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ENVIRONMENT CANADA
ENVIRONMENTAL PROTECTION SERVICE
PACIFIC REGION

SHELLFISH GROWING WATER CONTROL PROGRAM
ANNUAL REVIEW 1981 -1982
Howe Sound, Jervis Inlet, Nelson Island, Pender Harbour, Halfmoon Bay, Buccaneer Bay, Sechelt Inlet Ucluelet Inlet, Meares Island, Browning Passage

Regional Program Report: 82 - 3

By

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ABSTRACT

Between April 1, 1981 and March 31, 1982 the Environmental Protection Service conducted bacteriological surveys of bivalve molluscan shellfish growing waters covering 215 km of coastline in the following areas: Howe Sound, Jervis Inlet, Nelson Island, Pender Harbour, Halfmoon Bay, Buccaneer Bay, Sechelt Inlet, Ucluelet Inlet, Meares Island and Browning Passage. The surveys were conducted to classify the shellfish growing waters in accordance with federal bacteriological pollution standards for acceptable shellfish harvesting areas. Sanitary surveys were conducted concurrently to identify and evaluate the source of fecal pollution to the marine waters.

The data collected indicated numerous areas were contaminated with fecal pollution beyond acceptable federal water quality standards. The sources of contamination to the study areas were varied and included raw and partially treated sewage discharges, urban and agricultural drainage, overboard sewage discharges, sewage treatment plant discharges and non-point sewage sources.

As a result of these surveys, 12 new closures have been added to Schedule I (Contaminated Areas) of the Pacific Shellfish Regulations.

RÉSUMÉ

Entre le 1er avril 1981 et le 31 mars 1982, le Service de la protection de l'environnement a effectué une analyse bactériologique des eaux où croissent des mollusques bivalves, au long des 215 km de côtes bordant les zones suivantes: Howe Sound, Jervis Inlet, Nelson Island, Pender Harbour, Halfmoon Bay, Buccaneer Bay, Sechelt Inlet, Ucluelet Inlet, Meares Island et Browning Passage. Cette analyse a eu pour objet de classer les eaux où croissent les mollusques, selon qu'elles sont ou non propres à leur pêche, par rapport aux normes fédérales de pollution. En même temps, on a effectué des analyses sanitaires pour identifier et évaluer les formes de pollution des eaux de la mer par matières fécales.

Les résultats obtenus par les analyses montrent que de nombreuses zones sont contaminées par une pollution d'origine fécale au-delà des normes de qualité de l'eau fixées par les organismes fédéraux. Les sources de contamination des zones étudiées sont variées: elles commprennent le déversement d'effluents non traités ou partiellement traités, les eaux de ruissellement d'effluents non traités ou partiellement traités, les eaux de ruissellement provenant de secteurs urbains et de zones agricoles, le déversement d'eaux usées à partir des bateaux, le produit des systèmes de traitement des eaux d'égout et la pollution provenant de sources impossibles à localiser.

A la suite de ces analyses, douze nouvelles zones interdites ont été ajoutées à la partie I (zones contaminées) des règlements relatifs à la pêche des mollusques dans le Pacifique.

TABLE OF CONTENTS

		Page
ABSTRACT		i
RÉSUMÉ		ii
TABLE OF CONTENTS		iii
	List of Tables	ix
	List of Figures	x
	List of Abbreviations	xi
CONCLUSIONS		xii
SCHEDULE I CLOSURES		xx
1	INTRODUCTION	1
2	SAMPLES STATION LOCATIONS	4
3	FIELD PROCEDURES AND METHODS	5
3.1	Bacteriological Sampling and Analyses	5
3.2	Physical Testing Equipment and Measurement	6
4	RESULTS AND DISCUSSION	8
4.1	Area I - Howe Sound	9
4.1.1	Keats Island	11
4.1.2	Gower Point to Steep Bluff	12
4.1.3	Gibsons - Steep Bluff to Soames Point	13
4.1.4	Soames Point to Williamson Landing	15
4.1.5	Gambier Island - Thornbrough Bay	16
4.1.6	Gambier Island - West Bay	16
4.1.7	Gambier Island - Centre Bay	16
4.1.8	Gambier Island - Port Graves	17
4.1.9	Gambier Island - Halkett Bay	18
4.1.10	McNab Creek	18

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(Continued) TABLE OF CONTENTS

		Page
4.1.11	Potlatch Creek	19
4.1.12	Anvil Island	20
4.1.13	Furry Creek to Horseshoe Bay	21
4.1.14	Bowen Island - Deep Bay	22
4.1.15	Bowen Island - Hood Point	23
4.1.16	Bowen Island - Grafton Bay	23
4.2	Area II - Jervis Inlet and Sunshine Coast Areas	24
4.2.1	Vancouver Bay	27
4.2.2	Goliath Bay	27
4.2.3	Granville Bay	27
4.2.4	St. Vincent Bay - Totem Oyster Company	28
4.2.5	St. Vincent Bay - Seaman Hope Fisheries	29
4.2.6	Hardy Island	29
4.2.7	Telescope Passage	30
4.2.8	Blind Bay	30
4.2.9	Hidden Basin	31
4.2.10	Cockburn Bay	32
4.2.11	Gunboat Bay	33
4.2.12	Churchill Bay	34
4.2.13	Harness Island	35
4.2.14	Secret Cove	35
4.2.15	Smuggler Cove	36
4.2.16	Halfmoon Bay	36
4.2.17	Buccaneer Bay	38
4.2.18	Sechelt Inlet	38
4.2.19	Storm Bay	39
4.3	Area III - Ucluelet Inlet and Tofino Areas	40
4.3.1	Ucluelet Inlet	40
4.3.1.1	Head of Ucluelet Inlet	46

(Continued) TABLE OF CONTENTS

		Page
4.3.1.2	Ucluelet Inlet East Shore	46
4.3.1.3	Ucluelet Inlet West Shore	47
4.3.2	Browning Passage, Meares Island and Tofino	49
4.3.2.1	Browning and Duffin Passage	49
4.3.2.2	Meares Island	50
ACKNOWLEDGEMENTS		53
REFERENCES		54
APPENDIX I	Area I Figures	56
	Figure 1. Marine and Freshwater Sample Station Locations - Gower Point to Williamson Landing, Including Keats Island	57
	Figure 2. Marine and Freshwater Sample Station Locations - Gambier Island, McNab Creek, Potlatch Creek and Anvil Island	58
	Figure 3. Marine and Freshwater Sample Station Locations - Furry Creek to Horseshoe Bay	59
	Figure 4. Marine and Freshwater Sample Station Locations - Bowen Island	60
APPENDIX II	Area I Tables	61
	Table 1. Daily Data Record for Marine Sample Stations (Area I)	62
	Table 2. Summary of Fecal Coliform MPN Data for Marine Sample Stations (Area I)	77
	Table 3. Freshwater and Effluent Sample Station Locations (Area I)	81

(Continued) TABLE OF CONTENTS

			Page
	Table 4.	Daily Bacteriological Results for Freshwater and Effluent Samples Stations (Area I)	84
	Table 5.	Summary of Bacteriological Results for Freshwater and Effluent Sample Stations (Area I)	89
APPENDIX III	Area II Figures		91
	Figure 1.	Marine Sample Stations - Vancouver Bay Goliath Bay, Granville Bay, Hardy Island and Nelson Island	92
	Figure 2.	Freshwater Sample Stations - Vancouver Bay, Goliath Bay, Granville Bay, St. Vincent Bay, Hardy Island and Nelson Island	93
	Figure 3.	Marine and Freshwater Sample Station Locations - St. Vincent Bay and L.5756, Hardy Island	94
	Figure 4.	Marine and Freshwater Sample Station Locations - Gunboat Bay	95
	Figure 5.	Marine and Freshwater Sample Station Locations - Churchill Bay	96
	Figure 6.	Marine and Freshwater Sample Station Locations - Secret Cove and Harness Island	97
	Figure 7.	Marine Sample Station Locations - Smuggler Cove and Buccaneer Bay	98
	Figure 8.	Marine and Freshwater Sample Station Locations - Halfmoon Bay	99
	Figure 9.	Marine and Freshwater Sample Station Locations - Sechelt Inlet and Storm Bay	100

(Continued) TABLE OF CONTENTS

			Page
APPENDIX IV	Area II Tables		101
	Table 1.	Daily Data Record for Marine Sample Stations (Area II)	102
	Table 2.	Summary of Fecal Coliform MPN Data for Marine Sample Stations (Area II) - Combined Data (February, August and September)	125
	Table 3.	Summary of Fecal Coliform MPN Data for Marine Sample Stations (Area II) - August 19 - September 9, 1981	130
	Table 4.	Summary of Fecal Coliform MPN Data for Marine Sample Stations (Area II) - February 10-26, 1981	135
	Table 5.	Freshwater and Effluent Sample Station Locations (Area II)	138
	Table 6.	Daily Bacteriological Results for Freshwater and Effluent Sample Stations (Area II)	140
	Table 7.	Summary of Bacteriological Results for Freshwater and Effluent Sample Stations (Area II)	146
APPENDIX V	Area III Figures		149
	Figure 1.	Ucluelet Inlet Marine Sample Station Locations	150
	Figure 2.	Ucluelet Inlet Freshwater Sample Station and Village Outfall Locations	151
	Figure 3.	Meares Island Marine and Freshwater Sample Station Locations	152

(Continued) TABLE OF CONTENTS

		Page
	Figure 4. Tofino Marine Sample Station Locations	153
	Figure 5. Tofino Freshwater Sample Station and Outfall Locations	154
APPENDIX VI	Area III Tables	155
	Table 1. Daily Data Record for Marine Sample Stations (Area III)	156
	Table 2. Summary of Fecal Coliform MPN Data for Marine Sample Stations (Area III)	167
	Table 3. Freshwater Sample Station Descriptions (Area III)	170
	Table 4. Daily Bacteriological Results for Freshwater Sample Stations (Area III)	171
	Table 5. Summary of Bacteriological Data for Freshwater Sample Stations (Area III)	173
APPENDIX VII	Biochemical Confirmation Results	174
APPENDIX VIII	Sewage Treatment Plant Operational Assessment in Study Areas	178
APPENDIX IX	Shellfish Tissue Trace Metal Levels - Howe Sound	187

LIST OF TABLES

Table		Page
1	Daily Rainfall Data for Study Periods	7
2	Median Fecal Coliform Levels at Ucluelet Inlet Stations (MPN/100 mL)	44
3	Influence of Tides on Ucluelet Inlet Water Quality	44
4	Regression Coefficient Analysis - Ucluelet Inlet	45
5	Summary of Fish Processing Operations - Ucluelet	48
6	Summary of Discharges Originating Within the Village of Tofino	51
7	Tofino Area Marine Bacteriological Summary	52

LIST OF FIGURES

Figure		Page
1	Schedule I Closures in Study Area I	xxii
2	Schedule I Closures in Study Area II	xxiii
3	Schedule I Closures in Study Area III	xxiv
4	Study Areas	3
5	Study Area I	10
6	Study Area II	25
7	Oyster Lease Locations - Study Area II	26
8	Study Area III	41
9	Oyster Lease Locations - Study Area III	42

LIST OF ABBREVIATIONS

EPS	Environmental Protection Service
FC	Fecal Coliform
FS	Fecal Streptococci
G	"greater than"
L	"less than"
m	metres
ml	millilitres
m^3/sec	cubic metres per second
MF	Membrane Filtration
MPN	Most Probable Number
ppt	parts per thousand
STP	Sewage Treatment Plant

CONCLUSIONS

1. During the survey of Howe Sound, record-breaking rainfall was believed responsible for the introduction of substantial fecal pollution into the receiving environment from numerous unidentified non-point sources. These sources, which included septic tank absorption field seepage, pastureland and hinterland drainage, together with Fraser River and Squamish River freshets, significantly reduced surface water salinity levels in the Sound and likely contributed high levels of indicator bacteria. It is not known whether these high levels of fecal coliforms would have been observed in the absence of heavy rainfall since there is little background coliform data with which to compare these results. In many portions of the study area, the marine water quality results can be explained by the existence of known or probable pollution sources. In those areas where no sources could be identified, the conclusions reflect the abnormal weather conditions encountered during the survey.

2. The northwestern shoreline of Keats Island, specifically Plumper Cove, meets the approved shellfish growing water standard. However, overboard discharges of sewage from pleasure boats utilizing the Provincial Park facilities may result in unacceptable contamination of the growing waters and shellfish tissue. A seasonal closure in this area is warranted to safeguard the consumer during the heavy boating period.

3. The mainland coastline from Gower Point to Steep Bluff is subject to intermittent fecal contamination arising from non-point urban drainage. The discharge of sewage from the Village of Gibsons sewage treatment plant may also impair water quality during those times when there is inadequate disinfection. However, this was not observed during the survey. It is not known whether water quality in this vicinity would meet

shellfish growing standards under normal rainfall conditions, although the observed rapid improvement in water quality following the cessation of rain suggest the contamination may be transient in nature.

4. The tidal foreshore from Steep Bluff to Soames Point is contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish harvested from this area may pose a health hazard. Urban drainage from sewered and unsewered areas was implicated as the major source of bacterial contamination.

5. The tidal foreshore from Soames Point to, but not including, the Langdale Ferry Terminal meets the approved shellfish growing water quality criteria. The present 125 meter radius closure around the ferry terminal docks is sufficient to safeguard the shellfish consumer.

6. Water quality in the vicinity of Y.M.C.A. Camp Elphinstone meets the shellfish growing water standard despite a high fecal coliform level detected in a shellfish sample. The area from which the shellfish were taken is under a general 125 meter wharf closure.

7. Water quality in Thornbrough Bay and West Bay on Gambier Island is acceptable for shellfish harvesting. One sample station in West Bay exceeded the standard but was within the 125 meter wharf closure.

8. Water quality in Centre Bay is influenced from an unknown source which caused localized contamination at one station and resulted in the contamination of resident shellfish. It is likely the contamination observed resulted from the abnormally high rainfall and subsequent land wash. Grouped MPN data from all stations in the bay meets the growing water standard indicating water quality is generally acceptable.

9. The intertidal area at the head of Port Graves is contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish harvested from this area could pose a health hazard. The cause of pollution is suspected to be drainage from pastureland which is contaminated with animal fecal material.

10. The discharge of septic tank effluent through a submerged outfall at the Fircom Camp (Halkett Bay) results in significant contamination of the immediate foreshore. It is likely the extent and degree of contamination would increase during peak use periods at the camp. The intertidal area at the head of Halkett Bay meets the approved growing water standard and was apparently unaffected by the Camp Fircom discharge.

11. The intertidal area at McNab Creek is contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish harvested from this area could pose a health hazard. Uplands drainage appears to be the source of contamination. The area may also be subject to sewage discharges from anchored pleasure craft during the summer months.

12. The source of contamination to a single station in the vicinity of Potlatch Creek was not identified and overall water quality as determined by grouped MPN data meets the approved shellfish growing water standard. The area may be subject to increased sewage contamination from a submerged outfall when the Boys and Girls Camp is in full operation during the summer.

13. A single sample station located north of Irby Point on Anvil Island did not meet the shellfish growing water standard. In the absence of any identified pollution sources and considering the abnormal rainfall levels, this contamination is not considered to occur at frequent enough intervals to warrant closure.

14. Water quality in the vicinity of the Daybreak Point Bible Camp Society site is acceptable for the purpose of shellfish harvesting. However, during peak use periods contamination of the foreshore may occur as a result of the marine discharge of septic tank effluent. The existence of two wharves precludes the harvesting of shellfish from most of the area due to the 125 meter wharf closure.

15. The tidal foreshore from Furry Creek to Horseshoe Bay is of acceptable water quality for the purpose of shellfish harvesting. High fecal coliform levels obtained in shellfish samples prior to the water sampling program reflect the transient bacterial contamination which resulted from unusually heavy rainfall.

16. The waters and tidal foreshore at the head of Deep Bay, Bowen Island are contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish harvested from this area could pose a health hazard. Septic tank absorption field seepage and general uplands drainage is implicated as the cause of the contamination.

17. The shellfish growing waters in the vicinity of Hood Point, Bowen Island, are of acceptable bacteriological quality.

18. The intertidal zone at the head of Grafton Bay is subject to fecal pollution to the extent that shellfish harvested from this area could pose a health hazard. Contaminated drainage from farm pastureland was identified as the source of bacterial pollution.

19. Oyster leases in Vancouver Bay (lease L.5633), Goliath Bay (lease L.5107 and L.4833) and Granville Bay (lease L.6369) all meet the shellfish growing water quality standard.

20. The water quality in the vicinity of the Totem Oyster Co. meets the shellfish water quality standard with the exception of station 27. The probable source of contamination is the agricultural area behind the shucking plant.

21. The water quality of the Seaman and Hope Fisheries lease (L.3858) meets the shellfish growing water standard.

22. The water quality in Telescope Passage including oyster leases L.5756 and UF 6171 (Blind Bay Enterprise) meets the shellfish growing water standard. During the August-September 1981 survey a floating resort was anchored in the area. Untreated sewage discharged into the marine environment from a holding tank on the barge could contaminate nearby shellfish waters, although this was not observed during the survey. The resort did not have a permit for discharging to the marine environment.

23. Blind Bay meets the shellfish growing water quality standard with the exception of station 54. The contamination of this station is due to a direct discharge from a sewage line originating from the house above.

Water quality in anchorage areas was not influenced by the presence of pleasure vessels, probably because of the low number of boats.

24. The water quality of Hidden Basin meets the approved growing water standard except for portions of the head and southern shoreline. The source of contamination along the southern shoreline was identified as a broken sewage line from a nearby residence. Receiving water contamination was only observed during the winter survey, as sewage from the broken pipe was being washed into the immediate foreshore area. The source(s) of contamination in the vicinity of oyster lease UNS 0549733 was not identified, however the growing water standard was exceeded at this

location during February and shellfish collected during the summer were contaminated to unacceptable levels.

25. Cockburn Bay meets the shellfish growing water quality standard.

26. The growing waters in Gunboat Bay are contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish harvested from this area may pose a health hazard. The identified sources are the freshwater inputs at the heads of the bay, which drain agricultural and grazing lands. No other sources were identified. Shellfish harvested commercially from the lease (L.2629A & B) in Gunboat Bay are relayed to approved areas and allowed to depurate prior to processing and are therefore safe to eat.

27. Shellfish harvested from Churchill Bay are subject to fecal contamination arising from grazing land drainage. There is presently no attempt to control animal grazing in order to prevent shellfish growing water contamination.

28. Water overlying shellfish lease UF 6172 at Harness Island meets the approved growing water standard. Sewage discharged from the Dahlex Holdings treatment plant did not affect water quality in the sampling area.

29. The growing waters in Smuggler Cove are contaminated with fecal pollution to the extent that consumption of bivalve molluscan shellfish harvested from this area may pose a health hazard. The source of contamination in water and shellstock is identified as overboard sewage discharges from anchored vessels.

30. Water quality in Halfmoon Bay is generally good, although the growing water standard was exceeded at two stations. Frenchman's Cove is subject to intermittent contamination from anchored pleasure vessels and from two houseboats. Contamination recorded south of Halfmoon Bay Creek is attributed to a direct sewage discharge from a single family dwelling.

Although the contamination observed in Halfmoon Bay is minimal and localized, the situation could worsen with the impending construction and/or enlargement of four sewage treatment systems with marine outfalls. Based on Waste Management Branch permit discharge information, up to $500m^3$/day of sewage effluent could ultimately be discharged into Halfmoon Bay from four separate outfalls. Observations of the existing sewage treatment plant showed it to be poorly maintained resulting in the discharge of a poor quality effluent. Without proper operation and maintenance, other sewage plants proposed for this area could produce poor quality effluents.

31. All marine stations in Buccaneer Bay meet the shellfish growing water quality standard.

32. The water quality of the shellfish leases in Sechelt Inlet (L.3596 and L.6899) meets the shellfish growing water quality standard. A single high fecal coliform count is considered anomalous since no sources of contamination were identified.

33. The water quality overlying Storm Bay oyster leases L.3596 and L.6497 meets the shellfish growing water quality standard. A single high fecal coliform count was attributed to surface runoff resulting from an extremely heavy rainfall.

34. The waters and tidal foreshore of Ucluelet Inlet are contaminated with fecal pollution to the extent that consumption of bivalve molluscan

shellfish harvested from this area may pose a health hazard. The highest levels of contamination are noted along the western shorelines and are attributed to numerous raw and/or septic tank discharges to the foreshore. These sources and possibly other unidentified sources along both the eastern and western shorelines are also responsible for the poor water quality noted at marine stations along the eastern shoreline and the centre line of the inlet.

35. Sewage discharges from the Village of Tofino do not impair shellfish growing water quality in the shellfish production areas of Duffin Passage and Browning Passage. Nearshore contamination is likely to occur and was noted at two locations, however the extensive tidal flushing in this vicinity appears to be sufficient to adequately disperse and/or dilute the volume of sewage presently being discharged.

36. Commercial shellfish leases in Lemmens Inlet and Browning Passage meet the approved shellfish growing water standard.

SCHEDULE I CLOSURES

As a result of the studies described herein, the following amendments to Schedule I (Contaminated Areas) of the Pacific Shellfish Regulations have been instituted.

1. Area 28-3. The tidal foreshore of Plumper Cove, Keats Island, Area 28, lying within a 300 m radius of the Provincial Park wharf, except that shellfish may be taken from September 15 to April 30 each year.

2. Area 28-4. The tidal foreshore lying from the mouth of Chaster Creek to a point onshore 400 m northeast of the Gibsons sewage treatment plant outfall sign, Area 28.

3. Area 28-5. The tidal foreshore lying from Steep Bluff to Soames Point, Area 28.

4. Area 28-6. The intertidal area at the head of Port Graves, Gambier Island, Area 28.

5. Area 28-7. The tidal foreshore lying within a 200 m radius of the Camp Fircom sewage outfall, Halkett Bay, Gambier Island, Area 28.

6. Area 28-8. The intertidal area of that portion of the foreshore known as McNab Creek, Area 28.

7. Area 28-9. The tidal foreshore lying 200 m to the west, and 400 m to the east of the mouth of Potlatch Creek, Area 28.

8. Area 28-10. The tidal foreshore of Deep Bay, Bowen Island, Area 28, lying inside a line drawn from the red navigation beacon on the south shore of Deep Bay to the foot of Ocean View Road.

9. Area 28-11. The intertidal zone at the mouth of Grafton Creek, Grafton Bay, Bowen Island, Area 28.

10. Area 16-7. The tidal foreshore of the small, unnamed northern most bay in Hidden Basin, Nelson Island, Area 16, excluding foreshore lease UNS 0349733.

11. Area 16-8. The tidal foreshore of Churchill Bay, Francis Penninsula, Area 16, lying within a 200 m radius of the northernmost point of the bay.

12. Area 16-9. The waters and tidal foreshore of Smuggler Cove, Area 16, lying inside a line drawn from the Smuggler Cove Marine Park sign at the entrance to the cove, to the opposite shore, except that shellfish may be harvested from Sepetember 15 to April 30 each year.

Until remedial action can be taken to repair a sewage disposal system in Hidden Basin, the following area will be closed under Fisheries Public Notice: "The tidal foreshore of Hidden Basin, Nelson Island, Area 16, lying between the Mouth of Bruce Creek and a point on land 200 m to the northeast."

Schedule I closures 16-1 and 16-3 for Pender Harbour and Secret Cove will remain in effect.

Although closures have not been recommended in anchorage areas in Blind Bay, specifically Ballet Bay and the Fox I. area, shellfish harvesters should be aware that the possibility of harvesting contaminated shellfish from those areas increases with boat anchorage activity.

Schedule I closure 23-2 of Ucluelet Inlet will remain in effect.

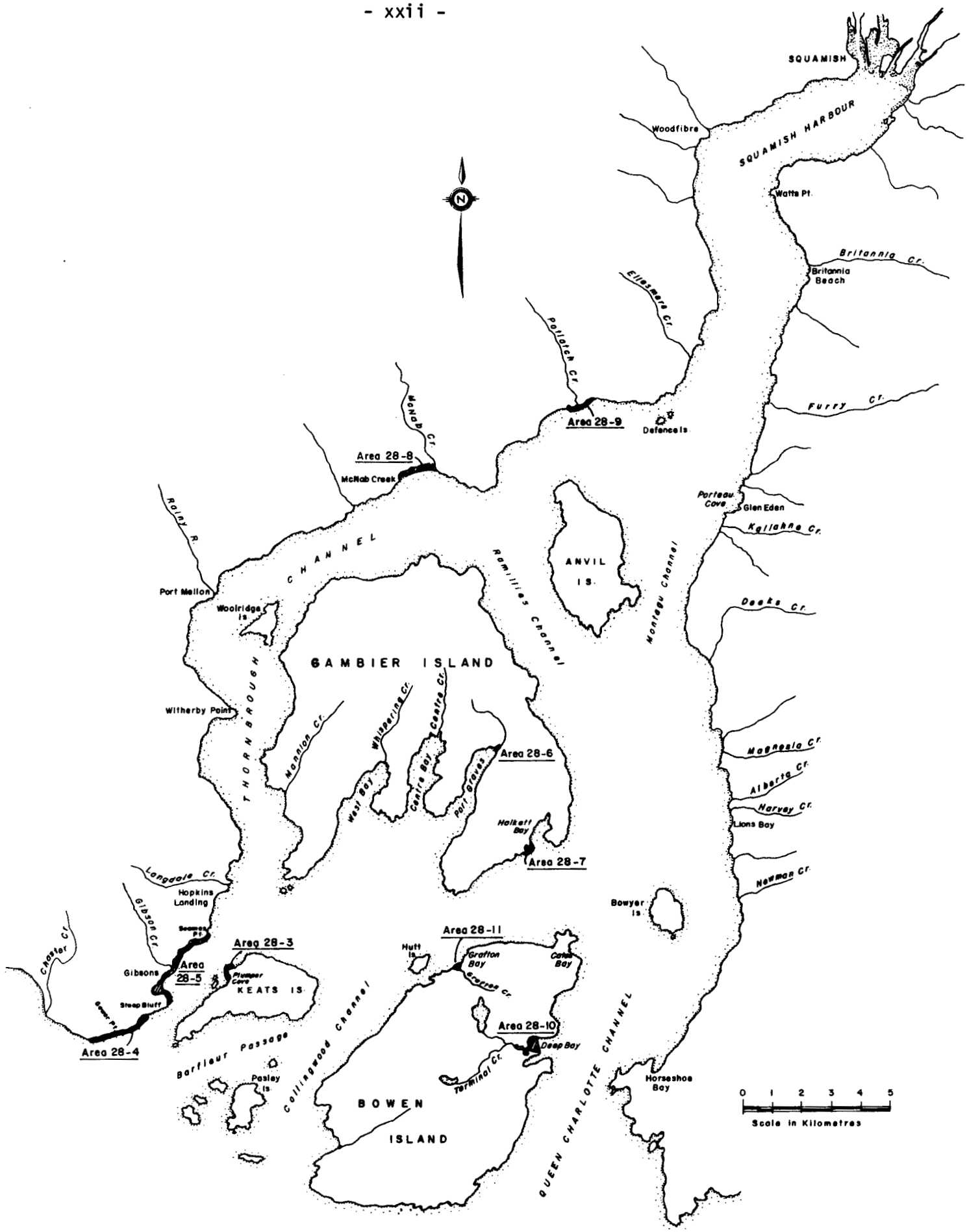

FIGURE I SCHEDULE I CLOSURES IN STUDY AREA I

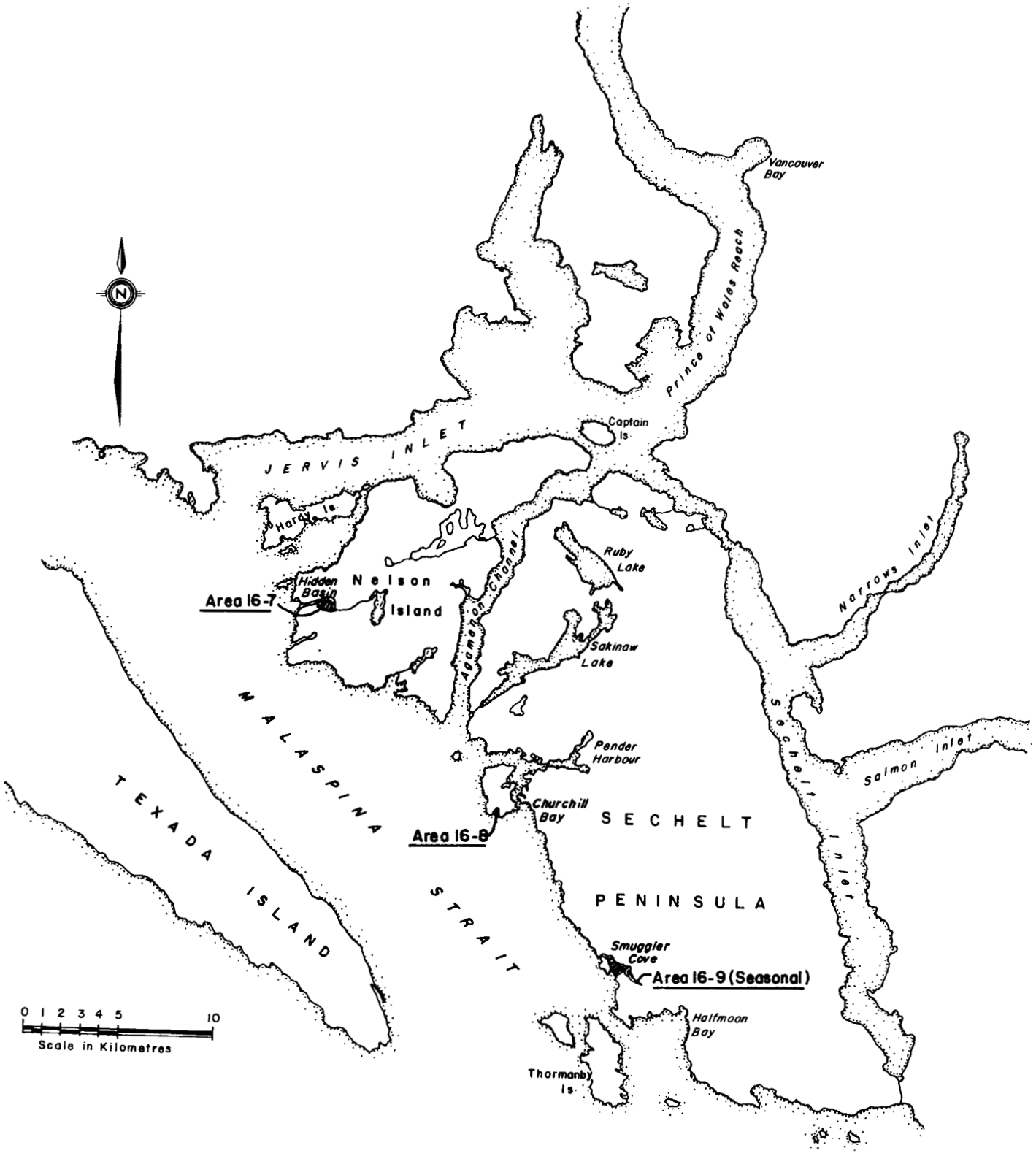

FIGURE 2 SCHEDULE I CLOSURES IN STUDY AREA II

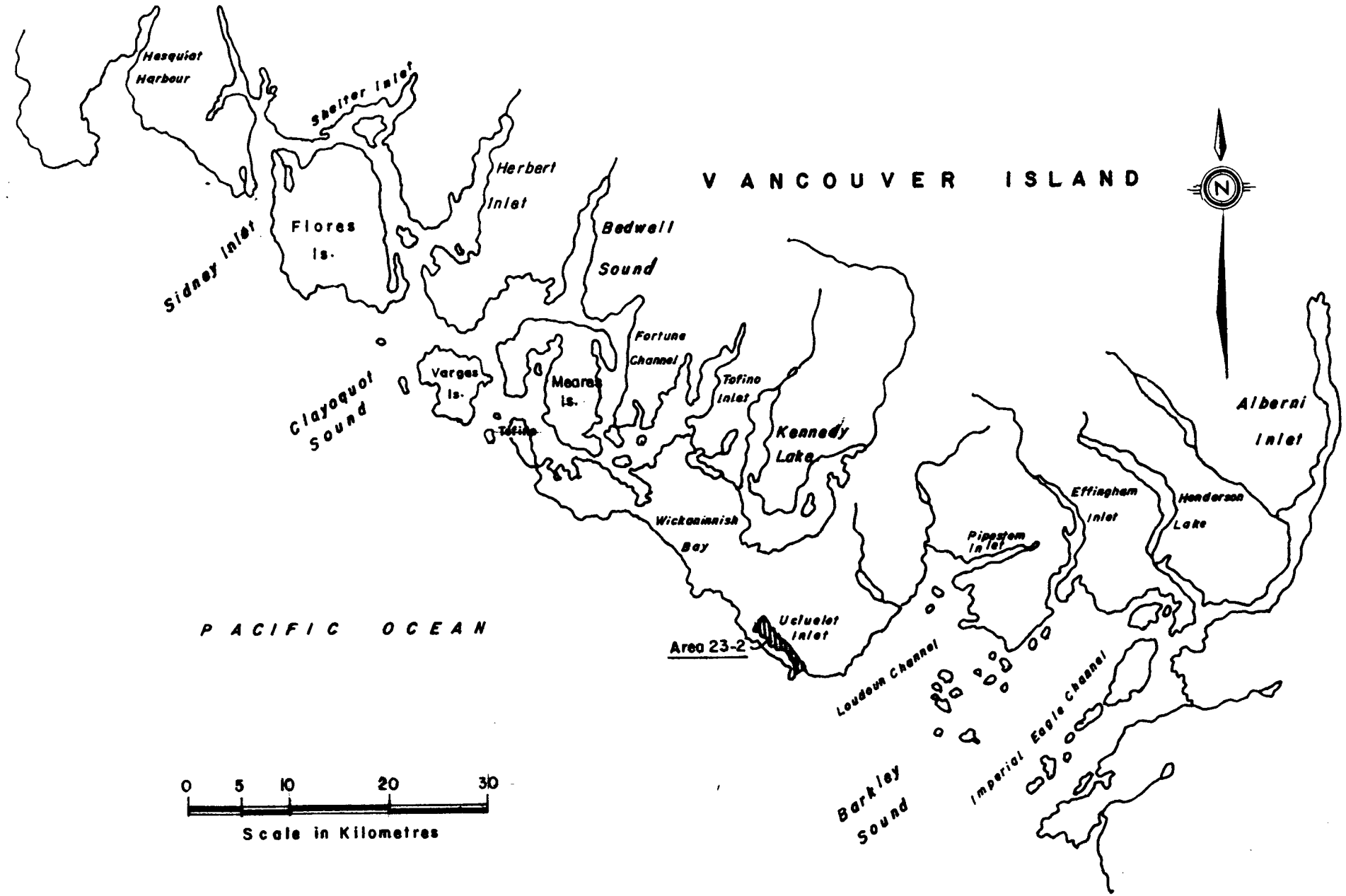

FIGURE 3 SCHEDULE I CLOSURES IN STUDY AREA III

1 INTRODUCTION

Under the requirements of the Canadian Shellfish Safety Program the Environmental Protection Service regularly conducts water quality surveys to assess the bacteriological quality of shellfish harvesting areas. During the 1981-1982 program year (April 1, 1981 to March 31, 1982) surveys were conducted by EPS in the following areas:

(a) Area I: Howe Sound, excluding the Squamish Estuary

(b) Area II: Jervis Inlet, Nelson Island, Pender Harbour, Halfmoon Bay, Buccaneer Bay and Sechelt Inlet

(c) Area III: Ucluelet Inlet, Meares Island and Browning Passage, including Tofino

Data for Area II was collected during both February and August, 1981 and results from both studies are included herein. The sampling areas are shown in Figure 4.

Previous shellfish surveys for the study areas had been carried out by EPS in 1974 (1,2) when the Pender Harbour, Sechelt Peninsula and Sechelt Inlet areas were sampled. However, no growing water surveys had been conducted in Howe Sound or the Ucluelet-Tofino area. Consequently, shellfish surveys were planned in these areas with the following objectives:

1. Assess the shellfish growing water quality of previously unsurveyed commercial oyster leases and other identified shellfish areas.

2. Re-assess water quality of shellfish areas in Pender Harbour and Sechelt Inlet since the previous 1974 survey.

3. Obtain baseline bacteriological water quality data of shellfish growing areas in the immediate vicinity of the Villages of Ucluelet and Tofino prior to proposed changes in the sewage treatment and disposal schemes for the two areas.

4. Obtain baseline bacteriological water quality data of shellfish growing areas in Halfmoon Bay prior to the expansion of an existing sewage treatment plant with marine discharge, and the installation of three new sewage treatment systems with marine outfalls.

5. Assess the adequacy of Schedule I shellfish closures in the study areas.

Bacteriological and sanitary surveys were conducted during May and June 1981 (Area I), February and August 1981 (Area II) and February 1982 (Area III) by staff of the Environmental Protection Service.

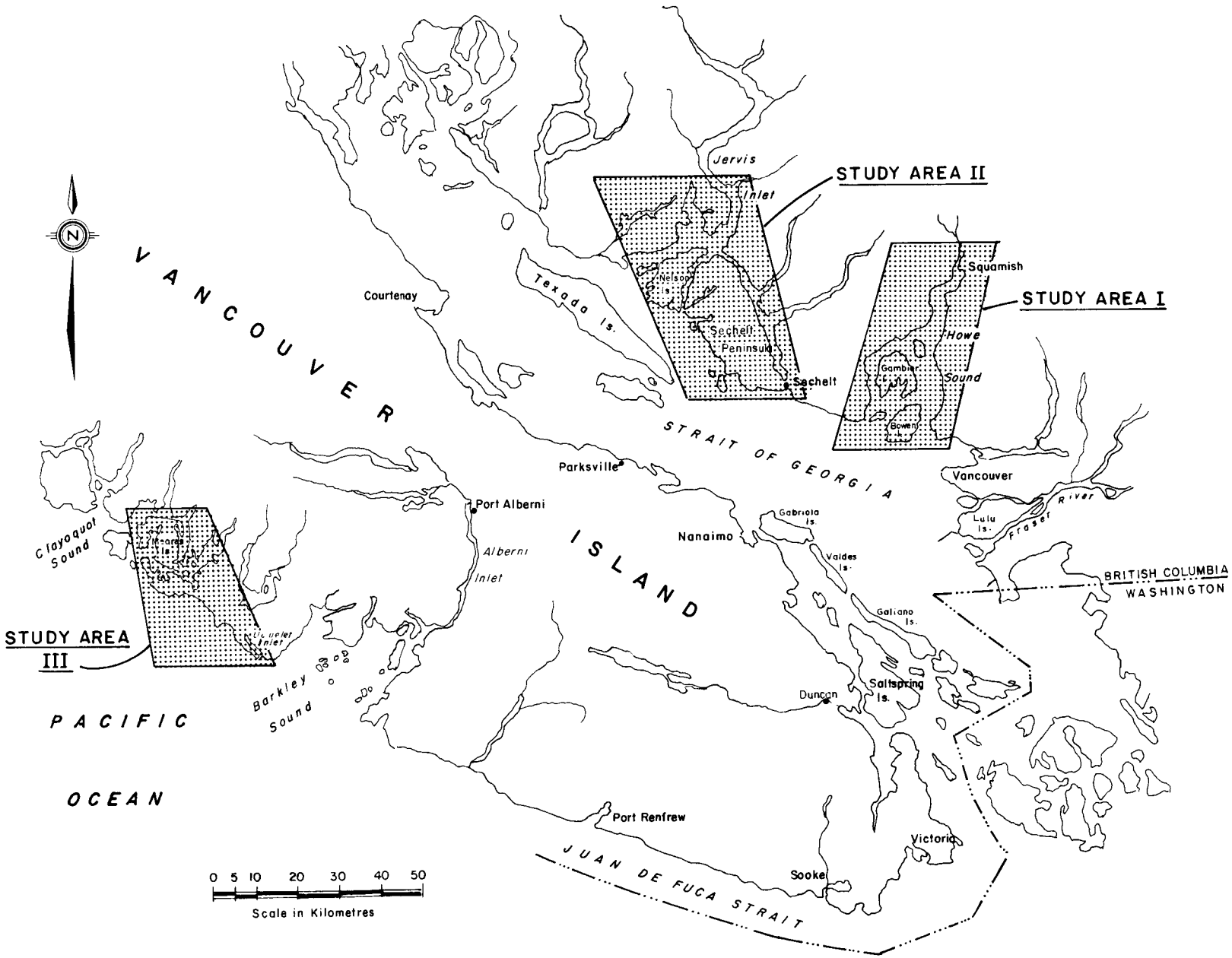

FIGURE 4 STUDY AREAS

2 SAMPLE STATION LOCATIONS

Marine sample stations were located over commercial oyster leases and in clam and oyster areas identified by the federal Department of Fisheries and Oceans and provincial Marine Resources Branch. The extent of sampling was dependent upon the proximity of identified and potential sewage sources to the shellfish areas.

Freshwater and effluent sample stations were established on all major inputs to the marine sampling areas.

The location of commercial oyster leases in the study areas are shown in Figures 7 and 9 and sample station locations are shown in Appendices I (Area I), III (Area II) and V (Area III). Marine and freshwater sample station descriptions are presented in Appendices II (Area I), IV (Area II) and VI (Area III).

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 15-30 cm below the water surface. The water depth at collection points over shellfish beds did not exceed 1.5 m. Samples were stored in coolers at temperatures not exceeding 10°C until processed. All analyses were conducted on site in the EPS mobile microbiology laboratory, generally within five hours of collection.

The fecal coliform MPN per 100 ml was determined using the multiple tube fermentation technique (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 (3). The culture medium used was the A-1 medium as described by Andrews and Presnell (4) and further evaluated by Kay (5). A-1 medium was supplied by Gibco Diagnostics or was prepared in this laboratory.

All freshwater samples were collected in sterile wide mouth glass bottles and were tested for fecal coliform and fecal streptococci using the membrane filtration method described in Part 909 of the 14th edition of Standard Methods. Media used were mFC and KF Streptococcus Agar obtained from Difco laboratories, Detroit, for the fecal coliform and fecal streptococci tests respectively. The membrane filters used were Millipore HC, obtained from Millipore Limited, Mississauga, Ontario.

Biochemical confirmation of fecal coliform isolates obtained from the MPN procedure was performed on a percentage of all samples collected. These results are presented in Appendix VII.

3.2 Physical Testing Equipment and Measurement

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 ppt. Salinity data and tide information are presented in Table 1 of Appendices II, IV and VI for Areas I, II and III respectively.

Rainfall measurements were obtained from the nearest Atmospheric Environment Service guaging station or were measured on-site. Daily rainfall data for the study periods is presented in Table 1.

TABLE 1: DAILY RAINFALL DATA FOR STUDY PERIODS

Study Area I		Study Area II			Study Area III		
Date (1981)	Rainfall (mm)	Date (1981)	Rainfall (mm)		Date (1982)	Rainfall (mm)	
May 20	1.0[1]	February 5-10	0.0[2]		February 3	0.2[4]	
21	2.8	11	2.8	(1.4)[3]	4	trace	
23	4.6	12	9.2	(22.3)	5	0.5	
24	24.0	13	8.6	(23.9)	6	trace	
25	trace	14	1.2	(30.2)	9	0.2	
29	5.8	15	6.4	(40.7)	10	37.0	(22.8)[5]
30	trace	16	14.4	(38.0)	11	18.6	(5.1)
June 2	6.7	17	7.5	(37.5)	12	93.4	(25.4)
3	2.9	18	11.0	(35.9)	13	20.8	(91.4)
4	10.8	19	8.5	(7.1)	14	36.2	(12.7)
5	12.6	20	3.6	(10.6)	15	45.4	(50.8)
8	3.2	21	3.2	(0.9)	16	80.0	(25.4)
9	6.7	23	0.4	(7.5)	17	32.4	(0.3)
10	7.6	24	0.2	(0.8)	18	64.6	(73.7)
11	trace	25	4.0	(2.2)	19	13.0	(15.2)
12	7.7	26	2.2	(2.0)	20	7.8	(7.6)
13	2.6	August 14-23	0.0	(0.0)	21	15.4	(1.5)
15	12.1	24	3.2	(3.0)	22	3.4	(25.4)
16	1.7	25	3.4	(7.4)	23	9.0	(7.6)
17	10.8	26	0.2	(1.7)	24	184.2	(81.3)
18	10.6	27	0.0	(1.0)	25	54.6	(96.5)
21	4.5	28	0.3	(8.7)			
22	7.3	29	14.2	(0.0)			
		31	22.2	(38.8)			
		September 1	6.5	(0.8)			
		3	2.0	(6.0)			

[1]Gower Point - AES
[2]Mary Island - AES
[3]Malibu - Jervis Inlet - AES
[4]Tofino Airport - AES
[5]Mackenzie Beach - EPS

Note: Dates not recorded had 0.0 mm rainfall

4 RESULTS AND DISCUSSIONS

Canadian bivalve molluscan shellfish growing waters are classified according to the following bacteriological 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, in those portions of the area most probably exposed to fecal contamination during the most unfavorable hydrographic and pollution conditions.*

Shellfish growing areas can also be closed on the basis of known or potential pollution sources which may or may not be reflected in the bacteriological water quality results. In this regard, all major freshwater and effluent inputs to the study areas were sampled and both fecal coliform and fecal streptococci measurements were performed on these samples. The fecal coliform:fecal streptococci ratio (FC:FS) of each input was calculated where both mean values exceeded 100/100 ml in an attempt to determine the origin of fecal contamination observed. Geldreich and Kenner (6) have reported higher FS than FC levels 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. Care must be taken in the interpretation of FC:FS data and in this report it is presented as supporting data for sanitary investigations. The calculated FC:FS ratios are presented in Appendices II, IV and VI.

The concept of population equivalents was used to compare the theoretical relative receiving water impacts of the various freshwater inputs in some of the study areas. 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

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

fecal coliform concentration in domestic sewage has been estimated at 20% of the total concentration. This yeilds a value of 3.2×10^{10} fecal coliforms/person/day. The equation used for calculating population equivalents was:

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

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

Shellfish closures imposed on the basis of the sanitary and bacteriological surveys resulted in 16.3 km of coastline or 163.5 hectares of shellfish growing areas being classified as unacceptable in the three survey areas. The rationale behind the imposition of these closures is presented in subsequent sections of the text. For ease of discussion, results for the three survey areas (Areas I, II and III) are presented separately.

4.1 Area I - Howe Sound

Marine sampling in this study was conducted between May 25 and June 24, 1981 and was confined to specific portions of southern Howe Sound where shellfish resources had been identified by the Department of Fisheries and Oceans (Figure 5). There is presently no commercial harvesting of bivalve molluscan shellfish in the Sound.

A total of 613 samples were collected from 98 marine sample stations in Area I. Fecal coliform levels exceeding the approved shellfish growing water standard were found in the Gibsons area, McNab Creek, Potlatch Creek, Port Graves, Halkett Bay, Deep Bay and Grafton Bay.

