Environment Canada

Environmental Protection

Environnement Canada

Protection de l'environnement

A Bacteriological Assessment of the Morell River, Kings Co. (Shellfish Area, P.E.I. No. 4)

Surveillance Report EPS 5-WP-72-14
Atlantic Region

ENVIRONMENTAL PROTECTION SERVICE REPORT SERIES

Surveillance reports present the results of monitoring programs carried out by the Environmental Protection Service. These reports will usually be published on a regular basis.

Other categories in the EPS series include such groups as Regulations, Codes and Protocols, Policy and Planning, Technical Appraisal, Technology Development, Surveillance and Reprints of Published Papers.

Inquiries pertaining to Environmental Protection Service Reports should be directed to the Environmental Protection Service, Department of the Environment, Ottawa K1A 0H3, Ontario, Canada.

A BACTERIOLOGICAL ASSESSMENT

of

THE MORELL RIVER. KINGS CO.

(SHELLFISH AREA P.E.I. #4)

by

M.D. Baxter, Department of the Environment

Environmental Protection Service

Halifax, N.S.

for

Shellfish Bacteriological Surveillance

Environmental Protection Service

Report Number EPS 5-WP-72-14

January, 1973

ABSTRACT

Construction of a sewage collection and treatment system for the community of Morell, P.E.I. suggested the need for reassessment of the existing shellfish closure on the Morell River, P.E.I. #4-3.

Results of this study indicate that the tidal waters of Morell River is grossly polluted with coliform bacteria. Sanitary investigation of the surrounding watershed and shoreline delineated two significant sources of pollution in the area.

High coliform densities throughout the tidal waters of the Morell River requires that the existing shellfish closure #4-3 remain in effect to be in compliance with the standards established for shellfish growing waters.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

In compliance with a proposal adopted by the Interdepartmental Shellfish Committee Meeting at Ottawa in March 1972, a physical, sanitary and bacteriological survey of the Morell River, was carried out during the months of June and July 1972. This study was completed by the Mobile Laboratory of Environmental Protection Service, Atlantic Region.

Construction of a sewage collection and treatment system in the community of Morell, suggested the need for reassessment of the shellfish growing waters in the Morell River The survey was completed with the view toward reducing the existing closure area.

Sampling and analysis were carried out by the Mobile Laboratory, located in Charlottetown, over a period of 17 days. The sanitary investigation of the shoreline and watershed was conducted in conjunction with the water monitoring program.

The existing shellfish closure #4-3, on Morell River was implemented following the recommendations of a survey report submitted by Public Health Engineering Division, National Health and Welfare (Manuscript Report #59-4, 1959). The adequacy of the closure was periodically confirmed by a physical sanitary survey from the Moncton Office of Public Health Engineering Division, National Health and Welfare.

The bacteriological assessment of water quality in the Morell River, was carried out to determine the sources of coliform

bacteria in the shellfish growing waters.

A total of 125 water samples were collected from 25 sampling stations, and were tested for coliform and fecal coliform densities by the approved standard method. The sampling times were so arranged as to obtain samples representing conditions at different tidal phases (see Table 1).

Salinity determinations were made each day on a composite of the water samples collected to determine the effect of dilution on salinity due to rainfall and induced landwash (see Table 2).

Weather data was obtained from the Department of the Environment, Atmospheric Environmental Service, for the area. Parameters such as wind velocity and direction, atmospheric temperature and precipitation were recorded for consideration in this report (see Tables 3 and 4).

2. METHODS

All samples were tested for coliform bacteria by the methods outlined in A.P.H.A. "Recommended Procedures for the Bacteriological Examination of Sea Water and Shellfish", Fourth Edition, 1970. Coliform and fecal coliform densities were determined from all water samples by multiple dilution tubes (MPN) methods using Bacto-Lauryl Tryptose Broth with three or five tubes in each of at least three consecutive decimal dilutions with incubation at 35.5°C for 24 and 48 hours. Confirmation of all positive cultures was completed in (a)

Bacto-Brilliant Green Bile Broth with incubation at 35.5°C for 24 and 48 hours, and in (b) Bacto-E.C. medium with incubation for 24 hours at 44.5°C in a recirculating water bath.

