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MANUSCRIPT REPORT

NO. KR. 71-7

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WATER QUALITY STUDY OF THE INTERNATIONAL
SECTION OF THE ST. LAWRENCE RIVER, CONDUCTED
FOR THE ADVISORY BOARD ON WATER POLLUTION,
INTERNATIONAL JOINT COMMISSION, 1970

by

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DEPARTMENT OF FISHERIES AND FORESTRY

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SUMMARY

The International Section of the St. Lawrence River can be divided into two distinct areas for water quality studies: from Kingston to Brockville and from Brockville to Cornwall. The median values of ammonia nitrogen, nitrite nitrogen, nitrate nitrogen, orthophosphate phosphorus and non-volatile organic carbon for the Brockville to Cornwall area were double the median values recorded from the Kingston to Brockville area. Other chemical parameters of interest also increased considerably commencing at Brockville.

Total Kjeldahl Nitrogen levels increased 0.173 mg/l in 1970 when compared to 1968 median values. This increase indicates that a large quantity of organic nitrogen or ammonia was released into the river. As the flow in the St. Lawrence River is extremely large, (averaging about 232,000 c.f.s.) a 0.173 mg/l concentration increase would result in an additional discharge of approximately 110 tons per day (40,000 tons per year) of organic nitrogen or ammonia over the year 1968.

Orthophosphate phosphorus median values for all ranges increased significantly from 1969 to 1970, while the total phosphorus values remained relatively unchanged.

No evidence of cross-boundary pollution was observed during the 1970 study. However, comparison of ammonia, nitrite and nitrate median values at the offshore stations on both the Canadian and United States sides of the boundary

indicated that the Canadian side is more polluted than the United States side in the areas downstream from Brockville to Upper Canada Village (Figs. 5, 7 and 9).

In general, little change was observed on the majority of physical parameters in the main river when compared to previous years. However, stations located at the mouth of tributary streams recorded low secchi, high colour and low specific conductance. In the beginning of September, there was no evidence of stratification in the upper end of the St. Lawrence River.

INTRODUCTION

A water quality study of the International Section of the St. Lawrence River was conducted by the Public Health Engineering Division of the Department of Fisheries and Forestry during the period, April 20 to September 10, 1970.

The 1970 survey was a continuation of a series of studies started in 1965. Three complete cruises were carried out during the summer of 1970. In addition six pesticide cruises and four physical observation cruises were also carried out in the St. Lawrence River by Public Health Engineering Division personnel.

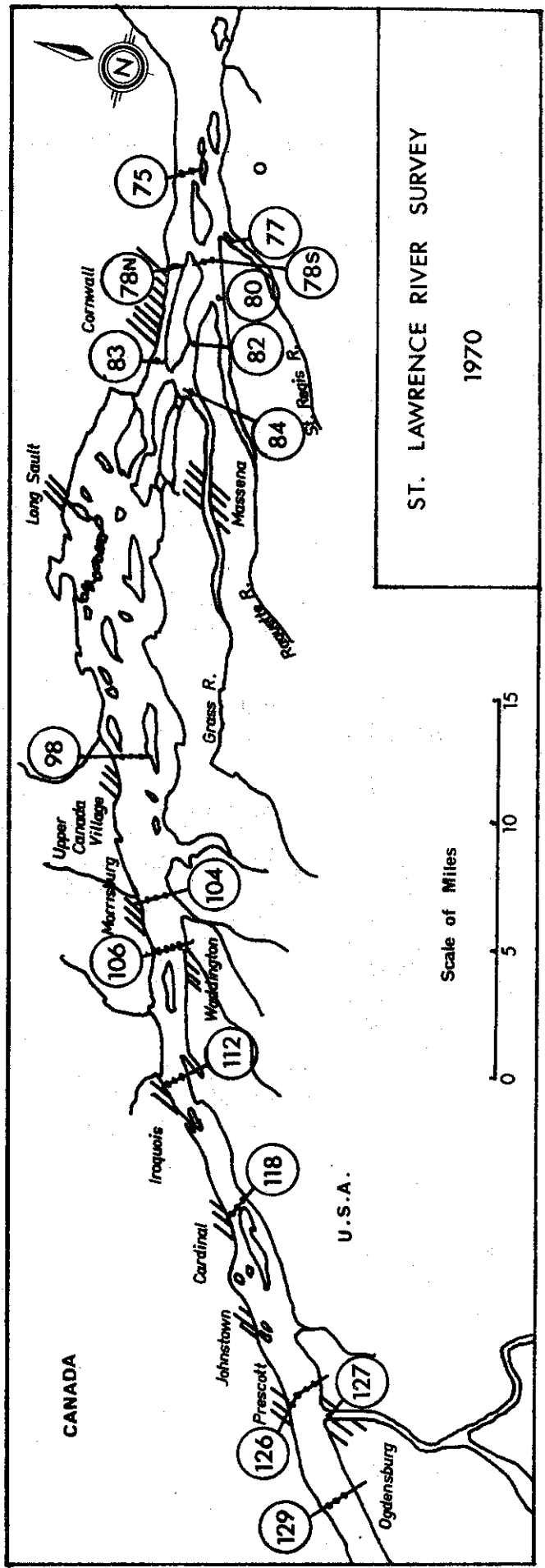
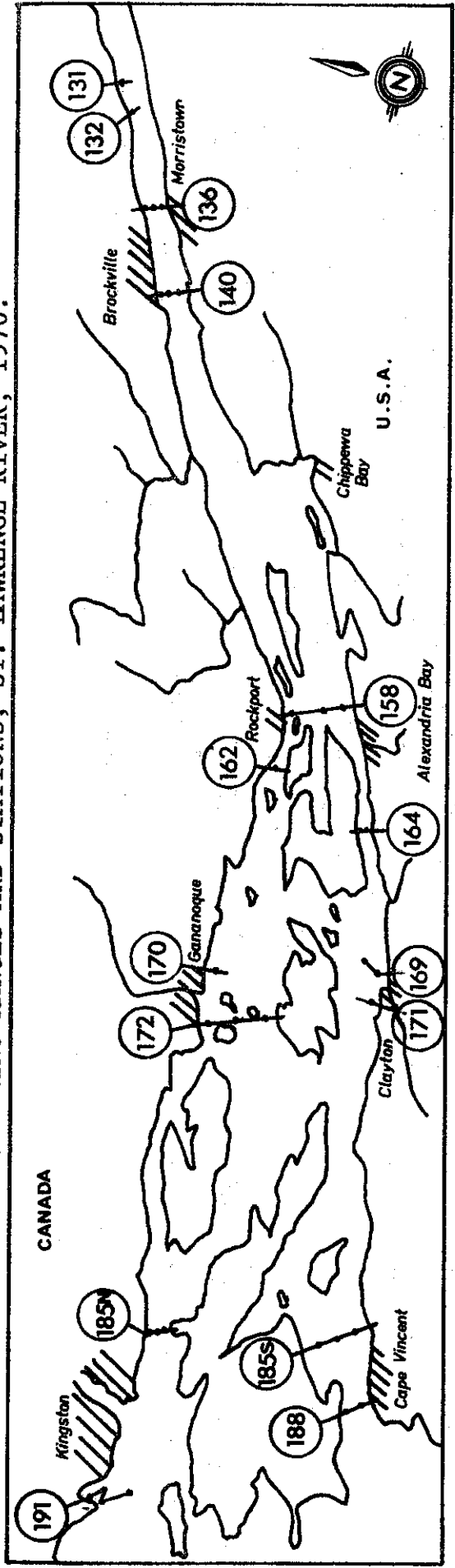
The sampling stations in 1970 were the same as the 1969 monitor stations. There were 31 ranges and 69 stations. The location of the sampling ranges and stations are shown in Figure 1 and Table I(a, b and c).

BACTERIOLOGICAL STUDIES

A summary of the Bacteriological data obtained from samples collected during the 1970 survey on the St. Lawrence River is included in the Appendix Tables VI, VII and VIII.

In the April 21 to 29, 1970 study the bacterial density patterns observed were similar to the April 29 to May 7, 1969 study, with the following exceptions, where coliform densities were much lower than those observed during the 1969 study: 78(N)A: 80S; 84S; 112A: 136A. During this study Salmonella were isolated from samples collected from stations 136A and 78(N)A.

FIGURE 1. LOCATION OF SAMPLING RANGES AND STATIONS, ST. LAWRENCE RIVER, 1970.



ST. LAWRENCE RIVER SURVEY
1970

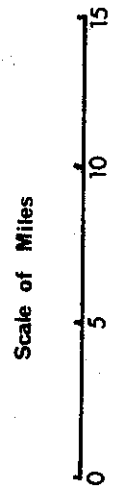


TABLE I (a). ST. LAWRENCE RIVER SAMPLING RANGES AND STATIONS, 1970.

Range & Station	Latitude	Longitude	Description		
			Canadian Side	U.S. Side	
191(N) A	44°12'53"	76°32'46"	Above Kingston in Cataragui Bay Opposite Samson Pt. & Carruthers Pt.		
B	44°12'43"	76°31'48"			
C	44°12'30"	76°32'36"			
D	44°12'10"	76°31'56"			
188(S) A	44°07'40"	76°21'58"	Above Alexandria Pt.	Above Cape Vincent	
B	44°07'19"	76°21'40"			
185(N) A	44°14'24"	76°24'57"	Below Kingston to Abraham Head		
B	44°14'07"	76°24'39"			
C	44°13'54"	76°24'26"			
185(S) A	44°09'22"	76°19'54"	East of Button Bay	Below Cape Vincent	
B	44°09'04"	76°19'25"			
C	44°08'45"	76°18'57"			
172(N) A	44°19'03"	76°10'30"	Above Gananoque. South to McRay Pt., Grindstone Island		
B	44°18'06"	76°09'39"			
C	44°17'19"	76°08'54"			
171(S) A	44°14'31"	76°06'36"		Opposite Bartlett Pt., Above Clayton Harbor	
170(N) A	44°19'28"	76°08'41"	Below Gananoque. Midpoint Mainland and Corn Island		
169(S) A	44°15'15"	76°04'35"		Below Clayton	
B	44°14'51"	76°04'57"			
164(S) A	44°18'10"	75°58'56"		Thousand Is. Bridge	
B	44°18'08"	75°58'53"			
162(N) A	44°21'44"	75°58'57"	Thousand Is. Bridge		
158 A	44°22'33"	75°55'40"	Rockport	Iroquois Pt. Below Alexan- dria Bay	
B	44°21'27"	75°54'28"			
C	44°21'11"	75°54'11"			

TABLE I (b). ST. LAWRENCE RIVER SAMPLING RANGES AND STATIONS, 1970.

Range & Station	Latitude	Longitude	Description	
			Canadian Side	U.S. Side
140	A 44°34'00"	75°42'50"	Above Brockville	West of Jacques Cartier Park
	B 44°33'54"	75°42'36"		
	C 44°33'40"	75°41'54"		
136	A 44°36'04"	75°39'36"	Below Brockville	Below Morris-town
	B 44°35'52"	75°39'20"		
	C 44°35'41"	75°39'05"		
132	A 44°38'57"	75°35'31"	Below Brockville Chemicals Sewer Outfall, Maitland	
131	A 44°39'39"	75°34'23"	Below Dupont Sewer Outfall Maitland	
129	A 44°40'39"	75°33'08"	Above Prescott	Nevins Point
	B 44°40'22"	75°32'46"	Little Church	
	C 44°40'14"	75°32'28"	Bay	
127	A 44°41'46"	75°29'56"		Oswegatchie River Mouth Ogdensburg
126	A 44°42'50"	75°30'03"	Below Prescott	Below Ogdensburg
	B 44°42'58"	75°28'59"		
	C 44°42'51"	75°28'28"		
	D 44°42'44"	75°28'00"		
118	A 44°47'12"	75°22'21"	Eastern Section	Channel N/E Tip Galop
	B 44°47'13"	75°22'01"	Cardinal	
	C 44°47'14"	75°21'34"		
112	A 44°51'04"	75°17'29"	Below Iroquois	Above White-house Creek
	B 44°50'52"	75°17'17"		
	C 44°50'39"	75°17'05"		
106	A 44°53'11"	75°11'34"	Above Morrisburg	Clark Pt. Below Waddington
	B 44°53'02"	75°11'33"		
	C 44°52'40"	75°11'28"		
	D 44°52'32"	75°11'27"		

TABLE I (c). ST. LAWRENCE RIVER SAMPLING RANGES AND STATIONS, 1970.

Range & Station	Latitude	Longitude	Description	
			Canadian Side	U.S. Side
104	A 44°54'00"	75°09'36"	Below Morrisburg (Nash Creek)	East of Murphy Islands
	B 44°53'45"	75°09'23"		
	C 44°53'29"	75°09'07"		
98	A 44°56'32"	75°03'38"	Whitney Pt. (Upper Canada Village)	Wilson Hill Island
	B 44°56'12"	75°03'21"		
	C 44°56'03"	75°03'12"		
84(S)	A 44°59'09"	74°46'18"		Mouth of Grass River
83(N)	A 45°00'25"	74°45'28"	N/W Tip Cornwall Island	
82(S)	A 44°59'23"	74°44'21"		At Seaway International Bridge
80(S)	A 44°59'23"	74°41'23"		Mouth of Raquette River
78(N)	A 45°01'17"	74°41'06"	S/E Cornwall to Cornwall Island	
	B 45°01'09"	74°41'00"		
78(S)	A 45°00'07"	74°40'10"	S/E Side Cornwall Island	Below Raquette River
	B 44°59'57"	74°40'03"		
77	A 45°00'04"	74°38'22"	Mouth of St. Regis River	Mouth of St. Regis River
	B 44°59'52"	74°38'36"		
75	A 45°02'12"	74°36'29"	Glengarry Pt. to Eastern Tip St. Regis Island	
	B 45°01'48"	74°36'16"		

In the July 6 to July 16, 1970 study no major significant differences were found between the 1970 and 1969 study of the same period. There was a slight increase in the counts from the Brockville to the Cornwall area. However any increase was within the 1969 maximum counts with the exception of samples collected from 75A.

