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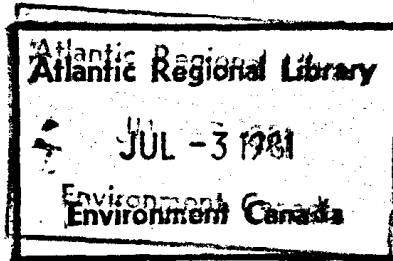


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BACTERIOLOGICAL SURVEY OF
PRINCE EDWARD ISLAND SHELLFISH AREA 1
KILDARE RIVER, DOCK RIVER AND
ALBERTON HARBOUR

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BACTERIOLOGICAL SURVEY
OF
PRINCE EDWARD ISLAND SHELLFISH AREA 1
KILDARE RIVER, DOCK RIVER AND ALBERTON HARBOUR

by

A.S. MENON AND H.R. VAN-OTTERLOO

MICROBIOLOGY SECTION
ENVIRONMENTAL SERVICES BRANCH
ENVIRONMENTAL PROTECTION SERVICE
ATLANTIC REGION

EPS-5-AR-76-7

FOREWORD

This report is the result of a joint investigation conducted by the Environmental Protection Service and the Prince Edward Island Department of the Environment.

Without the exceptional cooperation and assistance provided by the Prince Edward Island Department of Environment, this report would not have been possible. The authors, however, are completely responsible for the interpretation of the data and the conclusions of this report.

ABSTRACT

A bacteriological survey of Kildare River, Dock River and Alberton Harbour, Prince Edward Island was conducted from May 27 to August 19, 1975. The purpose of the survey was to reassess the present classifications of these areas for the harvesting of shellfish.

A total of 265 seawater samples were collected from the study areas and analysed for fecal coliforms by the standard 5-tube MPN method. Results of the analyses indicate that the Kildare River area was very sensitive to rainfall induced run-off pollution. The bacteriological quality of the river became unacceptable for approved shellfish harvesting following an episode of heavy rainfall greater than one inch. However, the water quality of the river is generally satisfactory during much of the year, with the exception of the upper portion of the river above Montrose and at Montrose where there are a number of potential fecal contamination sources associated with the agricultural activities on the watershed. It is recommended that the existing closure (1-3) at the mouth of Campbell's Creek be retained because untreated sanitary wastes discharged into the river have not been corrected. A new closure should be established in the sector of Kildare River upstream from the highway bridge as indicated in Figure 1 of this report.

ABSTRACT (CONTINUED)

The upper sector of the Dock River was polluted by the effluent discharged from the Alberton sewage lagoon at the northeast branch and a lift station overflow at the northwest branch of the river. It is therefore recommended that the existing closure (1-4) at the Dock River be rescinded and a new closure be established at the northeast branch of Dock River just above station 6 and another closure established just above station 9 on the northwest branch of the River as indicated in Figure 4. Bacteriological water quality in the Alberton Harbour was satisfactory in terms of approved shellfish growing area water standards and should remain open for direct shellfish harvesting.

RÉSUMÉ

Entre le 27 mai et le 19 août 1975, la rivière Kildare, la rivière Dock et le havre Alberton, à l'île du Prince-Édouard, ont fait l'objet d'une étude bactériologique. Il s'agissait de réévaluer la région en fonction de la pêche aux mollusques.

Deux cent soixante cinq échantillons d'eau de mer prélevés dans la zone considérée ont fait l'objet d'une analyse régulière faisant usage de cinq éprouvettes pour déterminer le NPP de coliformes fécaux. Les résultats ont indiqué que la région de la rivière Kildare est très sensible à la pollution de ruissellement pluvial. Une précipitation de plus d'un pouce élevait le taux bactérien de la rivière à tel point que les mollusques y étaient impropres à la consommation. Toutefois la qualité des eaux y est satisfaisante durant la majeure partie de l'année, sauf à Montrose et en amont de cette localité où l'on a identifié un certain nombre de sources possibles de contamination fécale liées aux exploitations agricoles du versant est. L'une des recommandations est de continuer d'interdire la pêche (1-3) à l'embouchure du ruisseau Campbell puisqu'un certain volume d'eaux usées non traitées se déverse toujours dans la rivière. On devrait en outre fermer à la pêche la section de la rivière Kildare en amont du pont de la grand-route tel qu'indiqué à la figure I.

Le cours supérieur de la rivière Dock se trouvait également pollué. La branche du nord-est recevait le trop-plein d'une fosse d'eaux usées d'Alberton tandis que celle du nord-ouest recevait le déversement d'une station de pompage. L'étude recommande de lever l'interdiction frappant actuellement la rivière Dock (1-4), mais par contre de défendre la pêche dans la branche nord-est de la même rivière, immédiatement en amont de la station 6, ainsi que dans la branche nord-ouest, immédiatement en amont de la station 9, tel qu'indiqué à la figure 4. La qualité bactériologique des eaux du havre Alberton satisfaisait aux normes exigées pour les zones coquillières et cette baie devrait demeurer ouverte à la pêche aux mollusques.

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1 INTRODUCTION

A bacteriological survey of Kildare River, Dock River and Alberton Harbour (Prince Edward Island Area 1) was conducted by a mobile laboratory unit of the Environmental Protection Service during the period of May 27 to August 19, 1975. The closures which exist in this area are described in the schedule of the Prince Edward Island Fishery Regulations:

ITEM 1-3 - "The waters of Kildare River, Prince Court, west of a straight line drawn from Oyster Survey Monument No. 7A to Oyster Survey Monument No. 7B, both as shown on the plan showing Oyster Leases in the Cascumpeque Bay area, Kildare River."

