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Surveillance Report EPS 5-PR-75-14

Pacific Region April 1976

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SHELLFISH GROWING WATER SANITARY SURVEY OF THE

MAINLAND COASTLINE, SCUTTLE BAY TO SALTERY BAY, BRITISH COLUMBIA, 1975

by

B.H. Kay

Pollution Abatement Branch Environmental Protection Service Pacific Region

Report Number EPS 5-PR-75-14 April, 1976

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ABSTRACT

A sanitary and bacteriological survey covering 60 kilometers of coastline between Scuttle Bay and Saltery Bay was conducted from November 3 to December 1, 1975 by personnel of the Environmental Protection Service, Pacific Region.

The bacteriological survey was conducted to evaluate the quality of waters overlying shellfish beds in the survey area and more specifically to assess the adequacy of the present Schedule J shellfish closure extending from Scuttle Bay to Myrtle Point. In addition to quantifying the bacterial levels in the marine waters, a concurrent investigation to identify sources of sewage contamination to the survey area was undertaken. A special study evaluating the performance of the four local sewage treatment systems with respect to physical, chemical, bacteriological and operational parameters, was also done at this time.

During the four week survey, 486 samples were collected and analyzed for fecal coliform levels. A total of 54 marine stations were sampled, and of these, 32 did not meet the shellfish growing water fecal coliform standard. - ii -

Du 3 novembre au l^{er} décembre 1975, le personnel du Service de protection de l'environnement de la région du Pacifique a effectué une étude sanitaire et bactériologique de 60 kilomètres de côte entre la baie Scuttle et la baie Saltery.

Cette étude bactëriologique ayait pour but d'évaluer l'état des eaux où vivent les crustacés dans la zone étudiée, et plus particulièrement de réexaminer l'efficacité de la barrière installée entre la baie Scuttle et la pointe Myrtle en vertu du programme J. En plus de mesurer les quantités de bactéries se trouvant dans l'eau de mer, on a cherché à découvrir quelles étaient les sources de la contamination par les eaux d'égout dans la zone étudiée. On a effectué à la même époque une étude spéciale destinée à évaluer les résultats obtenus par les quatre installations locales de traitement des eaux usées dans les domaines physique, chimique, bactériologique et dans celui du fonctionnement.

Durant les quatre semaines qu'a duré cette étude, on a analysé 373 prélèvements d'eau de mer et 113 échantillons d'eau douce et d'effluent afin de connaître la quantité de coliformes fécaux qu'ils contenaient. 32 des 54 stations-témoins ne répondaient pas aux normes concernant les coliformes fécaux dans les eaux à crustacés.

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CONCLUSIONS

- The intertidal waters of a small section of Scuttle Bay are contaminated with fecal pollution to the extent that consumption of molluscan shellfish may be hazardous. The source of contamination was not identified.
- 2. The intertidal waters from Scuttle Bay to Grief Point are contaminated with fecal pollution to the extent that consumption of molluscan shellfish may be hazardous. Fecal contamination contributed by the Sliammon River, and sewage discharged from the Sliammon Sewage Treatment Plant (STP), the Wildwood Heights Sewage Lagoon, the Powell River Water Pollution Control Plant (WPCP) and the Westview WPCP are the major sources of bacterial contamination to these waters.
- 3. The intertidal waters from Grief Point to Myrtle Beach were of acceptable water quality during the survey period; however, the area is subject to possible fecal contamination from the emergency overflow discharges of three sewage pump stations.
- 4. The intertidal waters of Myrtle Beach are contaminated with fecal pollution to the extent that consumption of molluscan shellfish may be hazardous. The pollution at Myrtle Beach appears to be caused primarily by domestic animal wastes arising from pastureland drainage and, to a lesser extent, drainage from unsewered areas.
- 5. Portions of the intertidal waters of Brew Bay and Lang Bay are contaminated with fecal pollution to the extent that consumption of molluscan shellfish may be hazardous. Localized fecal pollution resulted from pastureland drainage and possible faulty septic tank tile field sewage disposal systems.

RECOMMENDATIONS

1. The present contaminated areas 15-1 and 16-2 Schedule J closures should remain in effect: Area 15-1. "That portion of the tidal foreshore, Area 15, from the mouth of Powell River north to, but not including, Scuttle Bay." Area 16-2. "That portion of the tidal foreshore, Area 16, from Mvrtle Point to the Powell River." Although water quality in the area from Grief Point south to, but not including Myrtle Beach, was acceptable, it is recommended that this area remain closed to the harvesting of shellfish due to the potential of intermittent fecal contamination arising from three sewage pump stations emergency overflow discharges located between Cariboo Street and Penticton Street. 2. The following should be added to Schedule J of the British Columbia Fishery Regulations:

> Area 15-2. "The waters and tidal foreshore of Scuttle Bay lying within a 200 metre radius of the foot of Klahanie Drive."

Area 16-3. "The waters and tidal foreshore of Brew Bay lying within a 150 metre radius of the mouth of Whitehall Creek."

- 3. Letters to be written to the responsible provincial and federal authorities concerning the suspected and identified pollution sources listed below, requesting their investigations and remedial action where necessary:
 - (a) 40 Klahanie Drive possible faulty septic tank absorption field.
 - (b) 36 Klahanie Drive septic seepage evident near beach.
 - (c) Sliammon Sewage Treatment Plant operational diffi-

culties resulted in high fecal coliform counts in the effluent.

- (d) Unnamed creek (station 16) discharges Wildwood Heights sewage lagoon effluent across beach to Malaspina Strait.
- (e) Powell River WPCP stormwater and raw sewage overflow discharge.
- (f) Willingdon Creek direct access to creek by farm animals.
- (g) Westview WPCP raw sewage overflow discharge.
- (h) Storm drains (Westview to Grief Point) stormwater drainage, animal wastes, possible illegal connections to storm sewer.
- Myrtle Creek pastureland drainage; drainage from unsewered areas.
- (j) Deighton Creek direct access by farm animals; drainage from unsewered areas.
- (k) 6321 Centennial Drive residence has excess water drainage below tile field system which enters Myrtle Beach via storm ditches; recommend samples be taken for bacteriological analysis.
- Lot 43 Centennial Drive drainage pipe located in close proximity to tile field; drainage enters Myrtle Beach via storm ditches; recommend samples be taken for bacteriological analysis.
- (m) Brew Bay direct access by farm animals to drainage ditch.
- (n) Lang Bay direct access by farm animals to Whitehall Creek.

1 INTRODUCTION

The mainland area of British Columbia from Lund to Saltery Bay presently supports a population of approximately 20,000 people, the most heavily populated area being the Municipality of Powell River. The 1971 census determined the population of the Municipality to be 13,726 with a 1975 projection of 14,726 (1). The MacMillan Bloedel Pulp and Paper Mill at Powell River is the major employer in the area.

The oyster and clam resource along the coastline from Scuttle Bay to Saltery Bay is not commercially utilized; however, there is significant recreational harvesting by local residents and tourists. The major shellfish producing areas are Scuttle Bay and Myrtle Beach, with numerous smaller "pockets" of clams and oysters occurring along the entire coastline.

The tidal foreshore extending from Myrtle Point north to, but not including, Scuttle Bay is presently closed to shellfish harvesting under the British Columbia Fishery Regulations Schedule J of contaminated areas. The contaminated areas 15-1 and 16-2 have been closed since October, 1972. The closures were predicated on the known discharge of raw sewage from several outfalls serving the Powell River, Westview and Sliammon areas, and on supportive total and fecal coliform data obtained on two occasions:

1. In 1968 the B.C. Department of Health conducted a float study and bacteriological sampling program in the area from Powell River to Grief Point (2). The major sources of contamination to their study area at this time were the 312,000 Igpd Powell River raw sewage outfall and the 210,000 Igpd Westview raw sewage outfall. Dangerously high levels of fecal contamination (with respect to shellfish consumption) were found in some of their sampling areas during their September sampling period.

- 1 -

A sanitary and bacteriological survey conducted between Scuttle Bay and Sliammon River, in July, 1972 by the Environmental Protection Service (3), clearly demonstrated that significant contamination from the Sliammon Indian Reserve sewage outfall was entering the receiving waters. The shellfish growing waters in the vicinity of the outfall did not meet the total coliform standard which was in effect at that time.

2.

In November, 1973, samples of growing waters and shellstock were collected by EPS personnel from the Myrtle Beach area under closure and analyzed for fecal coliforms. The results of these analyses indicated that unacceptable fecal contamination was being experienced at Myrtle Beach at this time.

Since the closure in 1972, changes have been made in both the sewage collection and treatment systems serving the Sliammon, Powell River and Westview areas. These present systems are described in detail in Environmental Protection Service Surveillance Report EPS 5-PR-75-13 (4). As a result of these changes a re-assessment of the Powell River shellfish closures was required. The previously unsurveyed shellfish growing waters south of the closure from Myrtle Point to Saltery Bay was also included.

Accordingly, personnel of the Shellfish Water Quality Program (Environmental Protection Service, Pacific Region) conducted a bacteriological and sanitary survey of the coastline from Scuttle Bay to Saltery Bay from November 3 - December 1, 1975. The survey was conducted in late fall coincident with heavy precipitation and poor hydrographic conditions deemed to reflect the worst possible pollution conditions.

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2 SAMPLE STATION LOCATIONS

A total of 54 marine and 17 freshwater sample stations were chosen to evaluate the growing water quality. Sample station locations are shown in Figures 1 and 2 and a description of the marine and freshwater sample stations can be found in Appendices I and II, respectively.

Sample stations were positioned over shellfish beds based on resource data obtained from the Powell River Regional District, Marine Resources Branch (Province of B.C.) and the Fisheries and Marine Service, Environment Canada.

The coastline from Scuttle Bay to Grief Point was extensively sampled due to several municipal and industrial pollution inputs which influence this area.

The Myrtle Point area south of Grief Point has a considerable oyster and clam resource and is susceptible to contamination from Myrtle Creek and Deighton Creek. Nine marine sample stations were established here.

The degree of sampling in Brew Bay, Lang Bay, Frolander Bay and Thunder Bay was determined by the extent of residential development and the presence of freshwater inputs. Eleven sample stations adequately monitored these areas.

Streams and rivers were routinely sampled in conjunction with the marine sampling program.



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FIGURE I SCUTTLE BAY TO MYRTLE POINT SAMPLE STATION LOCATIONS



3 FIELD PROCEDURES AND METHODS

Sampling stations were selected, and a bacteriological and physical water-testing program was developed to assess the shellfishgrowing water quality and the source of pollutants.

3.1 Bacteriological Sampling and Analyses

All water samples for bacteriological analyses were collected in sterile 170 or 340 cc wide-mouth bottles approximately 15 to 30 cm below the water surface. The water depth at collection points over shellfish beds did not exceed 1.2 metres. Samples were collected by boat or on foot and stored in coolers at temperatures not exceeding 10° C until processed. Analyses were carried out in the Environmental Protection Service mobile laboratory located at the sampling area and were performed within three hours of collection.

The fecal 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 407C of the 13th edition of <u>Standard Methods for the Examination of Water and Wastewater</u> (5). Incubation was for 24 \pm 2 hours in a water bath equipped with a circulation device, and maintained at 44.5 \pm 0.2^oC. Presumptive culture medium used was Bacto-Lauryl Tryptose Broth; fecal coliform determinations were made using Bacto-EC medium.

All freshwater samples were analyzed for total and fecal coliforms using both MPN and membrane filter techniques (Part 408 of <u>Standard Methods</u>). The volume of sample filtered was not less than 100 mL and appropriate dilutions were made in order that the number of colonies per plate normally ranged between 20 and 80. Colonies were counted under 10 power magnification using a cool white fluorescent bulb as the light source. Bacto-mFC Agar was used for the fecal coliform determinations. Factory-sterilized membrane filters (0.45 micron pore size) were obtained from Sartorius (West Germany).

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Fecal coliform plates were incubated at $44.5 \pm 0.2^{\circ}$ C for 24 hours in water-tight plastic bags submerged in a water bath. Colonies which were totally or partially blue in colour were counted as fecal coliforms.

IMViC analyses on bacterial isolates were performed as described in Part 410B of <u>Standard Methods</u>. All test media used were Bacto brand. The test reagent used in the Indole test was Kovac's Reagent (BDH).

3.2 Physical and Chemical Testing Equipment and Analyses

Temperature and salinity measurements at marine sample stations were made at a depth of 15 to 30 cm below the water surface, using a YSI Model 33 Salinity-Conductivity-Temperature meter. Temperature and salinity readings at shore-sampled stations were made with a standard immersible thermometer and a Beckman Model RB3-349 Solubridge Electrolytic Conductivity meter. Wind speeds were determined with a Casella hand-held wind meter and a Telcor series 210 electronic wind speed/direction indicator.

Tide data presented is that for Point Atkinson and the rainfall data was obtained from the meteorological station operated by Pacific Western Airlines located at Powell River Municipal Airport.

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4 DISCUSSION OF RESULTS

Daily bacteriological physical and elemental data for each sample station is presented in Appendices III and IV. Fecal coliform results for marine stations, sewage treatment systems and freshwater stations are summarized in Tables 1, 2 and 3 respectively.

The results have been interpreted and the growing waters classified based on the following criteria:

In order that an area can be considered bacteriologically safe for the harvesting of shellfish, the fecal coliform median MPN of the water must not exceed 14 per 100 mL, and not more than 10 percent of the samples ordinarily exceed an MPN of 43 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 unfavorable hydrographic and pollution conditions.¹

During the survey, 373 marine, 75 freshwater and 38 effluent samples were collected and analyzed for fecal coliform levels. A minimum of six samples was collected for each marine station. The bacteriological results presented in Table 1 show that only 22 of the 54 marine stations met the shellfish growing water fecal coliform standard. Of the remaining 32 sample stations which were classified as unacceptable, 24 exceeded the standard at the median level and 8 exceeded the standard at the 90 percentile level.