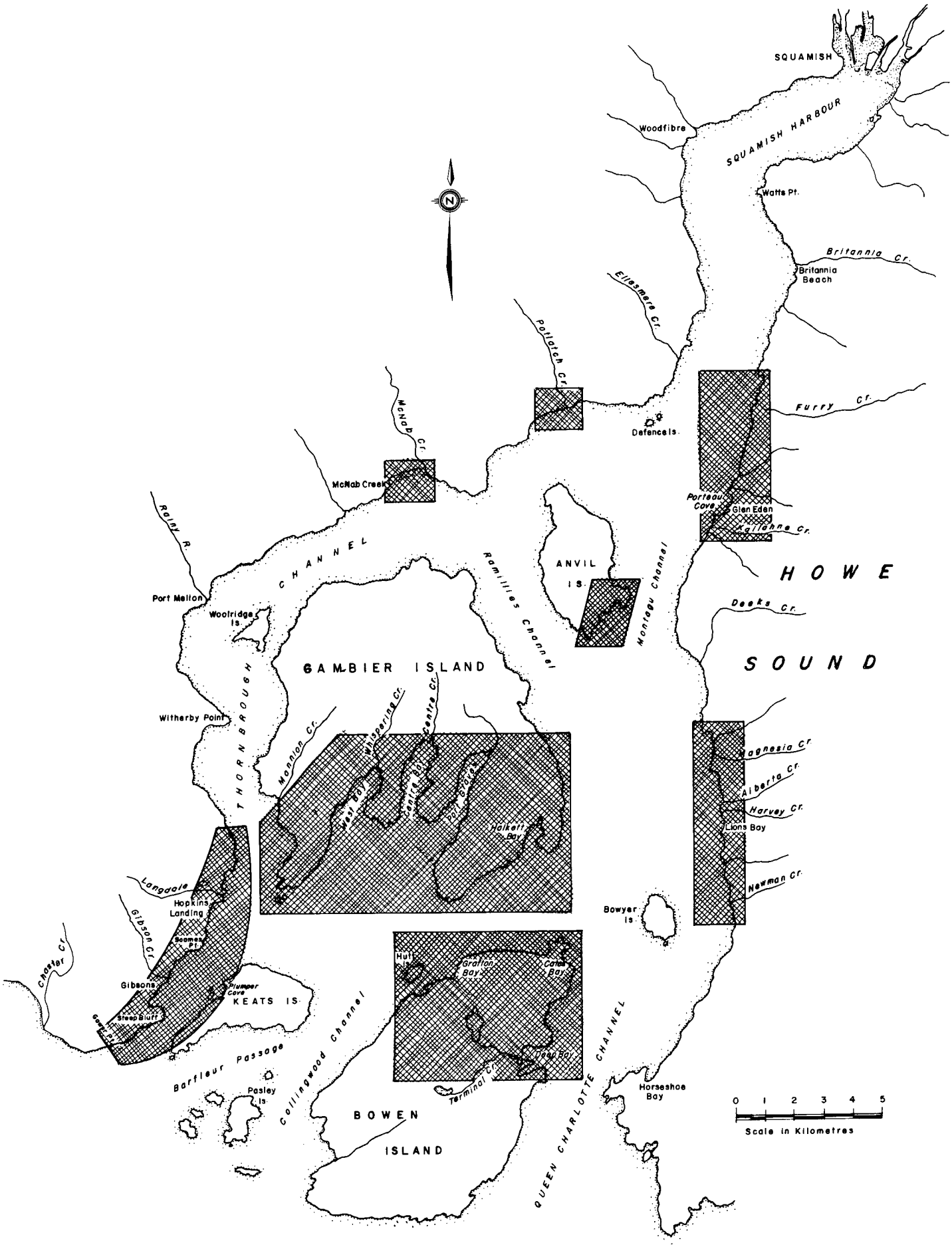

FIGURE 5 STUDY AREA I

Marine bacteriological data was compared with rainfall amounts (including 24 hr antecedent rainfall), salinities and state of tide at collection time in an attempt to determine what influences these factors were having on water quality. The results of these regression analyses and graphical interpretations are further discussed in subsequent sections.

As a general note, this survey was conducted during a period of unseasonably high levels of rainfall. Rainfall during the May 24 - June 24, 1981 period totalled 149.6 mm and monthly totals for May and June were 82.0 mm and 135.8 mm respectively (Vancouver Airport data). This compares with historical mean rainfall levels of 47.5 mm and 45.2 mm for May and June.

This excessive rainfall, together with the freshwater influences of the Fraser and Squamish Rivers on the study area, resulted in very low salinities being obtained in the surface (0.5m) waters. Mean salinity values at all stations ranged from 3.6 ppt to 13.5 ppt.

4.1.1 Keats Island (Stations 1-9)

Sampling at Keats Island was confined to Plumper Cove and all marine stations met the approved shellfish growing water criteria. A stream entering Plumper Cove (S1: mean FC = 260/100 ml; FC:FS = 1.0) was moderately contaminated although fecal coliform levels generally decreased following a heavy rainfall of 24 mm recorded on May 24 (Gower Point weather station). This reduction in fecal coliforms together with the low FC:FS ratio suggests contamination originated from non-human sources. The 90 percentile MPN value of 33/100ml for marine station 6 reflects the variable water quality caused by S1.

Plumper Cove is a Provincial Marine Park and is used extensively during the summer months by residents of the Lower Mainland and Sunshine Coast as a recreational boating area. Data obtained from the Parks and Outdoor Recreation Division of the Provincial Ministry of

Lands, Parks and Housing showed that 4,179 boating parties utilized this park during 1980. It is likely that this number is higher since boat counts were not taken every day. EPS surveys in other major anchorage areas (7) has shown conclusively that overboard discharges of sewage from pleasure boats can significantly pollute both the shellfish growing waters and shellfish tissue to unacceptable levels. Therefore this area may be subject to sewage contamination during the summer months. During the course of this survey, daily boat counts ranged from 3 to 7, with a total of 24 over the six sampling days.

4.1.2 Gower Point to Steep Bluff (Stations 10-20)

High fecal coliform levels were recorded at stations 11, 12, 13, 14, 15, 16, 17, 18 and 19 on May 25, following antecedent 24 hour rainfall of 24 mm. These elevated levels resulted in stations 12, 14 and 15 exceeding the growing water standard at the 90 percentile level. Regression analysis and log-probability plots of grouped MPN data from stations 10-20 further implicate the heavy rainfall as the cause of the high MPN values. This landwash effect was most pronounced outside the sewered area (i.e. west of marine station 16).

No significant point source discharges to this area were identified with the exception of the Village of Gibsons sewage treatment plant submerged outfall. The outfall pipe enters the water at station 17 and terminates at a depth of about 25 m, 190 m offshore. Samples taken of the final plant effluent had a fecal coliform range of 1.4×10^3/100 ml to 5×10^4/100 ml, with a mean value of 2.9×10^4/100 ml.

Although the STP effluent is chlorinated, the plant does experience some infiltration/inflow during large rainfalls. Because the chlorine application is manually controlled the dosage may be inadequate during high flow rates, possibly resulting in receiving water

contamination. This was not observed during the survey as stations 16, 17 and 18, located closest to the outfall had lower fecal coliform values than other stations in the area, despite the high rainfall.

The relatively high post-chlorination fecal coliform levels are probably due to insufficient chlorine contact time at the plant. However, provided a chlorine residual is maintained at the end of the contact chamber, the final effluent fecal coliform values should be further reduced due to the additional contact provided by the length of the outfall. The absence of a shellfish resource in the immediate vicinity of the outfall may preclude the need for disinfection. A review of existing oceanographic data for this location and/or further such studies, or appropriate bacteriological monitoring in the absence of chlorination could determine whether disinfection is necessary. Additional plant data is provided in Appendix VIII.

4.1.3 Gibsons - Steep Bluff to Soames Point (Stations 21-26)

All marine stations with the exception of station 25 exceeded the approved shellfish growing water criteria. The poorest water quality was observed on high slack and ebb tides although growing water quality was not met on any stage of the tide. This suggests land-based rather than offshore (e.g. Gibsons STP outfall) sources to be the cause of bacterial pollution. The marine bacteriological data was poorly correlated with other physical parameters such as rainfall and salinity.

Much of this area is sewered, the northern boundary being Gibsons Creek. All sewage gravity feeds to a 3 pump lift station at the foot of Prouse Road. The lift station has an emergency outfall to the bay but apparently seldom, if ever, has overflowed. The lift station capacity reportedly provides at least 3 hours to overflow and a shutdown alarm is telemetered to three separate locations.

Several streams and culverts (S2-S10) discharge to the bay fronting the Village of Gibsons and of these S3, S4, S5, S8 and S9 had

high fecal coliform levels. Stations S3-S5 had the same order of magnitude flow rates and the total bacterial contribution of each was quite small, having population equivalents of less than 1. However the cumulative effect of these discharges, in addition to general land wash and seepage has an obvious detrimental effect on marine water quality.

Freshwater inputs are the result of surface runoff from rainfall as well as a considerable amount of spring water. Specific sources of contamination were not identified and would require upstream sampling to provide this information. Freshwater station S5 (mean FC = 2124/100 ml; FC:FS = 5.6) was the only station where human sewage was indicated as the major source, based on the FC:FS ratio.

Gibson Creek (S10) which enters north of the government wharf near marine station 24, was not highly contaminated (mean FC = 43/100 ml) and had a relatively low flow (50 L/min). It was not determined what the source(s) of contamination to marine station 24 was, although houses in the immediate vicinity have on site sewage disposal. The water quality of Gibson Creek may also be quite variable since a single sample taken at the mouth yielded an FC value of 111/100 ml, while samples collected upstream at Highway 101 were generally lower.

The source(s) of contamination at station 26 was not identified and neither Soames Creek (S11; mean FC = 7/100 ml) or S12 (mean FC = L1/100 ml) were contributors of fecal pollution to this location.

Shellfish were collected at three locations in this area and were analyzed for fecal coliform. The results were as follows:

Location	Marine Sample Station	Species	Fecal Coliform MPN/100g
Gibson Bay	22	Mya arenaria	16,000
Granthams Landing	25	Mytilus edulis	G16,000
Soames Point	26	Mya arenaria	16,000

The high fecal coliform values indicate substantial, continuous pollution of these shellfish waters.

4.1.4 Soames Point to Williamsons Landing (Stations 27-35)

All marine stations with the exception of station 36 were of acceptable shellfish growing water quality. Contamination at stations 36 may have resulted from Langdale Creek (S13; mean FC = 42/100 ml) due to the large flow recorded during the survey (5000 L/min).

The area from Soames Point to Langdale is heavily populated with almost continuous shoreline dwellings. Sewage disposal is by septic tank/drain field systems, many of which are old. There was no apparent foreshore seepage from these systems during the survey, nor were any other freshwater inputs identified.

The Salvation Army Camp Sunrise on the south bank of Langdale Creek disposes of all sewage to ground via septic tank/drain field and was not implicated as the source of contamination to Langdale Creek. The camp was not heavily used during the survey, with only 3 people on site during the sampling program.

The B.C. Ferry Corporation operates a sewage treatment plant at the Langdale terminal which discharges at the end of the fuel jetty, 6 m below LLW. This discharge was not considered a source of contamination due to the minimal flow rate and distance from the shoreline. Additional plant information is presented in Appendix VIII.

A shellfish sample (*Mya arenaria*) collected at station 32 yielded a fecal coliform MPN of 1300/100g indicating this area is subject to contamination which was not apparent by the water quality results.

Three marine stations located north of the Langdale terminal were of acceptable water quality although a shellfish sample (*Mya arenaria*) collected near the YMCA Camp Elphinstone dock was highly contaminated (G16,000/100g). No sources of contamination were noted at this location and the camp was not operating at full capacity during the survey.

4.1.5 Gambier Island - Thornbrough Bay (Stations 36-39)

All marine stations were of acceptable water quality although station 38 was subject to fecal contamination, probably from a stream (S14; mean FC = 30/100 ml) entering immediately south of the government dock. No other sources of fecal contamination to Thornbrough Bay were identified.

4.1.6 Gambier Island - West Bay (Stations 40-42)

All stations in West Bay had elevated fecal coliform levels although station 42 was the only one which exceeded the shellfish growing water standard. The unnamed creek (S15; mean FC = 16/100 ml) entering the bay immediately south of the government dock may have been partially responsible for the contamination observed at station 42. However, the low fecal coliform levels in S15 do not indicate a significant problem with respect to fecal contamination. Other specific pollution sources were not identified although there are several houses in the vicinity. A shellfish sample (*Mya arenaria*) collected near station 42 had a fecal coliform count of 2300/100g.

4.1.7 Gambier Island - Centre Bay (Stations 43-45)

Marine station 44 did not meet the shellfish growing water standard although there was no apparent source for the fecal contamination observed. An oyster sample collected at this location also indicated the presence of sewage contamination, with a fecal coliform level of 2200/100g.

Centre Creek (S16; mean FC = 25/100 ml) enters at the head of the bay and may have been responsible for the contamination noted, although water quality at station 45, located closest to the creek discharge, was acceptable. One house with a wharf is located in the bay

on the eastern shore. A small creek discharging at the base of the house was not contaminated and the house was not occupied during the survey.

The grouped MPN data for all stations indicates overall water quality meets the growing water standard despite the contamination noted at station 44, and no correlation was found between marine water quality and rainfall, salinity or tide conditions.

4.1.8 Gambier Island - Port Graves (Stations 46-48)

None of the marine stations met the shellfish growing water standard. Analysis of the data with respect to tide conditions at time of sampling shows unacceptable fecal contamination was recorded on all stages of the tide with the lowest coliform levels noted on the low slack tides.

The major source of contamination appears to be the unnamed creek (S17; mean FC = 69/100 ml) entering at the head of the bay. This creek drains part of a development (Sea Ranch) covering 300 acres with about 60 proposed lots. The development holds WMB permit PE-5301 for the disposal of 46.5 m^3/day of septic tank effluent to the ground. At present, there are only two houses on the property, one of which is occupied. However, several cows and sheep were noted on the property and appear to have access to the creek and foreshore areas and are the probable source of fecal contamination (FC:FS data for the station is inconclusive).

Single samples of two small drainage flows on the eastern shore had counts of 66/100 ml and 170/100 ml and may also contribute to the poor water quality observed. An oyster (*Crassostrea gigas*) sample collected in this bay had a fecal coliform count of 5400/100g.

A sanitary survey of the Anglican Church Camp Artaban, due west of Sea Ranch, indicated a small stream which runs through the camp property was contaminated (single sample FC = 1900/100 ml). It is postulated that the source is one or more of the three septic tank/drain

field systems. The contaminated stream enters Port Graves at the government wharf.

4.1.9 Gambier Island - Halkett Bay (Stations 49-54)

Marine sample stations 49-51 were positioned to assess the impact of a septic tank outfall extending 61 m offshore (Camp Fircom, WMB permit PE-3755) at the entrance to Halkett Bay. Stations 49 and 50 were contaminated to unacceptable levels from this source. A second source may have been a drainage ditch having an FC count of 240/100 ml (single sample). This ditch passes through the camp and enters near station 50. During the sampling program the camp was not operating and it is conceivable that water quality could worsen considerably when the camp population increases to more than 50 during the summer.

Three sample stations were located at the head of Halkett Bay and all met the shellfish growing water standard. Despite the absence of residential development and/or freshwater inputs, fecal coliforms were detected (highest MPN = 46/100 ml) indicating the influence of landwash. A shellfish sample (*Mya arenaria*) had a fecal coliform level of 170/100g, which is high considering the absence of identifiable pollution sources.

4.1.10 McNab Creek (Stations 55-57)

All marine stations in this vicinity exceeded the approved shellfish growing water standard and grouped MPN data for all these stations had median and 90 percentile values of 15.5/100 ml and 79/100 ml, respectively. Water quality was poor on all stages of the tide except low slack, although only three data points are available for this condition. The data suggests, albeit inconclusively, that the contamination was land-based and not introduced from offshore sources. Regression analysis was unable to correlate MPN levels with physical factors (i.e. rainfall and salinity).

This bay is approximately 1250 meters long with a Canadian Forest Products logging camp at the west end and approximately 7 houses at the mouth of McNab Creek at the east end. Samples of McNab Creek (S18; mean FC = L5/100 ml) showed very low fecal coliform levels and in fact marine station 57 at the mouth of McNab Creek exhibited the lowest median MPN value, discounting McNab Creek as a major contributor of bacterial pollution.

No marine sample stations were located at the far western end of the bay due to its utilization as a log booming area. A sanitary survey of the logging camp identified two surface flows having fecal coliform counts of 400/100 ml and 140/100 ml. A small creek running through the camp was also sampled, and yielded low fecal coliform levels. The two contaminated flows pass through the main part of the camp (bunkhouse, cookhouse and office area) and may be polluted by the two septic tank/drain field systems serving the camp. However, the low FC counts and low flows were not likely to be the cause of contamination at the marine stations, located a considerable distance from this camp.

No other sources of sewage contamination were identified although the shallow marshy foreshore and immediate uplands may harbour coliforms of non-human origin which are discharged to the bay via many diffuse sources. Fecal pollution may also result from overboard discharges of sewage from anchored pleasure boats. Up to 35 boats have been anchored in the bay on summer weekends according to local reports. A shellfish sample (*Mytilus edulis*) collected near station 56 had a fecal coliform MPN of 700/100g.

4.1.11 Potlatch Creek (Stations 58-60)

Station 59 was the most highly contaminated station and exceeded the growing water standard at the median level. Grouped MPN data for the three stations indicates unacceptable contamination occurs on a high slack tide but not on an ebb tide. There is insufficient data

to assess general water quality on low slack and flood tide conditions. Rainfall and salinities did not correlate with the MPN values obtained.

Three samples collected at the mouth of Potlatch Creek (S19; mean FC = 18/100 ml; mean FS = 124/100 ml) indicated low level fecal contamination which did not adversely effect water quality at the nearest marine station (58). The higher fecal strepocooci levels suggest, but do not confirm, animals as the contamination source. The Potlatch Boy's and Girl's Camp is located at the mouth of the creek on the west bank. Marine samples were not collected west of the creek due to the presence of a wharf and the resultant standard Schedule I shellfish closure. An employee of the camp reported there are three septic tanks, two with drain fields and one discharging through an outfall to the Sound. Subsequent checking with the Club management in Vancouver confirmed that such an outfall has existed since the early 1960's when the drain field ceased functioning properly. In an effort to maintain these sewage disposal systems camp personnel periodically remove septic tank accumulated sludge to disposal pits.

At the time of sampling the camp was not operational with only a caretaker on site; however up to 200 people use the camp during the summer and the effect of this increased population on water quality is not known. The camp was not implicated as the source of contamination at station 59, located east of the mouth of Potlatch Creek and it is suggested the general landwash effect was responsible for the counts observed. A sample of mussels (*Mytilus edulis*) collected in the vicinity of station 59 had a fecal coliform MPN of 80/100g.

4.1.12 Anvil Island (Stations 61-63)

Marine station 61 did not meet the approved growing water standard although the 90 percentile value of 44.4/100 ml indicates only borderline contamination. This station was located in a small bay northeast of Irby Point. Three homes were situated on the bay although none were occupied at the time of sampling. A small creek entering near

station 61 was sampled twice giving fecal coliform results of 10/100 ml and 23/100 ml.

Stations 62 and 63 were located near the Daybreak Point Bible Camp Society site. Both stations met the shellfish growing water standard although some fecal contamination was present at both locations.

This camp discharges a maximum of 20.5 m^3/day of septic tank effluent through a 15 m outfall pipe off Daybreak Point (WMB permit PE-2784). At the beginning of the sampling period the outfall line, which runs along the rocky east side of Daybreak Point, was broken well above the high water mark but was subsequently repaired before the end of the survey. The break in the pipe did not affect water quality at marine station 62 since the camp was not fully occupied and the discharge volume was minimal.

Samples collected at the mouth of Champside Creek (S20; mean FC = 43/100 ml) indicate this input is subject to some fecal contamination and may have been responsible, at least partially, for the contamination observed at station 63.

4.1.13 Furry Creek to Horseshoe Bay (Stations 64-80)

All marine stations along this coastline met the approved shellfish growing water standard and freshwater inputs (S21-S28) had low level fecal contamination. The highest fecal coliform levels were recorded at S24 (mean FC = 59/100 ml) which drains into Porteau Cove between marine stations 65 and 66. However, no adverse effect was noted at these stations. Shellfish samples (*Mytilus edulis*) were collected at three locations along this coastline and the results are as follows:

Location	Marine Sample Station	Species	Fecal Coliform MPN/100g
Furry Creek	66	M. edulis	4450*
Porteau	68	M. edulis	330*
Daisy Creek	--	M. edulis	170*

*average of two replicates

It is difficult to correlate this data with that of the marine stations since the shellfish were collected on June 4, 1981 and water sampling began June 9. The high fecal coliform levels obtained may be indicative of the pollution arising from non-point sources as a result of the heavy rainfalls.

4.1.14 Bowen Island - Deep Bay (Stations 81-88)

All marine stations in Deep Bay exceeded the shellfish growing water standard, with the exception of station 81. Calculated median and 90 percentile values for grouped MPN data from all stations were 23/100 ml and 82.2/100 ml respectively, demonstrating overall water quality in the bay was poor with respect to shellfish harvesting. The growing water standard was exceeded on all stages of the tide except low slack and highest fecal coliform counts were obtained on the high slack and ebb tides. These observations suggest onshore sources to be the major cause of contamination. Regression analysis of MPN data vs salinity and rainfall showed poor correlation.

The major freshwater input to the bay is Killarney Creek (S29; mean FC = 174/100 ml), which enters at the southeast corner. This creek drains Killarney Lake and flows into a lagoon prior to reaching Deep Bay. Samples collected at the discharge from Killarney Lake (S31; mean FC = 13/100 ml) indicate low level contamination originating at the lake. Samples taken downstream from the lake but upstream of the lagoon (S30; mean FC = 43/100 ml) showed a slight increase in fecal coliform values. There are several homes located on the lagoon between S30 and S29 which are serviced by septic tank/drain field systems and therefore are potential sources of sewage contamination during periods of high rainfall. The highest population equivalent during the sampling program for Killarney Creek at the mouth was 4.

Two tributaries discharging into Killarney Creek between S30 and S31 were also sampled. Terminal Creek (S32; mean FC = L14/100 ml) had the

largest flow but a low fecal coliform count while the second unnamed creek had fecal coliform counts of 50/100 ml and 150/100 ml and may be a source of contamination to upper Killarney Creek.

There are few residences in the drainage basin of Killarney Creek upstream of S30 and it is likely that observed low-level fecal contamination originates from animal sources. The only other input to Deep Bay was a small drainage pipe (S33; mean FC = 53/100 ml) entering at the southeast corner of the bay. This fecal contamination may have had a localized effect on the receiving water quality.

Previous sampling of Deep Bay had been conducted by EPS on July 24, 1979 and March 17 and 18, 1980. During these sampling periods marine water quality was much better than that observed during this survey. Grouped MPN data for these two samplings showed overall water quality to be slightly over the shellfish standard in the immediate vicinity of Killarney Creek during July 1979. The subsequent sampling in 1980 showed overall water quality to be within the standard. The record-breaking total rainfall amounts recorded during the 1981 survey are no doubt responsible for this general worsening of water quality. Shellfish samples were collected at marine stations 79 and 82, yielding fecal coliform MPN's of 5400/100g and 3500/100g, respectively.

4.1.15 Bowen Island - Hood Point (Stations 89-96)

Marine stations were located in Cates Bay, Enchanta Bay, Columbine Bay and Smugglers Cove and all met the approved shellfish growing water standard. No freshwater inputs were identified in these areas and no other sources of sewage contamination were noted.

4.1.16 Bowen Island - Grafton Bay (Stations 97-98)

Marine station 98, located at the head of Grafton Bay exceeded the shellfish growing water standard at the median level. Two freshwater

inputs enter the bay at this location and were the only identified sources of fecal coliforms to the area. The first stream was sampled only once at the mouth (FC = 81/100 ml) and once upstream (FC = 63/100 ml) indicating some contamination was originating east of the Honeymoon Creek road. The absence of residential development suggests animal sources to be the cause. The major stream, Grafton Creek (S35; mean FC = 54/100 ml), drains an area to the south and southeast of Grafton Bay. This creek passes through the Endswell Farm which occupies much of the land between Galbraith Bay and Grafton Bay. Animals on the farm include ducks, cows, horses, chickens and pigs. Although the animals may not have direct access to the creek, drainage from the pasture does flow into the creek and may contain animal fecal material, particularly during heavy rains. Samples taken downstream (S35-S38) of the farm had significantly higher fecal coliform levels than did the upstream station (S39; mean FC = 1/100 ml), confirming that the farm is the major contamination source to the creek. A shellfish sample (*Mya arenaria*) collected near the mouth of Grafton Creek yielded an MPN of 1600/100g.

Honeymoon Creek (S34; mean FC = 2/100 ml), which enters Grafton Bay northeast of Grafton Creek, was found to be uncontaminated. Marine station 97, located off the mouth of Honeymoon Creek was also free of significant contamination.

4.2 Area II - Jervis Inlet and Sunshine Coast Areas

Sampling in study area II was conducted from February 10-26 and August 19 - September 3, 1981. The sampling areas are shown in Figure 6 and oyster lease locations are shown in Figure 7. During these two sampling periods 1,027 marine samples were collected from 140 sampling locations. Samples were collected during two periods of the year to assess water quality under varying pollution conditions. The February survey was chosen to coincide with a period of high rainfall while the

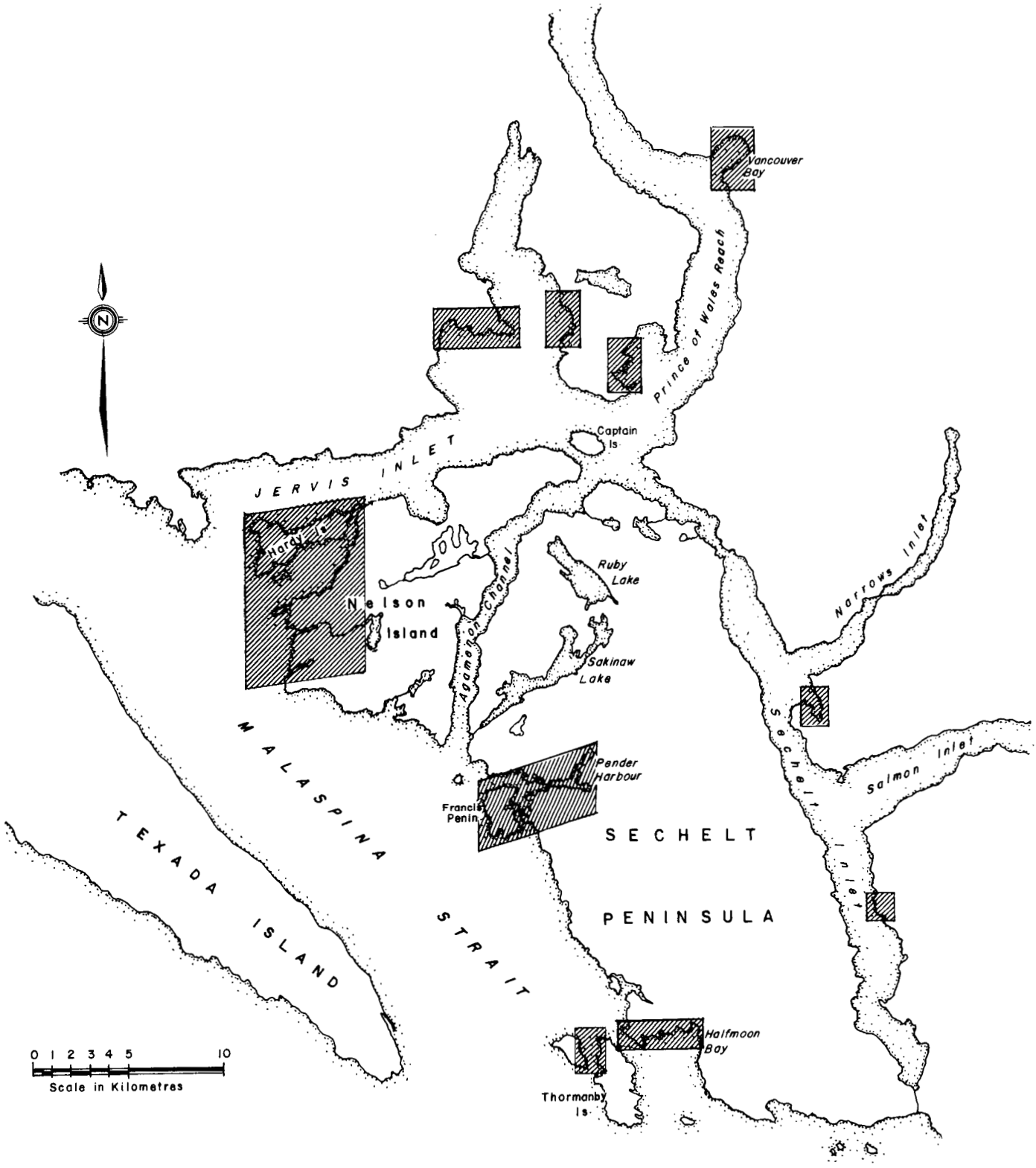

FIGURE 6 STUDY AREA II

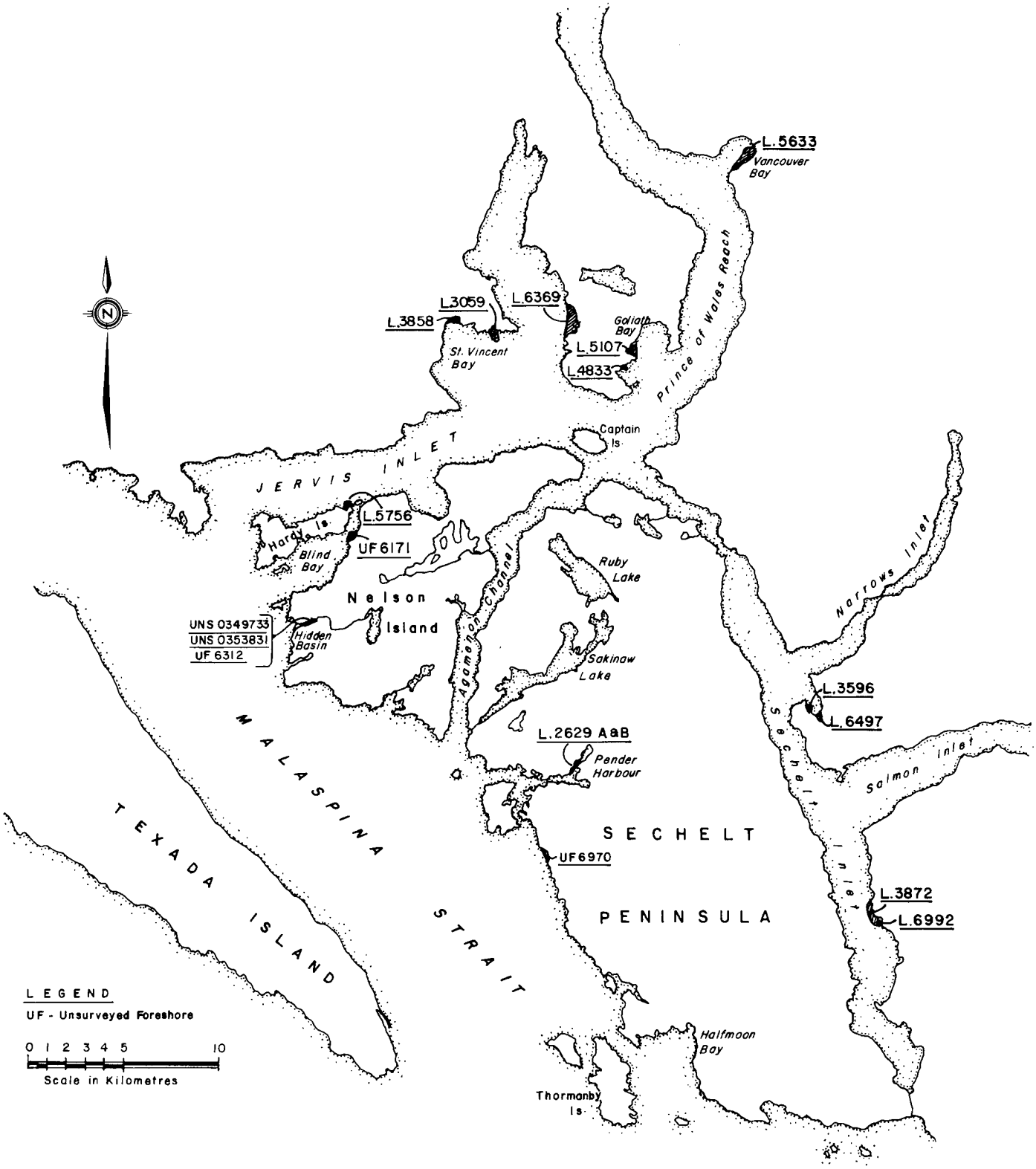

FIGURE 7 OYSTER LEASE LOCATIONS - STUDY AREA II

summer survey was conducted to determine the effect of increased boating activity and summer home occupancy on shellfish growing water quality.

Total rainfall during February was 78.8 mm, less than the normal mean of 101.8 mm. Conversely, rainfall during the summer survey amounted to 52.3 mm, slightly higher than the normal mean of 42.9 mm. The effects of rainfall and other physical parameters on bacteriological water quality are discussed in subsequent sections.

The median and 90 percentile values for each station were calculated from combined data from both the February and August sampling periods, although data from each survey period will be discussed separately in subsequent sections.

4.2.1 Vancouver Bay (Stations 1-7)

All the marine stations over shellfish lease L.5633 met the shellfish growing water quality standard. This lease is owned by B.C. Forest Products Ltd. which operates a private lodge at the head of the bay. Sewage from the lodge is disposed of on land and the system was functioning properly during our investigation.

The three freshwater inputs showed little fecal contamination.

4.2.2 Goliath Bay (Stations 8-12)

The water quality over shellfish leases L.5107 and L.4833 all met the shellfish standard.

Freshwater station S4 showed no fecal contamination and no other sources were evident.

4.2.3 Granville Bay (Stations 13-19)

All marine stations over shellfish lease L.6369 met the shellfish growing water quality standard. Station 18 showed some fecal contamination

during August 1981 and was influenced by freshwater station S5.

Freshwater station S6 demonstrated some fecal coliform contamination but appeared not to influence the nearby marine stations. The contamination source for the freshwater stations was not determined.

The uplands area is occupied by five mobile homes and a shellfish processing plant. Adjoining the processing plant were living quarters, which had no internal connection with the plant. The quarters were only occupied during the August-September survey. The plant was used for sorting, packing etc. of shellfish. The sewage system for the house is a septic tank and absorption field.

4.2.4 St. Vincent Bay - Totem Oyster Co. (Stations 20-31)

The Totem Oyster Co. operation includes shucking, washing and packing of oysters. In July 1980, the federal Fish Inspection Branch conducted a survey of the plant and oyster lease to determine the source of high fecal levels in shellfish. This survey found evidence of fecal contamination in places such as the floor on the inside entrance, floor of the packing room, shucking table, liquid on the shucking room floor and in bird droppings near the shucking plant. The plant was also being used as an abbattoir for warm-blooded animals. The aforementioned resulted in several recommendations such as removing the bird nests around the plant and disinfecting the area, provide a disinfecting footbath, disinfecting the floor area where shellstock awaiting processing is stored, and prohibiting the processing of warm blooded animals.

The Fish Inspection Branch also analysed water and shellstock samples from the lease area. They found high levels of fecal coliforms in water fronting the shucking plant, (G2400 MPN/100 ml) and off the island just north of Junction Island (240/100 ml). One shellstock sample off the N.W. tip of Junction Island exceeded the standard and had a fecal count of 790/100g.

Subsequent to the Inspection Branch survey, and following changes in processing procedures and plant operation, EPS sampled the lease area as

part of the growing water survey of the entire area. Our study found that all marine stations met the shellfish growing water quality standard, with the exception of station 27. Station 27 was located off the Totem Oyster Co. shucking plant and the highest fecal coliform levels were found in the February survey. The fecal contamination was sporadic and the agricultural area and outhouse behind the shucking plant were possible sources of contamination. Previous work conducted by the Federal Fish Inspection Branch also implicated these sources as a cause of contamination.

4.2.5 St. Vincent Bay - Seaman Hope Fisheries (Stations 32-42)

Shellfish leases UF 3257 and UF 3858 were surveyed and all marine stations met the shellfish growing water standard. Elevated fecal coliform counts were observed at stations 35 and 36 during the August-September survey with counts of 33 and 27/100ml MPN, respectively. These stations were located at the head of the bay north of Seaman's house near freshwater input S8 which was implicated as the source of contamination. Samples collected at the mouth of the creek averaged a fecal count of 88/100ml while samples taken on a single occasion upstream at 35, 50 and 70 metres had counts of 390, 42 and 3/100ml respectively. The source of contamination to the creek was not determined. The remaining freshwater inputs showed no contamination.

Shellstock samples previously collected by Fish Inspection in the vicinity of the processing plant (formerly W&K Shellfish) were found to be contaminated. The source of contamination was not determined by Fish Inspection or EPS. The plant was not operating during the EPS surveys and no sewage sources were identified.

4.2.6 Hardy Island (Station 43 to 47)

All marine stations met the shellfish growing water standard over shellfish lease L.5756. Low levels of fecal coliforms were evident during the August-September survey with the highest counts for all stations occurred on August 25. Rainfall occurring on the previous day and the day of

sampling may have resulted in surface runoff contaminating the surrounding waters.

There were no freshwater stations in this area.

4.2.7 Telescope Passage (Stations 48-53)

All marine stations met the shellfish growing water quality standard. Low levels of fecal coliforms were evident during the August-September survey for stations 50-53, which are located over oyster lease UF 6171 (Blind Bay Enterprises). Station 51 had the highest count of 27/100ml MPN and was located in a bay behind the Ray Lipp residence of Blind Bay Enterprises. The source of contamination was not determined. A dye test was carried out to find the sewage outfall terminus from the Lipp residence however the dye was not observed indicating the sewage plume did not reach the surface.

Marine samples were also collected near the Pacific Coho Floating Resort, which was anchored north east of Blind Bay Enterprises. The resort discharges sewage to the marine environment after undergoing treatment in two septic tanks. Sewage then passes to a holding tank and is reportedly released on an ebb tide. The discharge frequency is dependent on resort use and the operators discretion. There were no guests during the sampling period but the resort operators were present. Twelve marine samples were collected and one had a high count (170/100ml MPN). However, this sample was collected at the opposite end of the septic/holding tanks and subsequent biochemical analysis showed the bacteria to be of the Klebsiella group. There is therefore some doubt as to the sanitary significance of this high fecal value. All other samples ranged from L2 to 2/100ml MPN. (Note: these stations were not assigned location numbers).

4.2.8 Blind Bay (Stations 54-58)

All marine stations met the shellfish growing water quality standard with the exception of station 54. The source of fecal contamination

at this station was a sewage line that originated from the home above and discharged directly into the marine environment.

Stations 55-58 were sampled to assess boat anchorage area water quality. The presence of boats in the vicinity of the marine stations did not have any impact on fecal coliform levels. Boat counts were generally low, the highest number being seven. The highest fecal count was 17/100ml MPN on August 20 for station 57 and no vessels were anchored nearby.

Background samples taken in the middle of Blind Bay at various locations were not contaminated.

The one freshwater station S12 located by marine station 58 showed no contamination.

4.2.9 Hidden Basin (Stations 59-71)

All marine stations met the shellfish growing water standard with the exception of stations 64 and 68-70. Two oyster leases located in Hidden Basin were the most heavily sampled.

Stations 59-61, located at lease UNS 0353831, were sampled during the summer only and were of acceptable water quality. Off-bottom oyster culture techniques are used on this lease making the shellfish less susceptible to surface runoff contamination.

The second oyster lease, UNS 0349733, located at the north end of Hidden Basin, may be subject to fecal contamination from an unknown source. A single dwelling in the vicinity was occupied during the summer survey however dye-testing of the sewage disposal facilities (septic tank-tile field) proved negative. Stations 62-65 were sampled in this area during February and August-September. Significant fecal contamination was observed at stations 62, 63 and 64 in February, with stations 62 and 64 exceeding the growing water standard. Subsequent sampling in the summer showed that all stations met the standard, although fecal contamination was still evident. Since the source(s) of contamination was not identified but was apparently influencing the water quality at all stations to some

extent, the overall water quality at this location was evaluated by combining the data collected at all stations (62-65) during both summer and winter. The results are shown as follows:

	Combined	Summer	Winter
Median (MPN/100ml)	2.5	2.0	4.5
90 percentile (MPN/100ml)	33.0	15.8	42.6

This data shows that the shellfish growing water standard is met at all times of the year, although winter data very nearly exceeds the 90 percentile limit of 43/100ml. The problem of fecal contamination was further substantiated when a mixed clam sample collected during the summer yielded a fecal coliform MPN of 2200/100g. The contaminated area lies outside the legal lease boundaries.

The vicinity of marine stations 68-70 was more contaminated during the February survey than in summer. The fecal coliform counts for these stations ranged from L2-22/100ml MPN during the summer and 2 to G1600/100ml MPN during the winter. The source of contamination was identified as a broken sewer line on land.

During the February survey rainfall occured prior to the sampling period and on each sampling day resulting in sewage from the broken line being washed into the marine receiving waters. During the summer this effect was not observed.

4.2.10 Cockburn Bay (Stations 72-74)

All marine stations met the shellfish growing water quality standard. Low levels of fecal coliforms were evident during the February survey. Possible sources of contamination were the freshwater inputs S17 and S19, which showed some contamination. The source of contamination of the freshwater stations was not determined. This area was not surveyed in August.

4.2.11 Gunboat Bay (Stations 75-86)

This area is presently under a Schedule I closure, and was surveyed to re-evaluate water quality over two active leases, 2629A and 2629B.

Gunboat Bay had previously been surveyed by EPS in 1974 (1) at which time fecal pollution of the receiving waters was attributed to contaminated freshwater inputs. Animal fecal matter was implicated as the source since the freshwater streams passed through grazing lands. A subsequent survey conducted in August and September 1977 by the provincial Pollution Control and Health Branches (8) concluded that the sources of contamination to these streams likely resulted from pigpens and livestock in the drainage area. Dye studies conducted on residential ground disposal systems in Gunboat Bay proved negative for homes close to the creeks, although 6 homes along the shoreline were identified as having direct discharges or malfunctioning disposal systems. A follow-up survey was conducted by the Ministry of Health (9) in 1978 to investigate improvable lots or alternate sewage disposal methods for those lots identified as having problems in the 1977 survey. Additional bacteriological sampling of the creeks entering Gunboat Bay was also undertaken. This sampling program further implicated substantiated animals as the source of fecal pollution rather than malfunctioning ground disposal systems in the creek drainage areas.

During the August survey fecal contamination was observed at all stations in Gunboat Bay. Grouped summer MPN data for marine stations 75-84 exceeded the shellfish standard with a median of 9.5/100ml and a 90 percentile of 79.0/100ml.

Although not sampled to the same extent during February, Gunboat Bay also exhibited fecal contamination at stations 77 and 78. Several freshwater samples were collected at the head of Gunboat Bay, including Kleindale Creek and Anderson Creek. These stations (S20-S32) eventually enter the head of the north arm (S20-S28) or east arm (S29-S32)

and all showed evidence of fecal contamination. The sanitary survey and previous investigations (8, 9) indicated that much of the upland area is farmland. The FC:FS ratio in station S24 supports this observation, with a value less than 0.7, indicating animal sources.

The fecal coliform levels of the marine stations reached their highest levels on September 1, 1981. The preceeding day's rainfall of 22.4mm suggests surface runoff contributes fecal coliforms to the bay. The highest fecal counts were observed at stations 84 and 86, with counts of 540/100ml MPN and 920/100ml MPN, respectively. These sample stations are located at the head of the north and east arms of Gunboat Bay and reflect the degradation in water quality caused by rain- induced runoff from the upland areas. The freshwater inputs at the head of the two arms may have also been responsible for the contamination noted at stations 75, 76, 79 and 81, although stations 80 and 83, located on a centre line of the north arm were not as highly contaminated as these other stations. This suggests that other unidentified sources, in addition to Kleindale and Anderson Creek, may have been responsible for the unacceptable coliform levels observed.

4.2.12 Churchill Bay (Stations 87-91)

All marine stations in Churchill Bay met the approved growing water standard during both the winter and summer sampling periods, although fecal contamination was evident in all stations during the winter sampling. The bay receives drainage from a field area reportedly used for grazing cattle and horses. Freshwater station S33, which flows through this field, was sampled in February, and had a mean FC count of 38/100ml. However, this low level contamination was not observed in the immediate receiving waters and during summer sampling the freshwater source was not flowing.

Churchill Bay had been used as an oyster relay area by the Oyster Bay Oyster Company prior to August 1980. However oyster samples collected from Churchill Bay by the Fish Inspection Branch on August 6, 1980 had FC

counts of 140,490 and 50 per 100g of tissue and a subsequent sample collected on August 29, 1980 yielded an FC count of 700/100g. As a result of these high FC levels in the oyster meat, the practice of relaying oysters to Churchill Bay was discontinued.

Although the EPS sampling indicated growing water standards were being met in Churchill Bay, drainage from the grazing field could contaminate shellfish during low tide and was the probable cause of high tissue FC levels recorded by Fish Inspection.

4.2.13 Harness Island (Stations 92-99)

Shellfish lease L.6970 was surveyed during the summer only and all stations met the approved growing water standard. Marine station 96 had the highest fecal count of 33/100ml MPN, most probably due to Haslam Creek (S34), which had a mean fecal count of 66.5/100ml. The origin of fecal contamination to Haslam Creek was not determined. Freshwater stations S35 to S37 were also contaminated but at low levels, (mean FC values of 31.7, 14.7 and 17.7/100ml respectively).

Three marine stations, (92-94) were established to determine the influence of a sewage outfall from Dahlex Holdings Ltd., which services 7 homes. Sewage from this development is treated in an activated sludge batch plant and discharged through a 52m long outfall terminating in 15m of water. The maximum permitted daily discharge is $5.43m^3$. The marine samples collected over the outfall did not detect the sewage, nor was sewage observed at foreshore stations 93 and 94 collected on a flood tide.

4.2.14 Secret Cove (Station 100)

This area is presently under Schedule I closure and was not extensively sampled. Sources of sewage contamination to Secret Cove have previously been described (2).

One marine sample station (100) was established south of Turnagain Island to obtain background levels of fecal coliforms over a new outfall. The outfall combines the sewage and wastewaters from Secret Cove Marina and the Jolly Roger Inn. Sewage was not detected at this location during the sampling program.

4.2.15 Smuggler Cove (Stations 101-103)

Smuggler Cove is a provincial marine park and a popular boat anchorage area. The marine stations here did not meet the shellfish growing water standard.

Sample stations for water and shellstock were established to determine the impact of vessel discharges. The number of boats present in Smuggler Cove during the sampling period ranged from 7 to 23. On August 22, 1981 marine stations 101-103 had their highest fecal counts of 110,240 and 130/100ml MPN respectively, coincident with the greatest number of boats.

In addition to water samples, shellstock samples were analyzed and contamination was evident. The range for all shellstock samples was from L20 to 490/100g MPN. The only identified source of contamination was the overboard discharge of sewage from anchored vessels in the vicinity of the collection sites.

Smuggler Cove was last surveyed in 1974(1) by the Environmental Protection Service and was also subject to sewage contamination from vessel discharges at that time, although shellfish growing water standards were met.

4.2.16 Halfmoon Bay (Stations 104-115)

Sampling in Halfmoon Bay was confined primarily to the Brooks Cove, Frenchman's Cove and Priestland Cove areas, as these were the major identified shellfish areas. All marine stations with the exception of 105

and 114 met the approved growing water standard, although contamination was noted at stations 104,108,109,110,111,112 and 113.

Halfmoon Bay has considerable residential development along the foreshore and several new subdivisions are in the planning stages or are being constructed. Presently, most sewage disposal is accomplished by on-site ground disposal systems however one marine sewage outfall discharges to the bay and three additional outfalls have been approved by the provincial Waste Management Branch. Pertinent details of these permits are given below.

Permitted Sewage Discharges to Halfmoon Bay

Permit Holder	Permit No.	Maximum Daily Flow(m^3)	Treatment	Status
Halfmoon Bay Properties	PE-5779	200	secondary	not constructed
Ovalle & Marshall	PE-6041	3.5	septic tank	not constructed
Halfmoon Bay Developments	PE-375	200	secondary	constructed
Brynelson-Benzon Realty	PE-5184	95	secondary	not constructed

Receiving waters in the vicinity of the existing discharge (PE-375, STP 2) were not sampled due to the absence of a shellfish resource. However, the operation of the treatment plant was observed during both winter and summer surveys and this information is presented in Appendix VIII. The source(s) of contamination to stations 104 and 105 was not identified although high fecal levels were observed only during the summer survey. The increased boating activity and summer occupancy of homes may have been responsible for the observed contamination. In addition, two houseboats were anchored in this area (known locally as Frenchman's Cove) and both were occupied. The methods of sewage disposal on the houseboats were not positively determined although one occupant reportedly used shore facilities.

Fecal coliform levels in stations 111-113 ranged from L2 to 33/100ml, with the slightly higher levels noted during the winter survey. Sample station 114 exceeded the growing water standard and the contamination was attributed to a raw sewage discharge from a dwelling onshore. Fecal pollution was also noted in freshwater station S42, entering at this location. The high fecal levels in station 114 were only recorded during the summer survey.

4.2.17 Buccaneer Bay (Stations 116-120)

All marine stations met the shellfish growing water quality standard with the highest FC count being 17/100ml.

The area was also surveyed by EPS in 1974 (1), and the study concluded that boat anchorage and summer residence occupancy did not result in contamination of the clam beds in the bay.