ITEM 1-4 - "That portion of Dock River including Alberton Creek, Prince County, that is above or northerly of a line drawn across the said river South 73°00' West astronomic from Oyster Survey Monument No. 17, as shwon on the plan showing Oyster Leases in the Cascumpeque Bay area to the large rock on the opposite shore of the river."

Alberton Harbour is presently open for direct shellfish harvesting. The only closure being enforced here is the 400 ft. standing wharf closure.

2 MATERIALS AND METHODS

2.1 Sampling

Water samples were collected in sterile glass bottles at a depth of approximately one foot by means of a rod sampling device. All samples collected were kept in an insulated cooler and transported to the mobile laboratory for analysis within two hours of collection.

2.2 Bacteriological Analyses

All water samples were tested for fecal coliform levels by multiple tube dilution (MPN) method according to the A.P.H.A. "Recommended Procedures for the Bacteriological Examination of Sea Water and Shellfish"⁽¹⁾. Bacto-Lauryl Tryptose Broth was used as the presumptive test medium with incubation at $35\pm 0.5^{\circ}\text{C}$ for 24 and 48 hours, and positive cultures were transferred to Bacto-EC Medium and incubated in a water bath at $44.5\pm 0.2^{\circ}\text{C}$ for 24 hours. The most probable number (MPN) of fecal coliform was derived using a 5-tube decimal dilution MPN table.

The criterion used for the classification of approved shellfish growing waters is a median fecal coliform value of 14 MPN per 100 ml with no more than 10 percent of the samples exceeding an MPN of 43 for a 5-tube decimal dilution test. In addition to bacteriological data, sanitary information of the study area is also included in assessing the closure.

2.3 Physical Data

To facilitate the interpretation of bacteriological data, additional physical data were collected. Salinities (ppt) were determined by the Knudsen Method (2) from water samples collected from selected stations. Water temperatures were also recorded at selected stations. The tidal state was estimated and recorded for the time period encompassing the beginning and end of each sampling run. In addition, records of daily precipitation at Alberton, P.E.I., were provided by the Atmospheric Environment Service, Environment Canada, Atlantic Region.

3. RESULTS AND DISCUSSION

3.1 Kildare River

The location of sampling stations established in Kildare River is shown in Figure 1. Fecal coliform MPN results for 161 water samples collected from 26 sampling stations on six sampling days in Kildare River are presented in Table 1 of the Appendix. A record of daily precipitation for the survey area is provided in Figure 1 of the Appendix.

On the southern shore of the Kildare River below Montrose, there are a few houses and farms scattered along the river's edge, and a number of farms are located on the drainage of the Huntley River. The existing closure (1-3) is located on Campbell Cr ek and was implemented due to the