During this study Salmonella were isolated from samples collected from stations 136A and 127A. S. Paratyphi B was isolated from a filtered sample collected from station 136A on July 13th and on July 14th S. enteritidis was isolated from a filtered sample collected from station 127A. On August 11th a filtered sample collected from 127A yielded S. manhattan and on August 12th a filtered sample collected from 104A yielded S. thompson.

In the August 31 to September 10, 1970 study the Bacteriological data were compatible with data obtained during October, 1969. Bacteriological densities obtained from a water sample collected at station 75A were slightly higher than those obtained during 1969.

No Salmonella were isolated from the field filtered samples during this study.

The bacteriological data from the three, 1970 St. Lawrence River studies are comparable with that obtained during the 1968, 1969 studies, with the exception of Range 75. Bacterial densities obtained from samples collected from this range indicate a slight increase over those obtained during

the 1969 survey.

CHEMICAL STUDIES

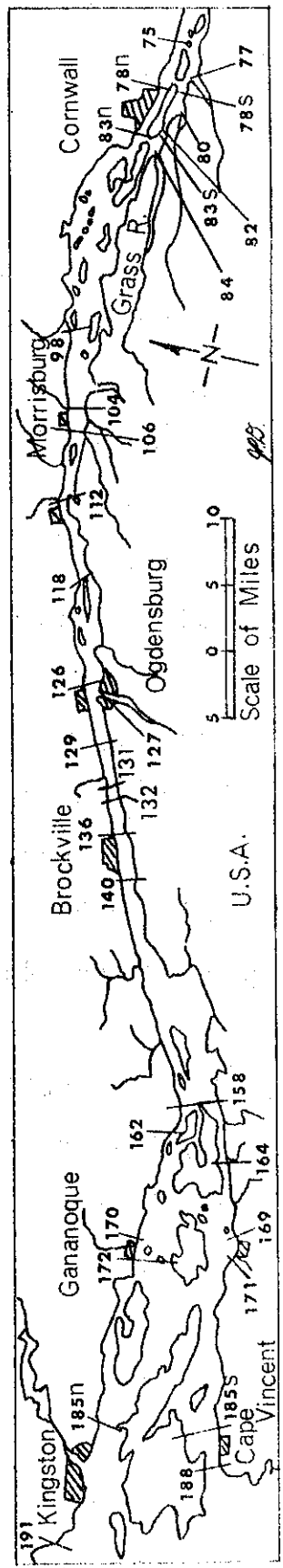
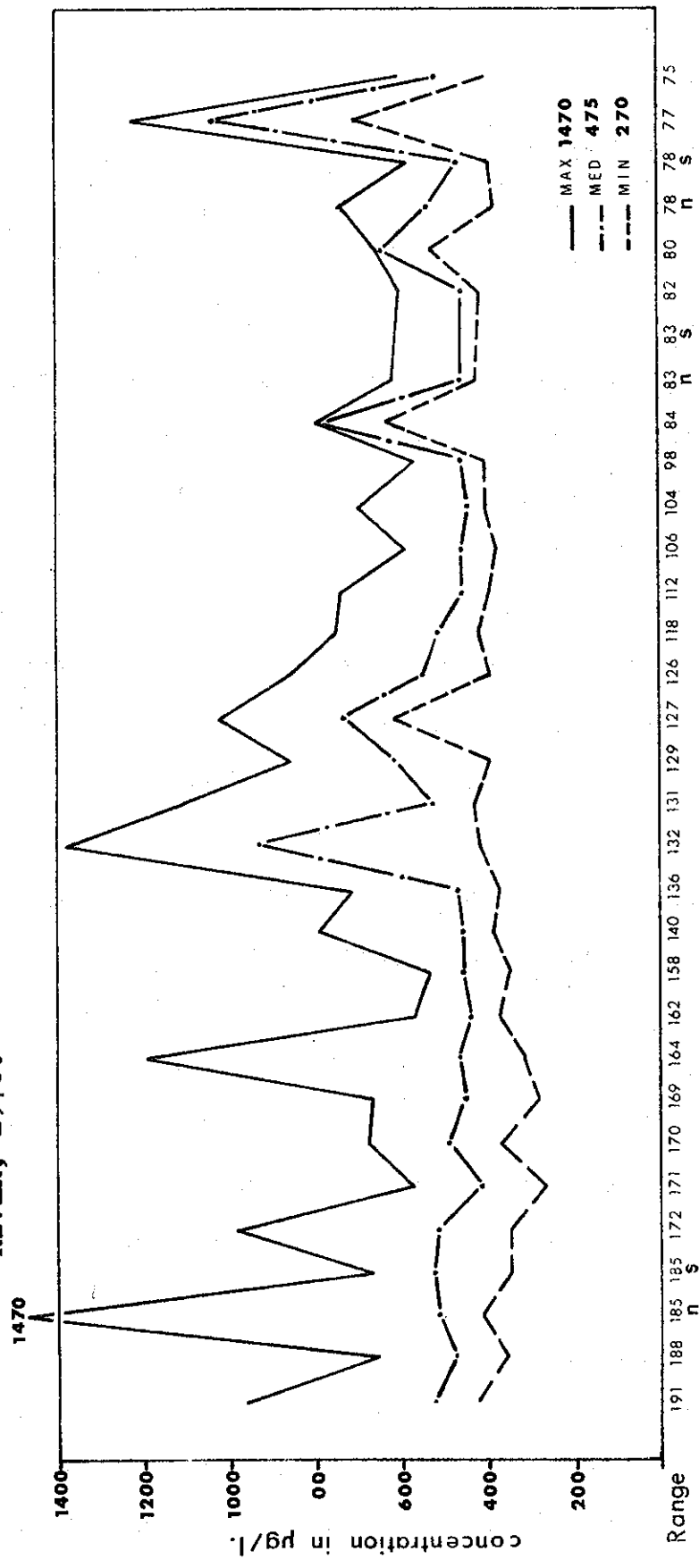
Chemical data obtained during the 1970 survey of the International Section of the St. Lawrence River are summarized in Table I(a-e) of the Appendix. Table II of the Appendix summarizes and compares total kjeldahl nitrogen, ammonia nitrogen, nitrite nitrogen, nitrate nitrogen, orthophosphate phosphorus and total phosphorus median values found during the 1967, 1968, 1969 and 1970 surveys. Comparison of nitrogen, phosphorus and non-volatile organic carbon median values at the Canadian and United States offshore stations are shown in Table IV of the Appendix.

Total Kjeldahl Nitrogen

Total kjeldahl nitrogen measures the organic nitrogen and ammonia nitrogen present in the water. Table I of the Appendix and Figure 2 summarize the maximum, minimum and median values of the total kjeldahl nitrogen (T.K.N.) in the St. Lawrence River, 1969. Comparison was made on the median values of 1967, 1968, 1969 and 1970 for all ranges which are shown in Table II of the Appendix.

The concentrations of T.K.N. in the St. Lawrence River ranged from .270 mg/l to 1.470 mg/l with a median value of .475 mg/l. Ten results were greater than 1.000 mg/l which were detected in the samples collected at the ranges 185N, 164S, 132, 131, 127S and 77S. Concentrations for the season were high in July, moderate in September and low in

FIGURE 2. MAXIMUM, MINIMUM AND MEDIAN TOTAL KJELDAHL NITROGEN VALUES, ST. LAWRENCE RIVER, 1970.



April. T.K.N. concentration showed no significant variations between offshore stations and mid-channel stations (Table III of the Appendix) except stations 129A and 126A. With these exceptions, the level of T.K.N. for the north stations was much higher than the south stations at the ranges 129 and 126, Figure 3 (Table IV of the Appendix).

The highest T.K.N. was recorded at range 185N, station A, (below the Kingston Pollution Control Unit) with a concentration of 1.470 mg/l. This value was much lower than the highest value for 1969 (8.300 mg/l) which was found at range 132, station A (near the outfall of Brockville Chemical Plant). T.K.N. concentrations increased considerably at range 77S in 1970 survey. As a result, range 77S recorded the highest median values and had increased nearly one fold compared to the 1967, 1968 and 1969 median values.

The median values in 1967, 1968, 1969 and 1970 were 0.300, 0.302, 0.400 and 0.475 mg/l respectively (Table II of the Appendix). It seemed that T.K.N. concentration increased considerably in 1969 and 1970.

Ammonia Nitrogen

The ammonia concentration ranged from 0.005 to 1.160 mg/l with a median value of 0.025 mg/l (Figure 4). Range 132 recorded the highest value of 1.160 mg/l. Ammonia concentrations were higher at stations 132A, 131A, 129A, 118A and 84A than other stations. From Brockville to Upper

FIGURE 3. COMPARISON OF TOTAL KJELDAHL NITROGEN MEDIAN VALUES OF CANADIAN (NORTH) AND U.S. SIDE (SOUTH) STATIONS FROM SELECTED RANGES, ST. LAWRENCE RIVER, 1970.

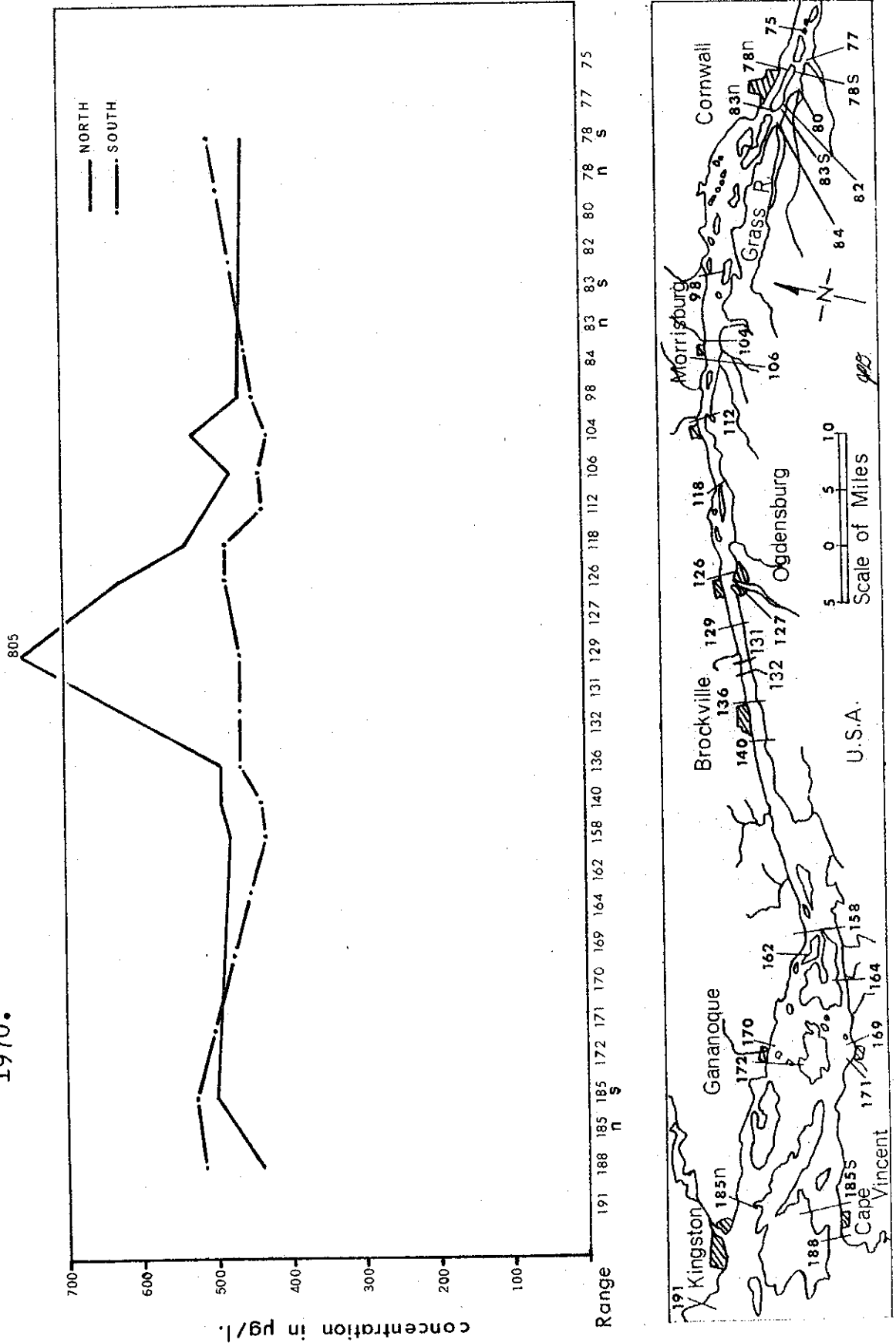
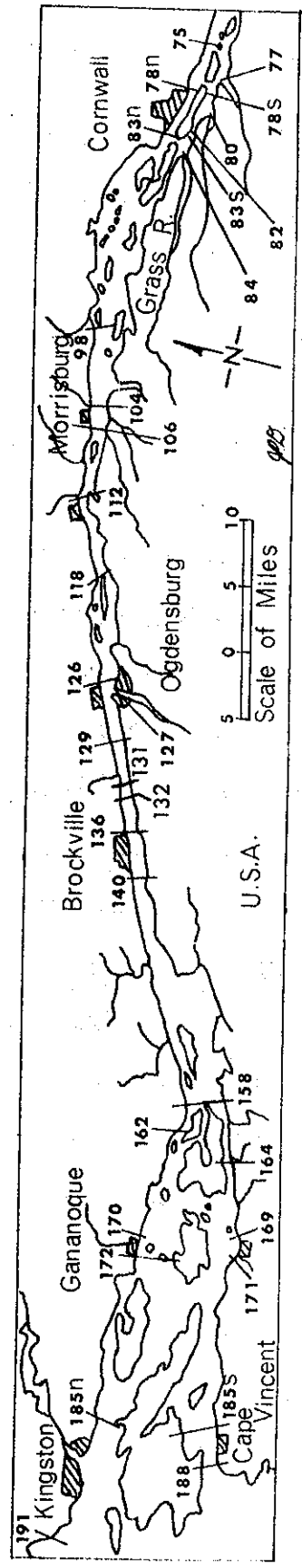
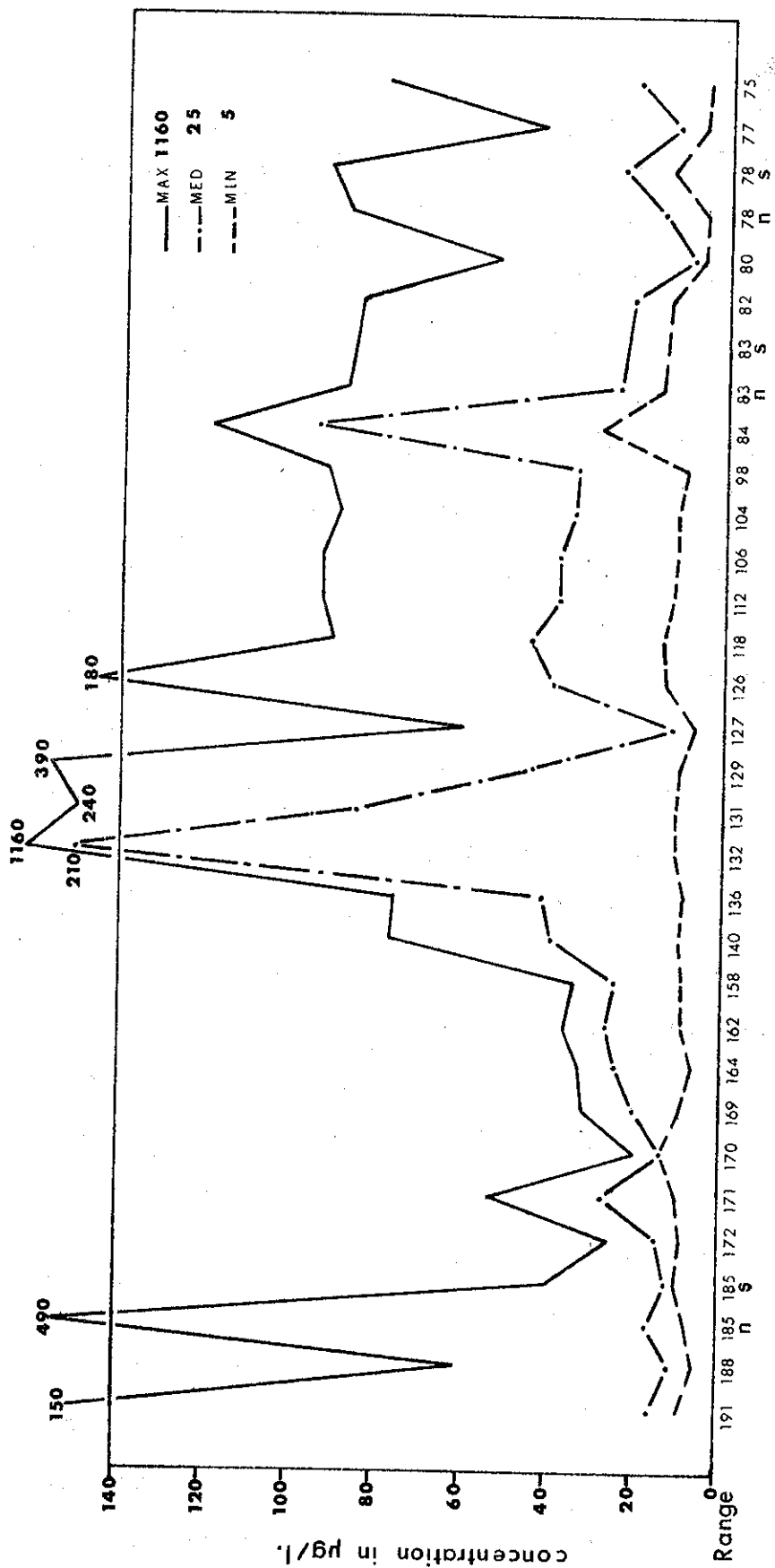