When the growing water standard is exceeded at the median level, this indicates that the pollution being experienced in the sampling area is of a continuous, rather than intermittent nature. Figure 1 clearly demonstrates that this type of pollution is occurring in the more heavily populated areas where the volume of sewage entering

¹This report expresses the 10 percent limit in terms of a 90 percentile MPN value which must not exceed 43 per 100 m ℓ .

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TABLE 1 SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE STATIONS

Sample	Number of	MPN	Fecal Coli	form MPN/100 ml
Station	Samples	Range	Median	90 Percentile
1	6	2 - 7	3	5.8
2	6	2 - 23	6.5	22.4
3	10	<2 - 31	5.5	23
Ă	10	2 - 540	13	130
5	6	7 - 350	26 5	169 4
5	6	<2 - 140	12 5	112 /
7	0	~2 - 140	12.5	162
/	0	12 250	12.5	242
8	D C	15 - 550	90	242
9	D	40 - 540	/9	204
10	6	33 - 350	90	242
	6	11 - 920	90	578
12	6	13 - 330	41	1/4
13	6	12 - 130	16	106
14	6	11 - 350	38.5	206
15	6	22 - 230	59.5	194
16	6	8 - >1600	125	>964
17	6	2 - 40	6.5	24.4
18	6	2 - 11	4.5	7.4
19	6	5 - >1600	8.5	>688
20	6	2 - 280	74.5	159.4
21	8	5 - 920	46	213
22	8	13 - 220	33	101
23	8	5 - 240	22	127.3
24	8	2 - 790	33	328
25	7	<2 - >1600	17	>494
26	6	2 - 79	29	61.6
27	8	2 - 540	5	218,
28	8	<2 - 23	3.5	18.2
29	6	<2 - <2	<2	<2
30	6	<2 - <2	<2	<2
31	6	<2 - 2	<2	<2
32	10	<2 - 46	2	17
33	6	17 - 110	28	73.4
34	ĩÕ	<2 - 130	65	79
35	6	13 - 540	41	318
36	6	13 J40 4 - 70	41	57 /
37	6	23 - 110	20 5	96
20	6	40 1600	150	950
20	6	47 - 1000		UCO Ar A
39	C C	0 - 79 0 - 70	10.0	40.4
40	D O	2 - /Y 2 - 21	12	09.4
41	ð	$\frac{1}{2}$ - 21	2	14.0
42	ð	< <u>-</u> - y	3.5	5.8
43	8	<2 - 9	Z	8.2

(continued)

Sample	Number of	MPN	Fecal Coliform MPN/100 ml		
Station	Samples	Range	Median	90 Percentile	
A A	0	<0 <u>250</u>	0	3 7 4	
44	8	<2 - 350	2	174	
45	10	<2 - 110	5	33	
46	6	<2 - 2	2	2	
47	6	<2 - 70	27	57.4	
48	10	<2 - 110	7.5	33	
49	6	<2 - 6	<2	5.4	
50	10	<2 - 350	<2	7	
51	6	<2 - 2	<2	2 2	
52	6	<2 - 5	<2	<3.2	
53	6	<2 - 23	<2	10.4	
54	6	<2 - 17	<3.5	11	

TABLE 2SUMMARY OF FECAL COLIFORM MPN DATA FOR SEWAGE TREATMENT
SYSTEMS

Sample Source	Number of Samples	MPN Range	Mean Fecal MPN per 100 m&
Sliammon Plant Effluent	5	1600 - 1.7 x 10 ⁶	5.7 x 10 ⁵
Westview Effluent	8	7×10^4 - 3.3 × 10^5	1.6 x 10 ⁵
Westview By-pass	7	7.9 x 10^5 - 2.4 x 10^6	1.6 x 10 ⁶
Powell River Effluent	7	8 x 10 ⁴ - 4.9 x 10 ⁵	2.5×10^5
Powell River By-pass	5	$4.9 \times 10^5 - 2.4 \times 10^6$	1.5×10^{6}
Wildwood Lagoon Effluent	6	$<2 \times 10^4 - 8 \times 10^4$	4.3×10^4

3 SUMMARY OF FECAL COLIFORM DATA FOR FRESHWATER STATIONS

	Memb	rane Filtrati	on Test	MPN Test		
Sample Station	Number of Samples	Range	Mean Coliform/100 m£	Number of Samples	Range	Mean MPN/100 mL
S1 .	3	6 - 110	45.3	1	-	13 ^a
S2	3	10 - 68	42.6	ו	-	70
S3	-	-	-	4	8 - 2300	936
S4	2	32 - 41	36.5	1	-	110
S5	3	40 - 260	116.6	2	460 - >1600	-
S6	3	50 - 65	58.3	3	230 - >1600	-
S7	3	2 - 30	18	2	170 - >1600	-
S 8	3	11 - 250	150.5	2	50 - 350	200
S9	4	43 - 2460	658.3	2	49 - 240	144.5
S10	5	20 - 1480	399	1	-	350
S11	2	30 - 430	230	1	-	79
S12	4	50 - 640	240	1	-	110
\$13	2	73 - 82	77.5	2	79 - 170	124.5
S14	2	20 - 41	29.5	2	33 - 79	56
S15	1	-	250	2	350 - 350	350
\$16 ^b	2	2 - 3	2.5	2	<2 - <2	<2
S17	2	15 - 19	17	2	21 - 46	28.5

aWhen only one sample was taken, the result is given in the "mean coliform/100 mL" column.

 $^{\rm b}{\rm S16}$ (Lois River) was sampled at three different locations:

November 20 and 24 - Highway 101 Bridge crossing

November 25 - Power generating station

November 26 - Mouth of Lois River

the receiving waters is the greatest. More specifically, two distinct areas, Scuttle Bay to Grief Point, and Myrtle Beach, demonstrated continuous pollution. Intermittent pollution, where the standard is exceeded at the 90 percentile level, was observed at Brew Bay and Lang Bay, which are situated east of the more densely populated areas.

Elemental and hydrographic conditions experienced during the survey were significant factors in adversely affecting the water quality. Total precipitation during November, 1975 was 279.5 mm (Figure 3), almost 177% greater than the mean total precipitation normally occurring in November (6). The high rainfall resulted in the bypass of raw sewage at the Powell River and Westview WPCP's and this, combined with increased landwash, resulted in a significant reduction of the shellfish growing water quality in the affected survey areas.

The prevailing winds during the survey were southeasterly, which had the effect of blowing surface waters up the mainland coast, and towards Vancouver Island. The prevailing currents in Malaspina Strait have been reported to be such that sub-surface waters move northwesterly up the strait and divide, with a westerly flow going through Algerine Pass, and a northwesterly flow past the Municipality of Powell River (7). Further evidence of this northwesterly flow comes from examining the dispersion pattern of MacMillan Bloedel's Pulp and Paper Mill effluent. A study conducted by EPS (8) using zinc concentration in oysters as an indicator of the presence of pulp mill effluent, has shown that the mill's zone of influence extends further than 10 miles to the northwest and 8 miles to the southeast. Other parameters used in this study to examine the dispersion of the effluent also indicated a net northern flow.

Thus from this evidence, it appears there was a general tendency for surface and subsurface contamination to move in a northwesterly direction up the coast during the survey.

During the sampling periods, small tide ranges were experi-





enced, usually not exceeding 2 metres between high and low tides. It was therefore difficult to assess the influence tidal changes may have had on the dispersion of sewage.

4.1 Scuttle Bay to Myrtle Beach

This stretch of coastline is the most heavily populated of the survey area and, not surprisingly, was found to be the most heavily polluted. Of the 29 shoreline stations positioned in this area, 22 did not meet the shellfish growing water fecal coliform standard.

The 20 kilometers of coastline receives effluent from three sewage treatment plants, a sewage lagoon, the MacMillan Bloedel Powell River Division Pulp and Paper Mill, and numerous streams and storm drains. During the survey period, an average total flow of $0.17m^3$ /sec (3.3 million Igpd) of domestic sewage effluent was discharged into the receiving waters from the four sewage treatment systems.

Fecal coliform MPN data for the sewage treatment systems is presented in Table 2. The bacteriological contribution of all major discharges and inputs to this area has been expressed in terms of population equivalents¹ (Figure 4), which incorporates both daily flows and bacterial densities into its calculation. In this way, the <u>rel-</u> ative significance of all the discharges can more easily be interpreted.

4.1.1 <u>Scuttle Bay to Sliammon</u>. Sample stations 9 to 13, located offshore from the Sliammon Indian Reservation, all exhibited unacceptable continuous fecal contamination. Receiving water pollution levels in the Scuttle Bay-Sliammon area can be attributed to the Sliammon Indian Reservation sewage-treatment plant (STP) and the Sliammon River (S2), having population equivalents of 20.7 and 26.7, respectively. The health significance of the Sliammon River discharge, relative to that of the STP, is not clear, as the source of contamination to the

¹A population equivalent of one is equal to 3.2×10^{10} fecal coliforms/ person/day (3).



POPULATION EQUIVALENTS HISTOGRAM

river was not ascertained. Higgs (4) suggests three possible explanations as to the source of fecal contamination: (1) landwash from the watershed; (2) exfiltration from a sewer line which crosses the creek; or (3) backflow of contamination from the sewage outfall into the mouth of the creek.

The treatment plant discharge exhibited a mean fecal coliform MPN of $5.7 \times 10^5/100$ mL and is of obvious sanitary significance. During the survey period the plant was not operating satisfactorily and routine effluent chlorination was difficult to maintain. The plant services all homes on the Reservation (approximate population 400) with the exception of one residence located on the east side of Highway 101. Fecal contamination was evident in a small stream (S1) entering at station 9 but was not considered significant relative to the above discharges. This stream drains a section of the sewered Reservation development.

The Klahanie subdivision located northwest of the Sliammon Village consists of approximately 50 homes having individual septic tank tile field disposal systems. Sample stations 5 through 8, located along the coastline fronting this development, all exhibited unacceptable fecal coliform densities. No discharges of sewage to the receiving waters were evident in this area, although seepage was identified at two residences. It would appear that the contamination observed at stations 5 through 8 is primarily due to the Sliammon Treatment Plant discharge and to the Sliammon River. The northwestern movement of surface and subsurface waters would explain the transport of contamination from these sources along the Klahanie subdivision shoreline. Bacterial pollution in the growing waters decreased with increasing distance from the Village.

Sample station 4, located in Scuttle Bay, exhibited intermittent contamination and was subsequently classified as unacceptable. It is unclear as to the source of pollution here as there was no evidence of a local problem. Conceivably, sewage from the Sliammon Indian Reservation could be swept into the bay during certain wind and current conditions, resulting in intermittent contamination of this station. Water quality at station 3 was acceptable, although low level contamination was indicated from the bacteria counts obtained.

Sample stations 1 and 2 both exhibited acceptable water quality and appear to be outside the influence of the Sliammon STP. No local pollution sources were identified in this area.

4.1.2 <u>Sliammon to Powell River</u>. Sample stations 14 through 17 were located along this area of coastline. Stations 14, 15 and 16 all exceeded the growing water standard with median MPN's of 38.5/100 ml, 59.5/100 ml and 125/100 ml, respectively. Station 17 exhibited acceptable water quality.

There is no shoreline development in this area with the exception of a civic beach (Gibson's Beach) located approximately 1.5 km southeast of Sliammon. The only pollution input between Sliammon and the Powell River is the stream entering at station 16 (S3). This stream receives effluent from the Wildwood Heights development sewage lagoon. During the survey period, S3 exhibited a mean fecal coliform MPN of 936/100 mL, which corresponds to a population equivalent of 2.3. The effluent from the lagoon, which enters approximately 1.2 km upstream from the mouth, exhibited a mean fecal coliform MPN of 4.3 x 10^4 . It would appear there is significant bacterial die-off occurring between the lagoon discharge to the stream and the stream discharge to Malaspina Strait. The contamination observed at stations between the mouth of S3 and the Sliammon Indian Reservation is most probably due to the combined influence of the Sliammon STP and the sewage entering from S3. It is also possible that sewage from the Powell River WPCP is carried up the coast and contributes to the pollution levels in this area. However, the influence of this plant was not evident as acceptable water quality was observed at stations 17 and 18, which conceivably would be in the path of this effluent.

The health hazard associated with the Wildwood Heights lagoon effluent could be more acute during the summer months, when the stream which receives this effluent reportedly runs dry. This would result in undiluted sewage being discharged at the mouth of S3. A chlorination unit which will become operational in 1976 should reduce this health hazard.

4.1.3 <u>Powell River to Myrtle Beach</u>. Sample stations 19 to 30 were located in this area to assess growing water quality. Stations 19 to 27, inclusive, all exceeded the growing water standard at the median level indicating continuous pollution was occurring. Stations 28, 29 and 30 had acceptable water quality and did not appear to be influenced by sewage discharged from the treatment plants.

The relative bacteriological importance of all major discharges to this area of Malaspina Strait is shown in Figure 4. Each discharge and its effect on the receiving waters will be individually discussed in the following text:

(1) MacMillan Bloedel Ltd., Powell River Division. During the survey period, the total effluent discharge from 6 discharge points at the mill averaged 3.84m³/sec (73.0 million Igpd). The major bacterial contribution came from the woodroom effluent with a mean fecal MPN of 766/100 ml, which represents a population equivalent of 10. The domestic sewer lines for the mill are connected into the Powell River WPCP and there should be no discharge of fecal material from the mill. However, biochemical analysis of bacterial isolates obtained from this effluent indicated that 76% of all isolates were E. coli indicating the presence of fecal contamination in this discharge. The presence of sewage in this discharge is most probably due to the existence of domestic sewage lines which have not been connected to the Powell River sanitary sewer system. Samples for bacteriological analysis were also taken outside the foam control boom at the mill and the results are presented on page 94, Appendix III. The low bacteria counts obtained demonstrate that the mill is not a major contributor of bacterial contamination to Malaspina Strait.