4.2.18 Sechelt Inlet (Stations 121-128)

Two shellfish leases, L.6992 and L.3872, were sampled and all marine stations met the shellfish water quality standard except station 121 where FC counts of 46 and 540/100ml were recorded. All stations had evidence of fecal contamination. There was no development or freshwater inputs in the area and these high values may have resulted from a heavy rainfall which occurred on August 31. In fact, the highest fecal coliform counts at all stations were observed on August 31, 1981, coincident with a 22.2mm rainfall in a 24 hour period. The amount of rainfall in such a short period, and resultant landwash, may have contributed to the elevated fecal coliforms observed. Another possible source of contamination was a harbour seal which was repeatedly observed in the vicinity of the leases.

4.2.19 Storm Bay (Stations 129-140)

All marine stations met the shellfish growing water quality standard over shellfish leases L.3596 and L.6497, with the exception of station 131 which was skewed by one high count of 1600/100ml MPN. All stations showed some level of contamination with the highest levels observed on August 31 and September 1, 1981 coincident with heavy rainfall. The total rainfall was 28.7mm in 48 hours. The two freshwater inputs (S46 and S47) had no significant impact on the levels of fecal coliforms in the marine receiving water. Other possible sources of contamination were the homes located along the east shore, but fecal coliform levels there did not indicate the presence of sewage sources in this area.

4.3 Area III - Ucluelet Inlet and Tofino Areas

Sampling in Study Area III was conducted from February 8-25, 1982. The sampling areas are shown in Figure 8 and oyster lease locations are shown in Figure 9. During the survey 388 marine samples were collected from 86 sampling locations. The sampling program was limited due to poor weather and local power outages which prevented completion of two sets of analyses.

Rainfall recorded by the Atmospheric Environment Service at Tofino Airport between February 8-25, 1982 amounted to 644.0 mm compared with 527.5 mm recorded by EPS personnel at the Mackenzie Beach Resort. Both values exceed the historical monthly precipitation average of 326.6 mm (10). The effect of rainfall on water quality was difficult to assess due to insufficient data; however, fecal coliform levels in Ucluelet Inlet increased as the survey progressed, coincident with more intensive rainfall (Table 1).

4.3.1 Ucluelet Inlet

Ucluelet Inlet has been under shellfish closure since 1972 due to discharges from numerous raw and septic tank outfalls, moored vessels and fish processing plants. The background associated with sewage disposal in Ucluelet is described in detail elsewhere (11). Briefly, the Village of Ucluelet installed a sanitary sewer system in 1967 to collect septic tank effluent and discharge it to Ucluelet Inlet through a series of eight marine outfalls. At that time each outfall was registered with the Pollution Control Board however only one outfall, located at the foot of Bay Street, had an effluent discharge permit (PE-207). This permit is still in effect and allows the discharge of 130 m^3/day of untreated domestic sewage through this outfall. In 1979 the Village embarked on an outfall consolidation program which has resulted in the diversion of two raw sewage outfalls (Lyche Road and Hemlock Street) to the Bay Street

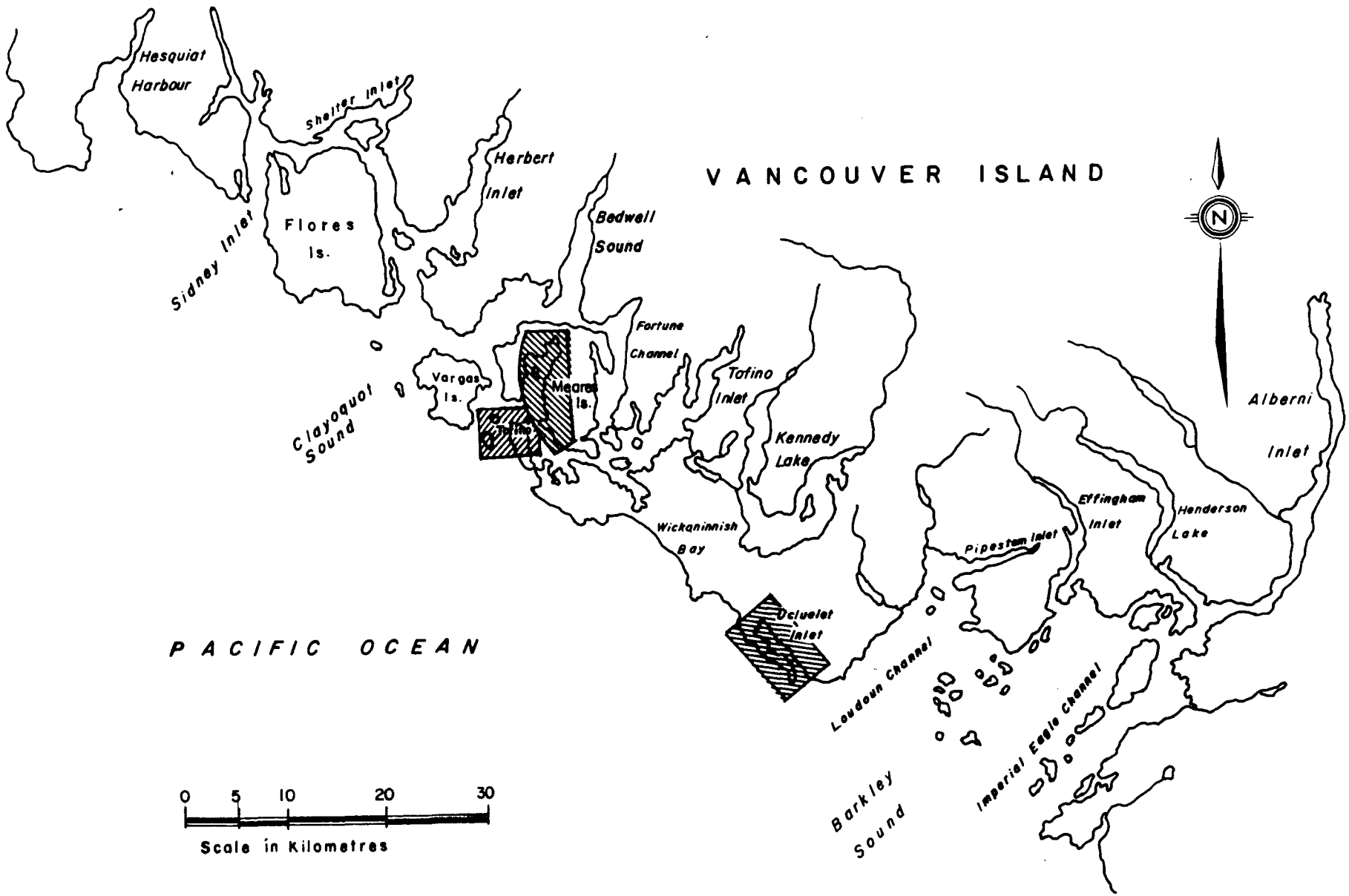

FIGURE 8 STUDY AREA III

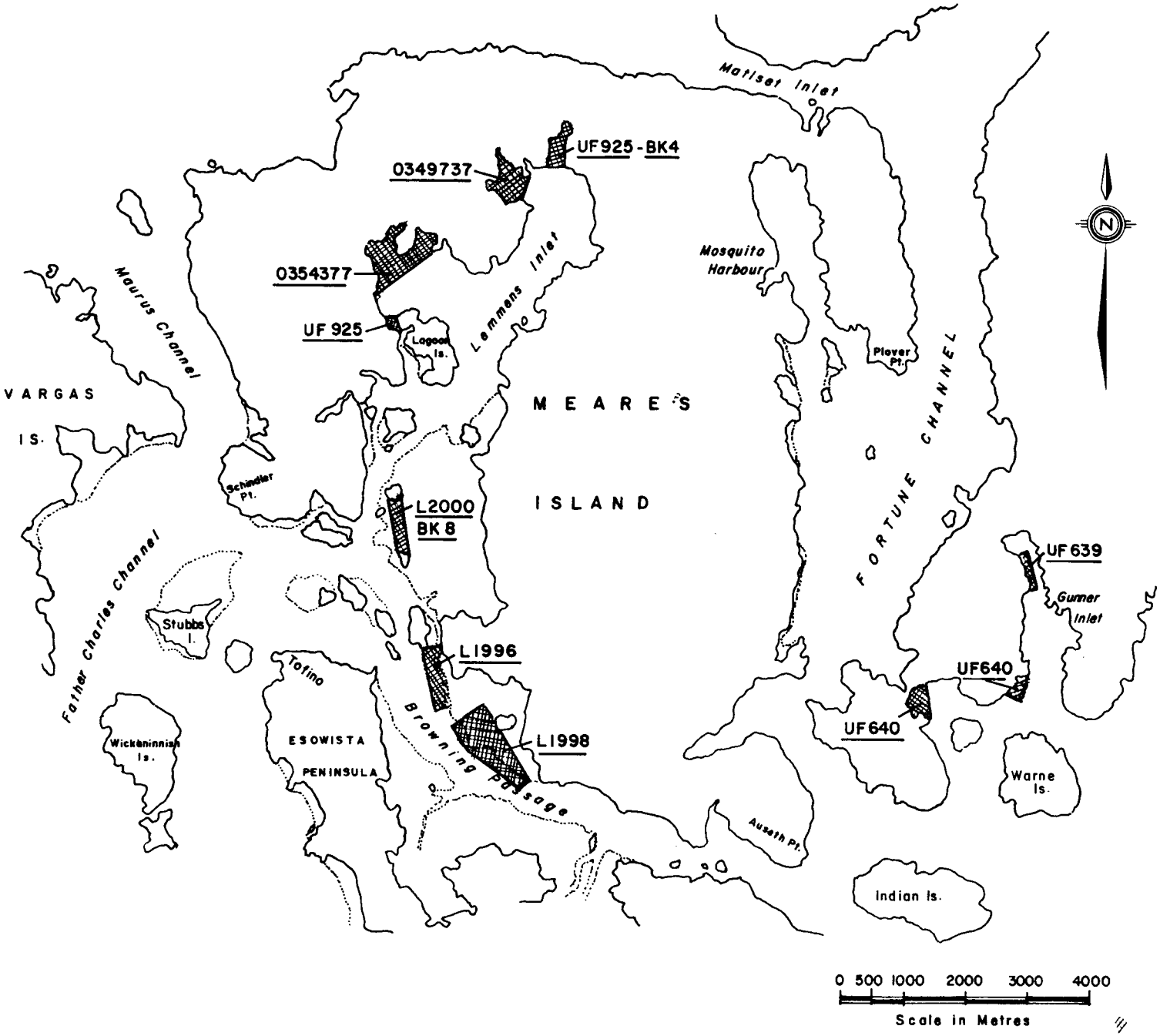

FIGURE 9 OYSTER LEASE LOCATIONS - STUDY AREA III

outfall (11). The present volume discharged through PE-207 represents in excess of 50% of the total Village sewage flow with the remainder being discharged through outfalls at Eber Street, Alder Steet, Garden Street, Alma Street and Cedar Street. These outfall locations are shown in Appendix V, Figure 2.

In July 1981 the Village applied for a new permit to construct sewage holding ponds and a sewage outfall to discharge during the ebb tide into Ucluelet Inlet. Construction of these works would elminiate the existing multiple discharges and consolidate the discharge at a point 230 m northeast from the northern tip of Hyphocus Island. At the time of writing this application was still under review and consideration has been given to relocating the outfall to a point off the southern tip of Hyphocus Island (pers. comm.).

Effluent discharge permits are also held by two fish processing plants; Central Native Fisherman's Co-op (PE-3430) and Trans-Pacific Fish Ltd. (PE-3301). In addition, 6 fish buying stations also have discharges to the inlet. The effluent disposal practices of the fish processing plants and buying stations have been reviewed by Hatfield (12) and are summarized in Table 5. During the survey these plants were not operating.

Additional sewage discharges into Ucluelet Inlet include raw outfalls serving individual residences and a marine outfall discharging septic tank effluent from the Ittatsoo Indian Village, located across the inlet from Ucluelet.

As a result of the considerable background information available for this area (reviewed in ref. 11), sampling of the Village of Ucluelet sewage outfalls was not undertaken during this survey. However, extensive marine sampling was conducted to assess the bacteriological water quality and determine the adequacy of the present Schedule I shellfish closure. Of the forty-four sample stations established in Ucluelet Inlet, only 6 met the shellfish growing water standard. The remainder of the stations, with the exception of 8, 10, 13, 15, 20, 31, 32, 34 and 40, were continuously polluted with respect to the shellfish standard (i.e. the median fecal

coliform MPN exceeded 14/100 ml). The highest fecal coliform levels were observed along the western shoreline with decreasing levels along the centre line and eastern shoreline respectively. This data is shown in Table 2.

TABLE 2. MEDIAN FECAL COLIFORM LEVELS AT UCLUELET INLET STATIONS (MPN/100 ml)

Western Shore		Centre Line		Eastern Shore		
240	(station 11)	5	(station 10)	23	(station 9)	
79	(" 12)	7	(" 13)	23	(" 14)	
130	(" 17)	49	(" 16)	11	(" 15)	
33	(" 18)	49	(" 19)	7	(" 20)	
170	(" 22)	23	(" 24)	49	(" 21)	
79	(" 23)	27	(" 27)	33	(" 25)	
21	(" 28)			33	(" 26)	
107.4		26.6		25.6	-geometric mean	cumulative
81.0		19.3		21.6	-arithmetic mean	
79		25		23	-median	

This data is consistent with the known sources of sewage pollution, most of which are located along the western shoreline within the boundaries of the Village of Ucluelet.

The influence of tides on water quality in the Inlet was examined and the results are presented in Table 3. In this analysis data was combined from sample stations in each sampling area (west, centre, east)

TABLE 3. INFLUENCE OF TIDES ON UCLUELET INLET WATER QUALITY

	High Slack			Flood			Ebb		
Location	50 pct[1]	90 pct[2]	n	50 pct	90 pct	n	50 pct	90 pct	n
West shore	33	114.7	13	240	G1600	9	70	749	23
Centre	5	37.8	17	17	33	14	41	146	24
East shore	64	134	19	27	36.2	8	2	7.1	13

[1] median
[2] percentile

according to the state of the tide at the time of collection. In all cases except two, the approved shellfish growing water standard was exceeded in all areas on all stages of the tide. The poorest water quality was measured along the western shore on the flood tide. However, these high fecal coliform levels may have been more a function of rainfall than tidal conditions as all flood tide samples were collected on February 12 coincident with a 24-hour rainfall of 93.4 mm.

Linear regression analysis was performed on grouped MPN data to examine the variation of MPN's against rainfall and salinities. The data is presented in Table 4.

TABLE 4. REGRESSSION COEFFICIENT ANALYSIS-UCLUELET INLET

Y	X_1	X_2	X_3
West shore	0.48	0.06	0.07
East shore	0.19	0.41	0.35
Centre	0.03	0.43	0.38
Stuart Bay	0.08	0.46	0.72
Spring Cove	0.14	0.27	0.61
All Inlet station (6-32)	0.21	0.07	0.05

Where Y = MPN/100 ml for each station in sampling area

X_1 = 24 hour rainfall (mm)

X_2 = antecedent 24 hour ranfall (mm)

X_3 = salinity (ppt)

Note: r values are absolute value

The regression coefficient values are, in most cases, too low to be considered significant. However, the data for Stuart Bay shows a reasonable correlation (r = 0.72) between fecal coliform levels and salinity. In this case there is an inverse correlation: high fecal coliform values occur with low salinities. This is consistent with the sources of fecal pollution being associated with freshwater. The poor correlations observed with rainfall may be due, in part, to a lack of sufficient time-series rainfall data.

4.3.1.1 Head of Ucluelet Inlet. Sample stations were not established in this area due to its exclusive use as a log dumping, sorting, and booming area. Data from marine stations 1 and 5 indicated fecal coliform levels increased as one approached the Ucluelet townsite. No sources of contamination were observed at the head of the inlet and samples taken at the major creeks (Smith Creek - S1, Thornton Creek - S3 and Mercantile Creek - S4) showed low levels of fecal coliforms, the highest mean value being 11/100 ml.

4.3.1.2 Ucluelet Inlet East Shore (Stations 8-37). All marine stations located along the eastern shoreline exceeded the approved shellfish growing water standard, although no sources of fecal contamination were positively identified. Freshwater stations S6, S7, S8, S9 and S10 in this area did not exhibit significant fecal coliform levels. The major population centre on the east shore is the Ittatsoo Indian Reserve, since much of Port Albion has now been abandoned. The sanitary survey in Port Albion found only two homes and one houseboat occupied, none of which were implicated as pollution sources. The Ittatsoo Indian Village has approximately 45 homes and 300 residents. Twelve homes are reportedly serviced by septic tanks and on-site ground disposal while the remainder are connected to a sewer system with marine outfall. Homes connected to the sewer system have individual septic tanks leading to a large holding tank which discharges through a 274 m outfall to the middle of the inlet near Native Islet.

Neither the on-site disposal systems nor the outfall were positively identified as pollution sources to the eastern shoreline. Dye added to the outfall was not observed in the inlet indicating it did not surface.

4.3.1.3 Ucluelet Inlet West Shore. All marine stations with the exception of 38 and 39 exceeded the approved shellfish growing water standard. Stations 38 and 39, while showing some evidence of fecal contamination, were too far removed from the pollution sources to become polluted to unacceptable levels.

The source(s) of contamination to Spring Cove (stations 40-44) was not identified. The area can be used extensively by fishing vessels unloading fish at the B.C. Packers Plant however this was not observed during the survey. There are approximately 5-6 homes in the vicinity of marine stations 41 and 42 which are not connected to the Village of Ucluelet sewage collection system. There was no evidence of sewage contamination from these homes.

The remainder of the western shoreline was highly contaminated with sewage. In addition to the sewage sources described in Section 4.3.1, a beach survey located 16 separate sewage discharges from private residences and several more storm culverts and freshwater inputs. Some of the storm culverts were sampled (S12-S16) and all showed evidence of fecal contamination. The drainage in these culverts had very low FC:FS ratios which can be indicative of animal sources of fecal pollution. However, the drainage area is exclusively urban, the only animal sources being domestic pets. Therefore the low ratios are most probably the result of differential die-off rates of fecal coliforms and fecal streptococci. Since some of the homes in the townsite are not connected to the sewer (particularly in the drainage area for S14), the fecal contamination observed probably resulted from septic tank-tile field seepage and therefore did not give ratios representative of fresh human fecal pollution.

TABLE 5 SUMMARY OF FISH PROCESSING OPERATIONS-UCLUELET

NAME OF OPERATION	DOMESTIC SEWAGE	PROCESS EFFLUENT	WMB PERMIT NO.	DISCHARGE VOLUME (m^3/day)
Trans Pacific Fish Ltd.	Septic tanks & tile field system	Fine screening and extended outfall pipe	3301	165
Ucluelet Fishing Co. Ltd.	Discharged directly into the Inlet	Discharged directly into the Inlet	none*	
? Harry L. Ostergaard & Son Ltd.	Septic tank under dock with overflow to the Inlet	Discharged directly into the Inlet	none*	
Central Native Fishermen's Cooperative	Septic tank with overflow to process effluent disposal outlet pipe	Fine screening and extended outfall pipe	3430	186.5
Neptune Packers Ltd.	Septic tank on shore with overflow into the Inlet	Discharged directly into the Inlet	none*	
Prince Rupert Fisherman's Cooperative Ass'n.	Discharged directly into the Inlet	Discharged directly into the Inlet	none*	
? McCallum Sales Ltd. Turtle?	Septic tank on shore with overflow into the Inlet	Discharged directly into the Inlet	none*	
B.C. Packers., Spring Cove	Septic tank on shore with overflow into Spring Cove	Discharged directly into Spring Cove	none*	

*These are fish buying stations which discharge small quantities of waste water and have not historically required a Waste Management Branch permit.

During the survey none of the fish processing (2 plants) or packing (6 plants) facilities were operating (Table 5). Sewage discharges from these sources and vessels docking at these facilities may cause water quality deterioration beyond that observed during the survey.

4.3.2 Browning Passage, Meares Island and Tofino

Sampling in this portion of the study area was confined to commercial oyster leases in Lemmens Inlet and Browning Passage, and in the immediate vicinity of the Village of Tofino. Water quality was generally good with only two stations exceeding the shellfish growing water standard. Oyster leases in Gunner Inlet (UF 639 and UF 640) and along the east shores of Meares Island (L. 2020) were surveyed but were not sampled due to the absence of pollution sources.

4.3.2.1 Browning and Duffin Passage (Sample Stations 45-66). Marine sample stations were established in Browning Passage to assess water quality at 2 oyster leases (L. 1998 and L. 1996) and determine the impact of sewage discharges from the Village of Tofino on water quality. Only marine stations 63 and 65 were contaminated with fecal pollution beyond acceptable shellfish growing water standards. Neither of these two stations was located in a shellfish production area.

The existing sewage works for the Village of Tofino have been described at length by Motherwell (13), while waste water handling practices of fish processing and buying plants in Tofino have been investigated by Hatfield (12). This information is summarized in Table 6.

Bacteriological sampling of the Tofino Harbour area has previously been conducted by EPS and WMB and the results are summarized in Table 1. Coliform levels obtained during the 1982 survey were generally lower than previous studies, although both EPS and WMB data collected along the shoreline in the vicinity of PE-3287 indicated sewage was not reaching the shore. During the various fishing seasons, fecal coliform densities would likely increase in the harbour area due to overboard sewage

discharges from moored vessels and discharges from the fish processing operations which, incidentally, were not operating during this survey.

The water quality offshore of the Village in the vicinity of Beck, Stone and Neilson Islands was not affected by the discharges of sewage from Tofino.

4.3.2.2 Meares Island. Sampling on Meares Island was confined to 5 oyster leases and water quality over all leases was excellent with no pollution sources being observed. Freshwater sample stations S19-S25 were not contaminated, with fecal coliform means ranging from 0/100 ml to 11/100 ml.

TABLE 6 SUMMARY OF DISCHARGES ORIGINATING WITHIN THE VILLAGE OF TOFINO

PERMIT HOLDER AND/OR NAME OF OPERATION	DISCHARGE LOCATION	DISCHARGE VOLUME (m^3/day)	PERMIT NUMBER	TYPE OF DISCHARGE	MAP REF[1]
Village of Tofino	First St.	unknown	none	septic tank effluent from 18 properties	e
"	Second St.	unknown	none	septic tank effluent from 16 properties	g
"	Third St.	unknown	none	septic tank effluent from 10 properties	i
"	Fourth St.	160.0	PE-443	septic tank effluent from 40 properties	j
"	Chesterman St.	42.5	PE-4303	septic tank effluent	a
Gibson System	Fourth St.	unknown	none	septic tank effluent from 4 properties	k
Tofino Hospital Society	Neill St.	23.3	PE-3287	septic tank effluent	b
B.C. Packers	Browning Passage	1360.0	PE-2707	fish processing	f
"	"	4.55	"	septic tank	
"	"	3268.8	"	cooling water	
"	"	1641.6	"	cooling water	
J. Griffin & Co.	Browning Passage	55.0	PE-5039	wash-down water and septic tank effluent	j
Canako Sea Products	Browning Passage	40.0	PE-1570	seafood processing effluent and septic tank effluent	o
Tofino Packing Co. Ltd.	Browning Passage	unknown	none	wash water	d
McCallum Sales	Browning Passage	unknown	none	wash water, septic tank overflow	h
Vancouver Shellfish Co.	Browning Passage	unknown	none	septic tank effluent, wash water	l

[1] see Figure 5, Appendix V

TABLE 7 TOFINO AREA MARINE BACTERIOLOGICAL SUMMARY

STATION LOCATION	SAMPLING AGENCY	COLLECTION DATE(S)	FECAL COLIFORM MPN/100 mL				1982[1] STATION	FECAL COLIFORM MPN/100 mL			
			No. of Samples	Range	Median	90 pct.		No. of Samples	Range	Median	90 pct.
First street gov't dock	EPS	August 1976	5	8-G1600	79	G920.0					
Coast Guard dock	EPS	August 1976	5	11-170	33	140.0	63	4	L2-130	17.5	91.2
6th street dock	EPS	August 1976	5	5-1600	33	839.5	51	4	L2-8	5.	8.
Olsen Road dock	EPS	August 1976	5	2-17	9	15.0					
Channel marker - Browning Passage	EPS	August 1976	4	2-11	6.5	9.8	50	4	L2-7	3.5	6.2
50m east of PE-443 outfall (shore)	WMB	15.04.75-16.08.78	5	L2-79	13	56.0	57	4	L2-49	2.5	31.4
50m west of PE-443 outfall (shore)	WMB	15.04.75-16.08.78	5	L2-49	13	49.0	57	4	L2-49	2.5	31.4
at shoreline PE-443	WMB	15.04.75-16.08.78	4	L2-26	5	18.8	57	4	L2-49	2.5	31.4
over outfall line PE-3287	WMB	15.04.75-14.03.79	7	2-G2400	130	G2400.0					
65m west of PE-3287 (shore)	WMB	14.07.77-16.08.78	3	2-8	2	—	68	3	L2-5	2.	4.1
65m east of PE-3287 (shore)	WMB	14.07.77-16.08.78	3	L2-5	2	—	67	3	L2-L2	L2.	L2.

[1]nearest sample station collected in Feb. 1982

ACKNOWLEDGEMENTS

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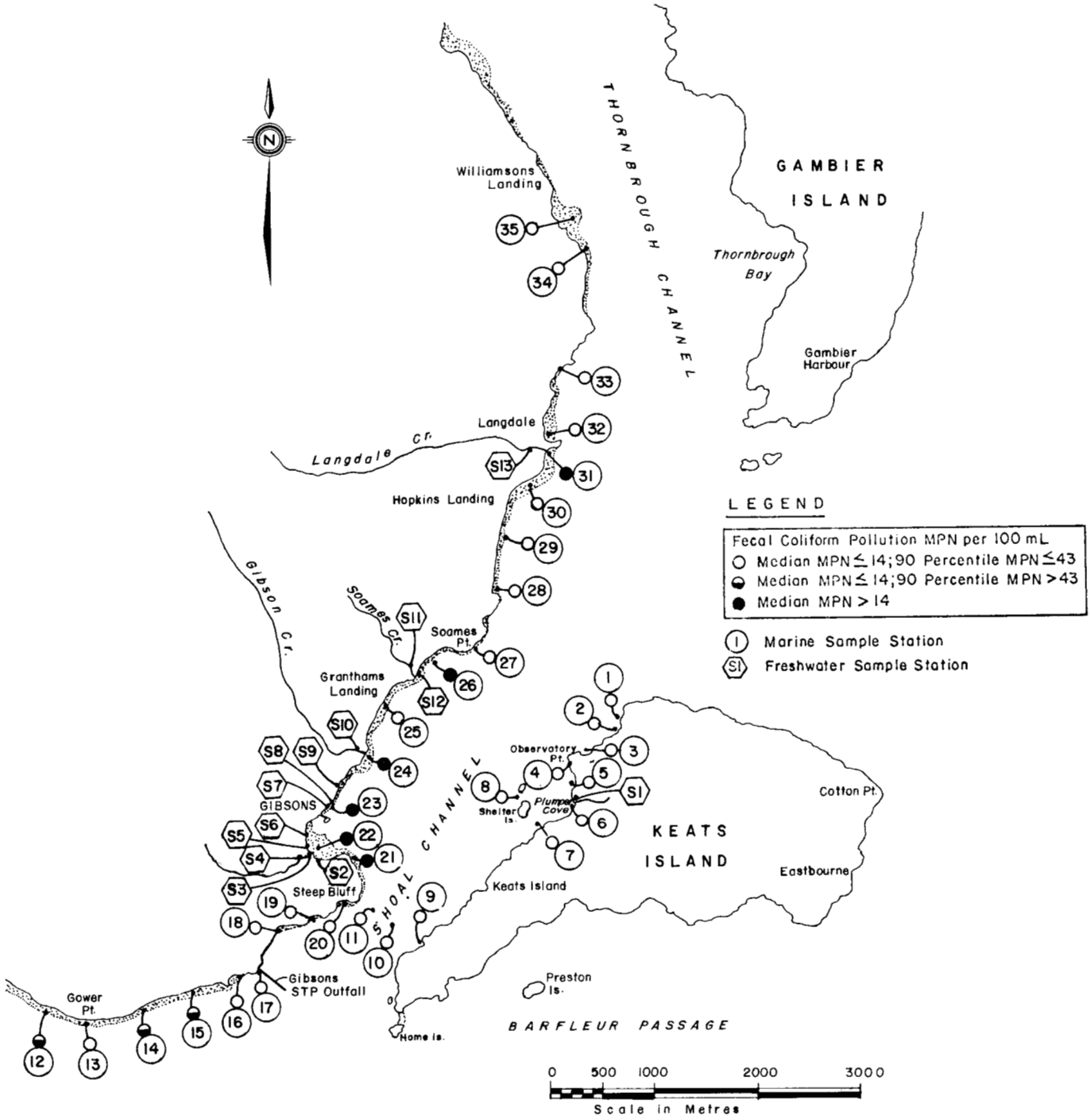
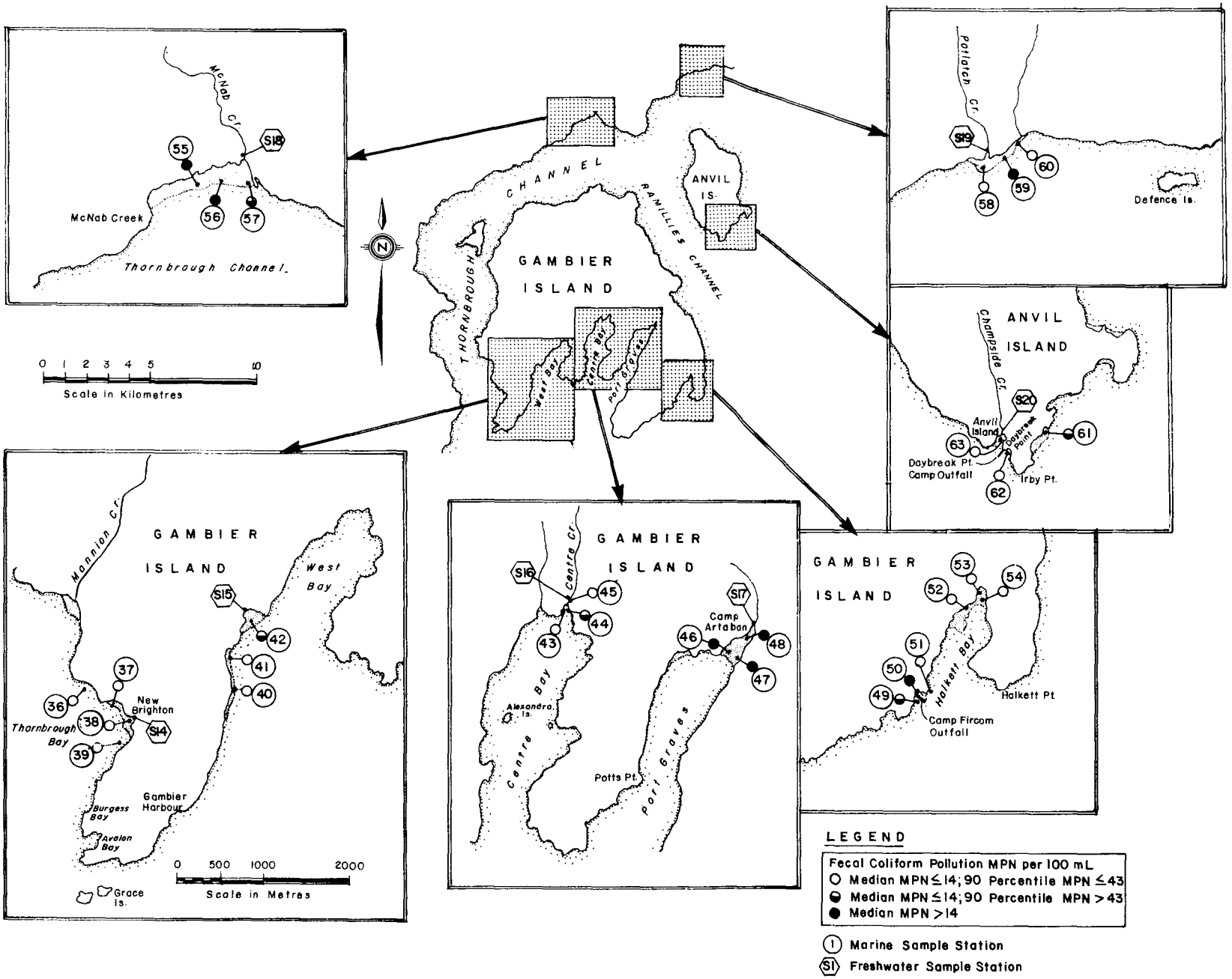
APPENDIX I

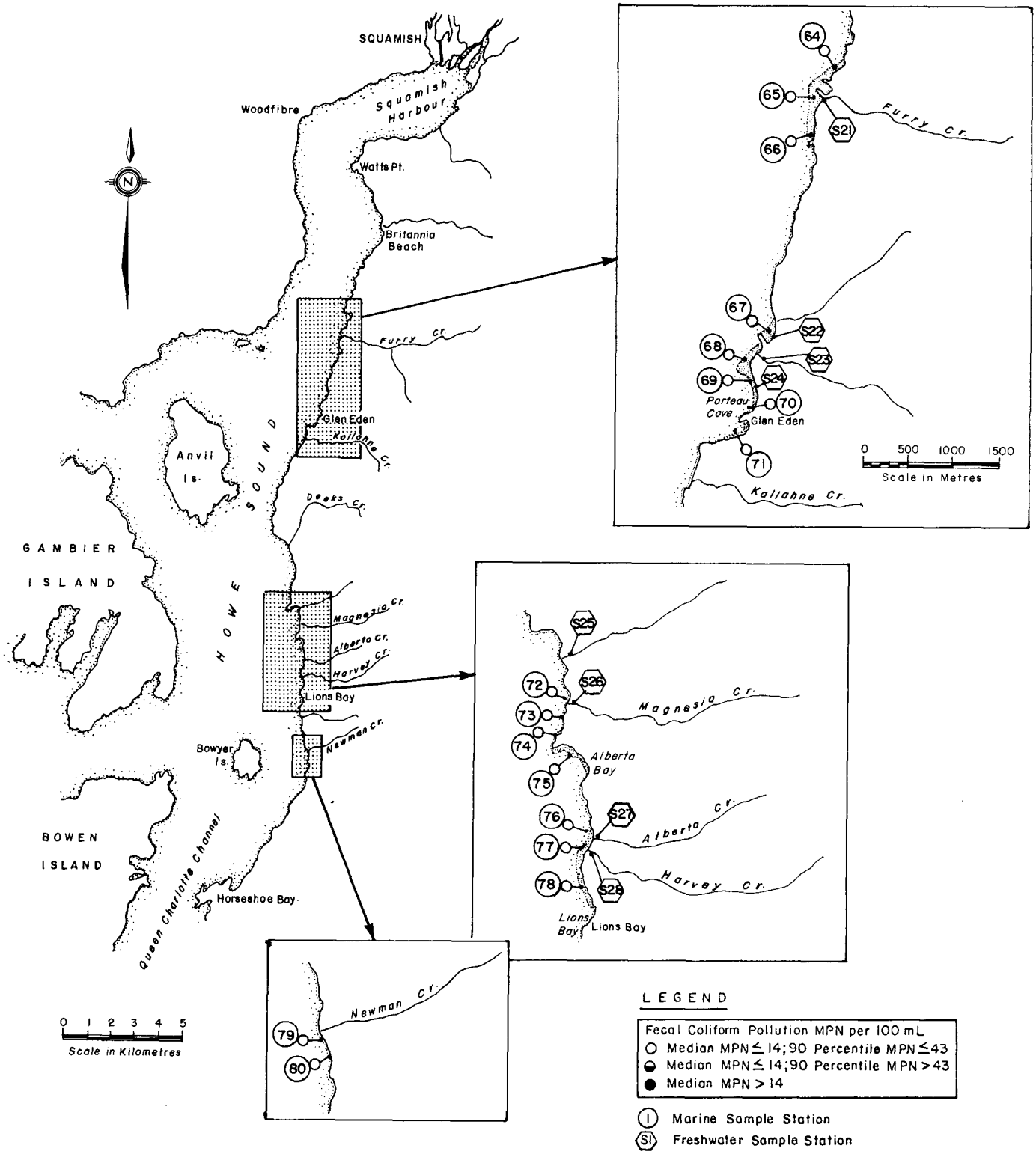
AREA I - FIGURES



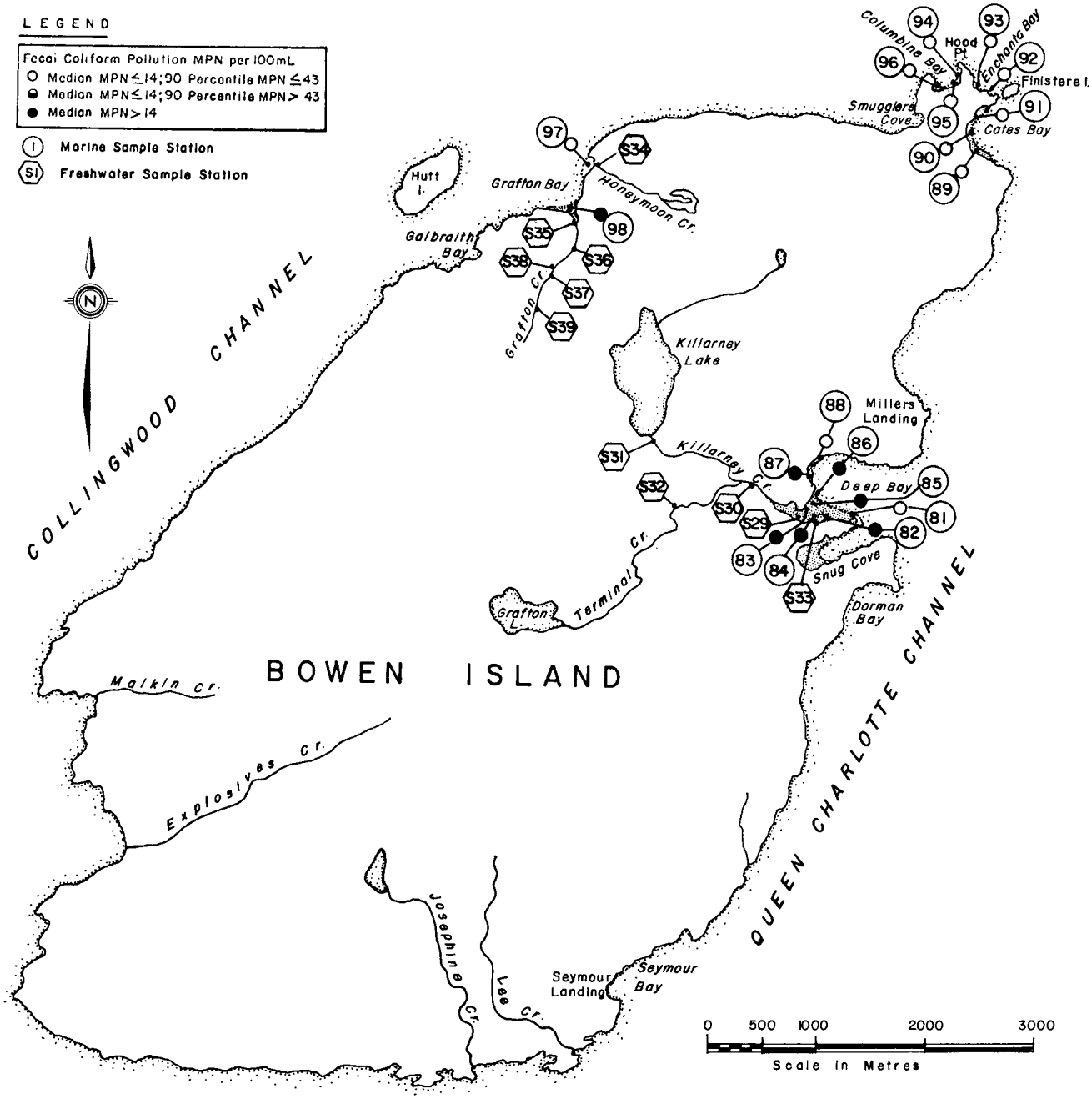
APPENDIX I
FIGURE I MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - GOWER POINT TO WILLIAMSONS LANDING, INCLUDING KEATS ISLAND



APPENDIX I
FIGURE 2 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - GAMBIER ISLAND, McNAB CREEK, POTLATCH CREEK AND ANVIL ISLAND



APPENDIX I
FIGURE 3 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - FURRY CREEK TO HORSESHOE BAY



APPENDIX I
FIGURE 4 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - BOWEN ISLAND

