Environment Canada
Environnement Canada

Environmental Protection
Protection de l'environnement

Shellfish Growing Water Sanitary Survey of Comox Harbour Area British Columbia, 1974

Surveillance Report EPS 5-PR-74-13

Pacific Region

November, 1974

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 E.P.S. series include such groups as Regulations, Codes, and Protocols, Policy and Planning, Technical Appraisal, Technology Developments, 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, Kapilano 100, Park Royal, West Vancouver, B.C. V7T 1A2.

SHELLFISH GROWING WATER SANITARY SURVEY

OF

COMOX HARBOUR AREA

BRITISH COLUMBIA

by

B. Kay, B.Sc.

and

T.J. Tevendale, P.Eng.

Pollution Abatement Branch
Environmental Protection Service
Pacific Region
Vancouver, B.C.

Report EPS 5-PR-74-13
November 1974

ABSTRACT

A sanitary and bacteriological survey of Comox Harbour and the contiguous tidal foreshore from Goose Spit to Kye Bay, was conducted from April 17 to May 10, 1974, by personnel of the Environmental Protection Service, Pacific Region. The survey was conducted concurrent with a study of Baynes Sound (E.P.S. Surveillance Reports EPS 5-PR-74-9 and EPS 5-PR-74-10).

The purpose of the survey was to re-evaluate the quality of the shellfish growing waters in Comox Harbour, which is presently under Schedule J closure (B.C. Fishery Regulations).

The bacteriological quality of the majority of marine sample stations was acceptable, with only three stations exceeding the present growing water standards. One of the latter stations was positioned over a commercial oyster lease in Comox Harbour.

A recommendation is made to conduct a comprehensive winter sanitary and bacteriological survey of the Harbour, including analysis of growing waters, shellfish tissue and freshwater streams entering the harbour.

RESUME

Le personnel du Service de protection de l'environnement (région du Pacifique) a entrepris une étude sanitaire et bactériologique du port de Comox et de l'avant-plage contigüe qui s'étend de Goose Spit à Kye Bay, pendant la période du 17 avril au 10 mai. Cette étude fut entreprise en corrélation avec une étude similaire dans le détroit de Baynes (S.P.E., Rapports de surveillance S.P.E. 5-PR-74-10 et S.P.E. 5-PR-74-9).

L'étude avait pour objet de réévaluer la qualité des eaux où se reproduisent les crustacés et les mollusques dans le port de Comox, qui tombe actuellement sous les dispositions de l'annexe J du Règlement sur les pêcheries de la C.-B.

La majorité des échantillons qui ont été prélevés furent acceptables du point de vue bactériologique, à l'exception de trois qui ne répondaient pas aux normes acceptables en la matière. Un de ces prélèvements a eu lieu dans une station située dans les eaux d'une concession huîtrière du port de Comox.

On a donc recommandé d'entreprendre une étude bactériologique détaillée du port, y compris l'analyse des eaux où se reproduisent les mollusques et les crustacés et celle de leurs tissus et des courants d'eau douce que pénètrent dans le port.

TABLE OF CONTENTS

1. INTRODUCTION

The shellfish growing waters of Comox Harbour were last surveyed in April and November 1964 by the federal Department of National Health and Welfare and the provincial Department of Health Services and Hospital Insurance. These studies resulted in a closure of the harbour in 1965. Prior to this time, the harbour was a commercial source of oysters from leased oyster beds. The leases are still used as a commercial source of seed oysters. A reassessment of these waters was deemed necessary to determine the validity of the present Schedule J closure and to assess the growing water quality of the foreshore waters outside the harbour.

Accordingly, a sanitary and bacteriological survey of Comox Harbour and the contiguous tidal foreshore from Goose Spit to Kye Bay was conducted from April 17 to May 10, 1974, by personnel of the Environmental Protection Service, Pacific Region. The survey was conducted concurrent with a survey of the tidal foreshore of northern Baynes Sound[4,5] (Denman Island and Vancouver Island).

Nine marine sample stations were located inside the harbour. The remaining marine stations were primarily located along the tidal flats between Balmoral Beach and Cape Lazo. The Courtenay sewage lagoon and the Canadian Forces Base Comox sewage treatment plant effluents and several freshwater inputs to the harbour were also monitored for the presence of fecal contamination.

2. SAMPLE STATION LOCATIONS

Sample stations were located in Comox Harbour to assess the impact of the Courtenay River (and other freshwater inputs to the harbour) on the shellfish growing water quality. Only limited sampling of the harbour was possible as most of the survey period was allotted to the concurrent study of Baynes Sound.