(2) Powell River Water Pollution Control Plant (Plant 171).

The combined sewage bypass from this plant was the most significant contributor of bacterial contamination of all the major discharges during the survey period, exhibiting an average fecal MPN of 1.5 x $10^6/100$ ml, or a population equivalent of 1,346. The treated effluent had an average fecal MPN of 2.5 x $10^5/100$ mL, which corresponds to a population equivalent of 346. Bacterial contamination is more apt to reach the foreshore from the bypass outfall than from the effluent outfall. The former discharge terminates 91 metres from low water mark (LWM) at a depth of only 0.3 metres below LWM, whereas the latter discharge terminates 368 metres from LWM at a depth of 47.7 metres. The average discharges from these two outfalls during the survey were 0.034 m^3 /sec (0.64 million Igpd) and 0.05 m^3 /sec (0.97 million Igpd), respectively. Very limited marine sampling was done in the vicinity of this treatment plant and the pulp mill due to unsuitability of the area for shellfish harvesting. The waters are presently used for industrial and commercial purposes by MacMillan Bloedel Ltd.

The bypass of sewage through the overflow outfall would appear to be a chronic problem during periods of heavy rainfall. The sanitary and storm sewers serving Powell River both flow through the plant and the hydraulic loadings on the plant exceeded design flow by 60% throughout the survey period, and no doubt this occurs frequently during the wet season.

(3) <u>Westview Water Pollution Control Plant (Plant 73)</u>. Sample stations 20, 21, 22 and 23 were positioned along the shoreline northwest of the Westview discharge and all exceeded

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the growing water standard at the median level. By-passed raw sewage, final effluent and waste digested sludge are discharged through a single marine outfall terminating 425.6 metres from LWM at a depth of 58.4 metres below LWM. As was the case with the Powell River WPCP, the bypass at the Westview WPCP proved to be the largest contributor of bacterial contamination, having a population equivalent of 1,101 as compared with 234 for the effluent. Due to the movement of currents in Malaspina Strait, sewage effluent from this plant is considered to be the major source of foreshore contamination northwest of the plant.

Rainfall again was the cause of the plant overload during the survey as an average of $.052 \text{ m}^3/\text{sec}$ (1.0 million Igpd) of effluent was treated while an average of $.026 \text{ m}^3/\text{sec}$ (0.5 million Igpd) of sewage was bypassed. The Westview area is reported to have separate sanitary and storm sewers and it is, therefore, difficult to explain the excessively high flows observed during wet weather. It would appear that there is either considerable infiltration into the sanitary lines, or a considerable amount of storm water still flows through the WPCP.

Other local, less significant, sources of fecal contamination in this vicinity included Willingdon Creek (S4) and an unnamed drainage creek (S5). These two inputs exhibited mean fecal MF counts of 36.5/100 ml and 116.6/100 ml, respectively, with corresponding population equivalents of 2.5 and 0.32. Willingdon Creek consists of two branches which drain Cranberry Lake from the northern and southern ends. Both branches drain wooded areas before entering Malaspina Strait. The north branch also drains approximately 20 acres of pastureland before entering the wooded area. The source of contamination to S5 was not ascertained but is probably runoff containing animal fecal matter, as this stream drains a residential section of Westview. Storm drains at Marine Avenue and Willingdon Street enter this creek, greatly increasing its flow, although the low population equivalent makes this an insignificant source of contamination to the receiving waters. Both S4 and S5 should be considered localized health dangers where they flow across the foreshore, particularly during wet weather periods.

No stations were placed in the area of the marina or ferry terminal as Schedule J (9) wharf closures prohibit shellfish harvesting in this vicinity. The danger of sewage contamination from boat discharges at the marina becomes more acute during the summer months and may then be a significant source of fecal contamination. Construction of additional moorage was in progress at the time of the survey and on completion there will be moorage capacity for over 1,000 boats.

Numerous storm water discharges flow across the foreshore area into Malaspina Strait between the Coast Ferries terminal and Grief Point. Four of these inputs were sampled (S6, S7, S8, S9) and all exhibited the presence of fecal coliforms. The most significant contributor was S6, which in fact is a creek draining a large, low lying wooded area. The estimated flow of the creek was 0.18 m^3 /sec (7.6 cfs) during periods of steady rainfall which corresponded to a population equivalent of 2.6. The source of contamination to this creek is most probably domestic animal wastes as it flows through many residential lots before entering the Strait near Hammon Avenue. S7, S8 and S9 enter the Strait at the foot of Nootka, Oliver and Penticton Streets, respectively. The population equivalents of these drains were considered insignificant; however, a reconnaissance of the shoreline area revealed the presence of at least 15 additional storm drains. The cumulative contribution of fecal contamination from these drains does represent a significant localized health hazard with respect to harvesting of shellfish along this foreshore. Marine sample stations 24, 25, 26 and 27 positioned along this shoreline all exceeded the growing water standard.

The area south of Grief Point did not appear to be adversely influenced by bacterial contamination from the Powell River-Westview areas, as sample stations 28, 29, 30, 31 and 32 all exhibited acceptable water quality. Receiving waters in the immediate vicinity of Grief Point could, however, be subject to contamination from a pump station emergency overflow discharge. In the event of a pump malfunction, sewage can overflow the manhole and subsequently flow down the bank across the foreshore. The pump station is equipped with an alarm system and to date no overflows have been reported, although pump failures have occurred. Another pump station located at the foot of Malaspina Avenue at Grief Point will discharge raw sewage through a 30.4 cm diameter marine outfall during periods of extended down times. The outfall extends 182.4 metres into Malaspina Strait at a depth of 18.2 metres below LWM. Two residences located near station 35 are reportedly not connected to the Westview sewerage district and have individual disposal systems. There was no evidence of

septic seepage emanating from either of these two homes. The receiving waters in this area are also subject to contamination from the Cariboo Street pump station emergency overflow discharge. Sewage can be discharged through a 30.4 cm diameter outfall which terminates 152 metres from LWM at a depth of 14.2 metres below LWM.

All sample stations located south of station 35 monitor coastline which lies outside the sewered areas.

4.2 Myrtle Beach

The Myrtle Beach area has a considerable oyster and clam resource and, prior to its closure in 1972, there was an estimated annual harvest of 20-30 tons of shellfish.

Significant localized fecal contamination was evident in the Myrtle Beach area, with sample stations 33-40 all exceeding the growing water standard. Stations 31 and 32, located north of Myrtle Beach, both met the growing water standard with median MPN's of <2/100 ml and 2/100 ml, respectively, and did not appear to be adversely affected by either sewage from the Municipality of Powell River or by contamination from Myrtle Beach.

Myrtle Creek (S10), Deighton Creek (S12), and a storm drain (S11) were the three major pollution inputs to this area, having mean fecal coliform MF counts of 399/100 ml, 240/100 ml and 230/100 ml. The population equivalents of the Myrtle and Deighton creek discharges were very roughly calculated as 14.03 and 5.12, respectively. These estimates are calculated on the basis of dry weather flows and most probably would be higher during rainfall. Both Myrtle and Deighton creeks drain pastureland and residential areas which are potential sources of fecal contamination. The bacteria counts in these creeks demonstrated a tendency to increase in relation to rainfall, suggesting that much of the fecal pollution is derived from landwash. Pastureland runoff is a significant source of bacteria of public health importance. The proximity of pastureland to shellfish growing waters is, therefore, a factor in determining the acceptability of the waters for shellfish harvesting. One such pasture area is located at the mouth of Myrtle Creek. Sheep, horses, pigs and chickens are raised on a small farm here and drainage from this land can find its way to the creek.

Provincial health officials have identified a sewage disposal problem at the Paradise Mobile Home Park, located approximately 1.6 kilometers upstream on Myrtle Creek. It was reported that sewage from a septic tank is discharged through a pipe onto the ground and subsequently enters Myrtle Creek. Samples taken on two consecutive days from the creek above and below the discharge point did not indicate any increase in fecal coliform levels. On-site examination of the area in question did, however, reveal the existence of a disposal problem.

The Ocean Villa Apartments on Centennial Drive were ordered closed by the Health Department in 1969 due to a faulty sewage disposal system which resulted in seepage reaching the beach area. At present only 1 of the 24 units is occupied and no problems were identified.

Fecal coliforms were found in a storm culvert (S11) which drains a residential area on the north side of Highway 101 at Myrtle Beach. The sources of contamination to this culvert were not identified although two homes had pipes for excess drainage in the vicinity of their tile fields. This drainage was not of a septic nature during the survey period.

Deighton Creek (S12) is susceptible to animal fecal pollution from the Ward residence on the creek. The pastureland, which supports seven cattle and approximately thirty chickens, slopes towards Deighton Creek enabling runoff to contaminate the water. No other

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residences were located near the mouth of the creek; however, the considerable upstream residential and pastureland development may contribute to the bacterial levels in the creek.

4.3 Myrtle Point to Albion Point

Sample stations 41, 42 and 43 were located along this shoreline and all met the growing water standard. No significant shellfish resource was identified in this area and sample stations were chosen more to determine the sphere of influence of Myrtle and Deighton treeks. The general northwestern flow in Malaspina Strait, together with the dilution and dispersion of pollution entering at Myrtle Beach, adequately reduced the danger of contamination along this shoreline. No local sewage disposal problems were observed.

4.4 Brew Bay

Both oysters and clams were prevalent in Brew Bay and two sample stations were chosen to assess the growing water quality. Station 44, located at the west end of the bay, exceeded the fecal standard at the 90 percentile level (174/100 mL) indicating an intermittent source of pollution. Station 45, located at the east end of the bay off the mouth of Kelly Creek, met the growing water standards.

Two streams entered the receiving waters in the vicinity of station 44, both of which drain residential development and pastureland. A bacteriological sample of one of these streams, entering at the foot of Donkersley Road, was taken on November 26 with a resultant fecal coliform MPN of 130/100 m&. Horses and cattle were found grazing in close proximity to these streams and the slope of the surrounding land was such that all landwash would enter these creeks.

Kelly Creek (S13) is the largest freshwater input to Brew

Bay and exhibited moderate fecal pollution with a mean MF fecal count of 77.5/100 mL at the mouth. On the basis of the acceptable water quality observed at station 45, there appears to be adequate dilution of any bacterial contamination entering the receiving waters from this source. Kelly Creek drains pastureland to the north and also flows through Lang Ranch which grazes horses. No sewage disposal problems were identified along this creek and it would appear the major inputs to Brew Bay are contaminated with animal, rather than human, wastes.

4.5 Lang Bay

Lang Bay was described by the Fisheries and Marine Service as having a marginal shellfish resource and five sample stations (46-50) were considered adequate to assess the growing waters. Station 47 was the only point to exceed the growing water standard, with a median MPN of 27/100 m.

The far west end of Lang Bay is presently utilized as a booming ground for Weldwood of Canada Ltd. which precludes its use for the harvesting of shellfish. The growing waters located east of the booming grounds, and monitored by stations 46, 47 and 48, are subject to contamination from two major freshwater sources. Whitehall Creek (S14), which enters Lang Bay at station 47, exhibited a mean fecal MF count of $29.5/100 \text{ m}\ell$ at the mouth. The flow from this creek was not measured, however it was considerable during the survey and was probably the most significant source of contamination to station 47. Once again the major source of fecal pollution to Lang Bay appears to be animal wastes. A farm located just upstream and to the west of the mouth of Whitehall Creek maintains 16 sheep and all runoff from this land drained towards the creek. The farm's septic tank absorption field also sloped towards the creek but appeared to be operating satisfactorily. The Seabreeze Cabins and Campsite lie across the creek from this farm and have five cabins with septic

tanks and absorption fields at the back, facing the creek. Two of these systems were recently installed and no seepage was evident from any of the units. However, any seepage from these units would ultimately enter Whitehall Creek, due to the slope of the land. On the north side of Highway 101, this creek flows through ranchland where 16 cattle were seen grazing.

The major freshwater input to the east end of Lang Bay was the Lois River (S16), which did not exhibit any significant fecal contamination during the study period. Water from this river is used to drive turbines at a power-generating plant and, therefore, the flow is controlled dependent upon electrical requirements. The river does not drain any residentially developed areas upstream and any contamination observed would be the result of hinterland runoff.

There are 6 residences near the mouth of Lois River, 3 of which are older buildings (approximately 25 years) having steel septic tanks and old tile field systems. There were no obvious problems observed during an on-site examination.

Fecal contamination was observed in a stream west of the Ed George residence, onshore from station 50, where an MPN count of >1600/100 mL was encountered on November 26. This stream flows beside the tile field and also drains pastureland. Horse dung was evident along the stream bed and it was difficult to determine whether any contamination was due to human sources. The water quality at stations 49 and 50 was not significantly impaired by this source, although a single high fecal count of 350/100 mL at station 50 was most probably a result of this stream.

4.6 <u>Stillwater Bay</u>

No sample stations were assigned to this area due to its present usage as a log dump and booming ground by MacMillan Bloedel Ltd.'s Stillwater Division.

4.7 Frolander Bay

Oysters were identified by the Powell River Regional District as being the major shellfish resource in Frolander Bay. Sample stations 51, 52 and 53 were positioned in the bay and all met the growing water standard, each having a median MPN of <2/100 mL. There are approximately 20 residences in this general vicinity, with perhaps 5 or 6 located on the beachfront. No sewage disposal problems were in evidence, and no major streams or rivers enter the receiving waters of Frolander Bay.

No sampling was conducted along the coastline between Frolander Bay and Thunder Bay due to the absence of development and/or a shellfish resource.