APPENDIX II

AREA I - TABLES

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS001	49 24.60	123 27.82	81/05/25	0845	HIGH SLACK	11	14.0
			81/05/26	1220	EBB	<2	14.0
			81/05/27	1132	HIGH SLACK	2	11.0
			81/05/28	1140	FLOOD	<2	12.0
			81/05/29	1125	FLOOD	<2	13.0
			81/06/01	1225	LOW SLACK	2	11.0
HS002	49 24.00	123 27.82	81/05/25	0850	HIGH SLACK	22	14.0
			81/05/26	1220	EBB	<2	14.0
			81/05/27	1130	HIGH SLACK	<2	12.0
			81/05/28	1140	FLOOD	2	13.0
			81/05/29	1125	FLOOD	5	13.0
			81/06/01	1220	LOW SLACK	2	10.0
HS003	49 24.40	123 28.10	81/05/25	0855	HIGH SLACK	13	14.0
			81/05/26	1215	EBB	4	14.0
			81/05/27	1125	HIGH SLACK	2	10.0
			81/05/28	1135	FLOOD	2	13.0
			81/05/29	1120	FLOOD	<2	12.0
			81/06/01	1220	LOW SLACK	<2	10.0
HS004	49 24.35	123 28.22	81/05/25	0855	HIGH SLACK	13	14.0
			81/05/26	1215	EBB	<2	13.0
			81/05/27	1125	HIGH SLACK	8	12.0
			81/05/28	1135	FLOOD	4	13.0
			81/05/29	1120	FLOOD	<2	12.0
			81/06/01	1220	LOW SLACK	5	10.0
HS005	49 24.25	123 28.20	81/05/25	0900	HIGH SLACK	17	14.0
			81/05/26	1215	EBB	2	14.0
			81/05/27	1125	HIGH SLACK	4	12.0
			81/05/28	1135	FLOOD	13	13.0
			81/05/29	1120	FLOOD	<2	12.0
			81/06/01	1220	LOW SLACK	2	10.0
HS006	49 24.13	123 28.22	81/05/25	0905	HIGH SLACK	33	14.0
			81/05/26	1205	EBB	<2	14.0
			81/05/27	1135	HIGH SLACK	2	11.0
			81/05/28	1130	FLOOD	33	13.0
			81/05/29	1115	FLOOD	4	12.0
			81/06/01	1210	LOW SLACK	<2	10.0
HS007	49 24.05	123 28.50	81/05/25	0910	HIGH SLACK	14	14.0
			81/05/26	1205	EBB	2	14.0
			81/05/27	1110	FLOOD	8	12.0
			81/05/28	1125	FLOOD	<2	13.0
			81/05/29	1115	FLOOD	<2	12.0
			81/06/01	1210	LOW SLACK	<2	12.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS008	49 24.18	123 28.60	81/05/25	0915	HIGH SLACK	7	14.0
			81/05/26	1205	EBB	<2	14.0
			81/05/27	1110	FLOOD	2	13.0
			81/05/28	1125	FLOOD	<2	13.0
			81/05/29	1110	FLOOD	2	12.0
			81/06/01	1210	LOW SLACK	<2	10.0
HS009	49 23.40	123 29.40	81/05/25	0925	HIGH SLACK	31	14.0
			81/05/26	1200	EBB	<2	14.0
			81/05/27	1105	FLOOD	2	14.0
			81/05/28	1120	FLOOD	2	14.0
			81/05/29	1105	FLOOD	2	12.0
			81/06/01	1205	LOW SLACK	<2	11.0
HS010	49 23.50	123 29.68	81/05/25	0930	HIGH SLACK	8	14.0
			81/05/26	1200	EBB	8	14.0
			81/05/27	1105	FLOOD	2	13.0
			81/05/28	1120	FLOOD	<2	13.0
			81/05/29	1050	FLOOD	<2	11.0
			81/06/01	1205	LOW SLACK	<2	11.0
HS011	49 23.58	123 29.82	81/05/25	0930	HIGH SLACK	33	14.0
			81/05/26	1200	EBB	<2	14.0
			81/05/27	1100	FLOOD	5	12.0
			81/05/28	1120	FLOOD	13	12.0
			81/05/29	1050	FLOOD	<2	12.0
			81/06/01	1205	LOW SLACK	2	12.0
HS012	49 23.08	123 32.45	81/05/25	0945	HIGH SLACK	95	13.0
			81/05/26	1150	HIGH SLACK	2	14.0
			81/05/27	1055	FLOOD	4	16.0
			81/05/28	1110	FLOOD	<2	13.0
			81/05/29	1045	FLOOD	8	13.0
			81/06/01	1155	LOW SLACK	11	12.0
HS013	49 23.00	123 32.13	81/05/25	0945	HIGH SLACK	79	13.0
			81/05/26	1150	HIGH SLACK	<2	14.0
			81/05/27	1050	FLOOD	5	14.0
			81/05/28	1110	FLOOD	5	12.0
			81/05/29	1045	FLOOD	2	12.0
			81/06/01	1155	LOW SLACK	<2	12.0
HS014	49 23.10	123 31.65	81/05/25	0950	HIGH SLACK	110	13.0
			81/05/26	1145	HIGH SLACK	13	14.0
			81/05/27	1050	FLOOD	2	14.0
			81/05/28	1105	FLOOD	2	13.0
			81/05/29	1045	FLOOD	<2	13.0
			81/06/01	1155	LOW SLACK	2	12.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS015	49 23.18	123 31.25	81/05/25	1000	HIGH SLACK	350	12.0
			81/05/26	1140	HIGH SLACK	5	13.0
			81/05/27	1045	FLOOD	2	14.0
			81/05/28	1105	FLOOD	2	12.0
			81/05/29	1040	FLOOD	2	12.0
			81/06/01	1155	LOW SLACK	5	12.0
HS016	49 23.23	123 30.86	81/05/25	1000	HIGH SLACK	23	13.0
			81/05/26	1140	HIGH SLACK	5	14.0
			81/05/27	1045	FLOOD	<2	13.0
			81/05/28	1105	FLOOD	<2	13.0
			81/05/29	1040	FLOOD	2	13.0
			81/06/01	1150	LOW SLACK	17	12.0
HS017	49 23.28	123 30.71	81/05/25	1000	HIGH SLACK	33	14.0
			81/05/26	1135	HIGH SLACK	8	15.0
			81/05/27	1045	FLOOD	5	13.0
			81/05/28	1100	FLOOD	<2	12.0
			81/05/29	1040	FLOOD	2	13.0
			81/06/01	1150	LOW SLACK	2	12.0
HS018	49 23.48	123 30.55	81/05/25	1005	HIGH SLACK	33	14.0
			81/05/26	1135	HIGH SLACK	13	14.0
			81/05/27	1040	FLOOD	2	13.0
			81/05/28	1100	FLOOD	<2	12.0
			81/05/29	1035	FLOOD	<2	13.0
			81/06/01	1150	LOW SLACK	<2	12.0
HS019	49 23.55	123 30.30	81/05/25	1010	HIGH SLACK	70	14.0
			81/05/26	1130	HIGH SLACK	2	14.0
			81/05/27	1035	FLOOD	2	14.0
			81/05/28	1100	FLOOD	2	13.0
			81/05/29	1035	FLOOD	8	13.0
			81/06/01	1150	LOW SLACK	2	12.0
HS020	49 23.60	123 30.02	81/05/25	1015	HIGH SLACK	17	14.0
			81/05/26	1130	HIGH SLACK	<2	14.0
			81/05/27	1035	FLOOD	11	13.0
			81/05/28	1055	FLOOD	4	12.0
			81/05/29	1035	FLOOD	8	12.0
			81/06/01	1145	LOW SLACK	2	12.0
HS021	49 23.75	123 29.99	81/05/25	1020	HIGH SLACK	33	15.0
			81/05/26	1130	HIGH SLACK	17	15.0
			81/05/27	1035	FLOOD	5	10.0
			81/05/28	1055	FLOOD	17	12.0
			81/05/29	1030	FLOOD	8	12.0
			81/06/01	1145	LOW SLACK	17	12.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS022	49 23.90	123 30.28	81/05/25	1030	HIGH SLACK	350	15.0
			81/05/26	1125	HIGH SLACK	240	15.0
			81/05/27	1030	FLOOD	49	12.0
			81/05/28	1055	FLOOD	49	12.0
			81/05/29	1030	FLOOD	5	12.0
			81/06/01	1140	LOW SLACK	95	10.0
HS023	49 24.15	123 30.18	81/05/25	1040	EBB	110	16.0
			81/05/26	1300	EBB	33	15.0
			81/05/27	1025	FLOOD	5	12.0
			81/05/28	1050	FLOOD	23	11.0
			81/05/29	1025	LOW SLACK	11	10.0
			81/06/01	1140	LOW SLACK	31	11.0
HS024	49 24.40	123 29.86	81/05/25	1045	EBB	540	14.0
			81/05/26	1300	EBB	49	14.0
			81/05/27	1025	FLOOD	350	10.0
			81/05/28	1050	FLOOD	130	10.0
			81/05/29	1025	LOW SLACK	49	10.0
			81/06/01	1135	LOW SLACK	13	10.0
HS025	49 24.68	123 29.70	81/05/25	1050	EBB	33	15.0
			81/05/26	1305	EBB	8	15.0
			81/05/27	1020	FLOOD	<2	12.0
			81/05/28	1045	FLOOD	4	11.0
			81/05/29	1025	LOW SLACK	<2	10.0
			81/06/01	1135	LOW SLACK	8	12.0
HS026	49 24.88	123 29.30	81/05/25	1100	EBB	49	15.0
			81/05/26	1305	EBB	46	14.0
			81/05/27	1020	FLOOD	<2	11.0
			81/05/28	1045	FLOOD	31	10.0
			81/05/29	1020	LOW SLACK	2	10.0
			81/06/01	1130	LOW SLACK	5	10.0
HS027	49 24.95	123 28.48	81/05/25	1105	EBB	49	14.0
			81/05/26	1310	EBB	2	14.0
			81/05/27	1015	FLOOD	2	10.0
			81/05/28	1040	FLOOD	5	11.0
			81/05/29	1020	LOW SLACK	<2	11.5
			81/06/01	1130	LOW SLACK	<2	12.0
HS028	49 25.22	123 29.80	81/05/25	1110	EBB	5	16.0
			81/05/26	1310	EBB	5	15.0
			81/05/27	1015	FLOOD	2	11.0
			81/05/28	1040	FLOOD	2	11.0
			81/05/29	1015	LOW SLACK	5	10.0
			81/06/01	1130	LOW SLACK	5	12.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS029	49 25.10	123 28.70	81/05/25	1115	EBB	4	16.0
			81/05/26	1315	EBB	<2	14.0
			81/05/27	1010	FLOOD	8	11.0
			81/05/28	1035	FLOOD	2	11.0
			81/05/29	1015	LOW SLACK	<2	10.0
			81/06/01	1125	LOW SLACK	13	12.0
HS030	49 25.75	123 28.50	81/05/25	1120	EBB	8	16.0
			81/05/26	1315	EBB	5	14.0
			81/05/27	1010	FLOOD	4	11.0
			81/05/28	1035	FLOOD	11	10.0
			81/05/29	1015	LOW SLACK	4	10.0
			81/06/01	1125	LOW SLACK	5	10.0
HS031	49 25.92	123 28.35	81/05/25	1120	EBB	23	16.0
			81/05/26	1045	HIGH SLACK	22	13.0
			81/05/27	1005	FLOOD	2	10.0
			81/05/28	1035	FLOOD	2	10.0
			81/05/29	1010	LOW SLACK	79	9.0
			81/06/01	1125	LOW SLACK	8	12.0
HS032	49 26.05	123 28.35	81/05/25	1130	EBB	5	16.0
			81/05/26	1045	HIGH SLACK	6	12.0
			81/05/27	1005	FLOOD	23	10.0
			81/05/28	1030	FLOOD	2	10.0
			81/05/29	1010	LOW SLACK	2	10.0
			81/06/01	1120	LOW SLACK	5	11.0
HS033	49 26.35	123 28.41	81/05/25	1130	EBB	23	16.0
			81/05/26	1040	HIGH SLACK	8	10.5
			81/05/27	1000	FLOOD	<2	9.0
			81/05/28	1030	FLOOD	2	10.0
			81/05/29	1010	LOW SLACK	4	10.0
			81/06/01	1120	LOW SLACK	<2	10.0
HS034	49 27.00	123 28.04	81/05/25	1135	EBB	13	15.0
			81/05/26	1040	HIGH SLACK	<2	10.0
			81/05/27	0955	FLOOD	<2	8.0
			81/05/28	1030	FLOOD	2	10.0
			81/05/29	1005	LOW SLACK	<2	9.0
			81/06/01	1115	LOW SLACK	2	11.0
HS035	49 27.15	123 28.12	81/05/25	1140	EBB	22	14.0
			81/05/26	1035	HIGH SLACK	5	9.5
			81/05/27	0955	FLOOD	5	8.0
			81/05/28	1020	FLOOD	2	10.0
			81/05/29	1005	LOW SLACK	5	8.0
			81/06/01	1115	LOW SLACK	2	10.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS036	49 27.16	123 26.65	81/05/25	1315	EBB	8	14.0
			81/05/26	1025	HIGH SLACK	8	12.0
			81/05/27	0925	FLOOD	<2	13.0
			81/05/29	0945	LOW SLACK	5	13.0
			81/06/01	1105	LOW SLACK	<2	10.0
HS037	49 27.05	123 26.45	81/05/25	1320	EBB	33	14.0
			81/05/26	1025	HIGH SLACK	5	12.0
			81/05/27	0925	FLOOD	2	13.0
			81/05/28	0940	FLOOD	<2	12.0
			81/05/29	0945	LOW SLACK	<2	13.0
			81/06/01	1105	LOW SLACK	<2	10.0
HS038	49 26.97	123 26.25	81/05/25	1330	EBB	49	12.0
			81/05/26	1020	HIGH SLACK	13	11.0
			81/05/27	0920	FLOOD	33	11.0
			81/05/28	0940	FLOOD	14	10.0
			81/05/29	0940	LOW SLACK	13	12.0
			81/06/01	1100	LOW SLACK	2	10.0
HS039	49 26.82	123 26.41	81/05/25	1335	EBB	<2	14.0
			81/05/26	1015	HIGH SLACK	<2	12.0
			81/05/27	0920	FLOOD	<2	13.0
			81/05/28	0935	FLOOD	2	13.0
			81/05/29	0935	LOW SLACK	5	13.0
			81/06/01	1100	LOW SLACK	5	10.0
HS040	49 27.13	123 25.22	81/05/25	1345	EBB	7	14.0
			81/05/26	1005	HIGH SLACK	2	12.5
			81/05/27	0900	FLOOD	4	14.0
			81/05/28	0925	LOW SLACK	49	13.0
			81/05/29	0925	LOW SLACK	<2	10.0
			81/06/01	1050	LOW SLACK	<2	12.0
HS041	49 27.39	123 25.30	81/05/25	1350	EBB	13	13.0
			81/05/26	1000	HIGH SLACK	11	12.0
			81/05/27	0900	FLOOD	2	14.0
			81/05/28	0925	LOW SLACK	33	13.0
			81/05/29	0925	LOW SLACK	5	11.0
			81/06/01	1050	LOW SLACK	8	11.0
HS042	49 27.60	123 25.10	81/05/25	1355	EBB	8	11.0
			81/05/26	0945	FLOOD	22	11.0
			81/05/27	0855	FLOOD	170	12.0
			81/05/28	0920	LOW SLACK	5	13.0
			81/05/29	0920	LOW SLACK	2	11.0
			81/06/01	1050	LOW SLACK	17	10.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS043	49 28.84	123 22.50	81/05/26	0920	FLOOD	5	12.0
			81/05/27	0840	LOW SLACK	<2	13.0
			81/05/28	0905	LOW SLACK	<2	12.0
			81/05/29	0905	LOW SLACK	5	12.0
			81/06/01	1025	LOW SLACK	<2	12.0
			81/06/22	1110	EBB	7	10.0
			81/06/23	0940	HIGH SLACK	2	11.0
HS044	49 28.83	123 22.45	81/05/26	0920	FLOOD	8	13.0
			81/05/27	0840	LOW SLACK	49	14.0
			81/05/28	0905	LOW SLACK	13	13.0
			81/05/29	0905	LOW SLACK	79	12.0
			81/06/01	1025	LOW SLACK	4	10.0
			81/06/22	1110	EBB	8	10.0
			81/06/23	0940	HIGH SLACK	5	11.5
HS045	49 28.85	123 22.45	81/05/26	0910	FLOOD	8	12.0
			81/05/27	0840	LOW SLACK	11	10.0
			81/05/28	0900	LOW SLACK	2	13.0
			81/05/29	0900	LOW SLACK	32	12.0
			81/06/01	1025	LOW SLACK	8	10.0
			81/06/22	1110	EBB	<2	11.0
			81/06/23	0940	HIGH SLACK	2	12.0
HS046	49 28.53	123 20.91	81/05/26	0855	FLOOD	540	11.0
			81/05/27	0825	LOW SLACK	33	13.0
			81/05/28	0835	LOW SLACK	<2	12.0
			81/05/29	0840	LOW SLACK	79	12.0
			81/06/01	0950	EBB	7	12.0
			81/06/22	1140	EBB	130	10.0
			81/06/23	0955	HIGH SLACK	170	10.5
HS047	49 28.50	123 20.81	81/05/26	0850	FLOOD	280	12.0
			81/05/27	0825	LOW SLACK	31	14.0
			81/05/28	0830	LOW SLACK	33	12.0
			81/05/29	0840	LOW SLACK	14	13.0
			81/06/01	0955	EBB	22	12.0
			81/06/22	1140	EBB	540	9.5
			81/06/23	1000	HIGH SLACK	7	12.0
HS048	49 28.62	123 20.05	81/05/25	0845	FLOOD	350	12.0
			81/05/27	0820	LOW SLACK	13	13.0
			81/05/28	0830	LOW SLACK	49	12.0
			81/05/29	0835	LOW SLACK	17	13.0
			81/06/01	0955	EBB	8	12.0
			81/06/22	1145	EBB	350	10.0
			81/06/23	1000	HIGH SLACK	46	12.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS049	49 26.62	123 40.70	81/06/11	1140	FLOOD	2	8.0
			81/06/12	1105	FLOOD	170	10.0
			81/06/15	1215	LOW SLACK	79	11.0
			81/06/16	1125	LOW SLACK	2	9.0
			81/06/22	1200	EBB	2	10.0
			81/06/23	1040	EBB	11	10.0
HS050	49 26.70	123 20.10	81/06/11	1145	FLOOD	>1600	8.0
			81/06/12	1105	FLOOD	>1600	10.0
			81/06/15	1215	LOW SLACK	8	10.0
			81/06/16	1125	LOW SLACK	49	9.0
			81/06/22	1040	EBB	350	9.0
			81/06/23	1200	EBB	350	10.0
HS051	49 26.70	123 19.90	81/06/15	1220	FLOOD	<2	10.0
			81/06/16	1130	LOW SLACK	5	9.0
			81/06/22	1040	EBB	<2	9.0
			81/06/23	1200	EBB	5	10.0
HS052	49 27.25	123 19.52	81/05/26	0830	FLOOD	11	12.0
			81/05/27	0800	LOW SLACK	5	12.0
			81/05/28	0805	LOW SLACK	2	10.0
			81/05/29	0815	EBB	2	16.0
			81/06/01	0935	EBB	2	10.0
			81/06/22	1210	EBB	23	8.0
			81/06/23	1045	EBB	46	9.0
HS053	49 27.45	123 19.42	81/05/26	0820	FLOOD	17	12.0
			81/05/27	0800	LOW SLACK	11	12.0
			81/05/28	0805	LOW SLACK	2	10.0
			81/05/29	0815	EBB	2	18.0
			81/06/01	0935	EBB	17	11.0
			81/06/22	1210	EBB	13	9.5
			81/06/23	1050	EBB	8	12.0
HS054	49 27.28	123 19.40	81/05/26	0820	FLOOD	11	12.5
			81/05/27	0800	LOW SLACK	5	12.0
			81/05/28	0805	LOW SLACK	<2	10.0
			81/05/29	0810	EBB	2	18.0
			81/06/01	0935	EBB	2	11.0
			81/06/22	1210	EBB	2	10.0
			81/06/23	1050	EBB	2	10.0
HS055	49 34.46	123 23.25	81/06/09	0925	FLOOD	5	7.5
			81/06/10	0956	FLOOD	140	4.5
			81/06/11	0825	LOW SLACK	8	4.0
			81/06/12	0810	EBB	79	4.5
			81/06/15	0920	EBB	23	7.0
			81/06/16	0840	EBB	79	8.0
			81/06/22	0915	HIGH SLACK	23	5.0
			81/06/23	1125	EBB	4	6.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS056	49 33.65	123 24.05	81/06/09	0925	FLOOD	2	7.0
			81/06/10	0955	FLOOD	17	5.0
			81/06/11	0825	LOW SLACK	2	5.0
			81/06/12	0840	LOW SLACK	33	6.0
			81/06/15	0925	EBB	17	4.0
			81/06/16	0840	EBB	33	6.0
			81/06/22	0915	HIGH SLACK	33	5.0
			81/06/23	1130	EBB	5	6.0
HS057	49 33.64	123 23.24	81/06/09	0930	FLOOD	170	6.0
			81/06/10	0955	FLOOD	14	1.0
			81/06/11	0830	LOW SLACK	8	4.0
			81/06/12	0845	LOW SLACK	8	4.0
			81/06/15	0930	EBB	11	.0
			81/06/16	0840	EBB	8	7.0
			81/06/22	0915	HIGH SLACK	23	1.0
			81/06/23	1130	EBB	7	8.0
HS058	49 34.75	123 18.90	81/06/09	0950	FLOOD	5	5.5
			81/06/10	0955	FLOOD	8	4.0
			81/06/11	0840	LOW SLACK	2	2.0
			81/06/12	0835	EBB	5	2.0
			81/06/15	0940	EBB	11	3.0
			81/06/16	0905	EBB	4	4.0
			81/06/22	0930	EBB	17	2.0
			81/06/23	1130	EBB	4	6.0
HS059	49 34.88	123 18.70	81/06/09	0950	FLOOD	5	7.0
			81/06/10	0955	FLOOD	130	4.0
			81/06/11	0840	LOW SLACK	33	4.0
			81/06/12	0835	EBB	79	4.0
			81/06/15	0945	EBB	8	7.0
			81/06/16	0905	EBB	33	6.0
			81/06/22	0930	EBB	7	4.0
			81/06/23	1140	EBB	2	8.0
HS060	49 34.98	123 18.55	81/06/09	1000	FLOOD	5	7.0
			81/06/10	1010	FLOOD	<2	4.0
			81/06/11	0845	LOW SLACK	23	4.0
			81/06/12	0835	EBB	23	4.0
			81/06/15	0945	EBB	17	6.5
			81/06/16	0905	EBB	14	6.0
			81/06/22	0930	EBB	5	5.0
			81/06/23	1145	EBB	2	8.0
HS061	49 30.90	123 17.90	81/06/09	1035	HIGH SLACK	4	10.0
			81/06/10	1100	FLOOD	23	6.0
			81/06/11	0920	LOW SLACK	<2	6.0
			81/06/12	0805	EBB	130	7.0
			81/06/15	0845	EBB	5	10.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS061	continued...		81/06/16	0810	EBB	13	10.0
			81/06/22	0855	HIGH SLACK	13	8.0
			81/06/23	1105	EBB	2	10.0
HS062	49 30.79	123 18.20	81/06/09	1100	HIGH SLACK	17	9.0
			81/06/10	1100	FLOOD	<2	8.0
			81/06/11	0925	LOW SLACK	2	6.0
			81/06/12	0805	EBB	<2	6.0
			81/06/15	0855	EBB	13	10.0
			81/06/16	0820	EBB	4	10.0
			81/06/22	0900	HIGH SLACK	33	10.5
			81/06/23	1110	EBB	13	12.0
HS063	49 30.85	123 18.30	81/06/09	1100	HIGH SLACK	2	8.0
			81/06/10	1105	FLOOD	33	8.0
			81/06/11	0925	LOW SLACK	33	6.0
			81/06/12	0805	EBB	2	7.0
			81/06/15	0900	EBB	8	9.0
			81/06/16	0825	EBB	17	10.0
			81/06/22	0900	HIGH SLACK	23	10.5
			81/06/23	1115	EBB	8	12.0
HS064	49 35.18	123 13.40	81/06/09	1005	FLOOD	<2	6.0
			81/06/10	1020	FLOOD	5	4.0
			81/06/11	0855	LOW SLACK	8	5.0
			81/06/12	0850	LOW SLACK	17	6.0
			81/06/15	0955	EBB	<2	5.0
			81/06/16	....	OTHER	5	5.0
HS065	49 35.00	123 13.60	81/06/09	1010	FLOOD	7	4.0
			81/06/10	1020	FLOOD	33	2.0
			81/06/11	0855	LOW SLACK	33	5.0
			81/06/12	0850	LOW SLACK	5	6.0
			81/06/15	1000	EBB	<2	5.0
			81/06/16	....	OTHER	2	4.0
HS066	49 34.80	123 13.63	81/06/09	1015	FLOOD	5	5.0
			81/06/10	1020	FLOOD	5	2.0
			81/06/11	0900	LOW SLACK	8	6.0
			81/06/12	0855	LOW SLACK	11	7.0
			81/06/15	1000	EBB	17	4.0
			81/06/16	0920	EBB	23	2.0
HS067	49 33.60	123 14.00	81/06/09	1020	FLOOD	2	7.0
			81/06/10	1025	FLOOD	2	5.0
			81/06/11	0900	LOW SLACK	13	5.0
			81/06/12	0855	LOW SLACK	<2	6.0
			81/06/15	1005	EBB	2	8.0
			81/06/16	0930	EBB	6	6.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS068	49 33.43	123 14.21	81/06/09	1020	FLOOD	<2	7.0
			81/06/10	1030	FLOOD	14	4.0
			81/06/11	0900	LOW SLACK	5	6.0
			81/06/12	0900	LOW SLACK	13	8.0
			81/06/15	1010	EBB	<2	7.0
			81/06/16	0930	EBB	5	6.0
HS069	49 33.30	123 14.15	81/06/09	1030	HIGH SLACK	2	8.0
			81/06/10	1035	FLOOD	2	10.0
			81/06/11	0905	LOW SLACK	<2	7.0
			81/06/12	0900	LOW SLACK	13	10.0
			81/06/15	1015	LOW SLACK	<2	10.0
			81/06/16	0930	EBB	2	8.0
HS070	49 33.15	123 14.19	81/06/09	1035	HIGH SLACK	2	9.0
			81/06/10	1040	FLOOD	33	8.0
			81/06/11	0905	LOW SLACK	<2	6.0
			81/06/12	0900	LOW SLACK	17	6.0
			81/06/15	1020	LOW SLACK	2	8.0
			81/06/16	0935	EBB	5	7.0
HS071	49 33.01	123 14.29	81/06/09	1035	HIGH SLACK	<2	8.0
			81/06/10	1045	FLOOD	2	6.0
			81/06/11	0905	LOW SLACK	11	6.0
			81/06/12	0905	LOW SLACK	11	6.0
			81/06/15	1020	LOW SLACK	5	8.0
			81/06/16	0935	EBB	8	7.0
HS072	49 28.57	123 14.57	81/06/09	1120	HIGH SLACK	<2	7.0
			81/06/10	1120	FLOOD	<2	7.0
			81/06/11	0955	LOW SLACK	5	7.0
			81/06/12	0920	LOW SLACK	2	5.0
			81/06/15	1035	LOW SLACK	2	9.0
			81/06/16	1000	EBB	2	10.0
HS073	49 28.45	123 14.60	81/06/09	1125	HIGH SLACK	2	9.0
			81/06/10	1120	FLOOD	<2	10.0
			81/06/11	0955	LOW SLACK	7	10.0
			81/06/12	0920	LOW SLACK	<2	6.0
			81/06/15	1040	LOW SLACK	<2	10.0
			81/06/16	1000	EBB	13	8.0
HS074	49 28.35	123 14.61	81/06/09	1125	HIGH SLACK	2	8.5
			81/06/10	1125	FLOOD	<2	10.0
			81/06/11	1000	LOW SLACK	7	10.0
			81/06/12	0920	LOW SLACK	<2	7.0
			81/06/15	1040	LOW SLACK	5	10.0
			81/06/16	1000	EBB	<2	10.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS075	49 28.22	123 14.51	81/06/09	1130	HIGH SLACK	5	10.0
			81/06/10	1125	FLOOD	<2	11.0
			81/06/11	1000	LOW SLACK	2	11.0
			81/06/12	0925	LOW SLACK	4	7.0
			81/06/15	1040	LOW SLACK	8	12.0
			81/06/16	1005	EBB	5	12.0
HS076	49 27.79	123 14.31	81/06/09	1140	HIGH SLACK	<2	9.0
			81/06/10	1130	FLOOD	<2	10.0
			81/06/11	1005	LOW SLACK	<2	7.0
			81/06/12	0925	LOW SLACK	2	7.0
			81/06/15	1045	LOW SLACK	<2	9.0
			81/06/16	1010	EBB	5	6.0
HS077	49 27.70	123 14.35	81/06/09	1145	HIGH SLACK	<2	9.0
			81/06/10	1130	FLOOD	<2	11.0
			81/06/11	1005	LOW SLACK	<2	9.0
			81/06/12	0925	LOW SLACK	5	7.0
			81/06/15	1050	LOW SLACK	2	10.0
			81/06/16	1010	EBB	23	8.0
HS078	49 27.42	123 14.37	81/06/09	1145	HIGH SLACK	13	9.5
			81/06/10	1135	FLOOD	17	10.5
			81/06/11	1005	LOW SLACK	2	9.0
			81/06/12	0930	LOW SLACK	23	7.0
			81/06/15	1050	LOW SLACK	8	
			81/06/16	1010	EBB	8	10.0
HS079	49 25.79	123 14.05	81/06/09	1230	HIGH SLACK	4	11.0
			81/06/10	1205	FLOOD	<2	10.0
			81/06/11	1015	FLOOD	2	10.0
			81/06/12	0940	LOW SLACK	13	8.0
			81/06/15	1105	LOW SLACK	5	10.0
			81/06/16	1020	EBB	2	10.0
HS080	49 25.69	123 13.96	81/06/09	1235	EBB	<2	10.0
			81/06/10	1205	FLOOD	<2	10.0
			81/06/11	1015	FLOOD	2	6.0
			81/06/12	0940	LOW SLACK	5	8.0
			81/06/15	1105	LOW SLACK	8	10.0
			81/06/16	1020	EBB	5	10.0
HS081	49 22.90	123 19.60	81/06/09	1250	EBB	23	10.0
			81/06/10	1205	FLOOD	13	10.0
			81/06/11	1035	FLOOD	2	10.0
			81/06/12	1020	LOW SLACK	2	9.0
			81/06/15	1120	LOW SLACK	8	11.0
			81/06/16	1035	EBB	22	12.0
			81/06/22	1000	EBB	<2	10.5
			81/06/23	0835	HIGH SLACK	13	10.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS082	49 22.93	123 19.79	81/06/09	1300	EBB	13	7.5
			81/06/10	1245	HIGH SLACK	79	5.0
			81/06/11	1040	FLOOD	33	4.0
			81/06/12	1020	LOW SLACK	23	6.0
			81/06/22	1005	EBB	79	8.0
			81/06/23	0840	HIGH SLACK	920	6.0
HS083	49 22.94	123 19.93	81/06/09	1300	EBB	13	9.5
			81/06/10	1245	HIGH SLACK	70	6.0
			81/06/11	1040	FLOOD	49	5.0
			81/06/12	1025	LOW SLACK	79	4.0
			81/06/22	1005	EBB	130	6.0
			81/06/23	0840	HIGH SLACK	350	7.0
HS084	49 22.95	123 19.88	81/06/09	1300	EBB	13	9.0
			81/06/10	1250	HIGH SLACK	79	6.0
			81/06/11	1040	FLOOD	49	7.0
			81/06/12	1025	LOW SLACK	13	5.0
			81/06/15	1120	LOW SLACK	33	10.0
			81/06/16	1035	EBB	23	10.0
			81/06/22	1005	EBB	79	7.5
			81/06/23	0840	HIGH SLACK	170	8.0
HS085	49 22.98	123 19.90	81/06/09	1305	EBB	33	8.0
			81/06/10	1250	HIGH SLACK	33	7.0
			81/06/11	1045	FLOOD	23	8.0
			81/06/12	1025	LOW SLACK	8	7.0
			81/06/22	1010	EBB	49	8.0
			81/06/23	0840	HIGH SLACK	26	10.0
HS086	49 23.04	123 19.88	81/06/09	1310	EBB	8	9.0
			81/06/10	1255	HIGH SLACK	22	8.0
			81/06/11	1050	FLOOD	8	8.0
			81/06/12	1025	LOW SLACK	7	8.0
			81/06/15	1125	LOW SLACK	23	10.0
			81/06/16	1040	EBB	130	10.0
			81/06/22	1010	EBB	95	6.0
			81/06/23	0845	HIGH SLACK	13	10.0
HS087	49 23.10	123 19.90	81/06/09	1310	EBB	7	9.0
			81/06/10	1300	HIGH SLACK	13	8.0
			81/06/11	1005	LOW SLACK	11	8.0
			81/06/12	1030	LOW SLACK	5	6.0
			81/06/15	1130	LOW SLACK	23	10.0
			81/06/16	1045	EBB	33	10.0
			81/06/22	1015	EBB	33	8.0
			81/06/23	0845	HIGH SLACK	23	12.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS088	49 23.20	123 19.86	81/06/09	1315	EBB	13	8.0
			81/06/10	1300	HIGH SLACK	5	10.0
			81/06/11	1055	FLOOD	<2	10.0
			81/06/12	1030	LOW SLACK	4	8.0
			81/06/15	1130	LOW SLACK	14	10.0
			81/06/16	1045	EBB	33	10.0
			81/06/22	1015	EBB	13	8.5
			81/06/23	0850	HIGH SLACK	23	11.0
HS089	49 24.78	123 18.73	81/06/10	1315	HIGH SLACK	<2	10.0
			81/06/11	1100	FLOOD	2	9.0
			81/06/12	1035	LOW SLACK	<2	8.0
			81/06/15	1140	LOW SLACK	11	10.0
			81/06/16	1050	LOW SLACK	<2	10.0
			81/06/22	1025	EBB	2	8.5
			81/06/23	0900	HIGH SLACK	<2	12.0
HS090	49 24.89	123 18.79	81/06/10	1315	HIGH SLACK	<2	10.0
			81/06/11	1105	FLOOD	2	10.0
			81/06/12	1040	LOW SLACK	<2	8.0
			81/06/15	1140	LOW SLACK	17	10.0
			81/06/16	1055	LOW SLACK	7	9.0
			81/06/22	1025	EBB	13	
			81/06/23	0900	HIGH SLACK	2	12.0
HS091	49 24.96	123 18.71	81/06/10	1320	HIGH SLACK	2	10.0
			81/06/11	1105	FLOOD	7	10.0
			81/06/12	1040	LOW SLACK	<2	8.0
			81/06/15	1145	LOW SLACK	23	10.0
			81/06/16	1055	LOW SLACK	<2	10.0
			81/06/22	1035	EBB	<2	10.0
			81/06/23	0905	HIGH SLACK	2	12.0
HS092	49 25.05	123 18.61	81/06/10	1320	HIGH SLACK	<2	10.0
			81/06/11	1110	FLOOD	<2	8.0
			81/06/12	1045	FLOOD	<2	8.0
			81/06/15	1050	LOW SLACK	<2	10.0
			81/06/16	1100	LOW SLACK	<2	9.0
			81/06/22	1030	EBB	13	10.0
			81/06/23	0910	HIGH SLACK	2	10.0
HS093	49 25.09	123 18.71	81/06/10	1325	HIGH SLACK	2	10.0
			81/06/11	1110	FLOOD	<2	8.0
			81/06/12	1045	FLOOD	<2	8.0
			81/06/15	1150	LOW SLACK	<2	9.0
			81/06/16	1105	LOW SLACK	5	9.0
			81/06/22	1035	EBB	5	10.0
			81/06/23	0910	HIGH SLACK	<2	10.0

APPENDIX II

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area I)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
HS094	49 25.10	123 18.79	81/06/10	1330	HIGH SLACK	13	10.0
			81/06/11	1110	FLOOD	2	9.0
			81/06/12	1045	FLOOD	<2	9.0
			81/06/15	1155	LOW SLACK	<2	10.0
			81/06/16	1110	LOW SLACK	2	9.0
			81/06/22	1035	EBB	2	11.0
			81/06/23	0915	HIGH SLACK	2	11.0
HS095	49 25.05	123 18.49	81/06/10	1330	HIGH SLACK	<2	10.0
			81/06/11	1115	FLOOD	2	9.0
			81/06/12	1050	FLOOD	2	8.0
			81/06/15	1155	LOW SLACK	<2	10.0
			81/06/16	1110	LOW SLACK	5	9.0
			81/06/22	1035	EBB	4	11.0
			81/06/23	0915	HIGH SLACK	2	10.0
HS096	49 25.09	123 18.53	81/06/10	1330	HIGH SLACK	5	10.0
			81/06/11	1115	FLOOD	2	8.0
			81/06/12	1050	FLOOD	<2	8.0
			81/06/15	1155	LOW SLACK	<2	10.0
			81/06/16	1100	LOW SLACK	5	10.0
			81/06/22	1040	EBB	<2	12.0
			81/06/23	0915	HIGH SLACK	<2	10.0
HS097	49 24.65	123 21.70	81/06/10	1335	HIGH SLACK	13	13.0
			81/06/11	1120	FLOOD	2	12.0
			81/06/12	1055	FLOOD	<2	10.0
			81/06/15	1205	LOW SLACK	2	12.0
			81/06/22	1045	EBB	2	13.0
			81/06/23	0920	HIGH SLACK	5	14.0
HS098	49 24.41	123 21.74	81/06/10	1335	HIGH SLACK	79	12.0
			81/06/11	1125	FLOOD	240	2.0
			81/06/12	1055	FLOOD	7	11.0
			81/06/15	1210	LOW SLACK	2	12.0
			81/06/16	1115	LOW SLACK	<2	14.0
			81/06/22	1045	EBB	33	14.0
			81/06/23	0920	HIGH SLACK	350	14.0

APPENDIX II

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area I)

STATION	NO. OF SAMPLES	MPN RANGE	MEDIAN	90 PERCENTILE
1	6	L2 - 11	L2.0	5.6
2	6	L2 - 22	2.0	11.8
3	6	L2 - 13	2.0	7.6
4	6	L2 - 13	4.5	10.0
5	6	L2 - 17	3.0	14.6
6	6	L2 - 33	3.0	33.0
7	6	L2 - 14	L2.0	10.4
8	6	L2 - 7	L2.0	4.0
9	6	L2 - 31	2.0	13.6
10	6	L2 - 8	L2.0	8.0
11	6	L2 - 33	3.5	21.0
12	6	L2 - 95	6.0	44.6
13	6	L2 - 79	3.5	34.6
14	6	L2 - 110	2.0	51.8
15	6	2 - 350	3.5	143.0
16	6	L2 - 23	3.5	19.4
17	6	L2 - 33	3.5	18.0
18	6	L2 - 33	L2.0	21.0
19	6	2 - 70	2.0	32.8
20	6	L2 - 17	6.0	13.4
21	6	5 - 33	17.0	23.4
22	6	5 - 350	72.0	284.0
23	6	5 - 110	27.0	63.8
24	6	13 - 540	89.5	426.0
25	6	L2 - 33	6.0	18.0
26	6	L2 - 49	18.0	47.2
27	6	L2 - 49	2.0	22.6
28	6	2 - 5	5.0	5.0
29	6	L2 - 13	3.0	10.0
30	6	4 - 11	5.0	9.2
31	6	2 - 79	15.0	45.4

continued...

APPENDIX II

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area I)

STATION	NO. OF SAMPLES	MPN RANGE	MEDIAN	90 PERCENTILE
32	6	2 - 23	5.0	12.8
33	6	L2 - 23	3.0	14.0
34	6	L2 - 13	L2.0	6.4
35	6	2 - 22	5.0	11.8
36	5	L2 - 8	5.0	8.0
37	6	L2 - 33	L2.0	16.2
38	6	2 - 49	13.5	39.4
39	6	L2 - 5	L2.0	5.0
40	6	L2 - 49	3.0	23.3
41	6	2 - 33	9.5	21.0
42	6	2 - 170	12.5	81.2
43	7	L2 - 7	2.0	5.6
44	7	4 - 79	8.0	58.0
45	7	L2 - 32	8.0	17.3
46	7	L2 - 540	79.0	281.0
47	7	7 - 540	31.0	358.0
48	7	8 - 350	46.0	350.0
49	6	2 - 170	6.5	115.4
50	6	8 - G1600	350.0	1600.0
51	4	L2 - 5	--	--
52	7	2 - 46	5.0	29.9
53	7	2 - 17	11.0	17.0
54	7	L2 - 11	2.0	6.8
55	8	4 - 140	23.0	91.2
56	8	2 - 33	17.0	33.0
57	8	7 - 170	9.5	52.4
58	8	2 - 17	5.0	12.2
59	8	2 - 130	20.5	89.2
60	8	L2 - 23	9.5	23.0
61	8	L2 - 130	9.0	44.4
62	8	L2 - 33	8.5	20.2

continued...

APPENDIX II

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area I)

STATION	NO. OF SAMPLES	MPN RANGE	MEDIAN	90 PERCENTILE
63	8	2 - 33	12.5	33.0
64	6	L2 - 17	5.0	11.6
65	6	L2 - 33	6.0	33.0
66	6	5 - 23	9.5	19.4
67	6	L2 - 13	2.0	8.8
68	6	L2 - 14	5.0	13.4
69	6	L2 - 13	2.0	6.4
70	6	L2 - 33	3.5	23.4
71	6	L2 - 11	6.5	11.0
72	6	L2 - 5	2.0	3.2
73	6	L2 - 13	L2.0	9.4
74	6	L2 - 7	L2.0	5.8
75	6	L2 - 8	4.5	6.2
76	6	L2 - 5	L2.0	3.2
77	6	L2 - 23	L2.0	12.2
78	6	2 - 23	10.5	19.4
79	6	L2 - 13	3.0	8.2
80	6	L2 - 8	3.5	6.2
81	8	L2 - 23	10.5	22.2
82	6	13 - 920	56.0	415.4
83	6	13 - 350	74.5	218.0
84	8	13 - 170	41.0	97.2
85	6	8 - 49	29.5	39.4
86	8	7 - 130	17.5	102.0
87	8	5 - 33	18.0	33.0
88	8	L2 - 33	13.0	25.0
89	7	L2 - 11	L2.0	4.7
90	7	L2 - 17	2.0	14.2
91	7	L2 - 23	2.0	11.8
92	7	L2 - 13	L2.0	5.3
93	7	L2 - 5	L2.0	5.0

continued...

APPENDIX II

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area I)

STATION	NO. OF SAMPLES	MPN RANGE	MEDIAN	90 PERCENTILE
94	7	L2 - 13	2.0	5.3
95	7	L2 - 5	2.0	4.3
96	7	L2 - 5	L2.0	5.0
97	7	L2 - 13	2.0	7.4
98	7	L2 - 350	33.0	273.0

APPENDIX II
TABLE 3: FRESHWATER AND EFFLUENT SAMPLE STATION LOCATIONS (Area I)

STATION NO.	LOCATION DESCRIPTION	RECEIVING WATER
S1	creek at beach south of government wharf	Plumper Cove, Keats Island
S2	152 mm culvert at beach in front of grey house	Gibsons Beach
S3	creek at beach 100 m south of foot of Prouse Road	Gibsons Beach
S4	creek at beach flowing between pink and grey houses	Gibsons Beach
S5	culvert terminating at beach at foot of Prouse Road	Gibsons Beach
S6	culvert at beach adjacent to Hyak Marine	Gibsons Beach
S7	culvert immediately north of Gibsons government wharf	Gibsons Beach
S8	culvert at beach below white house with red trim	Gibsons Beach
S9	culvert at beach below "Marina House"	Gibsons Beach
S10	Gibson Creek	Gibsons Beach
S11	Soames Creek at beach	Shoal Channel
S12	creek at beach approx. 100 m north of S11	Shoal Channel
S13	Langdale Creek at mouth	Thornbrough Channel
S14	creek entering immediately south of government wharf	Thornbrough Bay, Gambier I.
S15	creek entering immediately west of government wharf	West Bay, Gambier I.
S16	Centre Creek at mouth	Centre Bay, Gambier I.

continued...

APPENDIX II
TABLE 3: FRESHWATER AND EFFLUENT SAMPLE STATION LOCATIONS (Area I)

STATION NO.	LOCATION DESCRIPTION	RECEIVING WATER
S17	creek at head of Port Graves	Port Graves, Gambier I.
S18	McNab Creek at mouth	Thornbrough Channel
S19	Potlatch Creek at mouth	Thornbrough Channel
S20	Champside Creek at mouth	Daybreak Point, Anvil Island
S21	Furry Creek at mouth	Howe Sound
S22	composite of 2 culverts at beach, Porteau Park entrance	Porteau Cove
S23	creek at park road between parking lot and campsites	Porteau Cove
S24	creek at mouth entering small cove	Porteau Cove
S25	"M" Creek at mouth	Montagu Channel
S26	Magnesia Creek at B.C. Rail bridge	Montagu Channel
S27	Alberta Creek at B.C. Rail bridge	Alberta Bay
S28	Harvey Creek at Lions Bay Rd. bridge	Alberta Bay
S29	Killarney Creek at mouth	Deep Bay, Bowen I.
S30	Killarney Creek at Miller Road	Deep Bay, Bowen I.
S31	Killarney Creek at road near exit from Killarney Lake	Deep Bay, Bowen I.
S32	Terminal Creek at main road	Killarney Creek
S33	drainage pipe at SW corner of Deep Bay	Deep Bay, Bowen I.
S34	Honeymoon Creek at mouth	Grafton Bay, Bowen Island

continued...

APPENDIX II
TABLE 3: FRESHWATER AND EFFLUENT SAMPLE STATION LOCATIONS (Area I)

STATION NO.	LOCATION DESCRIPTION	RECEIVING WATER
S35	Grafton Creek at mouth	Grafton Bay, Bowen I.
S36	S35 upstream, culvert discharge at road	
S37	main tributary downstream of Endswell farm draining east side of farm (at road)	
S38	backwater of S37 and some drainage from farm (at road)	
S39	Grafton Creek upstream of farm Snug Cove Road	
STP 1	Influent - Gibsons sewage treatment plant at grit chamber discharge Effluent - Gibsons sewage treatment plant chlorinated effluent at chlorine contact chamber discharge	
STP 2	Influent - Langdale ferry terminal raw sewage Effluent - Langdale sewage treatment plant final chlorinated effluent	

APPENDIX II
TABLE 4: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area I)

STATION	DATE (1981)	FC/100 ml	FS/100 ml
S1	May 26	210	270
	27	730	180
	28	410	370
	29	110	370
	June 1	50	240
	2	50	160
S2	May 26	70	25
	27	59	18
	28	44	82
	29	--	50
	June 1	52	43
S3	May 26	400	230
	27	230	320
	28	370	410
	29	120	290
	June 1	2860	4500
S4	May 26	520	65
	27	320	40
	28	600	200
	29	290	140
	June 1	160	80
S5	May 26	7300	1700
	27	1060	50
	28	510	50
	29	1640	30
	June 1	111	61
S6	May 26	90	18
	27	33	13
	28	18	14
	29	18	11
	June 1	36	9
S7	May 27	--	18
	28	120	90
	29	56	280
	June 1	160	3000

Continued...

APPENDIX II
TABLE 4: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area I)

STATION	DATE (1981)	FC/100 ml	FS/100 ml
S8	May 27	11400	3000
	29	140	37
	June 1	10	10
S9	May 27	290	400
	28	760	550
	29	200	370
	June 1	330	30
S10	May 27	50	20
	28	29	52
	29	31	50
	June 1	60	48
S11	May 27	5	5
	28	15	11
	29	4	9
	June 1	2	9
S12	May 27	--	3
	28	1	4
	29	0	4
	June 1	0	5
S13	May 26	15	5
	27	28	7
	28	88	15
	29	36	14
S14	May 26	49	61
	27	26	31
	28	35	48
	29	26	103
	June 1	16	26
S15	May 26	29	0
	27	14	3
	28	17	10
	29	16	10
	June 1	10	18
	2	9	15

Continued...

APPENDIX II
TABLE 4: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area I)

STATION	DATE (1981)	FC/100 ml	FS/100 ml
S16	May 26	40	7
	27	24	5
	28	47	10
	29	10	7
	June 1	5	18
S17	May 28	97	35
	29	72	42
	June 1	80	20
	2	25	16
S18	June 15	L10	10
	16	6	2
	24	0	2
S19	June 15	30	300
	16	19	13
	24	4	59
S20	June 15	L10	30
	16	90	113
	24	30	110
S21	June 10	3	5
	11	4	3
	12	4	0
S22	June 9	0	12
	10	27	157
	11	1	4
	12	0	9
S23	June 9	3	20
	10	44	82
	11	3	2
	12	1	9
S24	June 10	160	190
	11	8	12
	12	9	4

Continued...

APPENDIX II
TABLE 4: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area I)

STATION	DATE (1981)	FC/100 ml	FS/100 ml
S25	June 9	0	6
	10	37	8
	11	0	6
S26	June 9	0	6
	10	5	5
	11	0	4
S27	June 9	6	4
	10	29	76
	11	6	15
	12	0	15
S28	June 9	0	2
	10	5	6
	11	0	2
	12	1	2
S29	June 11	70	24
	15	34	10
	16	417	117
S30	June 12	22	18
	15	30	46
	16	76	54
S31	June 15	17	15
	16	9	11
S32	June 15	L10	80
	16	17	34
S33	June 15	50	L10
	16	56	61
S34	June 11	6	8
	12	1	6
	15	1	19
	16	1	12

Continued...

APPENDIX II

TABLE 4: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area I)

STATION	DATE (1981)	FC/100 ml	FS/100 ml
S35	June 11	47	26
	12	57	12
	15	30	17
	16	80	93
S36	June 12	80	18
	15	69	37
	16	67	228
S37	June 15	115	41
	16	47	33
S38	June 15	77	53
	16	92	674
S39	June 15	0	0
	16	2	13
STP 1 (influent)	May 26	3.4×10^6	$L1 \times 10^5$
	28	4.7×10^6	1.9×10^5
	29	6.9×10^6	3.1×10^6
	June 1	1.1×10^6	8.3×10^5
STP 1 (effluent)	May 26	5.0×10^4	1.0×10^4
	27	1.0×10^4	1.4×10^3
	28	1.4×10^3	5.0×10^3
	29	3.7×10^4	1.8×10^3
	June 1	4.9×10^4	7.2×10^3
STP 2 (influent)	May 26	1.0×10^5	2.0×10^5
	27	3.2×10^5	7.2×10^4
	28	2.7×10^5	2.0×10^6
STP 2 (effluent)	May 26	4.0×10^4	8.0×10^4
	27	L10	L10
	28	20	160

APPENDIX II

TABLE 5: SUMMARY OF BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area I)

Sample Station	Fecal Coliform/100 ml			Fecal Streptococci/100 ml			FC:FS
	No. of Samples	Range	Mean	No. of Samples	Range	Mean	Ratio
S1	6	50-730	260	6	160-370	265	1.0
S2	4	44-70	56	5	18-50	44	-
S3	5	120-2860	796	5	230-4500	1150	0.7
S4	5	160-600	378	5	40-200	105	3.6
S5	5	111-7300	2124	5	30-1700	378	5.6
S6	5	18-90	39	5	9-18	13	-
S7	3	56-160	112	4	14-280	100	1.1
S8	3	10-11400	3850	3	10-3000	1016	3.8
S9	4	200-760	395	4	30-550	338	1.2
S10	4	29-60	43	4	20-52	43	-
S11	4	2-15	7	4	5-11	9	-
S12	3	0-1	L1	4	3-5	4	-
S13	4	15-88	42	4	5-15	10	-
S14	5	16-49	30	5	26-103	54	-
S15	6	9-29	16	6	0-18	9	-
S16	5	5-47	25	5	5-18	9	-
S17	4	25-97	69	4	16-42	28	-
S18	3	0-L10	L5	3	2-L10	L5	-
S19	3	4-30	18	3	13-300	124	-
S20	3	L10-90	43	3	30-113	84	-

continued...