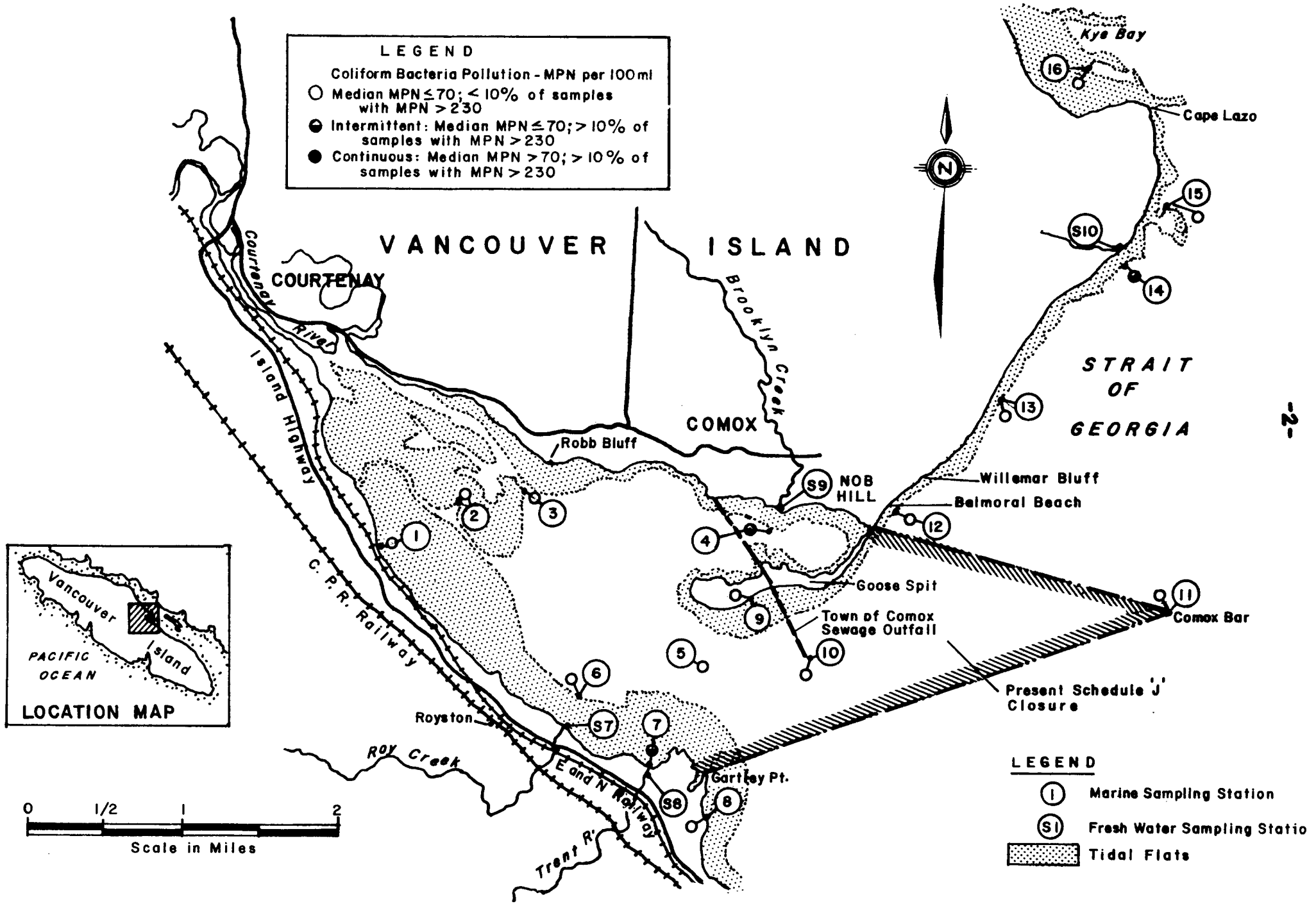

FIGURE I. SAMPLE STATION LOCATIONS

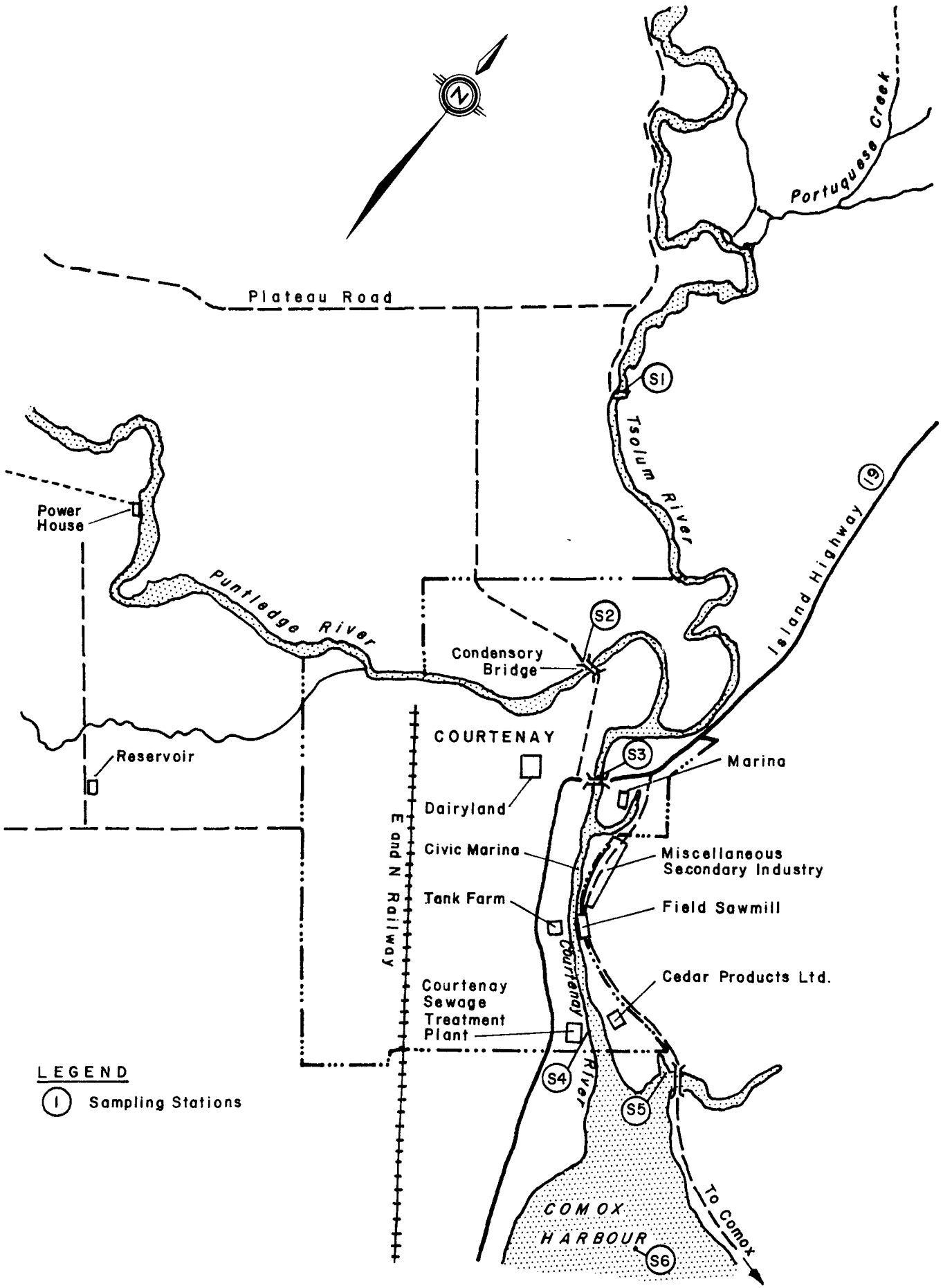

FIGURE 2 FRESH WATER STATIONS - COURTENAY RIVER TRIBUTARIES.

Sample stations 1, 2 and 3 were located over the tidal mudflats at the mouth of the Courtenay River. In addition to these marine stations, freshwater stations were placed on the Puntledge, Tsolum and Courtenay Rivers (S2, S1, S3 and S6) to assess the sources and levels of bacterial pollution entering the receiving waters by way of the Courtenay River.

Station 4 was positioned over the B.C. Packers oyster lease (lot 140) which is presently being used for hardening the shells of seed oysters.

Sample stations 6, 7 and 8 were chosen to evaluate the bacterial levels in the receiving waters influenced by Roy Creek, the Trent River and possible faulty on-site disposal systems, respectively. Roy Creek (S7) and Trent River (S8) were also sampled.

Sample stations 5, 9 and 10 were chosen to determine the extent and degree of bacterial pollution resulting from the Town of Comox raw sewage outfall.

Sample stations 12, 13, 14, 15 and 16 were positioned between Balmoral Beach and Kye Bay to evaluate sewage pollution from faulty on-site disposal systems and from a creek (S10) which drains surrounding farmland and receives effluent from the CFB Comox sewage treatment plant.

Sample station locations are shown in Figures 1 and 2, and complete descriptions are given in Appendix I.

3. FIELD PROCEDURE AND METHODS

Sample stations were selected and a bacteriological water testing program developed to assess the shellfish growing water quality and the sources of sewage pollution.

3.1 Bacteriological Sampling and Analysis

All water samples for bacteriological analysis were collected in sterile 6-ounce wide-mouth bottles approximately

six inches to one foot below the water surface. The water depth at collection points over the shellfish beds did not exceed four feet. All samples were collected by boat or by wading and stored in coolers at temperatures not exceeding 10°C until processed. Analyses were carried out in the Environmental Protection Service mobile laboratory and were performed within four hours of collection.