4.8 Thunder Bay

Oysters are the major resource in Thunder Bay (Regional District). Limitations in the laboratory sample-handling capacity allowed only sample station 54 to be assigned to this area. Water quality at this station was acceptable. Jefferd Creek (S17) is the only significant freshwater input to the bay and exhibited very slight fecal contamination, having a mean MF fecal count of 17/100 mL. Half a dozen sheep were grazing by the creek just below Highway 101, but no other sources of contamination, either human or animal, were observed along the stream. No sewage disposal problems were evident at any of the other residences in Thunder Bay. At present there are very few homes in this vicinity; however, two homes were under construction during the survey and there is considerable land which may be available for future development.

4.9 Thunder Bay to Saltery Bay

A pollution source reconnaisance of this coastline was considered sufficient to determine the acceptability of the marine waters for shellfish harvesting. There is virtually no development along this shoreline. with the exception of a Provincial Campsite and the Saltery Bay Ferry Terminal. The campsite, located approximately 1.6 kilometers east of Saltery Bay, has 39 campsites, as well as sewage disposal facilities for camper and mobile home units which are located approximately 550 metres from the ocean. Outdoor privys are the only disposal facilities available to the campers. The campsite was open but unoccupied during inspection.

Most of Saltery Bay comes under the Schedule J 400 foot wharf closure due to the presence of the ferry terminal and government wharf. There is some oyster resource at the east end of the bay but this area is dominated by booming activity. A creek which enters just east of the booming ground did not exhibit any fecal coliforms and no sources to this creek were evident. Sewage from the terminal facilities is treated in a package treatment plant with subsequent ground disposal. The health unit reports that the capacity of this plant exceeds the demand and no problems have been observed in its operation to date. Three houses located along the beachfront at the west end of the bay did not appear to have disposal problems. The foreshore in this area is outside of the Schedule J wharf closure. Saltery Bay is probably more susceptible to sewage pollution during the summer months, when the heaviest load is placed on the Terminal Treatment Plant. Sewage discharges from pleasure boats will also increase during the summer months, adding to the potential danger of contamination in Saltery Bay.

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- 9. Ammendment to Section 65 of the British Columbia Fisheries Regulations under the Fisheries Act.

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B. Kay, Bacteriologist, and D. Schroeder, Bacteriological Technician, conducted the bacteriological analyses in the Environmental Protection Service mobile laboratory located at Powell River. Mr. Kay compiled the bacteriological data.

D. Arney, Biological Technician, and K. Cooper, Engineering Technician, conducted the sanitary survey of the unsewered areas and carried out the sampling program. T. Higgs, contract Engineer, conducted the sanitary survey of the sewered areas, including the evaluation of all sewage treatment systems. APPENDIX I

MARINE SAMPLE STATION LOCATION DESCRIPTIONS

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APPENDIX I MARINE SAMPLE STATION LOCATION DESCRIPTIONS

Sample Station	Latitude	Longitude	Location
1	49 ⁰ 55' 22" N	124 ⁰ 39' 42" W	Approx. 150 yards east of Matheson residence.
2	49 ⁰ 55' 08" N	124 ⁰ 39' 01" W	Scuttle Bay.
3	49 ⁰ 54' 56" N	124 ⁰ 38' 32" W	Scuttle Bay - off white shacks.
4	49 ⁰ 54' 22" N	124 ⁰ 37' 23" W	NW foot of Klahanie Drive.
5	49 ⁰ 54' 12" N	124 ⁰ 37' 41" W	Off Green Trailer House at Scuttle Point.
6	49 ⁰ 54' 02" N	124 ⁰ 37' 16" W	Midway between Scuttle Point and Sliammon.
7	49 ⁰ 53' 48" N	124 ⁰ 37' 12" W	West of Sliammon I.R. Village.
8	49 ⁰ 53' 45" N	124 ⁰ 36' 55" W	Off white house with launch ramp.
9	49 ⁰ 53' 46" N	124 ⁰ 36' 37" W	Sliammon - off creek at west end of beach.
10	49 ⁰ 53' 42" N	124 ⁰ 36' 28" W	Sliammon - off church.
11	49 ⁰ 53' 42" N	124 ⁰ 36' 23" W	Off mouth of Sliammon Creek.
12	49 ⁰ 53' 36" N	124 ⁰ 36' 03" W	East of Sliammon Creek.
13	49 ⁰ 53' 28" N	124 ⁰ 35' 51" W	Sliammon - off house with blue roof.
14	49 ⁰ 53' 22" N	124 ⁰ 35' 37" W	Gibson's Beach.
15	49 ⁰ 53' 14" N	124 ⁰ 35' 20" W	Off Fisheries Marker.
16	49 ⁰ 54' 04" N	124 ⁰ 35' 09" W	Off unnamed creek draining Wildwood Heights Lagoon.
17	49 ⁰ 52' 42" N	124 ⁰ 34' 33" W	Off Fisheries Marker.
18	49 ⁰ 52' 08" N	124 ⁰ 35' 46" W	Mid-channel off M & B Mill.
19	49 ⁰ 51' 31" N	124 ⁰ 32' 39" W	Midway between Powell River WPCP and skating rink.

Sample Station	Latitude	Longitude	Location
20	49 ⁰ 50' 46" N	124 ⁰ 31' 50" W	Off Willingdon Park.
21	49 ⁰ 50' 41" N	124 ⁰ 31' 48" W	Off creek east of arena.
22	49 ⁰ 50' 36" N	124 ⁰ 31' 48" W	Off twin boat houses.
23	49 ⁰ 50' 33" N	124 ⁰ 31' 47" W	Off boathouse west of government wharf.
24	49 ⁰ 49' 56" N	124 ⁰ 31' 38" W	Westview-Grief Point.
25	49 ⁰ 49' 49" N	124 ⁰ 31' 35" W	Westview-Grief Point.
26	49 ⁰ 49' 32" N	124 ⁰ 31' 32" W	Westview-Grief Point.
27	49 ⁰ 49' 09" N	124 ⁰ 31' 28" W	Westview-Grief Point.
28	49 ⁰ 48' 16" N	124 ⁰ 31' 39" W	Grief Point.
29	49 ⁰ 47' 40" N	124 ⁰ 33' 21" W	Mid-channel off Grief Point.
30	49 ⁰ 48' 04" N	124 ⁰ 30' 50" W	Off Beach Gardens Resort.
31	49 ⁰ 47' 45" N	124 ⁰ 30' 06" W	Off point NW of Myrtle Beach.
32	49 ⁰ 47' 43" N	124 ⁰ 29' 08" W	Off green and white house NW of Myrtle Beach.
33	49 ⁰ 47' 37" N	124 ⁰ 28' 39" W	Myrtle Beach - brown house.
34	49 ⁰ 47' 37" N	124 ⁰ 28' 31" W	Myrtle Beach.
35	49 ⁰ 47' 40" N	124 ⁰ 28' 20" W	Myrtle Beach - off mill.
36	49 ⁰ 47' 39" N	124 ⁰ 28' 12" W	Myrtle Beach - bay at NW end.
37	49 ⁰ 47' 36" N	124 ⁰ 28' 05" W	Myrtle Beach - NW of Deighton Creek.
38	49 ⁰ 47' 34" N	124 ⁰ 28' 00" W	Myrtle Beach - NW of Deighton Creek.
39	49 ⁰ 47' 27" N	124 ⁰ 27' 52" W	Myrtle Beach - SE of Deighton Creek.

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I MARINE SAMPLE STATION LOCATION DESCRIPTIONS (Continued)

Sample Station	Latitude	Longitude	Location
40	49 ⁰ 47' 20" N	124 ⁰ 27' 41" W	Myrtle Beach - SE of Deighton Creek.
41	49 ⁰ 46' 44" N	124 ⁰ 27' 06" W	Myrtle Point.
42	49 ⁰ 46' 26" N	124 ⁰ 26' 13" W	Off white house between Myrtle Point and Albion Point.
43	49 ⁰ 46' 06" N	124 ⁰ 24' 45" W	Off yellow house NW of Albion Point.
44	49 ⁰ 46' 04" N	124 ⁰ 23' 30" W	Brew Bay.
45	49 ⁰ 46' 24" N	124 ⁰ 22' 43" W	Brew Bay - off Kelly Creek.
46	49 ⁰ 46' 28" N	124 ⁰ 21' 40" W	Lang Bay.
47	49 ⁰ 46' 32" N	124 ⁰ 21' 13" W	Lang Bay.
48	49 ⁰ 46' 21" N	124 ⁰ 20' 46" W	Lang Bay - SE end.
49	49 ⁰ 46' 18" N	124 ⁰ 20' 28" W	Lang Bay - off park at SE end.
50	49 ⁰ 46' 18" N	124 ⁰ 19' 51" W	Lang Bay - west of Lois River.
51	49 ⁰ 45' 40" N	124 ⁰ 17' 57" W	Frolander Bay - west end.
52	49 ⁰ 45' 38" N	124 ⁰ 17' 09" W	Frolander Bay - middle of bay.
53	49 ⁰ 45' 25" N	124 ⁰ 17' 10" W	Frolander Bay - east end.
54	49 ⁰ 46' 28" N	124 ⁰ 16' 36" W	Thunder Bay - head of bay.

APPENDIX II

FRESHWATER SAMPLE STATION LOCATION DESCRIPTIONS

Sample Station	Location
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S1	Mouth of unnamed creek on west end of Sliammon Village.
S2	Mouth of Sliammon River.
S 3	Mouth of unnamed creek draining Wildwood Heights Sewage Lagoon.
S4	Mouth of Willingdon Creek.
S5	Mouth of creek entering at foot of Willingdon Avenue.
S6	Mouth of creek entering east of Coast Ferries.
S7	Nootka Street storm drain.
S 8	Oliver Street storm drain.
S9	Penticton Street storm drain.
S10	Mouth of Myrtle Creek.
S11	Storm drain - Myrtle Beach.
S12	Mouth of Deighton Creek.
S13	Mouth of Kelly Creek.
S14	Mouth of Whitehall Creek.
S15	Drainage ditch - Lang Bay.
S16	Lois River.
S17	Mouth of Jefferd Creek.

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APPENDIX II FRESHWATER SAMPLE STATION LOCATION DESCRIPTIONS

APPENDIX III

BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE STATIONS

Sample Station: 1

Location: West Scuttle Bay

Date (1975)	Sample Time	Cor Time	Tide Iditions Height (m)	Mater Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 26	0915	0405 1125	1.7 4.6	ω	Nil	1	22.5	4
Nov. 26	1630	1125 1820	4.6 2.3	∞	ΝiΝ	ı	24.0	2
Nov. 27	1015	0510 1205	2.2 4.6	2	L i N	ı	21.0	2
Nov. 27	1525	1205 1905	4.6 1.9	2	Ni I	ı	20.0	2
Nov. 28	0845	0620 1250	2.6 4.6	ı	liN	ı	ı	7
Nov. 28	1510	1250 2000	4.6 1.5	Q	N†]	ı	17.0	£

Sample Station: 2

Location: Scuttle Bay

Da te (1975)	Sample Time	Con Time	Tide ditions Height (m)	Water Temp. (°C)	lotal Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 26	0630	0405 1125	1.74.6	œ	Lin		22.0	5
Nov. 26	1630	1125 1820	4.6 2.3	ω	ΝİΙ	ı	19.0	22
Nov. 27	0955	0510 1205	2.2 4.6	7	L İ N	ı	21.5	23
Nov. 27	1515	1205 1905	4. 6 1.9	7	Ni I	ı	61	2
Nov. 28	0060	0620 1250	2.6 4.6	ı	1 Î.N	ı	•	80
Nov. 28	1510	1250 2000	4.6 1.5	9	l i N	1	17	5

BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES APPENDIX III

Sample Station: ³

.

Location: Scuttle Bay

Date (1975)	Sample Time	Cor Time	Tide Iditions Height (m)	Vater Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1400	1025 1515	3.2 4.1	ı	Nil	· 1	ı	2
Nov. 18	0830	0600 1100	4.3 3.3	·	Nil	ı		Ŋ
Nov. 19	0830	0640 1140	4.5 3.3	I	Ni 1		'	31
Nov. 20	1400	1215 1655	3.4 4.1	ı	NiJ	·		23
Nov. 21	0830	0755 1300	4.6 3.4	ı	3.0	•	'	4
Nev. 24	1430	0945 1605	4.6 3.0	ı	Nil	·		9
NF025	0630	0315 1045	1.4 4.6		12.4		1	2
Nov26	0060	0405	1.74.6	Ø	liN	۱	21	14
Nov. 27	0945	0510 1205	2.2 4.6	6.5	l i N	ı	22	23
т 8 Молос 38 Спорт Спорт	0060 .	0620 1250	2.6 4.6	I	NiT	ı	ı	<2
NT SERVI CE								

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Sample Station: 4

Location: Scuttle Bay

Date (1975)	Sample Time	Con Time	Tide ditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal colifor MPN/100 ml
Nov. 17	1410	1025 1515	3.2 4.1	J	LiN	I	1	2
Nov. 18	0830	0600	4. 3 3.3	I	Nil	ł	i	2
Nov. 19	0945	0640 1140	4. 5 3.3	ı	L İ N	ı	ş	11
Nov. 20	1410	1215 1655	3.4 4.1	I	l i N	ı	١	4
Nov. 21	0945	0755 1300	4.6 3.4	ı	3.0	1	١	б
Nov. 24	1445	0945 1605	4.6 3.0	ı	L i N	ı	ì	540
Nov. 26	0845	0405 1125	1.7 4.6	I	LİN	1	۱.	21
Nov. 26	1615	1125 1820	4. 6 2.3	8	liN	ł	22	ω

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BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES APPENDIX III

Sample Station: 4

Location: Scuttle Bay

			Tide	Mater	Total			
Date	Samp le	Con	ditions	Temp.	Precip.	Wind	Salinitv	Fecal coliform
(1975)	Time	Time	Height (m)	(°C)	(mm)	(knots)	(ppt)	MPN/100 ml
Nov. 27	0925	0510	2.2	L.	[iN	ı	20	130
		G021	4.6)	-		0	000
00N	2100	0620	2.6		:			ł
NUV. 20	C1 C D	1250	4.6	ı		ı	ı	0/