FIGURE 4. MAXIMUM, MINIMUM AND MEDIAN AMMONIA NITROGEN VALUES, ST. LAWRENCE RIVER, 1970.



Canada Village, most of the ammonia results were greater than the overall median value (0.025 mg/l) except range 127. The median value was 0.018 mg/l between Kingston and Brockville while from Brockville to Cornwall, the concentration increased to 0.035 mg/l.

Range 132 was not a typical station for the ammonia concentration in the water. Ammonia nitrogen was on an average only 5 per cent of T.K.N. More than 95 per cent of the data showed that ammonia was approximately 2 to 10 per cent of T.K.N. At range 132, data showed that ammonia was as high as 84 per cent of T.K.N. This would indicate that range 132 was subjected to a concentrated ammonia discharge.

There was no evidence that ammonia concentration had increased in 1970 compared to 1969 data (Table III of the Appendix).

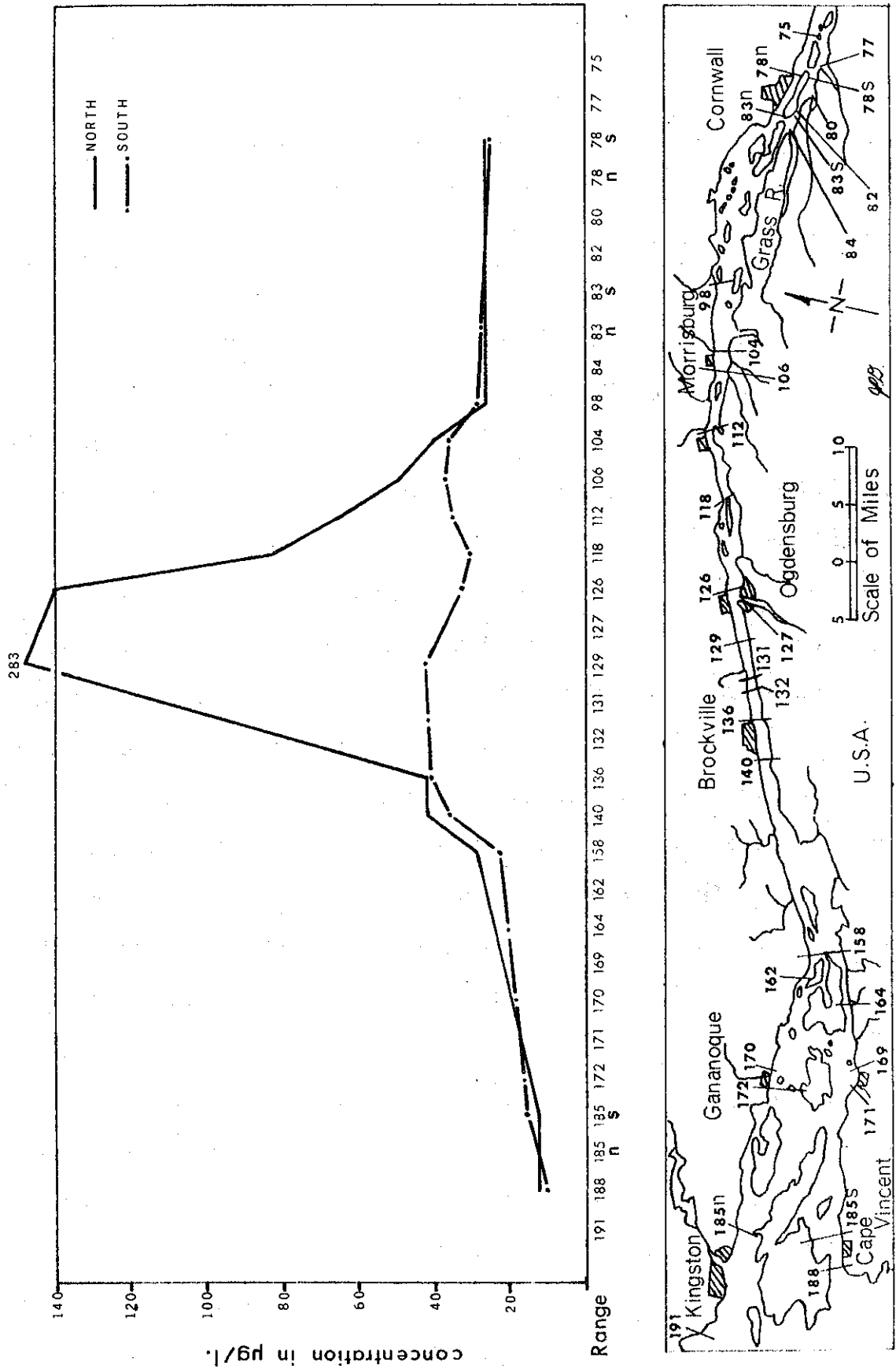
On samples from the same location, there was in many cases a distinct correlation between ammonia nitrogen and nitrate nitrogen. When ammonia increased or decreased with depth nitrate invariably followed the same pattern.

The comparison of median ammonia values of northern and southern stations from selected ranges indicated that the Canadian side was more polluted than the United States side in the area from below Brockville to Upper Canada Village (Figure 5).

Nitrite Nitrogen

The increase in nitrite is caused by biological

FIGURE 5. COMPARISON OF AMMONIA NITROGEN MEDIAN VALUES OF CANADIAN AND U.S. SIDE STATIONS FROM SELECTED RANGES, ST. LAWRENCE RIVER, 1970.



action on the organic nitrogen and ammonia. Nitrite is usually present in low concentration in the water. The increase of nitrite will indicate that pollutants have been recently discharged into the river.

The concentration of nitrite found in the St. Lawrence River ranged from 0.001 to 0.132 mg/l with a median value of 4 (Table I of the Appendix and Figure 6). The median nitrite value was 3 ug/l from Kingston to Brockville and it was double below Brockville to Cornwall. The highest station median value was found at station 129A, Figure 7, (Table III of the Appendix), with a value of 0.047 mg/l. Station 129A was located west of Prescott approximately two miles downstream from the Dupont Plant.

Results from station 129A invariably gave the highest station median value since the survey started in the St. Lawrence River in 1965. The station median values in 1967, 1968, 1969 and 1970 were 0.013, 0.022, 0.066 and 0.047 mg/l respectively. It reached a peak in 1969 and declined in 1970.

The 1970 nitrite data followed the same pattern as 1969. It seemed that the high nitrite concentrations began at range 129, station A, stayed along the north side for more than 20 miles, were diluted with the main flow at ranges 106 and 104, and appeared well-mixed at range 98 (Table II of the Appendix). The comparison of nitrite median values from selected ranges indicated that the concentration was higher

FIGURE 6. MAXIMUM, MINIMUM AND MEDIAN NITRITE NITROGEN VALUES, ST. LAWRENCE RIVER, 1970.

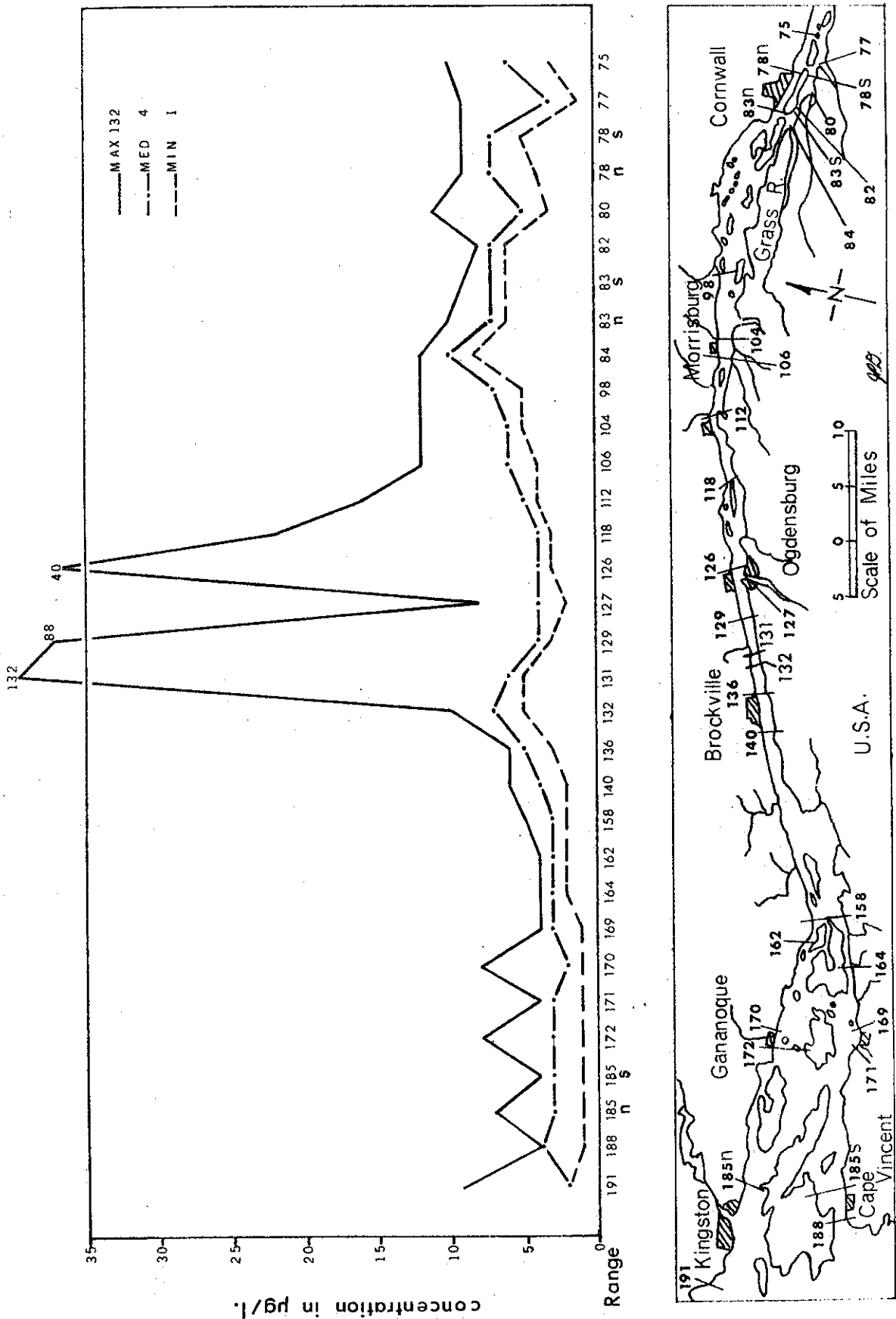
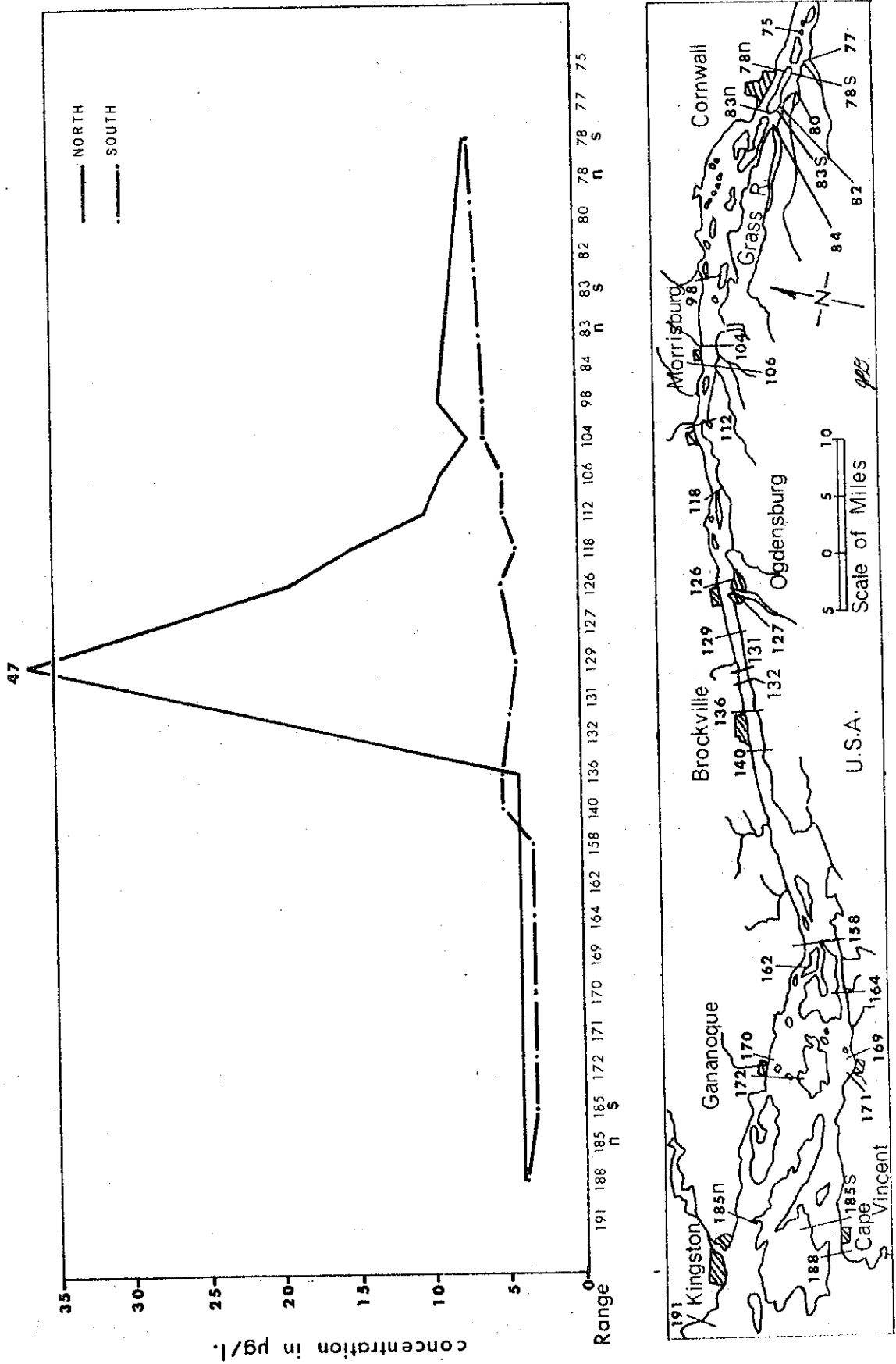