The total confirmed coliform MPN per 100 ml was determined using the multiple tube fermentation technique (at least 3 decimal dilutions of 5 tubes each) as described in Part 407A of the 13th edition of Standard Methods for the Examination of Water and Wastewater[1].

The fecal coliform MPN per 100 ml was determined as described in Part 407C of Standard Methods. Incubation was for 24±2 hours in a water bath equipped with a circulation device, and maintained at 44.5±0.2°C. Media used for the coliform MPN determinations was Lauryl Tryptose Broth and Brilliant Green Bile (2%) Broth for the confirmed test, and EC medium for the fecal coliform test.* The MPN/100 ml of each sample was calculated from Table II, Recommended Procedures for the Examination of Sea Water and Shellfish, Fourth Edition (1970)[2].

3.2 Physical Testing Equipment and Analyses

Temperature and salinity measurements were determined at a depth of six inches to one foot below the water surface. A Beckman Model RB-349 Solubridge Electrolytic Conductivity Meter was used for these measurements.

Tide data is for the Point Atkinson reference point. Daily rainfall and wind velocity (range recorded between 1100 and 1600 hours) was that recorded at Canadian Forces Base, Comox. Results are presented in Appendix II.

*All test media used was Bacto Brand obtained from Difco Laboratories, Detroit, Michigan.

4. DISCUSSION OF RESULTS

Sample station locations are shown in Figures 1 and 2. Daily bacteriological and elemental data for each sample station is presented in Tables 6 and 7 of Appendix II. Total and fecal coliform MPN results for marine sample stations are summarized in Tables 1 and 2, respectively. Bacteriological results for freshwater sample stations are summarized in Table 3. Precipitation data is presented in Figure 3.

The present shellfish growing water standards are defined as follows: "In order that an area can be considered bacteriologically safe for the harvesting of shellfish, the total confirmed coliform median MPN of the water must not exceed 70 per 100 ml, and not more than 10% of the samples ordinarily exceed an MPN of 230 per 100 ml for a 5 tube decimal dilution test in those portions of the area most probably exposed to fecal contamination during the most unfavourable hydrographic and pollution conditions. The foregoing limits need not be applied if it can be shown by detailed study that the coliforms are not of direct fecal origin and do not indicate a public health hazard."(3)

A total of 149 marine and 45 freshwater samples were collected for bacteriological analyses during the survey period. A minimum of six samples was collected for each marine station.

The bacteriological results presented in Table 1 indicate that all but three of the marine sample stations met the present shellfish growing water standards. Sample stations 4, 7 and 14 exceeded the 90 percentile limit of 230/100 ml with at least 14 samples being taken at each of these three stations. Oysters were also sampled from station 4; however, they were of acceptable bacteriological quality, with a fecal coliform MPN of 80/100 g.

4.1 Comox Harbour

Sample stations 1-4 were located inside Comox Harbour to assess the impact of the Courtenay River on the shellfish growing water quality. Stations 1, 2 and 3 exhibited acceptable total coliform levels and negligible fecal coliform pollution. However, station 4 exhibited unacceptable intermittent total coliform densities, with a median MPN value of 46/100 ml and a 90 percentile level of 435/100 ml.

Freshwater sample stations were placed on the Tsolum (S1), Puntledge (S2), and Courtenay Rivers (S3, S6) to determine possible sources of pollution to the harbour. In addition, the Courtenay Sewage lagoon (S4) and a slough (S5) draining farmland near the mouth of the Courtenay River were also monitored. A map of these stations is presented in Figure 2.

The pollution levels of the Courtenay River at S3 were moderate, with a total coliform MPN range of 33/100 ml - 1700/100 ml and a fecal coliform MPN range of 4.5/100 ml - 220/100 ml. One source of bacterial pollution to the Courtenay River was the Tsolum River, where a total coliform MPN range of 49/100 ml - 350/100 ml was recorded at S1. No significant bacterial pollution was observed in the Puntledge River. The bacterial levels in the Tsolum River most probably resulted from pasture land run-off, as a total of 0.33 inches of rain was recorded during the four-day sampling program on these rivers.

Sample station S6 was located at the mouth of the Courtenay River to determine if any deterioration in water quality occurred between station S3 at the Highway 19 Bridge, and S6, as a result of the Courtenay sewage lagoon effluent and other discharges into the river. Station S6 was also chosen to serve as an indication of the total bacterial pollution contributed by the Courtenay River.

TABLE 1: SUMMARY OF TOTAL CONFIRMED COLIFORM MPN DATA FOR SHELLFISH GROWING WATER SAMPLES

Sample Station	Number of Samples	MPN Range	Median MPN per 100 ml	90 Percentile MPN/100 ml
1	6	17-79	46.5	79
2	6	7.8-70	39.4	57.4
3	14	11-170	36	140
4	15	7.8->1600	46	435
5	6	13-49	36	49
6	6	7.8-70	39.5	57.4
7	14	4.5-1600	56.5	420
8	10	<1.8-70	22.5	49
9	6	23-79	49	73.6
10	14	4.5-350	33	130
11	6	<1.8-49	8	47.2
12	14	<1.8-220	13.5	97.6
13	6	<1.8-23	2.0	11.6
14	14	<1.8->1600	46	306
15	6	<1.8-49	4.8	47.2
16	6	<1.8-33	1.9	23.4

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR SHELLFISH GROWING WATER SAMPLES

Sample Station	Number of Samples	MPN Range	Median MPN per 100 ml	90 Percentile MPN/100 ml
1	6	6.8-14	9.4	13.4
2	6	4.5-7.8	7.3	7.8
3	14	1.8-33	4.5	16.3
4	15	<1.8-920	11	23
5	6	2.0-14	7.8	13.4
6	6	4.5-7.8	7.3	7.8
7	14	2.0-240	9.4	52.6
8	10	<1.8-22	3.0	6.8
9	6	1.8-14	8.8	13.4
10	14	<1.8-14	5.7	11
11	6	<1.8-11	1.8	9.1
12	14	<1.8-17	4.5	11.5
13	6	<1.8-2.0	<1.8	∿1.9
14	14	<1.8-220	8.9	121.6
15	6	<1.8-1.8	<1.8	1.8
16	6	<1.8-33	1.8	17.9

TABLE 3: SUMMARY OF BACTERIOLOGICAL MPN DATA FOR FRESHWATER SAMPLES

Sample Station	Number of Samples	MPN RANGE	
		Total Confirmed Coliform/100 ml	Fecal Coliform/100 ml
S1	4	49-350	13-49
S2	4	1.8-7.8	<1.8-4.5
S3	4	33-1700	4.5-220
S4	4	$7.9x10^4$-$9.2x10^5$	$1.7x10^4$-$1.1x10^5$
S5	4	49-540	33-79
S6	4	13-350	2.0-49
S7	4	170-1700	170-1300
S8	4	<1.8-49	<1.8-4.5
S9	5	49-1600	17-79
S10	4	140-1100	33-220
S11	4	49-350	14-<200

Examination of the bacteriological data for stations S3 and S6 indicate that, rather than a deterioration in water quality, there was an apparent improvement. The water quality at stations S6, 1, 2 and 3 was acceptable despite the discharge of 675,000 Igpd of sewage lagoon effluent into the Courtenay River at S4. During the survey period, the fecal coliform MPN levels in the effluent ranged from 1.7×10^4/100 ml to 1.1×10^5/100 ml.