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Sample Station:

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Location: Scuttle Point

Date (1975)	Sample Time	Con Time	ditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1420	1240 1730	3.0 4.3	8.0	26.4	NH @ 2	28.5	49
Nov. 6	0945	0805 1330	4.7 3.1	ı	22.1	SE @ 10	- I	350
Nov. 7	0320	0845 1430	4. 7 3.1	9.0	6.4	NE @ 2	17.5	40
Nov. 11	1020	0440 1210	2.0 4.3	8.5	4.8	E @ 15	22.5	7
Nov. 12	1415	1245 1955	4.2 2.1	9.4	29.7	SE @ 10	23.0	13
Nov. 13	0630	0645 1325	2.6 4.1	9.0	20.1	E to 20	23.5	Ε

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Sample Station: 6

Location: Scuttle Bay-Sliammon

Da te (1975)	Sample Time	Con Time	lide ditions Height (m)	Water Temp. (°C)	lotal Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1425	1240 1730	3.0 4.3	8,0	26.4	SM @ 3	27.5	94
Nov. 6	1010	0805 1330	4. 7 3.1	ı	22.]	SE @ 10	·	140
Nov. 7	0925	0845 1430	4.7 3.1	0.9	6.4	NE @ 4	17.5	20
Nov. 11	1020	0440 1210	2.0 4.3	8.0	4.8	E @ 8	23.0	2
Nov. 12	1435	1245 1955	4.2 2.1	0 . 6	29.7	SE @ 6	23.0	ß
Nov. 13	1050	0645 1325	2.6 4.1	0.0	20.1	SE @ 10	24.0	4

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Sample Station: 7

Location: Scuttle Bay-Sliammon

			Tide	Water	Total			
Date (1975)	Sample Time	Con Time	ıditions Height (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1430	1240 1730	3.0 4.3	8.0	26.4	W @ 5	27.5	110
Nov. 6	1015	0805 1330	4.7 3.1	ı	22.1	SE @ 8	١	240
Nov. 7	0935	0845 1430	1.7 3.1	0.0	6.4	NE @ 2	17.5	20
Nov. 11	1030	0440 1210	2.0 4.3	8.5	4.82	SE @ 9	23.5	2
Nov. 12	1440	1245 1955	4.2 2.1	10.0	29.7	SE @ 7	23.0	a
Nov. 13	1055	0645 1325	2.6 4.1	9.0	20.1	E @ 12	24.5	\$

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BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES APPENDIX III

Sample Station: 8

Location: Scuttle Bay-Sliammon

Date		Sample	Cond	ide itions	Water Temp.	Total Precip.	puiM	Salinity	Fecal coliform
(1975)		Time	Time	Height (m)	(°C)	(mm)	(knots)	(ppt)	MPN/ 100 ml
Nov. 5		1435	1240 1730	3.0	8.0	26.4	M @ 6	17.5	350
Nov. 6		1020	0805 1330	4.7 3.1	ŗ	22.1	SE @ 12	ı	170
Nov. 7	_	0935	0845 1430	4.7 3.1	8.5	6.4	E @ 7	12.0	50
Nov. 1	-	1030	0440 1210	2.0 4.3	8.0	4.82	E @ 15	21.0	22
Nov. 1	2	1450	1245 1955	4.2 2.1	0.6	29.7	SE to 40	21.0	130
Nov. 1	3	0011	0645 1325	2.6 4.1	8.5	20.1	E to 30	21.5	13
						·			

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Sample Station: 9

Location: Sliammon

			Tide	Mater	Total			
Da te (1975)	Sample Time	Con Time	iditions Height (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Vov. 5	1450	1240 1730	3.0 4.3	8.2	26.4	W @ 2	13.0	79
Vov. 6	1035	0805 1330	4.7 3.1	·	22.1	SE @ 15	•	540
łov. 7	0940	0845 1430	4.7 3.1	8.0	6.4	NE @ 5	8.0	80
Vov. 11	1035	0440 1210	2.0 4.3	8.0	4.8	E @ 13	20.0	49
łov. 12	1500	1245 1955	4.2 2.1	8.7	29.7	SE to 20	20.0	40
4ov. 13	0940	0645 1325	2.6 4.1	8.5	20.1	SE @ 12	15.0	62

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Sample Station: 10

Location: Sliammon

Date	Sample	Cor	Tide Iditions	Vater Temp	Total	Putp	Calinity	
(1975)	Time	Time	Height (m)	.())	(mm)	(knots)	(ppt)	MPN/100 ml
Nov. 5	1440	1240 1730	3.0 4.3	8.3	26.4	H 0 4	6.0	170
Nov. 6	1040	0805 1330	4. 7 3.1	۲	22.1	SE @ 22	I	350
Nov. 7	0945	0845 1430	4.7 3.1	8.0	6.4	NE @ 4	2.5	50
Nov. 11	1040	0440 1210	2.0 4.3	8.0	4.8	E @ 12	17.5	33
Nov. 12	1505	1245 1955	4.2 2.1	8.3	29.7	SE @ 20	13.5	33
Nov. 13	0945	0645 1325	2.6 4.1	8.0	20.1	SE to 30	11.5	130
			·					

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Sample Station: 11

Location: Sliammon

			Tide	Mater	Total			
Da te (1975)	Sample Time	Con Time	iditions Height (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Vov. 5	1255	1240 1730	3.0 4.3	8.7	26.4	W @ 4	14.0	11
Nov. 6	1045	0805 1330	4.7 3.1	1	22.1	SE @ 12	·	350
Vov. 7	0950	0845 1430	4.7 3.1	8.0	6.4	Е 0 3	8.0	02
Yov. 11	1045	0440 1210	2.0 4.3	8.0	4.8	E @ 11	23.0	11
Vov. 12	1510	1245 1955	4.2 2.1	8.1	29.7	SE @ 10-20	13.5	110
Vov. 13	0950	0645 1325	2.6	8.0	20.1	SE to 36	0	920 [.]

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BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES APPENDIX III

Sample Station: 12

Location: Sliammon

						Tata			
Date (1975)		Sample Time	Conc Time	lide ditions Height (m)	Mater Temp. (°C)	Precip.	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5		1500	1240 1730	3.0 4.3	8.0	26.4	W @ 3	13.5	49
Nov. 6		1055	0805 1330	4.7 3.1	,I	22.1	SE @ 5	ı	70
Nov. 7		0350	0845 1430	4.7 3.1	8.0	6.4	E @ 3	13.5	330
Nov. 1	_	1045	0440 1210	2.0 4.3	8.5	4.8	E 0 8	23.0	23
Nov. 1	2	1525	1245 1955	4.2 2.1	8.7	29.7	SE to 25	23.5	13
Nov. 1	e	0111	0645 1325	2.6	0.6	20.1	E @ 14	20.5	33

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Sample Station: 13

Location: Sliammon

Date	Samnle		Tide	Vater Temn	Total Duario	لمغمط	Salinitu	Facal coliform
(1975)	Time	Time	Height (m)	() ()	(mm)	(knots)	(ppt)	MPN/100 ml
Nov. 5	1500	1240 1730	3.0 4.3	8.0	26.4	M @ 6	13.5	49
Nov. 6	0011	0805 1330	4. 7 3.1	ì	22.1	SE @ 9	ı	130
Nov. 7	0955	0845 1430	4.7 3.1	8.5	6.4	E @ 4	14.0	06
Nov. 11	1050	0440 1210	2.0 4.3	8.5	4.8	NE @ 12	23.0	17
Nov. 12	1535	1245 1955	4 .2 2.1	8.9	29.7	SE to 15	23.0	17
Nov. 13	1115	0645 1325	2.6 4.1	0.0	20.1	E @ 10	22.0	12

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Sample Station: 14

Location: Gibson's Beach

Date	Sample	Con	Tide ditions	Wa ter Temp	Total	hind	Salinitv	Faral rolifowm
(1975)	Time	Time	Height (m)	.()°)	(mm)	(knots)	(ppt)	MPN/100 m1
Nov. 5	1520	1240 1730	3.0 4.3	7.5	26.4	W @ 5	13.5	17
Nov. 6	1115	0805 1330	4.7 3.1	ı	22.1	SE @ 5	ı	350
Nov. 7	0955	0845 1430	4.7 3.1	8.0	6.4	NE @ 3	12.5	110
Nov. 11	1055	0440 1210	2.0 4.3	8.0	4.8	E 0 15	23.5	33
Nov. 12	1555	1245 1955	4. 2 2.1	8.9	29.7	SE to 15	23.0	110
Nov. 13	1125	0645 1325	2.6 4.1	0.6	20.1	E to 20	22.5	נו

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BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES APPENDIX III

Sample Station: 15

Location: Sliammon

Da te	Sample	Con	Tide ditions	Mater Temp.	Total Precip.	Wind	Salinity	Fecal coliform
(1975)	Time	Time	Height (m)	(0°)	(uuu)	(knots)	(ppt)	MPN/100 ml
Nov. 5	1525	1240 1730	3.0 4.3	7.5	26.4	M @ 3	13.0	49
Nov. 6	1445	1330 1820	3.1 4.1	9.5	22.1	SE @ 12	12.5	2 30
Nov. 7	1000	0845 1430	4.7 3.1	8.0	6.4	E ĝ]	14.0	70
Nov. 11	1100	0440 1210	2.0 4.3	8.5	4.8	E @ 10	23.5	22
Nov. 13	1130	0645 1325	2.6 4.1	8.5	20.1	E @ 10	21.5	22
Nov. 14	1030	0750 1400	2.8 4.1	8.5	18.3	E @ 7	15.5	170

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Sample Station: 16

Location: Powell River

Date	Sample	Con	Tide ditions	Mater Temp.	Total Precip.	Wind	Salinitv	Fecal coliform
(1975)	Time	Time	Height (m)	())	(uuu)	(knots)	(ppt)	MPN/100 ml
Nov. 5	1515	1240 1730	3.0 4.3	7.9	26.4	01 0 M	11.5	>1600
Nov. 6	1455	1330 1820	3.1	9.5	22.1	SE @ 7	13.0	20
Nov. 7	1005	0845 1430	4.7 3.1	8.5	6.4	NE @ 3	7.0	230
Nov. 11	1100	0440 1210	2.0 4.3	8.5	4.8	E @ 12	22.5	8
Nov. 13	1130	0645 1325	2.6 4.1	8*2	20.1	E @ 10	20.0	11
Nov. 14	1035	0750 1400	2.8 4.1	8.5	18.3	E @ 10	14.5	540

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Sample Station: 17

Location: Powell River

Da te (1975)	Sample Time	Con Time	Tide ditions Height (m)	Wa ter Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1530	1240 1730	3.0	6.4	26.4	W @ 8	15.0	2
Nov. 6	1500	1330 1820	3.1 4.1	0.6	22.1	E 0 5	16.0	40
Nov. 7	1005	0845 1430	4.7 3.1	8.0	6.4	NE @ 6	14.0	5
Nov. 11	1105	0440 1210	2.0 4.3	8.5	4.8	E @ 18	22.5	14
Nov. 13	1140	0645 1325	2.6 4.1	8.5	20.1	E @ 22	15.5	8
Nov. 14	1040	0750 1400	2.8 4.1	8.5	18.3	E 0 7	18.0	4
			•			•		

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Sample Station: 18

Location: Mid-channel off Mill

Da te (1975)	Sample Time	Con T1me	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1115	1025 1515	3.2	8.0	lin	SW @ 9	20.0	4
Nov. 18	1005	0600 1100	4. 3 3.3	7.5	NiJ	LiN	21.0	2
Nov. 19	0855	0640 1140	4.5 3.3	7.0	liN	L i N	18.5	Ŋ
Nov. 20	1145	0710 1215	4. 5 3.4	8.0	Nil	SE @ 2	17.5	[[
Nov. 21	0630	0755 1300	4.6 3.4	7.0	3.0	NE @ 2	18.0	ß
Nov. 24	1100	0945 1605	4.6 3.0	8.0	NíJ	NW @ 13	21.0	2

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Sample Station: 19

Location: Powell River

			T 2 J 2	112 4 217	Tates			
Da te (1975)	Sample Time	Con Time	ditions Height (m)	Via ter Temp. (°C)	Precip.	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1545	1240 1730	3.0 4.3	9.7	26.4	W @ 6	24.0	>1600
Nov. 6	1510	0805 1330	4.7 3.1	9.5	22.1	SE @ 4	26.5	50
Nov. 7	1015	0845 1430	4.7 3.1	9.5	6.4	NW @ 2	24.5	80
Nov. 11	1120	0440 1210	2.0	8.5	4.8	E @ 19	24.5	LL I
Nov. 13	1205	0645 1325	2.6 4.1	0.6	20.1	E @ 20	24.0	ى ى
Nov. 14	1050	0750 1400	2.8	0.0	18.3	E @ 8	23.0	33
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BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES APPENDIX III

Sample Station: 20

Location: Willingdon Park

Date	Sample	Con	Tide ditions	Water Temp.	Total Precip.	Mind	Salinity	Fecal coliform
(1975)	Time	Time	Height (m)	(°C)	(uuu)	(knots)	(ppt)	MPN/100 ml
40V. 5	1550	1240 1730	3.0 4.3	0.6	26.4	M @ 7	18.0	280
Nov. 6	1150	0805 1330	4.7 3.1	I	22.1	SE @ 5	ı	62
Nov. 7	1020	0845 1430	4.7 3.1	0.0	6.4	Lin	24.5	70
Nov. 11	1130	0440	2.0 4.3	8.5	4.8	Е 0 Э	25.0	2
Nov. 12	1620	1245 1955	4.2 2.1	10.0	29.7	SE @ 7	22.0	79
Nov. 13	1210	0645 1325	2.6 4.1	8.5	20.1	E @ 12	24.5	33