Salinity determinations were made by the Knudsen Method from composite samples. Salinities were expressed as parts per thousand (PPT).

Samples were obtained from the 25 sampling stations by a rod sampling device. Water samples were collected in sterile 8-ounce glass bottles and transported to the Mobile Laboratory within 1 hour of collection for subsequent analysis.

3. RESULTS

The location of a total of 25 water sampling stations included in the assessment study are shown in Figure 1. Coliform and fecal coliform MPN counts for the 125 water samples collected are recorded in Table 5.

Sampling stations #1 to #19 were grossly polluted with coliform bacteria. The MPN values of these stations for five samplings were consistently high and totally unacceptable for shellfish growing waters.

Sampling stations #20 to #25 represent the water quality in the estuary of the Morell River. The MPN median values of these stations were significantly lower than those in stations #1 to #19. These values are considered to be within acceptable limits only in

consideration of the other pertinent information presented in this report.

Daily salinity determinations of the composited water samples, show a range differential of 2.8 PPT. The reduced variation in the daily salinity data suggests that rainfall-induced landwash had little, if any, effect on salinity during the study period.

The Atmospheric Environmental Service reported a total of 0.12 inches precipitation during the June sampling period and 0.25 inches during the July period for a total of 0.37 inches during the survey.

From the physical sanitary investigation of the shoreline and surrounding watershed, two very significant sources of pollution were detected: (a) a lift pump station for the sewage collector system located near the shoreline and sampling station #8 was not in operation and visual evidence indicated the unit had not operated for a very considerable time. As a result, the overflow from the system was discharging to the river; (b) a mink ranch located on the western shoreline [sampling stations #6 and #7] was discharging wash water from the mink food storage and mixing building to the river. The accumulation of this waste material [meat and grain] was visually evident on the shoreline in a decomposed state. The Prince Edward Island Water Authority has been notified of these conditions and have given the assurance that remedial action would be implemented at the earliest possible date.

4. DISCUSSION

The Morell River extends inland from St. Peters Bay in a southerly direction approximately 4 miles. The tidal waters extend upriver approximately 3 miles through pasture and woodland. The only dwellings near the shoreline are at the community of Morell.

The existing shellfish closure at the river estuary was implemented in 1960 as a result of the detected increase in coliform levels within the river waters.

The construction of a sewage collector and treatment system in 1970 suggested the need for a reassessment of the closure area.

The bacteriological data of this report clearly demonstrates that high coliform densities were found in the tidal waters of the Morell River. The presence of two potentially significant sources of pollution and high coliform densities in the area indicate the existing closure should be maintained.

Recent consultation with the provincial regulatory authorities indicate that conditions are currently being improved. Repairs to the lift pump station and discontinuing the practice of draining waste material to the river at the mink ranch should improve the water quality of the area significantly.

5. CONCLUSION

It may be concluded that:

(a) the tidal waters of the Morell River are grossly polluted from untreated sanitary sewage discharging to the river,

(b) the bacteriological data of this report illustrates the need for maintenance of the existing closure, in compliance with standards for "Satisfactory Compliance" in shellfish growing waters.

6. RECOMMENDATIONS

(a) That the existing shellfish closure on Morell River, Kings Co., Prince Edward Island, remain in effect as defined in the P.E.I. Fishery Regulations, P.C. 1972-520, March 21, 1972, Schedule "F", Item 4-3: "Morell River, Kings Co., above or southerly of a straight line drawn north 82° 50 min., west astronomic from Reference Point #3 as shown on the St. Peters Bay Oyster Leases Plan".

(b) That the appropriate pollution abatement and regulatory authorities be advised of the existing pollution sources and of the water quality in the tidal reaches of Morell River

TABLE 1. Tidal Phase and Sampling Time for Morell River, P.E.I., Shellfish Area #4

DATE 1972	TIDAL PHASE HIGH TIDE (hrs)	LOW TIDE (hrs)	SAMPLING TIME (hrs)
June 24	0450	1340	1430-1600
June 27	0530	1400	1300-1400
July 4	1053	1700	1100-1200
July 5	0005	0655	1000-1100
July 12	0640	1415	0930-1030

TABLE 2. Salinity Data of Composited Sampling for Morell River Survey Period June and July 1972.