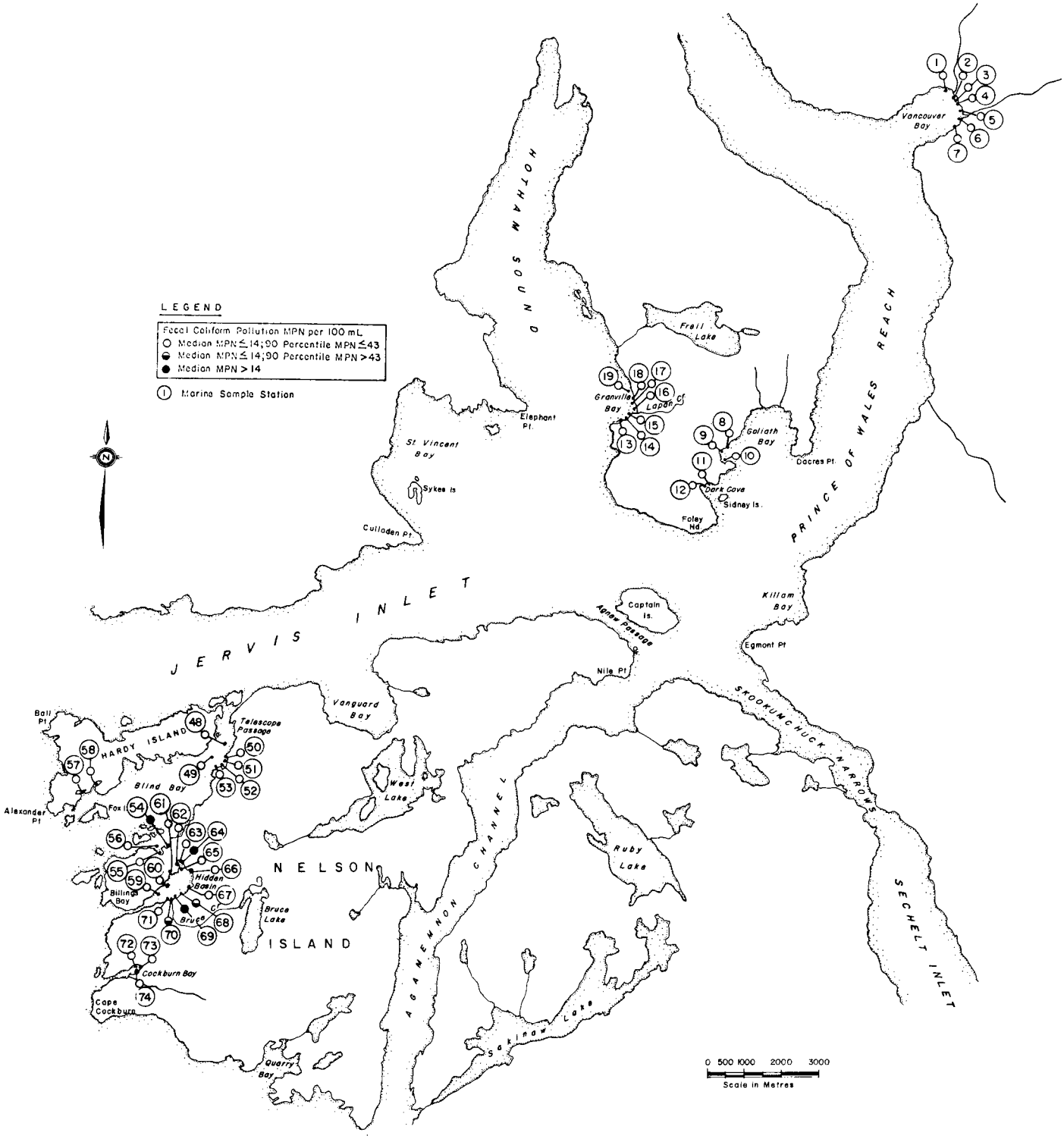
APPENDIX II

TABLE 5: SUMMARY OF BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area I)

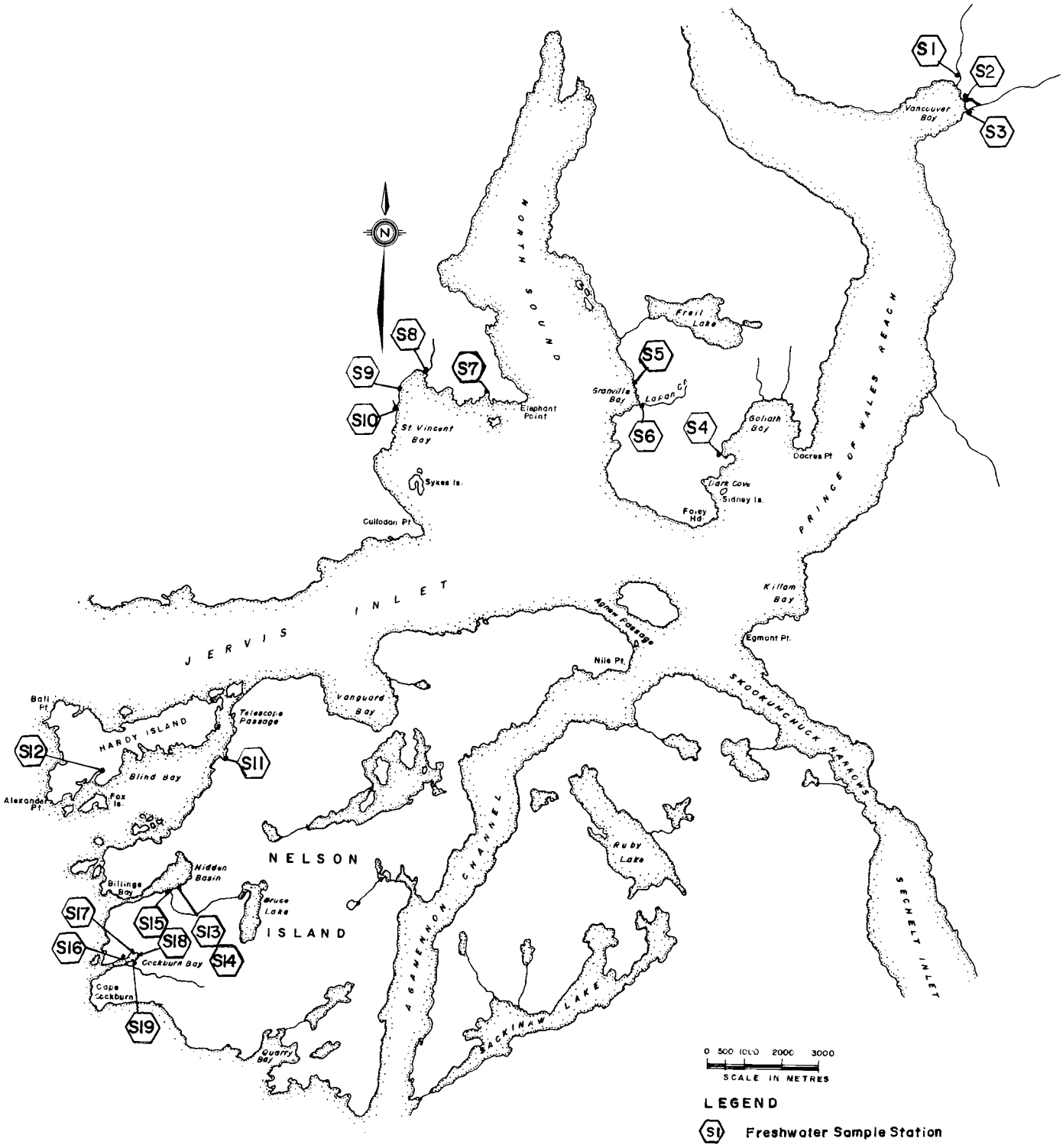
Sample Station	Fecal Coliform/100 ml			Fecal Streptococci/100 ml			FC:FS
	No. of Samples	Range	Mean	No. of Samples	Range	Mean	Ratio
S21	3	3-4	4	3	0-5	3	-
S22	4	0-27	7	4	4-157	46	-
S23	4	1-44	13	4	2-82	28	-
S24	3	8-160	59	3	4-190	69	-
S25	3	0-37	12	3	6-8	7	-
S26	3	0-5	2	3	4-6	5	-
S27	4	0-29	10	4	4-76	28	-
S28	4	0-5	2	4	2-6	4	-
S29	3	34-417	174	3	10-117	50	-
S30	3	22-76	43	3	18-54	39	-
S31	2	9-17	13	2	11-15	13	-
S32	2	L10-17	L14	2	34-80	57	-
S33	2	50-56	53	2	L10-61	L36	-
S34	4	1-6	2	4	6-12	11	-
S35	4	30-80	54	4	12-93	37	-
S36	3	67-80	72	3	18-228	94	-
S37	2	47-115	81	2	33-41	37	-
S38	2	77-92	85	2	53-674	364	-
S39	2	0-2	1	2	0-13	7	-

APPENDIX III

AREA II - FIGURES

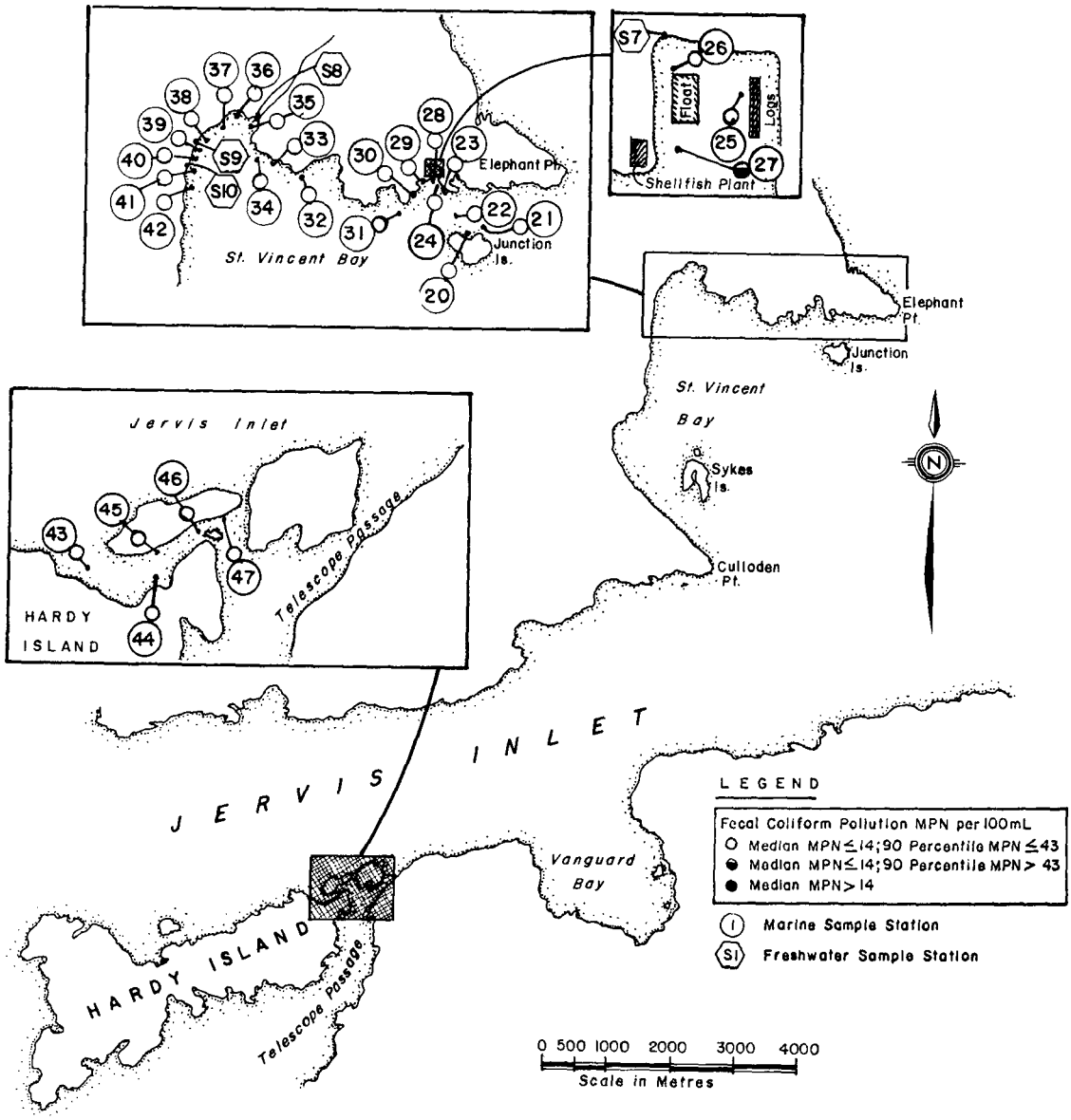


APPENDIX III
FIGURE I MARINE SAMPLE STATIONS - VANCOUVER BAY, GOLIATH BAY, GRANVILLE BAY, HARDY ISLAND AND NELSON ISLAND



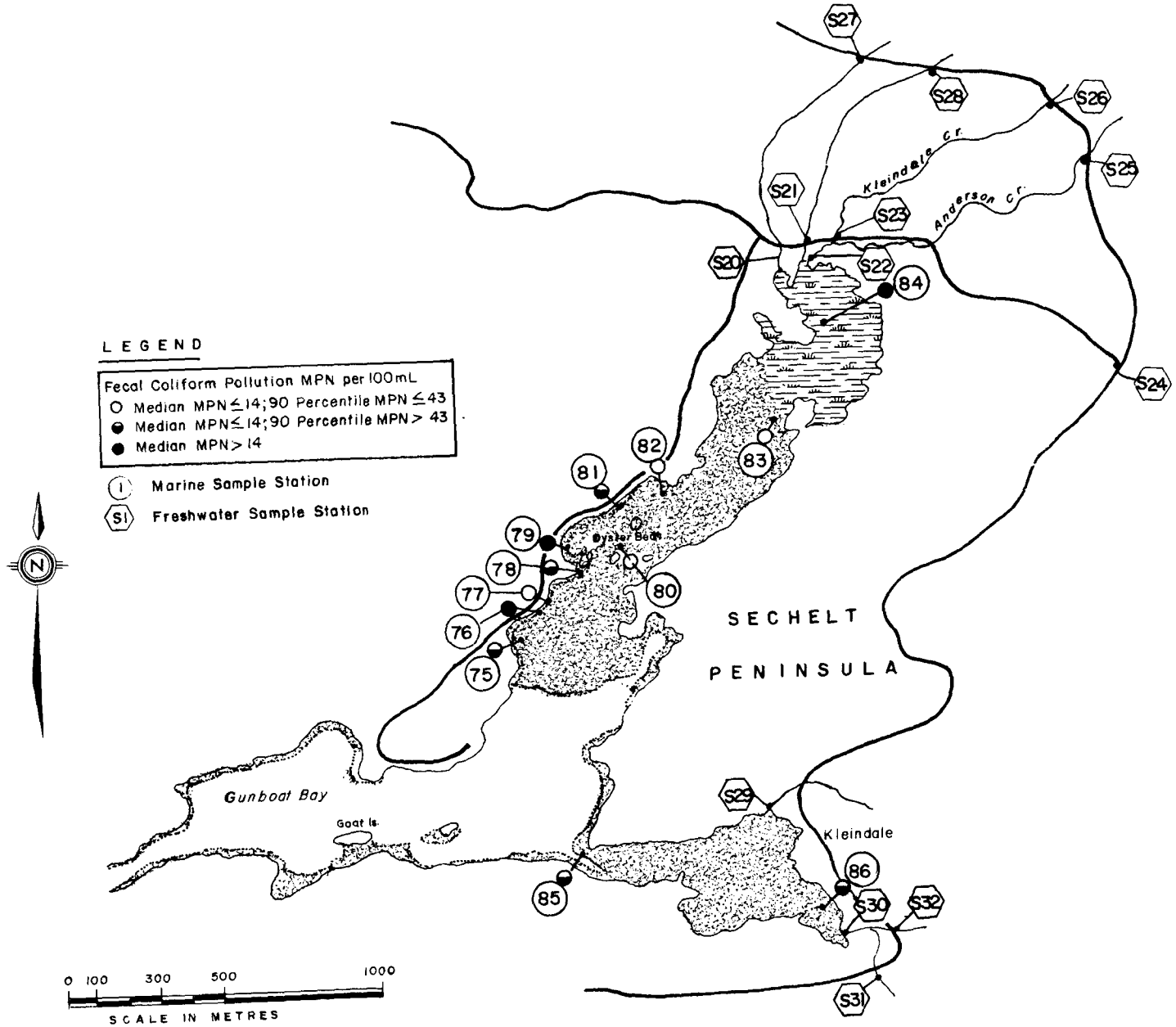
APPENDIX III

FIGURE 2 FRESHWATER SAMPLE STATIONS - VANCOUVER BAY, GOLIATH BAY, GRANVILLE BAY, ST. VINCENT BAY, HARDY ISLAND AND NELSON ISLAND

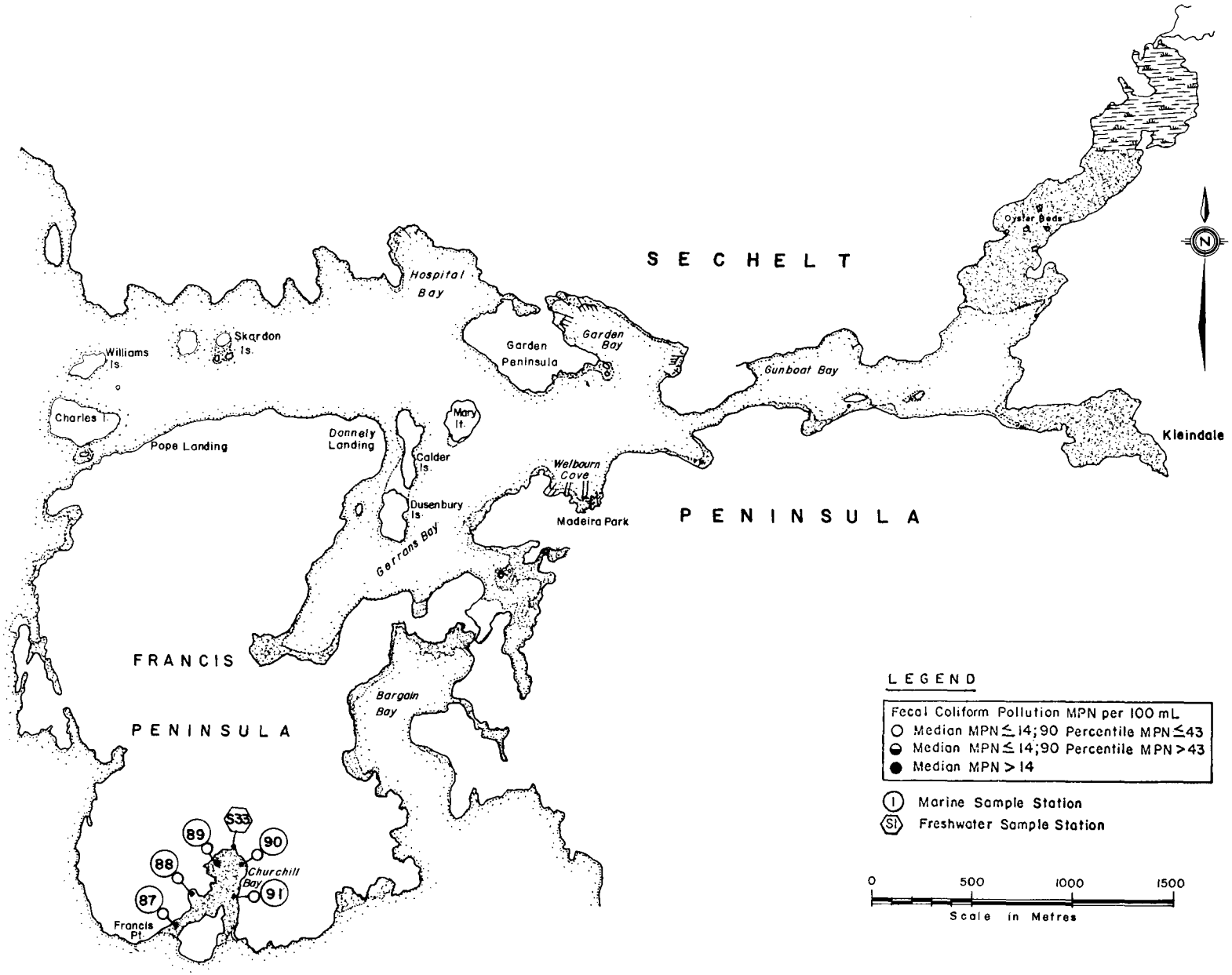


APPENDIX III

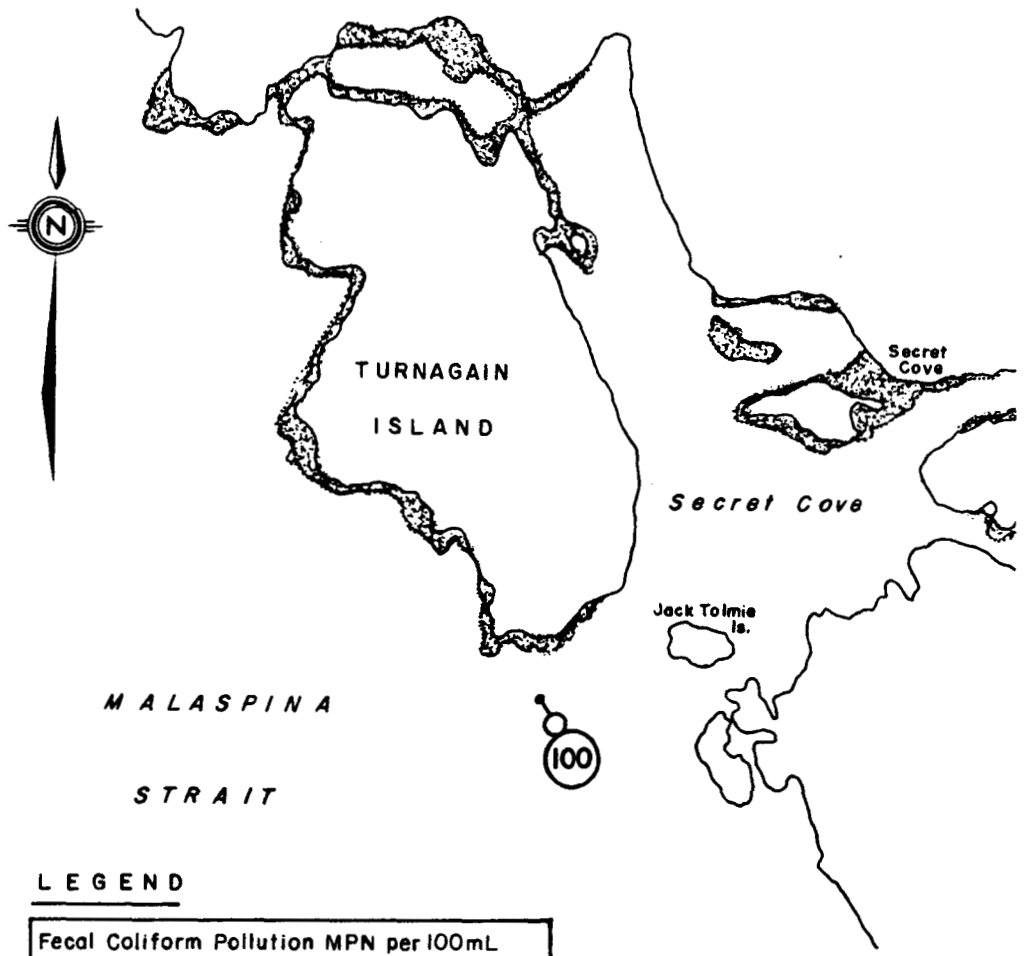
FIGURE 3 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - ST. VINCENT BAY AND L. 5756, HARDY ISLAND

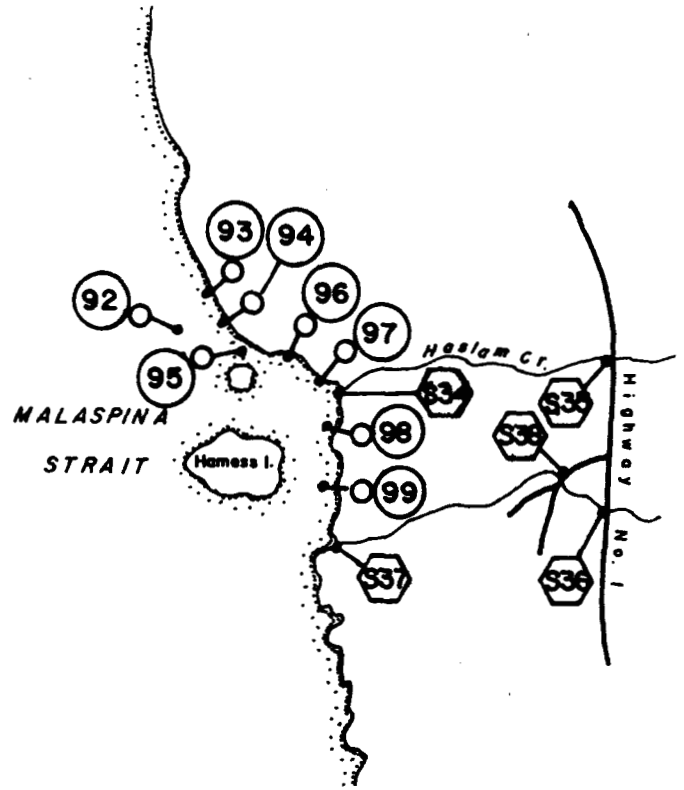


APPENDIX III
FIGURE 4 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - GUNBOAT BAY



APPENDIX III
FIGURE 5 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - CHURCHILL BAY





LEGEND

Fecal Coliform Pollution MPN per 100mL
- O Median MPN ≤ 14; 90 Percentile MPN ≤ 43
- ◒ Median MPN ≤ 14; 90 Percentile MPN > 43
- ● Median MPN > 14

(1) Marine Sample Station

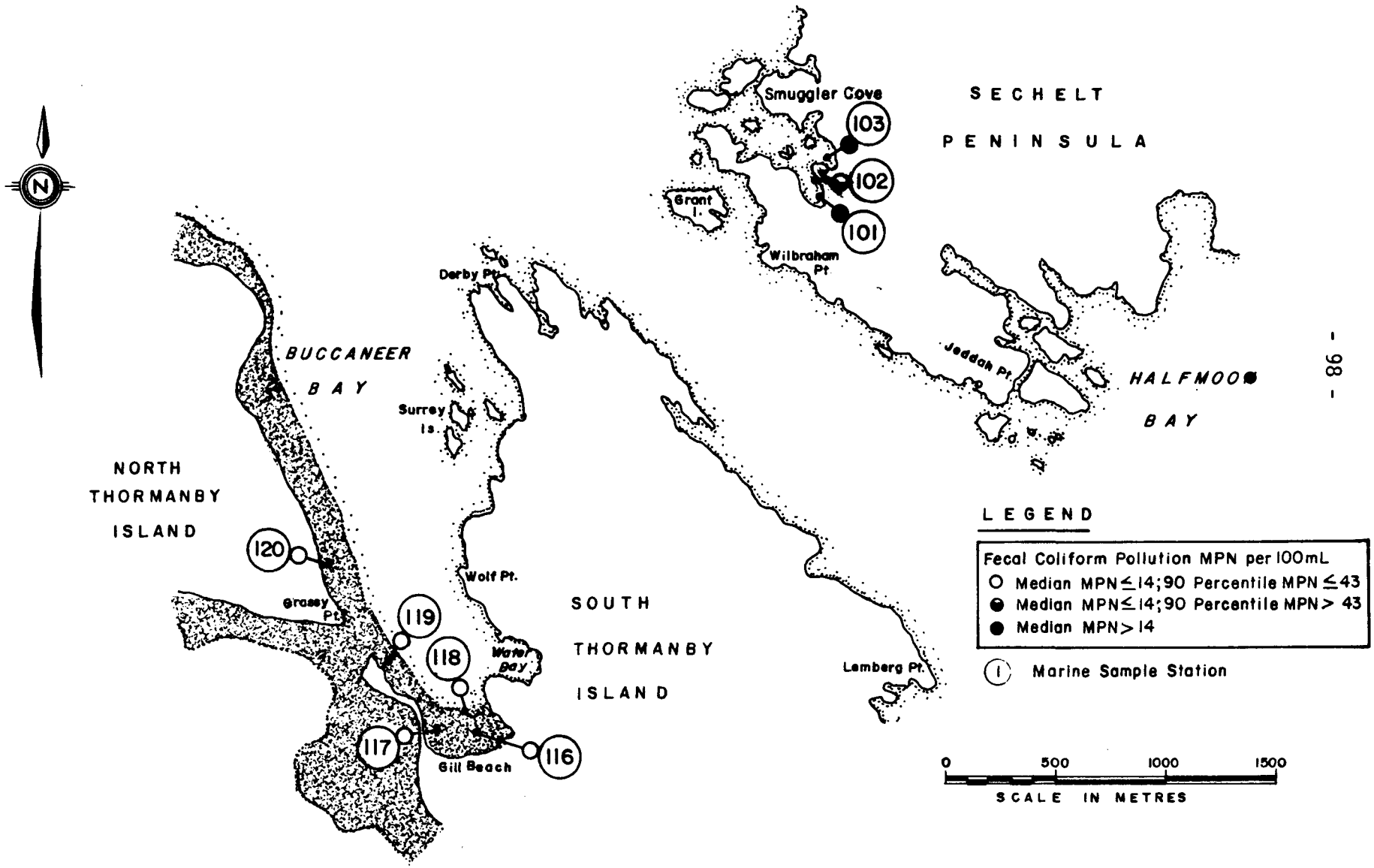
(S1) Freshwater Sample Station

0 100 300 500 1000

SCALE IN METRES

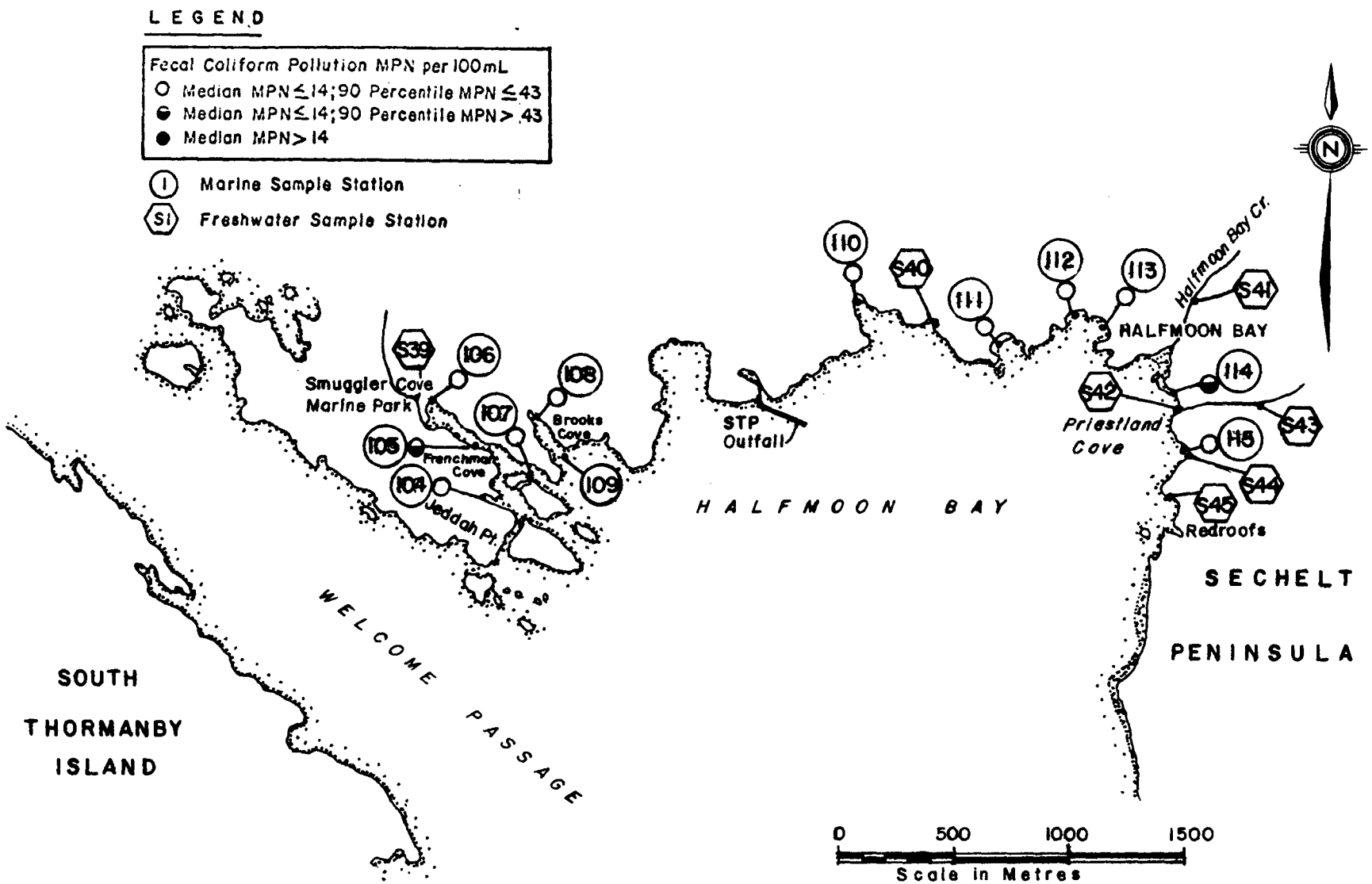
APPENDIX III

FIGURE 6 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - SECRET COVE AND HARNESS ISLAND



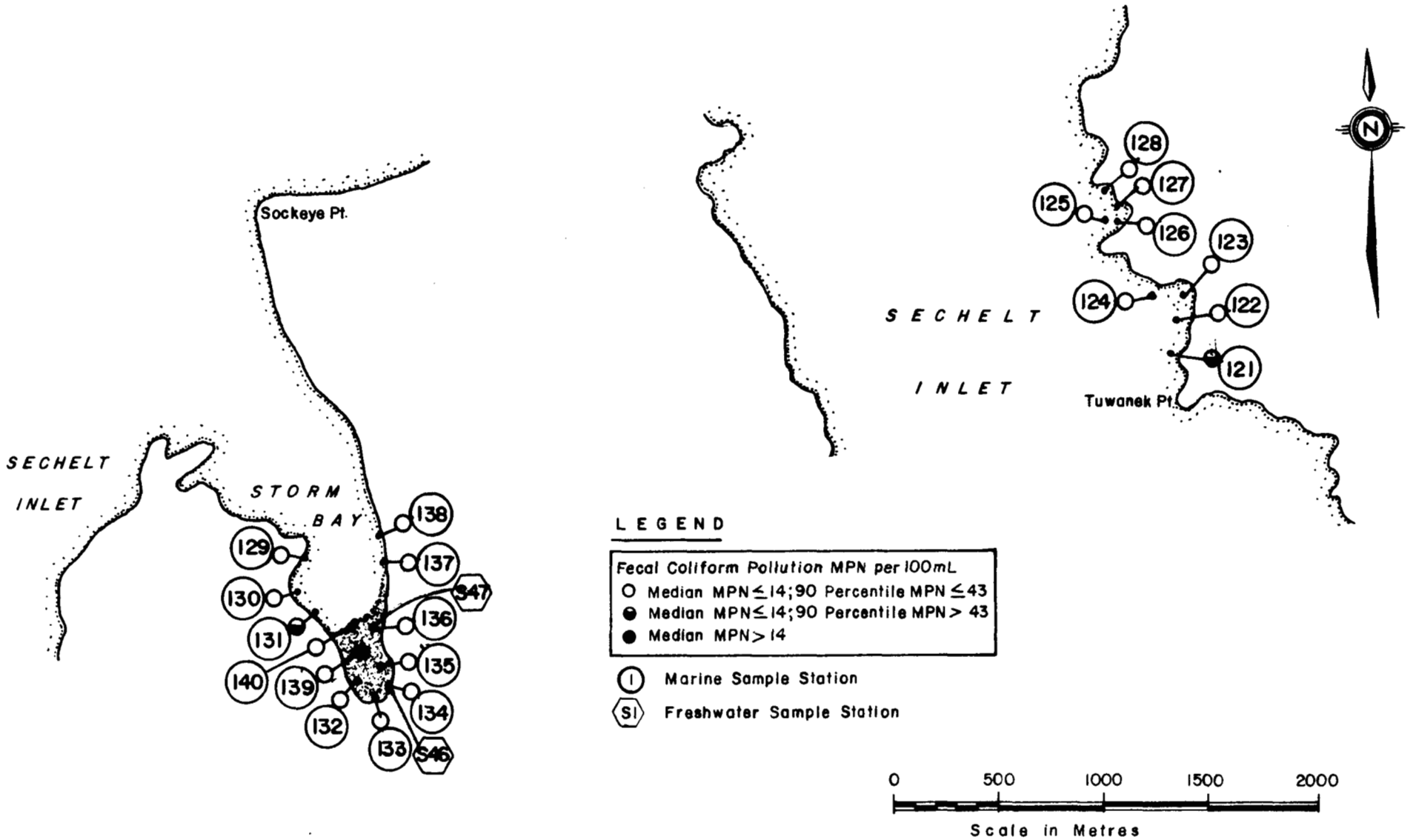
APPENDIX III

FIGURE 7 MARINE SAMPLE STATION LOCATIONS - SMUGGLER COVE AND BUCCANEER BAY



APPENDIX III

FIGURE 8 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - HALFMOON BAY



APPENDIX III

FIGURE 9 MARINE AND FRESHWATER SAMPLE STATION LOCATIONS - SECHELT INLET AND STORM BAY

APPENDIX IV

AREA II - TABLES

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI001	49 55.42	123 52.28	81/02/11	1230	EBB	<2	24.0
			81/02/12	1100	HIGH SLACK	<2	25.0
			81/02/13	1305	EBB	2	25.5
			81/02/25	1320	EBB	<2	7.0
			81/02/26	0930	HIGH SLACK	<2	20.0
JI002	49 55.36	123 52.20	81/02/11	1230	EBB	2	13.5
			81/02/12	1105	HIGH SLACK	<2	24.5
			81/02/13	1300	EBB	<2	25.5
			81/02/25	1325	EBB	<2	13.5
			81/02/26	0930	HIGH SLACK	2	13.0
JI003	49 55.28	123 52.24	81/02/11	1230	EBB	<2	23.5
			81/02/12	1105	HIGH SLACK	<2	26.0
			81/02/13	1300	EBB	<2	26.5
			81/02/25	1325	EBB	<2	8.0
			81/02/26	0935	HIGH SLACK	<2	13.5
JI004	49 55.44	123 52.13	81/02/11	1240	EBB	<2	26.5
			81/02/12	1105	HIGH SLACK	<2	26.5
			81/02/13	1305	EBB	<2	27.5
			81/02/25	1330	EBB	<2	12.0
			81/02/26	0935	HIGH SLACK	<2	17.5
JI005	49 55.13	123 52.00	81/02/11	1255	EBB	<2	23.5
			81/02/12	1110	HIGH SLACK	<2	27.5
			81/02/13	1320	EBB	<2	27.0
			81/02/25	1335	EBB	<2	17.0
			81/02/26	0940	HIGH SLACK	<2	20.0
JI006	49 55.05	123 51.91	81/02/11	1310	EBB	2	22.5
			81/02/12	1115	HIGH SLACK	<2	27.5
			81/02/13	1325	EBB	<2	27.5
			81/02/25	1340	EBB	7	19.0
			81/02/26	0945	HIGH SLACK	<2	21.0
JI007	49 54.92	123 51.93	81/02/11	1315	EBB	2	26.5
			81/02/12	1120	HIGH SLACK	<2	28.0
			81/02/13	1330	EBB	<2	27.5
			81/02/25	1340	EBB	<2	12.0
			81/02/26	0945	HIGH SLACK	<2	17.5
JI008	49 49.62	123 57.35	81/02/11	1340	EBB	<2	26.5
			81/02/12	1310	EBB	<2	27.5
			81/02/13	1230	HIGH SLACK	<2	27.5
			81/02/25	1255	EBB	<2	22.0
			81/02/26	1005	HIGH SLACK	<2	25.0
			81/08/24	1025	FLOOD	13	21.5
			81/08/25	1110	FLOOD	8	22.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI008	continued...		81/08/26	1200	FLOOD	<2	23.0
			81/08/27	1230	FLOOD	<2	24.0
JI009	49 49.53	123 57.44	81/02/11	1340	EBB	<2	26.5
			81/02/12	1310	EBB	<2	28.0
			81/02/13	1230	HIGH SLACK	<2	27.5
			81/02/25	1250	EBB	<2	22.5
			81/02/26	1010	HIGH SLACK	<2	25.0
			81/08/24	1030	FLOOD	5	21.5
			81/08/25	1110	FLOOD	<2	22.0
			81/08/26	1215	FLOOD	<2	23.0
			81/08/27	1235	FLOOD	<2	22.0
JI010	49 49.47	123 57.33	81/02/11	1345	EBB	<2	26.0
			81/02/12	1315	EBB	<2	27.5
			81/02/13	1220	HIGH SLACK	2	27.5
			81/02/25	1245	EBB	<2	23.5
			81/02/26	1015	HIGH SLACK	<2	24.0
			81/08/24	1030	FLOOD	<2	21.5
			81/08/25	1115	FLOOD	<2	22.0
			81/08/26	1210	FLOOD	<2	23.0
			81/08/27	1240	FLOOD	<2	22.0
JI011	49 49.08	123 57.69	81/02/11	1400	EBB	<2	27.0
			81/02/12	1325	EBB	2	27.0
			81/02/13	1215	HIGH SLACK	<2	27.5
			81/02/25	1245	EBB	<2	24.5
			81/02/26	1020	HIGH SLACK	<2	24.0
			81/08/24	1040	FLOOD	<2	21.5
			81/08/25	1125	FLOOD	<2	22.0
			81/08/26	1230	FLOOD	<2	23.0
			81/08/27	1240	FLOOD	<2	23.0
JI012	49 49.08	123 57.72	81/02/11	1405	EBB	<2	26.0
			81/02/12	1325	EBB	<2	27.0
			81/02/13	1215	HIGH SLACK	<2	27.5
			81/02/25	1240	EBB	<2	23.0
			81/02/26	1020	HIGH SLACK	<2	24.0
			81/08/24	1040	FLOOD	<2	22.0
			81/08/25	1125	FLOOD	<2	22.0
			81/08/26	1230	FLOOD	<2	23.0
			81/08/27	1250	FLOOD	<2	22.0
JI013	49 50.10	123 59.79	81/02/10	1530	LOW SLACK	<2	27.0
			81/02/11	1420	EBB	<2	27.0
			81/02/12	1405	EBB	<2	27.5
			81/02/13	1155	HIGH SLACK	<2	27.5
			81/02/25	1215	EBB	<2	24.5
			81/02/26	1115	EBB	<2	24.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI013	continued...		81/08/24	1105	FLOOD	9	23.0
			81/08/25	1150	FLOOD	<2	23.0
			81/08/26	1330	FLOOD	<2	24.0
			81/08/27	1315	FLOOD	<2	24.0
JI014	49 50.09	123 59.88	81/02/11	1425	EBB	<2	25.0
			81/02/12	1405	EBB	<2	27.5
			81/02/13	1150	HIGH SLACK	<2	27.5
			81/02/25	1210	EBB	<2	24.5
			81/02/26	1120	EBB	<2	22.5
			81/08/24	1110	FLOOD	<2	23.0
			81/08/25	1150	FLOOD	<2	23.0
			81/08/26	1335	FLOOD	<2	24.0
			81/08/27	1320	FLOOD	<2	23.0
JI015	49 50.12	123 59.70	81/02/10	1515	EBB	<2	25.5
			81/02/11	1430	EBB	<2	25.5
			81/02/12	1415	EBB	<2	27.0
			81/02/13	1150	HIGH SLACK	<2	27.5
			81/02/25	1210	EBB	<2	24.5
			81/02/26	1120	EBB	<2	19.0
			81/08/24	1110	FLOOD	<2	23.0
			81/08/25	1155	FLOOD	<2	23.0
			81/08/26	1355	FLOOD	2	24.0
			81/08/27	1320	FLOOD	<2	23.0
JI016	49 50.15	123 59.60	81/02/10	1515	EBB	<2	25.5
			81/02/12	1415	EBB	<2	27.5
			81/02/13	1145	HIGH SLACK	<2	27.5
			81/02/25	1205	EBB	<2	24.5
			81/02/26	1125	EBB	<2	24.5
			81/08/24	1110	FLOOD	<2	23.0
			81/08/25	1155	FLOOD	<2	23.0
			81/08/26	1340	FLOOD	5	22.0
			81/08/27	1320	FLOOD	<2	23.0
JI017	49 50.34	123 59.61	81/02/10	1505	EBB	<2	26.0
			81/02/11	1430	EBB	<2	23.5
			81/02/12	1420	EBB	<2	27.5
			81/02/13	1145	HIGH SLACK	<2	27.5
			81/02/25	1145	EBB	<2	23.0
			81/02/26	1125	EBB	2	22.0
			81/08/24	1115	FLOOD	<2	24.0
			81/08/25	1200	FLOOD	<2	22.5
			81/08/26	1345	FLOOD	2	22.0
			81/08/27	1325	FLOOD	<2	23.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI018	49 50.50	123 59.73	81/02/10	1500	EBB	<2	27.0
			81/02/11	1440	EBB	<2	27.0
			81/02/12	1420	EBB	<2	27.5
			81/02/13	1135	HIGH SLACK	<2	27.0
			81/02/25	1200	EBB	<2	24.0
			81/02/26	1125	EBB	<2	
			81/08/24	1200	FLOOD	2	23.0
			81/08/25	1200	FLOOD	7	23.5
			81/08/26	1355	FLOOD	<2	22.0
			81/08/27	1330	FLOOD	27	24.0
JI019	49 50.21	123 59.89	81/02/10	1520	EBB	<2	26.0
			81/02/11	1430	EBB	<2	25.0
			81/02/12	1410	EBB	<2	27.5
			81/02/13	1145	HIGH SLACK	<2	27.5
			81/02/25	1210	EBB	<2	24.0
			81/02/26	1120	EBB	<2	24.0
			81/08/24	1115	FLOOD	<2	23.0
			81/08/25	1155	FLOOD	<2	23.0
			81/08/26	1340	FLOOD	2	22.0
			81/08/27	1330	FLOOD	<2	24.0
JI020	49 49.85	124 03.10	81/02/10	1440	EBB	<2	27.5
			81/02/11	1450	EBB	<2	27.5
			81/02/12	1455	EBB	2	27.0
			81/02/13	1125	HIGH SLACK	8	26.0
			81/02/25	1150	EBB	<2	24.5
			81/02/26	1135	EBB	<2	23.5
			81/08/24	1210	FLOOD	<2	24.0
			81/08/25	1215	FLOOD	<2	24.5
			81/08/26	1410	FLOOD	7	22.0
			81/08/27	1340	FLOOD	<2	24.0
JI021	49 49.88	124 03.00	81/02/10	1435	EBB	<2	27.5
			81/02/11	1450	EBB	<2	27.5
			81/02/12	1455	EBB	<2	27.0
			81/02/13	1120	HIGH SLACK	<2	27.0
			81/02/25	1145	EBB	<2	24.0
			81/02/26	1135	EBB	<2	23.5
			81/08/24	1210	FLOOD	<2	24.0
			81/08/25	1215	FLOOD	<2	24.5
			81/08/26	1410	FLOOD	2	22.0
			81/08/27	1350	FLOOD	<2	24.0
JI022	49 49.85	124 03.30	81/02/10	1430	EBB	<2	27.5
			81/02/11	1450	EBB	<2	27.5
			81/02/12	1500	EBB	<2	27.0
			81/02/13	1120	HIGH SLACK	<2	27.5
			81/02/25	1130	EBB	<2	24.0
			81/02/26	1140	EBB	<2	24.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI022	continued...		81/08/24	1215	FLOOD	<2	24.0
			81/08/25	1215	FLOOD	<2	24.5
			81/08/26	1415	FLOOD	<2	23.0
			81/08/27	1400	FLOOD	<2	25.0
JI023	49 50.00	124 03.30	81/02/10	1430	EBB	<2	27.5
			81/02/11	1455	EBB	<2	27.5
			81/02/12	1500	EBB	<2	27.5
			81/02/13	1115	HIGH SLACK	5	27.5
			81/02/25	1130	EBB	<2	24.0
			81/02/26	1140	EBB	<2	23.5
			81/08/24	1215	FLOOD	<2	24.0
			81/08/25	1220	FLOOD	<2	24.5
			81/08/26	1420	FLOOD	<2	22.0
			81/08/27	1410	FLOOD	<2	25.0
JI024	49 50.10	124 03.20	81/02/10	1420	EBB	<2	27.5
			81/02/11	1455	EBB	<2	27.5
			81/02/12	1500	EBB	<2	27.0
			81/02/13	1115	HIGH SLACK	<2	27.0
			81/02/25	1125	EBB	2	24.0
			81/02/26	1145	EBB	<2	23.0
			81/08/24	1220	FLOOD	<2	24.0
			81/08/25	1220	FLOOD	<2	24.5
			81/08/26	1425	FLOOD	<2	23.0
			81/08/27	1410	FLOOD	<2	24.0
JI025	49 50.20	124 03.21	81/02/10	1420	EBB	<2	27.5
			81/02/11	1500	EBB	<2	27.0
			81/02/12	1505	EBB	<2	27.5
			81/02/13	1110	HIGH SLACK	<2	26.5
			81/02/25	1120	EBB	8	23.0
			81/02/26	1145	EBB	<2	24.0
			81/08/24	1225	FLOOD	5	24.0
			81/08/25	1225	FLOOD	<2	24.5
			81/08/26	1430	FLOOD	<2	24.0
			81/08/27	1415	FLOOD	<2	24.0
JI026	49 50.30	124 03.29	81/02/10	1415	EBB	<2	26.5
			81/02/11	1505	EBB	<2	25.5
			81/02/12	1510	EBB	<2	27.0
			81/02/13	1105	HIGH SLACK	<2	26.0
			81/02/25	1120	EBB	2	23.5
			81/02/26	1150	EBB	<2	24.0
			81/08/24	1225	FLOOD	<2	24.0
			81/08/25	1230	FLOOD	<2	24.5
			81/08/26	1430	FLOOD	<2	24.0
			81/08/27	1420	FLOOD	<2	24.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI027	49 50.24	124 03.29	81/02/10	1410	EBB	79	27.0
			81/02/11	1510	EBB	<2	27.0
			81/02/12	1515	EBB	2	26.5
			81/02/13	1105	HIGH SLACK	<2	27.0
			81/02/25	1115	EBB	17	24.0
			81/02/26	1155	EBB	49	24.0
			81/08/24	1235	FLOOD	2	24.0
			81/08/25	1245	FLOOD	5	24.5
			81/08/26	1435	FLOOD	2	24.0
			81/08/27	1430	FLOOD	<2	24.0
JI028	49 50.20	124 03.29	81/02/10	1410	EBB	<2	27.5
			81/02/11	1510	EBB	<2	26.5
			81/02/12	1515	EBB	2	26.5
			81/02/13	1100	HIGH SLACK	13	26.0
			81/02/25	1115	EBB	5	24.0
			81/02/26	1150	EBB	2	24.0
			81/08/24	1240	FLOOD	<2	24.0
			81/08/25	1245	FLOOD	<2	24.5
			81/08/26	1435	FLOOD	<2	24.0
			81/08/27	1435	FLOOD	8	24.0
JI029	49 50.22	124 03.38	81/02/10	1405	EBB	<2	27.0
			81/02/11	1515	EBB	<2	26.5
			81/02/12	1520	EBB	<2	27.0
			81/02/13	1100	HIGH SLACK	<2	25.5
			81/02/25	1110	EBB	<2	22.5
			81/02/26	1155	EBB	<2	24.0
			81/08/24	1240	FLOOD	<2	24.0
			81/08/25	1250	FLOOD	<2	24.5
			81/08/26	1440	FLOOD	<2	24.0
			81/08/27	1435	FLOOD	<2	24.0
JI030	49 50.12	124 03.40	81/02/10	1400	EBB	<2	27.5
			81/02/11	1520	EBB	<2	27.5
			81/02/12	1520	EBB	<2	27.0
			81/02/13	1055	HIGH SLACK	<2	26.5
			81/02/25	1110	EBB	2	23.5
			81/02/26	1200	EBB	<2	24.0
			81/08/24	1245	FLOOD	5	24.0
			81/08/25	1250	FLOOD	<2	24.5
			81/08/26	1440	FLOOD	<2	24.0
			81/08/27	1440	FLOOD	<2	25.0
JI031	49 50.06	124 03.35	81/02/10	1400	EBB	<2	27.5
			81/02/11	1520	EBB	<2	27.5
			81/02/12	1525	EBB	<2	27.0
			81/02/13	1055	HIGH SLACK	<2	27.0
			81/02/25	1105	EBB	2	23.5
			81/02/26	1200	EBB	<2	24.5

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI031	continued...		81/08/24	1250	FLOOD	<2	24.0
			81/08/25	1250	FLOOD	<2	24.5
			81/08/26	1445	FLOOD	2	24.0
			81/08/27	1440	FLOOD	<2	25.0
JI032	49 50.42	124 04.72	81/02/10	1350	EBB	<2	27.0
			81/02/11	1525	EBB	<2	26.5
			81/02/12	1535	EBB	<2	27.0
			81/02/13	1050	FLOOD	<2	26.5
			81/02/25	1000	HIGH SLACK	<2	24.0
			81/02/26	1205	EBB	<2	23.0
			81/08/24	1250	FLOOD	<2	25.0
			81/08/25	1255	FLOOD	<2	24.5
			81/08/26	1445	FLOOD	<2	24.0
			81/08/27	1445	FLOOD	<2	24.0
JI033	49 50.47	124 04.80	81/02/10	1350	EBB	<2	27.0
			81/02/11	1530	EBB	<2	27.0
			81/02/12	1540	EBB	<2	26.5
			81/02/13	1045	FLOOD	<2	26.5
			81/02/25	0955	HIGH SLACK	<2	24.0
			81/02/26	1205	EBB	<2	23.0
			81/08/24	1255	FLOOD	<2	24.0
			81/08/25	1300	FLOOD	<2	24.5
			81/08/26	1555	FLOOD	<2	24.0
			81/08/27	1445	FLOOD	<2	24.0
JI034	49 50.52	124 04.72	81/02/10	1345	EBB	<2	27.0
			81/02/11	1530	EBB	<2	26.0
			81/02/12	1540	EBB	<2	26.0
			81/02/13	1045	FLOOD	5	26.5
			81/02/25	0940	HIGH SLACK	<2	22.0
			81/02/26	1210	EBB	<2	23.0
			81/08/24	1255	FLOOD	5	24.0
			81/08/25	1300	FLOOD	5	24.5
			81/08/26	1600	FLOOD	<2	24.0
			81/08/27	1450	FLOOD	<2	24.0
JI035	49 50.58	124 04.80	81/02/10	1340	EBB	<2	25.5
			81/02/11	1540	EBB	<2	15.5
			81/02/12	1545	EBB	<2	24.0
			81/02/13	1045	FLOOD	<2	25.5
			81/02/25	0940	HIGH SLACK	<2	21.5
			81/02/26	1210	EBB	<2	22.0
			81/08/24	1305	FLOOD	33	24.0
			81/08/25	1300	FLOOD	2	25.0
			81/08/26	1605	FLOOD	<2	25.0
			81/08/27	1450	FLOOD	7	25.0

APPENDIX IV
TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)
Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI036	49 50.60	124 04.93	81/02/10	1335	EBB	<2	25.0
			81/02/11	1540	EBB	<2	26.0
			81/02/12	1550	EBB	<2	26.5
			81/02/13	1040	FLOOD	2	26.0
			81/02/25	0940	HIGH SLACK	<2	22.5
			81/02/26	1215	EBB	<2	22.0
			81/08/24	1300	FLOOD	<2	25.0
			81/08/25	1305	FLOOD	13	25.0
			81/08/26	1545	FLOOD	27	26.0
			81/08/27	1455	FLOOD	<2	25.0
JI037	49 50.55	124 05.00	81/02/10	1330	EBB	<2	25.5
			81/02/11	1545	EBB	<2	26.5
			81/02/12	1555	EBB	<2	27.0
			81/02/13	1035	FLOOD	2	26.5
			81/02/25	0935	HIGH SLACK	<2	23.0
			81/02/26	1230	EBB	<2	23.0
			81/08/24	1305	FLOOD	4	24.0
			81/08/25	1305	FLOOD	<2	25.0
			81/08/26	1545	FLOOD	<2	24.0
			81/08/27	1455	FLOOD	<2	24.0
JI038	49 50.50	124 05.10	81/02/10	1325	EBB	<2	26.5
			81/02/11	1550	EBB	<2	26.0
			81/02/12	1555	EBB	<2	26.5
			81/02/13	1035	FLOOD	13	26.5
			81/02/25	0930	HIGH SLACK	<2	23.5
			81/02/26	1235	EBB	<2	22.0
			81/08/24	1310	FLOOD	<2	24.0
			81/08/25	1310	FLOOD	<2	25.0
			81/08/26	1535	FLOOD	<2	23.0
			81/08/27	1500	FLOOD	2	24.0
JI039	49 50.47	124 05.20	81/02/10	1320	EBB	<2	26.5
			81/02/11	1555	EBB	<2	16.5
			81/02/12	1600	EBB	<2	26.5
			81/02/13	1030	FLOOD	2	26.0
			81/02/25	0930	HIGH SLACK	<2	24.0
			81/02/26	1250	EBB	<2	21.5
			81/08/24	1310	FLOOD	2	24.0
			81/08/25	1315	FLOOD	<2	25.0
			81/08/26	1535	FLOOD	<2	22.0
			81/08/27	1500	FLOOD	2	24.0
JI040	49 50.42	124 05.30	81/02/10	1305	EBB	<2	26.0
			81/02/11	1555	EBB	<2	27.0
			81/02/12	1605	EBB	5	26.5
			81/02/13	1015	FLOOD	<2	26.5
			81/02/25	0925	HIGH SLACK	<2	24.0
			81/02/26	1255	EBB	<2	22.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI040	continued...		81/08/24	1315	FLOOD	<2	24.0
			81/08/25	1315	FLOOD	<2	24.5
			81/08/26	1530	FLOOD	<2	24.0
			81/08/27	1505	FLOOD	<2	25.0
JI041	49 50.30	124 05.41	81/02/10	1300	EBB	<2	26.0
			81/02/11	1600	EBB	<2	16.5
			81/02/12	1610	EBB	<2	26.5
			81/02/13	1010	FLOOD	<2	26.0
			81/02/25	0920	HIGH SLACK	<2	24.0
			81/02/26	1255	EBB	<2	23.0
			81/08/24	1315	FLOOD	2	24.0
			81/08/25	1320	FLOOD	<2	24.5
			81/08/26	1530	FLOOD	<2	24.0
			81/08/27	1510	FLOOD	<2	24.0
JI042	49 50.21	124 05.43	81/02/10	1255	EBB	<2	26.5
			81/02/11	1600	EBB	<2	27.0
			81/02/12	1610	EBB	<2	26.5
			81/02/13	1010	FLOOD	6	26.0
			81/02/25	0920	HIGH SLACK	<2	23.0
			81/02/26	1300	EBB	<2	22.0
			81/08/24	1320	FLOOD	<2	24.0
			81/08/25	1325	FLOOD	<2	24.5
			81/08/26	1525	FLOOD	<2	23.0
			81/08/27	1510	FLOOD	2	25.0
JI043	49 45.28	124 09.48	81/02/17	1310	FLOOD	<2	
			81/02/18	1520	FLOOD	<2	28.0
			81/02/19	1220	LOW SLACK	2	27.5
			81/02/20	1135	EBB	<2	27.5
			81/02/23	1400	EBB	<2	26.5
			81/08/24	1405	FLOOD	<2	25.0
			81/08/25	1420	FLOOD	4	25.5
			81/08/26	1645	HIGH SLACK	<2	26.0
			81/08/27	1550	FLOOD	<2	26.0
JI044	49 45.27	124 09.41	81/02/17	1305	FLOOD	<2	26.0
			81/02/18	1526	FLOOD	<2	28.0
			81/02/19	1215	LOW SLACK	<2	27.5
			81/02/20	1130	EBB	<2	27.0
			81/02/23	1400	EBB	<2	26.5
			81/08/24	1405	FLOOD	<2	25.0
			81/08/25	1420	FLOOD	8	25.5
			81/08/26	1645	HIGH SLACK	2	26.0
			81/08/27	1550	FLOOD	<2	26.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI045	49 45.29	124 09.61	81/02/17	1305	FLOOD	<2	26.5
			81/02/18	1520	FLOOD	<2	28.0
			81/02/19	1215	LOW SLACK	<2	27.0
			81/02/20	1130	EBB	2	27.5
			81/02/23	1355	EBB	2	27.0
			81/02/24	1110	EBB	<2	26.0
			81/08/24	1405	FLOOD	<2	25.0
			81/08/25	1425	FLOOD	7	25.0
			81/08/26	1640	HIGH SLACK	<2	26.0
			81/08/27	1555	FLOOD	<2	26.0
JI046	49 45.37	124 09.61	81/02/17	1300	FLOOD	<2	26.0
			81/02/18	1515	FLOOD	<2	28.0
			81/02/19	1210	LOW SLACK	<2	27.0
			81/02/20	1130	EBB	<2	27.5
			81/02/23	1350	EBB	<2	27.0
			81/02/24	1105	EBB	<2	26.0
			81/08/24	1400	FLOOD	<2	25.0
			81/08/25	1425	FLOOD	2	25.5
			81/08/26	1635	HIGH SLACK	<2	26.0
			81/08/27	1555	FLOOD	<2	26.0
JI047	49 45.34	124 09.77	81/02/17	1300	FLOOD	<2	26.5
			81/02/18	1515	FLOOD	<2	27.0
			81/02/19	1210	LOW SLACK	2	27.0
			81/02/20	1130	EBB	<2	27.5
			81/02/23	1350	EBB	<2	27.0
			81/02/24	1105	EBB	<2	26.0
			81/08/24	1400	FLOOD	2	25.0
			81/08/25	1425	FLOOD	17	25.0
			81/08/26	1630	HIGH SLACK	<2	25.0
			81/08/27	1600	FLOOD	2	26.0
JI048	49 44.66	124 09.03	81/08/21	1155	HIGH SLACK	<2	24.0
			81/08/22	1050	FLOOD	<2	25.0
			81/08/23	0955	FLOOD	2	25.0
JI049	49 44.40	124 09.36	81/08/21	1150	HIGH SLACK	<2	24.0
			81/08/22	1050	FLOOD	<2	25.0
			81/08/23	0940	FLOOD	<2	25.0
JI050	49 44.41	124 09.13	81/02/17	1245	FLOOD	<2	26.0
			81/02/18	1500	FLOOD	<2	20.5
			81/02/19	1205	LOW SLACK	<2	26.5
			81/02/20	1125	EBB	<2	26.5
			81/02/23	1345	EBB	<2	26.5
			81/02/24	1100	EBB	2	24.0
			81/08/20	1150	EBB	4	23.0
			81/08/21	1150	HIGH SLACK	<2	25.0
			81/08/22	1055	FLOOD	<2	25.0
			81/08/23	0950	FLOOD	<2	25.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI051	49 44.38	124 09.20	81/02/17	1245	FLOOD	<2	24.0
			81/02/18	1455	FLOOD	<2	20.0
			81/02/19	1200	LOW SLACK	<2	25.0
			81/02/20	1120	EBB	<2	25.5
			81/02/23	1340	EBB	<2	23.5
			81/02/24	1100	EBB	<2	23.0
			81/08/20	1150	EBB	27	24.0
			81/08/21	1145	HIGH SLACK	<2	25.0
			81/08/22	1100	FLOOD	<2	25.0
			81/08/23	0950	FLOOD	2	25.0
JI052	49 44.35	124 09.22	81/02/17	1240	FLOOD	<2	25.5
			81/02/18	1455	FLOOD	<2	24.0
			81/02/19	1200	LOW SLACK	<2	27.0
			81/02/20	1120	EBB	<2	27.0
			81/02/23	1340	EBB	<2	25.5
			81/02/24	1100	EBB	<2	26.0
			81/08/20	1145	EBB	8	24.0
			81/08/21	1145	HIGH SLACK	<2	25.0
			81/08/22	1100	FLOOD	2	25.0
			81/08/23	0945	FLOOD	<2	25.0
JI053	49 44.30	124 09.29	81/02/17	1240	FLOOD	<2	25.0
			81/02/18	1450	FLOOD	<2	25.0
			81/02/19	1155	LOW SLACK	<2	27.5
			81/02/20	1120	EBB	<2	26.0
			81/02/23	1335	EBB	2	26.0
			81/02/24	1055	EBB	<2	26.0
			81/08/20	1140	EBB	<2	24.0
			81/08/21	1140	HIGH SLACK	5	25.0
			81/08/22	1100	FLOOD	<2	25.0
			81/08/23	0945	FLOOD	2	25.0
JI054	49 43.07	124 10.60	81/02/17	1130	LOW SLACK	130	26.5
			81/02/18	1425	FLOOD	350	25.5
			81/02/19	1140	LOW SLACK	22	27.0
			81/02/20	1100	EBB	8	27.0
			81/02/23	1320	EBB	70	26.0
			81/02/24	1025	EBB	33	26.0
			81/08/20	1130	EBB	49	24.0
			81/08/21	1130	HIGH SLACK	11	26.0
			81/08/22	1155	HIGH SLACK	5	25.0
			81/08/23	0925	FLOOD	23	26.0
JI055	49 42.95	124 10.68	81/02/17	1145	LOW SLACK	2	26.0
			81/02/18	1425	FLOOD	2	26.0
			81/02/19	1145	LOW SLACK	11	26.5
			81/02/20	1050	EBB	<2	26.0
			81/02/23	1315	EBB	<2	26.0
			81/02/24	1015	EBB	2	25.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI055	continued...		81/08/20	1120	EBB	8	24.0
			81/08/21	1122	HIGH SLACK	2	25.0
			81/08/22	1200	HIGH SLACK	5	25.0
			81/08/23	0920	FLOOD	<2	25.0
JI056	49 43.05	124 10.85	81/02/17	1145	LOW SLACK	2	25.0
			81/02/18	1430	FLOOD	<2	26.5
			81/02/19	1145	LOW SLACK	<2	27.0
			81/02/20	1050	EBB	<2	26.5
			81/02/23	1050	EBB	2	
			81/02/23	1310	EBB		26.5
			81/02/24	1020	EBB	5	26.0
			81/08/20	1125	EBB	7	24.0
			81/08/21	1120	HIGH SLACK	2	26.0
			81/08/22	1200	HIGH SLACK	<2	25.0
			81/08/23	0920	FLOOD	2	26.0
JI057	49 44.78	124 12.63	81/02/18	1340	FLOOD	<2	26.0
			81/02/19	1115	EBB	<2	21.5
			81/02/20	1025	EBB	2	25.5
			81/02/23	1245	EBB	<2	
			81/02/24	1045	LOW SLACK	<2	26.5
			81/08/20	1105	EBB	17	24.0
			81/08/21	1100	HIGH SLACK	<2	25.0
			81/08/22	1220	HIGH SLACK	<2	25.0
			81/08/23	0900	FLOOD	2	26.0
JI058	49 44.99	124 12.32	81/02/18	1350	FLOOD	<2	24.5
			81/02/19	1120	EBB	13	20.0
			81/02/20	1030	EBB	<2	26.0
			81/02/23	1250	EBB	<2	
			81/02/24	1040	EBB	<2	25.5
			81/08/20	1110	EBB	<2	24.0
			81/08/21	1100	HIGH SLACK	<2	25.0
			81/08/22	1210	HIGH SLACK	<2	25.0
			81/08/23	0850	FLOOD	2	25.0
JI059	49 42.50	124 10.50	81/08/20	0955	HIGH SLACK	2	26.0
			81/08/21	0900	FLOOD	2	26.0
			81/08/22	1235	HIGH SLACK	<2	25.5
			81/08/23	1050	FLOOD	<2	26.0
JI060	49 42.50	124 10.50	81/08/20	1000	HIGH SLACK	5	25.0
			81/08/21	0905	FLOOD	17	26.0
			81/08/22	1240	HIGH SLACK	<2	25.5
			81/08/23	1050	FLOOD	<2	26.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI061	49 42.50	124 10.50	81/08/20	1000	HIGH SLACK	<2	25.0
			81/08/21	0907	FLOOD	<2	26.0
			81/08/22	1240	HIGH SLACK	<2	25.0
			81/08/23	1050	FLOOD	<2	26.0
JI062	49 42.73	124 10.31	81/02/17	1040	LOW SLACK	23	23.0
			81/02/18	1220	LOW SLACK	<2	26.0
			81/02/19	1025	EBB	4	21.5
			81/02/20	0935	EBB	13	24.0
			81/02/23	1000	EBB	130	9.5
			81/02/24	0940	HIGH SLACK	<2	22.0
			81/08/20	1005	HIGH SLACK	7	25.0
			81/08/21	0924	FLOOD	4	26.0
			81/08/22	1250	HIGH SLACK	2	25.5
			81/08/23	1105	FLOOD	<2	26.0
JI063	49 42.86	124 10.21	81/02/17	1040	LOW SLACK	17	22.0
			81/02/18	1215	LOW SLACK	2	24.0
			81/02/19	1025	EBB	4	19.5
			81/02/20	0930	EBB	2	23.0
			81/02/23	1045	EBB	33	16.5
			81/02/24	0930	HIGH SLACK	2	23.5
			81/08/20	1005	HIGH SLACK	49	25.0
			81/08/21	0920	FLOOD	5	26.0
			81/08/22	1245	HIGH SLACK	<2	26.0
			81/08/23	1105	FLOOD	<2	26.0
JI064	49 42.80	124 10.25	81/02/17	1040	LOW SLACK	79	22.0
			81/02/18	1215	LOW SLACK	<2	23.0
			81/02/19	1020	EBB	<2	22.5
			81/02/20	0930	EBB	5	23.5
			81/02/23	1045	EBB	49	15.5
			81/02/24	0935	HIGH SLACK	9	24.0
			81/08/20	1000	HIGH SLACK	23	25.0
			81/08/21	0920	FLOOD	2	26.0
			81/08/22	1245	HIGH SLACK	<2	25.5
			81/08/23	1100	FLOOD	<2	26.0
JI065	49 42.78	124 10.18	81/02/17	1045	LOW SLACK	5	22.0
			81/02/18	1210	LOW SLACK	<2	25.0
			81/02/19	1020	EBB	<2	21.5
			81/02/20	0935	EBB	<2	23.0
			81/02/23	1050	EBB	13	21.0
			81/02/24	0935	HIGH SLACK	11	23.0
			81/08/20	1000	HIGH SLACK	11	25.0
			81/08/21	0910	FLOOD	2	26.0
			81/08/22	1245	HIGH SLACK	<2	25.0
			81/08/23	1100	FLOOD	2	26.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI066	49 42.60	124 09.85	81/02/17	1050	LOW SLACK	14	23.0
			81/02/18	1225	LOW SLACK	2	22.5
			81/02/19	1030	EBB	4	25.5
			81/02/20	0940	EBB	<2	25.0
			81/02/23	1105	EBB	<2	21.5
			81/02/24	0945	HIGH SLACK	13	24.0
			81/08/20	1015	HIGH SLACK	33	25.0
			81/08/21	1000	HIGH SLACK	2	26.0
			81/08/22	1250	HIGH SLACK	<2	25.0
			81/08/23	1110	FLOOD	<2	26.0
JI067	49 42.48	124 09.90	81/02/17	1100	LOW SLACK	5	24.0
			81/02/18	1235	LOW SLACK	<2	25.0
			81/02/19	1035	EBB	<2	26.5
			81/02/20	0945	EBB	<2	23.5
			81/02/23	1110	EBB	<2	25.5
			81/02/24	0950	HIGH SLACK	<2	25.0
			81/08/20	1020	HIGH SLACK	2	25.0
			81/08/21	1000	HIGH SLACK	2	26.0
			81/08/22	1255	HIGH SLACK	<2	25.0
			81/08/23	1115	FLOOD	<2	24.0
JI068	49 42.28	124 10.15	81/02/17	1105	LOW SLACK	110	25.0
			81/02/18	1250	FLOOD	6	24.0
			81/02/19	1040	EBB	49	26.0
			81/02/20	0955	EBB	46	23.0
			81/02/23	1115	EBB	540	21.5
			81/02/24	0950	HIGH SLACK	13	25.0
			81/08/20	1020	HIGH SLACK	13	25.0
			81/08/21	1005	HIGH SLACK	<2	26.0
			81/08/22	1255	HIGH SLACK	2	25.5
			81/08/23	1120	FLOOD	<2	26.0
JI069	49 42.22	124 10.24	81/02/17	1105	LOW SLACK	1600	26.0
			81/02/18	1250	FLOOD	150	25.0
			81/02/19	1045	EBB	920	25.5
			81/02/20	1000	EBB	>1600	23.0
			81/02/23	1120	EBB	1600	21.5
			81/02/24	0950	HIGH SLACK	13	26.0
			81/08/20	1025	HIGH SLACK	2	25.0
			81/08/21	1010	HIGH SLACK	<2	26.0
			81/08/22	1255	HIGH SLACK	<2	25.5
			81/08/23	1120	FLOOD	2	26.0
JI070	49 42.32	124 10.37	81/02/17	1110	LOW SLACK	13	24.0
			81/02/18	1255	FLOOD	2	25.0
			81/02/19	1050	EBB	130	25.0
			81/02/20	1005	EBB	79	21.5
			81/02/23	1120	EBB	17	18.0
			81/02/24	0955	HIGH SLACK	2	24.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI070	continued...		81/08/20	1030	HIGH SLACK	22	20.0
			81/08/21	1010	HIGH SLACK	8	25.0
			81/08/22	1300	HIGH SLACK	<2	25.0
			81/08/23	1125	FLOOD	5	26.0
JI071	49 42.30	124 10.38	81/02/17	1110	LOW SLACK	14	24.0
			81/02/18	1315	FLOOD	8	28.0
			81/02/19	1055	EBB	11	25.0
			81/02/20	1005	EBB	79	22.0
			81/02/23	1125	EBB	2	20.0
			81/02/24	0955	HIGH SLACK	<2	24.0
			81/08/20	1030	HIGH SLACK	8	24.0
			81/08/21	1045	HIGH SLACK	8	24.0
			81/08/22	1300	HIGH SLACK	8	24.0
			81/08/23	1125	FLOOD	<2	25.0
JI072	49 41.19	124 11.19	81/02/17	1005	LOW SLACK	<2	25.0
			81/02/18	1115	LOW SLACK	<2	25.0
			81/02/19	0950	EBB	5	16.5
			81/02/20	0910	EBB	2	23.0
			81/02/23	0945	EBB	<2	23.0
			81/02/24	0905	HIGH SLACK	<2	24.5
JI073	49 41.17	124 10.98	81/02/17	1000	LOW SLACK	<2	22.0
			81/02/18	1110	LOW SLACK	<2	25.0
			81/02/19	0945	EBB	<2	20.0
			81/02/20	0910	EBB	<2	24.5
			81/02/23	0940	EBB	<2	24.5
			81/02/24	0900	HIGH SLACK	<2	26.0
JI074	49 41.11	124 11.04	81/02/17	1000	LOW SLACK	<2	24.0
			81/02/19	0950	EBB	2	23.5
			81/02/20	0910	EBB	<2	24.5
			81/02/23	0945	EBB	<2	25.0
			81/02/24	0905	HIGH SLACK	<2	26.0
JI075	49 38.04	123 59.80	81/08/28	1735	FLOOD	7	25.0
			81/08/31	0840	EBB	2	25.5
			81/09/01	0840	HIGH SLACK	33	25.0
			81/09/02	0900	HIGH SLACK	79	25.0
			81/09/03	1015	HIGH SLACK	8	25.0
JI076	49 38.05	123 59.79	81/08/28	1735	FLOOD	2	25.0
			81/08/31	0840	EBB	23	25.5
			81/09/01	0840	HIGH SLACK	49	25.5
			81/09/02	0900	HIGH SLACK	33	24.5
			81/09/03	1010	HIGH SLACK	23	24.5

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI077	49 37.96	123 59.78	81/02/18	0925	EBB	22	14.0
			81/02/20	0840	EBB	17	11.5
			81/02/23	0900	HIGH SLACK	2	19.0
			81/02/24	0840	HIGH SLACK	2	16.5
			81/08/28	1730	FLOOD	2	25.0
			81/08/31	0845	EBB	8	26.0
			81/09/01	0845	HIGH SLACK	110	25.5
			81/09/02	0855	HIGH SLACK	8	24.0
			81/09/03	1010	HIGH SLACK	5	24.0
JI078	49 38.09	123 59.70	81/02/18	0925	EBB	8	10.5
			81/02/20	0845	EBB	130	11.5
			81/02/23	0900	HIGH SLACK	<2	20.0
			81/02/24	0845	HIGH SLACK	2	18.0
			81/08/28	1740	HIGH SLACK	2	25.0
			81/08/31	0845	EBB	46	26.0
			81/09/01	0845	HIGH SLACK	49	25.5
			81/09/02	0900	HIGH SLACK	8	25.0
			81/09/03	1015	HIGH SLACK	8	25.0
JI079	49 38.13	123 59.74	81/08/28	1740	HIGH SLACK	17	25.0
			81/08/31	0845	EBB	11	26.0
			81/09/01	0850	HIGH SLACK	70	25.0
			81/09/02	0905	HIGH SLACK	79	23.5
			81/09/03	1015	HIGH SLACK	2	23.0
JI080	49 38.14	123 59.59	81/09/01	0915	EBB	79	24.0
			81/09/02	0940	EBB	17	21.0
			81/09/03	1045	EBB	7	25.0
JI081	49 38.20	123 59.59	81/08/28	1740	HIGH SLACK	7	25.0
			81/08/31	0850	EBB	79	26.0
			81/09/01	0850	HIGH SLACK	70	25.5
			81/09/02	0905	HIGH SLACK	13	25.5
			81/09/03	1020	HIGH SLACK	8	25.0
JI082	49 38.24	123 59.49	81/08/28	1745	HIGH SLACK	8	25.0
			81/08/31	0855	EBB	8	25.5
			81/09/01	0855	HIGH SLACK	8	25.5
			81/09/02	0910	HIGH SLACK	4	25.5
			81/09/03	1020	HIGH SLACK	2	25.0
JI083	49 38.34	123 59.18	81/09/01	0900	EBB	46	24.0
			81/09/02	0910	HIGH SLACK	<2	25.0
			81/09/03	1020	HIGH SLACK	8	23.0
JI084	49 38.52	123 59.04	81/09/01	0905	EBB	540	8.0
			81/09/02	0925	HIGH SLACK	130	4.0
			81/09/03	1025	HIGH SLACK	350	3.5

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI085	49 37.62	123 59.75	81/09/01	0935	EBB	170	24.5
			81/09/02	0955	EBB	79	24.0
			81/09/03	1050	EBB	<2	25.0
JI086	49 37.50	123 59.10	81/09/01	0925	EBB	22	25.0
			81/09/02	0950	EBB	13	24.5
			81/09/03	1050	EBB	920	14.5
JI087	49 36.23	124 03.16	81/02/18	1000	EBB	5	27.0
			81/02/19	1150	LOW SLACK	79	26.5
			81/02/20	0935	EBB	9	25.0
			81/02/23	0945	EBB	5	26.0
			81/02/24	0930	HIGH SLACK	5	25.5
			81/02/26	....	OTHER	<2	24.5
			81/08/24	1345	FLOOD	<2	24.0
			81/08/25	1330	FLOOD	<2	25.0
			81/08/26	1330	FLOOD	5	
			81/08/27	1550	FLOOD	2	25.0
JI088	49 36.30	124 03.07	81/02/18	1005	EBB	<2	26.5
			81/02/19	1153	LOW SLACK	11	26.5
			81/02/20	0940	EBB	5	26.0
			81/02/23	0945	EBB	2	25.0
			81/02/24	0935	HIGH SLACK	14	25.0
			81/02/25	1205	EBB	<2	26.0
			81/02/26	....	OTHER	<2	25.0
			81/08/24	1340	FLOOD	<2	24.0
			81/08/25	1330	FLOOD	2	25.5
			81/08/26	1330	FLOOD	<2	24.0
			81/08/27	1500	FLOOD	<2	26.0
JI089	49 36.40	124 02.98	81/02/18	1010	EBB	<2	26.5
			81/02/19	1155	LOW SLACK	33	21.5
			81/02/20	0940	EBB	5	26.0
			81/02/23	0950	EBB	5	25.5
			81/02/24	0940	HIGH SLACK	13	26.0
			81/02/25	1210	EBB	<2	25.0
			81/02/26	....	OTHER	33	21.5
			81/08/24	1345	FLOOD	13	24.0
			81/08/25	1335	FLOOD	<2	25.5
			81/08/26	1335	FLOOD	<2	24.0
			81/08/27	1505	FLOOD	<2	25.0
JI090	49 36.40	124 02.89	81/02/18	1010	EBB	2	26.5
			81/02/19	1157	LOW SLACK	49	24.5
			81/02/20	0945	EBB	<2	26.5
			81/02/23	0950	EBB	4	25.0
			81/02/24	0940	HIGH SLACK	<2	26.0
			81/02/25	1215	EBB	13	25.0
			81/02/26	....	OTHER	4	20.5

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI090	continued...		81/08/24	1355	FLOOD	<2	24.0
			81/08/25	1340	FLOOD	<2	25.0
			81/08/26	1340	FLOOD	<2	24.0
			81/08/27	1505	FLOOD	2	25.0
JI091	49 36.31	124 02.90	81/02/18	1015	EBB	<2	27.0
			81/02/19	1210	LOW SLACK	49	25.5
			81/02/20	0945	EBB	2	26.5
			81/02/23	0955	EBB	4	25.0
			81/02/24	0950	HIGH SLACK	2	26.0
			81/02/25	1225	EBB	2	25.5
			81/08/24	1355	FLOOD	<2	24.0
			81/08/25	1345	FLOOD	<2	24.5
			81/08/26	1345	FLOOD	2	24.0
			81/08/27	1520	FLOOD	<2	25.0
JI092	49 35.70	124 01.30	81/08/28	1535	FLOOD	<2	
			81/08/31	0920	EBB	2	25.5
			81/09/01	1115	EBB	2	24.0
			81/09/02	0935	HIGH SLACK	5	25.0
			81/09/03	....	OTHER	<2	24.0
JI093	49 35.72	124 01.20	81/08/28	1530	FLOOD	<2	24.0
			81/08/31	0920	EBB	<2	25.0
			81/09/01	1110	EBB	<2	24.0
			81/09/02	0930	HIGH SLACK	2	25.0
			81/09/03	0905	HIGH SLACK	<2	24.5
JI094	49 35.70	124 01.20	81/08/28	1530	FLOOD	<2	24.0
			81/08/31	0915	EBB	<2	25.0
			81/09/01	1110	EBB	<2	24.0
			81/09/02	0930	HIGH SLACK	2	25.0
			81/09/03	0905	HIGH SLACK	<2	24.0
JI095	49 35.70	124 01.10	81/08/28	....	OTHER	2	24.0
			81/08/31	0915	EBB	<2	25.0
			81/09/01	1110	EBB	<2	24.0
			81/09/02	0925	HIGH SLACK	11	25.5
			81/09/03	0900	HIGH SLACK	<2	24.0
JI096	49 35.70	124 00.90	81/08/28	....	OTHER	<2	24.0
			81/08/31	0915	EBB	5	24.5
			81/09/01	1110	EBB	<2	24.0
			81/09/02	0925	HIGH SLACK	<2	25.5
			81/09/03	0900	HIGH SLACK	33	23.0
JI097	49 35.65	124 00.90	81/08/28	....	OTHER	<2	24.0
			81/08/31	0910	EBB	13	24.5
			81/09/01	1105	EBB	<2	24.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI097	continued...		81/09/02	0915	HIGH SLACK	<2	25.5
			81/09/03	0855	HIGH SLACK	<2	24.0
JI098	49 35.58	124 00.90	81/08/28	....	OTHER	<2	24.0
			81/08/31	0910	EBB	2	25.5
			81/09/01	1100	EBB	17	24.0
			81/09/02	0910	HIGH SLACK	5	25.0
			81/09/03	0855	HIGH SLACK	<2	24.0
JI099	49 35.44	124 00.90	81/08/28	....	OTHER	<2	24.0
			81/08/31	0910	EBB	2	25.0
			81/09/01	1100	EBB	2	24.0
			81/09/02	0910	HIGH SLACK	<2	25.0
			81/09/03	0850	HIGH SLACK	<2	24.0
JI100	49 31.65	123 58.05	81/08/20	1240	EBB	2	25.0
			81/08/21	0915	FLOOD	<2	24.0
			81/08/22	0905	FLOOD	<2	23.0
			81/08/23	0905	FLOOD	5	24.0
			81/08/28	1345	FLOOD	<2	23.0
			81/08/31	0940	EBB	<2	25.0
JI101	49 30.73	123 57.55	81/08/20	1145	EBB	17	26.0
			81/08/21	1050	HIGH SLACK	33	25.0
			81/08/22	0920	FLOOD	110	24.0
			81/08/23	0915	FLOOD	7	24.0
			81/08/28	1355	FLOOD	33	23.0
			81/08/31	0950	EBB	5	25.0
JI102	49 30.78	123 57.62	81/08/20	1145	EBB	8	25.0
			81/08/21	1045	HIGH SLACK	49	24.0
			81/08/22	0920	FLOOD	24	24.0
			81/08/23	0910	FLOOD	17	24.0
			81/08/28	1355	FLOOD	8	23.0
			81/08/31	1000	EBB	7	25.0
JI103	49 30.82	123 57.53	81/08/20	1150	EBB	23	25.0
			81/08/21	1055	HIGH SLACK	23	24.0
			81/08/22	0915	FLOOD	130	24.0
			81/08/23	0915	FLOOD	33	24.0
			81/08/28	1355	FLOOD	5	23.0
			81/08/31	1000	EBB	<2	25.0
JI104	49 30.40	123 56.90	81/02/18	1000	EBB	5	25.5
			81/02/19	0946	EBB	2	23.5
			81/02/20	1050	EBB	2	25.0
			81/08/20	1045	EBB	<2	24.0
			81/08/21	0945	FLOOD	<2	24.0
			81/08/22	0950	FLOOD	<2	23.0
			81/08/23	0930	FLOOD	79	21.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI105	49 30.50	123 56.95	81/02/18	0955	EBB	<2	25.5
			81/02/19	0950	EBB	5	24.0
			81/02/20	1050	EBB	2	26.0
			81/08/20	1035	EBB	8	24.0
			81/08/21	0940	FLOOD	<2	24.0
			81/08/22	0950	FLOOD	2	23.0
			81/08/23	0935	FLOOD	130	22.0
JI106	49 30.60	123 57.10	81/02/18	0945	EBB	2	23.5
			81/02/19	0940	EBB	<2	20.5
			81/02/20	1045	EBB	2	23.5
			81/08/20	1035	EBB	2	24.0
			81/08/21	0940	FLOOD	<2	24.0
			81/08/22	0915	FLOOD	2	23.0
			81/08/23	0935	FLOOD	<2	22.0
JI107	49 30.41	123 56.77	81/02/18	1015	EBB	2	25.5
			81/02/19	0948	EBB	8	24.0
			81/02/20	1055	EBB	<2	25.5
			81/08/20	1030	HIGH SLACK	2	24.0
			81/08/21	0945	FLOOD	<2	24.0
			81/08/22	0955	FLOOD	<2	22.0
			81/08/23	0930	FLOOD	11	22.0
JI108	49 30.58	123 56.75	81/02/18	1020	EBB	17	24.0
			81/02/19	0950	EBB	7	20.5
			81/02/20	1100	EBB	8	25.0
			81/08/20	1025	HIGH SLACK	5	24.0
			81/08/21	1000	HIGH SLACK	<2	24.0
			81/08/22	1000	FLOOD	5	23.0
			81/08/23	0945	FLOOD	2	22.0
JI109	49 30.48	123 56.65	81/08/20	1030	HIGH SLACK	<2	24.0
			81/08/21	0955	HIGH SLACK	<2	24.0
			81/08/22	1000	FLOOD	<2	23.0
			81/08/23	0940	FLOOD	<2	20.0
JI110	49 30.86	123 55.58	81/02/18	1050	LOW SLACK	2	25.5
			81/02/19	1000	EBB	23	26.5
			81/02/20	1105	EBB	2	25.0
			81/02/23	1015	EBB	2	22.0
			81/02/24	1105	EBB	<2	24.0
			81/08/20	1012	HIGH SLACK	2	24.0
			81/08/21	1005	HIGH SLACK	49	24.0
			81/08/22	1005	FLOOD	5	22.0
			81/08/23	0950	FLOOD	2	21.0
JI111	49 30.70	123 55.02	81/02/18	1105	LOW SLACK	2	22.0
			81/02/19	1008	EBB	33	19.5
			81/02/20	1110	EBB	<2	26.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI111	continued...		81/02/23	1050	EBB	11	25.0
			81/02/24	1115	EBB	5	20.0
			81/08/20	1005	HIGH SLACK	5	24.0
			81/08/21	1010	HIGH SLACK	2	24.0
			81/08/22	1010	FLOOD	2	22.0
			81/08/23	0955	FLOOD	2	20.5
JI112	49 30.76	123 54.80	81/02/18	1115	LOW SLACK	<2	22.0
			81/02/19	1012	EBB	17	21.0
			81/02/20	1110	EBB	5	26.0
			81/02/23	1055	EBB	5	24.5
			81/02/24	1120	EBB	<2	18.0
			81/08/20	1000	HIGH SLACK	2	24.0
			81/08/21	1015	HIGH SLACK	5	24.0
			81/08/22	1015	FLOOD	<2	22.0
			81/08/23	0955	FLOOD	<2	21.0
JI113	49 30.74	123 54.63	81/02/18	1115	LOW SLACK	<2	24.5
			81/02/19	1014	EBB	13	22.5
			81/02/20	1115	EBB	<2	26.0
			81/02/23	1100	EBB	2	25.0
			81/02/24	1145	EBB	4	15.0
			81/08/20	1000	HIGH SLACK	23	24.0
			81/08/21	1020	HIGH SLACK	4	24.0
			81/08/22	1020	FLOOD	5	22.0
			81/08/23	1000	FLOOD	2	22.0
JI114	49 30.63	123 54.40	81/02/18	1125	LOW SLACK	5	24.0
			81/02/19	1016	EBB	6	22.0
			81/02/20	1120	EBB	<2	23.0
			81/02/23	1100	EBB	5	24.0
			81/02/24	1150	EBB	5	12.0
			81/08/20	0950	HIGH SLACK	240	24.0
			81/08/21	1025	HIGH SLACK	33	24.0
			81/08/22	1020	FLOOD	17	23.0
			81/08/23	1000	FLOOD	4	22.0
JI115	49 30.50	123 54.35	81/02/18	1135	LOW SLACK	4	24.0
			81/02/19	1021	EBB	4	22.5
			81/02/20	1120	EBB	5	24.5
			81/02/23	1100	EBB	<2	25.0
			81/02/24	1150	EBB	5	10.0
JI116	49 29.43	123 58.84	81/08/20	1110	EBB	2	24.0
			81/08/21	1120	HIGH SLACK	<2	24.0
			81/08/22	1045	FLOOD	<2	24.0
			81/08/23	1025	FLOOD	<2	22.0
			81/08/28	1420	FLOOD	2	24.0
			81/08/31	1025	EBB	<2	26.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI117	49 29.43	123 59.04	81/08/20	1115	EBB	<2	26.0
			81/08/21	1120	HIGH SLACK	2	25.0
			81/08/22	1040	FLOOD	<2	23.0
			81/08/23	1025	FLOOD	<2	22.0
			81/08/28	1420	FLOOD	17	24.0
			81/08/31	1025	EBB	<2	26.0
JI118	49 29.45	123 58.90	81/08/20	1115	EBB	<2	26.0
			81/08/21	1115	HIGH SLACK	<2	25.0
			81/08/22	1040	FLOOD	<2	23.0
			81/08/23	1020	FLOOD	<2	24.0
			81/08/28	1420	FLOOD	5	24.0
			81/08/31	1020	EBB	<2	26.0
JI119	49 29.56	123 59.24	81/08/20	1120	EBB	<2	26.0
			81/08/21	1110	HIGH SLACK	<2	24.0
			81/08/22	1035	FLOOD	<2	23.0
			81/08/23	1020	FLOOD	2	23.0
			81/08/28	1425	FLOOD	<2	24.0
			81/08/31	1020	EBB	2	26.0
JI120	49 29.84	123 59.40	81/08/20	1125	EBB	<2	26.0
			81/08/21	1105	HIGH SLACK	2	24.0
			81/08/22	1035	FLOOD	<2	23.0
			81/08/23	1015	FLOOD	<2	23.0
			81/08/28	1430	FLOOD	<2	24.0
			81/08/31	1015	EBB	<2	25.5
JI121	49 33.60	123 46.50	81/08/28	1440	FLOOD	2	24.0
			81/08/31	1350	EBB	540	23.0
			81/09/01	0920	FLOOD	46	25.0
			81/09/02	0955	FLOOD	<2	24.5
			81/09/03	0930	FLOOD	4	25.0
JI122	49 33.63	123 46.65	81/08/28	1440	FLOOD	<2	24.0
			81/08/31	1355	EBB	5	24.0
			81/09/01	0920	FLOOD	5	25.0
			81/09/02	0955	FLOOD	2	24.5
			81/09/03	0935	FLOOD	<2	24.5
JI123	49 33.70	123 46.50	81/08/28	1440	FLOOD	<2	24.0
			81/08/31	1355	EBB	8	24.5
			81/09/01	0920	FLOOD	5	25.0
			81/09/02	1000	FLOOD	5	24.0
			81/09/03	0935	FLOOD	<2	25.0
JI124	49 33.70	123 46.55	81/08/28	1445	FLOOD	<2	24.0
			81/08/31	1355	EBB	14	24.0
			81/09/01	0920	FLOOD	8	25.5
			81/09/02	1000	FLOOD	<2	24.0
			81/09/03	0935	FLOOD	<2	25.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI125	49 33.93	123 46.82	81/08/28	1305	LOW SLACK	<2	24.0
			81/08/31	1400	EBB	11	24.0
			81/09/01	0925	FLOOD	23	25.0
			81/09/02	1005	FLOOD	<2	24.5
			81/09/03	0940	FLOOD	<2	25.0
JI126	49 33.93	123 46.70	81/08/28	1305	LOW SLACK	<2	24.0
			81/08/31	1400	EBB	5	25.0
			81/09/01	0925	FLOOD	49	25.0
			81/09/02	1005	FLOOD	<2	24.5
			81/09/03	0940	FLOOD	2	25.0
JI127	49 33.95	123 46.80	81/08/28	1310	LOW SLACK	<2	24.0
			81/08/31	1400	EBB	2	24.5
			81/09/01	0925	FLOOD	5	25.0
			81/09/02	1005	FLOOD	<2	24.5
			81/09/03	0940	FLOOD	<2	24.5
JI128	49 34.00	123 46.80	81/08/28	1310	LOW SLACK	<2	24.0
			81/08/31	1310	EBB	2	24.0
			81/09/01	0925	FLOOD	5	25.0
			81/09/02	1005	FLOOD	<2	24.0
			81/09/03	0940	FLOOD	<2	25.0
JI129	49 39.50	123 49.36	81/08/28	1405	LOW SLACK	<2	24.0
			81/08/31	1435	LOW SLACK	23	25.5
			81/09/02	1130	HIGH SLACK	<2	24.5
			81/09/03	1000	FLOOD	<2	24.5
JI130	49 39.45	123 49.30	81/08/28	1410	LOW SLACK	2	24.0
			81/08/31	1440	LOW SLACK	13	24.0
			81/09/02	1130	HIGH SLACK	<2	24.0
			81/09/03	1005	FLOOD	<2	24.5
JI131	49 39.45	123 49.25	81/08/28	1410	LOW SLACK	2	24.0
			81/08/31	1440	LOW SLACK	>1600	25.0
			81/09/01	0945	HIGH SLACK	33	24.5
			81/09/02	1030	HIGH SLACK	<2	25.5
			81/09/03	1010	FLOOD	<2	24.5
JI132	49 39.32	123 49.15	81/09/01	1000	HIGH SLACK	33	22.0
			81/09/02	1055	HIGH SLACK	<2	24.0
JI133	49 39.30	123 49.10	81/09/01	0955	HIGH SLACK	23	24.0
			81/09/02	1040	HIGH SLACK	<2	23.5
			81/09/03	1015	FLOOD	<2	25.0
JI134	49 39.30	123 49.03	81/09/01	1000	HIGH SLACK	33	23.5
			81/09/02	1045	HIGH SLACK	4	23.0
			81/09/03	1020	FLOOD	4	24.0

APPENDIX IV

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area II)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
JI135	49 39.32	123 49.10	81/09/01	0955	HIGH SLACK	70	24.0
			81/09/02	1035	HIGH SLACK	2	23.5
			81/09/03	1010	FLOOD	<2	24.5
JI136	49 39.35	123 49.10	81/08/28	1415	LOW SLACK	<2	24.0
			81/08/31	1445	LOW SLACK	2	25.5
			81/09/01	0950	HIGH SLACK	11	24.5
			81/09/02	1110	HIGH SLACK	<2	24.0
			81/09/03	1040	FLOOD	<2	24.5
JI137	49 39.45	123 49.10	81/08/28	1415	LOW SLACK	<2	24.0
			81/08/31	1445	LOW SLACK	<2	25.5
			81/09/01	0950	HIGH SLACK	9	24.5
			81/09/02	1115	HIGH SLACK	<2	25.0
			81/09/03	1040	FLOOD	<2	24.0
JI138	49 39.50	123 49.03	81/08/28	1420	LOW SLACK	<2	24.0
			81/08/31	1445	LOW SLACK	<2	25.0
			81/09/01	0950	HIGH SLACK	17	24.5
			81/09/02	1115	HIGH SLACK	<2	25.0
			81/09/03	1045	FLOOD	<2	25.0
JI139	49 39.32	123 49.10	81/09/01	0955	HIGH SLACK	31	25.0
			81/09/02	1035	HIGH SLACK	2	24.0
			81/09/03	1010	FLOOD	<2	24.0
JI140	49 39.45	123 49.15	81/08/28	1410	LOW SLACK	2	24.0
			81/08/31	1445	LOW SLACK	2	25.5
			81/09/01	0945	HIGH SLACK	13	24.5
			81/09/02	1035	HIGH SLACK	<2	24.0
			81/09/03	1010	FLOOD	<2	25.0

APPENDIX IV

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - COMBINED DATA (February, August and September)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
1	5	L2 - 2	L2	L2
2	5	L2 - 2	L2	2
3	5	L2	L2	L2
4	5	L2	L2	L2
5	5	L2 - L2	L2	L2
6	5	L2 - 7	L2	4.5
7	5	L2 - 2	L2	L2
8	9	L2 - 13	L2	8.5
9	9	L2 - 5	L2	L2
10	9	L2 - 2	L2	L2
11	9	L2 - 2	L2	L2
12	9	L2	L2	L2
13	10	L2 - 9	L2	L2
14	9	L2	L2	L2
15	10	L2 - 2	L2	L2
16	9	L2 - 5	L2	L2
17	10	L2 - 2	L2	2
18	10	L2 - 27	L2	7
19	10	L2 - 2	L2	L2
20	10	L2 - 8	L2	7
21	10	L2 - 2	L2	L2
22	10	L2	L2	L2
23	10	L2 - 5	L2	L2
24	10	L2 - 2	L2	L2
25	10	L2 - 8	L2	5
26	10	L2 - 2	L2	L2
27	10	L2 - 79	2	49
28	10	L2 - 13	L2	8
29	10	L2	L2	L2
30	10	L2 - 5	L2	2

Continued....

APPENDIX IV
TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - COMBINED DATA (February, August and September) (Continued)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
61	4	L2	L2	L2
62	10	L2 -130	4	23
63	10	L2 - 49	3	33
64	10	L2 - 79	3.5	49
65	10	L2 - 13	2	11
66	10	L2 - 33	2	14
67	10	L2 - 5	L2	2
68	10	L2 -540	13	110
69	10	L2 -G1600	81.5	1600
70	10	L2 - 130	10.5	79
71	10	L2 - 79	8	14
72	6	L2 - 5	L2	3.2
73	6	L2	L2	L2
74	6	L2 - 2	L2	L2
75	5	L2 - 79	8	56.0
76	5	2 - 49	23	41.0
77	9	2 -110	8	30.8
78	9	L2 -130	8	57.1
79	5	2 - 79	17	74.5
80	3	7,17,79	--	--
81	5	7 - 79	13	74.5
82	5	2 - 8	8	8
83	3	46;L2;8	--	--
84	3	540;130;350	--	--
85	3	170;79;L2	--	--
86	3	22;13;920	--	--
87	9	L2 - 79	5	9
88	11	L2 - 14	L2	10.4
89	11	L2 - 33	5	31
90	11	L2 - 49	2	12.1

Continued....

APPENDIX IV

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - COMBINED DATA (February, August and September) (Continued)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
31	10	L2 - 2	L2	2
32	10	L2	L2	L2
33	10	L2	L2	L2
34	10	L2 - 5	L2	5
35	10	L2 - 33	L2	7
36	10	L2 - 27	L2	13
37	10	L2 - 4	L2	2
38	10	L2 - 13	L2	2
39	10	L2 - 2	L2	2
40	10	L2 - 5	L2	L2
41	10	L2 - 2	L2	L2
42	9	L2 - 6	L2	2
43	9	L2 - 4	L2	2.2
44	9	L2 - 8	L2	2.6
45	10	L2 - 7	L2	2
46	10	L2 - 2	L2	L2
47	10	L2 - 17	L2	2
48	3	L2	L2	L2
49	3	L2	L2	L2
50	10	L2 - 4	L2	2
51	10	L2 - 27	L2	2
52	10	L2 - 8	L2	2
53	10	L2 - 5	L2	2
54	9	5 -350	28	130
55	9	L2 - 11	2	8
56	10	L2 - 7	2	5
57	9	L2 - 17	L2	2
58	9	L2 - 13	L2	3.1
59	4	L2 - 2	L2	2
60	4	L2 - 17	2.5	8.6

Continued....

APPENDIX IV

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - COMBINED DATA (February, August and September) (Continued)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
91	10	L2 - 49	2	4
92	5	L2 - 5	2	4.5
93	5	L2 - 2	L2	L2
94	5	L2 - 2	L2	L2
95	5	L2 - 11	L2	6.5
96	5	L2 - 33	L2	19
97	5	L2 - 13	L2	6.5
98	5	L2 - 17	2	11
99	5	L2 - 2	L2	2
100	6	L2 - 5	L2	3.2
101	6	5 -110	25	63.8
102	6	7 -240	12.5	125.4
103	6	L2 -130	23	71.8
104	7	L2 - 79	2	27.2
105	7	L2 -130	2	44.6
106	7	L2 - 2	2	2
107	7	L2 - 11	2	8.9
108	7	L2 - 17	5	10.7
109	4	L2	L2	L2
110	9	L2 - 49	2	25.6
111	9	L2 - 33	2	13.2
112	9	L2 - 17	L2	12.1
113	9	L2 - 23	4	14
114	9	L2 -240	5	53.7
115	5	L2 - 5	4	5
116	6	L2 - 2	L2	2
117	6	L2 - 17	L2	8
118	6	L2 - 5	L2	2.2
119	6	L2 - 2	L2	L2
120	6	L2 - 2	L2	L2

Continued....

APPENDIX IV

TABLE 2: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - COMBINED DATA (February, August and September) (Continued)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml		
		RANGE	MEDIAN	90TH PERCENTILE
121	5	L2 -540	4	293
122	5	L2 - 5	2	5
123	5	L2 - 8	5	6.5
124	5	L2 - 14	L2	11
125	5	L2 - 23	L2	17
126	5	L2 - 49	2	27
127	5	L2 - 5	L2	3.5
128	5	L2 - 5	L2	3.5
129	4	L2 - 23	L2	13.8
130	4	L2 - 13	L2	8.6
131	5	L2 -G1600	2	817
132	2	33;L2	--	--
133	3	23;L2;L2	--	--
134	3	33;4;4	--	--
135	3	70;2;L2	--	--
136	5	L2 - 11	L2	6.5
137	5	L2 - 9	L2	4.5
138	5	L2 - 17	L2	8.5
139	3	31;2;L2	--	--
140	5	L2 - 13	2	7.5

APPENDIX IV

TABLE 3: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - AUG.19 - SEPT.4/81

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
8	4	L2 - 13	5	11
9	4	L2 - 5	L2	3
10	4	L2 - L2	L2	L2
11	4	L2 - L2	L2	L2
12	4	L2 - L2	L2	L2
13	4	L2 - 9	L2	5.4
14	4	L2 - L2	L2	L2
15	4	L2 - 2	L2	L2
16	4	L2 - 5	L2	3
17	4	L2 - 2	L2	L2
18	4	L2 - 27	4.5	19
19	4	L2 - 2	L2	L2
20	4	L2 - 7	L2	4.2
21	4	L2 - 2	L2	L2
22	4	L2 - L2	L2	L2
23	4	L2 - L2	L2	L2
24	4	L2 - L2	L2	L2
25	4	L2 - 5	L2	3
26	4	L2 - L2	L2	L2
27	4	L2 - 5	2	3.8
28	4	L2 - 8	L2	4.8
29	4	L2 - L2	L2	L2
30	4	L2 - 5	L2	3
31	4	L2 - 2	L2	L2
32	4	L2 - L2	L2	L2
33	4	L2 - L2	L2	L2
34	4	L2 - 5	2.5	5
35	4	L2 - 33	4.5	22.6
36	4	L2 - 27	6.5	21.4
37	4	L2 - 4	L2	2.4

Continued....

APPENDIX IV

TABLE 3: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - AUG.19 - SEPT.4/81

(Continued)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
38	4	L2 - 2	L2	L2
39	4	L2 - 2	L2	2
40	4	L2 - L2	L2	L2
41	4	L2 - 2	L2	L2
42	4	L2 - 2	L2	L2
43	4	L2 - 4	L2	2.4
44	4	L2 - 8	L2	5.6
45	4	L2 - 7	L2	4.2
46	4	L2 - 2	L2	L2
47	4	L2 - 17	2	11
48	3	L2;L2;L2	--	--
49	3	L2:L2;L2	--	--
50	4	L2 - 4	L2	2.4
51	4	L2 - 27	L2	17
52	4	L2 - 8	L2	5.6
53	4	L2 - 5	L2	3.8
54	4	5 - 49	17	38.6
55	4	L2 - 8	3.5	6.8
56	4	L2 - 7	2	5
57	4	L2 - 17	L2	11
58	4	L2 - L2	L2	L2
59	4	L2 - 2	L2	2
60	4	L2 - 17	2.5	8.6
61	4	L2 - L2	L2	L2
62	4	L2 - 7	3	5.8
63	4	L2 - 49	2.5	31.4
64	4	L2 - 23	L2	14.6
65	4	L2 - 11	2	7.4
66	4	L2 - 33	L2	20.6
67	4	L2 - 2	L2	2

Continued....

APPENDIX IV

TABLE 3: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - AUG.19 - SEPT.4/81

(Continued)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
68	4	L2 - 13	L2	8.6
69	4	L2 - 2	L2	2
70	4	L2 - 22	6.5	12.4
71	4	L2 - 8	8	8
75	5	2 - 79	8	56
76	5	2 - 49	23	41
77	5	2 -110	8	59
78	5	2 - 49	8	47.5
79	5	2 - 79	17	74.5
80	3	79;17;7	--	--
81	5	7 - 79	13	74.5
82	5	2 - 8	8	8
83	3	46;L2;8	--	--
84	3	540;130;350	--	--
85	3	170;79;L2	--	--
86	3	22;13;920	--	--
87	4	L2 - 5	L2	3.8
88	4	L2 - 2	L2	L2
89	4	L2 - 13	L2	7.8
90	4	L2 - 2	L2	L2
91	4	L2 - 2	L2	L2
92	5	L2 - 5	2	4.5
93	5	L2 - 2	L2	L2
94	5	L2 - 2	L2	L2
95	5	L2 - 11	L2	6.5
96	5	L2 - 33	L2	19
97	5	L2 - 13	L2	6.5
98	5	L2 - 17	2	11
99	5	L2 - 2	L2	2
100	6	L2 - 5	L2	3.2

Continued....

APPENDIX IV

TABLE 3: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - AUG.19 - SEPT.4/81

(Continued)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
101	6	5 -110	25	63.8
102	6	7 -240	12.5	125.4
103	6	L2 -130	23	71.8
104	4	L2 - 79	L2	47.4
105	4	L2 -130	5	81.2
106	4	L2 - 2	L2	2
107	4	L2 - 11	L2	7.4
108	4	L2 - 5	3.5	5
109	4	L2 - L2	L2	L2
110	4	2 - 49	3.5	31.4
111	4	2 - 5	2	3.8
112	4	L2 - 5	L2	3.8
113	4	2 - 23	4.5	15.8
114	4	4 -240	25	157.2
116	6	L2 - 2	L2	2
117	6	L2 - 17	L2	8
118	6	L2 - 5	L2	2.2
119	6	L2 - 2	L2	L2
120	6	L2 - 2	L2	L2
121	5	L2 -540	4	293
122	5	L2 - 5	2	5
123	5	L2 - 8	5	6.5
124	5	L2 - 14	L2	11
125	5	L2 - 23	L2	17
126	5	L2 - 49	2	27
127	5	L2 - 5	L2	3.5
128	5	L2 - 5	L2	3.5
129	4	L2 - 23	L2	13.8
130	4	L2 - 13	L2	8.6
131	5	L2 -L1600	2	817

Continued....

APPENDIX IV

TABLE 3: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - AUG.19 - SEPT.4/81

(Continued)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml		
		RANGE	MEDIAN	90TH PERCENTILE
132	2	33;L2	--	--
133	3	23;L2;L2	--	--
134	3	33;4;4	--	--
135	3	70;2;L2	--	--
136	5	L2 - 11	L2	6.5
137	5	L2 - 9	L2	4.5
138	5	L2 - 17	L2	8.5
139	3	31;2;L2	--	--
140	5	L2 - 13	2	7.5

APPENDIX IV

TABLE 4: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - FEB.10 - 26/81

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
1	5	L2 - 2	L2	L2
2	5	L2 - 2	L2	2
3	5	L2	L2	L2
4	5	L2	L2	L2
5	5	L2 - L2	L2	L2
6	5	L2 - 7	L2	4.5
7	5	L2 - 2	L2	L2
8	5	L2	L2	L2
9	5	L2	L2	L2
10	5	L2 - 2	L2	L2
11	5	L2 - 2	L2	L2
12	5	L2	L2	L2
13	6	L2	L2	L2
14	6	L2	L2	L2
15	6	L2	L2	L2
16	6	L2	L2	L2
17	6	L2 - 2	L2	L2
18	6	L2	L2	L2
19	6	L2	L2	L2
20	6	L2 - 8	L2	4.4
21	6	L2	L2	L2
22	6	L2	L2	L2
23	6	L2 - 5	L2	2
24	6	L2 - 2	L2	L2
25	6	L2 - 8	L2	3.2
26	6	L2 - 2	L2	L2
27	6	L2 - 79	9.5	61
28	6	L2 - 13	2	8.2
29	6	L2	L2	L2
30	6	L2 - 2	L2	L2

Continued....

APPENDIX IV

TABLE 4: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - FEB.10 - 26/81

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
31	6	L2 - 2	L2	L2
32	6	L2	L2	L2
33	6	L2	L2	L2
34	6	L2 - 5	L2	2
35	6	L2	L2	L2
37	6	L2	L2	L2
38	6	L2 - 13	L2	5.2
39	6	L2 - 2	L2	L2
40	6	L2 - 2	L2	2
41	6	L2 - 5	L2	L2
42	6	L2	L2	2.4
43	5	L2 - 6	L2	L2
44	5	L2 - L2	L2	L2
45	6	L2	L2	L2
46	6	L2 - 2	L2	L2
47	6	L2	L2	L2
50	6	L2 - 2	L2	L2
51	6	L2	L2	L2
52	6	L2	L2	L2
53	6	L2 - 2	L2	L2
54	6	8 -350	51.8	218
55	6	L2 - 11	2	L2
56	6	L2 - 5	L2	3.2
57	5	L2 - 2	L2	L2
58	5	L2 - 13	L2	6.5
62	6	L2 -130	8.5	65.8
63	6	2 - 33	3	33.4
64	6	L2 - 79	7	61
65	6	L2 - 13	2.5	11.8
66	6	L2 - 14	3	13.4

Continued....

APPENDIX IV

TABLE 4: SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (Area II) - FEB.10 - 26/81

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100ml RANGE	MEDIAN	90TH PERCENTILE
67	6	L2 - 5	L2	2
68	6	6 -540	47.5	282
69	6	13 -G1600	1260	1600
70	6	2 -130	15	99.4
71	6	L2 - 79	9.5	40.0
72	6	L2 - 5	L2	3.2
73	6	L2	L2	L2
74	6	L2 - 2	L2	L2
77	4	2 - 22	9.5	20
78	4	L2 -130	5	81.2
87	6	L2 - 79	5	4.4
88	7	L2 - 14	2	11.9
89	7	L2 - 33	5	33
90	7	L2- 49	4	23.8
91	6	2 - 49	2	17.5
104	3	2 - 5	2	4.1
105	3	L2 - 5	2	4.1
106	3	L2 - 2	2	2
107	3	L2 - 8	2	6.2
108	3	7 - 17	8	14.3
110	5	L2 - 23	2	12.5
111	5	L2 - 33	5	22.0
112	5	L2 - 17	5	11
113	5	L2 - 13	2	8.5
114	5	L2 - 6	5	5.5
115	5	L2 - 5	4	5

APPENDIX IV

TABLE 5: FRESHWATER AND EFFLUENT SAMPLE STATION LOCATIONS (Area II)

Station No.	Location Description	Receiving Water
S1	High Creek at the mouth	Vancouver Bay
S2	Vancouver River at mouth - north fork	Vancouver Bay
S3	Vancouver River at the mouth - south fork	Vancouver Bay
S4	Unnamed creek at the mouth	Goliath Bay
S5	Granville creek at the mouth	Granville Bay
S6	Lapan Creek - at the mouth	Granville Bay
S7	Water supply for Totem Oyster at the mouth	St. Vincent Bay
S8	Edgar Creek at the mouth	St. Vincent Bay
S9	Creek at the mouth 50 m west of marine station station 38	St. Vincent Bay
S10	Creek at the mouth 50 m north of W & K Plant	St. Vincent Bay
S11	Creek at the mouth S.E. of mar. station 52	Blind Bay
S12	Creek at the mouth N.E. of mar. station 58	Blind Bay
S13	Drainage near marine station 69	Hidden Basin
S14	Small creek at the mouth east of dock and northwest of chicken coop	Hidden Basin
S15	Bruce Creek at the mouth	Hidden Basin
S16	Creek at the mouth 100 metres west of station 17	Cockburn Bay
S17	Creek at the mouth head of the bay	Cockburn Bay
S18	Creek at the mouth east of dock	Cockburn Bay
S19	Creek at the mouth house off marine station 74	Cockburn Bay
S20	First creek at Garden Bay Rd. east of Oyster Bay Rd.	Gunboat Bay
S21	2nd creek on Garden Bay Road at small farm	Gunboat Bay
S22	Anderson Creek at the mouth	Gunboat Bay
S23	Kleindale Creek above the confluence with Anderson Creek	Gunboat Bay

Continued....

APPENDIX IV

TABLE 5: FRESHWATER AND EFFLUENT STATION LOCATIONS (Area II) (Continued)

Station No.	Location Description	Receiving Water
S24	Culvert at the intersection of Garden Bay Road and Highway 101	Gunboat Bay
S25	Anderson Creek at Highway 101 - south leg	Gunboat Bay
S26	Kleindale Creek at Highway 101	Gunboat Bay
S27	S20 at Highway 101	Gunboat Bay
S28	S21 at Highway 101	Gunboat Bay
S29	Creek at mouth approx 200m north-west of Kleindale farm	Gunboat Bay
S30	At the mouth below confluence of S31 & S32	Gunboat Bay
S31	Creek at the mouth 50 metres beyond S32 - west	Gunboat Bay
S32	Creek through the farm at Highway 101	Gunboat Bay
S33	Creek at the head of bay - draining farmland	Churchill Bay
S34	Mouth of Haslam Creek - Harness Is.	Malaspina Strait
S35	Haslam Creek at Highway 101	Malaspina Strait
S36	Silver Sands Creek at Highway 101	Malaspina Strait
S37	Mouth of Silver Sands Creek	Malaspina Strait
S38	Silver Sands Creek at Johnson's "Love Nest"	Malaspina Strait
S39	Mouth of the creek at the head of Frenchmans Cove	Halfmoon Bay
S40	Large stream east of marine station 111	Halfmoon Bay
S41	Halfmoon Creek at Mintie Road	Halfmoon Bay
S42	Enters south of marine station 114 in Priestland Cove	Halfmoon Bay
S43	Upstream of S42 at road	Halfmoon Bay
S44	Enters at marine station 115 at the mouth	Halfmoon Bay
S45	Culvert draining a lagoon at Redroofs Rd.	Halfmoon Bay
S46	East side of bay near marine station 134 at mouth	Storm Bay
S47	Mouth of the creek at the head of the bay	Storm Bay
STP 1	Final effluent - Dahlex Holdings (PE-4186)	Vic. Harness Island
STP 2	Final effluent - Halfmoon Bay Development (PE-375)	Halfmoon Bay

APPENDIX IV
TABLE 6: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II)

STATION	DATE (1981)	FC/100 ml	FS/100 ml
S1	February 11	0	0
	12	0	0
	13	0	0
S2	February 11	0	0
	12	0	0
	13	2	1
S3	February 11	0	0
	12	0	1
	13	1	0
S4	February 11	0	0
	12	0	0
	13	0	0
S5	February 10	0	0
	11	0	0
	12	0	0
	13	0	0
	August 24	48	--
	25	26	5
	26	25	11
S6	February 10	1	0
	11	1	0
	12	0	0
	13	1	0
	August 24	200	--
	25	50	23
	26	32	53
S7	February 10	2	0
	11	1	0
	12	1	0
	13	17	0
S8	February 10	0	0
	11	0	0
	12	0	0
	13	5	0

Continued...

APPENDIX IV
TABLE 6: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II)

STATION	DATE (1981)		FC/100 ml	FS/100 ml
S8 (Cont.)	August	26	67	27
		27	26	41
		31	170	430
S9	February	10	0	0
		11	0	0
		12	1	4
		13	0	0
S10	February	10	0	0
		11	0	0
		12	0	0
		13	1	0
S11	February	18	0	0
		19	0	0
		20	0	0
S12	February	18	0	0
		19	0	0
		20	0	0
S13	February	18	4	0
		19	1	0
		20	0	0
S14	February	18	1	0
		19	1	2
		20	0	2
S15	February	18	13	0
		19	17	4
		20	6	0
	August	20	35	--
		21	14	--
		22	22	--
		23	68	--
S16	February	18	4	0
		19	1	0
		20	0	0

Continued...

APPENDIX IV
TABLE 6: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II)

STATION	DATE (1981)		FC/100 ml	FS/100 ml
S17	February	18	5	1
		19	16	2
		20	4	0
S18	February	18	0	0
		19	0	0
		20	1	7
S19	February	18	4	0
		19	17	0
		20	1	1
S20	September	1	480	500
		2	270	350
		3	260	80
S21	September	1	600	380
		2	310	380
		3	70	120
S22	September	1	160	310
		2	80	150
		3	20	90
S23	September	1	20	330
		2	21	41
		3	9	22
S24	September	1	3000	7900
		2	2300	1600
		3	1090	600
S25	September	1	20	330
		2	21	41
		3	9	22
S26	September	1	L10	10
		2	1	1
		3	0	8
S27	September	2	L10	180
		3	3	258

Continued...

APPENDIX IV
TABLE 6: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II)

STATION	DATE (1981)		FC/100 ml	FS/100 ml
S28	September	2	10	10
		3	1	21
S29	September	2	110	80
		3	51	83
S30	September	2	70	280
		3	51	24
S31	September	1	10	30
		2	6	3
		3	3	0
S32	September	1	20	150
		2	262	169
		3	9	2
S33	February	20	26	7
		25	40	L10
		26	47	8
S34	August	31	230	510
	September	1	10	20
		2	9	11
		3	17	7
S35	September	1	50	200
		2	24	51
		3	21	46
S36	September	1	20	80
		2	12	62
		3	12	31
S37	September	1	40	140
		2	11	62
		3	2	19
S38	August	31	400	950
	September	1	50	110
		2	4	147
		3	3	31

Continued...

APPENDIX IV
TABLE 6: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II)

STATION	DATE (1981)		FC/100 ml	FS/100 ml
S39	February	18	0	0
		19	0	0
		20	0	0
S40	February	18	6	0
		19	3	2
		20	1	1
S41	February	18	2	0
		19	2	2
		20	1	2
S42	February	18	4	0
		19	7	6
		20	1	0
	September	1	60	180
		2	35	51
S43	September	1	80	90
		2	28	46
S44	February	18	0	0
		19	3	0
		20	26	38
S45	February	18	3	15
		19	4	37
		20	4	6
	August	20	16	--
		21	7	--
		22	16	--
S46	September	1	L10	30
		2	2	20
S47	September	2	L10	30
		3	4	41
STP 1 (effluent)	August	31	8.7×10^4	8.8×10^3
	September	1	6.9×10^4	2.5×10^4

Continued...

APPENDIX IV
TABLE 6: DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II)

STATION	DATE (1981)		FC/100 ml	FS/100 ml
STP 1 (Cont.)	September	2	7.5×10^3	9.0×10^3
		3	1.4×10^4	L1.0×10^3
STP 2 (effluent)	February	25	1.0×10^5	4.6×10^4
		26	L100	L100
	August	20	2.0×10^4	--
		21	3.6×10^4	--
		22	3.3×10^4	--
		23	2.2×10^4	--

APPENDIX IV

TABLE 7: SUMMARY OF BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II)

SAMPLE STATION	FECAL COLIFORMS/100ml			FECAL STREPTOCOCCUS/100ml			
	NO. OF SAMPLES	RANGE	MEAN	NO. OF SAMPLES	RANGE	MEAN	FC:FS*
S1	3	0	0	3	0	0	
S2	3	0 - 2	L2	3	0 - 1	L2	
S3	3	0 - 1	L2	3	0 - 1	L2	
S4	3	0	0	3	0	L2	
S5	7	0 - 48	14.1	6	0 - 11	2.7	
S6	7	0 -200	40.3	6	0 - 53	12.7	
S7	4	1 - 17	5.4	4	0	0	
S8	7	0 -170	38.3	7	0 -430	71.1	
S9	4	0 - 1	L2	4	0 - 4	L2	
S10	4	0 - 1	L2	4	0	0	
S11	3	0	0	4	0	0	
S12	3	0	0	3	0	0	
S13	3	1 - 4	L2	3	0	0	
S14	3	0 - 1	L2	3	0 - 2	L2	
S15	7	6 - 68	25	3	0 - 4	L2	
S16	3	0 - 1	L2	3	0 - 8	2.7	
S17	3	4 - 16	8.3	3	0 - 2	L2	
S18	3	0 - 1	L2	3	0 - 7	2.3	

Continued....

* FC:FS ratios calculated when both FC and FS means exceed 100/100ml.

APPENDIX IV

TABLE 7: SUMMARY OF BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II) (Continued)

SAMPLE STATION	FECAL COLIFORMS/100ml			FECAL STREPTOCOCCUS/100ml			
	NO. OF SAMPLES	RANGE	MEAN	NO. OF SAMPLES	RANGE	MEAN	FC:FS*
S19	3	1 - 17	7.2	3	0 - 1	L2	
S20	3	260 -480	337	3	80 -500	310	1.09
S21	3	70 -600	327	3	120 -380	293	1.12
S22	3	20 -160	87	3	90 -310	183	
S23	3	9 - 21	16.7	3	22 -330	131	
S24	3	1090 -3000	2130	3	600 -7900	3367	0.63
S25	3	5 - 70	29	3	27 -100	54	
S26	3	0 -L10	--	3	1 - 10	6.2	--
S27	2	L10 - 3	--	2	180 -258	219	
S28	2	L10 - 1	--	2	10 - 21	10.1	
S29	2	51 -110	54	2	80 - 83	54	
S30	2	51 - 70	60	2	24 -280	152	
S31	3	L10 - 6	--	3	0 - 30	11	
S32	3	9 -262	97	3	2 -169	107	0.91
S33	3	26 - 47	38	3	8 -L10	--	
S34	4	L10 -230	66.5	4	7 -510	137	
S35	3	21 - 50	31.7	3	46 -200	99	

Continued....

* FC:FS ratios calculated when both FC and FS means exceed 100/100ml.

APPENDIX IV

TABLE 7: SUMMARY OF BACTERIOLOGICAL RESULTS FOR FRESHWATER AND EFFLUENT SAMPLE STATIONS (Area II) (Continued)

SAMPLE STATION	FECAL COLIFORMS/100ml			FECAL STREPTOCOCCUS/100ml			
	NO. OF SAMPLES	RANGE	MEAN	NO. OF SAMPLES	RANGE	MEAN	FC:FS*
S36	3	12 - 20	14.7	3	31 - 80	57.7	
S37	3	2 - 40	17.7	3	19 -140	73.7	
S38	4	3 -400	114.3	4	31 -950	309.5	0.37
S39	3	0	--	3	0	0	
S40	3	1 - 6	3.3	3	0 - 2	1	
S41	6	1 - 7	3.2	3	0 - 2	L2	
S42	5	1 - 60	21.4	5	0 -180	47.4	
S43	2	28 - 80	54	2	46 - 90	68	
S44	3	0 - 26	9.7	3	0 - 38	12.7	
S45	6	3 - 16	8.3	3	6 - 37	19.3	
S46	2	L10 - 2	--	2	20 - 30	25	
S47	2	L10 - 4	--	2	30 - 41	35.5	
STP 1	4	7.5×10^3 - 8.7×10^4	4.4×10^4	4	L1000 - 2.5×10^4	1.4×10^4	3.1
STP 2	6	L100 - 1.0×10^5	4.2×10^4	2	L100 - 4.6×20^4	--	

* FC:FS ratios calculated when both FC and FS means exceed 100/100ml.

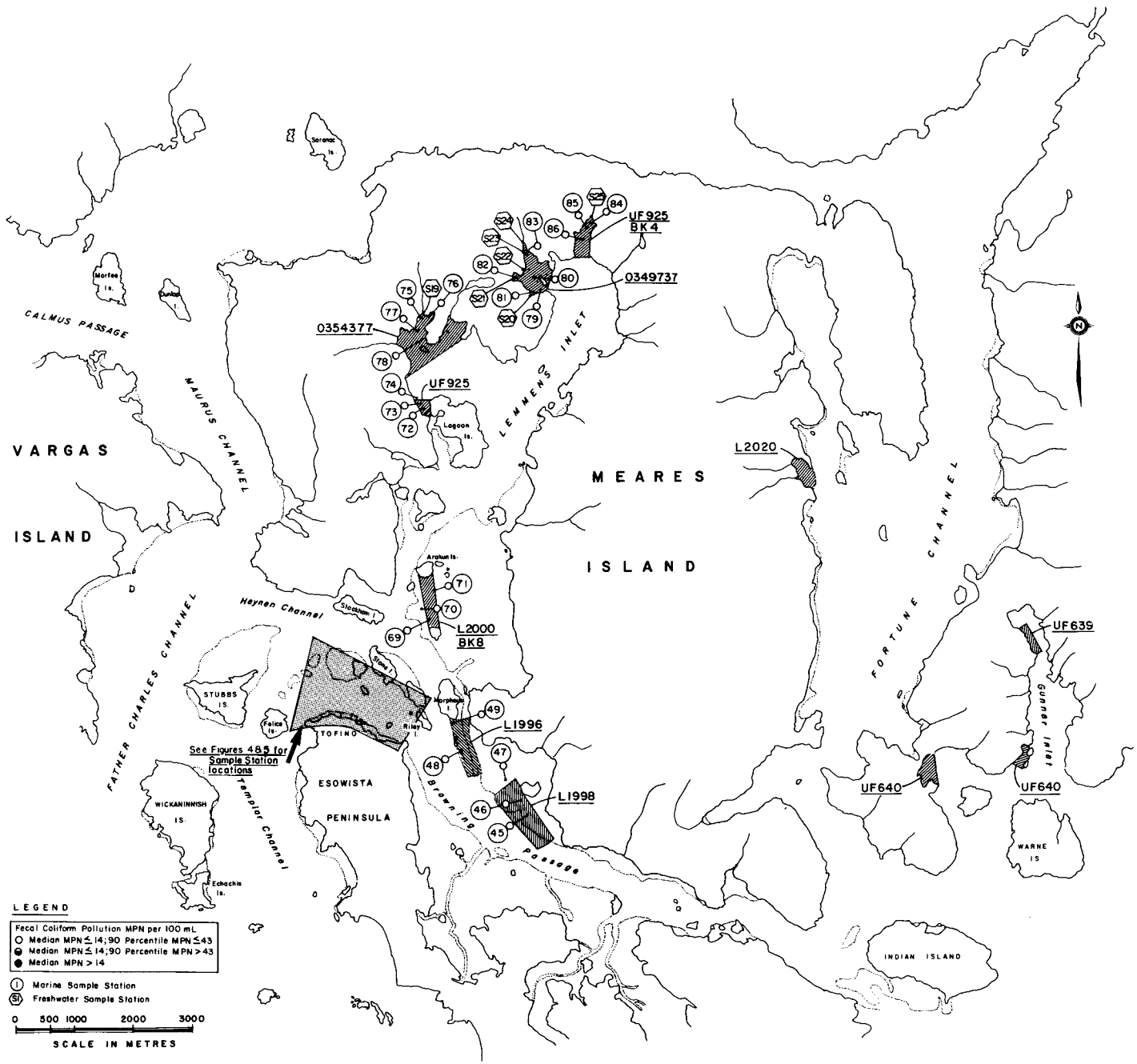
APPENDIX V

AREA III FIGURES

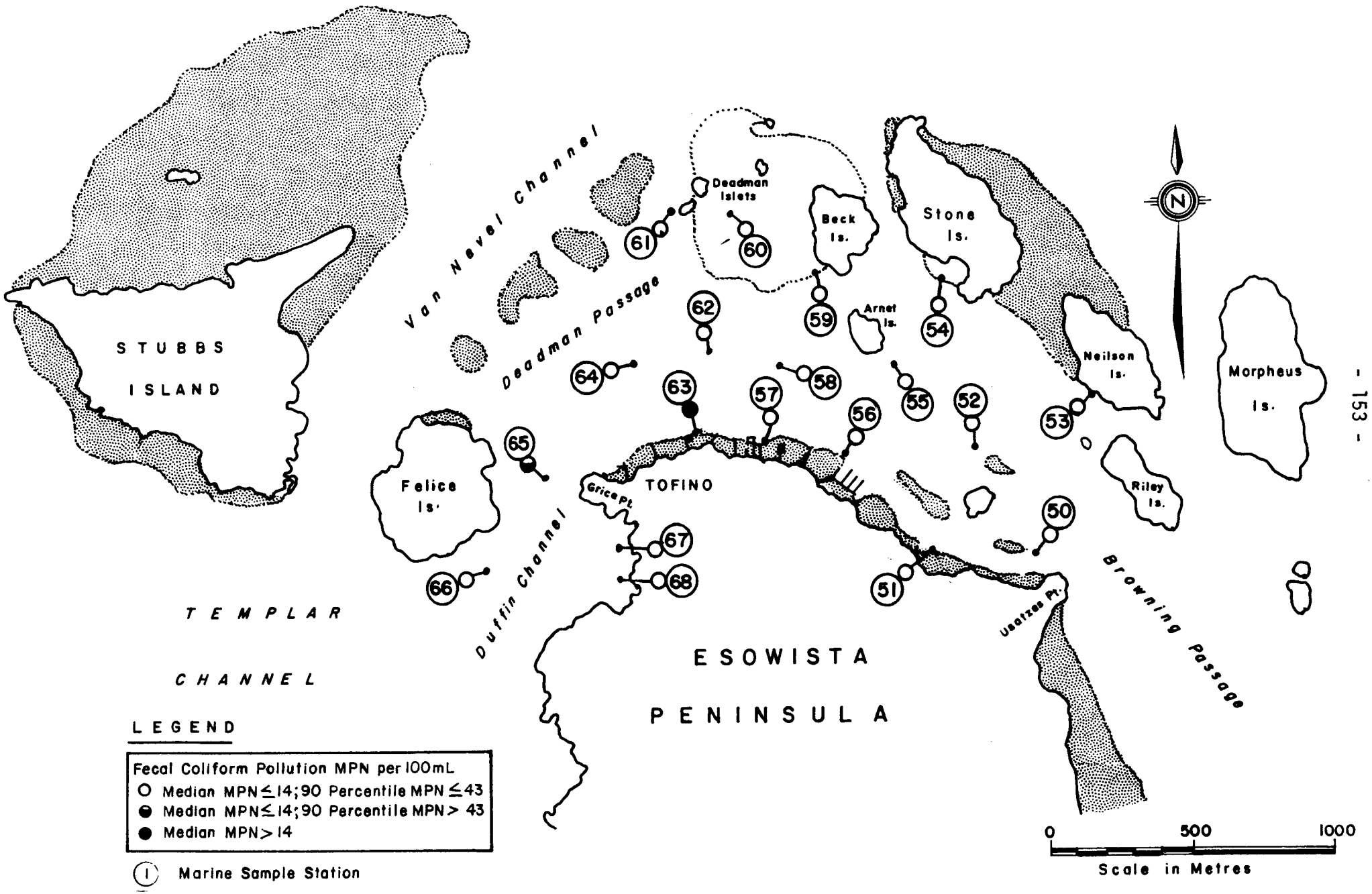
APPENDIX V
FIGURE I UCLUELET INLET MARINE SAMPLE STATION LOCATIONS

APPENDIX V

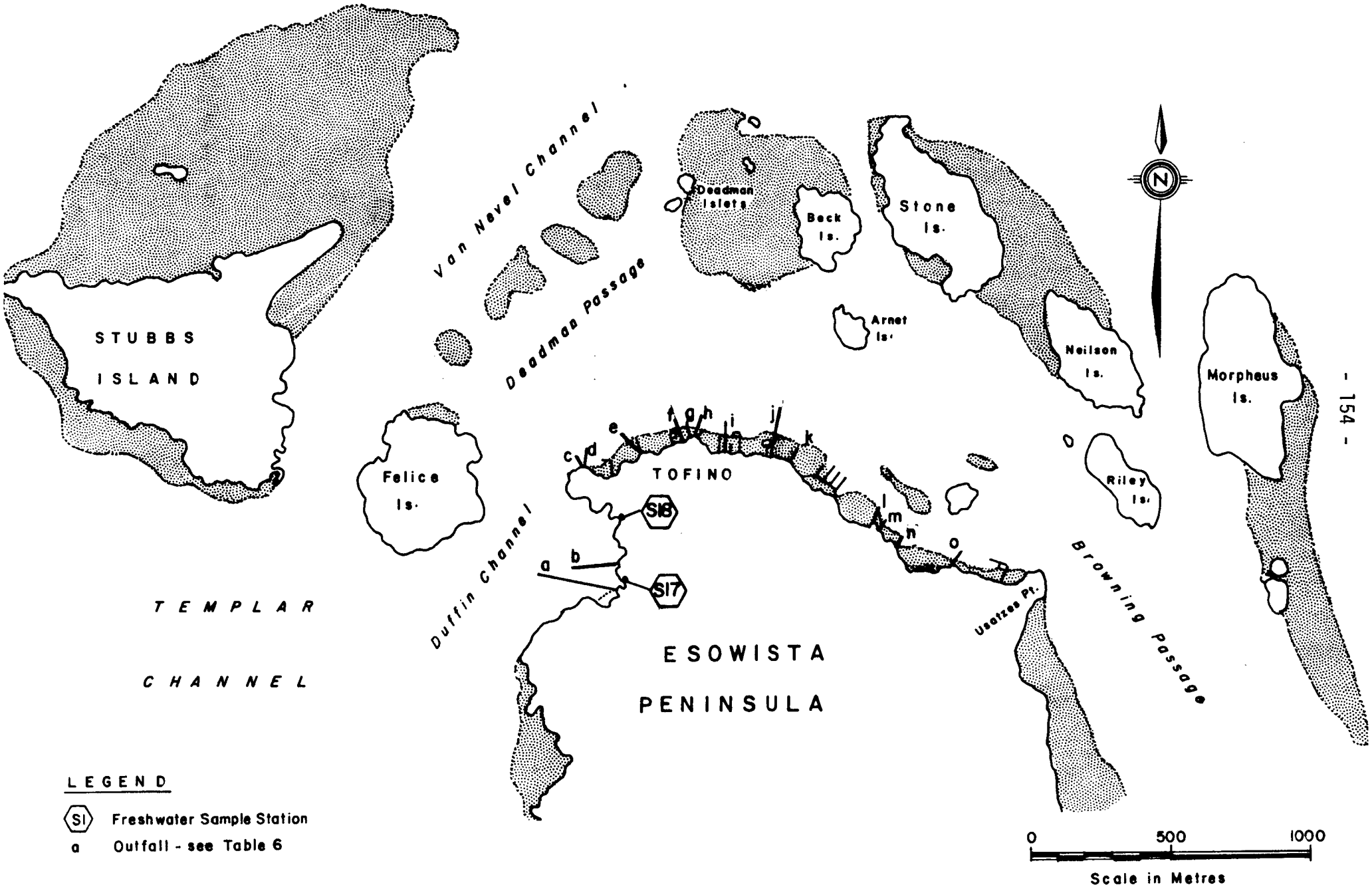
FIGURE 2 UCLUELET INLET FRESHWATER SAMPLE STATION AND VILLAGE OUTFALL LOCATIONS



APPENDIX V
FIGURE 3 MEARES ISLAND MARINE AND FRESHWATER SAMPLE STATION LOCATIONS



APPENDIX V
FIGURE 4 TOFINO MARINE SAMPLE STATION LOCATIONS



APPENDIX V
FIGURE 5 TOFINO FRESHWATER SAMPLE STATION AND OUTFALL LOCATIONS

APPENDIX VI

AREA III TABLES

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT001	48 57.50	125 33.88	82/02/09	1250	HIGH SLACK	2	24.0
			82/02/10	0935	FLOOD		24.5
			82/02/11	1325	FLOOD	7	24.0
			82/02/12	1010	FLOOD	11	20.0
			82/02/15	0930	EBB	23	6.0
			82/02/16	0920	EBB	17	3.5
UT002	48 57.10	125 33.98	82/02/09	1300	HIGH SLACK	<2	24.0
			82/02/10	1340	HIGH SLACK		25.5
			82/02/11	1330	HIGH SLACK	2	24.0
			82/02/12	1015	FLOOD	11	20.0
			82/02/15	0930	EBB	23	2.0
			82/02/16	0925	EBB	23	6.0
UT003	48 56.99	125 34.28	82/02/09	1305	HIGH SLACK	<2	23.5
			82/02/10	1340	HIGH SLACK		24.5
			82/02/11	1335	HIGH SLACK	5	21.5
			82/02/16	0930	EBB	8	5.0
UT004	48 56.90	125 34.28	82/02/09	1310	HIGH SLACK	<2	24.0
			82/02/10	1345	HIGH SLACK		25.5
			82/02/11	1340	HIGH SLACK	<2	20.5
			82/02/15	0935	EBB	79	6.0
			82/02/16	0930	EBB	49	6.0
UT005	48 57.23	125 33.42	82/02/09	1320	HIGH SLACK	<2	24.0
			82/02/10	0940	FLOOD		24.5
			82/02/11	1340	HIGH SLACK	2	24.0
			82/02/12	1020	FLOOD	7	21.0
			82/02/15	0935	EBB	49	6.0
			82/02/16	0930	EBB	33	4.5
UT006	48 56.98	125 32.90	82/02/09	1325	HIGH SLACK	33	24.5
			82/02/10	0940	FLOOD		24.5
			82/02/11	1345	HIGH SLACK	49	25.0
			82/02/12	1020	FLOOD	5	21.5
			82/02/15	0945	EBB	49	14.0
			82/02/16	0935	EBB	31	6.0
UT007	48 56.85	125 32.70	82/02/09	1330	HIGH SLACK	22	24.5
			82/02/10	0945	FLOOD		25.0
			82/02/11	1345	HIGH SLACK	2	25.5
			82/02/12	1020	FLOOD	5	23.0
			82/02/15	0945	EBB	110	16.0
			82/02/16	0935	EBB	23	6.0
UT008	48 56.91	125 32.55	82/02/09	1335	HIGH SLACK	2	25.0
			82/02/10	0950	FLOOD		25.0
			82/02/11	1345	HIGH SLACK	8	25.5

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT008	continued...		82/02/12	1020	FLOOD	8	21.5
			82/02/15	0950	EBB	79	14.5
			82/02/16	0935	EBB	31	4.0
UT009	48 56.78	125 32.29	82/02/09	1340	HIGH SLACK	2	24.5
			82/02/10	0955	FLOOD		25.5
			82/02/11	1350	HIGH SLACK	<2	23.5
			82/02/12	1025	FLOOD	31	20.5
			82/02/15	0950	EBB	170	16.0
			82/02/16	0940	EBB	23	6.5
UT010	48 56.70	125 32.47	82/02/09	1340	HIGH SLACK	2	25.0
			82/02/10	0955	FLOOD		25.5
			82/02/11	1350	HIGH SLACK	5	25.5
			82/02/12	1025	FLOOD	5	22.0
			82/02/15	0950	EBB	79	16.0
			82/02/16	0940	EBB	21	6.5
UT011	48 56.62	125 32.65	82/02/09	1340	HIGH SLACK	2	25.0
			82/02/10	1000	FLOOD		25.5
			82/02/11	1355	HIGH SLACK	240	24.5
			82/02/12	1025	FLOOD	>1600	24.0
			82/02/15	0955	EBB	>1600	15.5
			82/02/16	0945	EBB	46	7.5
UT012	48 56.55	125 32.52	82/02/09	1345	HIGH SLACK	<2	25.0
			82/02/10	1000	FLOOD		25.5
			82/02/11	1355	HIGH SLACK	46	25.5
			82/02/12	1030	FLOOD	240	24.0
			82/02/15	0955	EBB	350	18.0
			82/02/16	0945	EBB	79	7.5
UT013	48 56.60	125 32.39	82/02/09	1345	HIGH SLACK	5	25.0
			82/02/10	1000	FLOOD		25.5
			82/02/11	1355	HIGH SLACK	7	25.5
			82/02/12	1030	FLOOD	5	23.5
			82/02/15	0950	EBB	130	18.0
			82/02/16	0945	EBB	23	6.5
UT014	48 56.70	125 32.20	82/02/09	1350	HIGH SLACK	<2	25.0
			82/02/10	1005	FLOOD		26.0
			82/02/11	1355	HIGH SLACK	5	24.5
			82/02/12	1030	FLOOD	23	23.0
			82/02/15	1000	EBB	130	15.0
			82/02/16	0950	EBB	33	6.5
UT015	48 56.61	125 32.09	82/02/09	1350	HIGH SLACK	2	25.0
			82/02/10	1005	FLOOD		26.0
			82/02/11	1400	HIGH SLACK	11	25.0

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT015	continued...		82/02/12	1030	FLOOD	8	23.5
			82/02/15	1005	EBB	110	18.5
			82/02/16	0950	EBB	79	6.5
UT016	48 56.55	125 32.39	82/02/09	1335	HIGH SLACK	7	25.0
			82/02/10	1005	FLOOD		26.0
			82/02/11	1400	HIGH SLACK	170	26.0
			82/02/12	1035	FLOOD	33	24.0
			82/02/15	1005	EBB	49	18.0
			82/02/16	0950	EBB	49	7.0
UT017	48 56.47	125 32.92	82/02/09	1355	HIGH SLACK	46	25.0
			82/02/10	1010	FLOOD		26.0
			82/02/11	1400	HIGH SLACK	130	26.0
			82/02/12	1035	FLOOD	170	23.0
			82/02/15	1010	EBB	920	18.0
			82/02/16	0955	EBB	130	7.5
UT018	48 56.40	125 32.30	82/02/09	1400	HIGH SLACK	23	25.0
			82/02/10	1010	FLOOD		26.0
			82/02/11	1405	HIGH SLACK	33	26.0
			82/02/12	1035	FLOOD	540	22.0
			82/02/15	1010	EBB	240	20.0
			82/02/16	0955	EBB	33	7.5
UT019	48 56.46	125 32.17	82/02/09	1400	HIGH SLACK	13	25.0
			82/02/10	1015	FLOOD		26.0
			82/02/11	1405	HIGH SLACK	79	26.0
			82/02/12	1040	FLOOD	23	23.5
			82/02/15	1015	EBB	170	18.0
			82/02/16	1000	EBB	49	7.0
UT020	48 56.52	125 32.00	82/02/09	1405	HIGH SLACK	2	25.0
			82/02/10	1015	FLOOD		26.5
			82/02/11	1405	HIGH SLACK	5	26.0
			82/02/12	1040	FLOOD	7	23.0
			82/02/15	1015	EBB	130	20.0
			82/02/16	1000	EBB	79	7.0
UT021	48 56.43	125 31.90	82/02/09	1410	EBB	<2	25.0
			82/02/10	1020	FLOOD		26.5
			82/02/11	1410	HIGH SLACK	2	26.0
			82/02/12	1040	FLOOD	49	23.5
			82/02/15	1015	EBB	79	19.0
			82/02/16	1000	EBB	49	7.0
UT022	48 56.34	125 32.18	82/02/09	1410	EBB	17	25.0
			82/02/10	1025	FLOOD		26.0
			82/02/11	1410	HIGH SLACK	79	26.0

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT022	continued...		82/02/12	1040	FLOOD	>1600	22.0
			82/02/15	1020	EBB	>1600	18.0
			82/02/16	1005	EBB	170	7.5
UT023	48 56.25	125 32.10	82/02/09	1415	EBB	17	25.0
			82/02/10	1025	FLOOD		26.0
			82/02/11	1410	HIGH SLACK	49	26.0
			82/02/12	1045	FLOOD	920	22.0
			82/02/15	1040	EBB	350	20.0
			82/02/16	1005	EBB	79	8.5
UT024	48 56.30	125 31.98	82/02/09	1415	EBB	2	25.0
			82/02/10	1025	FLOOD		26.0
			82/02/11	1415	HIGH SLACK	17	26.0
			82/02/12	1045	FLOOD	23	24.0
			82/02/15	1040	EBB	170	19.5
			82/02/16	1010	EBB	33	8.0
UT025	48 56.35	125 31.80	82/02/09	1415	EBB	<2	25.0
			82/02/10	1030	FLOOD		26.5
			82/02/11	1415	HIGH SLACK	2	26.0
			82/02/12	1045	FLOOD	33	24.0
			82/02/15	1045	EBB	240	20.5
			82/02/16	1010	EBB	49	7.0
UT026	48 56.24	125 31.67	82/02/09	1420	EBB	<2	25.0
			82/02/10	1030	FLOOD		26.5
			82/02/11	1420	HIGH SLACK	2	25.5
			82/02/12	1050	FLOOD	33	24.0
			82/02/15	1045	EBB	110	21.0
			82/02/16	1010	EBB	49	8.0
UT027	48 56.20	125 31.88	82/02/09	1425	EBB	<2	25.0
			82/02/10	1035	FLOOD		26.5
			82/02/11	1820	HIGH SLACK	8	26.0
			82/02/12	1050	FLOOD	27	24.0
			82/02/15	1045	EBB	79	20.0
			82/02/16	1015	EBB	110	7.5
UT028	48 56.14	125 32.05	82/02/09	1430	EBB	8	25.0
			82/02/10	1035	FLOOD		26.5
			82/02/11	1425	HIGH SLACK	11	25.5
			82/02/12	1050	FLOOD	21	23.5
			82/02/15	1050	EBB	70	
			82/02/16	1015	EBB	49	8.0
UT029	48 56.05	125 31.90	82/02/09	1430	EBB	<2	25.0
			82/02/10	1040	FLOOD		26.5
			82/02/11	1425	HIGH SLACK	5	26.0

