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A Bacteriological and Sanitary Assessment of the Cocagne River and Harbour, Kent County (Shellfish Area, N.B. No. 6)

Surveillance Report EPS 5-WP-72-25
Atlantic Region

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A BACTERIOLOGICAL AND SANITARY ASSESSMENT

of

THE COCAGNE RIVER ESTUARY, KENT COUNTY

(SHELLFISH AREA, N.B. #6)

by

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for

Shellfish Bacteriological Surveillance

Environmental Protection Service

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ABSTRACT

A bacteriological and sanitary assessment study of the Cocagne River Estuary, a part of New Brunswick Shellfish Area #6, was conducted during May and June, 1972 by personnel of the Mobile Bacteriological Laboratory Unit of Environmental Protection Service, Atlantic Region.

The purpose of the study was to assess the adequacy of the present closure (SOR/71-28 New Brunswick Fishery Regulations para 6-5) as a result of a request from local fishermen in the area. The closure reads: "Cocagne Harbour and Cocagne River, Kent County westerly of a straight line drawn across the harbour from Oyster Survey Monument No. K-16 on Jim Long's Cape as shown on the plan showing oyster leases in Cocagne Harbour to Oyster Survey Monument K-21".

The existing closure was found to be adequate and in compliance with national standards for shellfish producing waters.

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1. INTRODUCTION

A bacteriological and sanitary assessment of the Cocagne River Estuary, New Brunswick (N.B. Shellfish Area #6), was conducted during May and June, 1972 by personnel of the Mobile Bacteriological Laboratory Unit of Environmental Protection Service, Atlantic Region.

The purpose of the study was to assess the need or the adequacy of the present closure (SOR/71-28 New Brunswick Fishery Regulations para 6-5) as a result of a request from local fishermen in the area. The closure area has an abundance of shellfish and therefore, it has economic importance.

The Cocagne River and Harbour receives sanitary sewage from numerous outfalls along both sides of the estuary. A 1968 bacteriological and sanitary survey by Public Health Engineering Division, Atlantic Region (Silliphant, et al. MS, 1968) showed that the Cocagne River and Harbour were grossly polluted.

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 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 (See Table 1).

Samples were obtained from 50 sampling stations with the aid of a rod sampling device. These samples were placed into sterile 8-ounce glass bottles and transported to the Mobile Laboratory within 1 hour of collection. The samples were immediately inoculated into prepared fermentation tubes, using the appropriate graduated quantities, for incubation.

3. RESULTS

The locations of the 50 water sampling stations used during this study are shown in Figure 1. Bacteriological results for the 189 water samples collected from these stations are recorded in Table 2. Water temperature, air temperature, tidal stage and wind data, as well as daily rainfall data (Atmospheric Environment Service, Department of the Environment) for Cocagne River, N.B., are presented in Tables 3, 4 and 5, respectively.

There were twenty-eight stations (56 per cent) with median coliform MPN counts greater than 70, and fifteen stations (30 per cent)

where the median coliform MPN counts exceeded 230. Twenty-two stations (44 per cent) had median fecal coliform MPN counts greater than 23.

The Cocagne River, upstream of the bridge crossing Route 11 highway, receives sanitary wastes from approximately 15 single family dwellings or cottages located on the south side of the river. This occurs either as a direct discharge or a septic tank effluent. In the immediate bridge area, three restaurants, one service station, and several homes discharge sanitary wastes. Refuse from the restaurants is stored on the bank of the river and presents a danger of spilling into the river before proper disposal.

In the harbour area, sanitary wastes from E.P. Melanson's Lobster Packing Plant are discharged, untreated, directly into the harbour. This plant has several process water outfalls; however, these are relatively free of any obvious process waste material. Several storm drains also empty into the harbour. In the wharf area, where most outfalls empty, there was evidence of oil or gas on the water. This could be lubricating oil or gas from the truck-fleet servicing operations.

Other minor sources of pollution in the watershed, such as drainage from manure piles or other general farming activities, cause noticeable effects on coliform densities in the Cocagne River. This was indicated following the heavy rainfall on June 1. The coliform densities in the upper reaches of the river increased significantly at this time.

4. DISCUSSION

It is apparent from the results of the sanitary investigation that numerous sources of untreated waste enter the Cocagne estuary area. The effects of these discharges on the receiving-water quality is substantiated by the bacteriological results. The effect of rainfall is particularly apparent in these results. On June 1 and 2, precipitation amounted to 0.61 and 0.55 inches, respectively. Bacteriological results of samples obtained on June 2, showed coliform MPN values in excess of 1,100 at stations #1 to #16 with only one exception at station #9. Rainfall-induced landwash has a significant effect on the bacteriological contamination of this estuary.

5. CONCLUSIONS

It may be concluded that:

(a) the need for continued maintenance of the existing shellfish closure, is confirmed by the bacteriological data, and the number of sewer outfalls noted by this report.