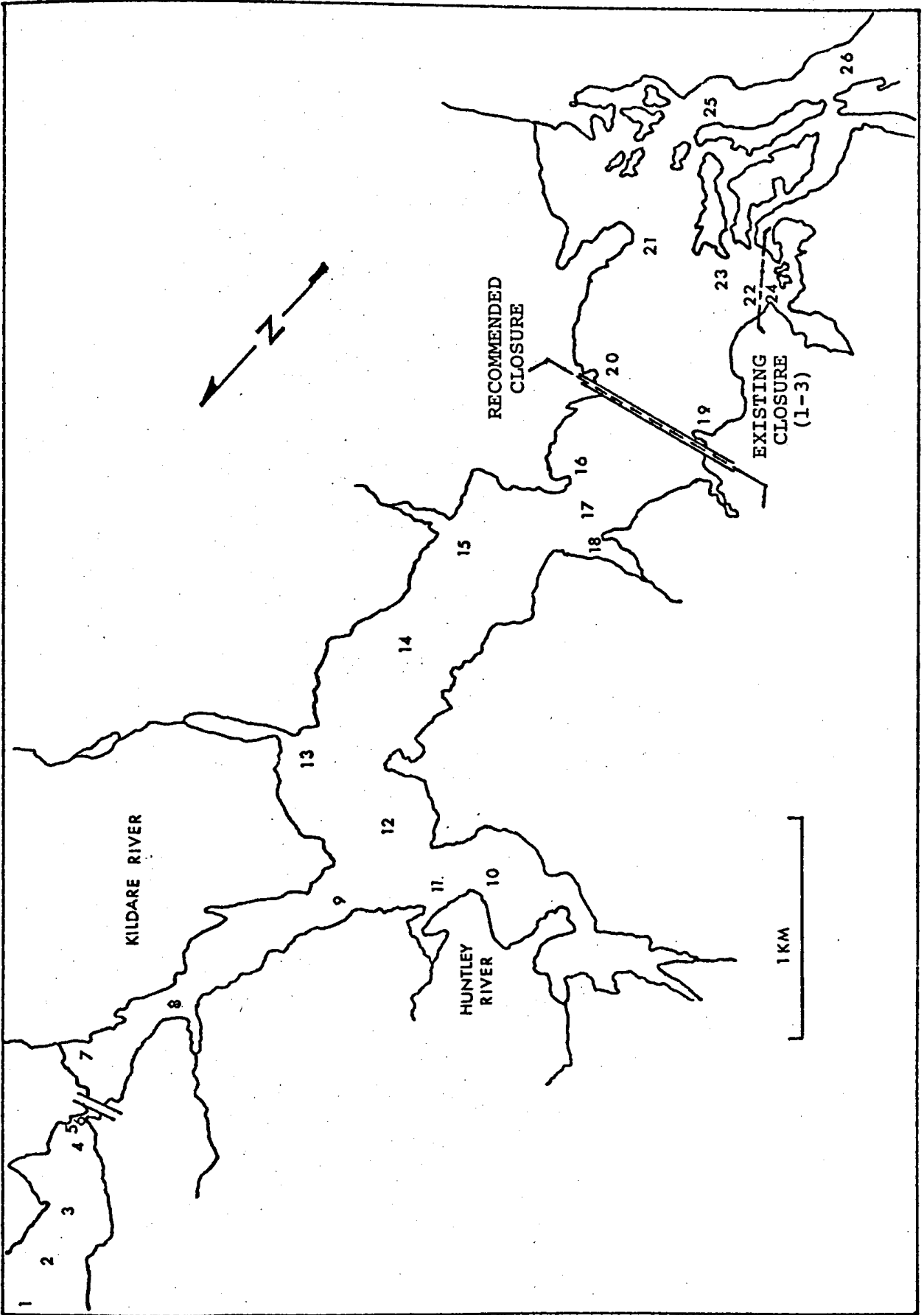


FIGURE 1 SAMPLING STATIONS AT KILDARE RIVER, P.E.I., 1975

direct discharge of untreated domestic wastes from a residence. This situation has not changed and a barn and manure pile located within 100 ft. of the stream were also noted. Near the mouth of the Huntley River, there are three cottages on the river bank. Domestic wastes from one cottage were disposed in a privy located on the river bank, while the other two had septic tank and tile field disposal systems. The field tiles in one case were located close to the river's edge. Further upstream on the Huntley River, there are homes scattered along the river and roughly a third of the watershed is used for agriculture (i.e. pasture and grain). The remainder of the watershed is forested.

On the north side of the river below Montrose, there are 18-22 cottages near the river bank. All these cottages appeared to have septic tank and tile field disposal systems and no drainage from these systems was observed. There is pasture land on at least one of the small tributary creeks and cattle were noted.

At Montrose, there are two farms, one on each side of the river. Runoff from the barns, manure piles and pasture drain directly to the river at the bridge. Cattle also have access to the water on the south side of the river. Above Montrose on the Montrose River, the watershed is hilly and forested, but with significant quantities of pasture land. Manure piles as well as cattle grazing in and near the water at several locations were noted.

Fecal coliform densities were generally very low in the lower section of the Kildare River (Stations 9 to 26), with the median fecal coliform levels well below 14 (Figure 2). A moderate degree of fecal contamination was found in the upper section of the Kildare River around Montrose (Stations 1 to 8). Median fecal coliform levels for most of the stations in this sector were greater than 14. A total of 2.45 inches of rain which fell on the area during the period of June 6 to 8 was a major factor in the significant increase in fecal coliform densities throughout the river on June 10 (Figure 3). Very little rain fell during the remainder of the study period and the fecal coliform densities at most stations were very low. It is apparent that the Kildare River area is sensitive to runoff pollution during periods of heavy rainfall.

3.2 Dock River and Alberton Harbour

A total of 104 water samples were collected from Dock River and Alberton Harbour for bacteriological analyses. The location of the 36 sampling stations are shown in Figure 4. Fecal coliform MPN's for these samples are given in Table 4 of the Appendix.

The northeast branch of the river receives effluent from the sewage treatment lagoon for the town of Alberton. Storm water flow from the town also enters this sector. The lagoon is a single cell system and no disinfection is provided. A garbage dump is located adjacent to the treatment lagoon.

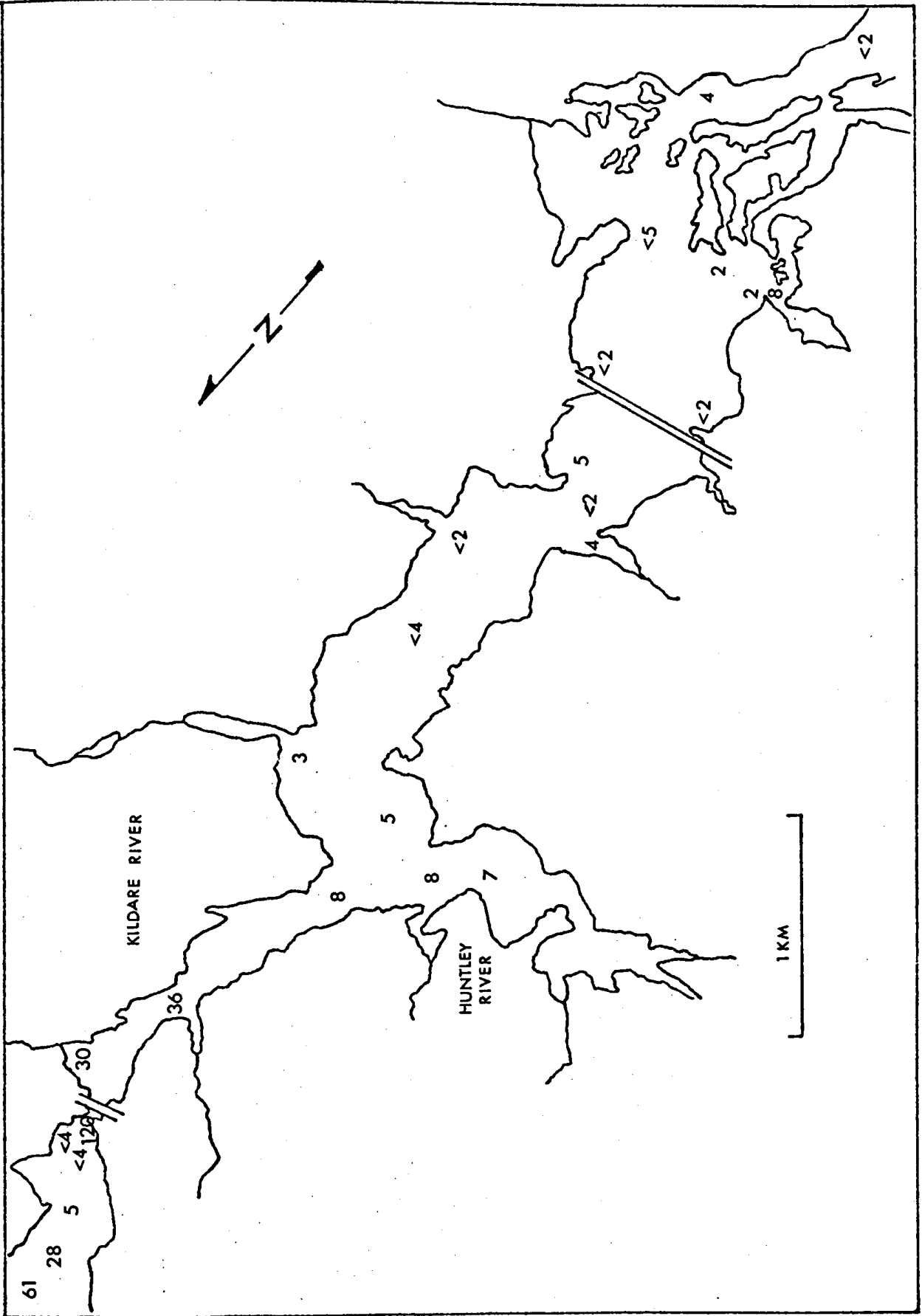


FIGURE 2 MEDIAN FECAL COLIFORM MPNS, KILDARE RIVER, P.E.I., 1975

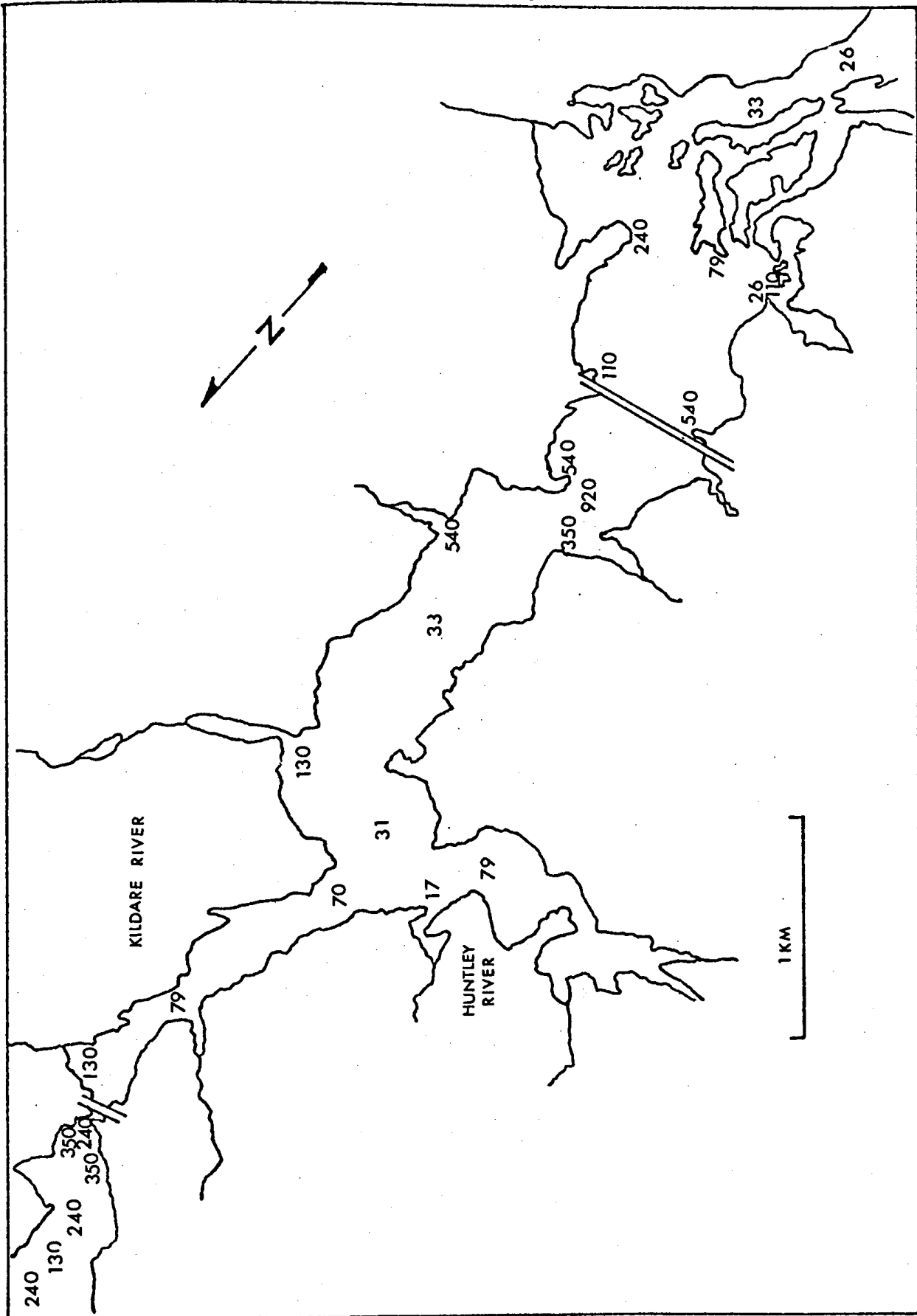


FIGURE 3 MAXIMUM FECAL COLIFORM MPNS, KILDARE RIVER, P.E.I., 1975

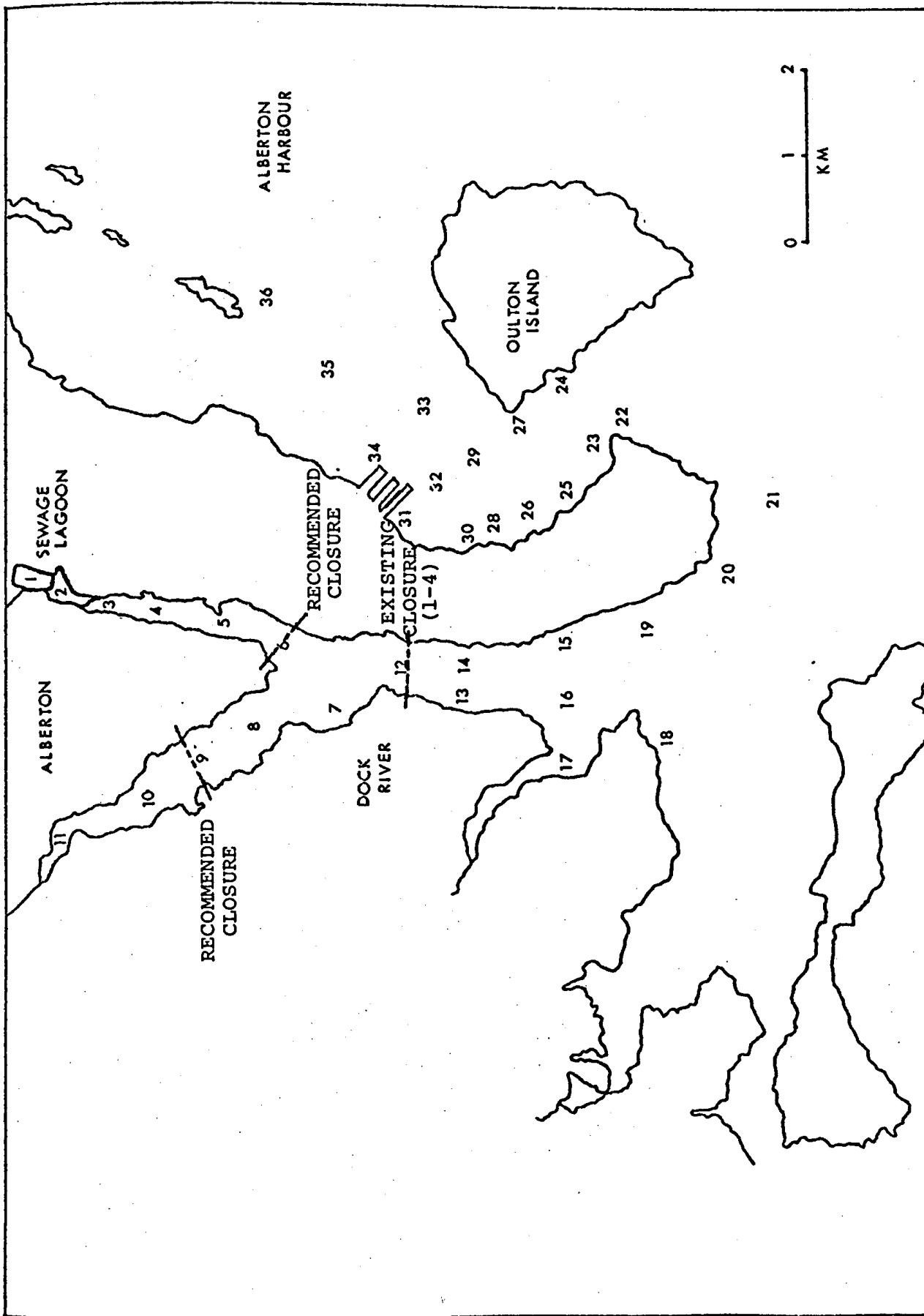


FIGURE 4 SAMPLING STATIONS AT DOCK RIVER AND ALBERTON HARBOUR, P.E.I., 1975

There is a lift station near the end of the northwest branch of the river. The overflow from this lift station is directed to the river.

Median and maximum fecal coliform levels for each station in the Dock River and Alberton Harbour are presented in Figures 5 and 6. High fecal coliform counts were found in the northeast arm of the Dock River, which is the section that receives the effluent from the Alberton sewage lagoon. The levels of fecal contamination observed in this area during the survey period were relatively low. However, under high rainfall conditions storm water from Alberton and increased flows from the lagoon can be expected to increase the fecal contamination of this area significantly. Possible bypass at the lift station could also occur during high flows and during periods of mechanical or electrical failure.

The remainder of the Dock River was free of any serious fecal contamination. Median fecal coliform densities at most stations in this sector of the river were below the bacteriological acceptable limit of 14 MPN for direct shellfish harvesting. None of the water samples collected from Alberton Harbour had fecal coliform counts greater than 2.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Kildare River

The results of sanitary and bacteriological investigations of the Kildare River indicate the adequacy of the existing closure 1-3 and the need for an additional closure on the river.