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Sample Station: 21

Location: Mestview

Date (1975)		Sample Time	T Cond Time	ide itions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5		1555	1240 1730	3.0 4.1	9.5	26.4	W (d 3	21.0	920
Nov. 6		1515	1330 1820	3.] 4.]	10.0	22.l	SE @ 7	24.0	210
Nov, 7		1020	0845 1430	4.7 3.1	0.0	6.4	SE @ 1	24.5	<20
Nov. 1	-	1130	0440 1210	2.0 4.3	8.5	4.8	E @ 8	25.0	ى ئ
Nov. 1	e	1215	0645 1325	2.6 4.1	0.6	20.1	SE @ 5	24.5	220
Nov. 1	4	1105	0750 1400	2.8 4.1	0.0	18.3	E @ 10	23.5	14
Nov. 1	7	1125	1025 1515	3.2	8.0	liN	SW @ 3	26.0	33
Nov. 1	œ	1025	0600 1100	4 .3 2.3	6.5	Nil	E @ 2	21.5	46

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Sample Station: 22

Location: Westview

Da te (1975)	Sample Time	Con Time	Tide ditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1600	1240 1730	3.0 4.3	0.0	26.4	M @ 7	22.0	220
Nov. 6	1620	1330 1820	3.] 4.]	10.0	22.1.	E @ 3	23.5	50
Nov. 7	1025	0845 1430	4.7 3.1	9.5	6.4	E @ 2	24.5	<20
Nov. 11	1135	0440 1210	2.0 4.3	8.5	4.8	E @ 3	25.5	13
Nov. 13	1215	0645 1325	2.6 4.1	0.0	20.1	E @ 14	24.5	49
Nov. 14	0111	0750 1400	2.8 4.1	0.9	18.3	E @ 10	23.5	33
Nov. 17	1135	1025 1515	3.2 4.1	8.0	LiN	SW @ 4	24.0	33
Nov. 18	1030	0600 1100	4.3	7.0	l i N	Nil	22.0	17

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Sample Station: 23

Location: Westview

Da te (1975)	Sample Time	Con Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1605	1240 1730	3.0	9.5	26.4	W @ 4	24.5	240
Nov. 6	1525	1330 1820	3.1	10.0	22.1	E 0 4	24.5	50
Nov. 7	1030	0845 1430	4.7 3.1	9.5	6.4	E @ 6	24.5	<20
Nov. 11	1135	0440 1210	2.0 4.3	8.5	4.8	E @ 12	25.5	62
Nov. 13	1220	0645 1325	2.6 4.1	0.0	20.1	E @ 14	24.5	22
Nov. 14	0111	0750 1400	2.8 4.1	9 . 5	18.3	E @ 7	23.5	2
Nov. 17	1140	1025 1515	3.2 4.1	8.0	lin	SW @ 4	22.5	11
Nov. 18	1035	0600 1100	4. 3 3.3	7.0	LiN	E @ 2	22.0	£

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Sample Station: 24

Location: Westview

Da te (1975)	Sample Time	Con Time	Tide ditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1610	1240 1730	3.0 4.3	9.5	26.4	W @ 3	25.5	130
Nov. 6	1530	1330 1820	3.1 4.1	10.0	22.1	E @ 7	23.5	062
Nov. 7	1030	0845 1430	4.7 3.1	9.5	6.4	S @ 3	24.5	<20
Nov. 11	1140	0440 1210	2.0	8.5	4.8	E011	25.0	2
Nov. 13	1225	0645 1325	2.6 4.1	0.6	20.1	Е @ 8	23.5	33
Nov. 14	1120	0750 1400	2.8 4.1	0.6	18.3	E Q	23.5	33
Nov. 17	1145	1025 1515	3.2 4.1	7.5	Nil	SW @ 4	22.0	13
Nov. 18	1040	0600 1100	4.3 3.3	7.0	L i N	LİN	21.0	2

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Sample Station: 25

Location: Westview

			Tide	Water	Total	L	C-1 : : +	East colifour
ua te 1975)	Time	Time	ditions Height (m)	(°C)	(mm)	(knots)	(ppt)	MPN/100 ml
Vov. 5	1615	1240 1730	3.0 4.3	9.5	26.4	SW @ 2	23.5	<1600
Nov. 6	1530	1330 1820	3.1	10.0	22.1	SE @ 7	24.0	20
Vov. 7	1035	0845 1430	4.7 3.1	9.5	6.4	E @ 3	24.5	20
Nov. 11	1145	0440 1210	2.0 4.3	8.5	4.8	E@11	25.0	2
Nov. 13	1225	0645 1325	2.6 4.1	0.0	20.1	E @ 6	24.0	11
Nov. 14	1125	0750 1400	2.8 4.1	9.5	18.3	E 0 7	23.0	4

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Sample Station: 26

Location: Westview

		Li	de	Water	Total			
Date (1975)	Sample Time	Time H	itions leight (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 5	1620	1240 1730	3.0 4.3	9.5	26.4	SW @ 3	25.0	62
Nov. 6	1535	1330 1820	3.1 4.2	10.0	22.1	SE @ 3	24.0	50
Nov. 7	1035	0845 1430	4.7 3.1	9.5	6.4	SE @ 6	23.5	50
Nov. 11	1150	0440 1210	2.0 4.3	8.5	4.8	E @ 11	25.0	ß
Nov. 13	1230	0645 1325	2.6 4.1	9.0	20.1	E @ 12	24.5	2
Nov. 14	1130	0750 1400	2.8 4.1	9.0	18.3	E @ 7	23.5	ω

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Sample Station: 27

Location: Westview

Date (1975)	Sample Time	Con Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Yov. 5	1625	1240 1730	3.0 4.3	0.6	26.4	SW @ 1	22.0	540
Vov. 6	1540	1330 1820	3.1 4.1	10.0	22.1	E 0 7	24.0	80
Vov. 7	1040	0845 1430	4.7 3.1	9.5	6.4	Е 0 Э	24.5	<20
Yov. 11	1150	0440 1210	2.0 4.3	8.5	4.8	E 0 11	25.5	4
Vov. 13	1230	0645 1325	2.6 4.1	0.6	20.1	E 0 9	24.5	23
Vov. 14	1130	0750 1400	2.8 4.1	9.5	18.3	E @ 6	23.0	ى ب
Vov. 17	1150	1025 1515	3.24.1	7.0	Nil	SW @ 5	22.5	N
Yov. 18	1045	0600	4. 3 3.3	7.0	LiN	S @ 4	21.5	2

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Sample Station: 28

Location: Grief Point

Da te (1975)	Sample Time	Con Time	Tide ditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 19	0915	0640 1140	4.5 3.3	7.0	Nil	Nil	22.5	23
Nov. 20	1435	1215 1655	3.4 4.1	7.0	l i N	NW @ 5	21.0	<2
Nov. 21	1000	0755 1300	4.6 3.4	6.5	3.0	NE @ 2	21.0	2
Nov. 24	1125	0945 1605	4.6 3.0	7.8	l i N	W @ 9	21.5	11
Nov. 25	0945	0315 1045	1.4 4.6	8.0	12.4	EGJ	22.5	17
Nov. 26	0845	0405 1125	1.7 4.6	7.8	Nil	W @ 6	22.0	42
Nov. 27	0610	0510 1205	2.2 4.6	7.5	lin	l i N	23.0	2
Nov. 28	0825	0620 1250	2.6 4.6	5.5	L Î N	Nil	22.5	5

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Sample Station: 29

Location: Mid-channel off Grief Point

			Tida	112 + AM	Total			
Da te (1975)	Sample Time	Con Time	ditions Height (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1413	1025	3.2 4.1	8.0	Ni I	SM @ 4	23.5	<2
Nov. 18	1050	0600 1100	4. 3 3. 3	7.0	lin	lin	20.5	<2
Nov. 19	0905	0640 1140	4 .5 3.3	6.0	Nil	E 0 5	21.0	, ,
Nov. 20	1425	1215 1655	3.4 4.1	6.7	N i N	NN @ 2	19.5	<2
Nov. 21	0955	0755 1300	4.6 3.4	6.3	3.0	SE @ 6	21.0	~2 ~
Nov. 24	1120	0945 1605	4.6 3.0	8.0	Nil	NW @ 14	22.0	<2
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Sample Station: 30

Location: Beach Gardens Resort

Da te (1975)	Sample Time	Con Time	Tide ditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1420	1025 1515	3.2 4.1	7.5	Nil	2M @ 7	23.5	~2
Nov. 18	1100	1100 1545	3.3	6.5	Nil	SE @ 3	20.0	\$
Nov. 19	0915	0640 1149	4.5 3.3	7.5	NiN	lin	22.5	\$
Nov. 20	1435	1215 1655	3.4 4.1	7.0	111	N 0 4	21.0	<2
Nov. 21	1000	0755 1300	4.6 3.4	6.5	3.0	Nil	21.5	<2
Nov. 24	1130	0945 1695	4.6 3.0	8.0	Nj	M @ 7	22.0	<, ,
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Sample Station: 31

Location: Myrtle Beach

Date	Sample	Con	Tide ditions	Water Temp	Total Precin	hait	Calinity	Forsl coliform
(1975)	Time	Time	Height (m)	(c))	(mm)	(knots)	(ppt)	MPN/100 ml
Nov. 17	1425	1025 1515	3.2 4.1	8.0	l i N	SW @ 5	24.0	<2
Nov. 18	1355	1100 1545	3.3	7.0	Nil	SE @ 4	20.0	2
Nov. 19	0320	0640 1140	4. 5 3.3	7.0	Nil	ΓiΝ	22.5	2
Nov. 20	1440	1215 1655	3.4 4.1	7.0	Ni J	SW @ 4	20.5	\$
Nov. 21	1005	0755 1300	4.6 3.4	6.1	3.0	NE @ 1	21.0	\$
Vov. 24	1425	0945 1605	4.6 3.0	8.5	Nil	5M @ 6	22.5	<2

Sample Station: 32

Location: Myrtle Beach

Da te (1975)	Sample Time	Con Time	Tide ditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1430	1025 1515	3.2	8.0	ΝiΊ	SW @ 2	24.0	46
Nov. 18	1350	1100 1545	3.3 4.1	7.0	Ni 1	SE @ 2	17.0	17
Nov. 19	0925	0640 1140	4. 5 3.3	7.5	Ni I	LiN	22.5	0
Nov. 20	1445	1215 1655	3.4 4.1	7.0	Ni I	S @ 3	20.0	2
Nov. 21	1010	0755 1300	4.6 3.4	6.5	3.0	L @ MN	21.0	<2
Nov. 24	1430	0945 1605	4.6 3.0	8.5	L I N	SW @ 4	23.0	<2
Nov. 25	1045	0315 1045	1.4 4.6	7.0	12.4	ΓĻΝ	21.0	ω
Nov. 26	0855	0405	1.7 4.6	8.0	lin	М @ З	22.0	ß
Nov. 27	0915	0510 1205	2.2 4.6	7.5	Ni J	ĹĮŊ	24.0	<2
Nov. 28	0830	0620 1250	2.6 4.6	4.5	l i N	Nil	23.0	<2

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Sample Station: 33

Location: Myrtle Beach

Date (1975)	Sample Time	Cor Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 4	1510	1140 1650	2.9 4.5	I	15.5	·	ı	33
Nov. 5	0955	0705 1210	4.8 3.0	1	26.4	7 O M	ı	23
Nov. 6	1450	1330 1820	3.1 4.1	5.0	22.1	SE @ 8	26.0	011
Nov. 7	1440	1430 1905	3.1 3.8	9.6	6.4	NE @ 4	22.0	17
Nov. 11	1155	0440 1210	2.0 4.3	7.0	4.8	ı	24.0	17
Nov. 12	0945	0550 1245	2.3 4.2	8.0	29.7	SE @ 20	20.0	49

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Sample Station: 34

Location: Myrtle Beach

Date (1975)	Sample Tíme	Con Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 4	1505	1140 1650	2.9 4.5	ı	15.5		ı	12
Nov. 5	0945	0705 1240	4.8 3.0	I	26.4	W @ 3	I	2 L
Nov. 6	1445	1330 1820	3.1 4.1	4.0	22.1	SE @ 4	25.0	130
Nov. 7	1435	1430 1905	3.1 3.8	10.3	6.4	NE @ 3	18.5	N
Nov. 11	1150	0440 1210	2.0 4.3	8.0	4.8	1	21.0	ω
Nov. 12	0955	0550 1245	2.3 4.6	8.2	29.7	SE @ 16	21.0	Ø
Nov. 18	1415	1100 1545	3.3 4.1	ı	l i N	ı	I	79
Nov. 19	0935	0640 1140	4.5 3.3		l i N	. 1	1	N
Nov. 20	0320	0710 1215	4.5 3.4	I	l i N	ı	ı	<2
Nov. 21	1015	0755 1300	4.6 3.4	6.7	3.0	N @ 1	20.5	£

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Sample Station: 35

Location: Myrtle Beach

Date	Sample	Con	Tide ditions	Water Temp.	Total Precip.	Wînd	Salinity	Fecal coliform
(1975)	Time	Time	Height (m)	(0°)	(uuu)	(knots)	(ppt)	MPN/100 ml
Nov. 4	1500	1140 1650	2.9 4.5	ı	15.5	ľ	L	49
Nov. 5	0943	0705 1240	4 .8 3.0	ı	26.4	W Q 4	ι	13
Nov. 6	1435	1330 1820	3.1 4.1	4.0	22.1	SE @ 5	25	170
Nov. 7	1430	1430 1905	3.1 3.8	10.0	6.4	NE @ 2	8	33
Nov. 11	1140	0440 1210	2.0 4.3	8.0	4.8	1	23.0	540
Nov. 12	1005	0550 1245	2.3 4.2	8.0	29.7	SE @ 15	20.5	22