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT029	continued...		82/02/12	1055	FLOOD	70	24.5
			82/02/15	1050	EBB	33	21.0
			82/02/16	1020	EBB	140	7.5
UT030	48 56.10	125 31.75	82/02/09	1430	EBB	<2	25.0
			82/02/10	1040	FLOOD		26.5
			82/02/11	1435	HIGH SLACK	4	26.5
			82/02/12	1055	FLOOD	23	24.5
			82/02/15	1055	EBB	70	20.5
			82/02/16	1020	EBB	170	7.5
UT031	48 56.00	125 31.75	82/02/09	1440	EBB	<2	25.0
			82/02/10	1045	FLOOD		27.0
			82/02/11	1430	HIGH SLACK	5	26.0
			82/02/12	1055	FLOOD	33	24.5
			82/02/15	1055	EBB	8	22.0
			82/02/16	1020	EBB	70	8.0
UT032	48 55.95	125 31.53	82/02/09	1435	EBB	2	25.0
			82/02/10	1045	FLOOD		27.0
			82/02/11	1430	HIGH SLACK	5	26.5
			82/02/12	1055	FLOOD	33	25.0
			82/02/15	1055	EBB	33	
			82/02/16	1025	EBB	33	7.5
UT033	48 56.13	125 31.42	82/02/09	1440	EBB	5	24.5
			82/02/10	1050	FLOOD		26.5
			82/02/11	1435	HIGH SLACK	17	24.5
			82/02/12	1100	FLOOD	49	21.0
			82/02/15	1055	EBB	79	14.0
			82/02/16	1025	EBB	70	13.0
UT034	48 56.08	125 31.25	82/02/09	1440	EBB	2	24.5
			82/02/10	1050	FLOOD		26.5
			82/02/11	1435	HIGH SLACK	<2	27.0
			82/02/12	1100	FLOOD	70	26.0
			82/02/15	1100	LOW SLACK	11	20.0
			82/02/16	1030	EBB	49	12.0
UT035	48 56.02	125 31.12	82/02/09	1445	EBB	<2	25.0
			82/02/10	1055	FLOOD		27.0
			82/02/11	1440	HIGH SLACK	4	28.0
			82/02/12	1100	FLOOD	17	26.0
			82/02/15	1100	LOW SLACK	79	24.0
			82/02/16	1030	EBB	79	12.5
UT036	48 55.88	125 30.83	82/02/09	1450	EBB	23	25.0
			82/02/10	1100	FLOOD		26.5
			82/02/11	1440	HIGH SLACK	17	28.0

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT036	continued...		82/02/12	1105	FLOOD	49	26.0
			82/02/15	1105	LOW SLACK	14	24.0
			82/02/16	1030	EBB	79	12.5
UT037	48 55.78	125 30.90	82/02/09	1450	EBB	2	25.0
			82/02/10	1100	FLOOD		26.5
			82/02/11	1440	HIGH SLACK	8	28.0
			82/02/12	1105	FLOOD	33	25.5
			82/02/15	1105	LOW SLACK	17	23.5
			82/02/16	1035	EBB	170	11.5
UT038	48 55.50	125 31.55	82/02/09	1500	EBB	<2	25.0
			82/02/11	1450	HIGH SLACK	<2	27.5
			82/02/12	1110	FLOOD	11	25.5
			82/02/15	1105	LOW SLACK	33	24.0
			82/02/16	1045	EBB	33	14.5
UT039	48 55.45	125 31.58	82/02/09	1500	EBB	<2	25.0
			82/02/11	1450	HIGH SLACK	5	27.0
UT040	48 55.60	125 31.60	82/02/10	1105	FLOOD		26.5
			82/02/11	1455	HIGH SLACK	<2	27.5
			82/02/12	1115	FLOOD	11	25.5
			82/02/15	1110	LOW SLACK	17	19.5
			82/02/16	1045	EBB	79	10.0
UT041	48 56.57	125 31.70	82/02/10	1110	HIGH SLACK		26.5
			82/02/11	1455	HIGH SLACK	2	27.0
			82/02/12	1115	FLOOD	79	23.5
			82/02/15	1110	LOW SLACK	13	17.0
			82/02/16	1050	EBB	130	15.5
UT042	48 55.73	125 32.00	82/02/10	1400	HIGH SLACK		25.0
			82/02/11	1455	HIGH SLACK	33	24.0
			82/02/12	1120	FLOOD	33	22.5
			82/02/15	1120	LOW SLACK	64	8.0
			82/02/16	1055	EBB	110	17.0
UT043	48 55.86	125 32.02	82/02/10	1405	HIGH SLACK		25.0
			82/02/11	1500	HIGH SLACK	14	25.5
			82/02/12	1120	FLOOD	49	21.5
			82/02/15	1120	LOW SLACK	220	
			82/02/16	1055	EBB	27	15.0
UT044	48 56.00	125 32.07	82/02/10	1410	HIGH SLACK		25.0
			82/02/11	1500	HIGH SLACK	49	22.0
			82/02/16	1055	EBB	130	13.0

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT045	49 08.32	125 51.62	82/02/17	0935	EBB	5	16.0
			82/02/19	1115	EBB	2	15.5
			82/02/22	1255	EBB	<2	24.0
			82/02/23	1425	EBB	5	23.5
UT046	49 08.50	125 51.73	82/02/17	0935	EBB	2	17.0
			82/02/19	1110	EBB	8	16.5
			82/02/22	1250	EBB	2	23.0
			82/02/23	1420	EBB	<2	24.0
UT047	49 09.00	125 52.10	82/02/17	0940	EBB	<2	20.0
			82/02/19	1110	EBB	2	20.0
			82/02/22	1245	EBB	<2	24.5
			82/02/23	1415	EBB	<2	26.0
UT048	49 09.03	125 52.49	82/02/17	0950	EBB	5	20.0
			82/02/19	1105	EBB	4	20.0
			82/02/22	1245	EBB	2	22.5
			82/02/23	1410	EBB	<2	25.0
UT049	49 09.22	125 52.55	82/02/17	0950	EBB	5	22.5
			82/02/19	1105	EBB	<2	21.0
			82/02/22	1240	EBB	<2	23.0
			82/02/23	1400	EBB	<2	25.0
UT050	49 09.05	125 53.35	82/02/19	1105	EBB	5	25.0
			82/02/22	1235	EBB	7	28.0
			82/02/23	1400	EBB	2	26.0
			82/02/24	1440	EBB	<2	26.0
UT051	49 09.10	125 53.64	82/02/19	1100	EBB	8	24.0
			82/02/22	1235	EBB	2	27.5
			82/02/23	1355	EBB	8	26.0
			82/02/24	1440	EBB	<2	26.0
UT052	49 09.28	125 53.53	82/02/19	1055	EBB	5	25.0
			82/02/22	1230	EBB	5	28.0
			82/02/23	1355	EBB	5	26.0
			82/02/24	1435	EBB	4	15.0
UT053	49 09.38	125 53.21	82/02/19	1045	EBB	8	23.0
			82/02/22	1230	EBB	<2	28.0
			82/02/23	1350	EBB	<2	25.0
			82/02/24	1430	EBB	2	16.0
UT054	49 09.60	125 53.63	82/02/22	1230	EBB	<2	28.0
			82/02/23	1350	EBB	2	26.0
			82/02/24	1430	EBB	<2	15.5

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT055	49 09.41	125 53.77	82/02/19	1040	EBB	<2	24.0
			82/02/22	1220	HIGH SLACK	<2	27.0
			82/02/23	1345	EBB	2	25.0
			82/02/24	1425	EBB	<2	26.0
UT056	49 09.26	125 53.98	82/02/19	1040	EBB	5	26.0
			82/02/22	1220	HIGH SLACK	5	27.0
			82/02/23	1345	EBB	8	26.0
			82/02/24	1425	EBB	<2	26.0
UT057	49 09.28	125 54.11	82/02/19	1035	EBB	49	26.5
			82/02/22	1215	HIGH SLACK	<2	28.0
			82/02/23	1340	EBB	<2	28.0
			82/02/24	1420	EBB	5	26.5
UT058	49 09.41	125 54.15	82/02/19	1030	EBB	33	26.0
			82/02/22	1215	HIGH SLACK	<2	28.0
			82/02/23	1340	EBB	2	28.0
			82/02/24	1420	EBB	<2	27.0
UT059	49 09.60	125 54.02	82/02/19	1030	EBB	5	25.0
			82/02/22	1210	HIGH SLACK	2	28.0
			82/02/23	1335	EBB	2	28.0
			82/02/24	1415	EBB	5	26.0
UT060	49 09.70	125 54.29	82/02/19	1025	EBB	7	25.0
			82/02/22	1205	HIGH SLACK	2	27.0
			82/02/23	1335	EBB	<2	28.0
			82/02/24	1415	EBB	<2	26.0
UT061	49 09.71	125 54.46	82/02/19	1010	HIGH SLACK	2	24.0
			82/02/22	1145	HIGH SLACK	2	27.0
			82/02/23	1315	EBB	<2	26.5
			82/02/24	1350	HIGH SLACK	<2	26.5
UT062	49 09.48	125 54.31	82/02/19	1020	EBB	5	26.0
			82/02/22	1205	HIGH SLACK	<2	28.0
			82/02/23	1330	EBB	<2	28.0
			82/02/24	1410	EBB	<2	26.0
UT063	49 09.30	125 54.36	82/02/19	1020	EBB	33	26.0
			82/02/22	1200	HIGH SLACK	130	28.5
			82/02/23	1325	EBB	2	28.0
			82/02/24	1410	EBB	<2	26.0
UT064	49 09.42	125 54.58	82/02/19	1015	EBB	4	26.0
			82/02/22	1150	HIGH SLACK	<2	28.0
			82/02/23	1315	EBB	<2	26.0
			82/02/24	1355	EBB	<2	26.5

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT065	49 09.20	125 54.80	82/02/19	1015	EBB	17	26.0
			82/02/22	1150	HIGH SLACK	130	30.0
			82/02/23	1150	EBB	2	26.0
			82/02/24	1355	EBB	5	26.0
UT066	49 90.00	125 54.87	82/02/22	1200	HIGH SLACK	<2	29.0
			82/02/23	1325	EBB	<2	26.5
			82/02/24	1405	EBB	4	26.5
UT067	49 09.10	125 54.55	82/02/22	1155	HIGH SLACK	<2	28.5
			82/02/23	1325	EBB	<2	28.0
			82/02/23	1400	EBB	<2	26.0
UT068	49 09.03	125 54.58	82/02/22	1155	HIGH SLACK	2	28.0
			82/02/23	1325	EBB	<2	28.0
			82/02/24	1400	EBB	5	26.5
UT069	49 10.15	125 52.82	82/02/17	1100	EBB	2	22.5
			82/02/19	0845	HIGH SLACK	2	25.0
			82/02/22	1030	HIGH SLACK	2	25.5
			82/02/23	1130	HIGH SLACK	<2	27.5
			82/02/24	1150	HIGH SLACK	<2	26.0
UT070	49 10.30	125 52.95	82/02/17	1105	EBB	<2	21.5
			82/02/19	0845	HIGH SLACK	<2	24.0
			82/02/22	1030	HIGH SLACK	4	26.0
			82/02/23	1135	HIGH SLACK	2	28.0
			82/02/24	1155	HIGH SLACK	<2	26.0
UT071	49 10.50	125 53.02	82/02/17	1110	EBB	<2	22.0
			82/02/19	0850	HIGH SLACK	2	23.5
			82/02/22	1035	HIGH SLACK	<2	25.0
			82/02/23	1135	HIGH SLACK	<2	26.0
			82/02/24	1155	HIGH SLACK	<2	25.0
UT072	49 12.10	125 53.03	82/02/17	1130	EBB	13	19.0
			82/02/19	0900	HIGH SLACK	<2	20.0
			82/02/22	1045	HIGH SLACK	5	15.5
			82/02/23	1150	HIGH SLACK	2	21.0
			82/02/24	1210	HIGH SLACK	<2	18.0
UT073	49 12.14	125 53.03	82/02/17	1125	EBB	<2	20.0
			82/02/19	0900	HIGH SLACK	<2	20.0
			82/02/22	1045	HIGH SLACK	2	19.0
			82/02/23	1150	HIGH SLACK	<2	20.0
			82/02/24	1210	HIGH SLACK	<2	20.0
UT074	49 12.22	125 53.03	82/02/17	1125	EBB	<2	19.5
			82/02/19	0900	HIGH SLACK	<2	26.0
			82/02/22	1045	HIGH SLACK	<2	20.0

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT074	continued...		82/02/23	1145	HIGH SLACK	<2	21.5
			82/02/24	1210	HIGH SLACK	<2	20.0
UT075	49 13.00	125 52.89	82/02/17	1130	EBB	<2	13.0
			82/02/19	0905	HIGH SLACK	2	13.5
			82/02/22	1050	HIGH SLACK	<2	20.0
			82/02/23	1155	HIGH SLACK	<2	20.5
			82/02/24	1215	HIGH SLACK	<2	16.0
UT076	49 13.02	125 52.89	82/02/17	1205	EBB	2	6.0
			82/02/19	0910	HIGH SLACK	2	14.0
			82/02/22	1055	HIGH SLACK	<2	20.0
			82/02/23	1155	HIGH SLACK	<2	22.0
			82/02/24	1215	HIGH SLACK	2	12.0
UT077	49 12.82	125 53.08	82/02/17	1210	EBB	<2	15.5
			82/02/19	0910	HIGH SLACK	2	18.0
			82/02/22	1055	HIGH SLACK	<2	21.0
			82/02/23	1200	HIGH SLACK	<2	22.0
			82/02/24	1220	HIGH SLACK	<2	20.5
UT078	49 12.73	125 53.00	82/02/17	1210	EBB	<2	18.5
			82/02/19	0915	HIGH SLACK	2	18.5
			82/02/22	1055	HIGH SLACK	<2	20.5
			82/02/23	1200	HIGH SLACK	<2	22.0
			82/02/24	1220	HIGH SLACK	<2	22.0
UT079	49 13.23	125 51.39	82/02/17	1220	EBB	2	8.0
			82/02/19	0920	HIGH SLACK	2	15.0
			82/02/22	1105	HIGH SLACK	<2	19.0
			82/02/23	1215	HIGH SLACK	<2	20.5
			82/02/24	1230	HIGH SLACK	<2	20.0
UT080	49 13.42	125 51.44	82/02/17	1230	EBB	<2	13.0
			82/02/19	0925	HIGH SLACK	5	14.0
			82/02/22	1110	HIGH SLACK	<2	17.5
			82/02/23	1220	HIGH SLACK	<2	18.5
			82/02/24	1235	HIGH SLACK	<2	20.0
UT081	49 13.20	125 51.45	82/02/19	0925	HIGH SLACK	5	9.0
			82/02/22	1110	HIGH SLACK	<2	16.5
			82/02/23	1220	HIGH SLACK	<2	20.0
			82/02/24	1235	HIGH SLACK	<2	15.0
UT082	49 13.45	125 51.65	82/02/17	1230	EBB	<2	12.5
			82/02/19	0935	HIGH SLACK	<2	13.0
			82/02/22	1115	HIGH SLACK	<2	18.5
			82/02/23	1220	HIGH SLACK	<2	10.0
			82/02/24	1235	HIGH SLACK	<2	14.0

APPENDIX VI

TABLE 1 : Daily Data Record for Marine Sample Stations
(Area III)

Fecal Coliform Units - MPN
Salinity Units - PPT

Station	Latitude	Longitude	Date	Time	Tide	Fec.Colif.	Salinity
UT083	49 13.65	125 51.50	82/02/17	1235	EBB	<2	3.0
			82/02/19	0935	HIGH SLACK	2	5.5
			82/02/22	1120	HIGH SLACK	<2	19.0
			82/02/23	1225	HIGH SLACK	<2	22.0
			82/02/24	1240	HIGH SLACK	<2	12.0
UT084	49 13.85	125 50.61	82/02/17	1250	EBB	<2	4.5
			82/02/19	0950	HIGH SLACK	<2	8.0
			82/02/22	1125	HIGH SLACK	2	21.0
			82/02/23	1235	HIGH SLACK	<2	21.5
			82/02/24	1250	HIGH SLACK	<2	20.0
UT085	49 13.80	125 50.68	82/02/17	1255	EBB	<2	12.5
			82/02/19	0950	HIGH SLACK	<2	17.5
			82/02/22	1130	HIGH SLACK	2	23.0
			82/02/23	1235	HIGH SLACK	<2	22.0
			82/02/24	1250	HIGH SLACK	<2	20.5
UT086	49 13.75	125 50.71	82/02/17	1300	EBB	2	15.0
			82/02/19	0955	HIGH SLACK	<2	18.5
			82/02/22	1130	HIGH SLACK	5	22.0
			82/02/23	1235	HIGH SLACK	<2	22.0
			82/02/24	1245	HIGH SLACK	<2	22.0

APPENDIX VI

TABLE 2 SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (AREA III)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100 ml		
		RANGE	MEDIAN	90th PERCENTILE
1	5	2-23	11	20
2	5	L2-23	11	23
3	3	L2-8	5	7.1
4	4	L2-79	24.5	67
5	5	L2-49	7	41
6	5	5-49	33	49
7	5	2-110	22	66.5
8	5	2-79	8	55
9	5	L2-170	23	100.5
10	5	2-79	5	50
11	5	2-G1600	240	G1600
12	5	L2-350	79	295
13	5	5-130	7	76.5
14	5	L2-130	23	81.5
15	5	2-110	11	94.5
16	5	7-170	49	109.5
17	5	46-920	130	545
18	5	23-540	33	390
19	5	13-170	49	124.5
20	5	2-130	7	104.5
21	5	L2-79	49	64
22	5	17-G1600	170	G1600
23	5	17-920	79	635
24	5	2-170	23	101.5
25	5	L2-240	33	144.5
26	5	L2-110	33	144.5
27	5	L2-110	27	94.5
28	5	8-70	21	51.5
29	5	L2-140	33	105
30	5	L2-170	23	120
31	5	L2-70	8	51.5
32	5	2-33	33	33
33	5	5-70	49	74.5

Continued...

APPENDIX VI
TABLE 2 SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (AREA III)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100 ml RANGE	MEDIAN	90th PERCENTILE
34	5	L2-70	11	59.5
35	5	L2-79	17	79
36	5	14-79	23	64
37	5	2-170	17	101.5
38	5	L2-33	11	33
39	2	L2-5	2.5	4
40	4	L2-79	9	51.8
41	4	2-130	46	109.6
42	4	33-110	48	91.2
43	4	14-220	38	151.6
44	2	49-130	89.5	113.8
45	4	L2-5	3.5	5
46	4	L2-8	2	5.6
47	4	L2-2	L2	L2
48	4	L2-5	3	4.6
49	4	L2-5	L2	3
50	4	L2-7	3.5	6.2
51	4	L2-8	5	8
52	4	4-5	5	5
53	4	L2-8	L2	5.6
54	3	L2-2	L2	L2
55	4	L2-2	L2	L2
56	4	L2-8	5	6.8
57	4	L2-49	2.5	31.4
58	4	L2-33	L2	20.6
59	4	2-5	3.5	5
60	4	L2-7	L2	5
61	4	L2-2	L2	2
62	4	L2-5	L2	3
63	4	L2-130	17.5	91.2
64	4	L2-4	L2	2.4
65	4	2-130	11	84.8
66	3	L2-4	L2	2.8

Continued...

APPENDIX VI

TABLE 2 SUMMARY OF FECAL COLIFORM MPN DATA FOR MARINE SAMPLE STATIONS (AREA III)

SAMPLE STATION	NO. OF SAMPLES	FECAL MPN/100 ml		
		RANGE	MEDIAN	90th PERCENTILE
67	3	L2	L2	L2
68	3	L2-5	2	4.1
69	5	L2-2	2	2
70	5	L2-4	L2	3
71	5	L2-2	L2	L2
72	5	L2-13	2	9
73	5	L2-2	L2	L2
74	5	L2	L2	L2
75	5	L2-2	L2	L2
76	5	L2-2	L2	L2
77	5	L2-2	L2	L2
78	5	L2-2	L2	L2
79	5	L2-2	L2	L2
80	5	L2-5	L2	2.5
81	4	L2-5	L2	3
82	5	L2	L2	L2
83	5	L2-2	L2	L2
84	5	L2-2	L2	L2
85	5	L2-2	L2	L2
86	5	L2-5	L2	3.5

APPENDIX VI

TABLE 3 FRESHWATER SAMPLE STATION DESCRIPTIONS (AREA III)

STATION NO.	LOCATION DESCRIPTION	RECEIVING WATER
S1	Smith Creek at mouth	Ucluelet Inlet
S2	Culvert south of M&B Booming operation	"
S3	Thornton Creek at fish hatchery	"
S4	Mercantile Creek at highway	"
S5	Mercer Creek at mouth	"
S6	Creek at road 15 m south of water valve (Port Albion)	"
S7	Creek at bridge south of Port Albion	"
S8	Creek south of Indian Band office (Ittatsoo)	"
S9	Creek 40 m south of S8	"
S10	Creek 60 m south of S9	"
S11	Culvert on isthmus - Hyphocus I.	"
S12	Culvert at end of Eber Road	"
S13	Landwash at end of Otter Street	"
S14	Culvert below Ucluelet Village office	"
S15	Culvert at Standard Oil office, Ucluelet	"
S16	Culvert at foot of Bay Street	"
S17	Mouth of creek north of Cedar Street outfall	Duffin Channel
S18	Mouth of creek below Tofino Hospital	"
S19	Mouth of creek entering at N. end of lease 0354377	Lemmens Inlet
S20	Mouth of creek entering at S. end of lease 0349737	"
S21/S22	Mouth of creek entering at E. end of lease 0349737	"
S23/S24	Mouth of creek entering at N. end of lease 0349737	"
S25	Mouth of creek entering at N. end of lease UF925 BK4	"

APPENDIX VI
TABLE 4 DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER SAMPLE STATIONS
(Area III)

STATION	DATE (1982)	FC/100 ml	FS/100 ml
S1	Feb 11	1	0
	12	7	6
	15	5	1
	16	14	2
S2	Feb 11	0	0
	12	0	0
	15	8	2
	16	1	0
S3	Feb 11	5	2
	12	7	1
	15	18	2
	16	11	0
S4	Feb 11	2	0
	12	9	0
	15	17	-
	16	16	2
S5	Feb 11	13	11
S6	Feb 11	1	2
	12	2	3
	15	2	17
	16	1	1
S7	Feb 12	5	5
	15	45	13
	16	5	10
S8	Feb 16	0	2
S9	Feb 16	1	6
S10	Feb 15	8	25
	16	1	1
S11	Feb 16	16	3
	22	9	2
S12	Feb 15	200	27000
	16	97	1690
	22	10	90

Continued...

APPENDIX VI
TABLE 4 DAILY BACTERIOLOGICAL RESULTS FOR FRESHWATER SAMPLE STATIONS
(Continued) (Area III)

STATION	DATE (1982)	FC/100 ml	FS/100 ml
S13	Feb 15	L100	3800
	16	2980	G800
	22	L100	20
S14	Feb 15	500	6400
	16	1490	3300
	22	1700	5490
S15	Feb 15	400	2800
	16	290	600
	22	190	80
S16	Feb 15	200	1800
	16	370	250
	22	20	20
S17	Feb 17	2	3
	19	2	5
S18	Feb 17	7	10
	19	15	17
S19	Feb 17	0	0
	19	0	0
S20	Feb 19	0	0
S21	Feb 17	0	0
	19	0	0
S22	Feb 17	1	0
	19	9	0
S23	Feb 17	0	8
	19	8	1
S24	Feb 17	0	0
	19	0	0
S25	Feb 17	0	0
	19	8	1

APPENDIX VI

TABLE 5 SUMMARY OF BACTERIOLOGICAL DATA FOR FRESHWATER SAMPLE STATIONS (AREA III)

SAMPLE STATION	NO. OF SAMPLES	FECAL COLIFORMS/100 ml		FECAL STREPTOCOCCI/100ml		FC:FS
		RANGE	MEAN	RANGE	MEAN	
S1	4	1-14	7	0-6	2	
S2	4	0-8	2	0-2	L1	
S3	4	5-18	10	0-2	1	
S4	4	2-17	11	0-2*	L1	
S5	1	13	13	11	11	
S6	4	1-2	2	1-17	6	
S7	3	5-45	18	5-13	9	
S8	1	0	0	2	2	
S9	1	1	1	6	6	
S10	2	1-8	5	1-25	13	
S11	2	9-16	13	2-3	3	
S12	3	10-200	102	90-27000	9600	0.03
S13	3	L100-2980	L1100	20-3800	G1500	L0.03
S14	3	500-1490	1200	3300-6400	5100	0.27
S15	3	190-400	290	80-2800	1200	0.32
S16	3	20-370	200	20-1800	690	0.79
S17	2	2	2	3-5	4	
S18	2	7-15	11	10-17	14	
S19	2	0	0	0	0	
S20	1	0	0	0	0	
S21	2	0	0	0	0	
S22	2	1-9	5	0	0	
S23	2	0-2	1	0-1	L1	
S24	2	0	0	0	0	
S25	2	0-8	4	0-1	L1	

* 3 samples collected

APPENDIX VII

BIOCHEMICAL CONFIRMATION RESULTS

1 INTRODUCTION

The accuracy of the MPN test procedure in recovering fecal coliforms, specifically Escherichia coli from the marine environment is routinely tested as part of the microbiology laboratory quality control procedure.

During shellfish surveys, a minimum of 10% of all positive (growth + gas) A-1 media tubes are subjected to biochemical identification to confirm the presence of E. coli in the sample. Positive tubes are generally picked randomly unless anomolous results are observed at individual sample stations.

2 MATERIALS AND METHODS

Inocula from positive A-1 tubes are streaked on Levine's EMB agar to obtain isolated colonies. After 24 hours incubation on Levine's EMB, typical coliform colonies are picked for further biochemical identification. If no typical coliform colonies are present, atypical colonies are selected for biochemical screening.

All isolates are subjected to the following series of biochemical screening tests: indole, methyl red, Voges-Proskauer, citrate (collectively known as IMViC) growth at 44.5°C (lactose), motility, oxidase and ornithine decarboxylase. The procedures followed were those described in Part 908 of the Environmental Protection Service Laboratory Manual (1).

3 RESULTS AND DISCUSSION

The predominant biochemical test patterns obtained in the three study areas are summarized in the table on the following page.

STUDY AREA	BIOCHEMICAL TEST I	MR	VP	C	EC	Orn.D.	Percentage of Total
I	+	+	-	-	+	+	75.3 (272/361)
	+	+	-	-	+	-	18.8 (68/361)
	+	-	-	+	+	+	1.1 (4/361)
	-	+	-	-	+	+	0.8 (3/361)
	-	+	-	-	+	-	0.8 (3/361)
	Other						3.0 (11/361)
II	+	+	-	-	+	+	74.8 (283/378)
	+	+	-	-	+	-	9.2 (35/378)
	-	-	+	+	-	-	4.2 (16/378)
	-	+	-	-	+	+	2.1 (8/378)
	-	-	+	+	+	-	1.6 (6/378)
	-	+	-	-	+	-	0.5 (2/378)
	Other						7.4 (28/378)
III	+	+	-	-	+	+	69.4 (100/144)
	+	+	-	-	+	-	14.5 (21/144)
	-	+	-	-	+	+/-	4.8 (7/144)
	Other						11.1 (16/144)

I = indole
MR = methyl red
VP = Voges Proskauer
C = citrate
EC = lactose fermentation @ 44.5°C
Orn.D. = ornithine decarboxylase

Isolates having a biochemical test pattern of +/-+--++/- are counted as Escherichia coli. On this basis, E. coli recoveries of 96%, 87% and 88% were obtained from Area I, II and III, respectively.

REFERENCES

1. Laboratory Manual - Environmental Protection Service, Fisheries and Marine Service (Pacific Region) January 1979.

APPENDIX VIII

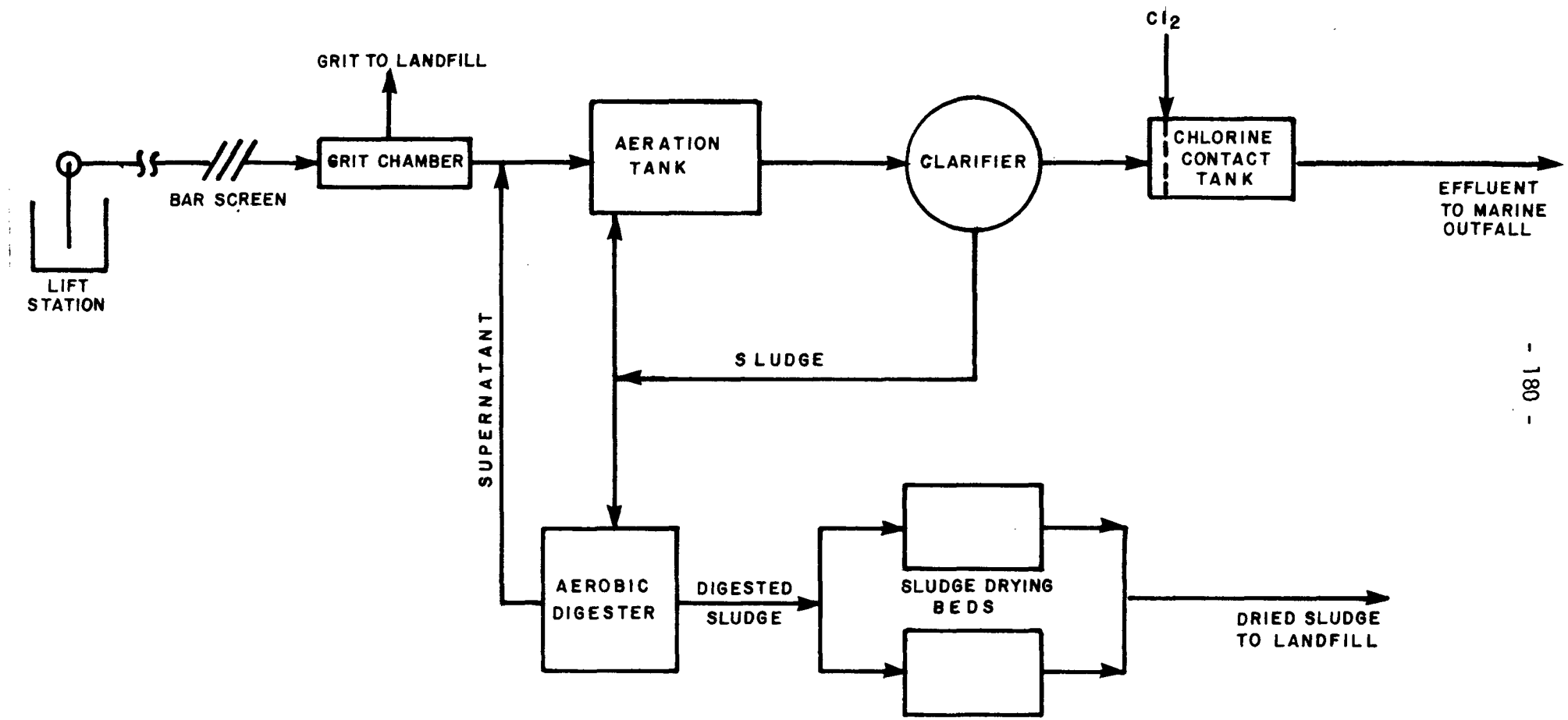
SEWAGE TREATMENT PLANT OPERATIONAL ASSESSMENTS IN STUDY AREA

A VILLAGE OF GIBSONS SEWAGE TREATMENT PLANT (PE-363)

The Village of Gibsons sewage treatment plant has been in operation approximately 8 years. The plant is staffed during the day only, Monday through Friday. It was designed as an extended aeration activated sludge process with a capacity of 180,000 IGPD. Figure 1 is a schematic process flow diagram of the plant. Most of the Village is sewered, and all sewage drains to a lift station near the beach at the foot of Prouse Road. The lift station has 3 pumps with a telemetred alarm to three locations to ensure response at all times, and a time-to-overflow of about 3 hours at maximum flow. The lift station overflows through a short outfall to Gibsons Bay. Apparently the station seldom, if ever, has overflowed. Although the sewer system is only about 10 years old, some inflow and/or infiltration occurs during heavy rains and the flow rate at the plant increases significantly. Apparently during the summer months when dilution is minimal (little rainfall) and the organic loading is highest (more people) the plant is fully loaded and has trouble treating the sewage to the required levels (WMB permit PE-363).

During the survey 3 sets of influent and effluent grab samples were taken over 3 consecutive days and analyzed for various parameters (Table 1). As the results indicate the plant efficiency was quite high, particularly with respect to BOD_5 and suspended solids removal. Some nitrification was occuring as evidence by the reduction in ammonia and alkalinity. However, the level of nitrification is somewhat lower than would be expected during extended aeration. This fact along with the relatively low level of mixed liquor suspended solids and high value for the 30 minute MLSS settling test, indicates that the plant is now operating in the conventional activated sludge mode. Therefore the plant is more highly loaded than designed for and substantiates the reported overloading during the summer months. Certainly more sludge must be wasted compared to the extended aeration operation.

The high Sludge Volume Index (SVI) values suggest a poor settling sludge but the low effluent NFR results indicate this was not the case. However, sludge wasting on the afternoon of May 27 reduced the



APPENDIX VIII
FIGURE 1 VILLAGE OF GIBSONS SEWAGE TREATMENT PLANT PROCESS FLOW SCHEMATIC

TABLE 1

VILLAGE OF GIBSONS SEWAGE TREATMENT PLANT ANALYTICAL RESULTS

Sample Date	Sample Time[1]	BOD_5		NFR		NFVR		NH_3		NO_3^-		Alkalinity		Total PO_4		pH		Aeration Tank		FC(MPN/100 ml)[4]	
		In[2]	Out[3]	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	NFR	NFVR	In	Out
26/5/81	1035																			3.4×10^6	5×10^4
27/5/81	1000	235	10	330	15	290	11	26.5	16.2	L0.010	0.033	147	105	7.20	2.25	7.2	7.4	2630	2230	---	1×10^4
28/5/81	1100	135	6	165	10	140	8	22.4	17.4	L0.010	0.033	122	110	6.05	2.92	7.2	7.3	2400	2000	4.7×10^6	1400
29/5/81	0900	240	20	277	25	243	21	36.1	17.1	L0.010	0.073	174	115	8.93	3.26	7.9	7.3	2350	1980	6.9×10^6	3.7×10^4
01/6/81	0900	—	—	—	—	—	—	—	—	—	—	—	—	—	—					1.1×10^6	4.9×10^4
MEAN		203	12	257	17	224	13	28.3	16.9	L0.010	0.046	148	110	7.39	2.81					4.0×10^6	2.9×10^4
% REDUCTION		94		93		94		40						62							

1 = all samples were grabs.
2 = raw influent downstream of grit chamber.
3 = effluent at chlorine contact chamber discharge.
4 = fecal coliform (most probable number/100 ml).

Date	30 Minute 1 Litre Settling Test of MLSS(ml)	Calculation	SVI
28/5/81	620	$\frac{(620)(1000)}{2400}$ =	258
29/5/81	610	$\frac{(610)(1000)}{2350}$ =	260

MLSS and probably reduced the thirty minute settling test value, resulting in a short term increase in the SVI. The effluent NFR results increased on May 29 and may have increased further on following days as a result of the apparent poor sludge settleability predicted by the high SVI's.

Dissolved oxygen levels measured in the aeration tank on May 27, 28 and 29 ranged from 0.35 to 0.70 mg/L, while the D.O. in the aerobic digester from a single measurement on May 28 was 8.7 mg/L, much more than necessary. The aeration tank D.O. should be kept at a minimum of 1 mg/L; the low levels measured could inhibit BOD_5 reduction and may already be contributing to the low level of nitrification. Apparently the existing compressor capacity is fully utilized and therefore the only immediate way to improve the situation would be to divert some air from the aerobic digester to the aeration tank. In the long term additional aeration capacity may be required.

Influent fecal coliform levels are typical for raw sewage. The effluent fecal coliform levels are fairly high considering total residual chlorine levels at the same location on two occasions were 0.5 mg/L. These results indicate that the residence time in the chlorine contact chamber may be too short and therefore the disinfection process is not complete. However, the length of outfall should provide more than sufficient contact time. (Samples could not be taken at the foreshore to confirm this).

Although these results indicate the plant was producing an excellent effluent with respect to BOD_5 and suspended solids, monitoring results submitted to the Waste Management Branch over the past 2 years as required by the permit indicate the plant's effluent quality is not consistently of high quality:

		mg/L		
Parameter	No. of Values	Max.	Min.	Mean
NFR	18	1269	7	148
BOD_5	19	714	L10	65
NH_3	6	13.4	0.8	4.8
TRC	12	1	0	0.4
FC(MPN/100 ml)i	6	1.6×10^5	20	2.9×10^4

At the time of the survey the Gibson's STP was doing an excellent job in reducing the key parameters BOD_5 and NFR (suspended solids). However, the plant appears to be approaching a condition of being fully loaded, and may actually exceed the treatment capacity during the summer. An overloaded condition may be alleviated for the short term by minor facility changes and improved process control techniques. If Gibsons continues to grow at the reported rate of approximately 12 new sewer connections/month, larger facilities will soon be required.

B B.C. FERRY CORPORATION LANGDALE TERMINAL (PE-3357)

The Langdale Terminal sewage treatment plant is a rotating biological contactor with a primary and a secondary clarifier, and effluent chlorination. The plant was visited 5 times on 5 separate days during the survey. On all occasions there was no flow through the plant, and there was a considerable amount of sludge floating in the clarifier, as well as some in the chlorine contact chamber. Although there was no discharge the manually controlled chlorinator continued to operate. The discs appeared to be adequately covered with biomass. Apparently there has been trouble with the plant since its installation, and it was obvious during our survey that it was not performing properly, at least with respect to solids removal. The no flow condition was the result of little or no usage of the washrooms as the result of the relatively low level of ferry traffic during the week. On weekends usage is much higher and plant operation is probably more normal.

It seems that the main problem hindering successful operation of this plant is the highly irregular influent rates (hourly, daily and seasonal). Some sort of flow equalization and/or controlled effluent recycle would help alleviate this situation. (Further assessment would be required to determine exactly what modifications are appropriate). Chlorination should be eliminated by appropriately locating the outfall, if it is not already, so as to prevent bacterial contamination of recreational and shellfish waters. At the very least some control of chlorination relative to flow should be installed.

C. HALFMOON BAY DEVELOPMENTS (PE-375)

Presently Halfmoon Bay Developments is serviced by a $57m^3$ capacity extended aeration sewage treatment plant. There are approximately 23 homes within the sub-division but all are not necessarily serviced by the plant. There is some discrepancy as to the actual number of homes serviced. The original permit authorizing the above works was amended in June 1981. The amendment makes provisions for increasing the discharge to $200m^3$/day, extending the length of the outfall by 54.8m and increasing the depth by 5m, and increasing the effluent BOD_5 and suspended solids levels, as well as eliminating the requirement for chlorination.

Surveys conducted during Feb. and Aug./Sept. of 1981 included some bacteriological sampling of the plant effluent (Table 2) and visual observation of the plant maintenance/operation. Under the conditions of the original permit chlorination was to be taking place. This, as indicated by the bacteriological results of Feb. 25, 26 and observations during our visits, was not being carried out properly.

The Aug./Sept. survey produced similiar results. Mixed liquor settling tests demonstrated that there was almost no biomass in the aeration tank, apparently due to a plugged sludge return line, and there was a high level of suspended solids in the clarifier effluent.

Plugged sludge return lines are prevalent in extended aeration plants using air-lift pumps and require frequent inspection. Due to the low level of mixed liquor suspended solids it is doubtful that the BOD_5 reduction was adequate to achieve the permit level.

TABLE 2

HALFMOON BAY DEVELOPMENT SEWAGE TREATMENT PLANT BACTERIOLOGICAL RESULTS

SAMPLE DATE	SAMPLE TIME[1]	FC (MF/100ml)[2,3]
25/2/81	1500	1×10^5
26/2/81[4]	0900	L 100
20/8/81	1615	2×10^4
21/8/81	1450	3.6×10^4
22/8/81	1605	3.3×10^4
23/8/81	N/A	2.2×10^4

1: Grab Samples

2: Fecal Coliform Membrane Filtration/100ml

3: Effluent at Plant Discharge

4: Chlorination

APPENDIX IX

SHELLFISH TISSUE TRACE METAL LEVELS - HOWE SOUND

In conjunction with the bacteriological water quality survey of Howe Sound, shellfish were collected at various locations for trace metals analysis. The collection sites are shown in Figure 1 and the data is presented in Table 1.

Each sample consisted of 3-20 animals, depending upon species, and were analyzed according to the procedures described in the EPS-FMS Laboratory Manual (1).

The results show the variation between species in their ability to concentrate and bioaccumulate various metals. Oysters (*C. gigas*) in particular generally demonstrated much higher levels of Cd, Cu and Zn than either mussels (*M. edulis*) or soft shelled clams (*M. arenaria*). The highest Cd, Cu and Zn levels were observed in oysters collected in Centre Bay. Sampling conducted by EPS in 1973(2) also demonstrated high levels of these metals in oysters as shown below:

	mg/kg wet weight			
METAL	BACKGROUND[1]	JUNE 1973	AUGUST 1973	JUNE 1981
Zn	540-860 (743)	1100-2400 (1668)	960-1800 (1592)	2060
Cu	15- 26 (20)	100- 200 (144)	120- 150 (140)	249.0
Cd	1.5-2.7 (2.0)	2.1- 2.9 (2.44)	1.6- 3.2 (2.18)	3.03
Hg		0.2		0.034

Numbers in brackets are mean values.

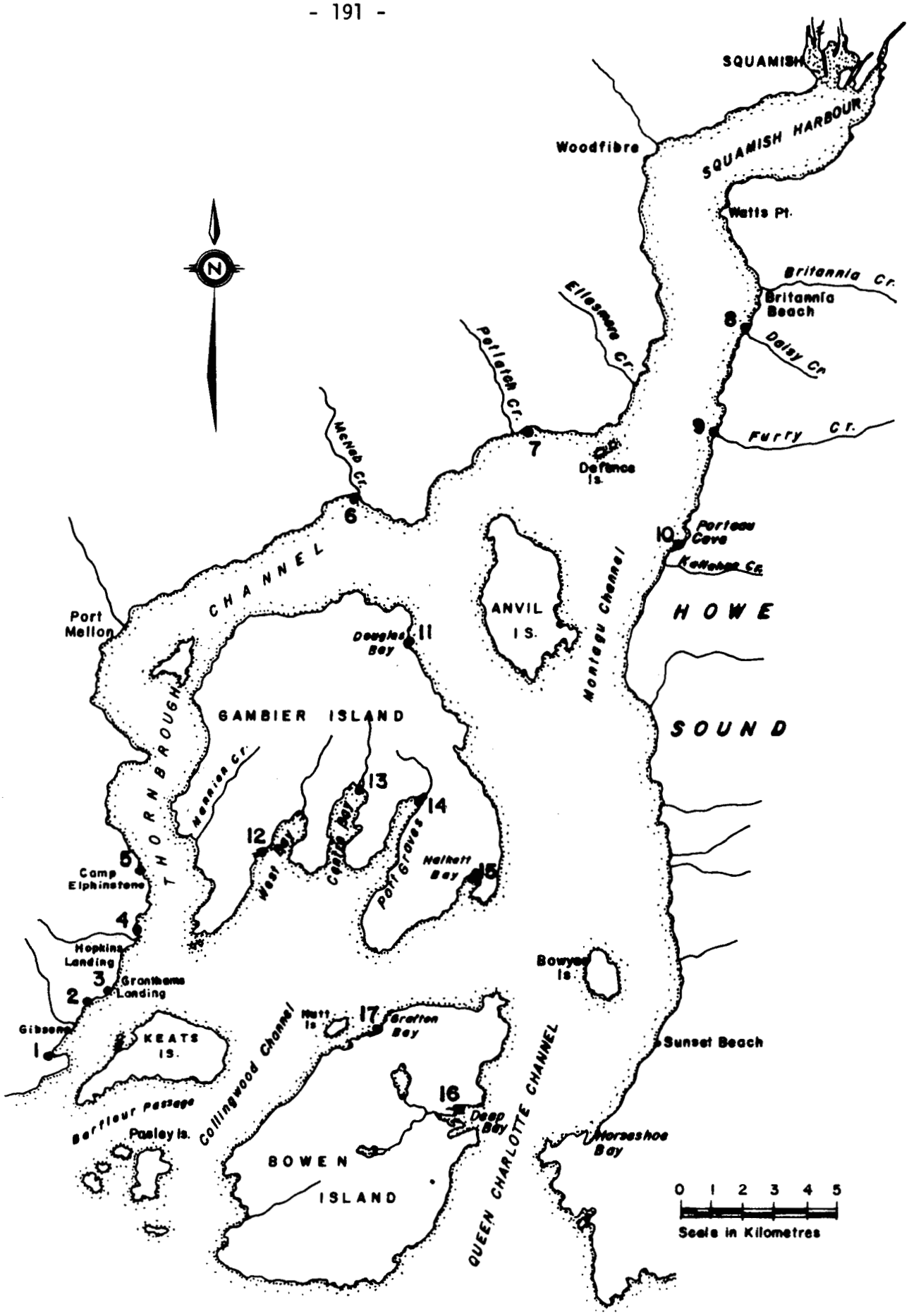
[1]Oyster (*C. gigas*) Samples collected in Okeover Inlet in May 1973

The higher levels observed in 1981 may be related to (i) worsening environmental conditions (ii) variations in the sampling location or (iii) improved detection limits resulting from methodology changes. Whatever the reason, the limited data obtained indicates there has not been a decrease in the levels of these trace metals in the oysters since 1973. Comparison of these levels with background levels recorded for Okeover Inlet show Zn, Cu and Cd to be 3-fold, 12-fold and 15-fold higher respectively. Conversely, Hg levels have shown a dramatic drop since 1973, and approach the detection limit of the test.

The significance of these metal levels with respect to public health hazards is not clear. The U.S. Food and Drug Administration have established interim alert levels for the following metals: Cd- 1.5 ug/g wet weight; Pb- 2.0 ug/g wet weight; Zn- 30 ug/g wet weight. In the case of Pb, none of the Howe Sound samples exceeded the alert level. However, Cd and Zn levels for all oyster samples approached or exceeded these alert levels, including those samples collected from a control location. Clearly, the applicability and epidemiological significance of these levels is questionable in B.C. waters.

TABLE 1: SELECTED TRACE METAL LEVELS IN HOWE SOUND SHELLFISH SAMPLES

SAMPLE STATION	SAMPLE LOCATION	SPECIES	mg/kg (wet weight)				
			Hg	Cd	Pb	Cu	Zn
1	Gibson's Beach	Mya arenaria	< 0.039	< 0.074	< 0.74	4.51	14.3
2	Granthams Landing	Mytilus edulis	0.030	0.594	< 0.582	1.81	34.4
3	Soames Point	Mya arenaria	< 0.030	0.141	< 0.617	3.58	16.7
4	Langdale Terminal	Mya arenaria	< 0.028	0.0927	< 0.0541	5.76	11.8
5	Camp Elphinstone	Mytilus edulis	0.040	0.681	< 0.552	2.31	33.5
		Mya arenaria	< 0.029	0.168	< 0.59	4.78	14.6
6	McNab Creek	Mytilus edulis	0.027	0.502	< 0.51	2.11	20.0
7	Potlatch Creek	Mytilus edulis	0.031	0.806	< 0.424	2.31	44.9
8	Daisy Creek	Mytilus edulis	0.025	0.414	< 0.47	3.69	33.4
9	Furry Creek	Mytilus edulis	0.030	0.709	< 0.48	4.31	42.5
10	Porteau	Mytilus edulis	0.033	0.591	< 0.533	3.03	23.1
11	Douglas Bay	Mytilus edulis	0.026	0.458	< 0.468	2.38	27.5
12	West Bay	Mya arenaria	0.032	0.132	< 0.531	5.05	13.9
13	Centre Bay	Crassostrea gigas	0.034	3.03	< 0.495	249.0	2060.0
14	Port Graves	Crassostrea gigas	0.033	1.39	< 0.552	39.4	601.0
15	Halkett Bay	Mya arenaria	< 0.027	0.0878	< 0.549	5.42	13.1
16	Deep Bay	Crassostrea gigas	0.038	1.67	< 0.571	90.6	913.0
16	Deep Bay	Mya arenaria	0.032	0.619	< 0.482	3.76	33.8
16	Deep Bay	Mytilus edulis	0.037	0.106	< 0.636	6.96	15.2
17	Grafton Bay	Mya arenaria	< 0.035	0.103	< 0.714	5.68	13.1



APPENDIX IX

FIGURE I SHELLFISH COLLECTION SITES - HOWE SOUND - June 1981

REFERENCES

1. Laboratory Manual - Environmental Protection Service, Fisheries and Marine Service (Pacific Region), January 1979.

2. Nelson, H. and D. Goyette. "Heavy Metal Contamination in Shellfish with Emphasis on Zinc Contamination of the Pacific Oyster, Crossostrea gigas." Environmental Protection Service Report Number EPS 5-PR-76-2, January 1976.

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