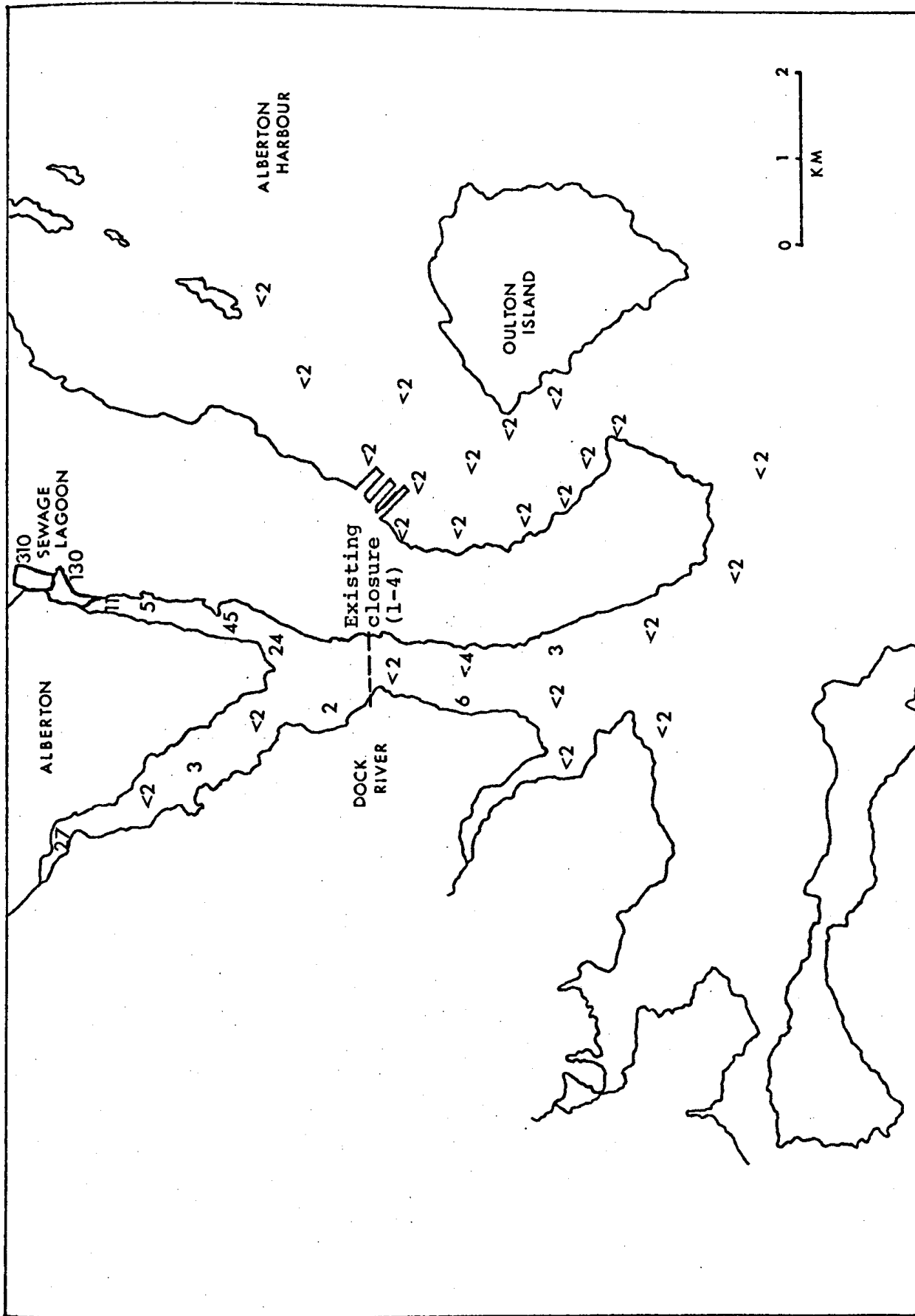


FIGURE 5 MEDIAN FECAL COLIFORM MPNS, DOCK RIVER AND ALBERTON HARBOUR, P.E.I., 1975

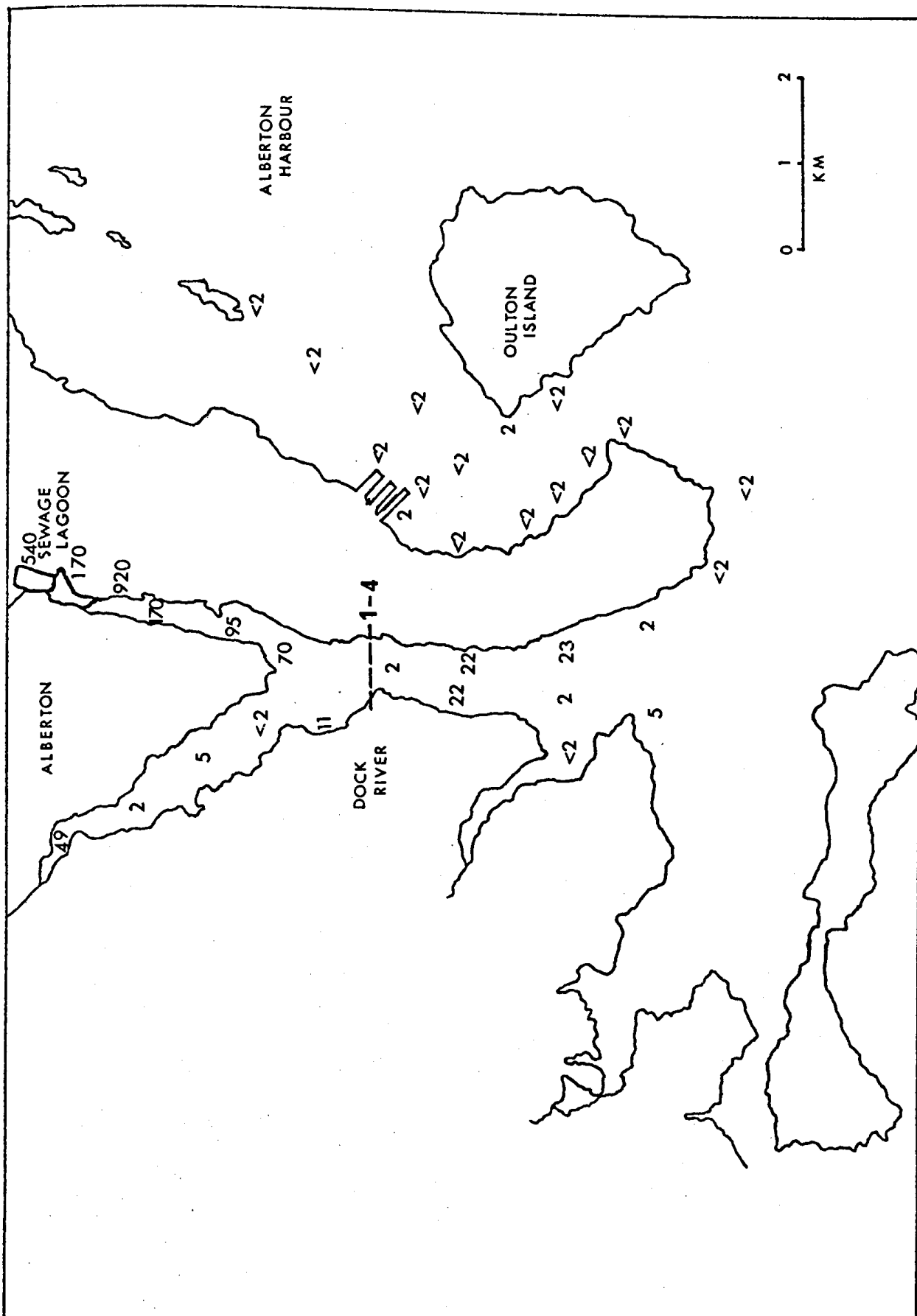


FIGURE 6 MAXIMUM FECAL COLIFORM MPNS, DOCK RIVER AND ALBERTON HARBOUR, P.E.I., 1975

The existing closure (1-3) at the mouth of Cambell's Creek is adequate and should remain in effect because untreated septic wastes discharged into the river have not been corrected.

Fecal coliform densities were very low in the remainder of the Kildare River with the exception on June 10 when 2.5 inches of rain fell on three consecutive days preceding the sampling date. The June 10 data shows counts in excess of the acceptable growing area standards throughout the course as far as Station 24. These data indicate that the Kildare River area was very sensitive to rainfall induced runoff pollution. Hence, under adverse conditions, a considerable number of fecal indicator bacteria would be carried by landwash to this sector of the river after a heavy rain storm. However, the fecal coliform levels in this sector of the river are generally acceptable for shellfishing during much of the year. The area above Station 10, however, showed evidence of fecal contamination on all sampling days. The upper portion of the river above Montrose and at Montrose has a number of potential fecal contamination sources associated with the agricultural activities on the watershed.

It is, therefore, concluded that the area above the highway 14 bridge (Figure 1) be closed to shellfish harvesting because of potential public health hazard induced by landwash pollution under heavy rainfall.

4.2

Dock River and Alberton Harbour

The northeast sector of the Dock River was polluted by the effluent discharged from the Alberton sewage lagoon. A moderate degree of fecal contamination was also found in the northwest branch of the Dock River which was attributed to occasional overflow from a lift station located at the northern shore. It is, therefore, recommended that the existing closure (1-4) at the Dock River be reduced to a sector of the river just above Station 9 in the northwest branch as indicated in Figure 4. Bacteriological water quality of the remainder of Dock River and Alberton Harbour was satisfactory in terms of approved shellfish growing area water standards. These waters should remain open for direct shellfish harvesting.

