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Shellfish Growing Water Sanitary Survey of the Vancouver Island Coastline, Wallis Point to Qualicum Bay, British Columbia, 1975

Surveillance Report
EPS 5-PR-75-11

Pacific Region
May 1976

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SHELLFISH GROWING WATER SANITARY SURVEY
OF THE VANCOUVER ISLAND COASTLINE, WALLIS
POINT TO QUALICUM BAY, BRITISH COLUMBIA, 1975

by

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ABSTRACT

A sanitary and bacteriological survey of the Vancouver Island foreshore between Wallis Point and Qualicum Bay, inclusive, was conducted from June 3 to July 4, 1975, by personnel of the Environmental Protection Service, Pacific Region.

The survey was conducted in order to determine the effects of boating activity and a summer tourist population on the shellfish growing water quality of the area. Background bacteriological data was also required prior to construction of a sewer system for the Parksville - Qualicum area, with a treatment plant and outfall to be located at the mouth of French Creek.

Unacceptable intermittent fecal pollution was observed in Parksville Bay, at the mouth of French Creek, and at Qualicum Beach. Except for Englishman and Little Qualicum rivers, significant fecal contamination was detected in all of the freshwater inputs, including the storm water culverts at Qualicum Beach.

A recommendation is made to add 3 closures to the British Columbia Fishery Regulations' contaminated area Schedule J.

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RÉSUMÉ

Du 3 juin au 4 juillet 1975, le personnel du Service de protection de l'environnement (région du Pacifique) a effectué une étude sanitaire et bactériologique sur le littoral de l'île Vancouver entre Wallis Point et Qualicum Bay inclusivement.

Cette étude avait pour but de déterminer les effets produits par les bateaux et les estivants sur la qualité de l'eau où l'on élève des crustacés. Il fallait également obtenir des données bactériologiques avant de construire un système d'égout pour la région de Parksville - Qualicum, une usine de traitement des eaux résiduaires et un égout de décharge qui seraient situés à l'embouchure du ruisseau French.

On nota, par intermittence, une pollution fécale inacceptable dans la baie de Parksville, située à l'embouchure du ruisseau French, et à Qualicum Beach. Sauf dans les rivières Englishman et Little Qualicum, on constata une forte contamination fécale dans tous les affluents d'eau douce, y compris les canaux d'écoulement des eaux de pluie, à Qualicum Beach.

On recommande d'ajouter 3 sections à l'annexe J (régions contaminées) du Règlement sur les pêcheries de la Colombie-Britannique.

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CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. The coastline waters surveyed meet the molluscan shellfish growing water bacteriological standard with the following exceptions:
 - a. Parksville Bay - A sample station in the vicinity of the Parksville sewer system outfall demonstrated unacceptable intermittent fecal contamination, and the Central Vancouver Island Health Unit verified that faulty septic tank - disposal fields could contaminate storm drainage to the western side of the Parksville Bay foreshore during heavy rainfall periods.
 - b. French Creek Boat Basin - The water at the entrance of the French Creek boat basin is subject to intermittent fecal contamination, and the shellfish growing water quality in the area could possibly be intermittently contaminated if mechanical failures occur at the planned Nanaimo Regional Sewer Authority treatment plant.
 - c. Qualicum Beach - The foreshore of Qualicum Beach is exposed to fecal contamination from a creek at the east end of the beach, and from several culverts that drain storm water from the residential area.

The suspected sources of pollution that affect the water quality of Parksville Bay, French Creek Boat Basin, and Qualicum Beach were identified and are listed in Appendix I. It is anticipated that most of these problems will be eliminated when the area is sewered.

2. There is some indication of fecal contamination at the head of Craig Bay, although the results are inconclusive due to lack of an adequate number of samples.
3. The single sample station located in Qualicum Bay met the shellfish growing water bacteriological standard during the survey.

RECOMMENDATIONS

1. It is recommended that the following shellfish growing waters be declared contaminated and included in Schedule J of the British Columbia Fishery Regulations:
 - a. Area 14-7 - "The waters and tidal foreshore lying within a line drawn from the west side of Parksville Bay at longitude 124° 20' 00" W to the most northerly point of land immediately east of the mouth of Englishman River."
 - b. Area 14-8 - "The waters and tidal foreshore lying within a 3,500 foot (1.07 kilometre) radius drawn from the mouth of French Creek." The 3,500 foot distance is predicated on the existence of the Columbia Beach Estates sewage treatment plant outfall and the proposed Nanaimo Regional Sewer Authority sewage treatment plant and outfall to be located at French Creek.
 - c. Area 14-9 - "The waters and tidal foreshore lying within a line drawn from the most northerly point of land at the west end of Qualicum Beach to the most northerly point of land at the east end of Qualicum Beach."

The recommended Schedule J closures are illustrated in Figure 1.

2. It is recommended that Craig Bay be more intensively studied during the months of July and August.
3. Since only one sample station was located in Qualicum Bay, a detailed study is recommended during July and August, the peak holiday months, when increased loads on sewage disposal systems are most likely to result in malfunctions.

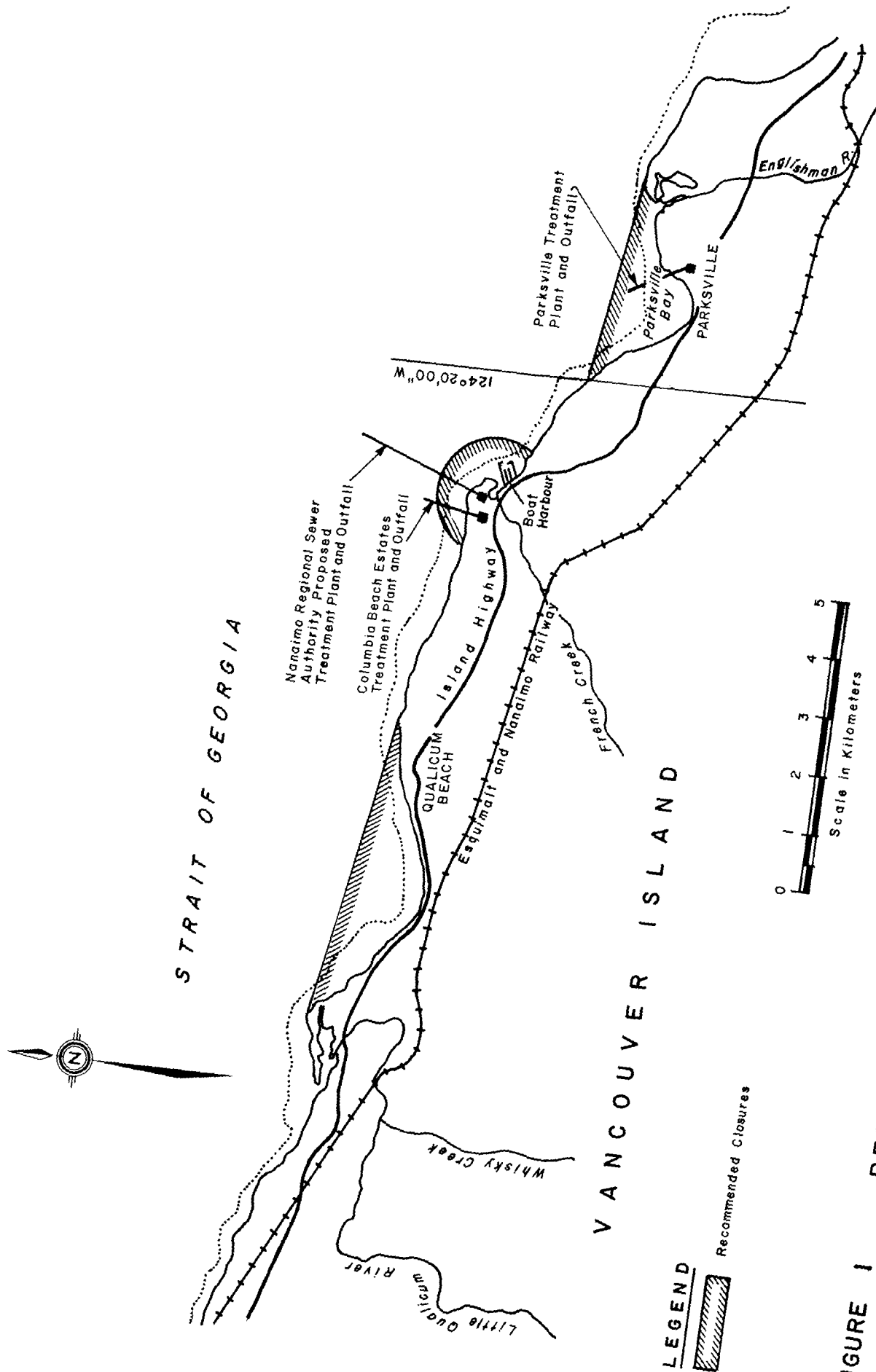


FIGURE 1 RECOMMENDED CLOSURES

1 INTRODUCTION

The survey area, Wallis Point to Qualicum Bay, is located north of Nanaimo on Vancouver Island. The two main centres in this section are Parksville and Qualicum, with resident populations of 2,169 and 1,245 respectively, according to Statistics Canada information (June 1, 1971 Census). Several resorts and motels in the area accommodate a large population of tourists in the summer, and boating activity increases also, especially at Schooner Cove, Northwest Bay, and French Creek, where there are moorage facilities.