FIGURE 7. COMPARISON OF NITRITE NITROGEN MEDIAN VALUES OF CANADIAN AND U.S. SIDE STATIONS FROM SELECTED RANGES, ST. LAWRENCE RIVER, 1970.



along the Canadian side of the river than along the United States side (Figure 7).

Nitrate Nitrogen

The range of nitrate concentration found in the St. Lawrence River was 0.002-0.480 mg/l with a median of 0.045 mg/l (Figure 8). The highest value was obtained in a sample collected from range 132 (near the waste outlet of the Brockville Chemical Plant).

The nitrate pattern was similar to those of ammonia, nitrite and orthophosphate in the St. Lawrence River. The river can be divided into two distinct areas: (1) Kingston to Brockville and (2) below Brockville to Cornwall. The median values of nitrate from Kingston to Brockville was 0.019 mg/l and below Brockville to Cornwall was 0.054 mg/l. Comparable high nitrate values were obtained at the mouth of tributary stations such as stations 127A, 84A, 80A and 77S(A).

The nitrate concentrations obtained from the selected ranges of the northern and southern stations indicated that results from Canadian offshore stations were higher than the United States offshore stations from below Brockville to Morrisburg (Figure 9).

Orthophosphate Phosphorus

The median value for orthophosphate found in the St. Lawrence River was 0.008 mg/l with a maximum value of 0.100 mg/l. The highest result was obtained at station 185N(A) (below the Kingston Pollution Control Unit) indicating

FIGURE 8. MAXIMUM, MINIMUM AND MEDIAN NITRATE NITROGEN VALUES, ST. LAWRENCE RIVER, 1970.

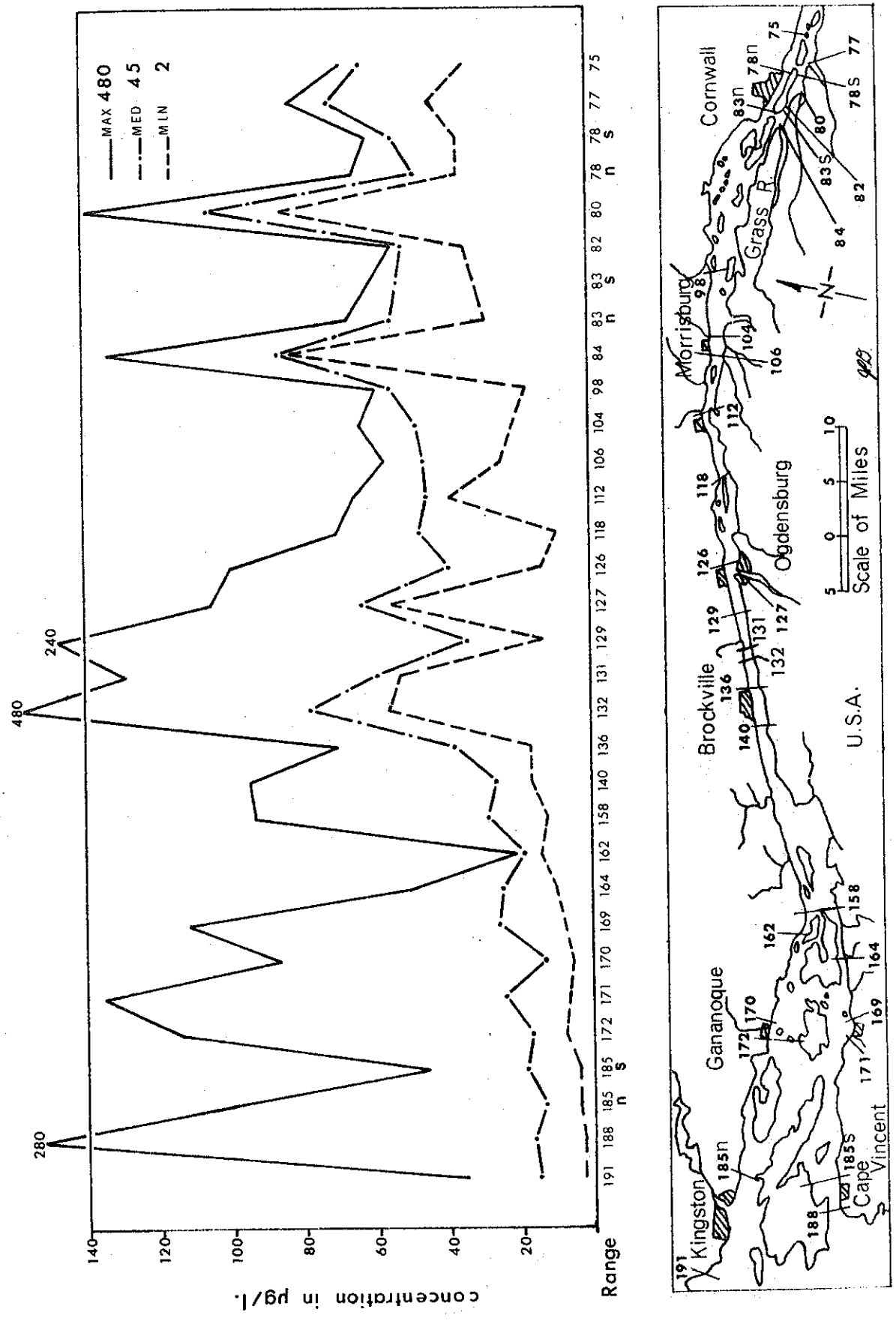
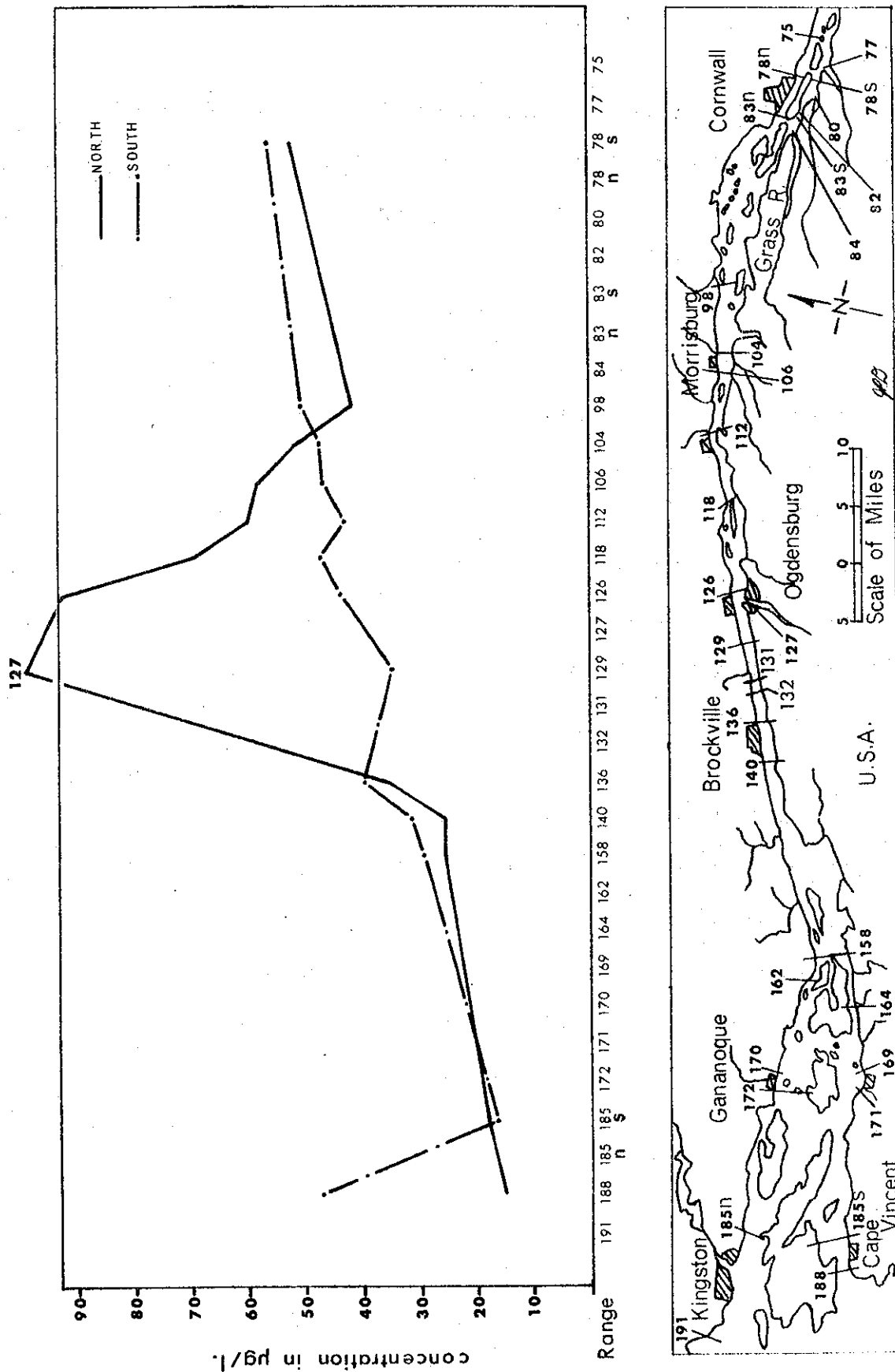


FIGURE 9. COMPARISON OF NITRATE NITROGEN MEDIAN VALUES OF CANADIAN AND U.S. SIDE STATIONS FROM SELECTED RANGES, ST. LAWRENCE RIVER, 1970.



a pollution source from domestic waste. High orthophosphate concentrations were also observed at Cornwall area and at the mouth of the Grass River (Figure 10). As the sources of phosphorus were mainly from municipal waste and agricultural runoff, high values of orthophosphate were recorded below populated areas rather than industrial waste outlet areas.

In the 1970 survey, orthophosphate concentrations increased considerably when compared to the data of the previous year, (Table IV of the Appendix). There was no evidence that northern stations contained higher orthophosphate concentrations than southern stations (Figure 11). Concentrations for the season were low in spring, moderate in fall and high in summer.

Total Phosphorus

The total phosphorus ranged from 0.006-0.110 mg/l with a median of 0.025 mg/l (Figure 12). No significant increase was observed in the 1970 results when compared to the previous years data.

In general, the median values for all ranges were quite consistent except the tributary stations such as 127A, 84A and 77S(A) (Figure 13). The seasonal variation was not clearly defined.