DATE 1972	SALINITY PARTS PER THOUSAND
June 26	16.1
June 27	18.4
July 4	17.3
July 5	18.9
July 12	18.7

TABLE 3. Climatological Data for the Morell River, P.E.I. Shellfish Area #4.

DATE 1972	SAMPLING TIME (hrs)	WATER TEMP. °C	AIR TEMP °C	WIND VELOCITY DIRCTION (MPH)
June 26	1430-1600	18°	21°	W 5/10
June 27	1300-1400	18°	20°	NW 10/15
July 4	1100-1200	20°	19°	NW 5/10
July 5	1000-1100	19°	21°	SW 5/10
July 12	0930-1030	19°	20°	SE 5

TABLE 4. Rainfall Data for Morell River, P.E.I. Shellfish Area #4

Date 1972	Precipitation in inches	
June 26	.05	
June 27	.01	
June 28	.02	
June 29	.04	
	sub total	0.12
July 1	.17	
July 3	.02	
July 4	.02	
July 10	.04	
	sub total	0.25
.		
.		
	TOTAL	0.37

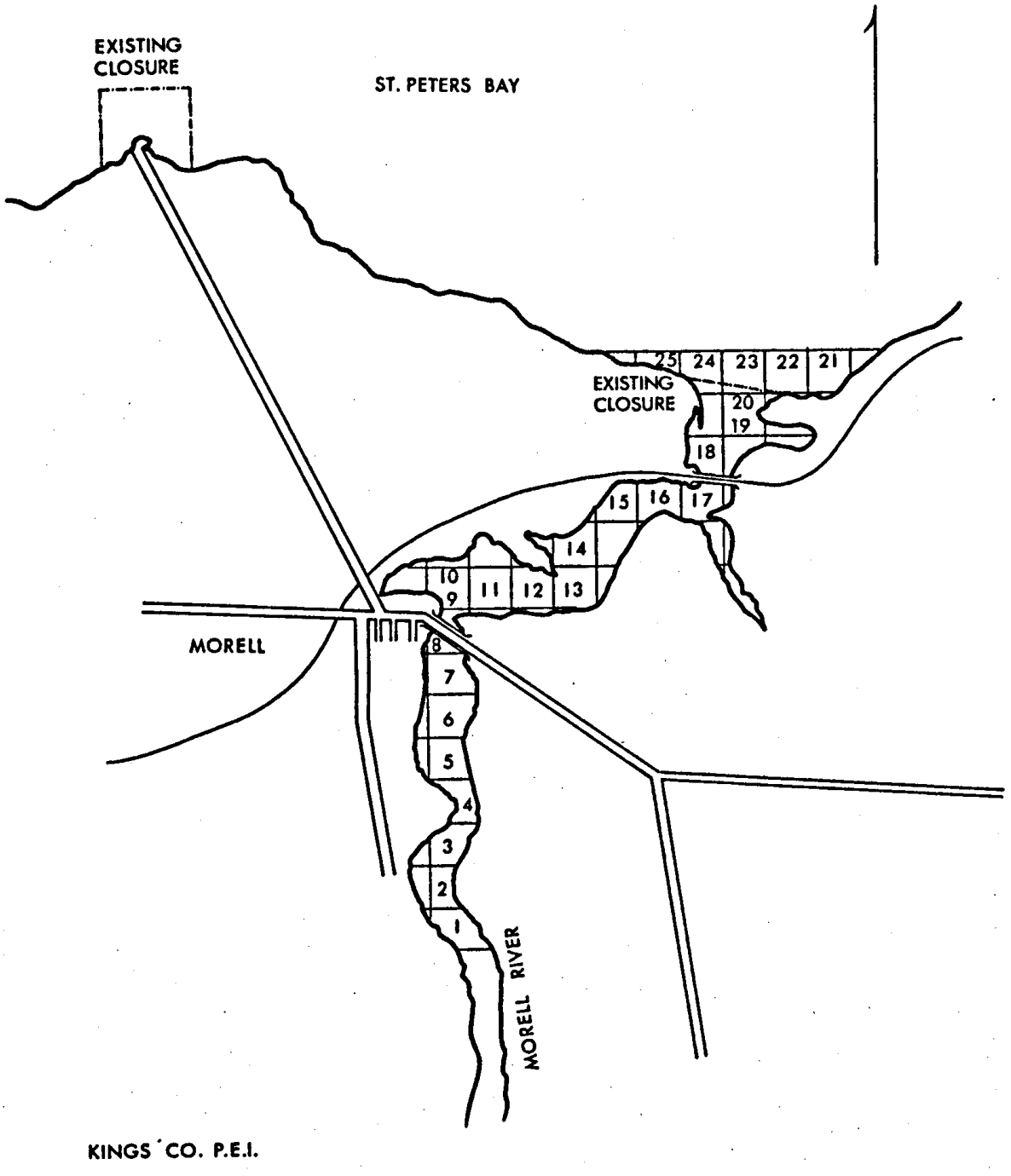
TABLE 5. Coliform and Fecal Coliform Data for the Morell River, P.E.I. Shellfish Area P.E.I. #4.

