LOCATION: International Boundary

Date 1966	Time A.D.T.	Flow c.f.s.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	Suspended Solids	Total Solids
June 7	1005	165	0.95	1.10	4.9	0	188
June 8	1020	208	0.93	0.95	4.2	4.0	194
June 9	0940	170	0.73	0.84	3.7	0	184
July 27	1010	74.5	1.10	1.24	5.1	7.5	235
July 28	0800	57.9	1.21	1.34	5.3	6.4	242
Min.	-	57.9	0.73	0.84	3.7	0	184
Max.	-	208	1.21	1.34	5.3	7.5	242
Mean	-	136	0.98	1.09	4.6	3.6	208

PO_4 - Orthophosphate as PO_4 in mg/l.

$NO_3(N)$ - Nitrate Nitrogen as N in mg/l.

$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l.

Suspended Solids - Non-filtrable residue in mg/l.

Total Solids - Total residue in mg/l.

TABLE 23

PRESQUILE RIVER

ANALYTICAL DATA

STATION:2 LOCATION: Highway Bridge Tracey Mills

Date 1966	Time A.D.T.	Flow c.f.s.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	Suspended Solids	Total Solids
June 7	1015	165	0.78	0.88	3.9	8	183
June 8	0800	208	0.81	0.73	3.2	0	195
June 9	0955	170	0.64	0.57	2.5	0	184
July 27	1025	74.5	0.95	0.91	4.1	0	231
July 28	0800	57.9	0.97	0.95	4.3	2	246
Min.	-	57.9	0.64	0.57	2.5	0	183
Max.	-	208	0.97	0.95	4.3	8	246
Mean	-	136	0.83	0.81	3.6	2	208

PO_4 - Orthophosphate as PO_4 in mg/l.

$NO_3(N)$ - Nitrate Nitrogen as N in mg/l.

$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l.

Suspended Solids - Non-filtrable residue in mg/l.

Total Solids - Total residue in mg/l.

TABLE 24

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 3

LOCATION: 3.7 miles from International Boundary (below Tracey Mills)

Date 1966	Time A.D.T.	Flow c.f.s.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	Suspended Solids	Total Solids
June 7	1025	165	0.71	0.85	3.8	0	172
June 8	0900	208	0.77	0.79	3.5	0	190
June 9	1005	170	0.75	0.71	3.2	0	176
July 27	1035	74.5	0.81	0.81	3.9	4.0	215
July 28	0845	57.9	0.82	0.84	3.9	6.0	213
Min.	-	57.9	0.71	0.71	3.2	0	172
Max.	-	208	0.82	0.85	3.9	6.0	215
Mean	-	136	0.77	0.80	3.6	2.0	193

PO_4 - Orthophosphate as PO_4 in mg/l.

$NO_3(N)$ - Nitrate Nitrogen as N in mg/l.

$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l.

Suspended Solids - Non-filtrable residue in mg/l.

Total Solids - Total residue in mg/l.

TABLE 25

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 4

LOCATION: Highway Bridge Centerville

Date 1966	Time A.D.T.	Flow c.f.s.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	Suspended Solids	Total Solids
June 7	1035	165	0.73	0.95	4.2	0	173
June 8	0730	208	0.72	0.71	3.2	0	186
June 9	1015	170	0.70	0.80	3.5	6.0	169
July 27	1045	74.5	0.79	0.84	4.2	7.0	217
July 28	0855	57.9	0.80	0.86	4.3	5.0	215
Min.	-	57.9	0.70	0.71	3.2	0	169
Max.	-	208	0.80	0.95	4.3	7.0	217
Mean	-	136	0.75	0.83	3.9	3.6	192

PO_4 - Orthophosphate as PO_4 in mg/l.

$NO_3(N)$ - Nitrate Nitrogen as N in mg/l.

$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l.

Suspended Solids - Non-filtrable residue in mg/l.

Total Solids - Total residue in mg/l.

TABLE 26

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 5

LOCATION: Rail Bridge, 5.6 miles from International Boundary

Date 1966	Time A.D.T.	Flow c.f.s.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	Suspended Solids	Total Solids
June 7	1055	165	0.68	0.95	3.8	0	187
June 8	0950	208	0.61	0.69	3.1	8.0	288
June 9	1035	170	0.68	0.68	3.0	4.0	165
July 27	1100	74.5	0.72	0.77	3.8	9.0	235
July 28	0905	57.9	0.73	0.81	4.0	7.0	257
Min.	-	57.9	0.61	0.68	3.0	0	165
Max.	-	208	0.73	0.95	4.0	9.0	257
Mean	-	136	0.68	0.78	3.6	5.6	226

PO_4 - Orthophosphate as PO_4 in mg/l.

$NO_3(N)$ - Nitrate Nitrogen as N in mg/l.

$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l.

Suspended Solids - Non-filtrable residue in mg/l.

Total Solids - Total residue in mg/l.

TABLE 27

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 6

LOCATION: Highway Bridge, 6.8 miles from International Boundary

Date 1966	Time A.D.T.	Flow c.f.s.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	Suspended Solids	Total Solids
June 7	1045	165	0.60	0.85	3.8	0	266
June 8	0940	208	0.66	0.80	3.5	12.0	195
June 9	1025	170	0.64	0.54	2.4	0	314
July 27	1110	74.5	0.69	0.81	3.9	14.0	280
July 28	0915	57.9	0.68	0.83	4.0	17.0	271
Min.	-	57.9	0.60	0.54	2.4	0	195
Max.	-	208	0.69	0.85	4.0	17.0	314
Mean	-	136	0.65	0.77	3.5	8.6	265

PO_4 - Orthophosphate as PO_4 in mg/l.

$NO_3(N)$ - Nitrate Nitrogen as N in mg/l.

$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l.

Suspended Solids - Non-filtrable residue in mg/l.

Total Solids - Total residue in mg/l.

TABLE 28

PRESQUILE RIVER

ANALYTICAL DATA

STATION: 7

LOCATION: Highway Bridge at Cannell

Date 1966	Time A.D.T.	Flow c.f.s.	PO_4	$NO_3(N)$	$NO_3(NO_3)$	Suspended Solids	Total Solids
June 7	0900	165	0.50	0.71	3.2	0	179
June 8	1050	208	0.68	0.56	2.5	0	182
June 9	1105	170	0.48	0.64	2.8	0	169
July 27	0930	74.5	0.59	0.74	3.3	4.0	215
July 28	0800	57.9	0.57	0.72	3.4	4.0	202
Min.	-	57.9	0.48	0.56	2.8	0	169
Max.	-	208	0.68	0.74	3.4	4.0	215
Mean	-	136	0.56	0.68	3.0	1.6	189

PO_4 - Orthophosphate as PO_4 in mg/l.

$NO_3(N)$ - Nitrate Nitrogen as N in mg/l.

$NO_3(NO_3)$ - Nitrate as NO_3 in mg/l.

Suspended Solids - Non-filtrable residue in mg/l.

Total Solids - Total residue in mg/l.