Phenol

In 1970, the sampling stations for phenol study were the same as 1969. Ten stations were selected in the St. Lawrence River. Table II summarizes the phenol data

FIGURE 10. MAXIMUM, MINIMUM AND MEDIAN ORTHOPHOSPHATE PHOSPHORUS VALUES, ST. LAWRENCE RIVER, 1970.

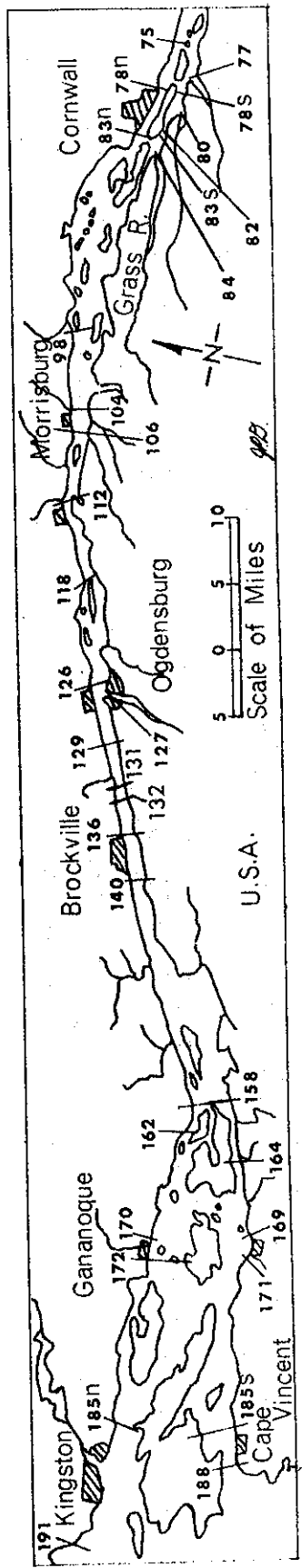
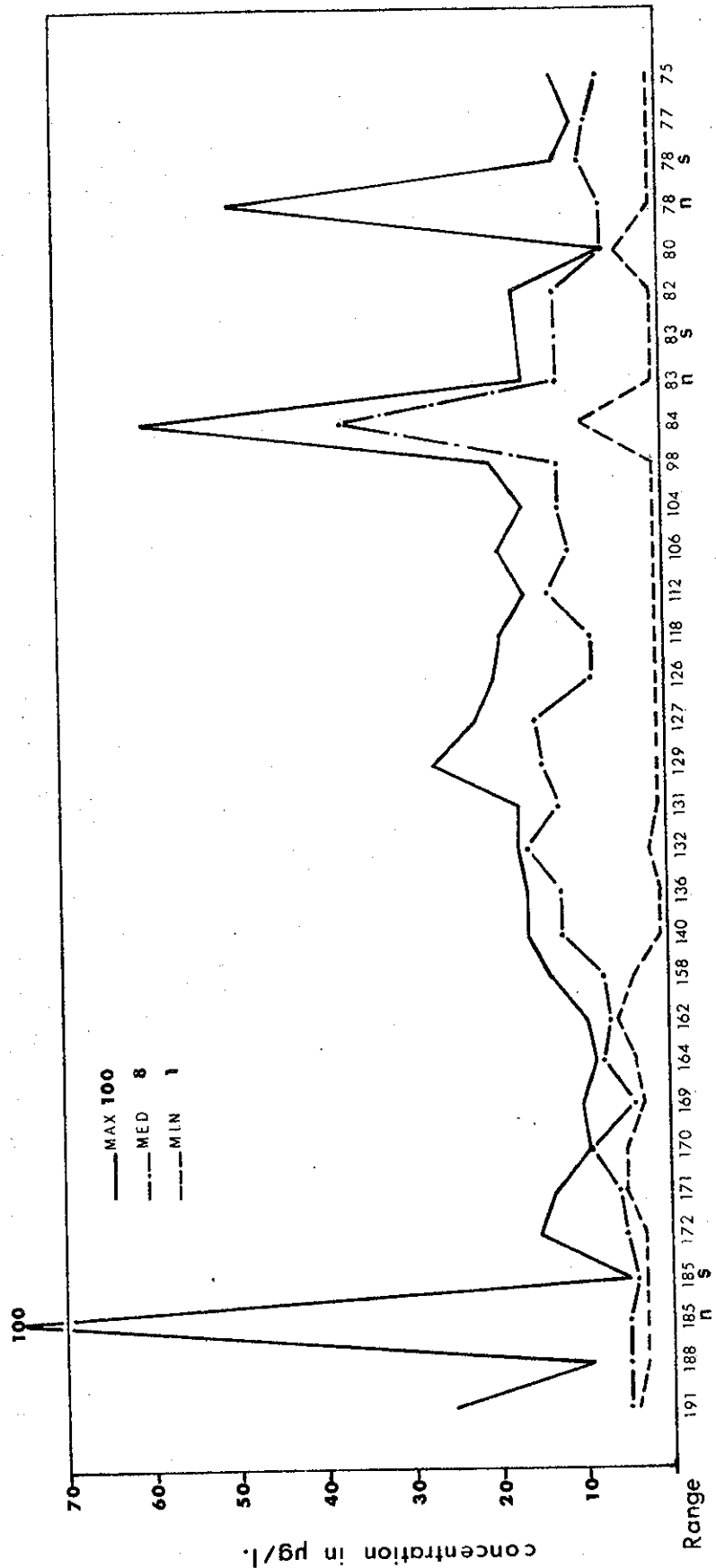


FIGURE 11. COMPARISON OF ORTHOPHOSPHATE PHOSPHORUS MEDIAN VALUES OF CANADIAN AND U.S. SIDE STATIONS FROM SELECTED RANGES, ST. LAWRENCE RIVER, 1970.

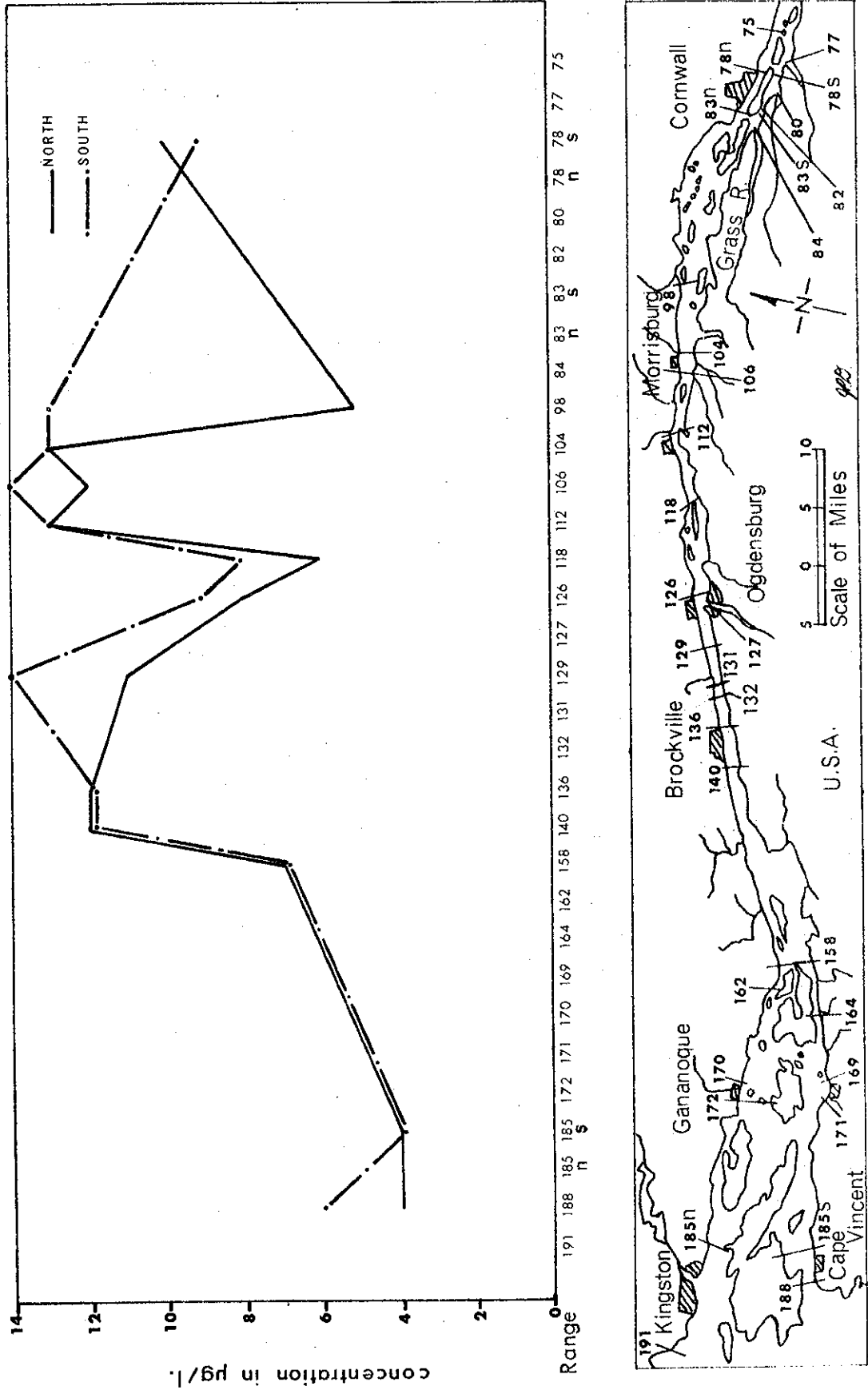


FIGURE 12. MAXIMUM, MINIMUM AND MEDIAN TOTAL PHOSPHORUS VALUES, ST. LAWRENCE RIVER, 1970.

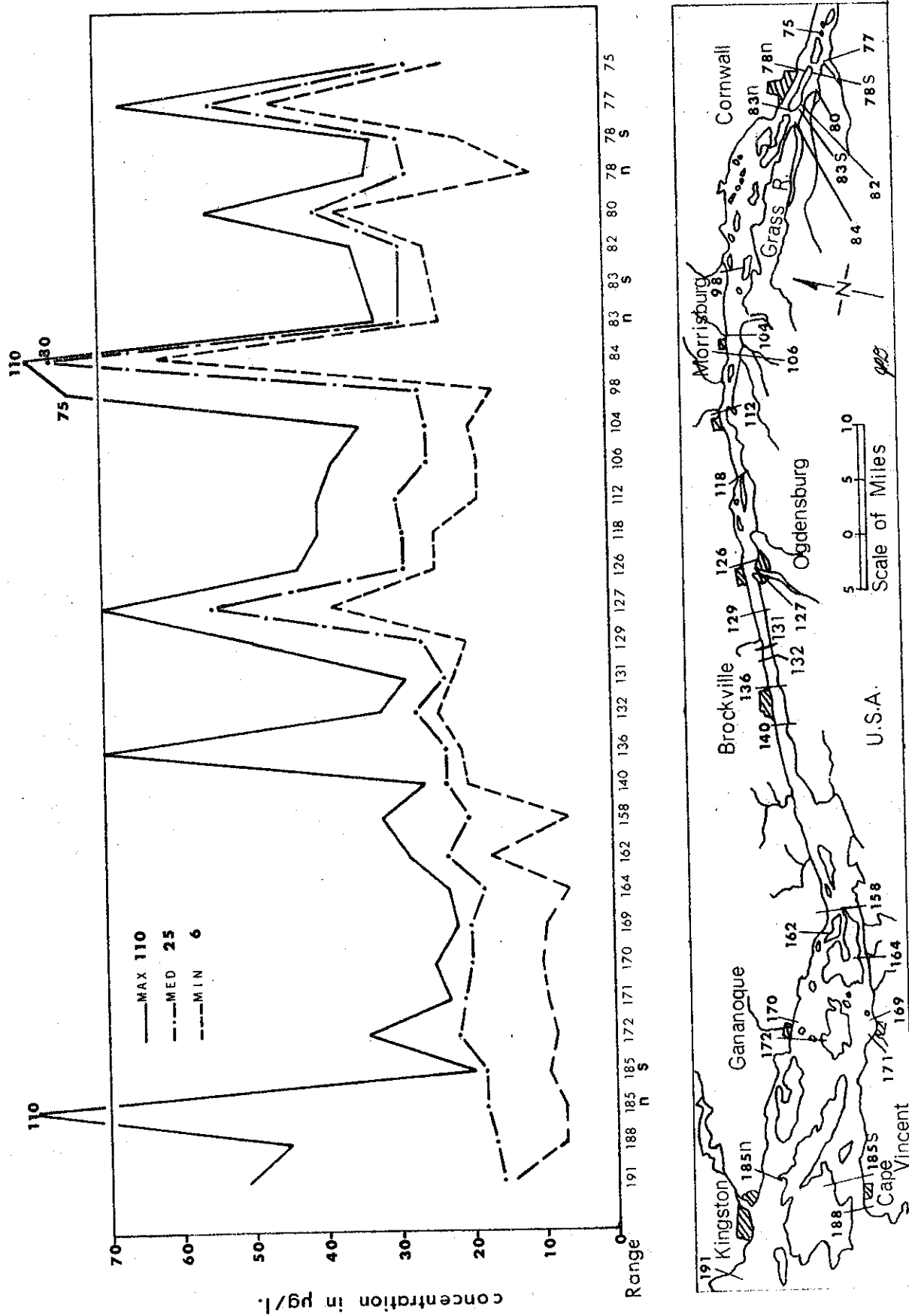


FIGURE 13. COMPARISON OF TOTAL PHOSPHORUS MEDIAN VALUES OF CANADIAN AND U.S. SIDE STATIONS FROM SELECTED RANGES, ST. LAWRENCE RIVER, 1970.