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Sample Station: 36

Location: Myrtle Beach

Date	Sample	Can	Tide ditions	Vater Temp	Total Precin	PuiM	Salinitu	Foral coliform
(1975)	Time	Time	Height (m)	(0.)	(mm)	(knots)	(ppt)	MPN/100 ml
Nov. 4	1455	1140 1650	2.9 4.5	ı	15.5	ı	1	33
Nov. 5	0940	0705 1240	4.8 3.0	I	26.4	N 0 7	ı	4
Nov. 6	1430	1330 1820	3.1 4.1	4.0	22.1	SE @ 3	23.0	70
Nov. 7	1425	0845 1430	4.7 3.1	9.9	6.4	NE @ 4	15.0	49
Nov. 11	1135	0440 1210	2.0 4.3	8.0	4.8	ı	24.0	6
Nov. 12	0101	0550 1245	2.3 4.2	8.7	29.7	SE @ 15	21.5	49

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Sample Station: 37

Location: Myrtle Beach

Date	Samp le	Con	Tide ditions	Water Temp.	Total Precip.	Wind	Salinity	Fecal coliform
(1975)	Time	Time	Height (m)	(°C)	(1111)	(knots)	(ppt)	MPN/100 ml
Nov. 4	1450	1140 1650	2.9	ł	15.5	I	ı	011
Nov. 5	0630	0705 1240	4.8 3.0	ł	26.4	W @ 5	ı	23
Nov. 6	1425	1330 1820	3.1 4.1	4.0	22.1	SE @ 5	19.0	70
Nov. 7	1420	0845 1430	4. 7 3.1	10.0	6.4	NE @ 5	16.0	33
Nov. 11	1130	0440 1210	2.0 4.3	8 . 0	4.8	I	22.0	23
Nov. 12	1015	0550 1245	2.3 4.2	8.2	29.7	SE @ 15	20.0	46

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Sample Station: 38

Location: Myrtle Beach

			Tide	Water	Total			
Da te (1975)	Sample Time	Time	ditions Height (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 4	1445	1140 1650	2.9 4.5	I	15.5	ı	ï	79
Nov. 5	0925	0745 1240	4.8 3.0	ı	26.4	W @ 5	ł	1600
Nov. 6	1415	1330 1820	3.1 4.1	4.0	22.1	SE @ 6	13.0	350
Nov. 7	1415	0845 1430	4. 7 3.1	9.9	6.4	NE @ 5	20.5	130
Nov. 11	1125	0440 1210	2.0 4.3	8.0	4.8	ı	20.0,	49
Nov. 12	1025	0550 1245	2.3 4.2	8.2	29.7	SE @ 5	17.5	170

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Sample Station: 39

Location: Myrtle Beach

Da te	Sample	Con	Tide ditions	Water Temp.	Total Precip.	Wind	Salinitv	Fecal coliform
(1975)	Time	Time	Height (m)	(c)	(uuu)	(knots)	(ppt)	MPN/100 ml
Nov. 4	1435	1140 1650	2.9 4.5	ı	15.5	ı		71
Nov. 5	0915	0705 1240	4 .8 3.0	ı	26.4	W @ 5	i	14
Nov. 6	1405	1330 1820	3.] 4.]	4.0	22.1	SE @ 5	26.0	71
Nov. 7	1405	0845 1430	4.7 3.1	10.0	6.4	NE @ 3	22.5	IJ
Nov. 11	1115	0440 1210	2.0 4.3	8.0	4.8	I	24.5	23
Nov. 12	1030	0550 1245	2.3 4.2	8.5	29.7	SE @ 5	24.0	79

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Sample Station: 40

Location: Myrtle Beach

Da te	Sample	Cor	Tide Iditions	Water Temp.	Total Precip.	Wind	Salinitv	Fecal coliform
(1975)	Time	Time	Height (m)	() ()	(шш)	(knots)	(ppt)	MPN/100 m1
Nov. 4	1430	1140 1650	2.9	ł	15.5	۲	ı	17
Nov. 5	0915	0705 1240	4.8 3.0	ı	26.4	M @ M	I	79
Nov. 6	1400	1330 1820	3.1 4.1	4.0	22.1	SE @ 5	25.0	63
Nov. 7	1400	0845 1430	4.7 3.1	10.0	6.4	NE .0 6	22.5	. 7
Nov. 11	, 1115	0440 1210	2.0 4.3	7.0	4.8	ı	24.0	7
Nov. 12	1030	0550 1245	2.3 4.2	8.7	29.7	SE @ 5	23.0	2

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Sample Station: 41

Location: Myrtle Point

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Da te (1975)	Sample Time	Cor Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 19	0935	0640 1140	4.5 3.0	7.0	l i N	ΝiΝ	22.5	<2
Nov. 20	1530	1215 1655	3.4 4.1	7.0	l i N	E @ 2	20.0	<2
Nov. 21	1025	0755 1300	4.6 3.4	6.5	3.0	N @ 1	21.0	7
Nov. 24	1440	0945 1605	4.6 3.0	8.0	l i N	W @ 5	23.0	<2
Nov. 25	0955	0315 1045	1.4 4.6	7.5	12.4	ΓİΝ	21.5	21
Nov. 26	0060	0405 1125	1.7 4.6	7.4	ΝîΊ	N @ 6	22.0	13
Nov. 27	0925	0510 1205	2.2 4.6	7.0	Nil	ΓİΝ	23.5	2
Nov. 28	0840	0620 1250	2.6 4.6	5.0	Nil	l i N	23.0	2

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Sample Station: 42

Location: Myrtle Point-Albion Point

Da te (1975)	Sample Time	Cor Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 19	0945	0640 1140	4. 5 3.3	7.0	LIN	Nil	22.0	\$
Nov. 20	1535	1215 1655	3.4 4.1	7.0	Nil	SE @ 2	19.0	6
Nov. 21	1030	0755 1300	4.6 3.4	6.7	3.0	N @ 2	20.5	Ъ
Nov. 24	1440	0945 1605	4.6 3.0	8.0	L İ N	W @ 7	23.0	ъ
Nov. 25	1000	0315 1045	1.4 4.6	7.5	12.4	E @ 2	21.5	2
Nov. 26	0905	0405 1125	1.7 4.6	7.7	NÌI	I @ MN	22.0	5
Nov. 27	0630	0510 1205	2.2 4.6	6.5	L İ N	N @ J	24.0	<2
Nov. 28	0840	0620 1250	2.6 4.6	5.5	Nil	N @ 1	22.5	<2

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Sample Station: 43

Location: Albion Point

Da te (1975)	Sample Time	Con Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots).	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 19	0945	0640 1140	4.5 3.3	7.0	ΓiΝ	N @ 1	22.5	\$
Nov. 20	1540	1215 1655	3.4 4.1	6.9	Lin	SE @ 2	20.0	^ 2
Nov. 21	1035	0755 1300	4.6 3.4	6.9	3.0	N @ 4	20.5	2
Nov. 24	1445	0945 1605	4.6 3.0	8.0	Νiη	W @ 5	23.0	<2
Nov. 25	1000	0315 1045	1.4 4.6	7.5	12.4	E @ 2	23.0	6
Nov. 26	0160	0405 1125	1.7 4.6	7.8	NÌJ	M @ 2	22.5	2
Nov. 27	0630	0510 1205	2.2 4.6	6.5	ΓiΝ	LİN	24.5	22
Nov. 28	0845	0620 1250	2.6 4.6	5.0	liN	N @ 2	23.0	8

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Sample Station: 44

Location: Brew Bay

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Da te (1975)	Sample Time	Con Time	iide ditions Height (m)	Water Temp. (°C)	Precip.	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1450	1025 1515	3.2 4.1	8.0	ΓiΝ	SW @ 4	22.0	130
Nov. 18	1410	1100 1545	3.3 4.1	7.0	NiT	E @ 4	21.0	350
Nov. 19	0955	0640 1140	4.5 3.3	6.5	Nil	NW @ 1	23.0	2
Nov. 20	1545	1215 1655	3.4 4.1	7.1	Nil	NW @ 3	21.0	2
Nov. 21	1040	0755 1300	4.6 3.4	6.4	3.0	N @ 3	18.0	4
Nov. 24	1450	0945 1605	4.6 3.0	8.0	Ni 1	W @ 3	23.0	2
Nov. 27	0935	0510 1205	2.2 4.6	6.5	Nil	NW @ 5	23.0	<2
Nov. 28	0850	0620 1250	2.6 4.6	5.0	ΓiΝ	N @ 2	22.5	5

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Sample Station: 45

Location: Brew Bay

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Da te (1975		Sample Time	Cond Time	ıde litions Height (m)	Water Temp. (°C)	Precip.	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov.	17	1500	1025 1515	3.2 4.1	8.0	LİN	SW @ 11	23.5	ى
Nov.	18	1415	1100 1545	3.3 4.1	8.0	Nil	E @ 4	16.0	ى
Nov.	19	1000	0640 1140	4.5 3.3	6.5	LiN	NW @]	22.5	<2
Nov.	20	1545	1215 1655	3.4 4.1	7.0	Nil	Е Э З	20.5	011
Nov.	21	1045	0755 1300	4.6 3.4	6.2	3.0	NW @ 3	19.0	2
Nov.	24	1455	0945 1605	4.6 3.0	7.5	L ŧ N	м ө Э	23.0	33
Nov.	25	1005	0315 1045	1.4 4.6	7.5	12.4	E @]	22.0	2
Nov.	26	0320	0405 1125	1.7 4.6	7.8	Nil	W @ 4	22.0	- N
Nov.	27	0940	0510 1205	2.2 4.6	6.5	ΓiΝ	N @ 4	23.0	œ
Nov.	28	0855	0620 1250	2.6 4.6	5.5	Nil	NW @ 2	25.0	ნ

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Sample Station: 46

Location: Lang Bay

Da te (1975)	Sample Time	Cor Time	Tide Iditions Height (m)	Vater Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1510	1025 1515	3.2 4.1	8.5	ГіN	SW @ 5	23.5	5
Nov. 18	1420	1100 1545	3.3	8.0	l i N	E @]	13.0	<2
Nov. 19	1000	0640 1140	4. 5 3.3	7.0	Ni T	Nil	23.0	2
Nov. 20	1555	1215 1655	3.4 4.1	7.0	lin	NW @ 3	19.5	2
Nov. 21	1050	0755 1300	4.6 3.4	6.4	3.0	N @ 1	18.5	2
Nov. 24	1500	0945 1605	4.6 3.0	8.0	l i N	W @ 3	22.5	2

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Sample Station: 47

Location: Lang Bay

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Da te (1975)	Sample Time	T Cond Time	ide litions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1515	1515 2240	4.1 1.0	8.0	Ni T	9 Ø MS	22.0	ى ا
Nov. 18	1425	1100 1545	3.34.1	8.0	ΓiΝ	E @ 5	12.0	70
Nov. 19	1005	0640 1140	4.5 3.3	7.5	Nil	liN	22.5	<2
Nov. 20	1555	1215 1655	3.4 4.1	7.6	N İ I	I @ MN	20.0	49
Nov. 21	1055	0755 1300	4.6 3.4	6.7	3.0	N @ 2	19.0	49
Nov. 24	1500	0945 1605	4.6 3.0	7.0	l i N	ы 0 3	23.0	~2

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Sample Station: 48

Location: Lang Bay

Da te (1975		Sample Time	T Cond Time	ide litions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov.	17	1525	1515 2240	4 .1 1.0	8.0	Lin	SW @ 7	18.0	011
Nov.	18	1430	1100 1545	3.3 4.1	7.5	LiN	E 0 5	15.0	<2
Nov.	61	1010	0640 1140	4.5 3.3	7.0	L İ N	liN	22.5	32
Nov.	20	1600	1215 1655	3.4 4.1	7.8	L İ.N	NW @ 2	19.0	22
Nov.	21	1100	0755 1300	4.6 3.4	6.9	3.0	N @ 2	19.0	5
Nov.	24	1505	0945 1605	4. 6 3.0	8.0	NÌI	W @ 7	21.5	33
. vov	25	0101	0315 1045	1.4 4.6	7.0	12.4	Nil	19.5	7
Nov.	26	0925	0405 1125	1.7 4.6	7.8	Ni I	NW @ 3	22.0	5
Nov.	27	0945	0510 1205	2.2 4.6	6.0	Nil	N @ 2	23.5	Q
Nov.	28	0060	0620 1250	2.6 4.6	7.5	ΝîΤ	N @ 3	22.5	ω

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Location: Lang Bay

Sample Station: 49

Da te (1975)	Sample Time	Con Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1535	1515 2240	4.1 1.0	8.5	ΓiΝ	SW @ 4	17.0	9
Nov. 18	、 1430	1100	3.3 4.1	8.0	Nil	SE @ 1	12.0	<2
Nov. 19	1015	0640 1140	4.5 3.3	7.0	l i N	Nil	23.0	a
Nov. 20	1605	1215 1655	3.4 4.1	7.0	Ni J	NW @ 2	9.5	<2
Nov. 21	1100	0755 1300	4.6 3.4	6.8	3.0	NE @ 7	19.0	2
Nov. 24	1510	0945 1605	4.6 3.0	8.0	l i N	SE @ 2	23.0	~2