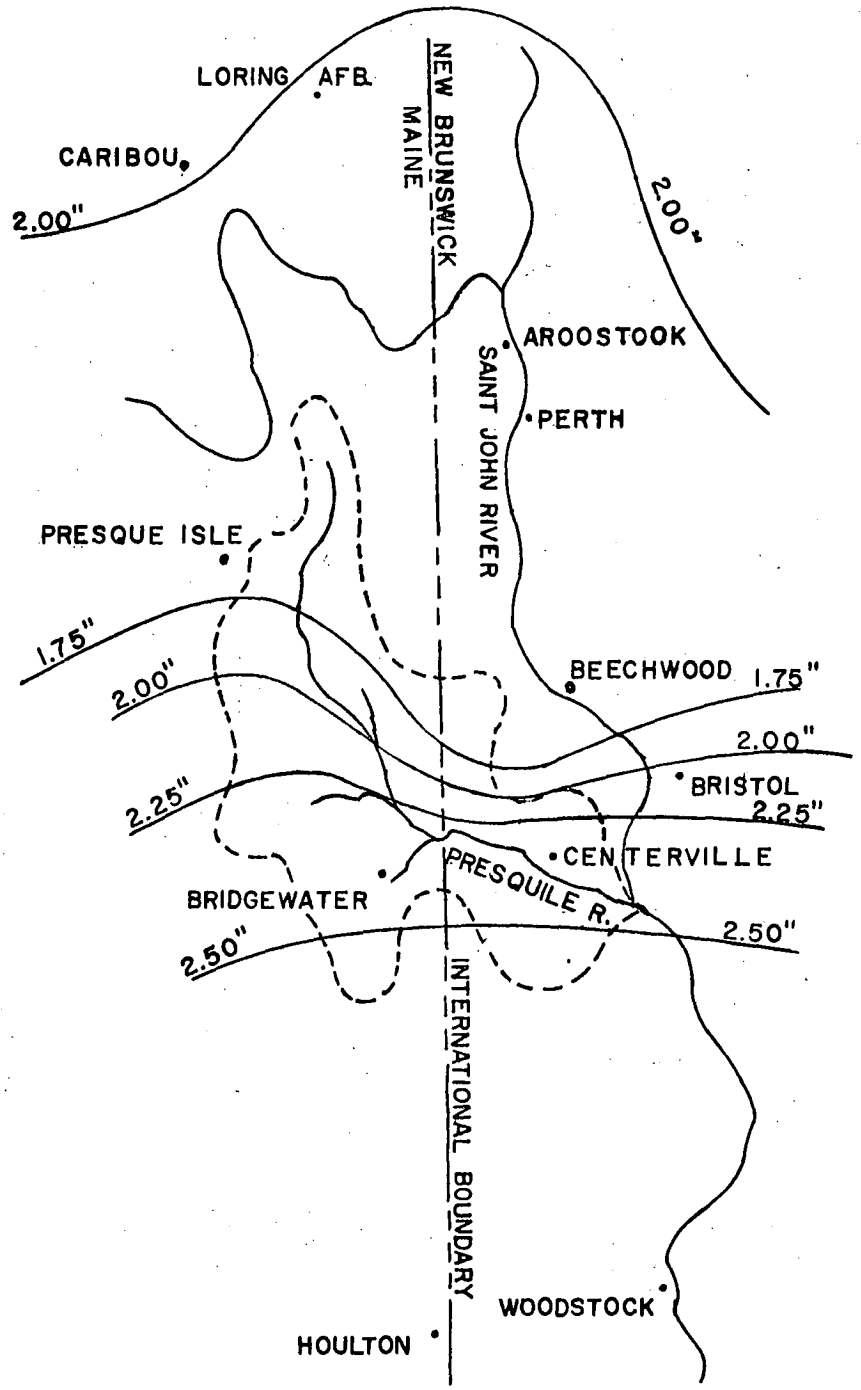


FIGURE 2

PRESQUILE BASIN
TOTAL RAINFALL
JUNE 1966

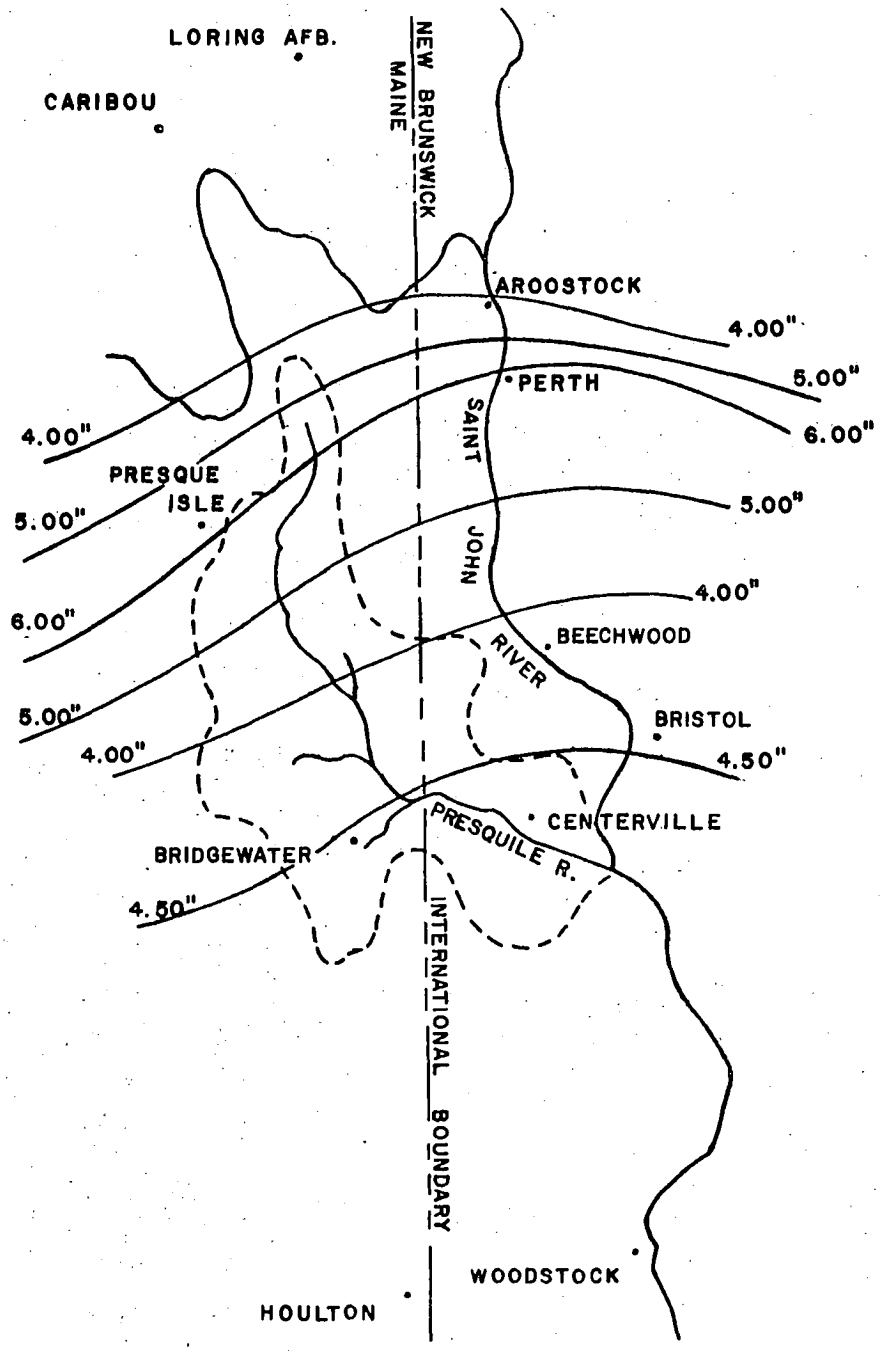


FIGURE 3

PRESQUILE BASIN
TOTAL RAINFALL
JULY 1966

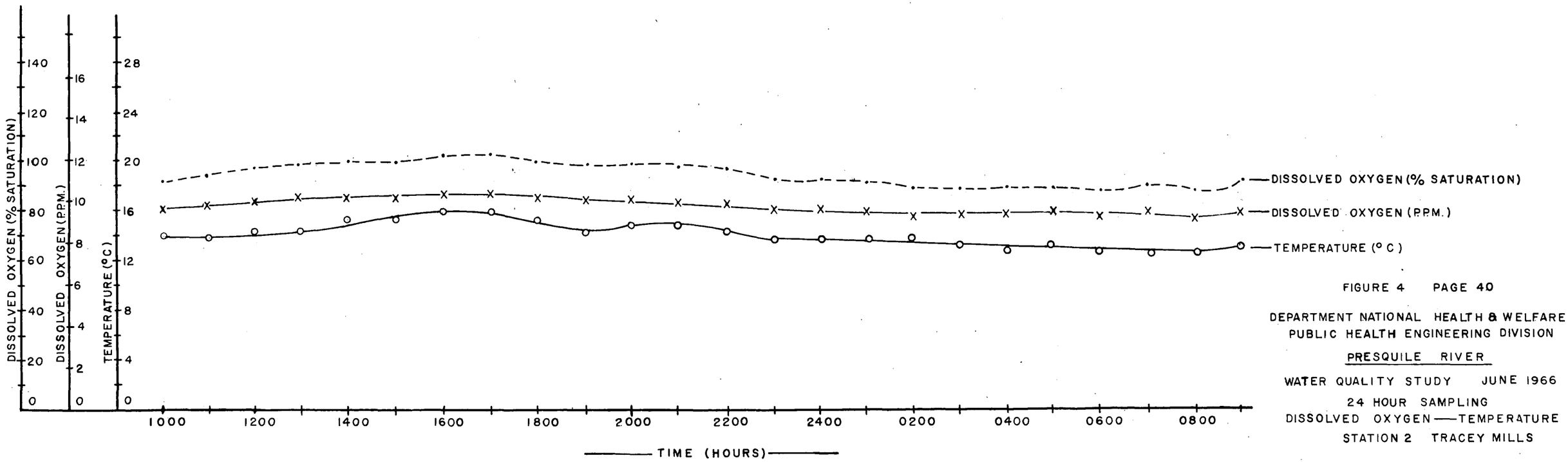


FIGURE 4 PAGE 40

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY JUNE 1966

24 HOUR SAMPLING
DISSOLVED OXYGEN — TEMPERATURE
STATION 2 TRACEY MILLS

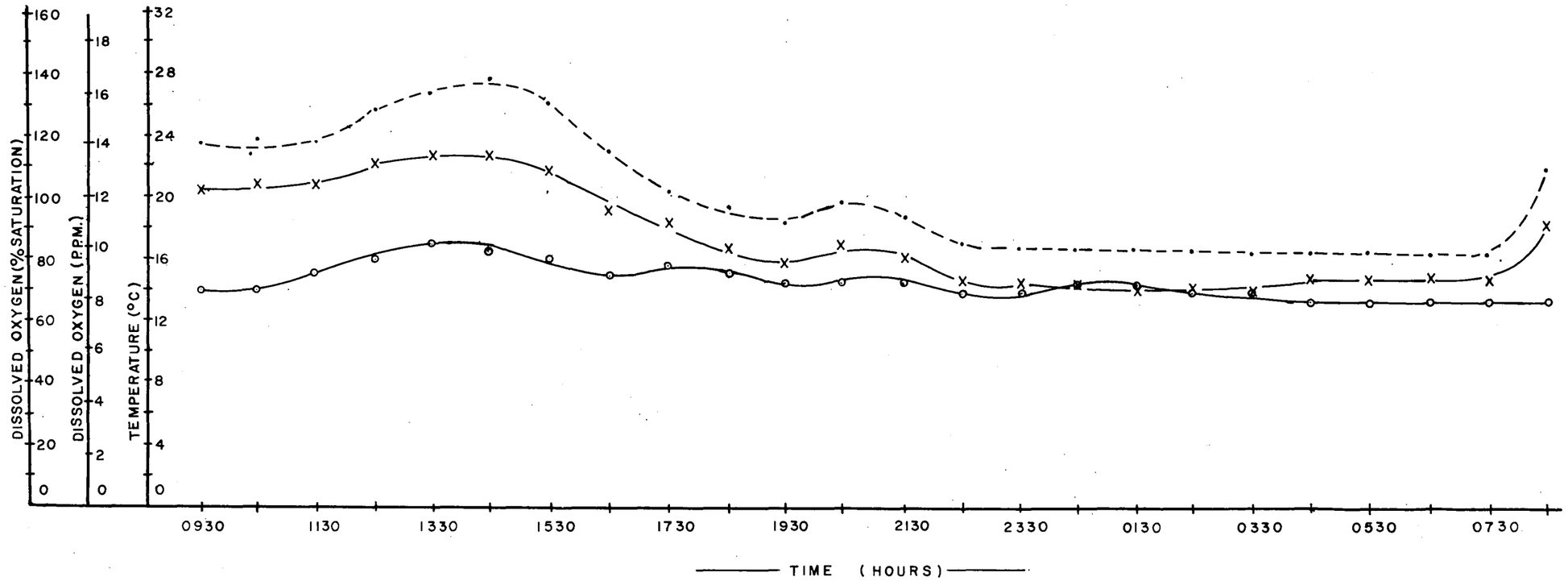


FIGURE 5 PAGE 41

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY JUNE 1966
24 HOUR SAMPLING
DISSOLVED OXYGEN — TEMPERATURE
STATION 4 CENTERVILLE