5 RECOMMENDATIONS OF THE MARITIME STANDING
COMMITTEE ON SHELLFISH

The existing closure P.E.I. 1-3, Kildare River, is adequate and should remain in effect unchanged.

A new closure should be established on the Kildare River encompassing all tidal waters upstream of the lower highway bridge on the river as shown in Figure 1 of this report.

The existing closure P.E.I. 1-4, should be rescinded and two new closures should be established; one on the northwest branch, and one on the northeast branch of the Dock River as shown in Figure 4 of this report.

REFERENCES

1. American Public Health Association, Recommended Procedures for the Examination of Sea Water and Shellfish, Fourth Edition, American Public Health Association, New York, 105 pp. (1970).

2. Anon, Determination of Chlorinity by the Knudsen Method, G.M. Manufacturing Company, New York (1962).

ACKNOWLEDGEMENTS

The authors wish to acknowledge the excellent cooperation and assistance provided by the Environmental Control Commission of Prince Edward Island and specifically Mr. C. Murphy of that office. Acknowledgement is also extended to Mr. K. McNeill and Mr. K. Burdet for field sampling and analyses. The help of the members of the Microbiology Section in the organization of the field activities and in the preparation of the report is also gratefully acknowledged.

TABLE 1. FECAL COLIFORM DATA, KILDARE RIVER, P.E.I., 1975

STATION	DATE	MAY 27	JUNE 10	JUNE 23	JULY 7	AUG 12	AUG 27	MEDIAN
	TIDE	H.F.	L.F.	L.F.	H.F.	H.R.	L.R.	
1		2	240	33	<2	79	33	61
2		<2	23	23	<2	33	130	28
3		2	46	2	<2	7	240	5
4		<2	350	5	<2	<2	240	<4
5		<2	350	5	<2	<2	70	<4
6		2	240	130	130	13	110	120
7		<2	26	11	110	33	130	30
8		<2	49	49	79	22	22	36
9		<2	70	8	<2	8	33	8
10		<2	79	33	7	7	7	7
11		17	8	2	17	-	5	8
12		<2	31	5	8	5	2	5
13		4	130	5	2	<2	<2	3
14		<2	33	11	<2	<2	5	<4
15		<2	540	<2	2	<2	<2	<2
16		<2	540	8	2	<2	33	5
17		<2	920	<2	2	<2	2	<2
18		<2	350	5	17	<2	2	4
19		<2	540	<2	2	<2	<2	<2
20		<2	110	<2	17	<2	<2	<2
21		<2	240	<2	8	7	<2	<5
22		2	26	<2	-	2	<2	2
23		2	79	<2	-	5	<2	2
24		<2	110	<2	-	22	8	8
25		<2	33	5	17	2	2	4
26		<2	26	<2	<2	<2	2	<2