The apparent improvement of the water quality was the result of tidal influences on the Courtenay River. During high tides, Comox Harbour waters are present to dilute and disperse pollutants in the river. In addition, the presence of seawater will increase the die-off rate of coliform bacteria entering the river. Station S6 could only be sampled during periods of higher tides and therefore it is conceivable that on low tides, where limited dilution of the lagoon effluent is achieved, shellfish in the tidal mudflats at the mouth of the river may become contaminated to dangerous levels.

Unacceptable bacterial levels observed at station 4 probably do not result from the Courtenay River, as stations 1, 2 and 3 exhibited acceptable water quality. Possible sources of bacterial contamination in this area may include: (1) Comox sewer system pumphouse; (2) Brooklyn Creek (S9); (3) discharges from boats moored at the government wharf and private marina; (4) landwash and septic tank seepage from summer homes and the DND Navy establishment on Goose Spit. Low levels of fecal contamination, ranging from a fecal coliform MPN of 17/100 ml to 79/100 ml, were detected in Brooklyn Creek. The bacterial densities may possibly increase in relation to rainfall, although there was considerable precipitation during the sampling period.

This bay is well protected from heavy seas, and there is poor tidal flushing. As a result, any pollution entering this area is likely to disperse and dilute at a very slow rate. Seed oysters from the B.C. Packers commercial lease in the vicinity of station 4 are not directly marketed

but are relayed to growing waters of acceptable quality in Henry Bay, Denman Island. However, a serious potential health risk exists if oysters are taken by recreational harvesters.

4.2 Comox Harbour Entrance

In addition to pollution emanating from the Courtenay River, the town of Comox sewage outfall was a possible source of bacterial contamination to Comox Harbour (see Figure 1). Raw sewage is discharged from an outfall extending 2,750 feet from the southeastern shore of Goose Spit into the receiving waters at a maximum rate of 490,000 Imperial gallons per day. Sample station 10, located above the sewage outfall, and sample stations 5, 6 and 9, located across the entrance to Comox Harbour, all exhibited acceptable water quality, suggesting there is sufficient dilution of the effluent. Waldichuk[6] stated that Comox Harbour is a positive estuary, i.e. it receives more fresh water from runoff and precipitation than it loses by evaporation. Thus there is always a flow of water out of the harbour into the sea. Strong southeasterly winds, which are predominant during the winter, generally retard the seaward flow of surface water contributed by runoff. However, there appears to be sufficient mixing to adequately reduce the bacterial densities resulting from the sewage outfall.

Fecal coliform MPN levels in Roy Creek (S7) ranged from 170/100 ml to 1300/100 ml indicating a potential health hazard exists in the vicinity of its discharge to the harbour. The coliform contamination from Roy Creek was not apparent at sample station 6.

4.3 Gartley Point

Limited sampling was done in this area. Station 7 was located near the mouth of the Trent River (S8), while station 8 was located south of Gartley Point, fronting approximately ten dwellings. Unacceptable bacterial levels were recorded at station 7, with a total coliform median MPN of 56.5/100 ml and a 90 percentile MPN level of 420/100 ml. The most probable source of pollution in this area was the Trent River,

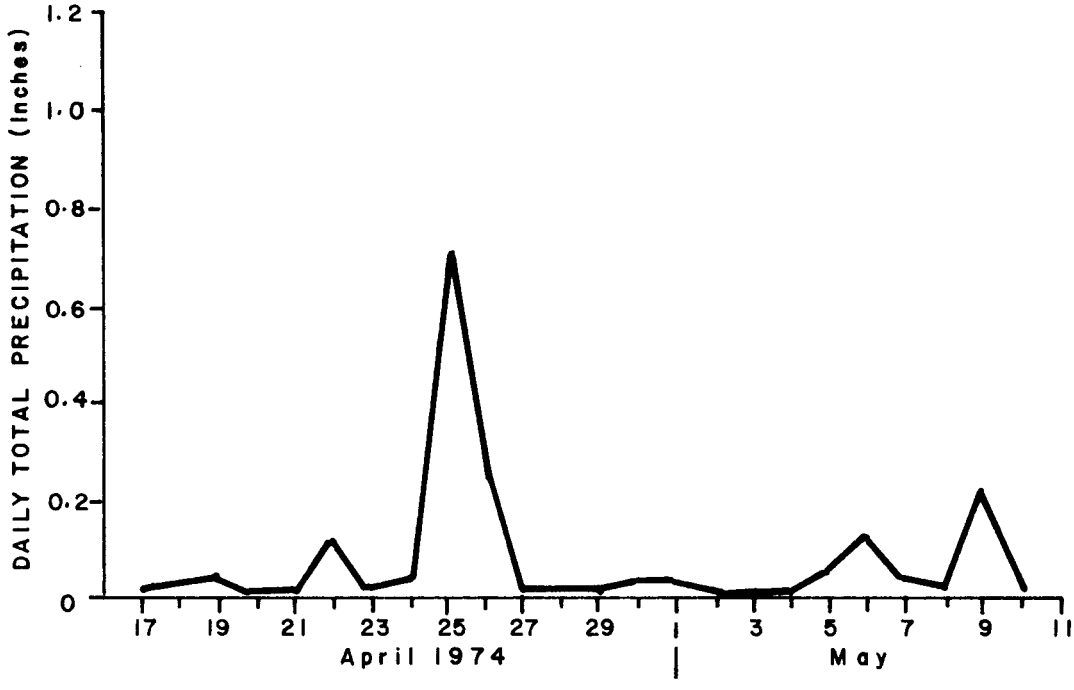

FIGURE 3 PRECIPITATION DATA

although samples taken from the river did not exhibit significantly high bacterial levels. Unfortunately, the sampling programs for station 7 and station S8 did not coincide, and as a result no correlation can be drawn between high marine MPN's and high river MPN's.

Ten samples were taken from stations 8 and all exhibited acceptable growing water quality.

4.4 Balmoral Beach to Cape Lazo

Sample stations 12, 13, 14 and 15 were located along the tidal foreshore between Cape Lazo and Balmoral Beach to evaluate domestic sewage pollution inputs as well as freshwater inputs. Stations 12, 13, and 15 were all of acceptable water quality. The homes in this area are well away from the beach area and no evidence of effluent seepage from on-site disposal systems was observed along the beach.

Station 14 exceeded the water quality standards with a total coliform median MPN of 46/100 ml and a 90 percentile MPN of 306/100 ml. Bacterial contamination at this point was contributed by S10, where the fecal coliform MPN ranged from 33/100 ml to 220/100 ml. This ditch drains a considerable area of farmland and is susceptible to contamination from animal sources. In addition, chlorinated effluent from the Comox Canadian Forces Base sewage treatment plant is introduced into this ditch at the rate of between 300,000 and 1,000,000 Igpd. During the survey period, the bacteriological quality of the effluent was excellent, the fecal coliform MPN not exceeding 200/100 ml. However, totally or partially unchlorinated sewage effluent may be discharged during periods of excessive flows and/or plant breakdowns which will cause water quality deterioration at station 14 and the surrounding receiving waters.