6. RECOMMENDATIONS

It is recommended that:

(a) the existing shellfish closure on the Cocagne River and Harbour, Kent County, N.B. as defined

by the New Brunswick Fishery Regulations P.C. 1971-16, January 12, 1971, Schedule 'E: Item 6-5, is adequate and should remain in effect.

(b) the Environmental Protection Service should inform the appropriate pollution abatement authorities of the pollution condition in the Cocagne River and Estuary waters.

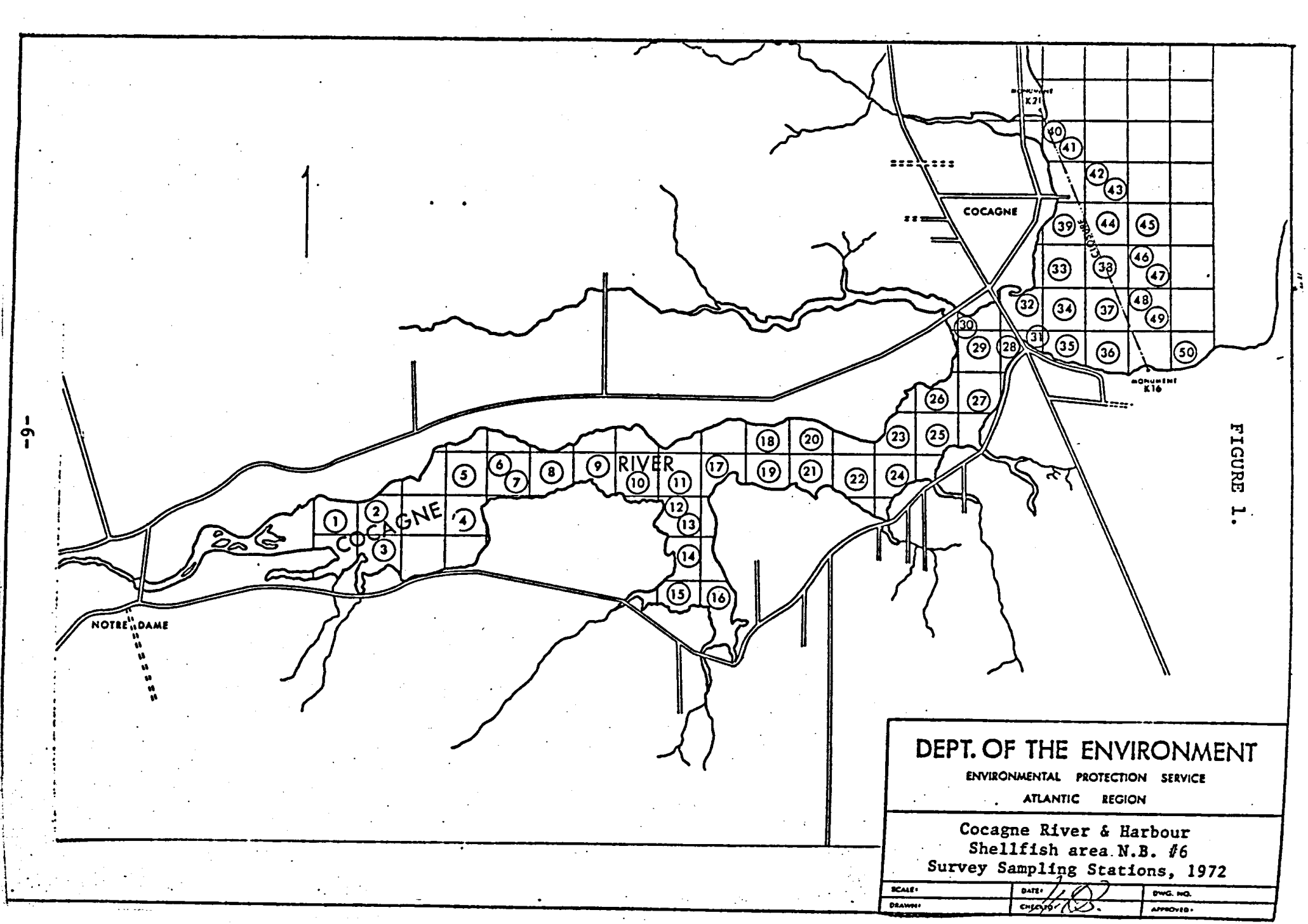

FIGURE 1.

DEPT. OF THE ENVIRONMENT
ENVIRONMENTAL PROTECTION SERVICE
ATLANTIC REGION

Cocagne River & Harbour
Shellfish area N.B. #6
Survey Sampling Stations, 1972

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

TABLE 1. SALINITY DATA IN PARTS PER THOUSAND (PPT) FOR THE COCAGNE RIVER DURING THE SURVEY PERIOD MAY 30 - JUNE 2, 1972.