Station No.	June 26 Coliform	June 26 F.C.	June 27 Coliform	June 27 F.C.	July 4 Coliform	July 4 F.C.	July 5 Coliform	July 5 F.C.	July 12 Coliform	July 12 F.C.	Median Coliform	Median F.C.
1	>2400	>2400	2400	460	460	43	1100	1100	1100	240	1100	460
2	1100	240	1100 +	460	150	43	460 +	240	240	93	460	240
3	1100	150	2400 +	240	1100	240	1100	150	1100	240	1100	240
4	1100	43	2400 +	210	2400	240	240	93	1100	1100	1100	210
5	>2400	>2400	2400	460	1100	210	150	93	460 +	93	1100	210
6	460	93	1100	93	460	93	93	23	2400 +	1100	460	93
7	>2400	1100	1100 +	150	460	43	28	20	2400 +	1100	1100 +	150
8	>2400	240	2400	240	1100	150	460	240	2400	240	2400	240
9	240	43	460	43	460	210	93	43	240	75	240	43
10	>2400	240	1100 +	150	460 +	210	93	43	460	93	460	150
11	150	23	2400	240	2400	1100	43	23	1100 +	240	1100	240
12	>2400	1100	1100	93	1100	240	93	23	2400	240	1100	240
13	240	23	1100	75	1100	210	150	75	240	15	240	75

Table 5. Cont'd

Station No.	Coli-form	F.C.	Coli-form	F.C.	Coli-form	F.C.	Coli-form	F.C.	Coli-form	F.C.	Median Coli-form	Median F.C.
	June 26		June 27		July 4		July 5		July 12			
14	240	43	460	23	240	23	1100	460	460	93	460	43
15	43	43	460	75	150	43	460	75	460	75	460	75
16	460	93	1100 +	150	240	75	1100	240	240	9	460	93
17	150	75	240	23	93	15	240	93	210	15	210	23
18	1100	75	120	15	150	15	240	75	150	9	150	15
19	240	93	240	15	93	23	150	93	240	43	240	43
20	210	93	43	15	93	23	93	23	43	9	93	23
21	150	75	93	15	75	23	240	93	75	23	93	23
22	21	15	43	9	23	9	150	43	43	15	43	15
23	9	<3	23	9	9	9	15	4	9	4	9	4
24	7	4	<3	<3	9	<3	23	7	9	4	9	4
25	4	<3	<3	<3	<3	<3	4	<3	15	<3	4	<3

FIGURE 1.



DEPT. OF THE ENVIRONMENT
ENVIRONMENTAL PROTECTION SERVICE
ATLANTIC REGION

Morell River
Shellfish Area P.E.I. #4
Survey Sampling Stations 1972

SCALE:	DATE:	DWG. NO.
DRAWN:	CHECKED:	APPROVED: