ENVIRONMENT CANADA
ENVIRONMENTAL PROTECTION SERVICE
PACIFIC REGION

SHELLFISH GROWING WATER SANITARY SURVEY OF THE EAST SIDE OF SAANICH PENINSULA, FROM CURTEIS POINT TO TELEGRAPH COVE, BRITISH COLUMBIA, 1979

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by

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ABSTRACT

A bacteriological survey of the bivalve molluscan shellfish growing waters along the east side of Saanich Peninsula, from Curteis Point to Telegraph Cove was conducted from November 4 - 30, 1979 by the Environmental Protection Service. Additional sampling was conducted from January 14 - 17, 1980 in selected portions of the study area. The survey was conducted to classify the shellfish growing waters as to their acceptability for the purpose of shellfish harvesting. A sanitary survey was conducted concurrent with the bacteriological study to identify and evaluate the sources of fecal pollution to the marine waters.

During the study, 640 marine, 155 freshwater and 17 effluent samples were collected at 93, 27 and 4 sample stations respectively. Twenty-nine percent of the marine stations did not meet the approved shellfish growing water standards. The major sources of contamination included discharges from the Sidney Water Pollution Control Centre, Bazan Bay Sewage Treatment Plant, Central Saanich Water Pollution Control Centre, Finnerty Cove Sewage Outfall, and contaminated storm drainage discharging to Cordova Bay.

As a result of this survey, amendments to the Pacific Shellfish Regulations Schedule I (contaminated areas) are proposed. These amendments will increase the size of the existing shellfish closure and add a new closure.

RESUME

Le Service de la protection de l'environnement a effectué, du 4 au 30 novembre 1979, une étude bactériologique des eaux où croissent des mollusques bivalves, le long de la côte est de la péninsule Saanich, depuis Curteis Point jusqu'à Telegraph Cove. Un autre échantillonnage a été fait du 14 au 17 janvier 1980 à différents points de cette zone. L'étude avait pour objet de classer les eaux où croissent les mollusques, selon qu'elles sont ou non propres à leur pêche. Une étude sanitaire e été effectuée en même temps que l'étude bactériologique pour identifier et évaluer différentes formes de pollution des eaux de la mer par les égouts.

Au cours de l'étude, on a prélevé respectivement 640, 155 et 17 échantillons dans 93 stations marines, 27 stations d'eau douce et 4 stations de déversement. Vingt-neuf pour cent des stations marines ne répondaient pas aux normes établies pour les eaux où croissent les mollusques. Les principales sources de contamination sont les déchets rejetés par le centre de contrôle de la pollution des eaux de Sidney, le centre de traitement des eaux d'égout de Bazan Bay, le centre de contrôle de la pollution des eaux de Central Saanich, l'égout de décharge de Finnerty Cove et la décharge des eaux de pluie contaminées de Cordova Bay.

Suite à cette étude, certains changements doivent être apportés à l'annexe (zones contaminées) des Règlements relatifs à la pêche des mollusques dans le Pacifique. Ces modificatifs prévoient une extension des zones interdites à la pêche aux mollusques et l'addition d'une nouvelle zone interdite.

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LIST OF ABBREVIATIONS

BOD_5	5-day biochemical oxygen demand
CRD	Capital Regional District
EPS	Environmental Protection Service
FC	Fecal Coliform
FS	Fecal Streptococci
G	"greater than"
L	"less than"
m	metres
ml	millilitres
mm	millimetres
m^3/sec	cubic metres per second
MF	Membrane Filtration
MPN	Most Probable Number
MPE	Mean population equivalent
NH_3	Ammonia
NFR	Non-filterable residue
ppt	Parts per thousand
STP	Sewage Treatment Plant
WMB	Waste Management Branch (formerly Pollution Control Branch - PCB)
WPCC	Water Pollution Control Centre

CONCLUSIONS

1. Portions of the tidal foreshore of Roberts Bay are contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish could pose a health hazard. The source of contamination was identified as a major drainage culvert. In addition to this source, fecal pollution can be introduced into Roberts Bay through three sewage lift station emergency overflows that discharge at an unknown frequency and for an unknown duration. Due to the inadequate pump malfunction warning systems and lack of auxiliary power at these stations, the aquatic environment in Roberts Bay is not sufficiently safeguarded to permit the harvesting of shellfish.

2. Portions of the tidal foreshore fronting the Town of Sidney are contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish could pose a health hazard. The major source of contamination was the discharge of treated sewage from the Sidney Water Pollution Control Centre (WPCC). The impact on the receiving waters as a result of storm water discharges was not measured due to the lack of precipitation during the survey. Previous data obtained from other sources would indicate water quality would worsen under wet weather conditions.

3. Although sample stations located north of the Sidney WPCC discharge met the shellfish growing water standard, the tidal foreshore is subject to sewage contamination of an unknown frequency and duration from two sewage lift station emergency overflows. Due to the inadequate pump malfunction warning systems and the lack of auxiliary power, the aquatic environment is not sufficiently safeguarded to permit the harvesting of shellfish. The discharge of storm drainage to this area has an unknown impact on the receiving waters.

4. The marine water quality in the vicinity of Reay Creek met the approved growing water standard. However, during wet weather conditions the marine waters may be subject to unacceptable levels of fecal contamination.

5. The tidal foreshore in the vicinity of the Bazan Bay sewage treatment plant discharge was contaminated with fecal pollution to the extent that the consumption of bivalve molluscan shellfish can pose a health hazard. Although the contamination was restricted to a relatively small area around the outfall, previous data from other sources indicates unacceptable fecal pollution extends at least 2000 m south of the discharge. It is expected that wet weather flows through storm drains and possibly the treatment plant is the cause of the poorer water quality noted by other investigators.

6. The tidal foreshore of Saanichton Bay met the approved growing water standard. However, the bay is subject to fecal contamination from the following sources:
   (i) Sewage discharged from four lift station emergency overflows. The frequency and duration of such discharges is not known.
   (ii) Agricultural run-off in Sand Hill Creek during wet weather periods.
   (iii) Intrusion of sewage discharged by the Central Saanich WPCC.
   (iv) Sewage discharged from anchored log booming vessels.

   Due to the inadequate pump malfunction warning systems and lack of auxiliary power at the lift stations, and the unknown frequency of sewage intrusion from the Central Saanich WPCC, the aquatic environment of Saanichton Bay is not sufficiently safeguarded to permit the harvesting of shellfish.

7. The discharge of treated sewage from the Central Saanich WPCC resulted in limited contamination of the foreshore in the vicinity of the outfall. Previous data obtained by other sources indicates shellfish growing water standards are exceeded over a greater area than that observed during this survey. The poorer water quality presumably occurs during wet weather flows through the plant.

8. The tidal foreshore waters on the west side of James Island, and the waters overlying James Spit were of acceptable quality for the purpose of shellfish harvesting.

9. The tidal foreshore waters from the southern end of Island View Beach to Sayward Beach were of acceptable quality for the purpose of shellfish harvesting.

10. The waters and tidal foreshore of Cordova Bay are subject to fecal pollution to the extent that consumption of bivalve molluscan shellfish can pose a health hazard. The cause of the pollution is contaminated storm drainage which is always present but which has a greater impact on the aquatic environment during wet weather conditions. The source of contamination to the storm drains has been identified as faulty on-site sewage disposal systems. The southeastern portion of Cordova Bay and Gordon Head are also subject to raw sewage contamination resulting from three sewage lift station emergency overflows, and from a major drainage stream.

11. The tidal foreshore from Gordon Head to Telegraph Cove is contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish could pose a health hazard. The source of contamination is the discharge of comminuted raw sewage from the Finnerty Cove outfall. This area is also subject to contamination from two sewage lift station emergency overflows.

SCHEDULE I CLOSURES

The following amendments to the Pacific Shellfish Regulations, Schedule I (contaminated areas) are proposed:

1. Amend Schedule I, Closure Area 19-3 as follows:
"Area 19-3. The tidal foreshore on the east side of Saanich Peninsula, Area 19, from the Saanich Peninsula - Piers Island cable marker, on the shore of Saanich Peninsula, southward to a point 1000 meters south of the boat-launching ramp at Island View Beach."

2. Add to Schedule I the following closed area:
"Area 19-4. The tidal foreshore on the east side of Saanich Peninsula, Area 19, lying from a point on shore parallel with the northern end of Parker Road, Cordova Bay, southward to Ten Mile Point."

The proposed closures are illustrated in Figure 1.

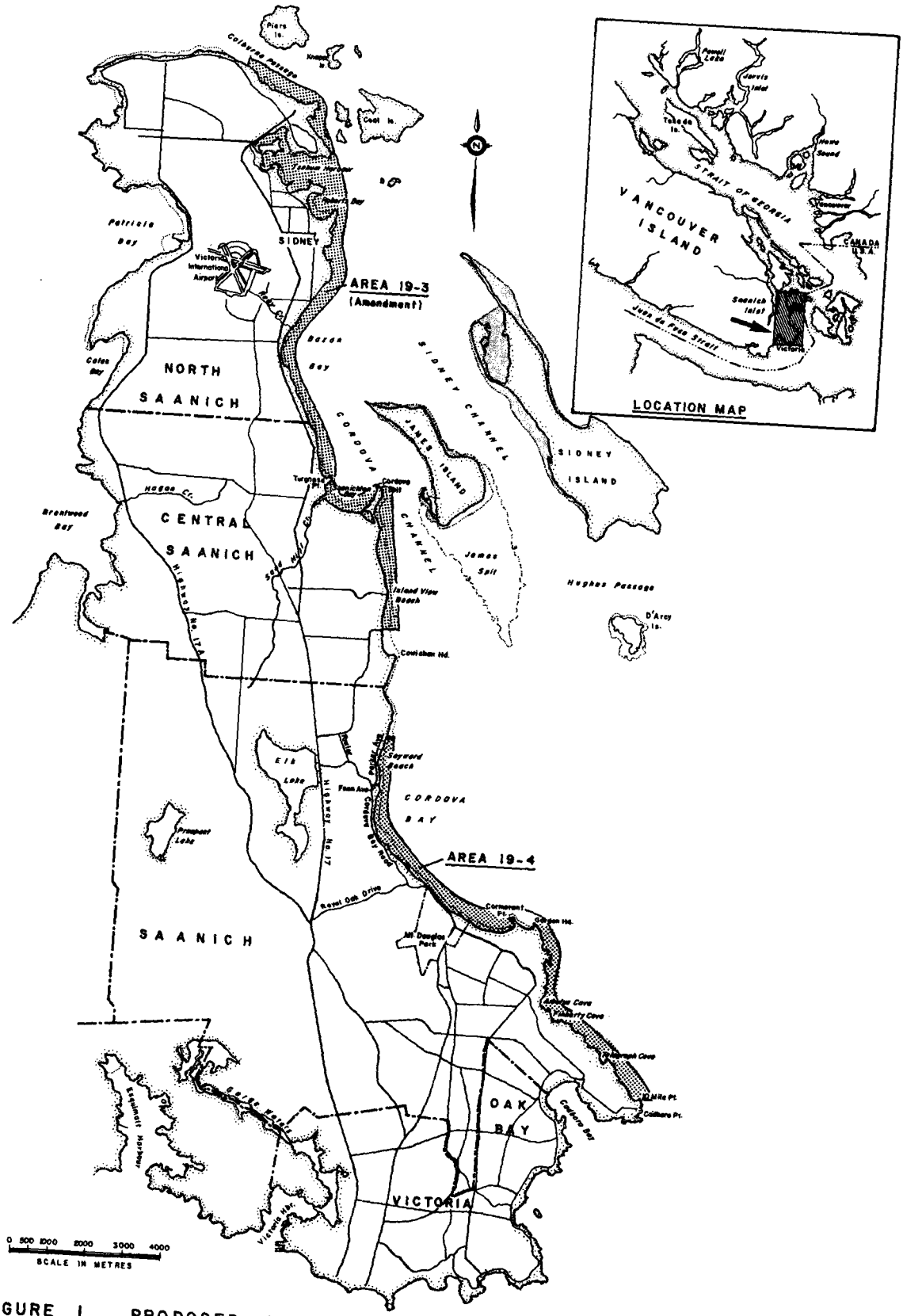

FIGURE 1 PROPOSED SCHEDULE I CLOSURES

1 INTRODUCTION

The Saanich Peninsula, located north of Victoria on Vancouver Island, is a large projection of land bordered on the west side by Saanich Inlet and on the east side by Haro Strait. Due to its proximity to Victoria, the peninsula has become a major residential area and together with agriculture, these two land uses predominate at present. The coastal areas of the peninsula are a mix of rocky coastline and natural beaches and provide a considerable area for recreational pursuits.

The study area (figure 1) is comprised of three municipalities and one township: the Municipality of North Saanich, the Municipality of Central Saanich, the Municipality of Saanich and the Town of Sidney. The 1976 census by Statistics Canada and the projected 1996 populations derived from the Official Regional Plan (1) are presented in Table 1. These projections indicated that considerable growth is expected in the Saanich Peninsula area and concomitant with this growth will be increased requirements for services and potentially increased pressures on the aquatic environment, specifically with respect to the marine discharge of municipal effluent.

TABLE 1 EXISTING (1976) AND PROJECTED POPULATION STATISTICS FOR STUDY AREA

	1976 CENSUS	1996 PROJECTION	% INCREASE
NORTH SAANICH	4 697	7 000	49
SIDNEY	6 732	9 500	41
CENTRAL SAANICH	7 413	11 500	55
SAANICH	73 383	143 000	95

The study described herein was conducted to assess the bacteriological quality of shellfish growing waters on the eastern coastline of Saanich Peninsula and to identify and evaluate the major sources of bacterial contamination to the study area. A shellfish growing water study of Saanich Inlet has been previously described (2). The classification of shellfish growing water quality is a requirement of the Canadian Shellfish Safety Program and is undertaken in all areas where bivalve molluscs are taken commercially or recreationally. In this specific case, data obtained from this study would also provide baseline information to assess the impact of proposed future development on the marine water quality along the east coast of Saanich Peninsula.

A shellfish closure was in effect prior to the survey along a portion of this coastline and is described as follows: "Area 19-3. The tidal foreshore on the east side of Saanich Peninsula, Area 19, from the Saanich Peninsula - Piers Island cable marker, on the shore of Saanich Peninsula, to Turgoose Point."* This closure was imposed on the basis of known domestic sewage discharges to this area, principally from the town of Sidney.

Sanitary and bacteriological surveys of Tsehum Harbour (3) and Saanichton Bay (4) were conducted in May of 1972 by the Environmental Protection Service to determine the cause(s) and extent of sewage contamination in these areas. The reports concluded that vessel discharges and minimal tidal action were responsible for bacteriological contamination in Tsehum Harbour. The contamination observed during the study was not considered excessive, however increased stream flows in the winter months and increased vessel moorage was predicted to cause water quality to worsen.

Saanichton Bay met the shellfish growing water standards during the 1972 survey and the major freshwater source to the bay, Sand Hill Creek, was not considered a significant pollution source at that time. The study was conducted prior to the installation of sewage treatment plants discharging to Bazan Bay and Cordova Channel. The

* Schedule I, Pacific Shellfish Regulations.

report concluded that, based on tidal current data obtained from the Canadian Hydrographic Service, sewage discharged from the proposed outfall into Cordova Channel could be swept into Saanichton Bay during a flood tide cycle.

Since these studies were conducted, significant changes in sewage collection and treatment systems have taken place in the study area. There are presently four registered municipal discharges between Roberts Bay and Telegraph Cove, and a summary of pertinent information on each is presented in Table 2. In addition to these registered discharges, numerous storm drains and sewage lift station emergency overflow pipes along the coastline are potential sources of bacteriological contamination to the shellfish growing areas (Figure 2).

Bivalve molluscan shellfish are not taken in commercial quantities along the eastern coastline of Saanich Peninsula, although recreational harvesting does occur to a limited extent in Saanichton Bay and Cordova Bay. Sidney Spit, located on the north end of Sidney Island, is also a popular clam digging area. Commercial geoduck harvesting was conducted in the James Spit area, although the area is presently under a conservation closure.

As a result of the presence of recreationally harvested shellfish in the area, and the changes in sewage collection and treatment, the Environmental Protection Service undertook a shellfish growing water sanitary survey of the east coast of Saanich Peninsula, from Curteis Point to Telegraph Cove in November 1979. Additional work was conducted in January, 1980.

TABLE 2 SUMMARY OF SEWAGE TREATMENT FACILITIES IN STUDY AREA

Treatment Plant	Discharge Point	Flow (m^3/sec)	Outfall Length (m)	Outfall Depth (m) Below LWL	Degree of Treatment	Sludge Disposal
Sidney	Sidney Channel	0.0680 treated	768	12.2 (diffuser)	secondary, no disinfection	through outfall
		0.3500 storm overflow	305 (excess flow)	-		
Dean Park	Bazan Bay	0.0013	323	5.4 (diffuser)	secondary, no disinfection	through outfall
Central Saanich	Cordova Channel	0.0160	435	16.0 (diffuser)	secondary, no disinfection	through outfall
Finnerty Cove	Haro Strait	0.0790	465	13.8	comminution, intermittent chlorination	-

Information obtained from the Waste Management Branch and Capital Regional District.

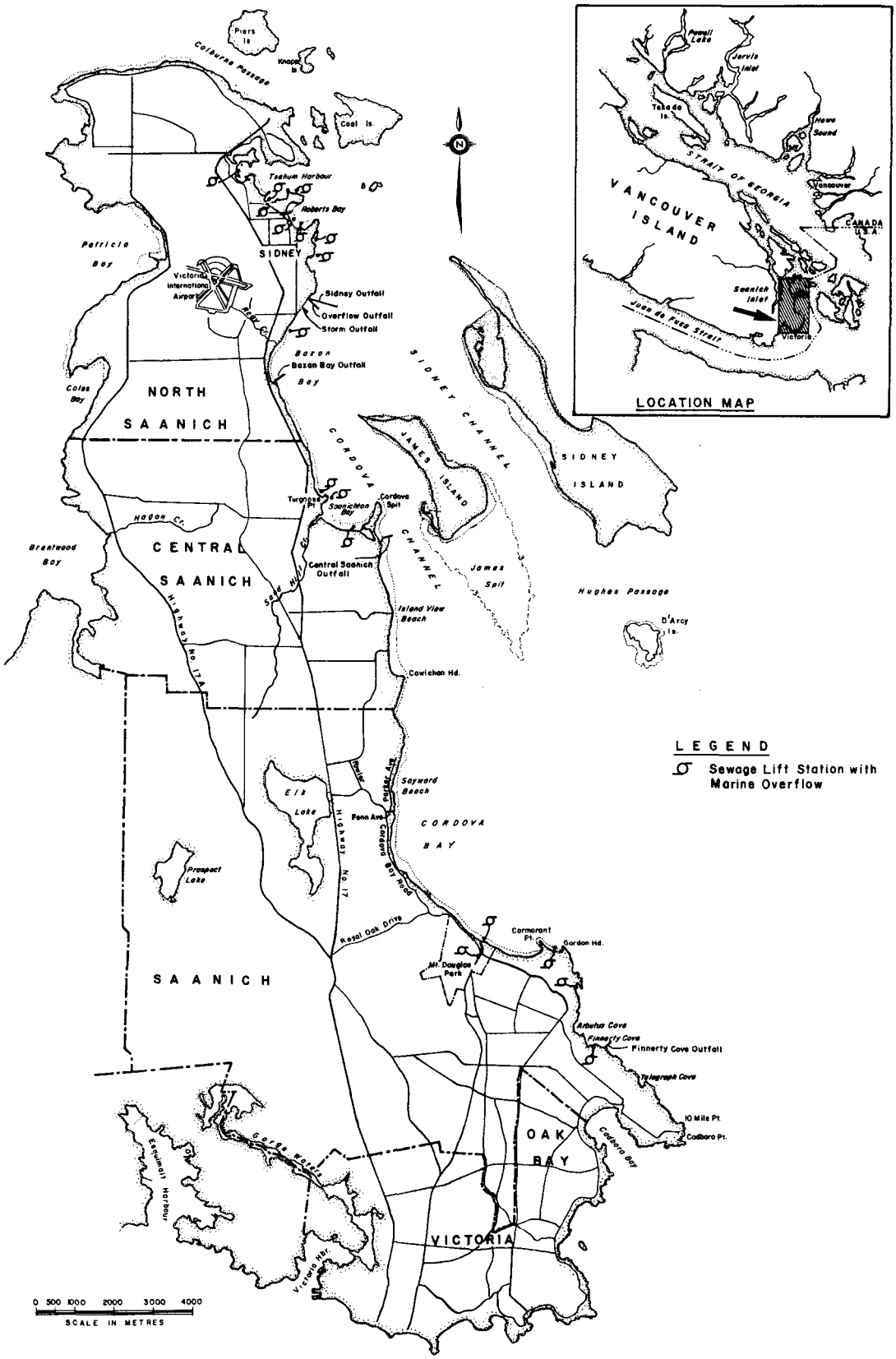

FIGURE 2 LOCATION OF SEWAGE TREATMENT PLANT OUTFALLS AND SEWAGE LIFT STATION MARINE OVERFLOWS IN STUDY AREA

2 SAMPLE STATION LOCATIONS

Marine sample stations were located along the Saanich Peninsula foreshore from Curteis Point to Telegraph Cove to assess shellfish growing water quality. Limited sampling was also conducted on the west side of James Island and in the James Spit area. Due to the considerable boating activity and commercial foreshore use in Tsehum Harbour, no samples were taken in this location.

Effluent samples were taken at the four registered discharges in the study area to assess effluent quality and potential impact on shellfish growing waters.

Freshwater sample stations were established on the major streams and drainage culverts which were anticipated to have a potential impact on shellfish growing waters.

Sample station locations are shown in Figures 3 and 4 and detailed descriptions of both marine and freshwater sample station locations are presented in Appendices I and II.

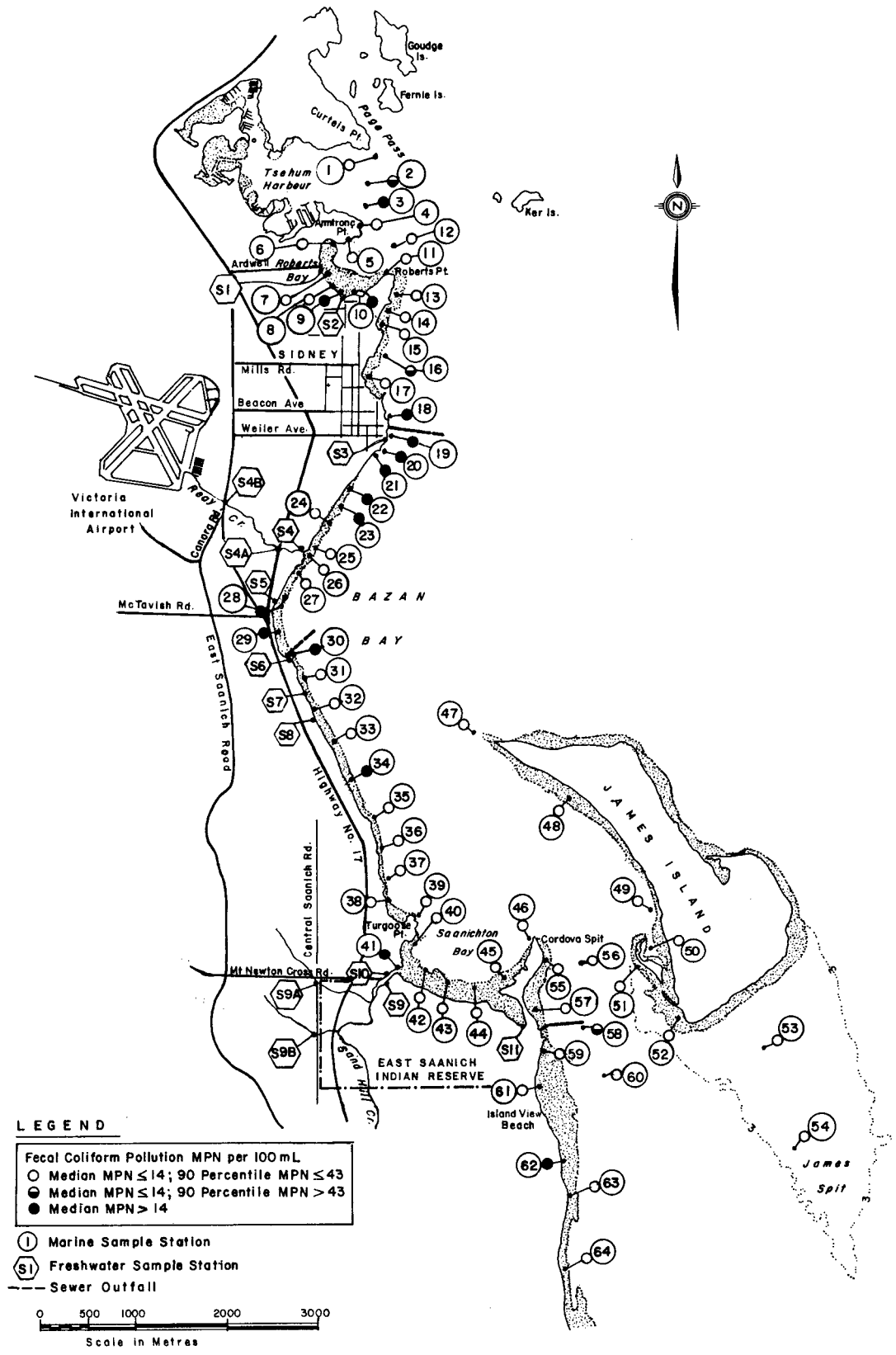

FIGURE 3 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - CURTEIS POINT TO ISLAND VIEW BEACH

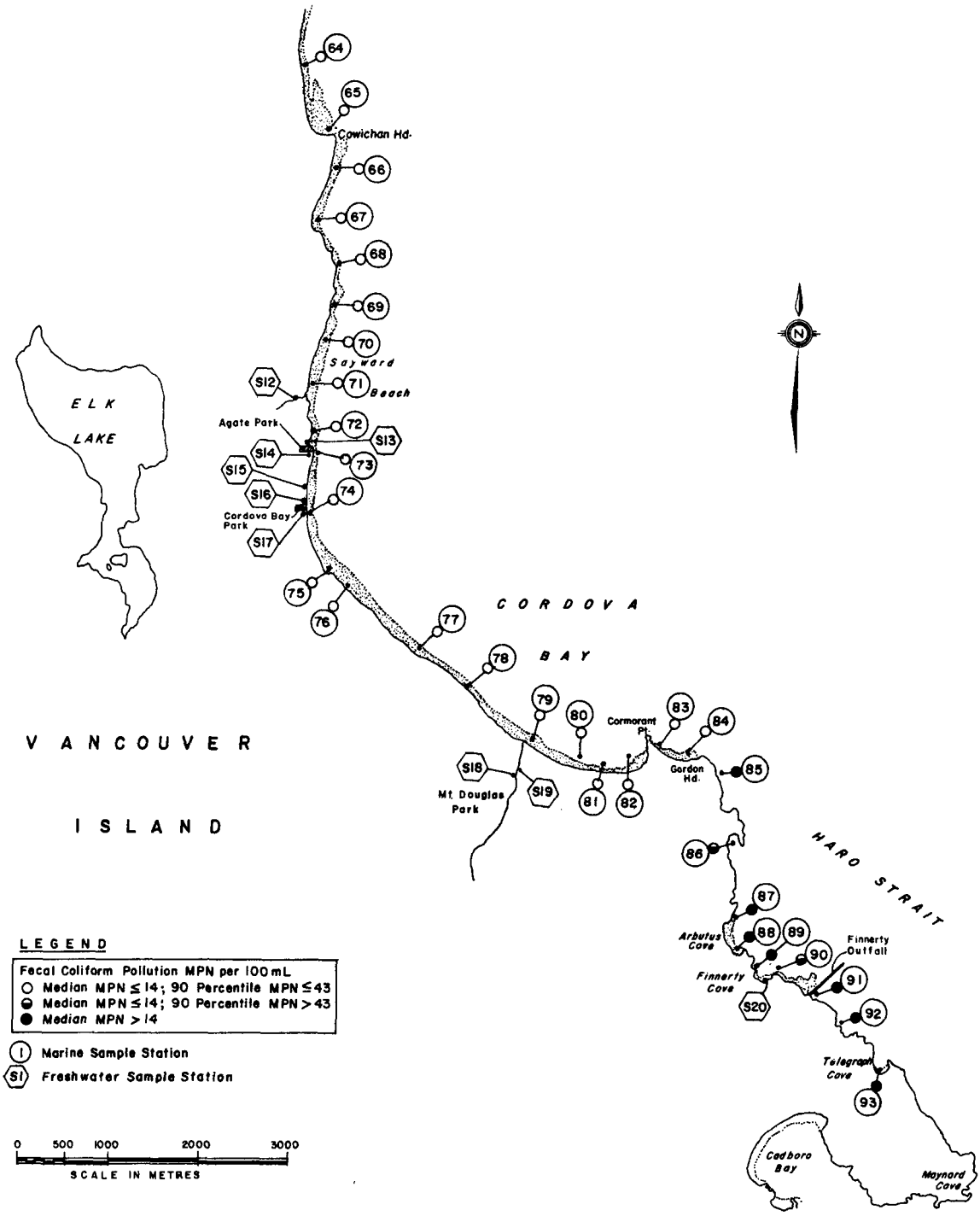

FIGURE 4 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - COWICHAN HEAD TO TELEGRAPH COVE

3 FIELD PROCEDURES AND METHODS

3.1 Bacteriological Sampling and Analyses

All marine water samples for bacteriological analyses were collected in sterile wide-mouth glass bottles, approximately 15 to 30 cm below the water surface. The water depth at collection points over shellfish beds did not exceed two meters. Samples were collected by boat or on foot. The samples were stored in coolers at temperatures not exceeding 10°C until processed. Analyses were carried out within three hours of collection in the mobile microbiology laboratory of the Environmental Protection Service, located in Sidney.

The fecal coliform most probable number (MPN) per 100 ml was determined using the multiple tube fermentation technique (at least three decimal dilutions of five tubes each) as described in Part 908C of the 14th edition of Standard Methods for the Examination of Water and Wastewater (5). The culture medium used was the A-1 medium, as described by Andrews and Presnell (6). This medium and the method described below were accepted by the Canadian government as the method of choice for the enumeration of fecal coliforms in shellfish growing waters in April 1977. An evaluation of the A-1 medium in the Pacific Region has been done by Kay (7) and the reader is referred to this paper for further information.

The "modified A-1" technique involves the inoculation of a series of dilutions in accordance with the multiple tube fermentation technique. Ten milliliter volumes of sample water were inoculated into five double strength tubes of A-1 medium, and 1.0 ml and 0.1 ml volumes were inoculated into five tubes each of single strength medium. The tubes were incubated at 35 $\pm$ 0.5°C in air incubators for three hours and then transferred to a water bath at 44.5 $\pm$ 0.2°C and incubated for a further 21 hours for a total of 24 $\pm$ 2 hours. All gassing tubes with growth were considered to be fecal coliform positive. The most probable number for each sample was then determined according to the manner described in Standard Methods.

All freshwater samples were collected in sterile wide-mouth glass bottles and were tested for fecal coliform and fecal streptococci, using the membrane filtration (MF) method described in Part 909 of the 14th edition of Standard Methods. Media used were m-FC and KF streptococcus agars obtained from Difco Laboratories Detroit, Michigan, USA, for the fecal coliform and fecal streptococcus tests respectively. The membrane filters used were Millipore HC, obtained from Millipore Limited, Mississauga, Ontario.

3.2 Physical and Chemical Testing Equipment and Analyses

Salinity measurements were made on all marine samples using an American Optical refractometer (Catalogue No. 10413) which has a resolution to the nearest 0.5 part per thousand. Wind speeds and direction were determined with a Telcor series 210 electronic wind speed/direction indicator. Tide data used was that for Fulford Harbour (Figure 5) and rainfall data was obtained from the Victoria International Airport (Figure 6).

All effluent samples for chemical analysis were submitted to the Environmental Protection Service/Fisheries and Marine Service Chemistry Laboratory, Cypress Creek, West Vancouver, and analyzed according to the most recent edition of the EPS/FMS Laboratory Manual (8).

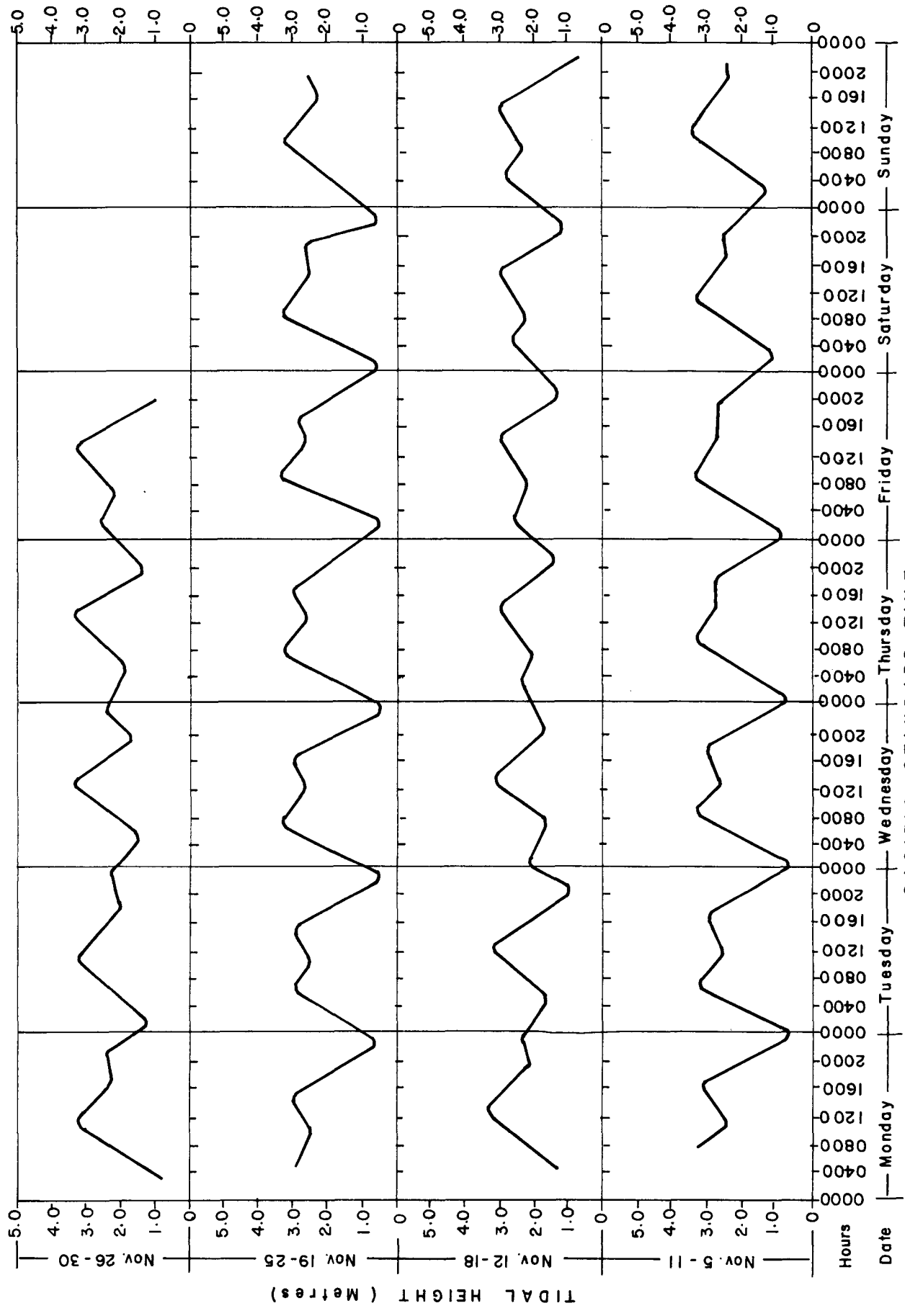

FIGURE 5 TIDAL HEIGHT GRAPH - FULFORD HARBOUR, SALTSPRING ISLAND
November 5 - 30, 1979

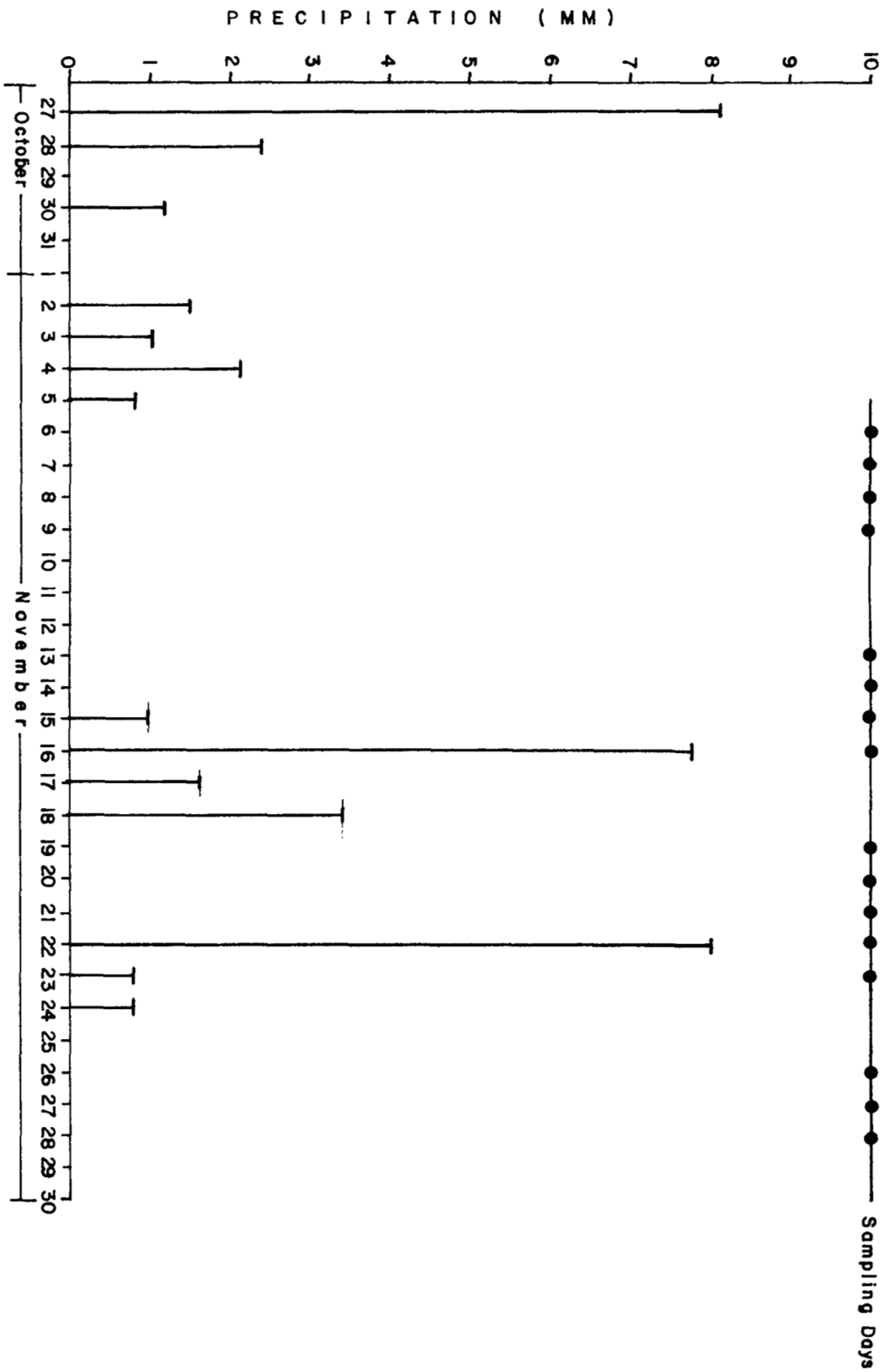

FIGURE 6 PRECIPITATION DURING SURVEY PERIOD - VICTORIA INTERNATIONAL AIRPORT - October 27-November 30, 1979

4 RESULTS AND DISCUSSION

Canadian bivalve molluscan shellfish growing waters are classified according to the following criterion:

> In order that an area 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% 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 unfavourable hydrographic and pollution conditions.*

Based on this criterion, 30 of the 93 marine sample stations were classified as contaminated. The major sources of contamination identified during the survey included: sewage discharged from the treatment facilities located at Sidney, Bazan Bay, Cordova Spit and Finnerty Cove; contaminated storm drains discharging to Cordova Bay; and a major drainage culvert discharging to Roberts Bay. Unidentified sources in Tsehum Harbour, presumably boat discharges, were the probable cause of contamination noted at the entrance to the harbour. Marine, and freshwater and effluent sample station bacteriological summaries are presented in Tables 3 and 4 respectively.

Historical mean precipitation data for the month of November (as measured at Victoria International Airport) shows that 125.7 mm of rain is normally encountered (9). However, during November 1979 only 28.8 mm of rain was measured thus the expected pollution effect of rain-induced runoff was not noted during this survey. Many of the storm culverts in the study area were not flowing, or had very low flows, and there was no positive correlation between rainfall, salinity and marine bacteriological water quality. Salinities at all stations ranged between 29.5 ppt and 32.0 ppt.

* This report expresses the 10 per cent limit in terms of a 90 percentile which must not exceed 43/100 ml.

TABLE 3 SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS

Sample Station	No. of Samples	MPN per 100 ml		
		Range	Median	90th percentile
1	8	L2-70	7.5	24.4
2	8	L2-170	6.5	51.6
3	6	L2-79	27	61
4	6	2-9	5	6.6
5	6	L2-11	6	9.2
6	6	L2-23	5.5	14
7	6	L2-14	9.5	14
8	7	2-49	8	24.5
9	7	8-46	23	36.9
10	6	4-33	19.5	27
11	6	2-33	6	27
12	6	L2-33	10.5	23.4
13	7	L2-49	8	30.8
14	6	L2-22	8.5	19
15	6	L2-33	6.5	23.4
16	7	L2-110	13	56.1
17	6	L2-8	5	8
18	7	17-79	33	55.9
19	7	2-33	17	33
20	7	8-G1600	49	514.3
21	7	2-G1600	17	599
22	7	L2-240	27	95.1
23	6	L2-130	33	79.6
24	8	L2-33	12.5	33
25	9	L2-79	5	31.3

continued...

TABLE 3 SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (continued)

Sample Station	No. of Samples	MPN per 100 ml		
		Range	Median	90th percentile
26	9	L2-49	5	34.6
27	8	L2-70	12.5	32.4
28	6	13-130	64	130
29	6	2-79	35.5	61
30	6	2-240	33	152.4
31	8	2-49	5	36.2
32	8	2-33	8	31.4
33	8	L2-33	5	25
34	6	8-49	28	49
35	8	L2-22	12	15.6
36	7	L2-33	5	13.4
37	6	L2-7	5	5.6
38	7	L2-31	8	24.7
39	6	L2-17	6	14.6
40	8	L2-49	13	28.2
41	7	2-49	17	49
42	6	2-17	6.5	14.6
43	6	L2-17	9.5	14.6
44	6	2-33	5	21
45	7	L2-23	8	18.8
46	6	L2-17	2	9.8
47	6	L2-13	2	10.2
48	6	L2-17	9.5	14.6
49	6	L2-11	2	7.4
50	6	L2-8	3	6.2

continued...

TABLE 3 SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (continued)

Sample Station	No. of Samples	MPN per 100 ml		
		Range	Median	90th percentile
51	6	L2-11	6	8.6
52	5	2-8	2	5
53	6	2-22	3.5	13
54	6	L2-13	2	8.2
55	7	2-49	13	39.5
56	7	L2-33	5	19
57	7	8-49	11	26.6
58	6	2-1600	11	669.8
59	7	2-23	9	18.8
60	7	L2-17	2	8.6
61	7	2-70	8	37.1
62	6	7-33	15	26.4
63	6	2-13	9.5	13
64	6	L2-33	7.5	23.4
65	6	2-33	8.5	21.6
66	7	L2-110	5	40.7
67	6	L2-8	4	8
68	6	7-33	10	21
69	6	L2-33	4.5	21
70	7	4-79	5	29.3
71	7	L2-17	5	14.2
72	8	2-33	6	25
73	8	L2-33	5	33
74	8	L2-23	6	11
75	7	6-17	11	14.2

continued...

TABLE 3 SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (continued)

Sample Station	No. of Samples	MPN per 100 ml		
		Range	Median	90th percentile
76	8	L2-79	11	37.4
77	8	4-33	10	25
78	7	2-23	8	18.8
79	6	L2-13	3	8.2
80	8	L2-33	9	25
81	7	2-22	11	18.5
82	8	L2-79	2	21.4
83	6	L2-11	4	8.6
84	6	L2-13	4.5	10
85	6	4-70	19.5	47.8
86	6	5-79	13.5	61
87	6	5-170	15.5	170
88	6	2-130	36	99.4
89	6	8-70	31	57.4
90	6	5-79	14	79
91	7	9-540	79	316
92	6	49-G1600	240	1600
93	6	79-540	260	426

During the January 1980 sampling period, greater precipitation was encountered which adversely affected the water quality in Cordova Bay (see Section 4.5).

Determination of the source and impact of fecal contamination in the freshwater samples was aided by the use of fecal coliform to fecal streptococci ratios and population equivalents. Membrane filtration fecal streptococci analyses were performed on all freshwater samples in an attempt to determine the origin of fecal contamination observed in the freshwater inputs. Geldreich and Kenner (10) have reported higher fecal streptococci (FS) than fecal coliform (FC) densities in all warm-blooded animal feces except for humans. The FC:FS ratio in humans was 4.4, whereas in other warm blooded animals the ratio was less than 0.7. The FC:FS ratios were calculated using mean freshwater results and are shown in Table 4.

The concept of population equivalents was used to compare the theoretical relative receiving water impacts of the various freshwater inputs. The population equivalent of a source of fecal contamination was calculated using the average daily per capita value for the fecal coliform contribution to a sewer system. An average person discharges 1.6×10^{11} total coliforms/day and the fecal coliform concentration in domestic sewage has been estimated at 20% of the total concentration (11). This yields a value of 3.2×10^{10} fecal coliforms/person/day. The equation used for calculating population equivalents was:

$$\text{Population Equivalents} = \frac{\text{Fecal coliform discharged per day}}{\text{Fecal coliforms/person/day}}$$

$$= \frac{\text{Flow x fecal coliform concentration}}{3.2 \times 10^{10}}$$

The results of these calculations are shown in Table 5 and will be discussed in subsequent sections.

TABLE 4 SUMMARY OF BACTERIOLOGICAL RESULTS FOR FRESHWATER SAMPLE STATIONS

Sample Station	No. of Samples	Range		Mean		FC:FS Ratio
		Fecal Coliform/100ml	Fecal Streptococci/100ml	Fecal Coliform/100ml	Fecal Streptococci/100ml	
S1	4	2600-42000	400-11000	17925	4545	3.9
S2	5	110-1600	105-G8000	517	1356	0.38
S2U	3	15-260	62-660	113	263	0.43
S3	3	80-1550	38-1700	603	609	0.99
S4	5	40-400	25-450	148	145	1.02
S4A	5	20-G800	72-1130	41	419	0.1
S4B	3	6-260	98-150	102	128	0.8
S5	2	1-3	11-31	2	21	- [a]
S6	4	3200-35000	350-4600	17200	2587	6.6
S7	4	0-34	2-54	16	22	- [a]
S8	2	8-20	8-58	14	33	- [a]
S9	2	12-15	39-96	13	67	- [a]
S9A	3	12-55	8-35	32	22	- [a]
S9B	2	0-12	9-18	6	13	- [a]
S10	2	23-30	60-11700 (3 samples)	26	3942	- [b]
S11	1	9	21	-	-	- [a]
S11U	2	0-0	9-20	0	14.5	- [a]

continued...

TABLE 4 SUMMARY OF BACTERIOLOGICAL RESULTS FOR FRESHWATER SAMPLE STATIONS (continued)

Sample Station	No. of Samples	Range		Mean		FC:FS Ratio
		Fecal Coliform/100ml	Fecal Streptococci/100ml	Fecal Coliform/100ml	Fecal Streptococci/100ml	
S12	5	16-410	39-410 (6 samples)	141	193	0.73
S13	5	1900-12200	900-24000	7950	7360	1.1
S14	4	1700-13100	670-G8000	5475	1453	3.77
S15	6	410-4300	800-10500	1722	4490	0.38
S16	5	110-820	30-880	381	295	1.3
S17	5	760-1870	60-630	1357	224	6.1
S18	6	280-3500	77-4300	2833	1344	2.1
S19	5	112-6800	230-29000	1980	6462	0.31
S20	4	0-44	2-260	11	68	- [a]

[a] Numbers too low to calculate ratio

[b] F.S. count skewed by one high result

TABLE 5 MEAN POPULATION EQUIVALENTS FOR FRESHWATER SAMPLE STATIONS

Sample Station	Mean Fecal Coliform/100ml	No. of Flow Measurements	Mean Flow (m^3/sec)	Mean Population Equivalent (M.P.E.)
S1	17925	2	0.002	L1
S2	517	1	0.08	1
S3	603	0	-	-
S4	.148	0	-	-
S5	2	1	0.001	L1
S6	17200	1	0.01	6
S7	16	1	0.0008	L1
S8	14	2	0.006	L1
S9	13	0	-	-
S10	26	1	0.002	L1
S11	9	0	-	-
S12	141	1	0.04	L1
S13	7950	5	0.0004	L1
S14	5475	1	0.0002	L1
S15	1722	3	0.01	L1
S16	381	5	0.004	L1

continued...

TABLE 5 MEAN POPULATION EQUIVALENTS FOR FRESHWATER SAMPLE STATIONS (continued)

Sample Station	Mean Fecal Coliform/100ml	No. of Flow Measurements	Mean Flow (m^3/sec)	Mean Population Equivalent (M.P.E.)
S17	1357	3	0.01	L1
S18	2833	4	0.006	L1
S19	1980	5	0.000	L1
S20	11	4	0.001	L1
Sidney WPCC	4.4×10^5	-	0.07^1 $(0.03)^2$	808 $(356)^2$
Bazan Bay STP	4.7×10^4	-	0.03^1 $(0.0007)^2$	32 $(1.0)^2$
Central Saanich WPCC	1.4×10^5	-	0.01^1 $(0.01)^2$	50 $(50)^2$
Finnerty Cove	4.96×10^6	-	0.081	10580

1 based on operator data/WMB permits

2 based on observed flow (dry weather) November 28, 1979

4.1 Curteis Point to Reay Creek (Marine Stations 1 - 26)

The marine water quality along this section of coastline was generally poor with 11 of the 26 sample stations exceeding the shellfish growing water standard. The major identified bacterial pollution source was the Sidney WPCC discharge. The large drainage culvert (S2) entering Roberts Bay also caused localized contamination in the bay.

The Sidney WPCC is an activated sludge plant with four independent treatment modules. During the survey the plant effluent had a mean fecal coliform count of 440 000 per 100 ml, representing an M.P.E. of 808. The influence of this discharge on marine water quality was evident at stations 18 - 23. On November 6, 7 and 8, influent flow by-passed the treatment tanks and was discharged after fine screening by the Roto-Strainer. This by-pass occurred to permit clean-out and maintenance of the treatment plant following the loss of biological activity reportedly resulting from the introduction of unknown toxic materials to the plant influent. Exceptionally high fecal coliform MPN's were noted at stations 20 and 21 on November 7 (G 1600/100 ml), most probably as a result of this by-pass. The total by-pass volume over the three-day shutdown was approximately 79 485 m^3. During 1979, this situation prevailed on three other occasions resulting in the by-pass of untreated sewage (12).

There were no other plant by-passes during November, however, the Sidney sewage collection system is plagued with infiltration problems and during heavy rains, a considerable amount of sewage influent is by-passed with only coarse screening. The provincial WMB discharge permit for Sidney stipulates a maximum daily storm overflow of 0.35 m^3/sec is allowed for this plant. Under such overflow conditions, the receiving water quality would predictably worsen. Data obtained by the CRD at receiving water sampling stations aroung the Sidney outfall is generally consistent with data presented here, although 90 percentile levels were higher, possibly due to the occurance of storm overflows and other rain-induced pollution sources. A summary of comparative data for selected marine sampling stations is presented in Appendix VIII.

A 24 hour chemical composite sample of the Sidney WPCC effluent was collected on November 28, 1979, and the results are presented in Appendix VI. The percentage removals of BOD_5 and NFR were good although this was due, to a large extent, to the dry weather conditions which resulted in high influent BOD_5 and NFR as well as low flow rates. WMB effluent data for this plant indicates that such a high level of treatment is not always attained, particularly with respect to NFR (see Appendix VI). The lack of NH_3 removal at this plant demonstrates little or no nitrification and therefore short aeration cell residence time.

The major drainage ditch (S2) discharging to Roberts Bay was responsible for the fecal contamination observed at marine stations 9 and 10. This ditch exhibited a mean fecal coliform count of 517/100 ml, representing an M.P.E. of 1. This is a very approximate M.P.E. since the ditch was often backed up by the tide and flows were difficult to measure. The FC:FS ratio of 0.38 for S2 suggests much of the contamination observed was of animal origin although this was not confirmed by upstream examination.

A second storm drain to Roberts Bay (S1) did not significantly impair marine water quality in the vicinity of its discharge despite the high fecal levels observed (mean fecal coliform count of 17 925/100 ml). These high fecal levels in addition to observed evidence of raw sewage suggests a possible residential sewer connection to this storm drain. A sewage lift station overflow pipe, located adjacent to S1, did not appear to be the cause of the raw sewage discharge.

Samples taken at S1 and S2 during a wet weather period in January, 1980 indicated the M.P.E.'s decreased during rainfall (Appendix VII, Table 3).

Two other freshwater inputs to this area were sampled: S3, which discharges at the foot of Weiler Avenue, and Reay Creek (S4). Due to the dry weather encountered during the study, there was no discharge

from S3 and samples were taken from stagnant water in the ditch. Reay Creek was sampled in three locations: (i) mouth (S4); (ii) Highway 17 (S4A) and (iii) Canora Road (S4B). Samples taken at the mouth were often influenced by the tide and flows could not be measured at this location. The mean fecal coliform count at this station was 149/100 ml, which did not significantly impair marine water quality in the vicinity. Samples collected at S4A during January 1980 exhibited significantly higher fecal coliform levels (Appendix VII) and the M.P.E. of 5 would result in higher fecal coliform levels in the receiving waters than was noted in November. The FC:FS ratio of 4.75 at this station suggests the source of fecal contamination is human but the sources could not be found. Reay Creek drains the eastern portion of the Victoria International Airport although samples taken at the airport boundary (S4B) on Canora Road indicated that much of the fecal contamination was introduced between the airport and Highway 17. The creek may receive drainage from a duck farm in the area however the FC:FS ratio does not indicate this to be the cause.

There were 25 other storm drains identified in this portion of the study area however none were flowing due to the dry weather conditions. Much of the Sidney storm drainage is discharged through a submerged outfall located approximately 100 m north of the foot of Weiler Road. The outfall terminates at a depth of 1.4 m below lowest low water, at a distance of 76 m from shore. This storm drain was not sampled but it is likely to have had low flows due to the lack of rainfall. During wet weather, these storm drains would contribute to the contamination of the marine waters although the impact of these discharges is unknown.

In addition to the identified and potential pollution sources listed above there are 10 sewage lift stations in the Sidney collection system which have emergency marine overflow discharges. These lift stations are characterized in Table 6. All lift stations operate on line voltage and are inspected daily, 7 days a week. Although some stations have warning lights to warn of pump malfunctions, there are no provisions

TABLE 6 CHARACTERISTICS OF SIDNEY COLLECTION SYSTEM LIFT STATIONS WITH MARINE OVERFLOWS

Lift Station	Location	No. of Pumps	Estimated Time[1] To Overflow	Overflow Location
Parkland	Parkland School	2	10-12 hours	Tsehum Harbour
Harbour Road	Harbour Road and Resthaven Drive	2	2 hours	Tsehum Harbour
Thumb Point	Foot of Harbour Road	2	2-3 hours	Armstrong Point (exfiltration chamber)
Allbay	Foot of Allbay Road	1	4-5 hours	Armstrong Point
Ardwell	Foot of Ardwell Road	1	5 hours	Roberts Bay
Amelia	Amelia and Allbay Road	2	2 hours	S2 - Roberts Bay
Fifth Street	Foot of Fifth Street	1	2-3 hours	Roberts Bay
Surfside	Foot of Surfside	1	4-6 hours	Foot of Surfside
Rothesay	Foot of Rothesay	2	4-6 hours	Foot of Rothesay
Lochside	North of Reay Creek	1	3-4 hours	Near Reay Creek
Summergate Village[2]	Canora Road	2	10 minutes	Reay Creek

1 overflow times based on estimates by Sidney public works staff.

2 private pump station.

provisions for standby power in the event of a major power outage. Since there are no records kept of overflow frequency and duration, it is difficult to predict the impact of overflows on the marine foreshore areas. These lift stations service all residential areas along the marine shoreline in Sidney with the exception of homes along Beaufort Road (Roberts Point). These homes are serviced by individual septic tanks and a sanitary survey did not reveal any malfunctioning disposal systems.

4.2 Reay Creek to Turgoose Point (Marine Stations 27-38)

Marine water quality in this portion of the study area was generally good with the exception of samples taken in the vicinity of the Bazan Bay sewage treatment plant. This is an extended aeration secondary treatment plant servicing the Dean Park subdivision which is located near the west end of Bazan Bay Road. The plant has two treatment modules although only one is required due to low flows through the system. During the survey the plant discharged an unchlorinated effluent having a mean fecal coliform count of 46 975/100 ml (M.P.E. = 32). The fecal contamination noted in the immediate vicinity of the outfall did not appear to extend southward although sample station 34 exceeded the growing water standard. The source of contamination at this station could not be determined. A composite chemical sample taken of the final effluent of the Bazan Bay STP on November 28, 1979, indicated good percentage removal of BOD_5 and NFR (Appendix VI, Table 1). Data obtained by the WMB for this discharge indicates the effluent quality is well within permit requirements, a consequence of the fact the plant is grossly underloaded and wet weather flows have little or no effect on effluent quality. The official Community Plan for the District of North Saanich predicts an extension of the Dean Park sewered area during 1978 - 1982 with further potential expansion to the foreshore during 1988 - 1992 (13).

In addition to the Bazan Bay STP effluent, 4 storm drains were monitored for fecal contamination (S5 - S8). Fecal coliform levels in

S6 were high, indicating possible contamination from faulty on-site disposal systems in uplands residential areas. The FC:FS ratio of 6.6 further suggests human sewage to be the cause. The remaining storm drains did not exhibit significant fecal coliform levels.

The Agriculture Canada Research Station disposes of sewage on-site by means of septic tanks and tile fields. All land drainage tiles on the property, including those which carry the septic tank effluent, drain into two ditches. One of these runs along the north boundary of the farm, and the other runs approximately south to north along the east boundary, which is adjacent to Highway 17. These ditches converge at the northeast corner of the property, from which point the combined flow is carried under the highway to Bazan Bay (14) in S7. Fecal coliforms were not detected in significant amounts in this ditch.

All homes in this portion of the study area, with the exception of the Turgoose Point area, are serviced by on-site sewage disposal systems. A sanitary survey of the foreshore did not reveal any malfunctioning septic tanks or tile fields.

Marine fecal coliform data is collected by the CRD to assess the effect of the Bazan Bay discharge on water quality in this area. Portions of their data, which is presented in Appendix VIII, indicate that water quality is generally worse than that observed during this survey. Once again, the dry weather conditions encountered during the survey did not permit observation of the possible pollution impact of storm drains on the marine foreshore resulting from wet weather flows.

Central Saanich municipality operates three sewage lift stations in the area north of Turgoose Point. Two of these stations are small pumps servicing two homes and in the event of an overflow condition sewage would exit via the manhole cover. The third station, located on Arthur Drive, has an emergency overflow to the foreshore. All lift stations operate on line voltage and do not have auxiliary power. The Arthur Drive station has a warning light to indicate pump malfunctions and a standby pump. The frequency and duration of lift station overflows is not known and it is difficult to predict the effect on

the foreshore of such occurrences. There were no lift station overflows noted during the survey.

4.3 Saanichton Bay (Marine Stations 39 - 46)

All marine stations in Saanichton Bay met the shellfish growing water standard with the exception of station 41. The source of contamination at this station, which is located near the mouth of Sand Hill Creek (S9), was not positively identified but may have been caused by the levels of fecal coliforms in S9. During the survey, freshwater samples taken at the mouth of Sand Hill Creek, and upstream on Central Saanich Road (S9A, S9B) showed low mean fecal coliform levels (L50/100 ml). A second storm culvert (S10) entering at the mouth of Sand Hill Creek also had low fecal coliform levels. Fecal coliform levels in Sand Hill Creek increased during January sampling ($\bar{x}$FC = 500/100 ml) and it is anticipated that marine water quality would deteriorate as a result of high rainfall. The FC:FS ratio of 0.12 obtained in January indicates that much of the fecal contamination was of animal origin which is supported by the upstream observations. This creek drains considerable agricultural area, including at least one dairy farm. Time did not permit a farm survey to be carried out nor were the drainage boundaries of Sand Hill Creek delineated. A third freshwater source (S11), located on the SE side of Saanichton Bay also drains agricultural land although no fecal contamination was observed at this station during the survey.

Three sewage lift stations have emergency overflows to Saanichton Bay which discharge at: (i) Turgoose Point; (ii) Sand Hill Creek and (iii) SE corner of Saanichton Bay. All these lift stations have dual pumps and warning lights but are not equipped with auxiliary power. The latter station services the Tsawout Band Indian Reserve (East Saanich Indian Reserve) and all homes on the reservation have reportedly been connected. Central Saanich municipal staff conduct weekly maintenance checks at these stations.

A fourth sewage lift station (private) services the KOA campground and pumps sewage to the Central Saanich system. In the event of an overflow from this station, sewage is discharged to a tile field located a considerable distance from the foreshore it is unlikely there would be any contamination resulting from an overflow.

All the lift stations mentioned above pump sewage to the Central Saanich WPCC, located on the eastern side of Cordova Spit. There was no evidence of sewage effluent from this plant adversely affecting water quality in Saanichton Bay. However, a study conducted by EPS in 1972 (4) concluded that sewage discharged from the Central Saanich STP could be swept into Saanichton Bay during a flood tide. This conclusion was based on current predictions by the Canadian Hydrographic Service. Computer simulations on the dispersion and dilution pattern of sewage discharged from this plant indicate that the western foreshore of Cordova Spit can become contaminated at an unknown frequency. These calculations were based on the observed fecal coliform discharge mean of 140 000/100 ml (see section 4.4) and an assumed T_{90} = 6 hours (bacterial die-off rate).

A minor source of fecal contamination to Saanichton Bay is the discharge of sewage from anchored vessels. Some log booming activity takes place in the bay and it is unlikely the log handling boats have sewage holding tanks.

4.4 Cordova Spit to Sayward Beach, including James Island (Marine Stations 47 - 69)

Marine water quality in this portion of the study area was acceptable with the exception of stations 58 and 62, which exceeded the shellfish growing water standard. Fecal contamination was noted in all stations in the vicinity of the Central Saanich discharge and higher than normal levels were recorded at stations 57, 59, and 61-64 on November 23, 1979. It is not known whether the increased fecal coliform MPN's resulted from a landwash effect due to rain which fell on November 22 and 23 or whether a recorded equipment malfunction in the EPS laboratory was responsible. The results for this sampling have not been

incorporated into the calculation of the median and 90 percentile but are included in Appendix III. Monitoring data collected by the CRD indicate fecal contamination arising from the discharge of the Central Saanich STP effluent extends at least as far as sample station 61 (Appendix VIII) and the data presented herein shows contamination reaching station 62. During this survey, the mean fecal coliform level of the Central Saanich plant was 142 330/100 ml representing an M.P.E. of 50. This treatment plant is an oxidation ditch design and was operating well during the survey. A 24 hour composite chemical sample of the effluent taken on November 28, 1979, indicated 88 and 94 per cent removal of BOD_5 and NFR respectively (Appendix VI, Table 1). Monitoring data obtained from the WMB shows that this degree of treatment is not always attained presumably due, in part, to the effects of wet weather flows.

The results of marine sampling along the western shore of James Island and over James Spit indicate sewage effluent discharged by the Central Saanich Plant is not affecting water quality in this area. There were no freshwater sample stations established along this portion of the study area since much of the drainage flowed westward, away from the foreshore. A drainage ditch located at the northern end of Island View Beach reportedly discharges through a submerged outfall although this was not observed. The uplands area does not support any animals except a few horses however the impact of this drainage ditch on the marine water quality during wet weather conditions cannot be predicted.

4.5 Sayward Beach to Gordon Head (Marine Stations 70 -84)

All marine sample stations in this portion of the study area met the shellfish growing water standard during the November sampling program. However, storm drains monitored in the Cordova Bay area had high fecal coliform levels, particularly S13, S14, S15, S18 and S19. The impact of these storm drains on the marine water quality was not observed at the low flows encountered.

In January, 1980 additional sampling was done in the Cordova Bay area to assess the effects of storm drainage on the marine water

quality during wet weather flows. This data, summarized in Appendix VII, shows a significant increase in the M.P.E.'s for most of the storm discharges, particularly S14 and S15. Marine water quality was also much poorer than that observed during November, and on the basis of the limited data obtained, would exceed the shellfish growing water standard under wet weather conditions.

The contamination of the foreshore by polluted storm drains in the Cordova Bay area has been well documented by other investigations. The soil in Cordova Bay has been described as having a low percolation rate subject to a seasonal water table coming within 0.6 meters of the surface. This soil characterization applies to all of the foreshore areas of Cordova Bay from 0 meters to 20 meters above sea level. In fact, all soil types in the Cordova Bay area are considered poor for the proper functioning of conventional septic tank absorption field systems (15), although there are some minimal areas where septic tank disposal systems may function.

Septic tank problems began to occur in the late 1960's and, since few regulations existed before that time, the locations of septic tanks were not required on building plans thus making it difficult to determine where the problems were. Sand filters were condemned by the health authorities in 1967 and, as of April 1970, subdivisions were frozen to a 5 acre minimum by the municipality to alleviate further health hazards resulting from inadequate sewage disposal systems.

During the summer of 1979, the Capital Regional District Health Unit conducted a sanitary survey of Cordova Bay and identified 156 malfunctioning disposal systems out of 908 lots visited. Health Unit monitoring of the storm drains during the summer indicates significant contamination still occurs despite the dry, warm weather. As a result of this monitoring data, the Cordova Bay beach was closed to swimming during 1979.

The Claremont School discharges treated sewage under permit to the surface storm drain system which eventually reaches the foreshore through either S15 or S16. Time did not permit an examination of the treatment works or sampling of the final effluent. The treatment system includes septic tanks, chlorination facilities with 1 hour retention,

slow sand filter and tile field system. Providing the chlorination facility is operating adequately, this discharge should not significantly affect marine water quality relative to other sewage disposal problems documented in Cordova Bay.

The southeastern portion of Cordova Bay is sewered, and is part of the Finnerty Cove collection system. There are three sewage lift stations with emergency marine overflows. A summary of all sewage lift stations with marine overflows for the Finnerty Cove system is presented in Table 7. During the November survey, overflows were noted at the Durling and Vantreight lift stations. None of the pump stations have auxiliary power although all are equipped with warning lights and dual pumps. The Ash Road pump station is continuously telemetered at the main fire hall.

S18 is the major drainage stream to this area and collects surface drainage from the Shellbourne area. The M.P.E. of this station was less than one during the November sampling program but increased to over 3 during January indicating this drain may have a significant impact on receiving water quality during wet weather periods.

In addition to the storm drains sampled, there are 14 other storm discharges identified by Saanich Municipality in this portion of the study area. The impact of these storm drains on receiving water quality during wet weather flows is unknown.

4.6 Gordon Head to Telegraph Cove (Marine Stations 85-93)

All marine stations in this portion of the study area exceeded the shellfish growing water standard. The major source of fecal contamination to the foreshore was the discharge of comminuted sewage through the Finnerty Cove outfall. During the survey, the mean fecal coliform count of the effluent was 4.96×10^6/100 ml, representing an M.P.E. of 10 580. This discharge accounted for 92% of all measured fecal coliform inputs to the entire study area. In addition to the high fecal coliform levels in marine samples, visual evidence of the sewage discharge was noted at various locations on the beach south of the discharge.

TABLE 7 CHARACTERISTICS OF FINNERTY COVE COLLECTION SYSTEM LIFT STATIONS WITH MARINE OVERFLOWS

Lift Station	Location	No.of Pumps	Estimated Time[1] To Overflow	Overflow Location
Ash	Ash at Durling	2	30-40 minutes	S18 - foreshore
Durling	Foot of Durling	2	1-2 hours	Cordova Bay
Vantreight	Vantreight Road	2	40-60 minutes	St. Margaret Bay
Shoreway	North end of Shoreway	2	60-90 minutes	Marine station 86
Alpine	Alpine Crescent	2	60-90 minutes	Finnerty Cove

1 estimates provided by Saanich municipal staff.

Although the provincial WMB permit stipulates chlorination of this effluent, the dose rate used during the survey period was insufficient to effect any decrease in the fecal coliform levels.

Only one storm drain (S20) was monitored in this area although 14 were identified by Saanich municipal staff. This storm drain had negligible contamination although it may intermittently receive raw sewage as the Alpine sewage lift station emergency overflow discharges to this culvert. A second sewage lift station emergency overflow for the Shoreway station discharges in the vicinity of marine station 86. No overflows were noted during the survey period, however, Saanich municipal staff reported an overflow at the Alpine station on November 22, 1979, which occurred as a result of a 2 hour power failure. Neither of these two stations have auxiliary power.

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APPENDIX I

MARINE SAMPLE STATION LOCATIONS

APPENDIX I MARINE SAMPLE STATION LOCATIONS AND DESCRIPTIONS

STATION	LATITUDE	LONGITUDE	DESCRIPTION
1.	48°40.43'	123°23.68'	Tsehum Harbour
2.	48°40.30'	123°23.72'	Tsehum Harbour
3.	48°40.05'	123°23.78'	Tsehum Harbour
4.	48°39.99'	123°23.84'	Roberts Bay
5.	48°39.96'	123°23.90'	Roberts Bay
6.	48°39.95'	123°24.04'	Roberts Bay
7.	48°39.78'	123°24.11'	Roberts Bay
8.	48°39.70'	123°24.08'	Roberts Bay
9.	48°39.66'	123°24.00'	Roberts Bay
10.	48°39.63'	123°23.80'	Roberts Bay
11.	48°39.78'	123°23.62'	Roberts Bay
12.	48°39.92'	123°23.48'	Roberts Bay
13.	48°39.63'	123°23.49'	Sidney
14.	48°39.55'	123°23.55'	Sidney
15.	48°39.47'	123°23.63'	Sidney
16.	48°39.30'	123°23.58'	Sidney
17.	48°39.15'	123°23.76'	Sidney
18.	48°38.93'	123°23.56'	Sidney
19.	48°38.82'	123°23.56'	Sidney
20.	48°38.77'	123°23.62'	Sidney
21.	48°38.73'	123°23.68'	Sidney
22.	48°38.50'	123°23.90'	Sidney
23.	48°38.42'	123°23.98'	Sidney
24.	48°38.31'	123°24.10'	Bazan Bay
25.	48°38.20'	123°24.20'	Bazan Bay

continued...

APPENDIX I MARINE SAMPLE STATION LOCATIONS AND DESCRIPTIONS (continued)

STATION	LATITUDE	LONGITUDE	DESCRIPTION
26.	48°38.13'	123°24.25'	Mouth of Reay Creek
27.	48°38.02'	123°24.32'	Bazan Bay
28.	48°37.90'	123°24.48'	Bazan Bay
29.	48°37.67'	123°24.48'	Bazan Bay
30.	48°37.54'	123°24.38'	Bazan Bay - outfall marker
31.	48°37.42'	123°24.30'	Bazan Bay
32.	48°37.23'	123°24.20'	Bazan Bay
33.	48°37.04'	123°24.05'	Bazan Bay
34.	48°36.82'	123°23.80'	Bazan Bay
35.	48°36.60'	123°23.62'	Bazan Bay
36.	48°36.42'	123°23.59'	Bazan Bay
37.	48°36.23'	123°23.50'	Bazan Bay
38.	48°36.13'	123°23.50'	Turgoose Point
39.	48°36.02'	123°23.12'	Turgoose Point
40.	48°35.87'	123°23.12'	Turgoose Point
41.	48°35.72'	123°23.38'	Mouth of Sand Hill Creek
42.	48°35.72'	123°23.15'	Saanichton Bay
43.	48°35.65'	123°22.92'	Saanichton Bay
44.	48°35.60'	123°22.70'	Saanichton Bay
45.	48°35.65'	123°22.48'	Saanichton Bay
46.	48°35.90'	123°22.21'	Cordova Spit
47.	48°37.10'	123°22.70'	James Island
48.	48°36.70'	123°21.90'	James Island
49.	48°36.05'	123°21.18'	James Island
50.	48°35.84'	123°21.18'	James Island

continued...

APPENDIX I MARINE SAMPLE STATION LOCATIONS AND DESCRIPTIONS (continued)

STATION	LATITUDE	LONGITUDE	DESCRIPTION
51.	48°35.73'	123°21.30'	James Island
52.	48°35.40'	123°20.90'	James Island
53.	48°35.24'	123°20.19'	James Spit
54.	48°34.65'	123°19.90'	James Spit
55.	48°35.78'	123°22.10'	Cordova Spit
56.	48°35.73'	123°21.82'	Cordova Channel
57.	48°35.43'	123°22.25'	Cordova Spit
58.	48°35.35'	123°21.82'	vicinity Central Saanich outfall boil
59.	48°35.22'	123°21.15'	Cordova Spit
60.	48°35.05'	123°21.58'	Cordova Channel
61.	48°35.00'	123°22.18'	Island View Beach
62.	48°34.57'	123°21.95'	Island View Beach
63.	48°34.35'	123°21.90'	Island View Beach
64.	48°33.91'	123°21.95'	Cowichan Head
65.	48°33.52'	123°21.71'	Cowichan Head
66.	48°33.30'	123°21.67'	Cowichan Head
67.	48°33.00'	123°21.80'	Cowichan Head
68.	48°32.72'	123°21.12'	Sayward Beach
69.	48°32.50'	123°21.16'	Sayward Beach
70.	48°32.38'	123°21.78'	Sayward Beach
71.	48°32.00'	123°21.88'	Sayward Beach
72.	48°31.72'	123°21.86'	Sayward Beach
73.	48°31.59'	123°21.80'	Agate Park
74.	48°31.22'	123°21.67'	Cordova Bay Park
75.	48°30.87'	123°21.71'	Cordova Bay

continued...

APPENDIX I MARINE SAMPLE STATION LOCATIONS AND DESCRIPTIONS (continued)

STATION	LATITUDE	LONGITUDE	DESCRIPTION
76.	48°30.78'	123°21.55'	Cordova Bay
77.	48°30.38'	123°20.98'	Cordova Bay
78.	48°31.15'	123°20.48'	Cordova Bay
79.	48°29.85'	123°19.87'	Cordova Bay
80.	48°29.73'	123°19.45'	Cordova Bay
81.	48°29.70'	123°19.23'	Cordova Bay
82.	48°29.75'	123°18.98'	Cordova Bay
83.	48°29.81'	123°18.70'	St. Margaret Bay
84.	48°29.74'	123°18.49'	St. Margaret Bay
85.	48°29.63'	123°18.15'	Gordon Head
86.	48°29.22'	123°18.05'	Gordon Head
87.	48°28.75'	123°18.00'	Arbutus Cove
88.	48°28.59'	123°18.00'	Arbutus Cove
89.	48°28.48'	123°17.82'	Finnerty Cove
90.	48°28.45'	123°17.68'	Finnerty Cove
91.	48°28.40'	123°17.32'	Finnerty Cove
92.	48°28.12'	123°17.00'	Finnerty Cove
93.	48°27.00'	123°16.75'	Telegraph Cove

APPENDIX II

FRESHWATER SAMPLE STATION LOCATIONS

APPENDIX II FRESHWATER SAMPLE STATION LOCATIONS

STATION	LOCATION	RECEIVING WATER
S1	storm culvert at foot of Ardwell Road	Roberts Bay
S2	drainage ditch beside Amelia sewage lift station	Roberts Bay
S3	drainage ditch at Weiler Ave	Bazan Bay
S4	Reay Creek at mouth	Bazan Bay
S4A	Reay Creek at Highway 17	-
S4B	Reay Creek at Canora Road	-
S5	storm culvert north of McTavish Road at Lochside	Bazan Bay
S6	drainage ditch at foot of Bazan Bay Road (adjacent to STP)	Bazan Bay
S7	drainage culvert at north end of Bazan Bay Park (at mouth)	Bazan Bay
S8	drainage culvert at south end of Bazan Bay Park (at Lochside Dr.)	Bazan Bay
S9	Sand Hill Creek at mouth	Saanichton Bay
S9A	Sand Hill Creek at Mt. Newton X Road and Central Saanich Road	-
S9B	Sand Hill Creek at C. Saanich Road approx. 600 m south of Mt. Newton X Road	-
S10	drainage culvert at mouth of Sand Hill Creek	Saanichton Bay
S11	drainage ditch at east end of Beach Road, Tsawout I.R. (at mouth)	Saanichton Bay
S11A	approximately 150 m upstream from S11	Saanichton Bay
S12	drainage ditch at mouth near beach access on Parker Drive	Cordova Bay
S13	drainage culvert at mouth, foot of Walema Drive	Cordova Bay

continued...

APPENDIX II FRESHWATER SAMPLE STATION LOCATIONS (continued)

STATION	LOCATION	RECEIVING WATER
S14	drainage ditch at mouth, Agate Park	Cordova Bay
S15	drainage culvert at mouth, 5091 Cordova Bay Road	Cordova Bay
S16	drainage culvert at mouth, 5056 Cordova Bay Road	Cordova Bay
S17	drainage culvert at mouth, Cordova Bay Park	Cordova Bay
S18	major drainage creek at Ash Road, Mt. Douglas Park	Cordova Bay
S19	drainage culvert at Ash Road (at mouth)	S18
S20	drainage culvert at mouth, 2400 Arbutus Road	Finnerty Cove

APPENDIX III

DAILY BACTERIOLOGICAL MPN DATA FOR MARINE SAMPLE STATIONS

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS

Sample Station	Collection Date	Collection Time	Fecal Coliform MPN/100 ml	Sample Station	Collection Date	Collection Time	Fecal Coliform MPN/100 ml
1.	Nov 6, 1979	1220	2	4.	Nov 6, 1979	1230	5
	Nov 7	0845	2		Nov 7	0855	5
	Nov 8	0915	13		Nov 8	0920	9
	Nov 9	0840	70		Nov 9	0845	5
	Nov 20	-	13		Nov 20	-	5
	Nov 21	0930	2		Nov 21	0940	2
	Nov 27	0850	L2				
	Nov 28	0930	13				
2.	Nov 6, 1979	1220	5	5.	Nov 6, 1979	1240	L2
	Nov 7	0850	8		Nov 7	0855	4
	Nov 8	0920	22		Nov 8	0925	11
	Nov 9	0840	170		Nov 9	0850	8
	Nov 20	-	11		Nov 20	-	2
	Nov 21	0930	2		Nov 21	0940	8
	Nov 27	0850	L2				
	Nov 28	0930	5				
3.	Nov 6, 1979	1225	5	6.	Nov 6, 1979	1240	L2
	Nov 7	0850	79		Nov 7	0855	2
	Nov 8	0920	49		Nov 8	0930	6
	Nov 9	0840	49		Nov 9	0850	23
	Nov 20	-	5		Nov 20	-	5
	Nov 21	0935	L2		Nov 21	0945	8

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
7.	Nov 6, 1979	1250	8	10.	Nov 6, 1979	1255	17
	Nov 7	0900	14		Nov 7	0910	23
	Nov 8	0935	11		Nov 8	0945	17
	Nov 9	0855	5		Nov 9	0905	22
	Nov 20	-	L2		Nov 20	-	33
	Nov 21	0950	14		Nov 21	1000	4
8.	Nov 6, 1979	1250	2	11.	Nov 6, 1979	1300	2
	Nov 7	0900	11		Nov 7	0915	7
	Nov 8	0940	8		Nov 8	0950	23
	Nov 9	0900	7		Nov 9	0910	5
	Nov 20	-	49		Nov 20	-	33
	Nov 21	0955	7		Nov 21	1005	4
	Nov 26	0900	14				
9.	Nov 6, 1979	1250	8	12.	Nov 6, 1979	1305	7
	Nov 7	0905	33		Nov 7	0915	17
	Nov 8	0940	33		Nov 8	0955	14
	Nov 9	0900	46		Nov 9	0910	33
	Nov 20	-	17		Nov 20	1000	5
	Nov 21	1000	23		Nov 21	1010	62
	Nov 26	0905	11				

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
13.	Nov 6, 1979	1305	L2	16.	Nov 6, 1979	1320	L2
	Nov 7	0920	8		Nov 7	0935	110
	Nov 8	1000	49		Nov 8	1020	17
	Nov 9	0915	23		Nov 9	0930	33
	Nov 20	1010	4		Nov 20	1030	13
	Nov 21	1020	11		Nov 21	1045	L2
	Nov 26	0910	5		Nov 26	0915	13
14.	Nov 6, 1979	1310	L2	17.	Nov 6, 1979	1325	5
	Nov 7	0925	2		Nov 7	0940	8
	Nov 8	1005	22		Nov 8	1020	L2
	Nov 9	0920	17		Nov 9	0935	8
	Nov 20	1015	8		Nov 20	1030	5
	Nov 21	1030	9		Nov 21	1050	2
15.	Nov 6, 1979	1315	L2	18.	Nov 6, 1979	1415	17
	Nov 7	0930	8		Nov 7	0950	33
	Nov 8	1010	17		Nov 8	1030	79
	Nov 9	0920	33		Nov 9	0940	27
	Nov 20	1020	L2		Nov 20	1035	33
	Nov 21	1040	5		Nov 21	1050	33
					Nov 26	0915	46

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
19.	Nov 6, 1979	1420	2	22.	Nov 6, 1979	1430	L2
	Nov 7	1005	33		Nov 7	1010	33
	Nov 8	1040	23		Nov 8	1040	27
	Nov 9	0940	17		Nov 9	0945	33
	Nov 20	1040	33		Nov 20	1050	13
	Nov 21	1055	17		Nov 21	1110	240
	Nov 26	0920	11		Nov 26	0930	5
20.	Nov 6, 1979	1420	8	23.	Nov 6, 1979	1430	L2
	Nov 7	1005	G1600		Nov 7	1015	26
	Nov 8	1035	49		Nov 8	1045	33
	Nov 9	0950	33		Nov 9	0955	46
	Nov 20	1040	13		Nov 20	1055	33
	Nov 21	1100	49		Nov 21	1120	130
	Nov 26	0920	49				
21.	Nov 6, 1979	1420	2	24.	Nov 6, 1979	1435	L2
	Nov 7	1005	G1600		Nov 7	1015	33
	Nov 8	1040	170		Nov 8	1045	8
	Nov 9	0945	33		Nov 9	1000	33
	Nov 20	1045	13		Nov 20	1055	31
	Nov 21	1100	17		Nov 21	1120	17
	Nov 26	0925	5		Nov 26	0930	5
					Nov 28	0945	2

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
25.	Nov 6, 1979	1440	5	28.	Nov 6, 1979	1445	13
	Nov 7	1015	26		Nov 7	1025	49
	Nov 8	1050	17		Nov 8	1105	33
	Nov 9	1000	79		Nov 9	1015	130
	Nov 20	1100	4		Nov 20	1110	79
	Nov 21	1125	4		Nov 21	1130	130
	Nov 26	0935	8				
	Nov 27	0910	L2				
	Nov 28	0950	2				
26.	Nov 6, 1979	1440	L2	29.	Nov 6, 1979	1450	2
	Nov 7	1020	7		Nov 7	1030	22
	Nov 8	1055	33		Nov 8	1110	22
	Nov 9	1005	49		Nov 9	1020	49
	Nov 20	1105	9		Nov 20	1115	79
	Nov 21	1125	5		Nov 21	1135	49
	Nov 26	0935	2				
	Nov 27	0910	2				
	Nov 28	0955	5				
27.	Nov 6, 1979	1445	L2	30.	Nov 6, 1979	1455	2
	Nov 7	1020	11		Nov 7	1030	5
	Nov 8	1100	14		Nov 8	1110	17
	Nov 9	1010	70		Nov 9	1020	49
	Nov 20	1110	23		Nov 20	1120	240
	Nov 21	1130	22		Nov 21	1140	94
	Nov 26	0940	L2				
	Nov 28	1000	4				

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
31.	Nov 6, 1979	1500	5	34.	Nov 6, 1979	1510	8
	Nov 7	1035	5		Nov 7	1045	49
	Nov 8	1115	49		Nov 8	1130	33
	Nov 9	1025	33		Nov 9	1035	49
	Nov 20	1120	17		Nov 20	1135	8
	Nov 21	1145	4		Nov 21	1200	23
	Nov 26	0945	5				
	Nov 27	0915	2				
32.	Nov 6, 1979	1500	5	35.	Nov 6, 1979	1515	2
	Nov 7	1040	8		Nov 7	1050	14
	Nov 8	1120	31		Nov 8	1130	22
	Nov 9	1030	33		Nov 9	1035	22
	Nov 20	1125	9		Nov 20	1335	13
	Nov 21	1150	2		Nov 21	1200	13
	Nov 26	0945	2		Nov 26	0950	L2
	Nov 27	0920	8		Nov 27	0925	L2
33.	Nov 6, 1979	1505	5	36.	Nov 6, 1979	1515	5
	Nov 7	1045	4		Nov 7	1055	5
	Nov 8	1125	22		Nov 8	1135	L2
	Nov 9	1030	23		Nov 9	1040	4
	Nov 20	1130	33		Nov 20	1140	5
	Nov 21	1155	5		Nov 21	1205	33
	Nov 26	0950	2		Nov 26	0955	L2
	Nov 27	0920	L2				

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
37.	Nov 6, 1979	1520	L2	40.	Nov 6, 1979	1530	5
	Nov 7	1055	5		Nov 7	1104	13
	Nov 8	1140	2		Nov 8	1145	49
	Nov 9	1050	7		Nov 9	1055	17
	Nov 20	1145	5		Nov 20	1200	23
	Nov 21	1205	5		Nov 21	1220	13
					Nov 26	1000	2
					Nov 28	1010	L2
38.	Nov 6, 1979	1520	22	41.	Nov 6, 1979	1535	2
	Nov 7	1100	7		Nov 7	1110	49
	Nov 8	1140	31		Nov 8	1150	14
	Nov 9	1050	17		Nov 9	1100	17
	Nov 20	1150	2		Nov 20	1200	17
	Nov 21	1210	8		Nov 21	1230	23
	Nov 26	0955	L2		Nov 26	1005	49
39.	Nov 6, 1979	1525	7	42.	Nov 6, 1979	1540	2
	Nov 7	1100	2		Nov 7	1110	2
	Nov 8	1140	L2		Nov 8	1155	L2
	Nov 9	1055	17		Nov 9	1105	17
	Nov 20	1155	13		Nov 20	1205	11
	Nov 21	1215	5		Nov 21	1230	13

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS (continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
43.	Nov 6, 1979	1540	6	46.	Nov 6, 1979	1550	2
	Nov 7	1115	5		Nov 7	1125	2
	Nov 8	1155	13		Nov 8	1200	5
	Nov 9	1110	13		Nov 9	1120	17
	Nov 20	1210	L2		Nov 20	1220	L2
	Nov 21	1235	17		Nov 21	1250	L2
44.	Nov 6, 1979	1545	33	47.	Nov 13, 1979	1340	5
	Nov 7	1120	5		Nov 14	0920	L2
	Nov 8	1200	5		Nov 15	0925	13
	Nov 9	1110	5		Nov 16	0950	L2
	Nov 20	1215	2		Nov 19	0920	7
	Nov 21	1240	13		Nov 23	0905	2
					Nov 27	1310	2
45.	Nov 6, 1979	1550	8	48.	Nov 13, 1979	1350	6
	Nov 7	1120	23		Nov 14	0925	17
	Nov 8	1200	17		Nov 15	0930	13
	Nov 9	1115	6		Nov 16	0955	8
	Nov 20	1220	L2		Nov 19	0925	11
	Nov 21	1245	8		Nov 26	1010	L2
	Nov 26	1005	2				

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
49.	Nov 13, 1979	1400	L2	52.	Nov 13, 1979	1415	2
	Nov 14	0930	11		Nov 14	0955	2
	Nov 15	0930	5		Nov 15	0940	8
	Nov 16	1000	2		Nov 16	1010	2
	Nov 19	0930	2		Nov 19	0940	2
	Nov 23	0925	2		Nov 23	0935	2
	Nov 27	1305	2				
50.	Nov 13, 1979	1405	2	53.	Nov 13. 1979	1420	22
	Nov 14	0945	4		Nov 14	1000	7
	Nov 15	0935	8		Nov 15	0945	2
	Nov 16	1005	5		Nov 16	1015	2
	Nov 19	0935	2		Nov 19	0945	2
	Nov 26	1015	L2		Nov 23	0940	2
					Nov 27	1300	5
51.	Nov 13, 1979	1410	11	54.	Nov 13, 1979	1425	13
	Nov 14	0950	7		Nov 14	1000	2
	Nov 15	0940	7		Nov 15	0950	L2
	Nov 16	1005	2		Nov 16	1020	5
	Nov 19	0940	5		Nov 19	0950	2
	Nov 23	0930	4		Nov 23	0945	2
	Nov 27	1300	L2		Nov 27	1255	L2

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS (continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
55.	Nov 13, 1979	1430	13	58.	Nov 13, 1979	1440	1600
	Nov 14	1020	13		Nov 14	1025	11
	Nov 15	0950	17		Nov 15	1000	11
	Nov 16	1020	34		Nov 16	1030	6
	Nov 19	0955	8		Nov 19	1000	8
	Nov 23	1030	13		Nov 23	1040	2
	Nov 27	0930	49		Nov 27	0935	33
	Nov 28	1015	2		Nov 28	1020	
56.	Nov 13, 1979	1535	8	59.	Nov 13, 1979	1450	8
	Nov 15	0955	33		Nov 14	1030	23
	Nov 16	1025	L2		Nov 15	1010	8
	Nov 19	1030	5		Nov 16	1035	13
	Nov 26	1155	2		Nov 19	1010	2
	Nov 27	0940	13		*Nov 23	1050	130
	Nov 28	1020	L2		Nov 27	0940	9
					Nov 28	1025	17
57.	Nov 13, 1979	1440	8	60.	Nov 14, 1979	1530	17
	Nov 14	1025	17		Nov 15	1005	5
	Nov 15	1000	9		Nov 16	1030	2
	Nov 16	1025	8		Nov 19	1030	5
	Nov 19	1005	11		Nov 26	1155	2
	*Nov 23	1040	33		Nov 27	0935	2
	Nov 27	0930	49		Nov 28	1140	L2
	Nov 28	1020	17				

* possible incubator malfunction

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
61.	Nov 13, 1979	1450	8	64.	Nov 13, 1979	1505	L2
	Nov 14	1035	23		Nov 14	1045	17
	Nov 15	1010	2		Nov 15	1030	13
	Nov 16	1035	70		Nov 16	1045	2
	Nov 19	1010	7		Nov 19	1025	33
	*Nov 23	1050	49		*Nov 23	1100	49
	Nov 27	0945	5		Nov 27	0955	L2
	Nov 28	1030	5				
62.	Nov 13, 1979	1455	33	65.	Nov 13, 1979	1510	2
	Nov 14	1035	7		Nov 14	1045	14
	Nov 15	1020	13		Nov 15	1035	9
	Nov 16	1040	13		Nov 16	1050	8
	Nov 19	1015	17		Nov 19	1030	2
	*Nov 23	1055	70		Nov 23	1110	33
	Nov 27	0945	22				
63.	Nov 13, 1979	1455	13	66.	Nov 13, 1979	1515	L2
	Nov 14	1040	5		Nov 14	1055	11
	Nov 15	1025	8		Nov 15	1040	11
	Nov 16	1040	13		Nov 16	1100	5
	Nov 19	1020	11		Nov 19	1030	2
	*Nov 23	1055	130		Nov 23	1110	110
	Nov 27	0950	2		Nov 28	1030	2

* possible incubator malfunction

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
67.	Nov 13, 1979	1520	L2	70.	Nov 13, 1979	1600	L2
	Nov 14	1310	8		Nov 14	1325	5
	Nov 15	1050	8		Nov 15	1105	8
	Nov 16	1100	4		Nov 16	1110	4
	Nov 19	1035	4		Nov 19	1055	5
	Nov 26	1025	2		Nov 23	1125	79
					Nov 26	1030	4
68.	Nov 13, 1979	1545	13	71.	Nov 13, 1979	1600	L2
	Nov 14	1315	7		Nov 14	1325	5
	Nov 15	1055	13		Nov 15	1110	2
	Nov 16	1100	7		Nov 16	1115	17
	Nov 19	1045	7		Nov 19	1055	13
	Nov 23	1120	33		Nov 26	1035	2
					Nov 27	1015	8
69.	Nov 13, 1979	1550	2	72.	Nov 13, 1979	1610	5
	Nov 14	1320	L2		Nov 14	1335	2
	Nov 15	1100	L2		Nov 15	1115	7
	Nov 16	1105	13		Nov 16	1120	23
	Nov 19	1050	7		Nov 19	1100	2
	Nov 23	1120	33		Nov 23	1135	33
					Nov 26	1040	4
					Nov 27	1015	13

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS (continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
73.	Nov 13, 1979	1620	5	76.	Nov 13, 1979	1635	L2
	Nov 14	1335	2		Nov 14	1345	79
	Nov 15	1120	5		Nov 15	1140	2
	Nov 16	1120	L2		Nov 16	1130	11
	Nov 19	1100	33		Nov 19	1110	4
	Nov 23	1140	33		Nov 23	1145	11
	Nov 26	1040	5		Nov 26	1050	21
	Nov 27	1020	2		Nov 27	1030	27
74.	Nov 13, 1979	1625	7	77.	Nov 13, 1979	1640	5
	Nov 14	1340	2		Nov 14	1350	9
	Nov 15	1125	8		Nov 15	1140	23
	Nov 16	1120	7		Nov 16	1130	33
	Nov 19	1105	L2		Nov 19	1115	7
	Nov 23	1140	23		Nov 23	1150	14
	Nov 26	1040	2		Nov 26	1050	11
	Nov 27	1025	5		Nov 27	1030	4
75.	Nov 14, 1979	1345	6	78.	Nov 14, 1979	1355	5
	Nov 15	1130	11		Nov 15	1145	17
	Nov 16	1125	11		Nov 16	1135	8
	Nov 19	1110	11		Nov 19	1120	2
	Nov 23	1145	17		Nov 23	1155	23
	Nov 26	1045	13		Nov 26	1050	8
	Nov 27	1025	13		Nov 27	1035	13

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS (continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
79.	Nov 14, 1979	1400	L2	82.	Nov 14, 1979	1415	5
	Nov 15	1150	13		Nov 15	1200	2
	Nov 16	1140	2		Nov 16	1155	7
	Nov 19	1120	2		Nov 19	1135	L2
	Nov 26	1055	4		Nov 23	1210	2
	Nov 27	1035	5		Nov 26	1100	79
					Nov 27	1045	2
					Nov 28	1055	L2
80.	Nov 14, 1979	1405	L2	83.	Nov 14, 1979	1420	L2
	Nov 15	1155	7		Nov 15	1220	2
	Nov 16	1145	33		Nov 16	1200	11
	Nov 19	1130	5		Nov 19	1140	4
	Nov 23	1205	22		Nov 23	1240	7
	Nov 26	1055	23		Nov 27	1045	4
	Nov 27	1040	11				
	Nov 28	1040	L2				
81.	Nov 14, 1979	1410	2	84.	Nov 14, 1979	1425	2
	Nov 15	1200	8		Nov 15	1225	2
	Nov 16	1150	13		Nov 16	1200	2
	Nov 19	1130	5		Nov 19	1145	8
	Nov 23	1205	17		Nov 23	1240	7
	Nov 26	1100	11		Nov 26	1100	13
	Nov 27	1040	22		Nov 27	1050	L2

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
85.	Nov 14, 1979	1430	4	88.	Nov 14, 1979	1445	8
	Nov 15	1230	22		Nov 15	1305	130
	Nov 16	1205	17		Nov 16	1215	79
	Nov 19	1150	8		Nov 19	1200	2
	Nov 23	1250	33		Nov 26	1115	49
	Nov 27	1055	70		Nov 27	1110	23
86.	Nov 14, 1979	1435	5	89.	Nov 14, 1979	1450	8
	Nov 15	1235	79		Nov 15	1310	49
	Nov 16	1210	49		Nov 16	1215	49
	Nov 19	1155	5		Nov 19	1205	8
	Nov 26	1105	22		Nov 26	1120	70
	Nov 27	1055	5		Nov 27	1240	13
87.	Nov 14, 1979	1440	5	90.	Nov 14, 1979	1455	5
	Nov 15	1300	17		Nov 16	1215	5
	Nov 16	1210	170		Nov 19	1205	17
	Nov 19	1155	11		Nov 26	1125	11
	Nov 26	1110	170		Nov 27	1240	79
	Nov 27	1100	14		Nov 28	1115	79

APPENDIX III DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE STATIONS
(continued)

Sample Station	Date	Time	Fecal Coliform MPN/100 ml	Sample Station	Date	Time	Fecal Coliform MPN/100 ml
91.	Nov 14, 1979	1500	33	OUTFALL (FINNERTY)	Nov 14, 1979	1450	G1600
	Nov 15	1320	540		Nov 15	1320	G1600
	Nov 16	1220	220		Nov 16	-	92000
	Nov 19	1210	9		Nov 19	1225	92000
	Nov 26	1130	79				
	Nov 27	1245	13				
	Nov 28	1120	110				
92.	Nov 15, 1979	1330	49				
	Nov 16	1225	1600				
	Nov 19	1230	G1600				
	Nov 26	1135	130				
	Nov 27	1230	79				
	Nov 28	1120	350				
93.	Nov 15, 1979	1340	79				
	Nov 16	1225	170				
	Nov 19	1230	350				
	Nov 26	1140	540				
	Nov 27	1230	110				
	Nov 28	1125	350				

APPENDIX IV

DAILY BACTERIOLOGICAL MF DATA FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS

APPENDIX IV: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS

STATION	DATE	TIME	FECAL COLIFORM/100 ml	FECAL STREPTOCOCCI/100 ml
S1	Nov 8, 1979	1125	15 100	1 280
	Nov 9	1000	42 000	5 500
	Nov 19	1110	2 600	400
	Nov 22	0920	12 000	11 000
S2	Nov 8, 1979	1120	160	260
	Nov 22	0935	1 600	G8 000
	Nov 23	0830	590	4 400
	Nov 27	0825	110	660
	Nov 28	0840	126	105
S2	Nov 9, 1979	0955	260	660
upstream	Nov 27	0840	15	62
	Nov 28	0845	63	67
S3	Nov 8, 1979	1110	180	38
	Nov 9	0930	80	90
	Nov 22	0955	1 550	1 700
S4	Nov 8, 1979	1100	42	59
	Nov 9	0930	40	25
	Nov 21	1020	116	93
	Nov 22	1045	500	450
	Nov 28	0900	40	98

APPENDIX IV: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (continued)

STATION	DATE	TIME	FECAL COLIFORM/100 ml	FECAL STREPTOCOCCI/100 ml
S4A	Nov 9, 1979	0935	28	1 130
	Nov 23	-	G800	290
	Nov 26	0825	20	480
	Nov 27	0850	39	72
	Nov 28	-	79	121
S4B	Nov 21, 1979	0950	260	136
	Nov 27	0900	6	150
	Nov 28	0925	40	98
S5	Nov 8, 1979	1055	1	11
	Nov 9	0925	3	31
S6	Nov 8, 1979	1035	7 600	350
	Nov 9	0920	35 000	900
	Nov 19	1120	23 000	4 600
	Nov 22	-	3 200	4 500
S7	Nov 8, 1979	1030	34	54
	Nov 9	0915	19	27
	Nov 27	0930	0	7
	Nov 28	0915	13	2
S8	Nov 23, 1979	0855	20	58
	Nov 28	0920	8	8
S9	Nov 8, 1979	1015	12	39
	Nov 22	1100	15	96

APPENDIX IV: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (continued)

STATION	DATE	TIME	FECAL COLIFORM/100 ml	FECAL STREPTOCOCCI/100 ml
S9A	Nov 21, 1979	0930	55	35
	Nov 27	1005	12	22
	Nov 28	0950	30	8
S9B	Nov 27, 1979	1010	0	18
	Nov 28	0955	12	9
S10	Nov 8, 1979	1010	23	66
	Nov 9	0900	-	60
	Nov 22	1105	30	11 700
S11	Nov 8, 1979	1000	9	21
S11A	Nov 9, 1979	0845	11	58
	Nov 27	0955	0	20
	Nov 28	0935	0	9
S12	Nov 15, 1997	0915	16	310
	Nov 16	0920	-	113
	Nov 19	1145	96	39
	Nov 22	1120	160	250
	Nov 23	0930	410	410
	Nov 26	0850	23	39
S13	Nov 15, 1979	0930	10 000	24 000
	Nov 16	0935	12 200	900
	Nov 22	1150	1 900	2 700
	Nov 23	0940	7 700	4 400
	Nov 26	0900	G8 000	4 800

APPENDIX IV: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (continued)

STATION	DATE	TIME	FECAL COLIFORM/100 ml	FECAL STREPTOCOCCI/100 ml
S14	Nov 15, 1979	0935	1 700	670
	Nov 16	0945	5 000	2 600
	Nov 22	1155	2 100	G8 000
	Nov 26	0910	13 100	1 090
S15	Nov 15, 1979	0945	1 350	1 240
	Nov 16	0955	1 260	3 600
	Nov 20	1000	410	7 800
	Nov 22	1210	4 300	10 500
	Nov 23	0950	1 600	3 000
	Nov 26	0925	1 410	800
S15 (upstream)	Nov 20, 1997		0	12
S16	Nov 15, 1979	1340	165	84
	Nov 16	1010	330	210
	Nov 22	1220	820	270
	Nov 23	1000	480	880
	Nov 26	0935	110	30
S17	Nov 15, 1979	1325	1 465	60
	Nov 16	1020	1 725	160
	Nov 22	1225	965	190
	Nov 23	1015	1 870	630
	Nov 26	0945	760	80

APPENDIX IV: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (continued)

STATION	DATE	TIME	FECAL COLIFORM/100 ml	FECAL STREPTOCOCCI/100 ml
S18	Nov 15, 1979	1315	13 500	2 800
	Nov 16	1030	300	400
	Nov 19	1200	280	77
	Nov 22	1250	1 700	4 300
	Nov 23	1030	460	400
	Nov 26	0955	760	86
S19	Nov 15, 1979	1310	6 800	1 180
	Nov 16	1035	2 600	1 300
	Nov 22	1250	200	29 000
	Nov 23	1030	112	600
	Nov 26	0955	190	230
S20	Nov 15, 1979	1245	0	6
	Nov 16	1055	0	2
	Nov 22	1315	44	260
	Nov 23	-	0	4

APPENDIX IV: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (continued)

STATION	DATE	TIME	FECAL COLIFORM/100 ml	FECAL STREPTOCOCCI/100 ml
Sidney	Nov 8, 1979	1015	1.7×10^6	2.6×10^6 raw
WPCC	Nov 9	-	7.1×10^6	5.6×10^6 bypass
Final	Nov 21	1030	6×10^5	1.3×10^5
	Nov 22	1005	2.8×10^5	1.7×10^5
Bazan	Nov 8, 1979	1025	1.8×10^5	3.8×10^4
Bay	Nov 9	-	5.4×10^4	2.5×10^4
STP	Nov 22	1010	1 000	2 000
Final	Nov 28	-	2 900	800
Finnerty	Nov 15, 1979	1030	2.1×10^6	2.5×10^6
Raw	Nov 16	1100	3×10^6	2.3×10^6
Finnerty	Nov 15, 1979	1115	2.8×10^6	1.3×10^6
Final	Nov 16	1110	G 8×10^5	1.5×10^6
	Nov 20	1120	9×10^6	1.1×10^6
	Nov 23		3.1×10^6	2.9×10^6
Central	Nov 15, 1979	1525	1.4×10^5	4.3×10^4
Saanich	Nov 16	0900	6.7×10^4	1.8×10^4
Final	Nov 28		2.2×10^5	4.1×10^4

APPENDIX V

SUMMARY OF SALINITY DATA FOR MARINE STATIONS

APPENDIX V SUMMARY OF SALINITY DATA FOR MARINE STATIONS

SAMPLE STATION	NO. OF SAMPLES	SALINITY RANGE (ppt)	MEAN SALINITY (ppt)
1	8	30-31	30.3
2	8	30-31	30.4
3	6	30-32	30.4
4	6	30-32	30.7
5	6	30-32	30.4
6	6	30-31	30.3
7	6	30-31	30.4
8	7	30-31	30.2
9	7	30-31	30.4
10	6	30-31	30.5
11	6	30-31	30.5
12	6	30-32	30.6
13	7	30-31	30.2
14	6	30-31	30.4
15	6	30-31	30.5
16	7	30-32	30.6
17	6	30-31	30.7
18	7	30-31	30.6
19	7	30-31	30.5
20	7	30-31	30.4
21	7	30-31	30.4
22	7	30-31	30.7
23	6	30-31	30.8
24	8	30-32	30.9
25	9	30-31	30.7
26	9	30-31.5	30.6
27	8	30-31	30.5
28	6	30-31	30.4

APPENDIX V SUMMARY OF SALINITY DATA FOR MARINE STATIONS (continued)

SAMPLE STATION	NO. OF SAMPLES	SALINITY RANGE (ppt)	MEAN SALINITY (ppt)
29	6	30-31	30.4
30	6	30-31	30.4
31	8	30.5-31.5	30.9
32	8	30.5-32	31.1
33	8	30-32	30.9
34	6	30-32	30.8
35	8	30-31	30.6
36	7	30-32	30.9
37	6	30-31	30.8
38	7	31-31	31.0
39	6	30.5-31	30.8
40	8	30-31	30.6
41	7	30-31	30.3
42	6	30-31	30.6
43	6	30-32	30.9
44	6	30-31	30.6
45	7	30-32	30.8
46	6	30-32	31.0
47	7	28-30	29.8
48	6	30-31	30.3
49	6	30-31	30.4
50	6	29.5-31	30.1
51	6	30-31	30.3
52	5	30-31	30.5
53	7	29.5-31	30.6
54	7	29.5-31	30.4

APPENDIX V SUMMARY OF SALINITY DATA FOR MARINE STATIONS (continued)

SAMPLE STATION	NO. OF SAMPLES	SALINITY RANGE (ppt)	MEAN SALINITY (ppt)
55	7	29.5-32	30.4
56	8	30.5-32	30.9
57	8	29.5-32	30.4
58	8	30-32	30.6
59	8	29.5-32	30.7
60	8	30-32	30.8
61	8	30-32	30.6
62	7	30-32	30.6
63	7	30-32	30.5
64	7	29.5-32	30.4
65	6	30-31	30.3
66	7	30-31	30.4
67	7	30-31	30.5
68	6	30-32	30.6
69	6	30-32	30.8
70	7	30-31	30.5
71	8	30-32	30.8
72	8	30-32	30.9
73	8	30-32	30.6
74	8	30-32	30.7
75	8	30-32	30.9
76	8	30-31	30.8
77	7	30-31.5	30.6
78	7	30-31.5	30.6
79	7	30-31.5	30.7
80	8	30-31.5	30.8
81	7	30-31	30.7
82	7	30-31.5	30.6

APPENDIX V SUMMARY OF SALINITY DATA FOR MARINE STATIONS (continued)

SAMPLE STATION	NO. OF SAMPLES	SALINITY RANGE (ppt)	MEAN SALINITY (ppt)
83	6	30.5-31.5	30.8
84	7	30-32	31.0
85	6	30.5-32	31.1
86	6	30.5-32	31.4
87	6	30.5-31.5	31.0
88	6	30.5-32	31.1
89	6	30.5-32	31.2
90	7	31-32	31.3
91	7	30.5-32	31.3
92	6	30-32	30.9
93	6	30-32	30.8
OUTFALL	4	30-31	30.4

APPENDIX VI

TABLE 1 : RESULTS OF 24 HOUR COMPOSITE SAMPLES TAKEN AT STUDY AREA TREATMENT PLANTS, NOVEMBER 28, 1979

TABLE 2 : SUMMARY OF WMB DATA TO OCTOBER, 1979, FOR STUDY AREA TREATMENT PLANTS

APPENDIX VI TABLE 1

RESULTS OF 24-HOUR COMPOSITE SAMPLES TAKEN AT AREA TREATMENT PLANTS

	SYDNEY STP					
	In	Out(NW)	Out(NE)	Out(SE)	Out(SW)	Out(Avg)	% Removal
BOD_5 (mg/l)	380	50	65	75	65	64	83
NFR (mg/l)	300	25	35	45	35	35	88
pH	7.4	7.9	7.8	7.8	7.8	7.8	-
COD (mg/l)	540	120	95	100	95	103	81
BOD_5:COD	0.70					0.62	
TOC (mg/l)	190	34	28	32	30	31	84
TOC:BOD_5	0.50					0.48	
ORTHO. PO_4 (P) (mg/l)	7.65	4.40	5.85	5.80	5.35	5.35	30
TOTAL PO_4 (P) (mg/l)	11.00	4.80	6.25	6.80	5.55	5.85	47
NITRITE (N) (mg/l)	0.0108	0.330	0.221	0.219	0.175	0.236	LO
NITRATE (N) (mg/l)	LO.010	0.280	0.234	0.181	0.165	0.215	LO
NH_3 (N) (mg/l)	33.2	37.5	37.5	39.6	37.5	38.0	LO
SURFACTANTS (mg/l)	1.1	0.17	0.20	0.16	0.18	0.178	84

APPENDIX VI TABLE 1 (continued)

RESULTS OF 24-HOUR COMPOSITE SAMPLES TAKEN AT AREA TREATMENT PLANTS

	BAZAN BAY			CENTRAL SAANICH		
	IN	OUT	% REMOVAL	IN	OUT	% REMOVAL
BOD_5 (mg/l)	360	45	88	340	40	88
NFR (mg/l)	270	15	94	250	15	94
pH	7.7	7.8	-	7.5	7.4	-
COD (mg/l)	404	65	84	380	80	79
BOD_5:COD	0.89	0.69		0.89	0.50	
TOC (mg/l)	156	-	-	120	22	82
TOC:BOD_5	0.43			0.35	0.55	
ORTHO. PO_4 (P) (mg/l)	6.53	7.70	LO	7.91	6.88	13
TOTAL PO_4 (P) (mg/l)	7.75	7.75	0	9.90	7.05	29
NITRITE (N) (mg/l)	0.0140	0.257	LO	0.013	5.35	LO
NITRATE (N) (mg/l)	LO.010	6.24	LO	LO.010	7.75	LO
NH_3 (N) (mg/l)	44.0	17.5	60	41.7	12.5	70
SURFACTANTS (mg/l)	1.3	0.11	92	2.4	1.2	50

APPENDIX VI TABLE 2

SUMMARY OF WMB DATA TO OCTOBER, 1979, FOR STUDY AREA TREATMENT PLANTS

	SIDNEY STP					BAZAN BAY		CENTRAL SAANICH	
	*No. of Samples	Out(NW)	Out(NE)	Out(SE)	Out(SW)	Out(Avg)	No. of Samples	Out(Avg)	No. of Samples	Out(Avg)
BOD_5, Mean (mg/l)	60	72	78	60	68	36	27	179	70
BOD_5, 90% (mg/l)	104	122	106	104	109	36	59	179	198
NFR, Mean (mg/l)	64	68	77	50	65	35	28	175	85
NFR, 90% (mg/l)	105	124	108	92	107	35	60	175	237
Flow, Mean (IGPD)	-	-	-	-		151	16 800	361	247 000
Flow, 90% (IGPD)						151	21 000	361	350 000

* varies between 60 and 175 samples

APPENDIX VII

TABLE 1 : DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE SAMPLE STATIONS, JANUARY 14 - 17, 1980

TABLE 2 : SUMMARY OF BACTERIOLOGICAL DATA FOR FRESHWATER SAMPLE STATIONS, JANUARY 14 - 17, 1980

TABLE 3 : MEAN POPULATION EQUIVALENTS FOR FRESHWATER SAMPLE STATIONS, JANUARY 14 - 17, 1980

APPENDIX VII TABLE 1

DAILY BACTERIOLOGICAL MPN RESULTS FOR MARINE SAMPLE STATIONS, JANUARY 14-17, 1980

Date	Precipitation (mm)	Fecal Coliform MPN/100 ml				
		Station 71	Station 72	Station 73	Station 74	Station 75
Jan 14	4.2	6	22	240	13	17
15	10.4	49	8	G1600	79	33
16	nil	33	49	1100	31	17
17	trace	7	5	22	14	33

APPENDIX VII TABLE 2

SUMMARY OF BACTERIOLOGICAL DATA FOR FRESHWATER SAMPLE STATIONS, JANUARY 14-17, 1980

Sample Station	Fecal Coliform MPN/100 ml			Fecal Coliform MPN/100 ml			FC:FS Ratio
	No. of Samples	Range	Mean	No. of Samples	Range	Mean	
S1	4	880-10 500	5 412	3	920-G8 000	2 360	2.29
S2	4	190- 1 375	649	3	930- 6 100	3 515	0.18
S4A	4	10- 5 000	1 823	3	52- 1 000	384	4.75
S4B	4	11- 410	223	3	160- 710	460	0.48
S9	4	260- 850	500	3	870- 7 400	4 135	0.12
S9A	4	90- 560	398	3	G800- 2 000	1 508	0.26
S9B	4	260- 520	403	3	300- 1 430	803	0.50
S12	4	89- 460	240	3	118- 970	459	0.57
S13	4	9 400-29 000	14 725	3	9 600-62 000	30 533	0.48
S14	4	4 200-48 000	21 225	3	360- 6 700	2 660	7.98
S15	4	3 200-12 900	6 250	3	920- 3 000	1 673	3.74
S16	4	1 160- 3 600	2 114	3	80- 480	257	8.23
S17	4	1 385- 2 700	2 096	3	520- 2 000	1 212	1.73
S18	4	290- 2 200	1 185	3	140- 4 700	1 737	0.68

APPENDIX VII TABLE 3

MEAN POPULATION EQUIVALENTS FOR FRESHWATER SAMPLE STATIONS, JANUARY 14-17, 1980

Sample Station	Mean Fecal Coliform/100 ml	No. of Flow Measurements	Mean Flow (m^3/sec)	Mean Population Equivalent (MPE)	November 1979 MPE
S1	5 412	3	0.003	0.4	1.0
S2	649	4	0.03	0.5	1.0
S4A	1 823	4	0.1	5	-
S4B	223	3	0.04	0.2	-
S9	500	1	0.03	0.4	-
S9A	398	3	0.06	0.7	-
S12	240	4	0.1	0.8	0.1
S13	14 725	4	0.001	0.6	0.1
S14	21 225	4	0.005	3	L0.1
S15	6 250	2	0.02	3	0.6
S16	2 114	4	0.004	0.2	L0.1
S17	2 096	4	0.004	0.2	0.4
S18	1 185	4	0.1	3	0.5

APPENDIX VIII

COMPARATIVE FECAL COLIFORM MPN DATA OBTAINED BY EPS AND CRD IN THE STUDY AREA

APPENDIX VIII COMPARATIVE FECAL COLIFORM MPN DATA OBTAINED BY EPS AND CRD IN THE STUDY AREA

Sample Station (EPS)	EPS DATA				CRD DATA			
	No. of Samples	MPN/100 ml			No. of Samples	MPN/100 ml		
		Range	Median	90 pct		Range	Median	90 pct
VICINITY OF:								
SIDNEY WPCC								
18	7	17-79	33	55.9	18	4-G2400	93	654
19	7	2-33	17	33.0	41	4-54000	93	3400
20	7	8-G1600	49	514.3	36	L3-G2400	43	1490
23	7	L2-130	33	79.6	19	L3-G2400	23	460
BAZAN BAY								
28	6	13-130	64	130.0	18	L30-G2400	460	2400
30	6	2-240	33	152.4	18	L3-G2400	240	1230
33	8	L2-33	5	25.0	18	4-G2400	460	2400
35	8	L2-22	12	15.6	14	L3-1100	68	1100
CENTRAL SAANICH								
55	7	2-49	13	39.5	59	4-G2400	43	460
57	7	8-49	11	26.6	61	L2-G2400	23	416
61	7	2-70	8	37.1	61	L3-G2400	43	972