4.5 Kye Bay

Sample station 16, located in Kye Bay, did not exhibit any significant fecal coliform contamination. This area is a popular resort spot, with several motels on the beachfront.

For this reason, the highest pollution levels would most probably occur during the summer months, during the greatest recreational utilization of the beach area. Thus a very limited sampling program and sanitary survey of this area was performed.

5. CONCLUSIONS

(i) The shellfish growing waters of Comox Harbour are susceptible to sewage pollution from the Courtenay River. During the survey period, marine sample stations in Comox Harbour exhibited acceptable water quality (with the exception of station 4), suggesting there was adequate dilution of any sewage effluents. Nevertheless, shellfish may become dangerously contaminated during periods of low tide, when dilution is limited.

(ii) The high bacterial densities observed at station 4 most probably result from local sources of pollution. Due to the presence of a sewage pumphouse in this area, the waters are subject to contamination by raw sewage during periods of excessive flows or pump breakdowns. The pumphouse is not equipped with an auxiliary pump or an emergency power system. As a result, oysters may be unsafe for consumption by recreational harvesters.

(iii) The Town of Comox sewage effluent discharged at the outfall did not appreciably reduce the water quality either outside or inside Comox Harbour, during the reported survey period.

(iv) The tidal foreshore of Comox Harbour between the Royston Wharf and Gartley Point is subject to fecal contamination from Roy Creek and the Trent River.

(v) The receiving waters at station 14 are subject to fecal contamination from the ditch which receives the C.F.B. Comox sewage treatment plant effluent and drains the surrounding farmland.

Plans are in preparation to upgrade the C.F.B. Comox Sewage Treatment Plant and the works are scheduled for completion by 1977. These changes will include:(1) replacement of sewer lines to reduce infiltration; (2) installation of a marine outfall for use during the winter months; (3) possible installation of a separate effluent discharge pipe for use in spray irrigation of surrounding farmlands during the summer months; and (4) general upgrading of the treatment plant equipment and operation.

6. RECOMMENDATIONS

(i) The present Schedule J closure of Comox Harbour should be maintained until a comprehensive bacteriological survey including analysis of growing waters, shellfish tissue and freshwater inputs can be conducted to evaluate all sources of pollution and more accurately ascertain the extent of pollution in the harbour. This survey should be conducted during the winter months when pollution levels are apt to be the highest.

(ii) The B.C. Packers commercial oyster lease located behind Goose Spit (station 4) should be adequately posted to prevent non-commercial utilization of the oysters in this area.

(iii) It is recommended that a 1,000 foot radius Schedule J closure be applied at the mouth of the ditch discharging farmland drainage and C.F.B. Comox sewage treatment plant effluent to the foreshore at station 14.

7. REFERENCES

1. Standard Methods for the Examination of Water and Wastewater. 13th edition, American Public Health Association, Washington, D.C., Part 400, pp. 635-677 (1971).

2. Recommended Procedures for the Examination of Sea Water and Shellfish. 4th edition, American Public Health Association, New York, N.Y., pp 40-47 (1970).

3. National Shellfish Sanitation Program Manual of Operations, Part 1. Sanitation of Shellfish Growing Areas. U.S. Department of Health, Education and Welfare, Washington, D.C., p. 13 (1965).

4. Shellfish Growing Water Sanitary Survey of Denman Island, Report EPS 5-PR-74-9, 1974, Pollution Abatement Branch, Environmental Protection Service, Environment Canada.

5. Shellfish Growing Water Sanitary Survey of Baynes Sound, Gartley Point to Deep Bay, Report EPS 5-PR-74-10, 1974, Pollution Abatement Branch, Environmental Protection Service, Environment Canada.

6. Oceanographic Characteristics of Comox Harbour and Approaches In Relation to Sea Disposal of Sewage, M. Waldichuk, Fisheries Research Board of Canada, Biological Station, Nanaimo, B.C.

ACKNOWLEDGEMENTS

B. Kay, bacteriologist, and M. Gaertner, Bacteriological Technician, conducted the bacteriological analyses in the Environmental Protection Service mobile laboratory located at Comox. Mr. Kay compiled the bacteriological data.

Mr. K. Cooper, Engineering Technician, and Mr. G. Derksen, Biological Technician, conducted the Sanitary Survey and carried out the sampling program.

APPENDIX I

TABLE 4. MARINE SAMPLE STATION DESCRIPTIONS

TABLE 5. FRESHWATER SAMPLE STATION DESCRIPTIONS

TABLE 4: MARINE SAMPLE STATION DESCRIPTIONS

Sample Station	Latitude	Longitude	Description
1	49°39'50"N	124°58'08"W	Small bluff located directly across Comox Harbour from Robb Bluff
2	49°40'04"N	124°57'32"W	Over oyster beds in the harbour tidal flats midway between stations 1 and 3
3	49°40'12"N	124°56'56"W	Offshore from red-roofed mansion at Rob Bluff
4	49°40'02"N	124°54'48"W	Over B.C. Packers commercial oyster lease inside Goose Spit, Comox Harbour
5	49°39'19"N	124°55'28"W	Mid-channel at entrance to Comox Harbour between Goose Spit and Gartley Point
6	49°39'04"N	124°56'22"W	Off Royston Wharf, Comox Harbour
7	49°38'41"N	124°55'44"W	Near the mouth of the Trent River, Comox Harbour
8	49°38'23"N	124°55'15"W	South of Gartley Point, fronting several residences
9	49°39'38"N	124°54'55"W	On the outer, southeastern shore of Goose Spit
10	49°39'19"N	124°54'22"W	In the receiving waters over the Comox township sewage outfall
11	49°39'37"N	124°51'13"W	At Comox Bar light and bell
12	49°40'07"N	124°53'38"W	Off Balmoral Beach just outside the Schedule J closure line
13	49°40'47"N	124°52'45"W	Off pink and white house on Cape Lazo Road
14	49°41'34"N	124°51'43"W	Mouth of drainage ditch servicing CFB Comox sewage treatment plant and surrounding farmland
15	49°41'55"N	124°51'23"W	Northeast of Station 14 in line with runway, offshore from cliffs
16	49°42'40"N	124°52'06"W	Approximately in the middle of Kye Bay

TABLE 5: FRESHWATER SAMPLE STATION DESCRIPTIONS

Sample Station	Latitude	Longitude	Description
S1	49°42'27"N	125°00'38"W	Tsolum River at Dove Creek Road Bridge
S2	49°41'47"N	124°59'58"W	Puntledge River at Anderton Road Bridge
S3	49°41'32"N	124°59'36"W	Courtenay River at Highway 19 Bridge
S4	49°40'57"N	124°59'36"W	Effluent from Courtenay aeration lagoon
S5	49°41'02"N	124°58'29"W	Slough draining farmland near mouth of Courtenay River
S6	49°40'36"N	124°58'08"W	Mouth of Courtenay River offshore from Indian Reserve
S7	49°38'52"N	124°56'26"W	Mouth of Roy Creek
S8	49°38'38"N	124°55'44"W	Mouth of Trent River
S9	49°40'09"N	124°54'40"W	Mouth of Brooklyn Creek near Station 4
S10	49°41'38"N	124°51'48"W	Drainage ditch at Station 14
S11			CFB Comox sewage treatment plant effluent