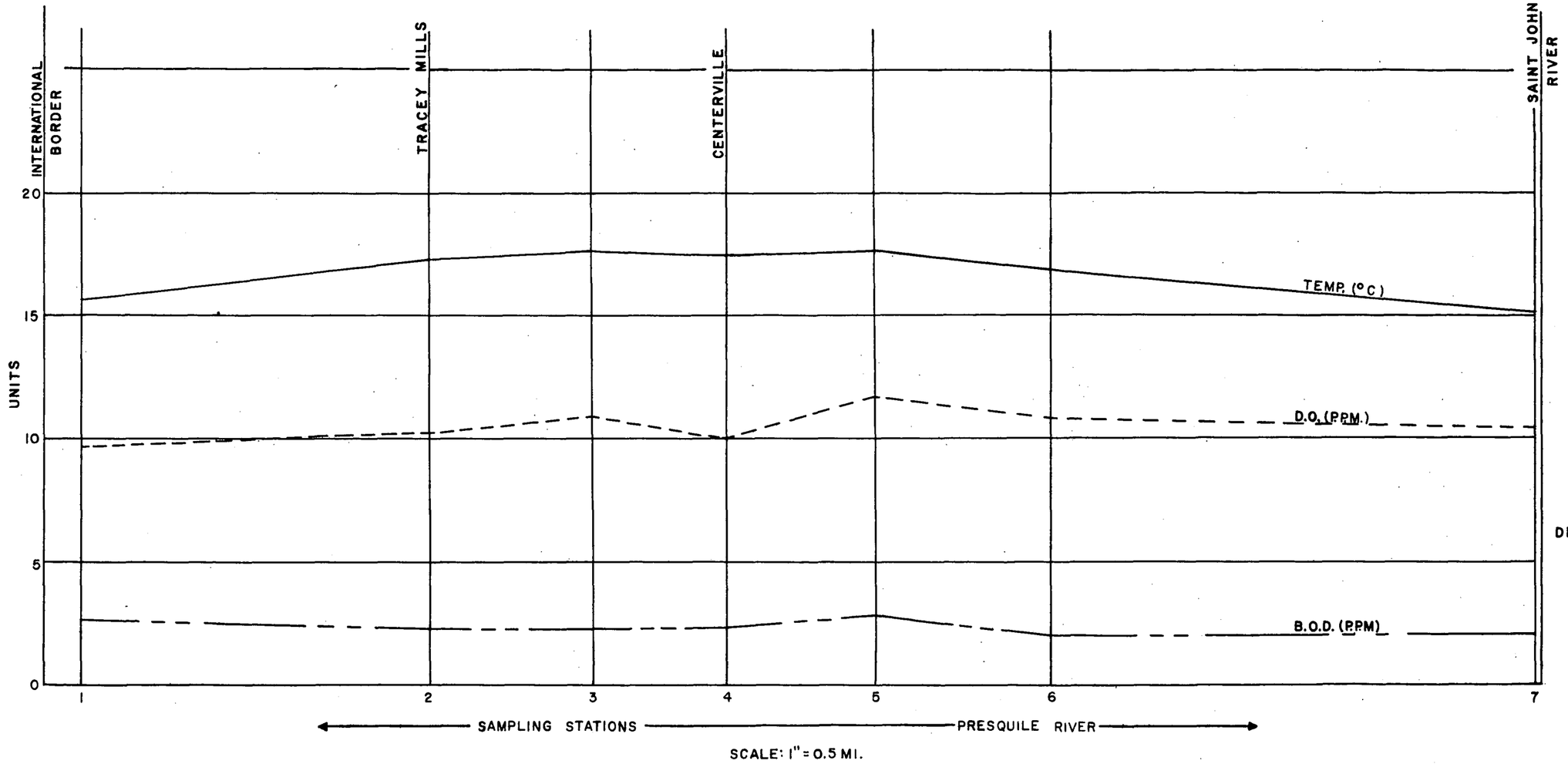


FIGURE 6 PAGE 42

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY —— 1966

TEMP. D.O. B.O.D.

MEAN PROFILES

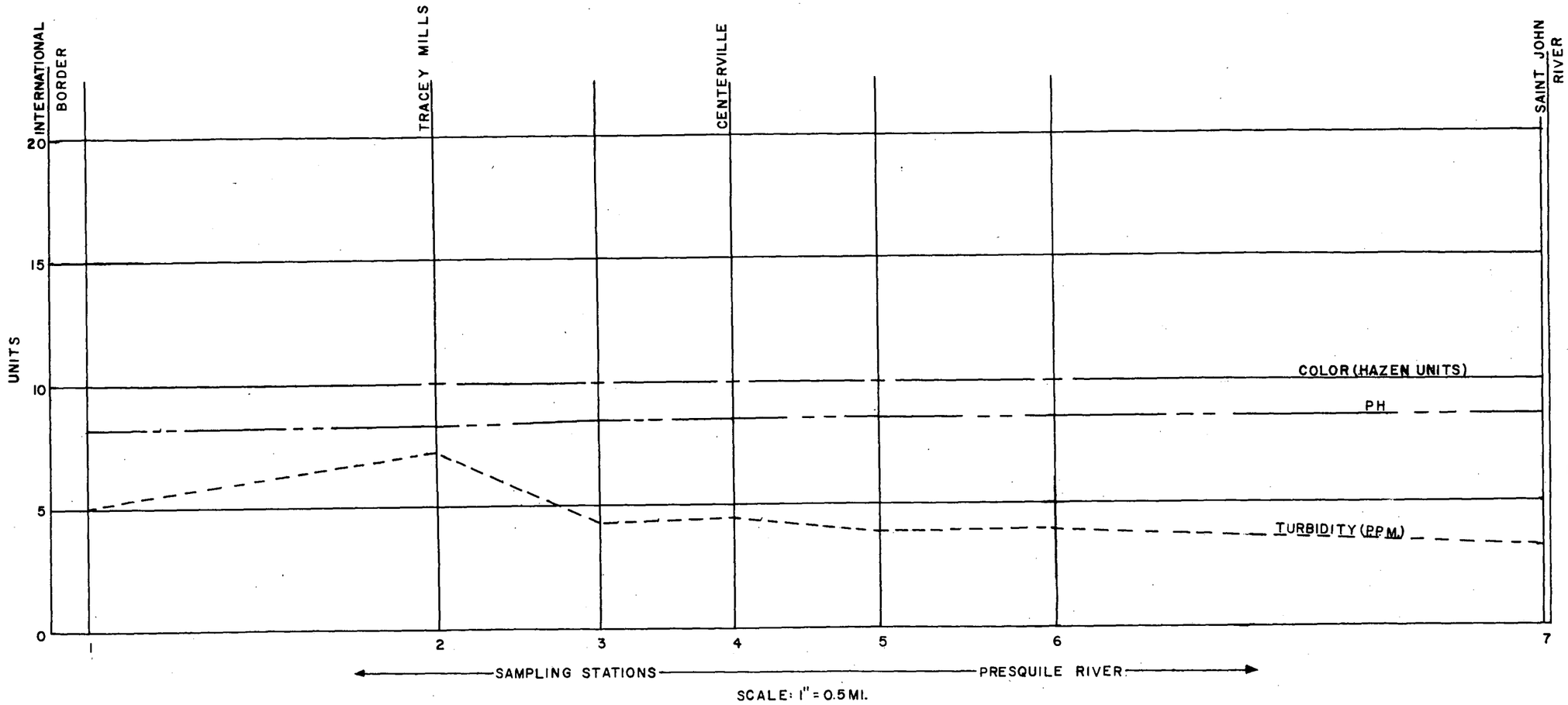


FIGURE 7 PAGE 43

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY ——— 1966

COLOR – PH – TURBIDITY
MEAN PROFILES

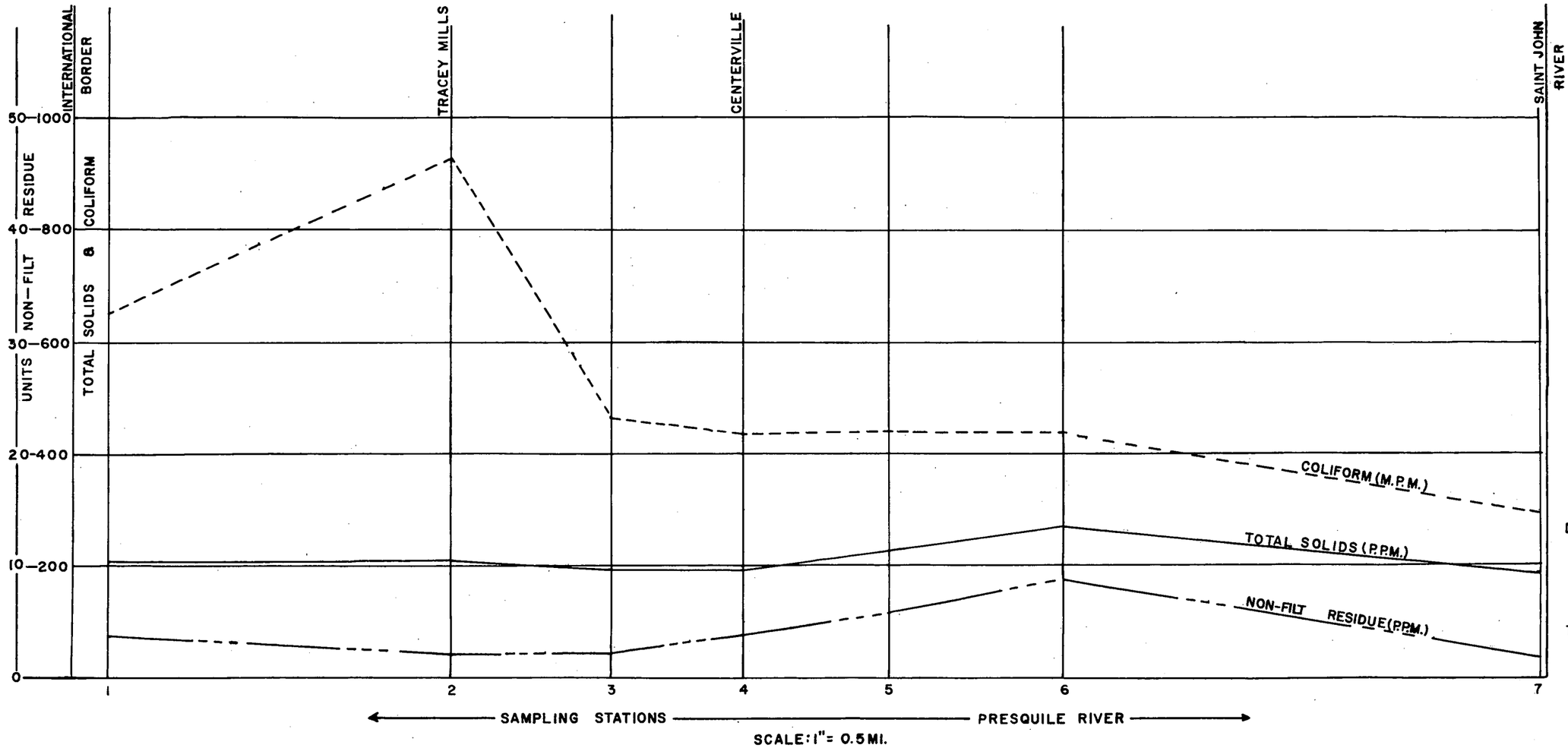


FIGURE 8 PAGE 44

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY —— 1966

TOTAL SOLIDS COLIFORM NON-FILT RESIDUE
MEAN PROFILES

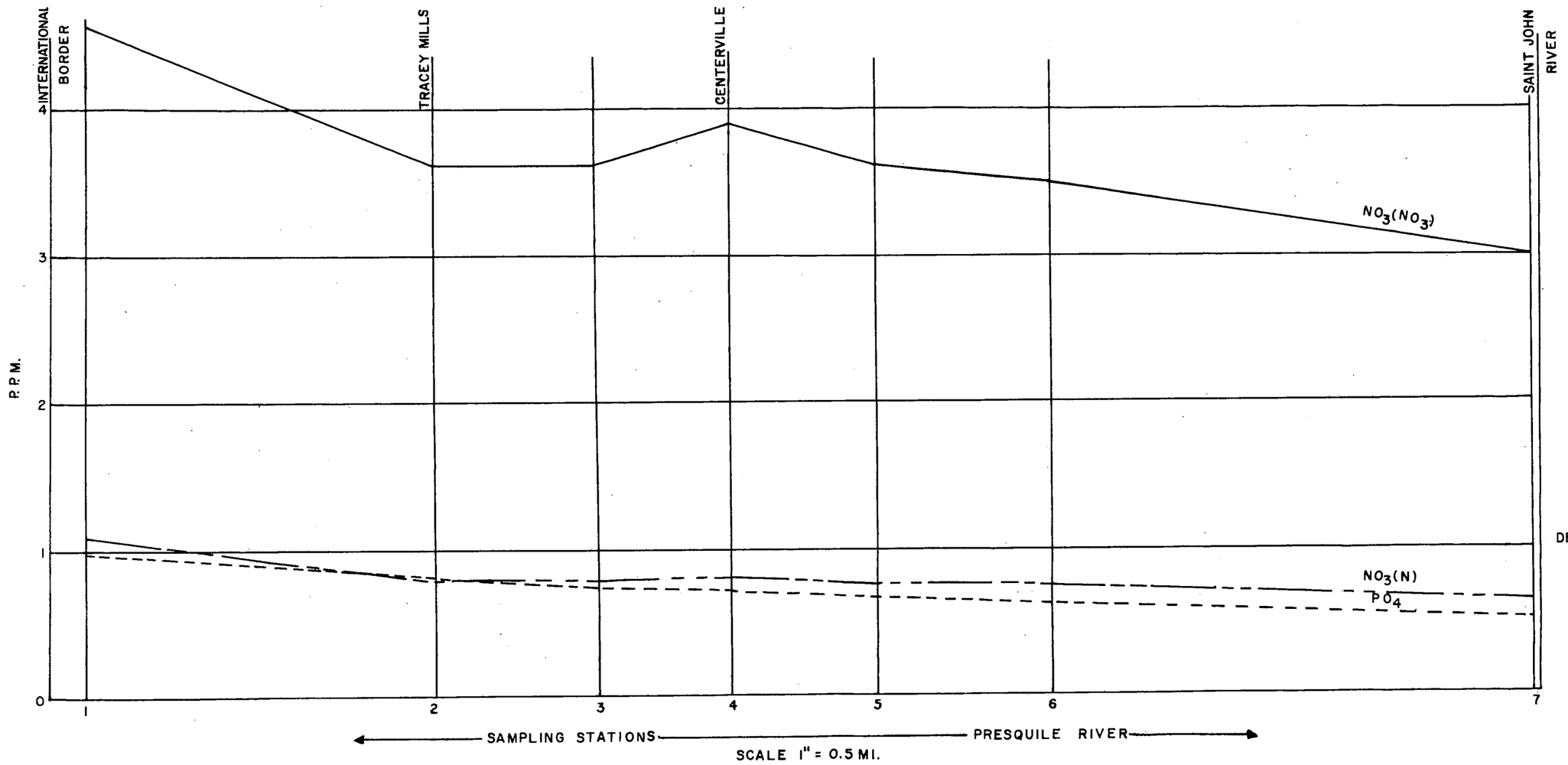


FIGURE 9 PAGE 45

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY ——— 1966

PO_4–$NO_3(NO_3)$–$NO_3(N)$
MEAN PROFILES

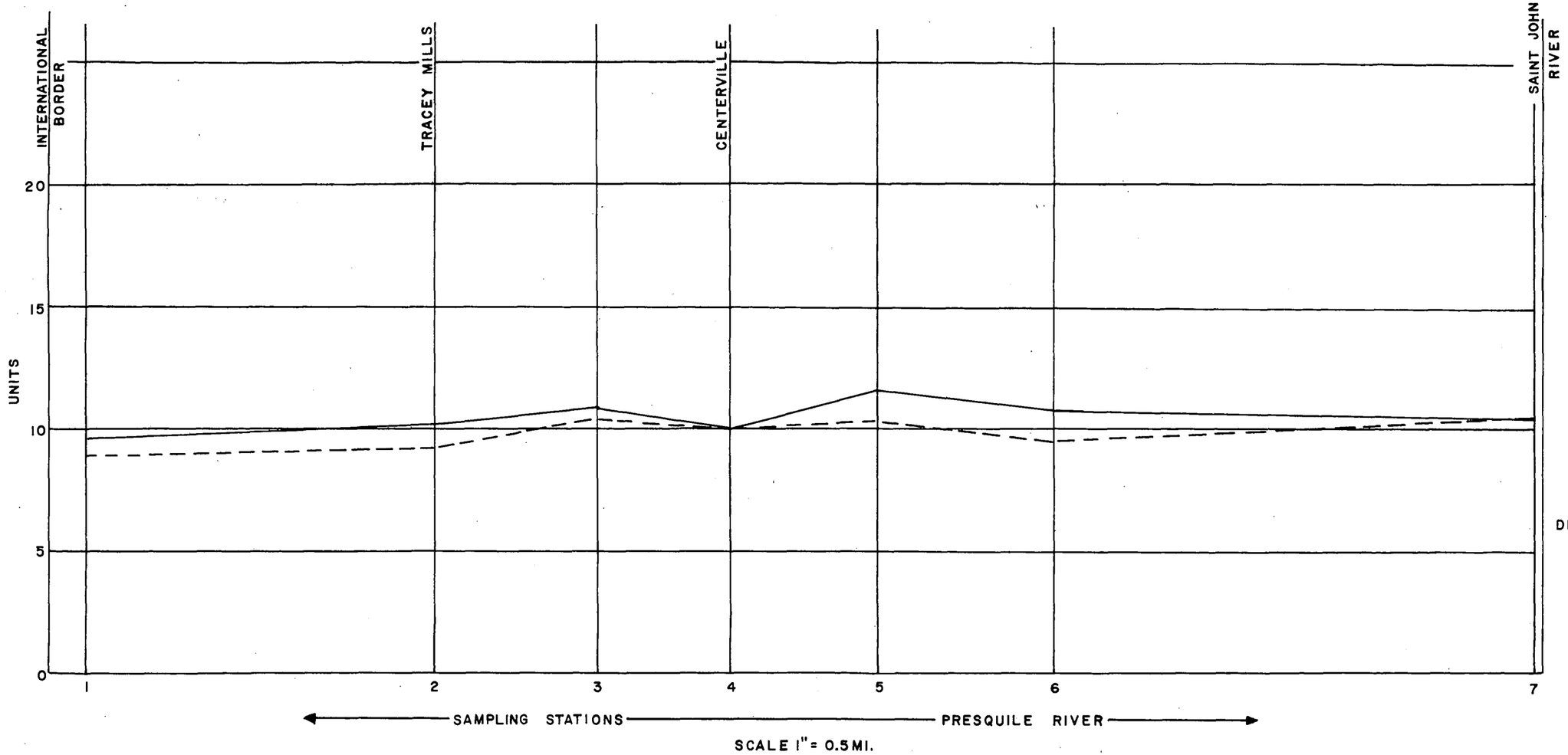


FIGURE 10 PAGE 46

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY —— 1965 – 66

COMPARISON OF MEAN D.O.(PPM)

REFERENCE

1965 D.O. – – – –

1966 D.O. ————

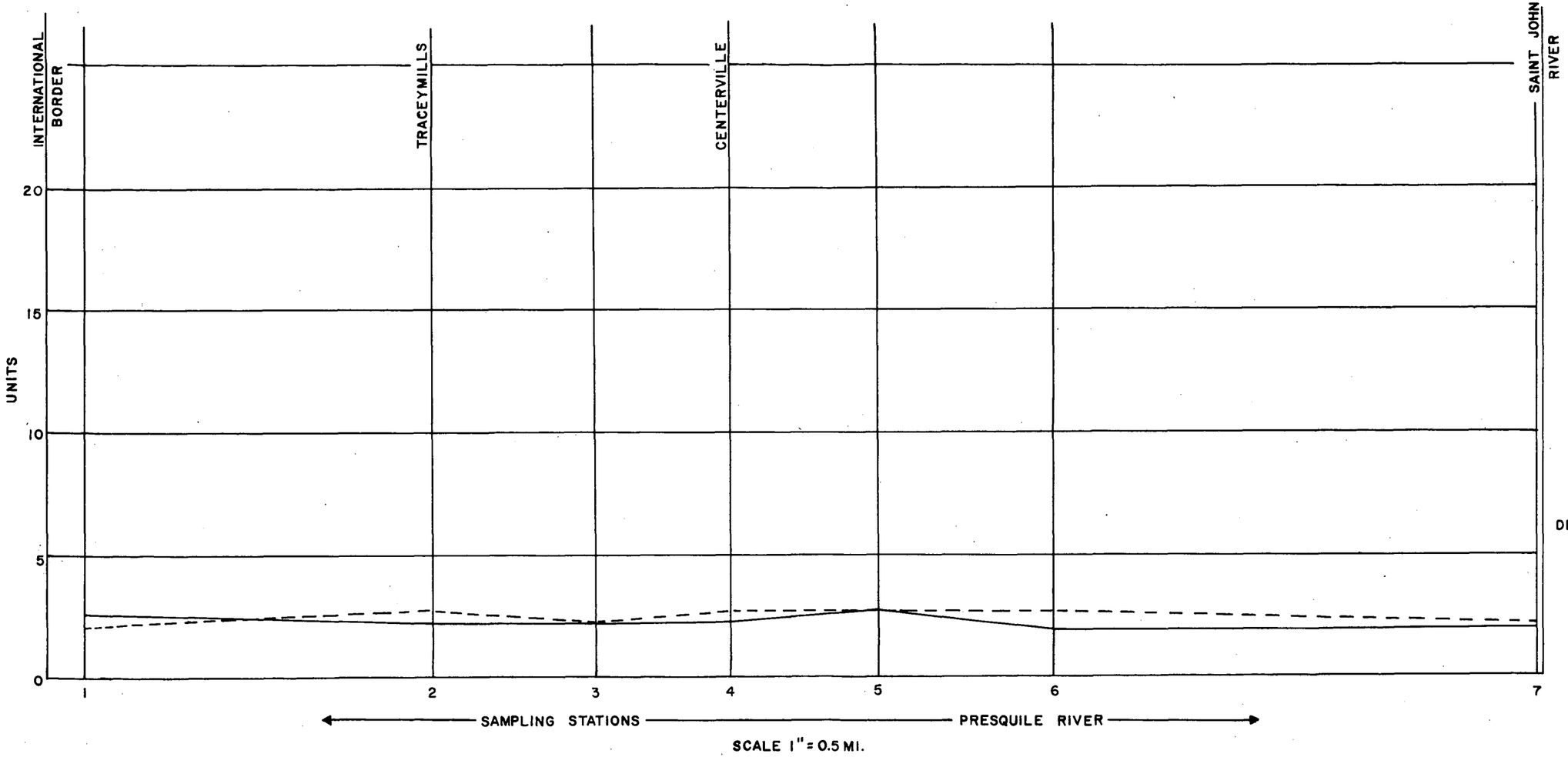


FIGURE 11 PAGE 47

DEPARTMENT NATIONAL HEALTH & WELFARE
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY 1965—66

COMPARISON OF MEAN B.O.D.

REFERENCE

1965 B.O.D. — — — —

1966 B.O.D. ————

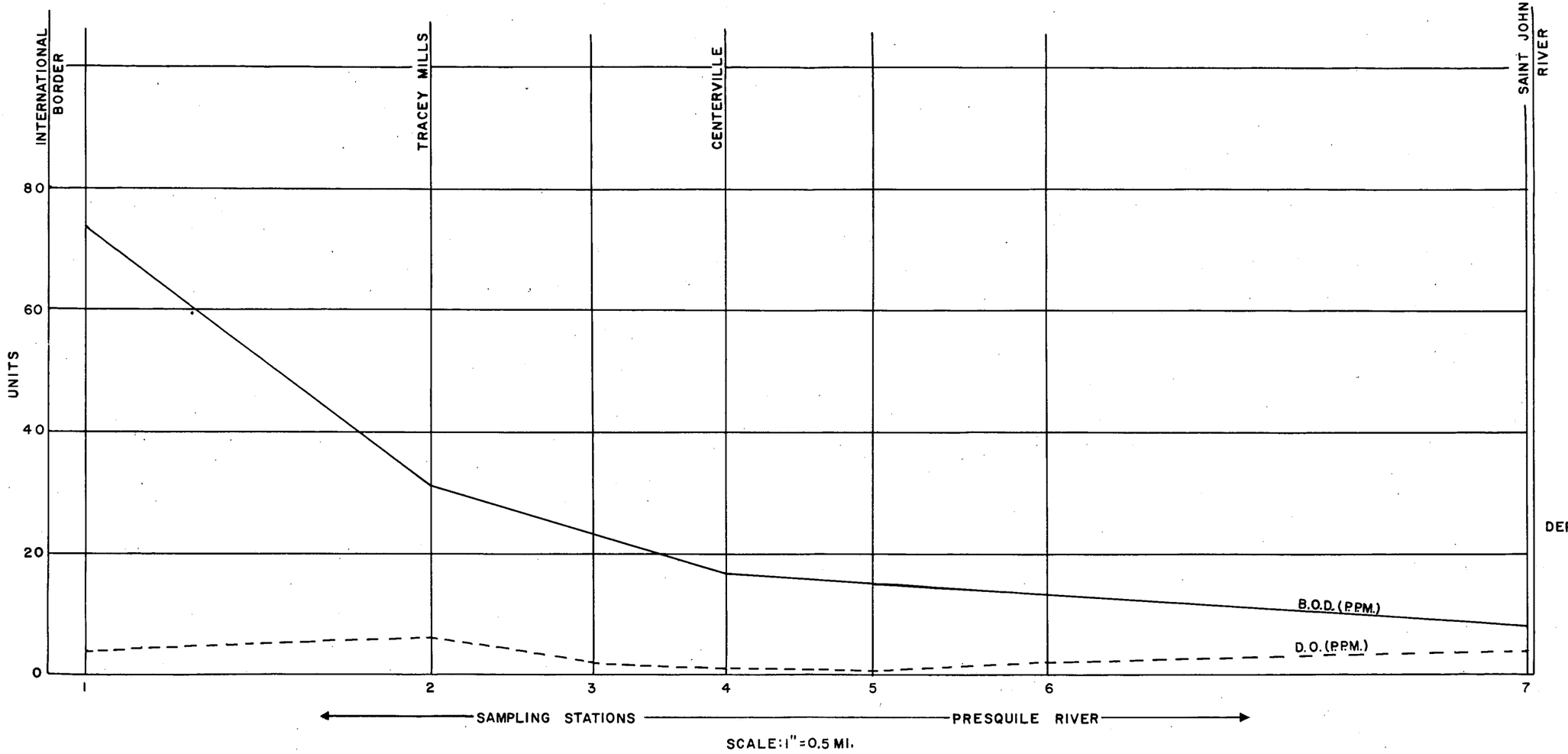


FIGURE 12 PAGE 48

DEPARTMENT NATIONAL HEALTH & WELFAR
PUBLIC HEALTH ENGINEERING DIVISION

PRESQUILE RIVER

WATER QUALITY STUDY —— 1967

D.O. B.O.D.
MEAN PROFILES

APPENDIX "A"

SURFACE WATER CLASSIFICATION - STATE OF MAINE:

Primary control of water pollution in the State of Maine is exercised by the Water Improvement Commission. Under State statutes the Commission is charged with the responsibility for making recommendations to the legislature with respect to the classification of rivers, waters and sections thereof within the State, based on reasonable standards of quality and use.

Four standards have been established by the Commission for the classification of surface waters in Maine. These classifications are summarized as follows:

"Class A shall be the highest classification and shall be of such quality that it can be used for bathing and for public water supplies after disinfection, and the dissolved oxygen content of such waters shall not be less than 75% saturation and contain not more than 100 coliform bacteria per 100 milliliters.

"There shall be no discharge of sewage or other wastes into water of this classification and no deposits of such material on the banks of such waters in such a manner that transfer of the material into the waters is likely. Such waters may be used for log driving or other commercial purposes which will not lower its classification.

"Class B, the second highest classification, shall be divided into two designated groups as B-1 and B-2.

"B-1. Waters of this class shall be considered the higher quality of the Class B group and shall be acceptable for recreational purposes and after adequate treatment for use as a potable water supply. The dissolved oxygen of such waters shall be not less than 75% of saturation and contain no more than 300 coliform bacteria per 100 milliliters.

"There shall be no disposal of sewage or industrial wastes in such waters except those which have received adequate treatment to prevent lowering of the standards for this classification, nor shall such disposal of sewage or waste be injurious to aquatic life or render such dangerous for human consumption.

"B-2. Waters of this class shall be acceptable for recreational boating, fishing, industrial and potable water supplies after adequate treatment. The dissolved oxygen of such waters shall not be less than 60% of saturation and contain no more than 1,000 coliform bacteria per 100 milliliters.

"There shall be no disposal of sewage or industrial waste in such waters to lower its classification nor shall such disposal of sewage or waste be injurious to aquatic life or dangerous for human consumption.

"Class C, the third highest classification, shall be of such a quality as to be satisfactory for recreational boating, fishing and other uses except potable water supplies and swimming, unless adequately treated to meet standards.

"Waters of this classification shall be free from scums, slicks, odors and objectionable floating solids, and shall be free from chemicals and other conditions inimical to aquatic life. The dissolved oxygen content of such waters shall not be less than 5 parts per million for trout and salmon waters and not less than 4 parts per million for non-trout and non-salmon waters.

"The Commission may take such action as may be appropriate for the best interests of the public when it finds that a "C" classification is temporarily lowered due to abnormal conditions of temperature and stream flow for that season involved.

"Class D waters, the lowest classification, shall be considered as primarily devoted to the transportation of sewage and industrial wastes without causing a public nuisance as defined in Chapter 141, Section 6, by the creation of odor producing sludge banks and deposits or other nuisance condition and such waters shall contain dissolved oxygen at all times. During a period of temporary reduction in the dissolved oxygen content in this class water, due to abnormal conditions of temperature of stream flow for the particular season involved, the Commission, provided a nuisance condition has not been created in such water and in the opinion of the Commission is not likely to be created during such season, shall take no action to reduce the amount of pollution from any source which is allowed in such class water under normal conditions.

"With respect to "C" and "D" classifications, the number of coliform bacteria, or amounts of toxic wastes or chemicals discharged into said waters shall be only those amounts which will not, in the determination of the Commission, be harmful to the public health".

The Prestile Stream was included with surface waters classified as Class B-1, the second highest classification, as of September 2, 1965.

APPENDIX "F"

Reports and Correspondence of the

July, 1968 Fish Kill

by the Canada, Department of Fisheries

FILE No. 702-6-3

Nº DU DOSSIER

CANADA

DEPARTMENT OF FISHERIES
MINISTÈRE DES PÊCHERIES

OFFICE OF
BUREAU DE
P. O. Box 277
Fredericton, N. B.
July 4, 1968

Mr. L. C. Ripley
District Protection Officer
Department of Fisheries
P. O. Box 277
Fredericton, N. B.

On July 3, 1968, accompanied by F/O Hannah of Woodstock, N. B., a patrol of the Presquile River was conducted to collect information concerning a report of fish mortality along the river, particularly in the Tracy Mills area.

As we approached the river below the Tracy Mills area, large quantities of dead fish were observed. The species were recognized as suckers, eels, and speckled trout. We proceeded to the mill and dam site. It was here that the main evidence of fish destruction was observed!

F/O Hannah and I estimated that there were 3,000 dead fish in this immediate area. More fish were observed in a weakened state but still able to swim about in a dazed condition.

We checked the feeder stream below Tracy Mills and found that trout were attempting to ascend the little stream, and thus escape the polluted water. The same condition existed in another feeder stream further down the Presquile River toward the main St. John River. There were dead fish along the river but in fewer numbers than at the Tracy Mills site, and immediately below the Tracy Mill site.

One speckled trout, approximately 10" in length, was picked up and put in a plastic bag and taken to F/O Hannah's domestic freezer in Woodstock, N. B. A water sample was also collected and taken to the Fredericton Office where it was turned over to Mr. Rod MacDonald, Biologist for the St. John River, with headquarters in Halifax.

.....2

Mr. L. C. Ripley 702-6-3

F/O Hannah and I proceeded to the U.S.A. border where the river was checked below the custom office. Dead fish were observed along with an ash color or milkish tinge in the water.

It is my opinion, that the substance which killed the fish was placed in the river in U.S.A. territory.

My recommendation is that this matter be investigated by a qualified member of the Federal Department of Fisheries, armed with proper evidence, and take this matter up with the proper authorities in the State of Maine.

D. O. Jenkins
Field Protection Officer.

OUR FILE No. 702-6-3

YOUR FILE No.

CANADA

DEPARTMENT OF FISHERIES

OFFICE OF
Fishery Officer,
Woodstock, N. B.
5 July, 1968

Mr. L. C. Ripley,
District Protection Officer,
Dept. of Fisheries,
Fredericton, N. B.

On July 2nd, this office received a call from Asst. Forest Ranger Cougle stating that fish were dying in The Big Presquile River. Mr. D. MacLean, superintendent of the hatchery at Florenceville called on the morning of July 3rd.

Mr. D. O. Jenking, Field Protection Officer, was due to visit this sub-district on July 3rd, so the visit to view this stream was delayed until he arrived. Together we visited and viewed the stream.

The first stop was at Tracey Mills and the smell of dead fish greeted us there. Many fish, suckers, trout, minnows, eels, etc. were floating just below the dam. Some photographs were taken of these fish. Above the dam there were also dead fish, but there were also some live ones. Some small minnows were swimming around just above the dam, but with part of their heads out of water most of the time. Just below the dam, a hundred yards or so, a small brook runs into the stream, and at the mouth of this small brook, quite a number of live fish were congregated. The same congregation of fish was noted at the mouth of another brook about two miles down stream from Centreville.

We drove to the Canada-U.S.A. border and from there we could see dead fish in the river without going down to the stream at all.

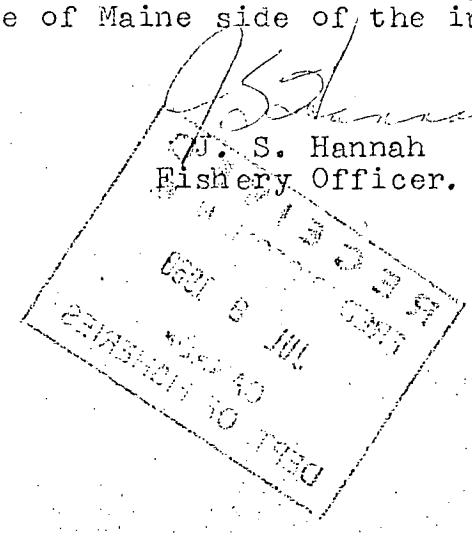
A water sample was taken from mid-stream about a hundred yards below the dam at Tracey Mills. A dead trout was also collected and is now in a freezer. The water sample was taken to Fredericton by Fishery Officer Jenkins.

The water in the stream appeared to have a peculiar grey color.

Mr. D. MacLean reported to me that there were also some dead trout down near the mouth of the river, but only small ones were found.

It would appear that the source of pollution originated somewhere on the State of Maine side of the international border.

J. S. Hannah
Fishery Officer.



702-6-3.

July 8th, 1968

Deputy Minister
Department of Fisheries
Ottawa, Ontario

Dear Sir:

On July 2nd a large fish kill occurred on the Presquille River, Carleton County, New Brunswick. An investigation by the New Brunswick Water Authority and our Department has traced the source of pollution to F. H. Vahlsing Incorporated, sugar refinery and potato processing plant at Easton, Maine.

A survey by the New Brunswick Water Authority indicated that the dissolved oxygen concentration in the river on July 4th was 8.5 p.p.m. above the plant, 0 p.p.m. at the border and 3.3 p.p.m. at the confluence with the Saint John River. As the investigations coincided with the July 4th holiday weekend in the U.S.A., the Maine authorities could not be contacted until today concerning the problem.

Mr. J. Lockhart phoned this morning and informed us that he had discussed the problem with Mr. R. W. MacDonald, Maine Water Improvement Commission. Mr. MacDonald informed him that the river under Maine standards has just recently been upgraded from class "D" to class "C". The Vahlsing Company, however, have been given two years to install the necessary equipment to improve the quality of the effluent. Under these conditions, he is unable to exert any pressure on the Company concerning the quality of their effluent.

The problem of U. S. pollution of boundary waters has received some consideration here during the last few weeks in connection with the pollution situation on the St. Croix River. It is my understanding that this type of pollution problem comes under the jurisdiction of the International Joint Commission. Would you please advise what action, if any on our part, is required to see that fishery conservation interests are protected from the Canadian viewpoint.

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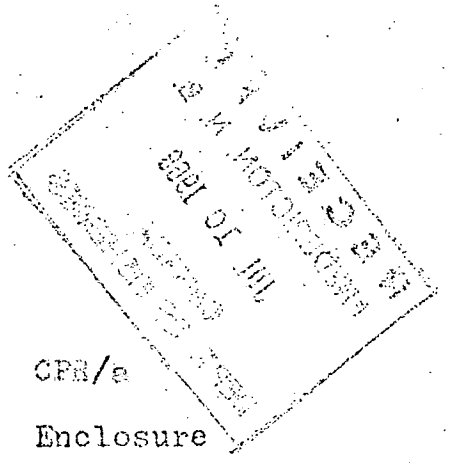
In the case of the Presquille River, severe public outcry has been expressed at the District Protection Officer level; and we foresee representation reaching Ottawa soon. Evidently the odour of decaying fish is a serious problem and the Department has been approached for assistance in moving the dead and decaying fish from the shorelines involved. Normally this would be a public health problem, but for the sake of public relations it may be worthwhile to consider assisting in the cleanup.

In order to assist us in dealing with boundary water pollution problems in the future, we would appreciate knowing more about the International Joint Commission, and how the Department's interests are looked after by this Commission. We are enclosing a copy of Mr. Ripley's report for your information.



Yours truly,

C. P. Ruggles
Acting Chief
Resource Development Branch
Maritimes Region

CPR/e

Enclosure

cc - Mr. Ripley

702-6-3

District Protection Officer
Fredericton, N. B.
July 9, 1968

Regional Director
Department of Fisheries
P. O. Box 550
Halifax, N. S.

Attention: Mr. J. Caldfield.

I am forwarding four shapshots taken by F/O Sherman Hannah showing the dead fish floating down the Presquile River on July 3, 1968. These pictures were all taken at the same spot just below the Tracy Mills dam, which is about mid way between the Border and the St. John River.

In these pictures, the fish can be seen caught in the eddies of the stream and floating down river. This is the place at which F/F/O Jenkins and F/O Hannah estimated the numbers of dead fish at about 3,000 in a space of about one-quarter of a mile of stream.

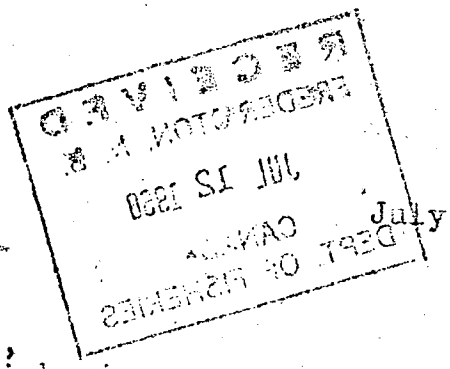
The fish seen here are made up of many which were killed in the immediate area plus some which were floating down from up stream and from across the Border. Although it has been a week since these pictures were taken, the problem in the Centreville area has not diminished and, at the time of writing this letter, many complaints are being received about the public nuisance caused from the smell of rotting fish. Some reports are that fish are still dying in the mouths of the smaller tributaries to the Presquile Stream.

For information.

L. C. Ripley
District Protection Officer.

Encls.
c.c.-F/O J.C. Hannah

702-6-3



July 10, 1968.

Deputy Minister,
Department of Fisheries,
Ottawa 8, Ontario.

We wish to refer to Mr. J. Parkinson's telephone conversation of July 10 with Mr. J. Dalziel concerning the pollution problem on the Presquille River.

Mr. B. Barnes of the N.B. Water Authority informed us this morning that he checked the river on the U.S.A. side of the border below the plant on the evening of July 9 and found the dissolved oxygen concentration to be 6 ppm. Water from this same area had 0 ppm. on July 4. Samples could not be collected on the Canadian side because the local residents had constructed a dam at the border in a vain attempt to keep the pollution on the U.S. side. The local press reported that the dam breached during the night. Conditions on the Canadian side were still bad last night but some improvement is expected today. One water sample collected on the Canadian side last week had a B.O.D. of 100 ppm.

We understand that the effluent from the potato processing plant is screened, passed through a grease trap and a series of six lagoons, the first having four surface aerators. The Company have just completed a new 120 day retention pond which will be used to retain the effluent during the summer.

We are enclosing for your information a copy of a letter and pictures from D.P.O. Ripley concerning the problem. We feel that the odor referred to by Mr. Ripley is caused more by the potato wastes than by the dead fish.

Yours truly,

C. P. Ruggles,
Acting Chief,
Resource Development Branch,
Maritimes Region.

c.c. D. P. O. Ripley.

JD/jc

702-6-3

District Protection Officer
Fredericton, N. B.
July 11, 1968

Regional Director
Department of Fisheries
P. O. Box 550
Halifax, N. S.

Attention: Mr. John Halniel

On July 10, 1968, a visit was made by the undersigned to the area of the Presquile River to make a check of the pollution situation.

The dam, which had been built by bulldozers about 200 yards down stream from the International Border, had been breached early that morning and the water was being used to fill the Tracy Mills Dam about 4 miles farther down stream. The stop logs in this later dam were, in turn, removed at about 11:30 A.M. on the same morning. The purpose of all this was an attempt by the local residents to use the flushing action of the water to remove the remanents of dead fish and other pollutants from the stream bed. It is not believed that this effort met with any degree of success because dead fish could still be seen in large numbers along the banks of the stream after the water level receded.

As the water levels began to drop, we organized the efforts of about fifteen of our Fishery Officers and Wardens in an attempt to remove the dead fish from the edges of the stream, particularly along the river at Centreville and the more populated areas in the locality. This proved to be another difficult operation which did not meet with a great deal of success, but I believe it did convince the local residents that an attempt was being made in some small way to keep down the stench of the dead fish.

It is difficult to estimate the number of dead fish which were killed in this very serious pollution. Although the kill in the main stem of the river seemed to be almost total and complete, our officers and wardens reported that, while working along the banks, they could see live fish in the mouths of the tributary streams and

....2

702-6-3

Regional Director

could also see large numbers of common black eels taking refuge from the pollution along the edge of the stream with their heads up on the grass and, during the rainy period, these eels were sometimes up in grassy areas several feet from the edge of the water.

Mr. Don MacLean, Officer in Charge at Florenceville Fish Culture Station, was able to rescue some fish from the mouths of certain feeder streams and transfer them to pure water areas by truck.

It is believed that many of the dead fish seen have floated down from the State of Maine but some estimates of the fish kill, in the 12 miles of stream from the U.S. Border to the St. John River, are as high as 50,000 fish ranging in size from small minnows to suckers and trout weighing 2 to 3 lbs. Large numbers of dead eels were also seen.

It was interesting to note that when the headpond of the dam at Tracy Mills was being filled on July 10th, the surface of the water was completely covered with a mass of maggots which had floated up from the dead fish along the shores.

The river was still very badly polluted on July 10th and samples of water taken at the Border showed that no oxygen was present. The stench of the dead fish has by now almost died down, but there is a smell coming from the water which is very offensive and very much like the smell of raw sewage. It would appear to the undersigned that what we are seeing in the Presquile River is an example of what happens when a river receives an overload of pollution with the resultings oxygen depletion. It is reported that Fahlning Incorporated have stopped pouring in effluence from their mill since last week, but the return to normal of the river water does not yet seem to have taken place and may not clean up for some time yet.

A decision was made by the N.B. Department of Natural Resources and the Water Authority to spray the banks of the stream with insecticide to kill the maggots, and to use lime to stop the stench of rotting fish. At first we thought this should be discouraged but a later decision was made to allow this operation to proceed.

Local residents on both sides of the Border are understandably very indignant about what has happened, not only because of the fish kill but because of the very offensive smell coming from the river.