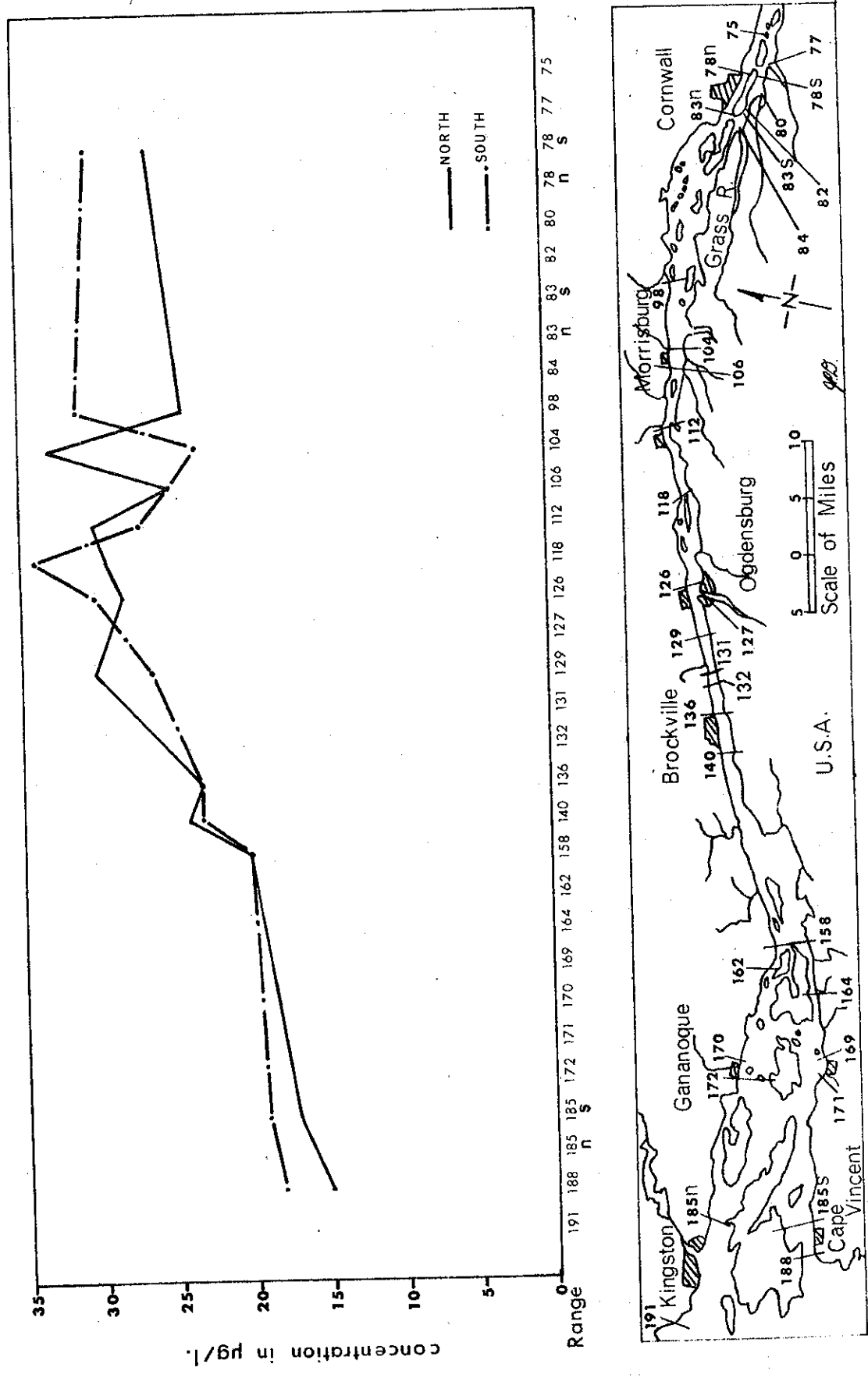


TABLE II. SUMMARY OF PHENOL RESULTS, ST. LAWRENCE RIVER, 1969 - 1970.

STATION	CRUISE NO.	PHENOL UG/L	
		1969	1970
191 B _s	1	1.0	1.2
	2	-	-
	3	-	1.0
170 A _s	1	0.5	1.7
	2	1.5	1.8
	3	-	1.3
169S B _s	1	3.0	0.5
	2	0.0	0.7
	3	1.1	0.5
132 A _d	1	1.0	0.6
	2	-	0.8
	3	0.2	0.7
131 A _d	1	1.5	1.5
	2	1.1	1.1
	3	0.6	1.2
129 A _s	1	0.5	1.4
	2	1.1	1.3
	3	0.3	1.3
127 A _s	1	2.7	2.5
	2	1.8	2.7
	3	0.9	2.3
126 A _s	1	0.5	1.4
	2	1.3	0.9
	3	0.3	1.1
78N A _s	1	-	6.3
	2	3.1	9.2
	3	8.3	7.5
75 A _s	1	6.1	8.2
	2	4.2	5.0
	3	5.6	8.7
Maximum		8.3	9.2
Minimum		0.0	0.5
Median		1.1	1.3

including 1969 results.

The concentrations of phenol were found to vary from 0.0005 to 0.0092 mg/l. All six samples collected from the Cornwall area at stations 78N(A) and 75A, gave high phenol values which exceeded the I.J.C.'s objective (0.005 mg/l maximum). At the other eight stations, phenol values ranged between .0005 and 0.0027 mg/l.

In the past surveys, Cornwall was the only area where high phenol concentrations were consistently obtained. It might be concluded that phenol was being discharged into the river in the Cornwall area.

Non-volatile Organic Carbon

The non-volatile organic carbon values ranged from 1.0 to 25.0 mg/l with a median of 6.0 mg/l (Table III). Over the season, non-volatile organic carbon remained approximately the same in April and July, and increased considerably from July to September. The highest median values for non-volatile organic carbon were found near Cornwall area at ranges 84, 80, 78N, 77 and 75, Figure 14. A comparison of median values from Canadian and U.S. side stations is shown in Figure 15.

The median value in April, 1970 was 5.0 mg/l compared to 8.4 mg/l for the same period of 1969 (Table IV). It appeared that the lowest median value (3.3 mg/l) was obtained in the winter cruise in February, 1969.

TABLE III. NON-VOLATILE ORGANIC CARBON MEDIAN VALUES,
ST. LAWRENCE RIVER, 1969-1970.

RANGE	FEBRUARY 1969*	APRIL TO MARCH 1969*	APRIL TO SEPTEMBER 1970**
191		6.9	5.0
188	3.0	3.0	4.8
185 N		6.6	4.5
185 S	3.0	6.7	3.5
172	3.2	9.2	3.5
171	2.5	9.1	4.0
170	4.9	10.1	3.3
169	3.2	9.0	3.5
164		9.4	5.8
162		9.9	4.8
158	3.9	9.2	4.5
140	3.4	9.2	4.3
136	3.3	9.5	3.8
132	3.8	9.3	4.8
131	3.5	8.7	5.5
129	2.8	8.4	6.0
127	7.4	12.0	10.0
126		7.4	6.5
118		8.4	7.5
112		7.1	10.0
106		6.9	11.5
104		6.8	9.5
98		7.3	9.0
84		7.5	13.0
83 N		5.2	7.5
82 S		3.5	8.3
80		7.2	14.5
78 N		5.7	14.8
78 S		7.8	9.3
77		8.5	14.8
75		4.8	15.8
St. Lawrence River Median	3.3	8.4	6.0

* One Cruise Only: **Three Cruises: Results in mg/l

FIGURE 14. MAXIMUM, MINIMUM AND MEDIAN NON-VOLATILE ORGANIC CARBON VALUES, ST. LAWRENCE RIVER, 1970.

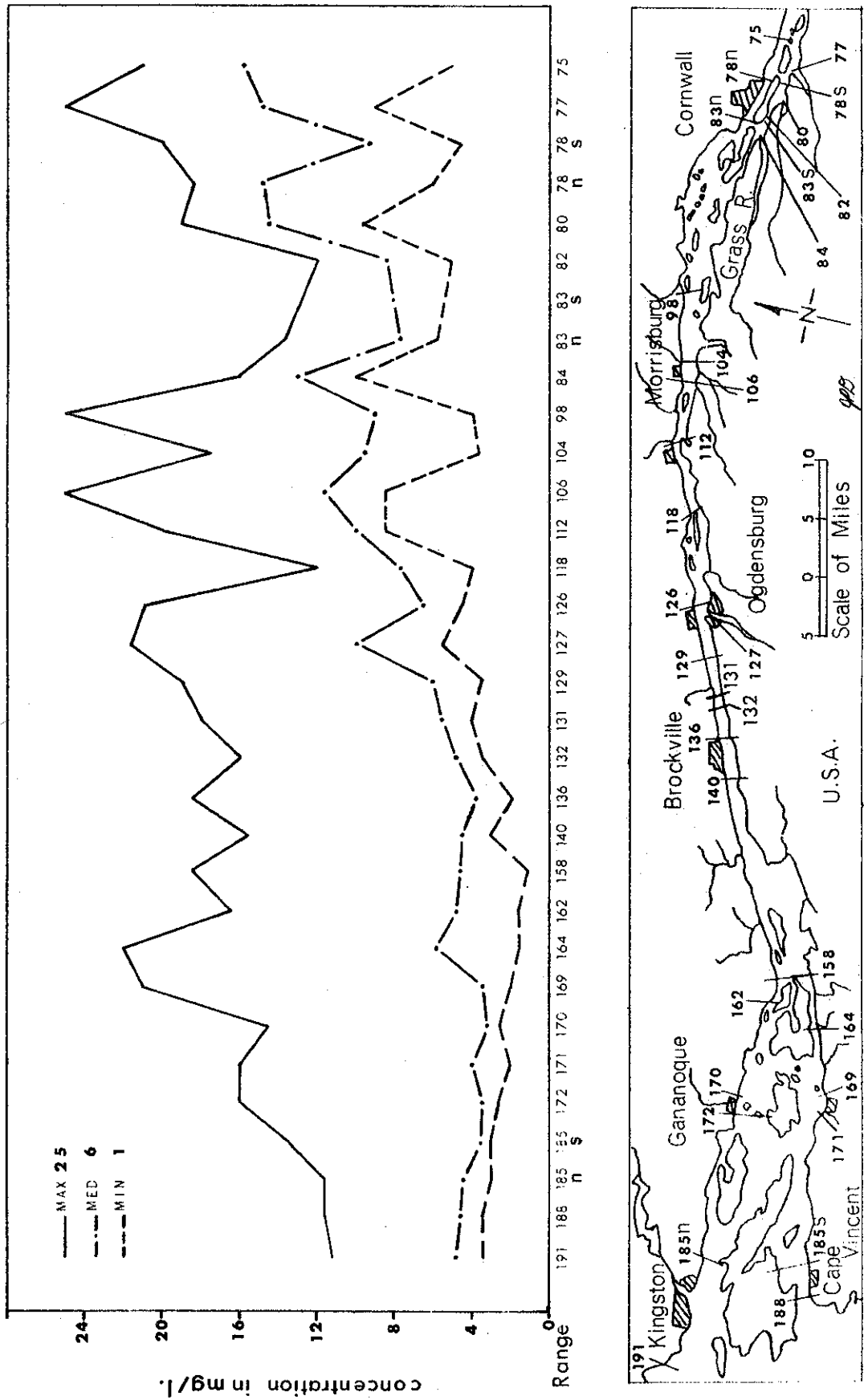
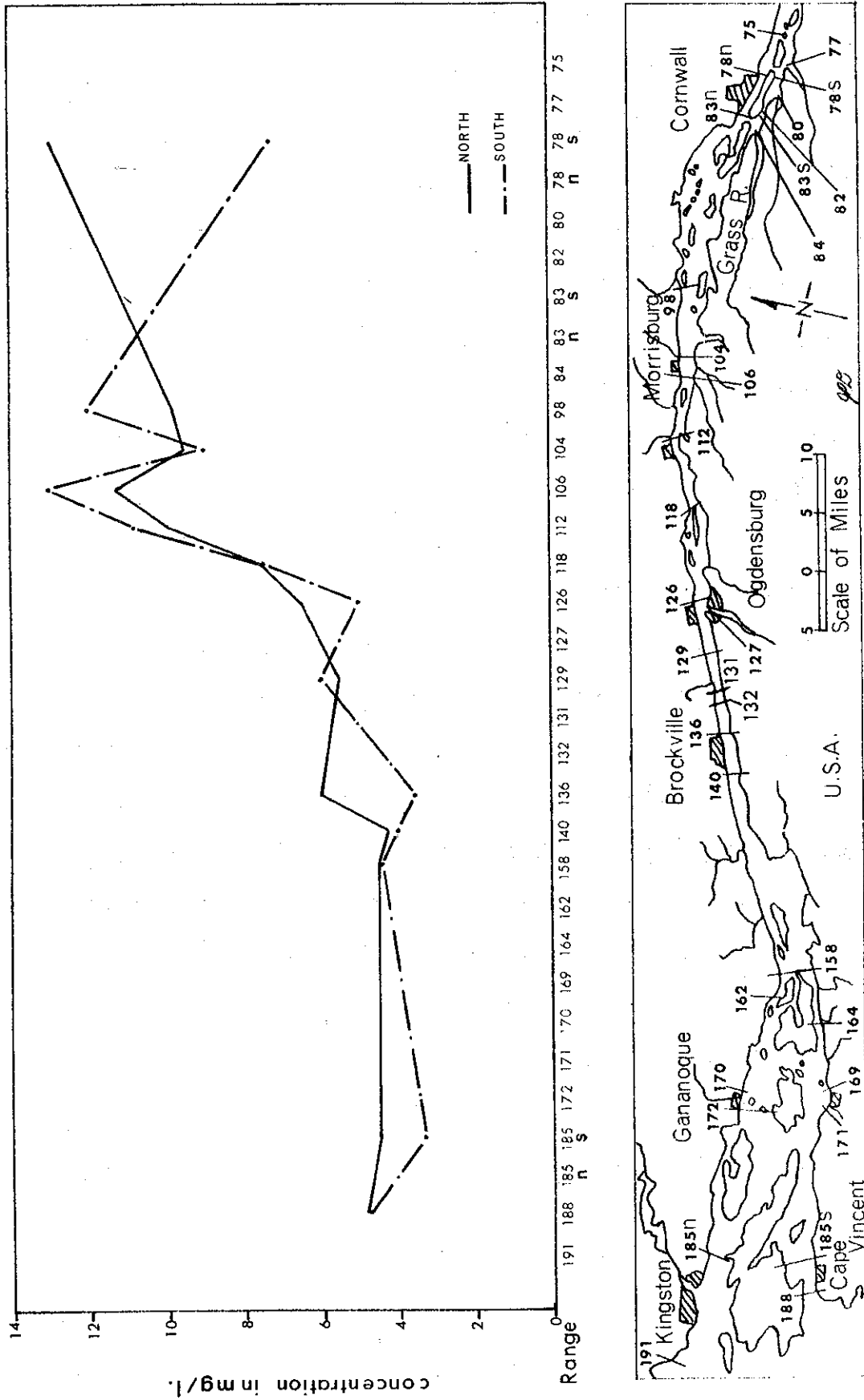


FIGURE 15. COMPARISON OF NON-VOLATILE ORGANIC CARBON MEDIAN VALUES OF CANADIAN AND U.S. SIDE STATIONS FROM SELECTED RANGES, 1970.