DATE 1972	SALINITY PARTS PER THOUSAND
May 30	19.3
May 31	19.7
June 1	17.1
June 2	16.4

TABLE 2 . COLIFORM AND FECAL COLIFORM DATA

FOR THE COCAGNE RIVER, SHELLFISH AREA #6

Station No.	Coli-form May 30	F.C. May 30	Coli-form May 31	F.C. May 31	Coli-form June 1	F.C. June 1	Coli-form June 2	F.C. June 2	Coli-form	F.C.	Median Coli-form	Median F.C.
1	14	9	460	93	120	39	>1100	240			290	66
2	15	4	460	460	75	43	>1100	93			265	68
3	210	9	23	9	11	<3	>1100	460			115	9
4	75	23	21	9	4	<3	>1100	240			50	16
5	93	93	93	93	23	4	>1100	460			93	93
6	120	43	>1100	460	43	4	>1100	460			>1100	250
7	93	4	150	93	43	9	>1100	460			120	50
8	<3	<3	120	75	43	9	>1100	460			80	41
9	9	<3	-	-	150	15	23	23			23	15
10	75	9	15	15	15	4	>1100	240			45	12
11	23	<3	43	9	43	<3	1100	93			43	5
12	4	<3	<3	<3	23	<3	>1100	460			14	<3
13	15	4	460	43	93	15	>1100	460			275	29
14	11	4	240	93	21	7	>1100	>1100			130	50
15	9	4	43	23	4	4	1100	240			26	14
16	23	4	9	4	4	15	>1100	460			20	4
17	15	<3	7	7	23	23	150	43			20	15
18	64	9	460	23	21	7	15	4			42	8
19	93	4	7	7	43	<3	4	4			25	4
20	28	4	93	43	23	4	460	23			60	14
21	93	4	15	7	9	4	75	4			45	6
22	460	23	<3	<3	<3	<3	>1100	240			230	12
23	93	4	150	15	11	4	>1100	460			120	10
24	150	9	<3	<3	120	120	460	240			135	65

TABLE 2. CONTINUED

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	F.C.
	May 30		May 31		June 1		June 2					
25	43	15	15	9	43	15	20	9			32	12
26	75	43	93	15	7	4	15	4			45	10
27	23	9	43	23	93	15	210	75			68	19
28	150	4	120	75	23	9	240	15			135	12
29	20	4	93	43	>1100	>1100	>1100	460			>1100	250
30	150	4	>1100	460	460	43	43	7			305	25
31	1100	43	120	15	93	7	93	43			105	29
32	>1100	150	>1100	240	>1100	>1100	150	15			>1100	195
33	460	23	75	7	>1100	>1100	>1100	240			>1100	132
34	240	110	43	7	120	9	93	9			105	9
35	460	93	1100	240	20	7	1100	150			780	120
36	120	93	93	<3	20	<3	4	4			55	2
37	-	-	210	9	-	-	4	<3			105	5
38	240	93	93	23	>1100	>1100	43	<3			165	58
39	460	240	150	4	120	9	43	9			135	9
40	-	-	>1100	460	20	7	>1100	1100			>1100	460
41	240	23	1100	460	20	<3	240	23			240	23
42	1100	240	>1100	1100	460	93	93	23			780	167
43	-	-	460	93	460	210	1100	23			460	93
44	-	-	210	93	93	23	23	4			93	23

TABLE 2. CONTINUED

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.
	May 30		May 31		June 1		June 2					
45	-	-	43	23	15	7	23	<3			23	7
46	-	-	23	15	15	7	<3	<3			15	7
47	-	-	7	7	23	4	9	<3			9	4
48	-	-	7	4	<3	<3	<3	<3			<3	<3
49	-	-	23	9	15	7	<3	<3			15	7
50	-	-	93	23	43	4	43	23			43	23
	LOW TIDE		LOW FALLING		LOW RISING		HIGH TIDE					

TABLE 3. CLIMATOLIGICAL DATA FOR THE COCAGNE RIVER N.B.

DURING THE SURVEY PERIOD MAY 30 - JUNE 2, 1972.

DATE 1972	SAMPLING TIME (HRS)	WATER TEMP. °C	AIR TEMP °C	WIND VELOCITY DIRCTION (mph)
May 30	1100 - 1300	16°	18°	SW° 5
May 31	1330 - 1530	15°	22°	W° 5-10
Jun 1	1400 - 1600	15°	25°	SW° 5-10
Jun 2	0900 - 1100	17°	15°	SW° 5-10

TABLE 4. TIDAL PHASES & SAMPLING TIMES FOR THE COCAGNE RIVER DURING THE SURVEY PERIOD MAY 30 - JUNE 2, 1972.

DATE 1972	TIDAL PHASE HIGH TIDE (hrs)	LOW TIDE (hrs)	SAMPLING TIME (hrs)
May 30	0715	1740	1100 - 1300
May 31	0755	1820	1330 - 1500
June 1	0830	1855	1400 - 1600
June 2	0920	1930	0900 - 1100

TABLE 5. RAINFALL DATA FOR THE COCAGNE RIVER

DURING THE SURVEY PERIOD MAY 30 - JUNE 2, 1972.

Date 1972	Precipitation in inches
May 29	.00
May 30	.00
May 31	.00
June 1	.61
June 2	.55
	TOTAL 1.16 INCHES