H.F. HIGH FALLING TIDE
H.R. HIGH RISING TIDE
L.F. LOW FALLING TIDE
L.R. LOW RISING TIDE

TABLE 2. FECAL COLIFORM DATA, DOCK RIVER AND ALBERTON HARBOUR, P.E.I., 1975

STATION	DATE	JUNE 10	JUNE 23	AUG 12	AUG 19	MEDIAN
	TIDE	L.F.	H.F.	H.R.	L.	
1		-	79	540	-	310
2		-	170	11	130	130
3		-	920	2	11	11
4		-	170	<2	5	5
5		-	49	<2	95	45
6		25	70	2	23	24
7		2	11	<2	2	2
8		<2	<2	<2	<2	<2
9		5	<2	4	2	3
10		<2	<2	<2	2	<2
11		49	5	49	<2	27
12		<2	2	<2	2	<2
13		22	2	4	7	6
14		<2	5	<2	22	<4
15		23	<2	2	4	3
16		<2	<2	<2	2	<2
17		<2	<2	<2	<2	<2
18		5	<2	<2	<2	<2
19		<2	2	<2	<2	<2
20		<2	<2	<2	<2	<2
21		<2	<2	-	-	<2
22		<2	<2	-	-	<2
23		<2	<2	-	-	<2
24		<2	<2	-	-	<2
25		<2	<2	-	-	<2
26		<2	<2	-	-	<2
27		2	<2	-	-	<2
28		-	-	-	-	-
29		<2	<2	-	-	<2
30		<2	<2	-	-	<2
31		<2	2	-	-	<2
32		<2	<2	-	-	<2
33		<2	<2	-	-	<2
34		<2	<2	-	-	<2
35		<2	<2	-	-	<2
36		<2	<2	-	-	<2

L.F. LOW FALLING TIDE
L. LOW TIDE

H.F. HIGH FALLING TIDE
H.R. HIGH RISING TIDE

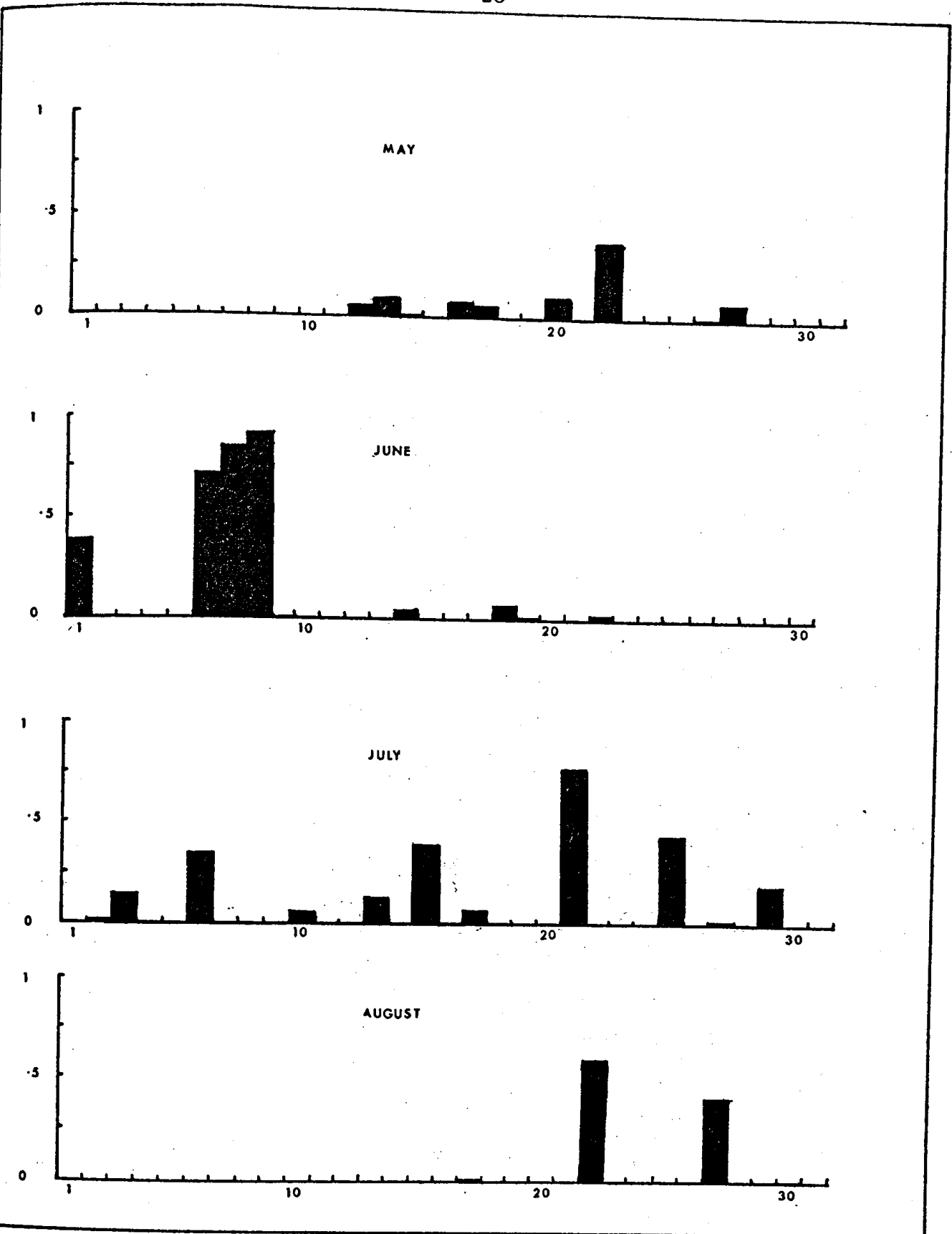


FIGURE 1 PRECIPITATION DATA IN INCHES FOR ALBERTON & KILDARE RIVER, P.E.I., DURING THE STUDY PERIOD, 1975