PHYSICAL STUDIES

Physical parameters measured were: air temperature, water temperature, secchi, colour, turbidity, specific conductance and pH. The secchi, water and air temperatures were measured in the field. In addition to the above parameters, four physical observation cruises were also conducted by P.H.E. Division personnel. The details of the physical observation study will be included in the individual manuscript report.

Table V of the Appendix summarizes all the physical data. In general, little change was observed on most of the physical parameters in the main river when compared to previous years.

The air temperature ranged from 4°C to 25.5°C during the sampling season. The median values in April, July and September were 10, 20 and 18°C respectively. These were different from the water temperatures. In April, water temperatures were much colder than air temperatures. The water was not as warm as the air in July and remained warmer than the air in September. The median values for water temperature in April, July and September were 5, 18 and 20°C respectively.

The water temperature data indicated little variation between the surface water and the deep water. In the beginning of September there was no evidence of stratification in the upper end of the St. Lawrence River.

The secchi readings varied from 1.0 to 4.5 metres with a median of 2.9 metres. The readings would be influenced by different conditions such as sunny or cloudy days, adverse weather and rapid flow etc. Most of the secchi readings were close to the median value of 2.9 metres except the stations located at the mouth of tributary streams. Those stations, such as 191A, 177A, 84A, 80A, 77A and B, recorded low secchi readings and also recorded high colour, and low specific conductance.

The data of colour, turbidity, specific conductance and pH were available for one cruise only. The readings for colour in the main river were consistently 5 Hazen Units.

RECOMMENDATIONS FOR FUTURE PROGRAM

- 1 - In the carrying out of future monitor surveys on the St. Lawrence River a more intensive study should be conducted in the Brockville to Cornwall area.
- 2 - The yearly Physical Observation cruises should be maintained on a continuing basis.

ACKNOWLEDGEMENTS

We wish to thank the P.H.E. Bacteriological staff under the direction of Mr. B. J. Dutka, the P.H.E. Chemistry staff under the supervision of Mr. G. Baulne for providing advisory and technical assistance and Mr. J. Donnelly, P.H.E. Engineering Technologist for assistance in the field work.

A P P E N D I X

TABLES I-V

TABLE I (a). SUMMARY OF CHEMICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970.

RANGE	TOTAL KJELDAHL NITROGEN			AMMONIA NITROGEN	NITRITE NITROGEN	NITRATE NITROGEN	ORTHO- PHOSPHATE PHOSPHORUS	TOTAL PHOSPHORUS	NON-VOLATILE CARBON
	Max.	Min.	Med.						
191	0.950	0.420	0.520	0.150	0.009	0.035	0.025	0.051	11.0
				0.008	0.002	0.002	0.004	0.014	3.5
				0.015	0.002	0.015	0.005	0.016	5.0
188 S	0.650	0.350	0.475	0.062	0.004	0.280	0.009	0.045	11.5
				0.005	0.001	0.002	0.003	0.007	3.5
				0.011	0.004	0.016	0.005	0.017	4.8
185 N	1.470	0.410	0.510	0.490	0.007	0.100	0.100	0.110	11.5
				0.007	0.001	0.003	0.003	0.007	3.0
				0.016	0.003	0.013	0.005	0.018	4.5
185 S	0.630	0.340	0.520	0.039	0.004	0.046	0.005	0.020	13.5
				0.010	0.001	0.003	0.003	0.009	3.0
				0.012	0.003	0.019	0.004	0.018	3.5
172	0.970	0.340	0.460	0.026	0.008	0.114	0.015	0.034	16.0
				0.008	0.001	0.008	0.003	0.008	2.5
				0.014	0.003	0.017	0.005	0.022	3.5
171	0.570	0.270	0.410	0.053	0.004	0.136	0.013	0.023	16.0
				0.010	0.001	0.006	0.005	0.009	2.0
				0.027	0.003	0.024	0.006	0.021	4.0
170	0.680	0.360	0.490	0.020	0.008	0.087	0.009	0.025	14.5
				0.013	0.001	0.005	0.005	0.010	2.5
				0.013	0.002	0.013	0.009	0.020	3.3

Results in mg/l

TABLE I (b). SUMMARY OF CHEMICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970.

RANGE	TOTAL										NON-VOLATILE CARBON
	KJELDAHL NITROGEN	AMMONIA NITROGEN	NITRITE NITROGEN	NITRATE NITROGEN	ORTHO- PHOSPHATE	TOTAL PHOSPHORUS	ORTHOPHOSPHATE	NITRATE NITROGEN	NITRITE NITROGEN	AMMONIA NITROGEN	
169	Max.	0.670	0.032	0.004	0.111	0.010	0.022	0.010	0.004	0.032	21.0
	Min.	0.280	0.009	0.001	0.008	0.003	0.009	0.003	0.001	0.009	2.0
	Med.	0.450	0.020	0.003	0.026	0.004	0.020	0.004	0.003	0.020	3.5
164	Max.	1.190	0.033	0.004	0.050	0.008	0.023	0.008	0.004	0.033	22.0
	Min.	0.310	0.007	0.002	0.010	0.004	0.006	0.004	0.002	0.006	1.5
	Med.	0.465	0.024	0.003	0.025	0.007	0.018	0.007	0.003	0.018	5.8
162	Max.	0.570	0.037	0.004	0.021	0.009	0.028	0.009	0.004	0.037	16.5
	Min.	0.370	0.009	0.002	0.014	0.006	0.007	0.006	0.002	0.009	1.5
	Med.	0.440	0.027	0.003	0.019	0.007	0.023	0.007	0.003	0.027	4.8
158	Max.	0.530	0.034	0.005	0.093	0.013	0.032	0.013	0.005	0.034	18.5
	Min.	0.340	0.009	0.002	0.012	0.004	0.006	0.004	0.002	0.009	1.0
	Med.	0.450	0.025	0.003	0.029	0.007	0.020	0.007	0.003	0.025	4.5
140	Max.	0.790	0.077	0.006	0.095	0.016	0.026	0.016	0.006	0.077	15.5
	Min.	0.380	0.010	0.002	0.016	0.001	0.020	0.001	0.002	0.010	3.0
	Med.	0.450	0.040	0.004	0.027	0.012	0.023	0.012	0.004	0.040	4.3
136	Max.	0.710	0.076	0.006	0.070	0.016	0.070	0.016	0.006	0.076	18.5
	Min.	0.370	0.009	0.003	0.016	0.001	0.021	0.001	0.003	0.009	2.0
	Med.	0.460	0.042	0.005	0.038	0.012	0.023	0.012	0.005	0.042	3.8
132	Max.	1.380	1.160	0.010	0.480	0.017	0.032	0.017	0.010	1.160	16.0
	Min.	0.410	0.011	0.005	0.056	0.002	0.024	0.002	0.005	0.011	3.5
	Med.	0.925	0.210	0.007	0.078	0.016	0.027	0.016	0.007	0.210	4.8

Results in mg/l

TABLE I (c). SUMMARY OF CHEMICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970.

RANGE	TOTAL KJELDAHL NITROGEN			AMMONIA NITROGEN	NITRITE NITROGEN	NITRATE NITROGEN	ORTHO- PHOSPHATE PHOSPHORUS	TOTAL PHOSPHORUS	NON-VOLATILE CARBON
	Max.	Min.	Med.						
131	1.100	0.240	0.132	0.128	0.017	0.028	18.0		
	0.420	0.011	0.005	0.052	0.001	0.022	4.0		
	0.515	0.086	0.006	0.059	0.012	0.023	5.5		
129	0.830	0.390	0.088	0.240	0.027	0.049	19.0		
	0.390	0.010	0.003	0.012	0.001	0.020	3.5		
	0.610	0.044	0.004	0.034	0.014	0.026	6.0		
127	1.020	0.061	0.008	0.105	0.022	0.070	21.5		
	0.610	0.007	0.002	0.055	0.001	0.038	5.5		
	0.725	0.012	0.004	0.063	0.015	0.055	10.0		
126	0.830	0.180	0.040	0.100	0.020	0.043	21.0		
	0.390	0.013	0.003	0.013	0.001	0.024	4.5		
	0.540	0.040	0.004	0.039	0.008	0.028	6.5		
118	0.740	0.092	0.022	0.070	0.019	0.040	12.0		
	0.410	0.014	0.003	0.009	0.001	0.024	4.0		
	0.505	0.035	0.004	0.047	0.008	0.028	7.5		
112	0.730	0.094	0.016	0.065	0.016	0.040	20.0		
	0.390	0.012	0.004	0.039	0.001	0.018	8.5		
	0.450	0.039	0.005	0.045	0.013	0.029	10.0		
106	0.590	0.094	0.012	0.057	0.019	0.038	25.0		
	0.380	0.011	0.004	0.024	0.001	0.018	8.5		
	0.450	0.039	0.006	0.046	0.011	0.025	11.5		

Results in mg/l

TABLE I (d). SUMMARY OF CHEMICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970.

RANGE	TOTAL KJELDAHL NITROGEN		AMMONIA NITROGEN	NITRITE NITROGEN	NITRATE NITROGEN	ORTHO- PHOSPHATE PHOSPHORUS	TOTAL PHOSPHORUS	NON-VOLATILE CARBON
	Max.	Min.						
104	Max.	0.700	0.090	0.012	0.063	0.016	0.034	17.5
	Min.	0.400	0.011	0.005	0.021	0.001	0.019	3.5
	Med.	0.440	0.035	0.006	0.048	0.012	0.025	9.5
98	Max.	0.570	0.093	0.012	0.059	0.020	0.075	25.0
	Min.	0.400	0.009	0.005	0.017	0.001	0.016	4.0
	Med.	0.450	0.034	0.007	0.055	0.012	0.026	9.0
84	Max.	0.790	0.120	0.012	0.132	0.060	0.110	16.0
	Min.	0.620	0.029	0.008	0.082	0.009	0.062	10.0
	Med.	0.790	0.095	0.010	0.086	0.037	0.080	13.0
83	Max.	0.610	0.088	0.010	0.067	0.016	0.032	13.5
	Min.	0.420	0.015	0.006	0.028	0.001	0.023	5.5
	Med.	0.465	0.025	0.007	0.054	0.012	0.028	7.5
82	Max.	0.600	0.085	0.008	0.054	0.017	0.035	12.0
	Min.	0.410	0.013	0.006	0.033	0.001	0.025	5.0
	Med.	0.455	0.022	0.007	0.051	0.012	0.028	8.3
80	Max.	0.650	0.053	0.011	0.139	0.007	0.055	19.0
	Min.	0.520	0.006	0.003	0.085	0.005	0.037	9.5
	Med.	0.640	0.008	0.005	0.105	0.007	0.040	14.5
78 N	Max.	0.730	0.088	0.009	0.065	0.050	0.033	18.5
	Min.	0.380	0.005	0.004	0.034	0.001	0.010	6.0
	Med.	0.525	0.015	0.007	0.048	0.007	0.027	14.8

Results in mg/l

TABLE I (e). SUMMARY OF CHEMICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970.

RANGE	TOTAL KJELDAHL NITROGEN			AMMONIA NITROGEN	NITRITE NITROGEN	NITRATE NITROGEN	ORTHO- PHOSPHATE PHOSPHORUS	TOTAL PHOSPHORUS	NON-VOLATILE CARBON
	Max.	Min.	Med.						
78 S	0.580	0.390	0.465	0.093	0.009	0.061	0.012	0.032	20.0
				0.013	0.005	0.037	0.001	0.020	4.5
				0.025	0.007	0.054	0.009	0.028	9.3
77	1.220	0.700	1.025	0.043	0.009	0.082	0.010	0.067	25.0
				0.007	0.001	0.043	0.001	0.046	9.0
				0.012	0.003	0.071	0.008	0.054	14.8
75	0.600	0.400	0.510	0.080	0.010	0.068	0.012	0.031	21.0
				0.005	0.003	0.034	0.001	0.022	5.0
				0.021	0.006	0.062	0.007	0.027	15.8
Cr.#1	0.910	0.270	0.470	0.330	0.070	0.139	0.025	0.075	25.0
				0.005	0.002	0.009	0.001	0.006	1.0
				0.011	0.006	0.042	0.002	0.020	5.0
Cr.#2	1.470	0.440	0.620	0.490	0.132	0.240	0.100	0.110	22.0
				0.005	0.001	0.002	0.001	0.014	2.0
				0.074	0.003	0.033	0.011	0.024	5.0
Cr.#3	1.380	0.400	0.460	1.160	0.088	0.480	0.037	0.080	25.0
				0.005	0.001	0.010	0.004	0.013	7.0
				0.028	0.004	0.040	0.009	0.025	13.5
St.	1.470	0.270	0.475	1.160	0.132	0.480	0.100	0.110	25.0
L.R.				0.005	0.001	0.002	0.001	0.006	1.0
				0.025	0.004	0.045	0.008	0.025	6.0

Results in mg/l

TABLE II. MEDIAN VALUES, ST. LAWRENCE RIVER, 1967, 1968, 1969 AND 1970.