APPENDIX II

TABLE 6 BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

TABLE 7 BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 1

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
May 3	1125	1025 1700	4.2 12.5	9.6	0.0	SE@ 6-10	light ripple	11.0	70	13
May 6	1650	1225 1940	2.1 14.3	10.5	0.11	SE@ 7-15	heavy ripple	11.5	23	7.8
May 7	1015	0555 1300	13.2 2.0	10.0	0.03	SE@13-25	heavy ripple	15.0	79	14
May 8	0920	0625 1335	12.9 2.2	9.0	trace	SE@ 0-18	calm	20.0	79	6.8
May 9	1910	0705 1415	12.6 2.6	8.5	0.22	S@ 5-17	chop	13.5	23	7.8
May 10	0835	0740 1450	12.1 3.2	--	trace	NE@ 2-10	ripple	--	17	11

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 2

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
May 3	1120	1025 1700	4.2 12.5	--	0.0	SE@ 6-10	light ripple	--	7.8	4.5
May 6	1655	1225 1940	2.1 14.3	10.2	0.11	SE@ 7-15	heavy ripple	9.0	33	7.8
May 7	1000	0555 1300	13.2 2.0	--	0.03	SE@13-25	heavy ripple	--	46	6.8
May 8	0935	0625 1335	12.9 2.2	8.5	trace	SE@ 0-18	calm	9.2	70	7.8
May 9	0920	0705 1415	12.6 2.6	8.8	0.22	S@ 5-17	chop	20	7.8	4.5
May 10	0845	0740 1450	12.1 3.2	--	trace	NE@ 2-10	ripple	--	49	7.8

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 3

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1600	1400 1955	10.6 6.9	11.0	0.0	E@ 2-5	calm	25.0	170	1.8
April 18	1120	0925 1510	7.1 11.2	10.0	0.01	E@ 3-7	ripple	21.0	23	4.5
April 19	1045	0950 1605	6.1 12.0	--	0.02	SE@15-18	--	--	23	2.0
April 22	1530	1120 1820	2.9 13.9	--	0.12	NE@ 3-11	--	--	49	4.0
April 23	1115	0500 1200	13.8 2.2	--	trace	NW@ 9-13	--	--	140	2.0
April 24	1130	0530 1240	13.8 1.7	--	0.02	NW@ 4-11	ripple	--	130	7.8
April 25	0915	0600 1325	13.6 1.6	7.6	0.71	SE@ 6-14	calm	22.0	13	7.8
April 26	0825	0645 1410	13.1 1.8	7.0	0.24	E@ 3-6	calm	20.5	140	33
April 29	1430	1100 1800	11.0 4.2	9.5	trace	E@ 3-9	ripple	24.2	14	4.5
May 1	0930	0900 1430	6.9 10.9	7.0	0.02	SE@12-16	--	6.5	49	7.8
May 2	--	--	--	--	trace	SE@ 7-12	--	--	23	7.8
May 3	1125	1025 1700	4.2 12.5	--	0.0	SE@ 6-10	ripple	--	11	2.0
May 6	1700	1225 1940	2.1 14.3	10.2	0.11	SE@ 7-15	--	16.0	17	2.0
May 7	0930	0555 1300	13.2 2.0	--	0.03	SE@13-25	--	--	79	22

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 4

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1600	1400 1955	10.6 6.9	11.0	0.0	E@ 2-5	calm	25.0	17	6.8
April 18	1115	0925 1510	7.1 11.2	9.5	0.01	E@ 3-7	ripple	25.0	79	13
April 19	0940	0950 1605	6.1 12.0	--	0.02	SE@15-18	--	--	>1600	920
April 22	1430	1120 1820	2.9 13.9	9.0	0.12	NE@ 3-11	--	25.2	33	23
April 23	1055	0500 1200	13.8 2.2	--	trace	NW@ 9-13	--	--	7.8	2.0
April 24	1110	0530 1240	13.8 1.7	--	0.02	NW@ 4-11	ripple	--	130	11
April 25	0940	0600 1325	13.6 1.6	7.8	0.71	SE@ 6-14	calm	8.2	49	11
April 26	0830	0645 1410	13.1 1.8	7.5	0.24	E@ 3-6	calm	18.0	330	20
April 29	1145	1100 1800	11.0 4.2	11.5	trace	E@ 3-9	ripple	26.5	46	<1.8
April 30	0940	0805 1245	8.3 10.7	--	0.01	NE@ 9-16	--	--	49	13
May 1	0940	0900 1430	6.9 10.9	9.2	0.02	SE@12-16	--	20.0	540	21
May 2	--	--	--	--	trace	SE@ 7-12	--	--	13	<1.8
May 3	1050	1025 1700	4.2 12.5	9.6	0.0	SE@ 6-10	light ripple	16.8	33	<1.8
May 6	1710	1225 1940	2.1 14.3	10	0.11	SE@ 7-15	heavy ripple	21.0	17	<1.8
May 7	1055	0555 1300	13.2 2.0	10.5	0.03	SE@13-25	heavy ripple	25.0	23	23

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 5

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht.(Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
May 3	1030	1025 1700	4.2 12.5	9.2	0.0	SE@ 6-10	light ripple	14.0	49	4.5
May 6	1640	1225 1940	2.1 14.3	10.2	0.11	SE@ 7-15	medium chop	21.0	13	2.0
May 7	1110	0555 1300	13.2 2.0	9.8	0.03	SE@13-25	heavy swell	10.0	23	4.5
May 8	1030	0625 1335	12.9 2.2	9.5	trace	SE@ 0-18	ripple	11.0	49	13
May 9	1000	0705 1415	12.6 2.6	9.0	0.22	S@ 5-17	medium swell	9.5	22	14
May 10	0905	0740 1450	12.1 3.2	--	trace	NE@ 2-10	ripple	--	49	11

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 6

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
May 3	1035	1025 1700	4.2 12.5	9.6	0.0	SE@ 6-10	light ripple	11.0	7.8	4.5
May 6	1645	1225 1940	2.1 14.3	10.8	0.11	SE@ 7-15	medium chop	17.5	33	7.8
May 7	1100	0555 1300	13.2 2.0	10.0	0.03	SE@13-25	heavy chop	9.5	46	6.8
May 8	1020	0625 1335	12.9 2.2	10.0	trace	SE@ 0-18	ripple	7.0	70	7.8
May 9	0950	0705 1415	12.6 2.6	8.8	0.22	S@ 5-17	medium swell	14.0	7.8	4.5
May 10	0835	0740 1450	12.1 3.2	--	trace	NE@ 2-10	ripple	--	49	7.8