Regional Office will be kept informed of developments with respect to this pollution.

L. G. Ripley
District Protection Officer.

APPENDIX "G"

Memoranda by

Mr. B. B. Barnes, P. Eng. and

Mr. James K. D. Hayden of the

New Brunswick Water Authority

July 8, 1968

TO: New Brunswick Water Authority

File No. 6-15.02

July 8, 1968

MEMORANDUM: Presquile

This morning the writer talked with Mr. R. W. Macdonald, Chief Engineer, Maine Water & Air Environmental Improvement Commission, concerning the recent problem on the Presquile River. Mr. Macdonald was aware of the situation but was unable to offer much encouragement for corrective measures.

The down grading of the River has been progressing down stream all summer as water flows decreased and temperatures rose. Maine Sugar Industries Inc. is presently processing cane sugar; in addition, Vahlsing Inc. potato processing plant recently acquired approximately one hundred car loads of potatoes which are now being processed. Treatment facilities are quite inadequate for this high load and the low summer flows.

On Friday, the writer flew up the Presquile River as far as the water supply dam, above the plant. The impounding reservoir is quite low and would not offer much hope for dilution water. The discharge from the industry is grey-white and still retains enough colour so that the flow pattern can be seen as it discharges into the Saint John River. Throughout the length of the river in Maine, the river banks and bottom appear black, indicating gross septic conditions.

During the last Legislature of the State of Maine, the river was reclassified to C level and therefore the industry has until 1970 to meet this requirement. Legally nothing can be done until that time under stream pollution legislation. However, the Commission has been pressing for the Attorney General to initiate a nuisance action. If this was successfully processed through the courts, the plants could be closed down until stream conditions were such that a nuisance would not result. However, other officials at both the State and Federal level have so far successfully persuaded the Attorney General not to take any action in this direction. No doubt the Attorney General's office is quite busy and have other more important cases.

Mr. Macdonald could not suggest any constructive action on our part, although he agreed that a letter from the Premier to Governor Kenneth M. Curtis might help to some degree.

(Sgd.) B. B. Barnes, P. Eng.
Engineer

TO: New Brunswick Water Authority

File No. 6-15.02

July 8, 1968

MEMORANDUM: Fish Kill on Presquile River

On July 4, 1968 reports of a fish kill in the Presquile River led Mr. Regis Daigle and the writer to the area to determine the cause. From river analysis, it is evident that the fish were killed by insufficient oxygen in the river. From these analysis and field observations, it is also evident that this condition has resulted from wastes from Maine Sugar Industries Inc. and Vahlsing Inc. plants at Easton Station, Maine being discharged to the Prestile Stream which becomes the Presquile River at the Canada - U. S. A. Border.

Mr. Daigle and the writer followed the Presquile River by road from its mouth to the border and thence followed the Prestile Stream to its source at an earthen dam north of Easton Station, Maine.

Large numbers of dead fish were found along the river. These were particularly numerous between Tracey Mills and Centreville. The smell in this area was quite strong as the fish began to decompose. This was particularly noticeable because of the proximity of the river to the highway (and homes) in this area. Some living fish were found where tributaries brought oxygen containing water to the river.

On July 4, river and stream samples were taken in the late afternoon for dissolved oxygen (D. O.) at various points in the system. On July 5 river samples were taken in the early morning for D. O. and Biochemical Oxygen Demand(BOD) from the mouth to the border. All D. O. samples were fixed in the field and titrated in the Fredericton Lab. These results are tabulated in the attached Appendix.

The appearance of the stream and the D. O. results indicate that the stream has had a BOD loading applied to it, which is larger than the stream with its low flow can assimilate. Above the application point, the stream is clean with high D. O. and supporting fish life. With the addition of the oxygen consuming wastes from the mentioned plants, the stream becomes a turbid greyish white and its oxygen content drops very quickly to levels too low to support fish life. This conditions continues to the lower reaches of the river. Near the mouth, the river is starting to recover.

(Sgd.) James K. D. Hayden
Industrial Wastes Engineer

Appendix

Summary of Prestile Stream/Presquile River

Dissolved Oxygen (D. O.) Determinations

Prestile (above Vahlsings)	July 4	5:05pm	20	8. 55	clear stream, fish swimming, weather-warm and sunny
Prestile (below Vahlsings)	July 4	4:45pm			stream turbid, grey-white
Prestile (Easton Bridge)	July 4	4:30pm	23	0. 4	stream turbid, grey-white, edge black and anaerobic
1 (1/4 mile-Border)	July 4	9:05 pm	22	0. 00	dead fish on rocks stream turbid, grey brown
2 (2. 6 miles-Tracey Mills)	July 4	3:20pm	21	3. 05	many dead fish
4 (4. 6 miles-Centreville)	"	6:20pm	24	0. 02	many dead fish
6 (6. 8 miles-Covered bridge)	July 4	9:30pm	23	0. 35	
7 (10. 1 mouth)	July 4	2:15pm	25	3. 35	dead fish floating by, live fish swimming
1 1/4 mile Border	July 5	7:40am	17. 5	0. 00	dead fish - weather overcast
2 Tracey Mills	July 5	8:05am	20	2. 60	dead fish
4 Centreville	July 5	8:25am	19. 5	0. 22	dead fish
6 Covered Bridge	July 5	8:40am	18. 5	0. 74	
7 Mouth	July 5	9:05am	18	4. 78	minnows swimming

* (Mileages shown are from Canada - U. S. A. Border)

** (Figures are average of two samples)

APPENDIX "H"

Data on Water Samples of the Presquile

prepared by

Mr. James K. Hayden,

for the New Brunswick Water Authority,

together with reports by

Canada, Department of Fisheries

PRESQUILE RIVER SAMPLES

In the period January 25 - May 28, 1969, a number of samples were taken from the Presquile River and analyzed for Dissolved Oxygen (DO) and Brochemical Oxygen Demand (BOD). The provisional mean daily discharges as recorded by the Tracey Mills gauging station are included. The DO as "Percent Saturation" has been calculated and is included. It should be noted that the bracketed "Percent Saturation" values have been estimated by assuming a linear variation of river water temperature and time between March 26 and May 28.

An analysis of the data shows that:

A. of thirty samples for DO
   - thirty percent were less than 75% saturation
   - twenty percent were less than 60% saturation
   - seven percent contained less than 5 p.p.m. DO

B. of thirty-two samples for BOD
   - eighty-four percent contained more than 2.5 p.p.m. BOD (The latter figure is the average of all BOD determinations of the "Presquile River Base Line Water Quality" study made by the Department of National Health & Welfare in 1965).

SUMMARY OF DATA
PRESQUILE RIVER
JANUARY 25 - APRIL 18, 1969

DATE (1969)	STATION	DISSOLVED P.P.M.	OXYGEN PERCENT SATURATION % (estimated)	B.O.D. P.P.M.	PROVISIONAL MEAN DAILY DISCHARGE AT TRACEY MILLS cfs
25/1	2			18	130
	4			16	
	5			15	
	6			11	
	7			15	
19/2	(7)?	11.4	80	1	68
24/2	1	11.9	81.5	1	100
	2	12.7	89.5	2	
	4	12.8	87.5	2	
	7	12.5	85.5	3	
5/3	A	1.5	10.3		
6/3	A			3	76
24/3	1	1.9	13.4	17	267
	2	7.7	54.2	7	
	4	8.6	60.5	5	
	6	10.1	71	7	
	7	11.4	80.1	4	
25/3	1	6.7	47.1	6	292
	4	10.5	73.9	6	
26/3	1	6.0	42.2	5	405
	4	10.8	76	6	
	7	11.5	80.9		
1/4	1	7.8	(56)	12	484

DATE (1969)	STATION	DISSOLVED P.P.M.	OXYGEN PERCENT SATURATION % (estimated)	B.O.D. P.P.M.	PROVISIONAL MEAN DAILY DISCHARGE AT TRACEY MILLS cfs
	4	10.8	(78)	6	
	7	13.2	(95)	5	
14/4	1	12.4	(95)	6	1540
	2	13.7	(105)	6	
	4	13.3	(101)	5	
	6	12.9	(98)	5	
	7	13.5	(103)	3	
18/4	4	13.8	(108)	4	4250
28/5	1	13	112	2	
	2	10	86		
	4	12	108	3	
	6	13.5	125		
	7	12	111	3	

PRESQUILE RIVER - PRESTILE STREAM

SAMPLING STATIONS

STATION	LOCATION
A	Prestile Stream at Highway Bridge just west of Boundary
1	Presquile River at International Boundary
2	Highway Bridge at Tracey Mills, N. B.
4	Highway Bridge at Centreville
5	Rail Bridge, 5.6 miles from Boundary
6	Highway Bridge, 6.8 miles from Boundary
7	Highway Bridge, 10.1 miles from Boundary

OUR FILE No. 702-6-3

YOUR FILE No.

CANADA

DEPARTMENT OF FISHERIES

OFFICE OF
Fishery Officer,
Woodstock, N. B.
27 January, 1969.

Mr. L. C. Ripley,
District Protection Officer,
Dept. of Fisheries,
Fredericton, N. B.

On advice from Mr. L. C. Ripley, the undersigned visited the Big Presquile River on 24th of January to investigate the reported pollution of this river.

At Tracy Mills, the water in the river is polluted more than usual. The water is a greyish color with a slight odor. Also below the dam, where the water is open, there is a covering of foam on the water to a depth of two feet or so.

Reports indicate that this pollution again originated from the Vahlsing plant at Easton Maine.

Unless something can be done to prevent the periodic pollution of this stream, it will be finished as a trout stream. Also this pollution could have serious effects on the Saint John River in the Mactaquac Headpond.

J. S. Hannah
Fishery Officer.

cc

OUR FILE No. 702-6-3

YOUR FILE No.

CANADA

DEPARTMENT OF FISHERIES

OFFICE OF
Fishery Officer,
Woodstock, N. B.
March 24, 1969.

Mr. L. C. Ripley,
District Protection Officer,
Dept. of Fisheries,
Fredericton, N. B.

On the news broadcast during the weekend, and in the morning paper, there were statements made by Mr. Robert Cains of Centreville that the Presquile River was polluted again. Consequently, this afternoon I travelled up and took along the new oxygen sampling kit.

I first stopped at Tracey Mills and anyone with a nose could tell that there was pollution present. For the oxygen sample I took water from above the dam, and the kit indicated that there was about two parts per million oxygen present there. When I came up from the mill, there was a member of the Water Authority there taking a water sample from the bridge. Although he did not finish his test, only going as far as fixing the water sample, he asked me what sort of a test I got from above the dam and he indicated that it was about the same as one he had taken at the international border. He was also going to take water samples farther down the river and at the mouth.

For your information,

J. S. Hannah
Fishery Officer.

APPENDIX "I"

Reports from the front page of the

Los Angeles Times, July 11, 1968

and the

Stars and Stripes, July 11, 1968

estimated to yield $7 million during the balance of the fiscal year, it is a key item in the council's $53.6 million revenue program intended to balance the $446.8 million budget and hold the line on the property tax.

Already approved by the council is a 1% boost in the municipal sales tax, which will produce an estimated $44.1 million. Collections are scheduled to begin Aug. 1.

A third revenue item—a 10% increase in fees for city permits and services—is expected to be submitted to the council within a week. Its estimated yield is $2.5 million.

Would Wipe Out Deficit

Passage of all three measures would not only wipe out a $30.6 million deficit in the budget but permit the council to eliminate a built-in 19-cent tax increase and finance a massive sewer construction program from general funds.

To offset the tax hike, resulting from escalating fire and police pension costs, the council would have to appropriate $11.3 million.

The first year cost of the sewer program is estimated at a minimum $12 million.

Spokesmen for the alcoholic beverage, restaurant and hotel-motel industries bitterly opposed the 5% hike in a public hearing preceding the council action.

They challenged its legality, maintaining the state pre-empted the field, argued it would have an adverse effect on business and cautioned that it could precipitate crime and corruption.

Frank Vitale, chairman of the board of the Bohemian Distributing Co., argued that "local political control would bring on local prohibition," in which "the public would suffer."

Please Turn to Page 23, Col. 1

Murville, France's longtime foreign minister who became finance minister at the height of the student-labor crisis a little over a month ago, is expected to complete a new cabinet by the end of the week.

Not only will it be a completely "new look" for the Gaullist government, but the departure of Pompidou, almost totally unexpected after his adroit and skillful direction of the Gaullist June election victory, means a complete reshuffle of the French political scene.

There are two opposite theories to explain the impending move. The first is that Pompidou is being dropped after six years in office

political direction as premier in order to prepare from the sidelines to run for the presidency to succeed De Gaulle, with assurances that the general will step down in the near future, probably in the first few months of 1969.

According to this theory, Couve de Murville will thus take charge of the unpopular and difficult measures to control the economy and institute necessary reforms in the months ahead, while Pompidou devotes himself to grass-roots politics and the improvement of the Gaullist political machine. For this task, he may well take over the presidency

Please Turn to Page 8, Col. 1

Canadians Knew Something in U.S. Was Fouled Up, Dam It

CENTREVILLE, N.B. (AP)—Appalled by the stench of rotting fish in a polluted river from Maine, Canadian villagers threw up a dam Tuesday to block the flow near the international boundary.

Centreville activists used five bulldozers to push earth and stone across the 60-foot-wide Prestile, a tributary of the St. John River. The water will form a small lake in Maine.

Two Royal Canadian Mounted Police stood watch "in case of trouble," but there was no interference.

The flurry recalled the Aroostook War of 1839, a bloodless row between Americans and Canadians about boundary lines that eventually led to the Webster-Ashburton treaty of 1842, which drew the U.S.-Canadian border in this area.

Centreville, a New Brunswick lumbering and potato-growing center, is on the river about three miles east of the border.

"The water is so bad we couldn't even use it for fire fighting," said Robert Caines, a Centreville spokesman. "It would foul our pumps."

Caines said the river, once a thriving trout stream, had become "nothing more than a sewer" since industrial plants opened operations near it in Maine.

Robert H. Smith, an engineer for the Maine Water and Air Environmental Improvement Commission, said in Augusta that most of the pollution comes from the combined outflow of the Valhising, Inc., potato processing factory and Maine Sugar Industries, Inc., at Easton.

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MIDEAST ORDERS WENT TO PHILIPPINES

Series of Errors Brought U.S. Ship Tragedy

SURRENDERED—San Francisco Police Chief Tom Cahill and Mayor Joseph Alioto look over firearms turned in by their owners with no questions asked. The effort, launched after the death of Robert F. Kennedy, has brought in 1,072 weapons. —Associated Press Photo

20 Yards From Maine Border

Angry Canadians Dam Polluted River

CENTREVILLE, N.B. (AP) Appalled by the stench of rotting fish in a polluted river from Maine, Canadian villagers threw up a dam Tuesday to block the flow near the international boundary.

Five bulldozers called in by Centreville activists mounded earth and stone across the 60-foot-wide stream, a tributary of the St. John River that is known in Maine as the Prestile and in Canada as the Presque Isle.

Two Royal Canadian Mounted Police stood watch "in case of trouble," but there was no interference—official or otherwise—in this impromptu creation of a sanitary cordon within 20 yards of American soil. The resultant lake should back up into Maine.

The flurry recalled the Aroostook War of 1839, a bloodless row between Americans and Canadians about boundary lines that eventually led to the Webster-Ashburton treaty of 1842, which drew the U.S.-Canadian border in this area.

The river rises south of Fort Fairfield, Maine, and runs southeast to the St. John at Florenceville, N.B.

Centerville, a lumbering and potato-growing center, is on the river about three miles east of the border.

"The water is so bad we couldn't even use it for fire fighting," said Robert Caines, a Centerville spokesman. "It would foul our pumps."

Caines said the river, once a thriving trout stream, had become "nothing more than a sewer" since industrial plants opened operations near it in Maine.

"And we're getting as much support for our protest from across the border as we are on this side," he said.

The situation has been under study in Augusta, Maine's capital.

Robert H. Smith, an engineer for the State Water and Air Environmental Improvement Commission, said Monday most of the pollution comes from the combined outflow of the Vahlsing, Inc., potato processing factory and Maine Sugar Industries, Inc., at Easton.

But Vahlsing stopped dumping waste into the river Monday, Gov. Kenneth M. Curtis said Tuesday.

Vahlsing's waste has been diverted into a lagoon which may take up to 60 days to fill, said an inspector for the Maine Air and Water Improvement Commission.

Fred C. Vahlsing Jr., Vahlsing's president, said his firm moved three weeks ago to anticipate problems from low water in the stream.

Smith said he received a report that fumes from decomposition of organic matter in the water at Mars Hill, northwest of Centreville, was causing paint on houses to turn black and peel.

About the only chance of relief by state law, he said, would be to have the condition declared a public nuisance and let a court decide what might be done about it.

Gail Seeks Record

BEACH, Florida
ly in a beach-
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ce, Bill ; who
d of 63

days underground earlier this year.

Miss Miller's coffin, six feet long and 2½ feet wide and high, is padded with foam rubber and equipped with a radio, telephone, air-conditioner, magazines, and a light.

A narrow chute extending five feet above ground connects her with the outside world and permits promoters to lower food to her.

"It's kind of boring and kind of crowded," she said. "But I'm going to try real hard for 65 days."

Miss Miller explained that a woman in Charleston, W.Va., is challenging White's record of 63 days. She said the woman, Patricia Havelamb, has been underground 51 days.

"If she breaks Bill's record, I want to go one over and break her record."

APPENDIX "J"

Riparian Landowners

on the

Presquile River in New Brunswick

APPENDIX "J"

PRESQUILE RIVER - RIPARIAN OWNERS

RIGHT SIDE OF RIVER FROM U.S.A. - CANADA BOUNDARY

	LAND OWNER	RIPARIAN RIGHT FRONTAGE (feet)
1.	David Watson	3730 feet
2.	Gerald Trafford	1875 feet
3.	Vernon McDougall	2750 feet
4.	Howard Page	4135 feet
5.	Gerald Trafford	1455 feet
6.	Gladys Shaw	200 feet
7.	Gerald Trafford	2070 feet
8.	Gladys Shaw	1745 feet
9.	George Walton	3860 feet
10.	Edward Fanjoy	1525 feet
11.	Perry Crain	240 feet
12.	Deborah Ogden	192 feet
13.	Edward Fanjoy	960 feet
14.	Laura Prentice	40 feet
15.	Richard Steeves	480 feet
16.	Charles Gammack	665 feet
17.	Ada Gillen	950 feet
18.	Harding Smith	3585 feet
19.	Earl McCarthy	2910 feet
20.	Howard Stuart Estate	3150 feet
21.	Leota Banks	3110 feet
22.	Mary White Estate	4680 feet
23.	Sandra Upton	160 feet
24.	Harry Hatfield	3520 feet
25.	H. J. Crabbe & Sons Ltd.	550 feet
26.	Hazel Stickney	1725 feet
27.	James Miller	4960 feet
28.	Phillip Graves	70 feet
29.	James Miller	130 feet
30.	Norman Miller	655 feet

TOTAL FOOTAGE: 56,062 feet

or 10.62 Miles

PRESQUILE RIVER - RIPARIAN OWNERS

LEFT SIDE OF RIVER FROM U.S.A. - CANADA BOUNDARY

	LAND OWNER	RIPARIAN RIGHT FRONTAGE (feet)
1.	Arnold Morse	775 feet
2.	Lawrence Price	1580 feet
3.	Adeline Clark	655 feet
4.	Kenneth McDonald	340 feet

5.	Adeline Clark	530 feet
6.	Evans McDonald	1745 feet
7.	Robert McIsaac	7555 feet
8.	Thomas Trafford	273 feet
9.	Ira Hamilton	300 feet
10.	Charles Miles	43 feet
11.	Nelson McKiel	650 feet
12.	Carleton Women's Institute	300 feet
13.	Lucy Tracey	395 feet
14.	Stanley Burtt	450 feet
15.	Donald Weston	860 feet
16.	Glenn Lunn	550 feet
17.	George Walton	1830 feet
18.	G. Green & Sons Ltd.	1585 feet
19.	Francis Green	115 feet
20.	G. Green & Sons Ltd.	100 feet
21.	Vida Green	150 feet
22.	Walter Green	150 feet
23.	G. Green & Sons Ltd.	100 feet
24.	Harry Taylor	725 feet
25.	Allison Wendell Grey	50 feet
26.	Frederick Thomas	490 feet
27.	Kenneth Wortman	130 feet
28.	Gary Green	120 feet
29.	James Lee	120 feet
30.	Francis Doherty	120 feet
31.	Wendell Gray	170 feet
32.	Emery Thomas	540 feet
33.	Wendall Gray	1000 feet
34.	Wilmot Reid	325 feet
35.	John Reid	1260 feet
36.	Gerald Lee	1845 feet
37.	Beatrice Boyd	2065 feet
38.	Louis Webb	1080 feet
39.	Clifton Fisher	1415 feet
40.	McCain Produce Co. Ltd.	1690 feet
41.	Mary White	2480 feet
42.	Sandra Upton	3535 feet
43.	Harry Hatfield	1485 feet
44.	A.D. McCain Estate	300 feet
45.	Yvon Branscombe	535 feet
46.	McCain Produce Co. Ltd.	2270 feet
47.	Harry Hatfield	1980 feet
48.	McCain Produce Co. Ltd.	525 feet
49.	A.D. McCain Estate	1775 feet
50.	Hazel Stickney	7000 feet

TOTAL FOOTAGE: 56,061 feet

or 10.62 miles

RIPARIAN LANDHOLDINGS
PRESQUILE RIVER

Drafted by: JH   Checked by: LVB   Figure 3