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Sample Station: 50

Location: Lang Bay

Da te (1975		Sample Time	Cond Time	ide itions Height (m)	Wa ter Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov.	17	1540	1515 2240	4.1 1.0	8.5	lin	SW @ 3	16.5	7
Nov.	18	1435	1100 1545	3.3 4.1	8.5	Nil	SE @ 4	11.0	Ş
Nov.	19	1015	0640 1140	4.5 3.3	7.5	liN	Nil	15.0	350
Nov.	20	1610	1215 1655	3.4 4.1	8 . 0	Nil	N @ 2	14.0	2
Nov.	21	1105	0755 1300	4.6 3.4	6.7	3.0	NE @ 6	19.5	~2
Nov.	24	1515	0945 1605	4. 6 3.0	8.0	N†1	К © 3	23.0	\$
Nov.	25	1015	0315 1045	1.4 4.6	7.5	12.4	NE @ 3	21.0	2
Nov.	26	0630	0405 1125	1.7 4.6	7.9	Nil	NW @ 5	21.5	ω
Nov.	27	0950	0510 1205	2.2 4.6	6.5	Nil	NE (3 1	22.0	<2≻
Nov.	28	0160	0620 1250	2.6 4.6	7.0	L i N	N @ 2	20.5	-2

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Sample Station: 51

Location: Frolander Bay

Da te (1975)	Sample Time	Cor Time	Tide Iditions Height (m)	Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1550	1515 2240	4.1 1.0	8.0	liN	SW@]	25.0	<2
Nov. 18	1445	1100 1545	3.3 4.1	8.0	Nil	lin	21.0	2
Nov. 19	1025	0640 1140	4. 5 3.3	7.0	Nil	lin	24.0	<2
Nov. 20	1615	1215 1655	3.4 4.1	7.0	Nil	M @]	21.0	<2
Nov. 21	1115	0755 1300	4.6 3.4	6.6	3.0	NE @ 7	21.0	<2
Nov. 24	1525	0945 1605	4.6 3.0	8.0	L i N	NW @ 2	23.0	2
			:					

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Sample Station: 52

Location: Frolander Bay

Date	Sample	Cor	Tide Iditions	Water Temp.	Total Precip.	Wind	Salinitv	Fecal coliform
(1975)	Time	Time	Height (m)	() ()	(1111)	(knots)	(ppt)	MPN/100 ml
Nov. 17	1455	1025 1515	3.2 4.1	8.0	L i N	L Ø MS	23.5	Ŷ
Nov. 18	1450	1100 1545	3.3 4.1	8.0	ΝiΊ	NE @ 2	22.0	Ş
Nov. 19	1030	0640 1140	4.5 3.3	7.5	liN	lin	23.5	\$
Nov. 20	1620	1215 1655	3.4 4.1	7.0	N i 1	NE @]	21.5	Ş
Nov. 21	31115	0755 1300	4.6 3.4	6.9	3.0	N @ 4	21.0	\$
Nov. 24	1525	0945 1605	4.6 3.0	8.0	Nil	L Ø MN	22.5	വ

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Sample Station: 53

Location: Frolander Bay

			Tide	Water	Total			
Da te (1975)	Sample Time	Con Time	ditions Height (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 17	1600	1515 2240	4.1 1.0	8.0	Nil	SW @ 4	21.0	<2
Nov. 18	1450	1100 1545	3.3	8.0	liN	l i l	22.5	<2
Nov. 19	1035	0640 1140	4.5 3.3	7.5	l i N	Lin	23.5	23
Nov. 20	1620	1215 1655	3.4 4.1	7.8	lin	NE @ 2	21.0	<2
Nov. 21	1120	0755 1300	4.6 3.4	6.8	3.0	N (9 3	21.0	2
Nov. 24	1530	0945 1605	4 .6 3.0	7.5	NÌJ	L Ð MN	23.0	<2

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Sample Station: 54

Location: Thunder Bay

				Tide	Water	Total			
Da te (1975)		Sample Time	Con	ditions Height (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal collform MPN/100 ml
Nov. 1	7	1620	1515 2240	4.1 1.0	7.5	L İ N	SW @ 3	21.0	<2
Nov. 1	ω	1505	1100 1545	3.34.1	8.0	ΓĻΝ	NW (ð 3	20.0	7
Nov. 1	6	1045	064 0 1140	4.5 3.3	6.5	ΓİΝ	W @ 2	21.5	-2
Nov. 2	0	1635	1215 1655	3.4 4.1	6.7	Nil	W @ 2	20.0	2
Nov. 2	5	1135	0755 1300	4.6 3.4	5.9	3.0	SE @ 11	16.0	17
Nov. 2	4	1540	0945 1605	4.6 3.0	7.0	Ni 1	SW @ 2	20.0	Ω

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Sample Station: Mill Effluent

Location: Outside foam control boom

			Tide	Water	Total			
Date (1975)	Sample Time	Con Time	ditions Height (m)	Temp. (°C)	Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
Nov. 18	1015	ı	·	8.5	ı	Ni I	9.5	71
Nov. 19	0850	ł	ı	8.0	ı	N i T	7.0	17
Nov. 20	1235	ı	·	8.0	ł	SW @ 6	0.0	240
Nov. 21	0940	ı	ı	8.0	ı	NE @ 3	6.0	17

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BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER STATIONS

Sample Station: S1

Location: Mest side of Sliammon Reserve

Date		Time of	Temp.	Total Precip.	Fecal Coli	form/100 mL	F10W Cutt/cer
TC/EIT		CO11ECC1011	1 4	/ 11111/	Malu	-11-1	
Nov. 6		1035	ı	22.1	ı	011	r
Nov. 1	0	1450	7.4	l in .	ı	20	9 . ≈
Nov. 1		1650	7.4	4.8	·	ı	ı
Nov. 1	2	1500	7.8	29.7	·	6	ı
Nov. 1.	с	0940	7.8	20.1	13	I	ł

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APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER SAMPLES

Sample Station: S2

Location: Sliammon River

Date (1975)		Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Coliform MPN	1/100 m& MF	Flow cuft/sec
Nov. 6		1045	•	22.1	ı	50	
Nov. 1	0	1500	7.2	Lin	ı	10	≃ 500
Nov. 1	_	1700	7.3	4.8	ı	ſ	ı
Nov. 1	2	1515	7.6	29.7	ı	68	ı
Nov. 1	e	0950	7.5	20.1	70	r	ı

Sample Sta	tion: S3	Loc	ation: Mouth of (Sewage La	Creek draining Wildwood E goon	states
Date (1975)	Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Coliform/100 m MPN MF	Elow cuft/sec
Nov. 18	0935	5.1	Nil	- 2300	
Nov. 19	1400	,	Nil	- 200	•
Nov. 20	1155	4.5	Lin	<200 -	ſ
Nov. 24	1035	6.4	L i N	، 8	ı

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Location: Willingdon Beach - West Branch of Creek

Date (1975)		Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Coli MPN	form/100 m£ MF	Flow cuft/sec
Nov.	10	1525	7.0	L I N	ı	ĭ	ז ז
Nov.	1	1705	7.5	4.8	ı	ı	·
Nov.	12	1610	7.2	29.7	ı	32	·
Nov.	13	1015	7.5	20.1	110		ı
Nov.	18	0945	,	liN	ł	41	ŀ

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Location: Foot of Willingdon Avenue

Date (1975		Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Colifor MPN	m/100 m& MF	Flow cuft/sec
Nov.	18	0940	·	ΓiΝ	ı	260	ı
Nov.	19	0905	ı	Lin .	ı	40	ı
Nov.	24	1410		LİN	·	50	ı
Nov.	25	1115	·	12.4	>1600	ŀ	ı
Nov.	26	0630	·	L I N	460	,	ı

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Location: Stream entering east of Coast Ferries

Date (1975)	Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Colif MPN	orm/100 m& MF	Flow cuft/sec
Nov. 18	0935		LİN	ł	65	ı
Nov. 19	0905		Nil	,	50	I
Nov. 24	1420	•	l i N	ł	60	١
Nov. 25	1120		12.4	>1600	٢	ı
Nov. 26	0945		L İ N	261	٢	ı
Nov. 27	1030	,	Ni I	230	۰.	·

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Station:
Sample

Location: Storm drain at foot of Nootka Street

Flow cuft/sec		I	ı	ı	ı	
orm/100 m& MF	V	• ~	30 -	ı	,	
Fecal Colif MPN	1	,	,	>1600	170	
Total Precip. (mm)	LţN		L İ N	12.4	ΝİΝ	
Temp. (^O C)	ı	,	ı	ı	ı	
Time of Collection	0925	0160	1425	1125	1015	
Date (1975)	Nov. 18	Nov. 19	Nov. 24	Nov. 25	Nov. 26	

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Location: Storm drain at foot of Oliver Street

Da te (1975)	Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Colit MPN	form/100 m& MF	Flow cuft/sec
Nov. 18	0320	ı	Lin	I	40	I
Nov. 19	0915	ı	LiN ·	t	11	I
Nov. 24	1425	·	Lin	ı	250	ı
Nov. 25	1130	·	12.4	350	ł	ł
Nov. 26	1025	·	ΓiΝ	50	ı	ı

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Location: Storm drain - foot of Penticton Street

Date (1975		Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Colifo MPN	rm/100 m& MF	Flow cuft/sec
Nov.	18	0915		ΓįΝ	ı	2460	,
Nov.	19	0320	ı	l i N	,	70	I
Nov.	20	0915	ı	Nil	,	43	I
Nov.	24	1430	ı	Nil	ſ	60	I
Nov.	25	1135	,	12.4	240	ı	ı
Nov.	26	1030	ı	LIN.	49	ı	ı

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APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR FRESHWATER SAMPLES

Sample Station: S10

Location: Myrtle Creek

Date (1975)	Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Colif MPN	corm/100 m& MF	Flow cuft/sec
Nov. 5	0101	J	26.4	ı	430	. I
Nov. 6	1615	J	22.1	·	1480	ı
Nov. 10	1615	6.5	NÌJ	ı	30	~ 46
Nov. 18	1420		N Î Î	ı	35	I
Nov. 19	0640	J	NÌJ	ı	20	ı
Nov. 26	1435	8	L i N	350		ı

Sample Station	1: 511	Foc	ation: Storm dra	in - Myrtle Beach	S	
Date (1975)	Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	Fecal Colifo NPN	orm/100 m2 MF	Flow cuft/sec
Nov. 4	1455	ı	15.5	62	J	١
Nov. 5	1 005	1	26.4	ł	430	ð
Nov. 6	1405	ı	22.1	ı	30	١
Nov. 11	1130	ŀ	4.8	ı	ı	3

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Location: Myrtle Beach - Deighton Creek

Date		Time of	Temp.	Total Precip.	Fecal Colif	form/100 m2	Flow
2/611		COLLECTION	. 1 1)		NTR	- - 	כחו ר/ אבר
Nov.	4	1440	ł	15.5	110	,	٢
Nov.	5	1000	ı	26.4	ı	640	ı
Nov.	9	1400	r	22.1	1	200	ı
Nov.	10	1600	6.2	Ni T	•	50	≃ 28
Nov.	11	1105	ł	4.8	ı	ı	ı
Nov.	18	1400	t	LIN .	I	70	r

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Location: Mouth of Kelly Creek

Sample Station: S13

Flow cuft/sec	ı	ı	ı	ı	
rtm/100 m& MF	73	82	ı	ı	
<u>Fecal Colifo</u> MPN	•	ı	79	110	
Total Precip. (mm)	Lin	Nil	12.4	Nil	
Temp. (^O C)	,	. 1	5.5	ı	
Time of Collection	0950	1250	1515	1005	
Da te (1975)	Nov. 20	Nov. 24	Nov. 25	Nov. 26	

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Sample Station: S14

Location: Mouth of Whitehall Creek

Date (1975)	Time of Collection	Temp. (⁰ C)	Total Precip. (mm)	<u>Fecal Coli</u> MPN	form/100 mL MF	Flow cuft/sec
Nov. 20	1000	ı	ΝiΊ	ı	41	ı
Nov. 24	1235	•	ΓiΝ	•	20	,
Nov. 25	1530	6.5	12.4	33		ı
Nov. 26	1015	•	ΝiΊ	79		

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Location: Lang Bay - Ditch

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Date (1975) Time of Collection Temp. Precip. Fecal Coliform/100 mL MPN Flag Nov. 24 1235 - Nil - 250 - Nov. 25 1530 7.5 12.4 350 - 250 Nov. 26 1015 - Nil - 250 -				Tatal			
Nov. 26 1015 - Nil - 250 - 250 Nov. 25 1530 - 250 - 250 Nov. 25 1530 7.5 12.4 350 - 250 -	Date	Time of Collection	Temp. (^O C)	Precip.	Fecal Colit MPN	form/100 m& MF	Flow cuft/sec
Nov. 24 1235 - Nil - 250 - 250 - Nov. 25 1530 7.5 12.4 350 - Nov. 26 1015 - Nil 350 - 350 -	10/61	00116001		· · · · ·			
Nov. 25 1530 7.5 12.4 350 - Nov. 26 1015 - Nil 350 -	Nov. 24	1235	1	Nil	ŧ	250	1
Nov. 26 1015 - Nil 350	Nov. 25	1530	7.5	12.4	350	ı	
	Nov. 26	1015	8	Nil	350	ł	8

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Sample Station: S16

Location: Lois River

			Total			;
Da te (1975)	Time of Collection	lemp. (°C)	Precip. (mm)	Fecal Coli MPN	form/100 mL MF	FIOW cuft/sec
Nov. 20 ^a	1055	,	N i J	•	2	
Nov. 24 ^a	1230		Nil	ı	2	
Nov. 25 ^b	ı	·	12.4	<2	ı	
Nov. 26 ^C	ı	ı	Nil	<2		

^aCollected at Highway 101 bridge crossing. ^bCollected at generating station spillway. ^cCollect at mouth of river.

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Location: Thunder Bay - Mouth of Jefferd Creek

1975)	Time of Collection	Temp. (^O C)	Total Precip. (mm)	Fecal Coli MPN	form/100 m2 MF	Flow cuft/sec
ov. 20	1025	ı	lin	·	15	ı
ov. 24	1225	·	[i l	ı	61	ı
ov. 25	1545	7.0	12.4	21	١	I
ov. 26	1030	ı	L i N	46	1	I