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 7

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1600	1400 1955	10.6 6.9	10.0	0.0	E@ 2-5	--	25.0	240	13
April 18	1110	0925 1510	7.1 11.2	9.0	0.01	E@ 3-7	ripple	14.2	13	2.0
April 19	0930	0950 1605	6.1 12.0	--	0.02	SE@15-18	--	--	79	2.0
April 22	1425	1120 1820	2.9 13.9	9.0	0.12	NE@ 3-11	heavy ripple	10.5	64	4.5
April 23	1050	0500 1200	13.8 2.2	8.5	trace	NW@ 9-13	--	20.8	79	11
April 24	1100	0530 1240	13.8 1.7	--	0.02	NW@ 4-11	ripple	--	17	7.8
April 25	0940	1600 1325	13.6 1.6	8.0	0.71	SE@ 6-14	ripple	5.5	33	13
April 26	0835	0645 1410	13.1 1.8	6.5	0.24	E@ 3-6	calm	5.0	1600	240
April 29	1440	1100 1800	11.0 4.2	10.5	trace	E@ 3-9	ripple	9.5	4.5	4.5
May 1	0920	0900 1430	6.9 10.9	6.1	0.02	SE@12-16	--	20.5	540	11
May 2	--	--	--	--	trace	SE@ 7-12	--	--	23	7.8
May 3	1030	1025 1700	4.2 12.5	9.2	0.0	SE@ 6-10	light ripple	13.4	46	2.0
May 6	1645	1225 1940	2.1 14.3	10.2	0.11	SE@ 7-15	medium chop	22.0	49	11
May 7	1110	0555 1300	13.2 2.0	10.0	0.03	SE@13-25	heavy chop	10.0	170	79

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 8

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht.(Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1600	1400 1955	10.6 6.9	11.0	0.0	E@ 2-5	--	14.0	23	<1.8
April 18	1100	0925 1510	7.1 11.2	10.0	0.01	E@ 3-7	ripple	16.5	22	6.1
April 19	1115	0950 1605	6.1 12.0	--	0.02	SE@15-18	--	--	33	4.5
April 22	1420	1120 1820	2.9 13.9	9.6	0.12	NE@ 3-11	heavy ripple	18.0	49	<1.8
April 23	1045	0500 1200	13.8 2.2	9.5	trace	NW@ 9-13	--	21.0	17	2.0
April 24	1055	0530 1240	13.8 1.7	--	0.02	NW@ 4-11	--	--	<1.8	<1.8
April 25	1215	0600 1325	13.6 1.6	8.5	0.71	SE@ 6-14	ripple	9.0	34	22
April 26	1100	0645 1410	13.1 1.8	8.0	0.24	E@ 3-6	ripple	13.5	70	6.8
April 29	1700	1100 1800	11.0 4.2	12.2	trace	E@ 3-9	ripple	12.0	14	<1.8
April 30	1510	0805 1245	8.3 10.7	--	0.01	NE@ 9-16	--	--	4.0	4.0

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 9

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
May 3	1025	1025 1700	4.2 12.5	9.5	0.0	SE@ 6-10	light ripple	27.8	23	4.5
May 6	1635	1225 1940	2.1 14.3	10.5	0.11	SE@ 7-15	medium chop	17.0	79	1.8
May 7	1115	0555 1300	13.2 2.0	9.5	0.03	SE@13-25	heavy swell	8.5	33	13
May 8	1040	0625 1335	12.9 2.2	9.8	trace	SE@ 0-18	ripple	28.0	49	13
May 9	1005	0705 1415	12.6 2.6	8.5	0.22	S@ 5-17	medium swell	15.0	70	14
May 10	0905	0740 1450	12.1 3.2	--	trace	NE@ 2-10	ripple	--	49	4.5

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 10

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht.(Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1325	0855 1400	8.1 10.6	10.1	0.0	E@ 2-5	--	23	33	2.0
April 18	0855	0925 1510	7.1 11.2	9.0	0.01	E@ 3-7	ripple	24.2	79	7.8
April 19	0900	0950 1605	6.1 12.0	--	0.02	SE@15-18	--	--	350	14
April 22	1217	1120 1820	2.9 13.2	10.5	0.12	NE@ 3-11	heavy ripple	20.8	130	6.8
April 23	0840	0500 1200	13.8 2.2	8.5	trace	NW@ 9-13	calm	24.0	33	11
April 24	0900	0530 1240	13.8 1.7	9.0	0.02	NW@ 4-11	heavy ripple	24.0	49	4.5
April 25	0945	0600 1325	13.6 1.6	8.5	0.71	SE@ 6-14	ripple	27.0	13	4.5
April 26	0840	0645 1410	13.1 1.8	8.2	0.24	E@ 3-6	calm	27.0	49	4.5
April 29	1445	1100 1800	11.0 4.2	10.5	trace	E@ 3-9	light chop	6.0	4.5	<1.8
April 30	1000	0805 1245	8.3 10.7	9.5	0.01	NE@ 9-16	--	20.5	23	7.8
May 1	0900	0900 1430	6.9 10.9	8.2	0.02	SE@12-16	--	15.5	130	11
May 2	0945	0940 1555	5.5 11.7	8.2	trace	SE@ 7-12	ripple	26.5	13	2.0
May 3	1020	1025 1700	4.2 12.5	9.5	0.0	SE@ 6-10	light ripple	24.5	14	2.0
May 6	1630	1225 1940	2.1 14.3	10.5	0.11	SE@ 7-15	medium chop	17.0	33	7.8

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 11

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht.(Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1355	0855 1400	8.1 10.6	10.0	0.0	E@ 2-5	--	25.5	<1.8	<1.8
April 18	0920	0925 1510	7.1 11.2	9.0	0.01	E@ 3-7	--	25.2	2.0	<1.8
April 22	1245	1120 1820	2.9 13.9	10.1	0.12	NE@ 3-11	heavy ripple	22.4	46	11
April 23	0925	0500 1200	13.8 2.2	8.5	trace	NW@ 9-13	--	24.5	14	1.8
April 24	0930	0530 1240	13.8 1.7	9.5	0.02	NW@ 4-11	light chop	26.0	<1.8	<1.8
April 25	1010	0600 1325	13.6 1.6	9.0	0.71	SE@ 7-14	heavy ripple	26.5	49	7.8

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 12

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht.(Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1330	0855 1400	8.1 10.6	10.0	0.0	E@ 2-5	--	25.5	2.0	<1.8
April 18	0900	0925 1510	7.1 11.2	9.0	0.01	E@ 3-7	ripple	24.5	7.8	<1.8
April 19	0905	0950 1605	6.1 12.0	--	0.02	SE@15-18	--	--	33	6.8
April 22	1220	1120 1820	2.9 13.9	11.0	0.12	NE@ 3-11	--	21.5	220	17
April 23	0845	0500 1200	13.8 2.2	8.5	trace	NW@ 9-13	calm	24.9	13	4.5
April 24	0905	0530 1240	13.8 1.7	9.0	0.02	NW@ 4-11	ripple	27.0	14	1.8
April 25	1945	0600 1325	13.6 1.6	9.0	0.71	SE@ 6-14	ripple	27.0	14	9.3
April 26	0845	0645 1410	13.1 1.8	8.5	0.24	E@ 3-6	calm	28.0	110	13
April 29	1450	1100 1800	11.0 4.2	11.8	trace	E@ 3-9	light chop	22.0	<1.8	<1.8
May 1	0910	0900 1430	6.9 10.9	8.5	0.02	SE@12-16	--	19.0	79	9.3
May 2	0950	0940 1555	5.5 11.7	9.0	trace	SE@ 7-12	ripple	28.5	4.5	<1.8
May 3	1015	1025 1700	4.2 12.5	9.5	0.0	SE@ 6-10	light ripple	28.5	2.0	<1.8
May 6	1625	1225 1940	2.1 14.3	9.8	0.11	SE@ 7-15	medium chop	26.0	7.8	4.5
May 7	1230	0555 1300	13.2 2.0	--	0.03	SE@13-25	--	--	22	4.5

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 13

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1335	0855 1400	8.1 10.6	10.0	0.0	E@ 2-5	--	25.0	<1.8	<1.8
April 18	0905	0245 0925	13.3 7.1	9.5	0.01	E@ 3-7	ripple	25.0	4.0	<1.8
April 19	0910	0310 0950	13.4 6.1	--	0.02	SE@15-18	--	--	2.0	<1.8
April 22	1230	1120 1820	2.9 13.9	10.8	0.12	NE@ 3-11	heavy ripple	22.0	23	2.0
April 23	0850	0500 1200	13.8 2.2	8.2	trace	NW@ 9-13	light chop	25.0	2.0	<1.8
April 24	0910	0530 1240	13.8 1.7	9.2	0.02	NW@ 4-11	ripple	26.8	<1.8	<1.8

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 14

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1345	0855 1400	8.1 10.6	10.0	0.0	E@ 2-5	--	25.0	<1.8	<1.8
April 18	0910	0925 1510	7.1 11.2	9.5	0.01	E@ 3-7	ripple	25.2	13	13
April 19	0915	0950 1605	6.1 12.0	--	0.02	SE@15-18	--	--	130	22
April 22	1235	1120 1820	2.9 13.2	10.2	0.12	NE@ 3-11	heavy ripple	22.1	>1600	220
April 23	0855	0500 1200	13.8 2.2	8.5	trace	NW@ 9-13	--	25.0	4.0	2.0
April 24	0920	0530 1240	13.8 1.7	9.5	0.02	NW@ 4-11	ripple	26.4	240	49
April 25	0955	0600 1325	13.6 1.6	9.0	0.71	SE@ 6-14	ripple	27.5	43	4.5
April 26	0850	0645 1410	13.1 1.8	8.8	0.24	E@ 3-6	calm	28.0	23	2.0
April 29	1500	1100 1800	11.0 4.2	13.0	trace	E@ 3-9	light chop	24.5	7.8	2.0
April 30	--	--	--	--	0.01	NE@ 9-16	--	--	130	49
May 1	--	--	--	--	0.02	SE@12-16	--	--	49	2.0
May 2	1000	0940 1555	5.5 11.7	9.0	trace	SE@ 7-12	ripple	28.0	7.8	4.8
May 3	0820	1025 1700	4.2 12.5	--	0.0	SE@ 6-10	--	--	350	170
May 6	1435	1225 1940	2.1 14.3	--	0.11	SE@ 7-12	--	--	240	17

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 15

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
April 17	1345	0855 1400	8.1 10.6	10.0	0.0	E@ 2-5	--	25.0	49	<1.8
April 18	0912	0245 0925	13.3 7.1	9.5	0.01	E@ 3-7	ripple	25.2	1.8	1.8
April 22	1240	1120 1820	2.9 13.9	10.1	0.12	NE@ 3-11	heavy ripple	23.0	46	1.8
April 23	1045	0500 1200	13.8 2.2	--	trace	NW@ 9-13	--	--	<1.8	<1.8
April 24	1330	1240 2000	1.7 14.4	--	0.02	NW@ 4-11	--	--	<1.8	<1.8
April 25	1420	1325 2055	1.6 14.5	--	0.71	SE@ 6-14	--	--	7.8	<1.8

TABLE 6: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 16

Date (1974)	Sample Time	Tide Conditions Time	Tide Conditions Ht. (Ft.)	Water Temp. (°C)	Total Precip. (in.)	Wind (mph)	Local Sea Cond.	Salinity (ppt)	Coliform MPN/100 ml Total	Coliform MPN/100 ml Fecal
May 3	0815	0335 1025	14.0 4.2	--	0.0	SE@ 6-10	--	--	33	33
May 6	1430	1225 1940	2.1 14.3	--	0.11	SE@ 7-15	--	--	2.0	<1.8
May 7	1250	0555 1300	13.2 2.0	--	0.03	SE@13-25	--	--	<1.8	<1.8
May 8	1430	1335 2110	2.2 14.4	--	trace	SE@ 0-18	--	--	<1.8	<1.8
May 9	1140	0705 1415	12.6 2.6	--	0.22	S@ 5-17	--	--	<1.8	<1.8
May 10	0840	0740 1450	12.1 3.2	--	trace	NE@ 2-10	--	--	17	7.8

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S1

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 7	1040	0.03	240	34
May 8	0940	trace	350	49
May 9	0915	0.22	49	13
May 10	0900	trace	49	17

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S2

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 7	1030	0.03	2.0	2.0
May 8	0935	trace	7.8	<1.8
May 9	0910	0.22	4.5	4.5
May 10	0850	trace	1.8	<1.8

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S3

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 7	1050	0.03	1700	220
May 8	0930	trace	95	17
May 9	0905	0.22	33	4.5
May 10	0840	trace	49	7.8

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S4

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 7	1020	0.03	2.8×10^5	4.6×10^4
May 8	0915	trace	2.4×10^5	7.9×10^4
May 9	0900	0.22	9.2×10^5	1.1×10^5
May 10	0830	trace	7.9×10^4	1.7×10^4

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S5

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 7	1100	0.03	350	79
May 8	0950	trace	540	49
May 9	0925	0.22	49	33
May 10	--	trace	79	49

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S6

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 7	0955	0.03	350	49
May 8	0945	trace	21	7.8
May 9	0930	0.22	49	11
May 10	0850	trace	13	2.0

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S7

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
April 19	1300	0.02	170	170
May 2	1415	trace	1300	1300
May 6	1255	0.11	1700	790
May 7	1010	0.03	1300	490

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S8

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
April 19	1300	0.02	49	4.0
May 2	1420	trace	17	4.5
May 6	1245	0.11	<1.8	<1.8
May 7	1005	0.03	<1.8	<1.8

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S9

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 6	--	0.11	1600	79
May 7	--	0.03	790	45
May 8	1530	trace	170	17
May 9	1035	0.22	49	33
May 9	--	0.22	70	33

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S10

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 7	1245	0.03	1100	220
May 8	1320	trace	140	33
May 9	1115	0.22	170	170
May 10	0830	trace	260	210

TABLE 7: BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S11

Date (1974)	Sample Time	Total Precip. (in.)	Coliform MPN per 100 ml	
			Total	Fecal
May 7	1300	0.03	<200	<200
May 8	1350	trace	350	70
May 9	1150	0.22	49	14
May 10	0850	trace	260	45