RANGE	TOTAL KJELDAHL NITROGEN				AMMONIA NITROGEN				NITRITE NITROGEN				NITRATE NITROGEN				ORTHOPHOSPHATE PHOAPHORUS				TOTAL PHOSPHORUS			
	1967	1968	1969	1970	1967	1968	1969	1970	1967	1968	1969	1970	1967	1968	1969	1970	1967	1968	1969	1970	1967	1968	1969	1970
191	294	302	370	520	16	28	9	15	3	3	3	2	18	21	35	15	4	6	3	5	48	22	16	
188	272	275	320	475	19	36	12	11	3	1	2	4	10	26	14	16	4	2	3	5	28	33	17	
185 N	290	258	370	510	22	48	11	16	3	2	4	3	18	63	23	13	4	5	3	5	58	29	18	
185 S	264	228	325	520	20	51	11	12	3	1	3	3	13	7	9	19	4	1		4	26	26	18	
172		250	400	460		31	10	14		2	4	3		45	6	17		3	2	5	33	24	22	
171		225	320	410		33	2	27		3	3	3		40	11	24		6	2	6	32	26	21	
170		300	400	490		27	8	13		2	4	2		21	5	13		7	4	9	43	27	20	
169 S	316	293	320	450	19	25	12	20	4	2	3	2	23	39	7	26	4	5	2	4	39	24	20	
164 S	286	300	325	465	17	22	19	24	3	2	3	3	6	35	99	25	4	4	2	7	25	18	18	
162	300	280	410	440	16	26	22	27	3	2	3	3	10	53	7	19	4	4	2	7	25	36	23	
158	289	308	340	450	17	25	24	25	3	2	3	3	15	43	10	29	4	4	3	7	24	41	20	
140	312	250	430	450	30	57	29	40	4	2	4	4	19	47	11	27	4	4	5	12	23	27	23	
136	305	250	355	460	26	59	33	42	4	2	4	5	17	48	12	38	4	5	6	12	32	18	23	
132		338	710	925		60	80	210		2	5	7		65	126	78		8	5	16	35	25	27	
131		275	590	515		62	258	86		2	37	6		68	159	59		7	8	12	21	22	23	
129	349	294	350	610	46	53	35	44	6	3	4	4	40	62	66	34	4	3	7	14	21	32	26	
127		485	690	725		70	36	12		2	5	4		56	29	63		9	7	15	31	12	55	
126	319	310	550	540	40	46	32	40	5	2	5	4	31	46	17	38	4	5	7	8	26	29	28	
118	308	280	545	505	32	33	31	35	7	3	4	4	23	46	61	47	4	4	7	8	23	33	28	
112	324	328	515	450	31	57	23	39	7	3	6	5	25	46	23	45	4	4	6	13	29	14	29	
106	301	310	645	450	31	50	28	39	6	3	7	6	26	47	37	46	5	5	7	11	27	33	25	
104	300	340	630	440	32	49	40	35	7	6	10	6	22	55	34	48	4	4	6	12	26	33	25	
98	309	335	610	450	32	44	34	34	8	3	10	7	31	53	30	55	5	4	6	12	27	21	26	
84		640	580	790		98	87	95		6	10	10		71	64	86		32	20	37	62	46	80	
83 N	277	363	350	465	17	54	17	25	7	5	10	7	21	63	38	54	5	4	5	12	30	20	28	
82 S	294	315	350	455	23	52	15	22	7	4	8	7	19	70	36	51	5	3	7	12	32	20	28	

TABLE III. COMPARISON OF MEDIAN VALUES OF NORTH, MID-CHANNEL AND SOUTH STATIONS FROM SELECTED RANGES, ST. LAWRENCE RIVER, 1970.

RANGE	TOTAL KJELDAHL-N			AMMONIA NITROGEN			NITRITE NITROGEN			NITRATE NITROGEN			ORTHO-PHOSPHATE			TOTAL PHOSPHORUS			NON-VOLATILE CARBON		
	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S
188	435	515	12	10	4	4	47	4	6	15	18	4.8	4.8	4.8	18	4.8	4.8	18	4.8	4.8	
185 S	500	525	12	16	4	3	17	4	4	17	19	4.5	4.5	4.5	19	4.5	4.5	19	4.5	4.5	
158	475	430	28	22	4	3	25	7	7	20	20	4.5	4.5	4.5	20	4.5	4.5	20	4.5	4.5	
140	490	440	42	36	4	5	25	12	12	24	23	4.3	4.3	4.3	23	4.3	4.3	23	4.3	4.3	
136	490	460	43	41	4	5	35	12	12	23	23	6.0	6.0	6.0	23	6.0	6.0	23	6.0	6.0	
129	805	460	283	43	47	4	129	11	14	30	26	5.5	5.5	6.0	26	5.5	6.0	26	5.5	6.0	
126	620	480	140	32	19	5	93	8	9	28	30	6.5	6.5	5.0	30	6.5	5.0	30	6.5	5.0	
118	535	480	82	30	15	4	68	6	8	29	34	7.5	7.5	7.5	34	7.5	7.5	34	7.5	7.5	
112	503	430	65	34	10	5	59	13	13	30	27	10.0	10.0	10.8	27	10.0	10.8	27	10.0	10.8	
106	470	435	49	36	9	5	55	12	14	25	25	11.3	11.3	13.0	25	11.3	13.0	25	11.3	13.0	
104	520	420	40	35	7	6	51	13	13	33	23	9.5	9.5	9.0	23	9.5	9.0	23	9.5	9.0	
98	460	440	26	28	9	6	41	5	13	24	31	9.8	9.8	12.0	31	9.8	12.0	31	9.8	12.0	
78 S	450	500	26	25	7	7	52	10	9	26	30	13.0	13.0	7.3	30	13.0	7.3	30	13.0	7.3	
Median	490	460	42	32	7	5	51	10	12	25	25	6.5	6.5	6.0	25	6.5	6.0	25	6.5	6.0	
ST.L.R.	475	25	4	45	8	25	45	8	25	45	25	6.0	6.0	6.0	25	6.0	6.0	25	6.0	6.0	

TABLE IV. COMPARISON OF MEDIAN VALUES OF NORTH, MID-CHANNEL AND SOUTH STATIONS FROM SELECTED RANGES, ST. LAWRENCE RIVER, 1970.

RANGE	TOTAL KJELDAHL-N			AMMONIA-N			NITRITE-N			NITRATE-N			ORTHOPHOSPHATE			TOTAL PHOSPHORUS			NON-VOLATILE CARBON		
	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S	N	M	S
185 N	535	530	495	16	14	15	4	4	3	20	19	12	7	5	5	20	18	16	4.3	4.3	4.8
185 S	500	570	525	12	14	16	4	4	3	17	20	16	4	4	4	4	17	19	4.5	3.5	3.3
158	475	450	430	28	24	22	4	3	3	25	29	29	7	7	7	20	19	20	4.5	4.3	4.5
140	490	475	440	42	42	36	4	4	5	25	26	31	12	11	12	24	23	23	4.3	4.5	4.0
136	490	430	460	43	42	41	4	5	5	35	39	39	12	13	12	23	23	23	6.0	3.5	3.5
129	805	490	460	283	44	43	47	4	4	127	30	34	11	15	14	30	26	26	5.5	6.8	6.0
126	620	460	480	140	40	32	19	4	5	93	32	43	8	9	9	28	26	30	6.5	7.3	5.0
118	535	455	480	82	35	30	15	4	4	68	35	47	6	8	8	29	27	34	7.5	8.0	7.5
112	503	430	430	65	39	34	10	5	5	59	42	42	13	13	13	30	28	27	10.0	8.5	10.8
106	470	480	435	49	41	36	9	6	5	55	45	41	12	11	14	25	22	25	11.3	12.0	13.0
104	520	440	420	40	36	35	7	6	6	51	48	47	13	12	13	33	27	23	9.5	9.0	9.0
98	460	455	440	26	37	28	9	8	6	41	55	50	5	12	13	24	24	31	9.8	8.0	12.0
Median	502	458	450	43	38	33	8	4	5	46	34	41	10	11	12	25	24	24	6.0	7.1	5.5
St. L. R.	475			25			4		45			8		25						6.0	

N = North; M = Mid-channel; S = South.

TABLE V (a). SUMMARY OF PHYSICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970.

RANGE	AIR TEMP. (°C)	WATER TEMP. (°C)	SECCHI (METER)	COLOUR (HAZEN SCALE)	TURBIDITY (JACKSON UNITS)	SPECIFIC CONDUCTANCE (MICROMHOS 25°C)	pH
191	Max.	20.0	4.0	5	2.7	332	8.36
	Min.	4.0	1.0	5	0.5	310	8.09
	Med.	14.0	17.0	3.0	0.9	314	8.33
188 S	Max.	20.0	3.7	5	0.8	339	8.37
	Min.	4.0	2.7	5	0.7	313	7.95
	Med.	15.0	18.0	3.5	0.7	316	8.34
185 N	Max.	25.5	3.2	5	1.4	318	8.40
	Min.	4.0	3.0	5	0.9	312	8.23
	Med.	17.0	17.0	3.0	1.0	315	8.33
185 S	Max.	22.0	3.8	5	1.5	317	8.46
	Min.	4.0	2.5	5	0.5	313	8.37
	Med.	17.0	3.0	5	1.1	314	8.40
172	Max.	20.0	3.5	5	4.2	310	7.90
	Min.	4.0	1.9	5	0.7	294	7.70
	Med.	13.0	17.0	3.0	1.3	302	7.80
171	Max.	20.0	3.2	5	0.7	291	8.10
	Min.	4.0	3.0	5	0.5	283	8.10
	Med.	15.0	17.0	3.1	0.6	287	8.10
170	Max.	20.0	2.7	5	1.0	306	8.10
	Min.	5.0	1.9	5	1.0	303	8.10
	Med.	16.0	14.0	2.5	1.0	305	8.10

Values for Colour, Turbidity, Specific Conductance and pH represent one cruise only.

TABLE V (b). SUMMARY OF PHYSICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970

RANGE	AIR TEMP. (°C)	WATER TEMP. (°C)	SECCHI (MEFER)	COLOUR (HAZEN SCALE)	TURBIDITY (JACKSON UNITS)	SPECIFIC CONDUCTANCE (MICROMHOS 25°C)	pH
169	Max.	20.0	3.2	5	1.0	327	7.50
	Min.	5.0	2.9	5	0.9	297	7.25
	Med.	15.0	3.2	5	1.0	321	7.35
164	Max.	25.0	3.2	5	1.0	328	8.13
	Min.	10.0	2.8	5	0.8	307	7.31
	Med.	16.0	3.1	5	0.9	318	7.84
162	Max.	23.0	3.5	5	0.9	315	8.20
	Min.	10.0	2.5	5	0.8	315	8.19
	Med.	15.0	2.8	5	0.9	315	8.20
158	Max.	25.0	4.0	5	0.9	319	8.27
	Min.	10.0	3.0	5	0.6	315	8.16
	Med.	17.0	3.1	5	0.9	318	8.23
140	Max.	19.0	3.5	5	1.0	317	8.00
	Min.	11.0	2.8	5	0.5	310	7.54
	Med.	16.0	3.3	5	0.8	3.7	7.88
136	Max.	20.0	3.6	5	1.7	333	8.07
	Min.	11.0	3.0	5	0.4	318	7.96
	Med.	16.0	3.2	5	0.8	320	8.05
132	Max.	20.0	3.1	10	0.9	336	8.30
	Min.	12.0	3.0	5	0.8	336	8.20
	Med.	16.0	3.0	10	0.8	336	8.25

TABLE V (c). SUMMARY OF PHYSICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970.

RANGE	AIR TEMP. (°C)	WATER TEMP. (°C)	SECCHI (METER)	COLOUR (HAZEN SCALE)	TURBIDITY (JACKSON UNITS)	SPECIFIC CONDUCTANCE (MICROMHOS 25°C)	pH
131	Max.	20.0	3.4	10	1.0	333	8.11
	Min.	12.0	3.0	10	0.3	331	8.09
	Med.	16.0	3.1	10	0.6	332	8.10
129	Max.	24.0	4.5	10	2.4	330	8.03
	Min.	12.0	2.0	5	0.1	313	7.38
	Med.	17.0	3.2	5	0.5	320	7.91
127	Max.	24.0	3.0				
	Min.	13.0	1.2				
	Med.	17.0	1.3	15	1.1	148	7.90
126	Max.	23.0	4.1	5	1.6	325	8.12
	Min.	12.0	1.5	5	0.9	314	7.93
	Med.	17.0	2.9	5	1.0	322	8.10
118	Max.	23.0	4.1	5	2.5	322	8.13
	Min.	12.0	2.0	5	1.3	316	8.05
	Med.	16.0	2.9	5	1.4	318	8.10
112	Max.	18.0	3.8	10	1.0	321	8.06
	Min.	11.0	1.8	5	0.6	312	8.02
	Med.	18.0	2.5	10	0.9	317	8.05
106	Max.	18.0	3.3	10	1.0	318	8.13
	Min.	10.0	2.2	5	0.5	311	8.04
	Med.	18.0	2.8	5	1.0	318	8.10

TABLE V (d). SUMMARY OF PHYSICAL DATA, MAXIMUM, MINIMUM AND MEDIAN VALUES, ST. LAWRENCE RIVER, 1970.

RANGE	AIR TEMP. (°C)	WATER TEMP. (°C)	SECCHI (METER)	COLOUR (HAZEN SCALE)	TURBIDITY (JACKSON UNITS)	SPECIFIC CONDUCTANCE (MICROMHOS 25°C)	pH
104	Max.	20.0	3.2	10	1.3	313	8.14
	Min.	11.0	2.0	5	1.0	311	8.09
	Med.	18.0	2.6	5	1.0	313	8.10
98	Max.	20.0	3.3	10	2.6	304	8.12
	Min.	10.0	1.5	5	1.8	301	8.08
	Med.	18.0	2.6	10	2.3	304	8.10
84	Max.	23.0	2.2				
	Min.	12.0	1.4	20	1.1	147	6.99
	Med.	22.0	1.4				
83 N	Max.	23.0	2.5	10	1.8	315	7.87
	Min.	12.0	1.8	5	1.6	315	7.60
	Med.	22.0	2.2	10	1.7	315	7.74
82 S	Max.	23.0	2.5	10	1.4	318	8.07
	Min.	11.0	1.8	10	1.3	315	7.97
	Med.	21.0	2.2	10	1.4	317	8.02
80	Max.	23.0	1.7				
	Min.	11.0	1.6	40	9.0	95	8.00
	Med.	21.0	1.7				
78 N	Max.	23.0	2.8	10	3.5	315	8.05
	Min.	12.0	1.5	5	1.2	313	7.86
	Med.	22.0	2.1	10	1.8	315	7.99