According to information obtained from Fisheries and Marine Service and the Pacific Biological Station in Nanaimo, isolated populations of shellfish are located along the surveyed foreshore, and there are no oyster leases in the area. There has been commercial and recreational harvesting of oysters in the Winchelsea Islands, although the resource appears to be almost depleted. Some recreational clam digging occurs in Craig Bay, but a large portion of the bay's shoreline is part of Rath Trevor Beach Park, a "Class A" provincial park where shellfish harvesting is prohibited. There is some recreational clam harvesting in Parksville Bay, and there is both recreational and commercial clam digging along the western portion of Qualicum Beach, the mouth of Little Qualicum River, and at Qualicum Bay. Oysters are not as common on the tidal foreshore of these areas.

Marine sample stations were located in the identified molluscan shellfish resource areas to permit classification of the shellfish growing water quality, and to obtain background bacteriological data for comparison purposes following completion of the sewer systems, sewage treatment plants, and marine outfalls planned for the survey area.

Since no previous shellfish water quality survey had been conducted along this section of coastline, the primary purpose of the survey was to classify the molluscan shellfish growing waters with respect to the health risk to the consumer. It was also intended that background bacteriological data be obtained prior to construction of a

sewer system and treatment plant by the Nanaimo Regional Sewer Authority to service the Parksville-Qualicum area, and prior to the construction of a sewage treatment plant to service a large condominium development at Schooner Cove.

Due to commitment during July and August of the field survey unit to other, more intensely harvested shellfish recreational areas, which are also influenced by increased summer populations and boating activities, this survey was conducted from June 9 to July 4, 1975. It was recognized that increased domestic sewage contributions could be anticipated in the area during the peak holiday months of July and August.

2 SAMPLE STATION LOCATIONS

The segment of coastline surveyed is approximately 40 kilometres long. This length, plus the several islands involved, compounded difficulties in processing samples from an adequate number of sample stations within the three-week sampling period. Rough water often slowed the sample runs made by boat, making necessary the gathering of some samples by truck.

No shellfish harvesting closures were in effect in the area before the survey, other than the general Schedule J 400-foot area closures applying to wharves, although a small portion of Qualicum Beach, 100 feet on either side of a contaminated stream, is closed to swimming. A freshwater sample station was located at the mouth of this stream to determine the level of fecal contamination, and a marine station was located offshore of its mouth to assess the stream's effects on the shellfish growing water quality.

Marine sample stations were located in the identified molluscan shellfish resource areas to permit classification of the shellfish growing waters, and to obtain background bacteriological data for comparison purposes following completion of the sewer systems, sewage treatment plants, and marine outfalls planned for the survey area. The marine sample station locations at Schooner Cove, Northwest Bay, and the mouth of French Creek were selected also with a view to assessing the influence of fecal discharges from the considerable boating activity in these areas.

Freshwater sample stations were situated on rivers, streams, and storm drains to assist in locating sources of fecal contamination. Several storm drainage culverts at Qualicum Beach were sampled in order to determine the extent of fecal contamination reaching the tidal fore-shore. Marine and freshwater sample station locations are shown in Figure 2, and sample station descriptions are given in Appendices II and III.

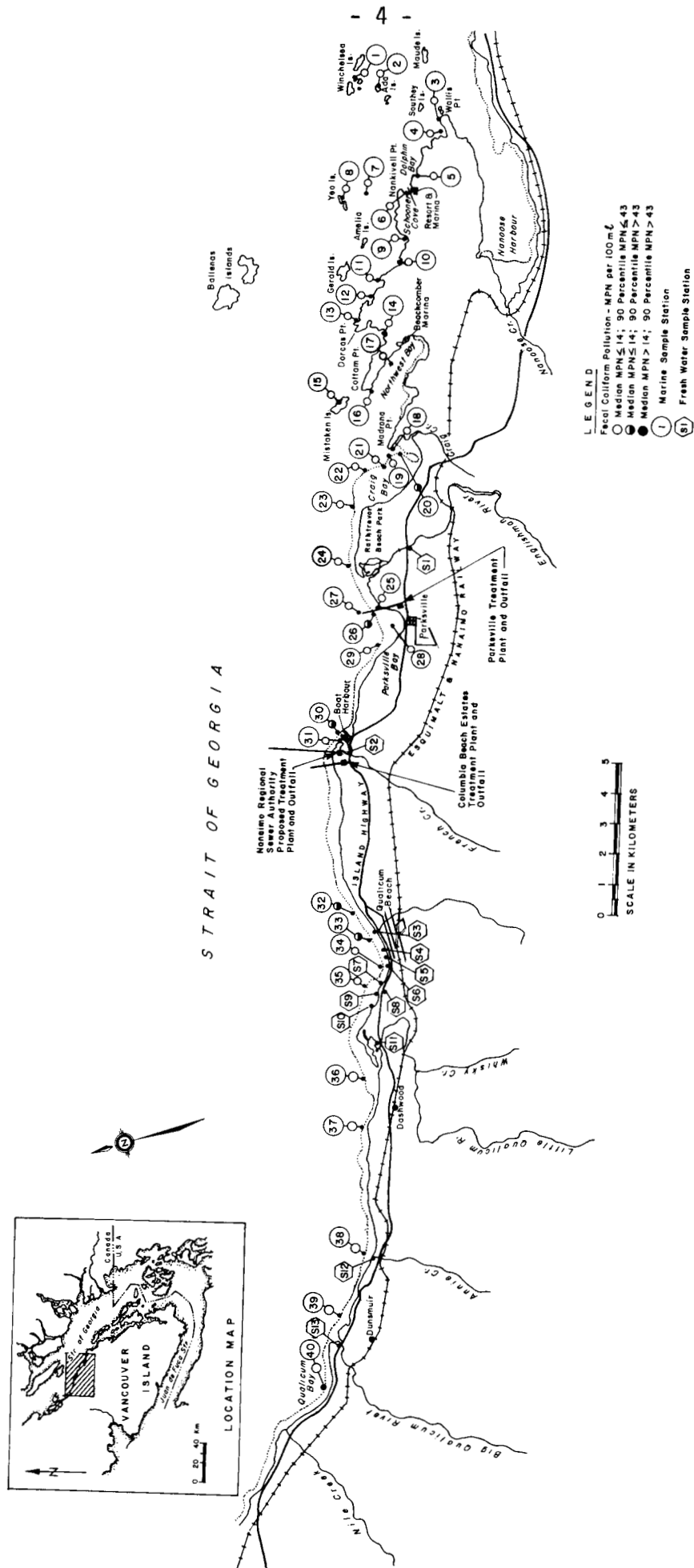


FIGURE 2 WALLIS POINT TO QUALICUM BAY - SAMPLE STATION LOCATIONS

3 FIELD PROCEDURES AND METHODS

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

3.1 Bacteriological Sampling and Analysis

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

The fecal coliform MPN per 100 ml was determined using the multiple tube fermentation technique (at least 3 decimal dilutions of 5 tubes each) as described in Part 407C of the 13th edition of Standard Methods for the Examination of Water and Wastewater (1). Incubation was for 24 ± 2 hours in a water bath equipped with a circulation device, and maintained at $44.5 \pm 0.2^\circ\text{C}$. Presumptive culture media used was Bacto-Lauryl Tryptose Broth; fecal coliform determinations were made using Bacto-EC medium.

3.2 Physical and Chemical Testing Equipment and Analyses

Temperature and salinity measurements at marine sample stations were made at a depth of 15 to 30 cm below the water surface using a YSI Model 33 Salinity-Conductivity-Temperature Meter. Measurements, by wading, were made with a standard submersible thermometer and a Beckman Model RB3-349 Solubridge Electrolytic Conductivity Meter. Wind speeds were determined with a Telcor Series 210 electronic wind speed/direction indicator.

Tide data obtained was that for Point Atkinson, and the daily rainfall data was obtained from the British Columbia Forest Service Ranger Station located at Parksville. The total rainfall figure for June, 1975, was obtained from the British Columbia Forest Service in Vancouver (measurements made at Big Qualicum River). Mean flow rates for the major freshwater inputs were obtained from the Water Survey of Canada Inland Waters Directorate, Environment Canada.

4 RESULTS AND DISCUSSION

Fecal coliform data for shellfish growing waters are summarized in Table 1, and fecal coliform data for freshwater sample stations are summarized in Table 2. Daily bacteriological results and sampling conditions for marine and freshwater stations are presented in Appendices IV and V respectively. Mean June flow rates for the major freshwater inputs are listed in Appendix VI.

The bacteriological data has been interpreted and the growing waters classified using the fecal coliform standard recommended at the Eighth National Shellfish Sanitation Workshop (2). An area can be considered bacteriologically safe for the harvesting of shellfish if the fecal coliform median MPN of the growing waters does not exceed 14 per 100 ml, and the 90 percentile MPN does not exceed 43 per 100 ml in those portions of the area most probably exposed to fecal contamination during the most unfavourable hydrographic and pollution conditions.

A total of 252 samples was collected from the 40 marine stations, and 63 samples were collected from the 13 freshwater stations.

All of the marine sample stations met the shellfish growing water standard, with the exception of stations 20, 26, 31, 32, and 33, which exceeded the standard at the 90 percentile level. All of the freshwater sample stations, except S1 and S11, exhibited significant fecal contamination.

Rainfall during the survey was not excessive. The total rainfall for June, 1975, was 45.7 millimetres, and the average monthly rainfall for June is 41.7 mm. Heaviest precipitation in the area occurs during December, which has an average monthly precipitation (rain and snow) of 159.8 mm (3).

TABLE 1 SUMMARY OF FECAL COLIFORM MPN DATA FOR SHELLFISH GROWING
WATER SAMPLES

Sample Station	Number of Samples	MPN Range	Fecal Coliform MPN/100 ml	
			Median	90 Percentile
1	5	<2-<2	<2.0	<2.0
2	5	<2-<2	<2.0	<2.0
3	5	<2-<2	<2.0	<2.0
4	6	<2-<2	<2.0	<2.0
5	7	<2-2	<2.0	2.0
6	7	<2-11	2.0	6.8
7	3	<2-<2	<2.0	<2.0
8	3	<2-5	2.0	4.1
9	8	<2-5	2.0	2.6
10	7	<2-<2	<2.0	<2.0
11	7	<2-5	2.0	2.9
12	7	<2-2	<2.0	2.0
13	7	<2-<2	<2.0	<2.0
14	7	<2-2	<2.0	2.0
15	6	<2-8	2.0	4.4
16	6	<2-2	<2.0	2.0
17	9	<2-14	2.0	11.3
18	8	<2-8	2.0	3.2
19	6	<2-2	<2.0	2.0
20	3	2-79	5.0	56.8
21	3	<2-2	<2.0	2.0
22	4	<2-5	2.0	3.8
23	6	<2-2	<2.0	2.0
24	8	<2-17	2.0	10.0
25	5	<2-49	5.0	33.0
26	10	<2-1600	7.0	170.0
27	2	2-11	6.5	9.2
28	4	2-49	8.0	32.6
29	6	<2-2	<2.0	2.0
30	6	<2-70	3.0	55.6
31	6	<2-5	2.0	3.2
32	12	<2-49	2.0	42.6
33	12	<2-920	9.0	65.8
34	4	2-31	8.0	21.8
35	8	<2-8	3.0	4.8
36	7	<2-11	2.0	11.0
37	6	<2-2	<2.0	2.0
38	7	<2-2	<2.0	2.0
39	7	<2-3.6	2.0	2.5
40	7	<2-5	2.0	4.3

TABLE 2 SUMMARY OF FECAL COLIFORM MPN DATA FOR FRESHWATER SAMPLES

Sample Station	Number of Samples	MPN Range	Mean Fecal Coliform MPN/100 mL
S1	7	5-17	10.4
S2	7	5-220	78.4
S3	8	110-3500	1200.0
S4	2	240-330	285.0
S5	2	79-1700	889.5
S6	3	110-790	343.3
S7	3	170-5400	2020.0
S8	2	>1600-5400	3500.0
S9	3	790->16000	6396.7
S10	3	1300-5400	2766.6
S11	8	4-49	20.8
S12	8	70-3500	840.0
S13	7	11-130	56.3

4.1 Wallis Point to Northwest Bay

The tidal foreshore of this area, which includes numerous islands, is rocky and abrupt, and the water depth varies considerably. There is no housing in the vicinity of Wallis Point or on the islands in the area, with the exception of a Canadian Armed Forces base on the Winchelsea Islands (station 1). Shoreline housing between Dolphin Bay (station 5) and sample station 11 is relatively dense, becomes sparse near Dorcas Point, then is more dense again around Cottam Point and along the northeast shore of Northwest Bay. The area is unsewered and sewage disposal is by septic tank disposal field systems, but some suspected domestic waste discharge lines entering the water were observed.

Sample stations 1 to 17, located along this section of foreshore, were all well within the safe bacteriological limits for shellfish growing waters.

In addition to the housing along the shoreline, a large resort development, including condominiums, a restaurant, and marina, all in different stages of completion, is located in Schooner Cove, immediately northwest of Dolphin Bay. A package sewage treatment plant, with a marine outfall, is planned to service this complex. At the time of the survey, several boats were moored at the docks that had been completed.

Sample station 6 was positioned on the northwest side of Schooner Cove to obtain background data prior to completion of the project and to evaluate the Schedule J 400-foot wharf closure in effect. The fecal coliform median MPN was 2/100 mL, and the 90 percentile MPN was 6.8/100 mL for station 6, which meets the shellfish growing water standards.

In the vicinity of sample station 10, sewage from a faulty septic tank tile field system was seeping down a steep bank and onto the beach below. This did not appear to influence the water quality at station 10, however, which demonstrated a fecal coliform 90 percentile

MPN of <2/100 mL.

At sample station 12, there is a small cove with a large oyster resource. Onshore of the cove is a church camp. Upon inspection, the camp's several septic tank tile field systems appeared to be functioning properly, and a new disposal field was being installed to replace an old faulty system. The 90 percentile fecal coliform MPN at sample station 12 was 2/100 mL.

Clayton's trailer resort is located at the head of the bay between Dorcas and Cottam points. The 8 trailers on the waterfront are serviced by a common septic tank tile field system. The washrooms, laundry, and some other trailers are serviced by 2 septic tanks and a 1500-foot sewage disposal tile field. The systems appeared to be functioning without problems. Sample station 14, in front of this resort, indicated that there was no fecal pollution with a 90 percentile fecal coliform MPN of 2/100 mL. There are very few oysters in the area, but there is evidence of a clam resource in the sandy tidal foreshore.

The Beachcomber Marina in Northwest Bay has accommodation for approximately 83 boats, none of which has permanent live-aboards. Shore toilet facilities, which are serviced by a septic tank disposal field system, are provided for boaters using the marina. No seepage problems were observed from this sewage disposal system, and the acceptable bacteriological data obtained at sample stations 16 and 17 did not indicate any significant fecal contamination emanating from sewage systems serving residences on the east side of the bay.

4.2 Madrona Point to Parksville Bay

The foreshore from Madrona Point to Parksville Bay is sandy, with large tracts of beach exposed at low tides. Sample stations varied somewhat in their daily location because of the tides, which were low during the day. There are numerous residences and resorts along this section, with the greatest concentration of dwellings at Parksville. All of the sample stations along this section met the shellfish growing water standards, except stations 20 and 26, which had

90 percentile MPN's of 56.8/100 ml and 170/100 ml respectively.

Station 20 was located in Craig Bay, opposite some dwellings. Since the tide was low on sampling and the sample station was far offshore, the possibility of detecting contamination from the shore was low. The fecal contamination indicated may have resulted from swimmers in the area, since the beach is a popular area in the summer, but the possibility of an onshore source of contamination cannot be ruled out. The confidence in the median and 90 percentile MPN's for samples taken along this beach is questionable since stations 20 and 21 were sampled only 3 times each, and station 22 was sampled only 4 times due to survey scheduling difficulties. No shellfish harvesting is allowed along the beach where stations 21 and 22 were located, since it is part of Rath Trevor Beach Provincial Park, a Class A park in which shellfish harvesting is prohibited.

Bacteriological samples taken on the east side of Parksville Bay demonstrated that there is some fecal contamination present. Sample station 26, which exceeded the 90 percentile growing water standard, was located shoreside of the end of the Parksville village sewer system outfall. Samples exhibiting fecal coliform MPN's of 49/100 ml, 170/100 ml, and 1600/100 ml were taken at station 26 on flooding tides, indicating that the sewage plume at the time was probably surfacing shoreward of the outfall. The Parksville sewer system serves 60 percent of the village (approximately 1,300 people), and discharges approximately $0.02 \text{ m}^3/\text{sec}$ of septic tank effluent through a 38 cm diameter outfall into approximately 21 m of water, 640 m offshore. Desludging of the septic tank occurs through this outfall.

Sample station 27, located over the end of the outfall, was sampled twice and did not demonstrate a very high fecal coliform density. This may have been due, in part, to the sewage plume shifting with the currents and tide, which would have carried some fecal contamination to the shore. Sample station 25, located where the Parksville outfall enters the water, indicated some contamination does occur with a fecal coliform 90 percentile of 33/100 ml.

It was reported, and verified, by the Central Vancouver Island Health Unit that some problems exist with the septic tank disposal systems that serve some of the residences in Parksville, especially in periods of high rainfall when storm drainage can carry septic seepage to the ocean. Reported problems with sewage disposal systems along Rushton Avenue in Parksville would contribute contamination to the east side of Parksville Bay, but none was detected in the relatively dry weather during the survey.

4.3 French Creek to Qualicum Beach

From French Creek to Qualicum Beach, the foreshore is sparsely populated, but there are numerous houses along the east and west ends of Qualicum Beach, and motels along the central portion of the beach. Of the six sample stations located along this section, stations 30, 32, and 33 did not meet the 90 percentile MPN of the shellfish growing water standards.

Sample station 30 demonstrated a fecal coliform 90 percentile MPN of 55.6/100 ml. This station was located at the mouth of the French Creek boat basin in order to determine the magnitude of contamination the pleasure craft and commercial fishing vessels were contributing to the surrounding waters. The highest fecal coliform MPN exhibited was 70/100 ml from a sample taken on an ebb tide, and this would indicate that some contamination is arising from the boats.

Sample station 31 was located at the mouth of French Creek to determine the effects of the creek on the water quality at its mouth and to obtain background data in anticipation of a Nanaimo Regional Sewage Authority secondary sewage treatment plant to be built at French Creek. The plant would treat sewage collected from Parksville, Qualicum Beach, and the area between, and discharge it to a point 2,440 m offshore of French Creek in 61 m of water depth. Station 31 met the shellfish growing water standards with a fecal coliform median MPN of 2/100 ml and 90 percentile MPN of 3.2/100 ml. The bacteriological results and salinity readings (average salinity of 24.7 parts per thousand) at this station indicated there was little influence from French Creek, which had a mean fecal coliform MPN of 78.4/100 ml (fresh-

water station S2).

Columbia Beach Estates, immediately west of French Creek, has 18 residences presently serviced by an activated sludge sewage treatment plant with a 30 cm diameter outfall extending 610 cm off-shore. The treatment plant formerly served as a training centre for student plant operators from Malaspina College in Nanaimo. Sewage from the subdivision is pumped from a wet well to the plant, where it is comminuted, treated in an aeration chamber, passed through a clarifier, and discharged unchlorinated to the sea. With an addition, the system is capable of treating the wastewater from 2,000 people. An inspection of the plant indicated that due to lack of solids, it is not operating according to design. Reported lack of a substantial shellfish resource in the immediate area and the present low-flow rate from the sewer system did not warrant sampling to the exclusion of other sites.

Qualicum Beach is densely populated in the summer, with homes and motels along the waterfront. It is an area of concern, since the beaches are utilized by both recreational and commercial clam diggers. Sample stations 32 and 33 both demonstrated intermittent fecal contamination with 90 percentile MPN's of 42.6/100 mL and 65.8/100 mL respectively. Station 33 was located offshore of a small stream that runs alongside Qualicum village, which is situated back from the beach. The stream is fed partially by storm runoff from the town, and is contaminated by septic wastes from faulty septic tank disposal systems. It is indicated as the source of contamination to stations 32 and 33. Freshwater station S3, located at the stream's mouth, had a fecal coliform mean MPN of 1200/100 mL.

Further along the beach, marine sample station 34 gave some indication of fecal contamination with a fecal coliform 90 percentile MPN of 21.8/100 mL. This station was located in front of the Shady Rest Hotel, which is serviced by three septic tanks that discharge into seepage pits located in landfill in front of the hotel. The sewage disposal system services a cafe and a pub that can accommodate 100 to 120

people. Septic seepage was discovered in two places, running onto the beach between the boards that support the landfill.

Seven freshwater sample stations were located at 6 culverts and ditches along Qualicum Beach, and all indicated that a high degree of fecal contamination is reaching the beach (freshwater sample stations S4 - S10, Table 2). It was difficult to pinpoint individual sources of contamination, since obvious signs of seepage were generally absent, and a dye test of a very suspect source was negative (possibly due to limitations of the dye and the time it would have taken to appear). The soil, in patches, did exhibit excessive moisture, and the geography of the area (housing on higher ground leading down to the shoreline) would encourage movement of groundwater and drainage, including any fecal contamination, toward the sea.

Marine samples taken at the stations along Qualicum Beach did not adequately reflect the contamination in the freshwater inputs. The tide was low during the times most suitable for sampling - it was not feasible to do the sample runs at night. The ditches and culverts subsequently flow across the beach, and the contamination is diluted when it reaches the low water line. The shellfish resource is still in contact with this drainage, however.

As aforementioned, the Nanaimo Regional Sewer Authority will be constructing a sewage collection, treatment, and disposal system for Qualicum Beach and Parksville. On the east end, the system will connect with and add onto the present Parksville village sewage system with a 69 cm interceptor running to a secondary sewage treatment plant, which will be located at the mouth of French Creek. On the west, a 46 cm interceptor, starting at Seacroft Road at the west end of Qualicum Beach, will run along the waterfront, widening to 61 cm before reaching the treatment plant. Effective sewerage of these centres should reduce the incidence of fecal contamination along their respective shorelines.

4.4 Little Qualicum River to Qualicum Bay

The section of tidal foreshore from the Little Qualicum River

to Qualicum Bay is mostly sandy, with some small rocks. Habitation is concentrated at the mouth of the Little Qualicum River and in Qualicum Bay, with the upland area between being heavily treed and sparsely settled. Sample stations 36 to 40, located along this section, all met the shellfish growing water standards.

There is a spit at the mouth of the Little Qualicum River, and it is the site of concentrated recreational and commercial clam digging, and limited oyster harvesting. The area immediately west of the spit is also used for clam harvesting. There is housing in the area, but no contamination was in evidence in the marine samples, and the local soil is quite sandy, facilitating good on-site sewage disposal. Sample station 36, located at the mouth of the Little Qualicum River, met the shellfish growing water standards with a median fecal coliform MPN of 2/100 mL and a 90 percentile MPN of 11/100 mL. The Little Qualicum River demonstrated a low fecal coliform mean MPN of 20.8/100 mL at sample station S11.

Freshwater sample station S12 (Annie Creek), located approximately midway along this section of shoreline, demonstrated a high degree of fecal contamination, with a fecal coliform mean MPN of 840/100 mL over 8 samples. A trailer park was being built on the east side of the creek and, although two of the trailers located beside the creek are suspect sources of contamination, no septic seepage was observed. The creek did not appear to influence station 38, which had a fecal coliform 90 percentile MPN of 2/100 mL. The creek is small, but can swell enormously in winter. Flow measurements, done by estimating the creek's cross-sectional area and velocity, were 0.007 m³/sec on June 23, and 0.04 m³/sec on July 4.

Sample station 40 was situated in Qualicum Bay, a resort area. Emphasis is on shoreline housing (which includes full-time residences and summer cottages), which is considerably dense. No significant contamination was in evidence here; station 40 had a fecal coliform 90 percentile MPN of 4.3/100 mL.

There is a trailer court with accommodation for up to 34 trailers in Qualicum Bay, but a sanitary survey of the court indicated that the 4 septic tanks and 2 septic tank disposal fields serving the trailers and washroom facilities were operating without any difficulties.

Problems may arise with tourist accommodations and summer homes in the months of July and August, when the tourist season is busiest.

REFERENCES

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APPENDIX I

POSITIVELY IDENTIFIED AND SUSPECTED
SOURCES OF POLLUTION

APPENDIX I POSITIVELY IDENTIFIED AND SUSPECTED SOURCES OF
POLLUTION

Sample Station	Source	Problem
25, 26	Parksville sewage disposal system.	Sewage from outfall contaminates eastern portion of Parksville Bay.
-	Faulty septic tank sewage disposal systems in Parksville	Septic seepage contaminates storm water entering western portion of Parksville Bay.
30	Boats at French Creek docks	Direct discharge from marine toilets contaminate water at boat basin.
32,33	Creek at east end of Qualicum Beach	Creek is contaminated by septic discharges from Qualicum.
-	Shady Rest Hotel	Septic seepage runs into beach from sewage disposal system.
-	Faulty septic tank sewage disposal systems in Qualicum	Septic seepage contaminates storm drainage running out of culverts along Qualicum Beach.

APPENDIX II

MARINE SAMPLE STATION LOCATIONS

APPENDIX II MARINE SAMPLE STATION LOCATIONS

Sample Station	Latitude	Longitude	Location
1	49°17'31"N	124°04'48"W	Winchelsea Islands
2	49°17'11"N	124°05'12"W	Ada Islands
3	49°16'21"N	124°06'27"W	Wallis Point
4	49°16'22"N	124°06'49"W	Cove at Wallis Point
5	49°17'01"N	124°07'43"W	Dolphin Bay
6	49°17'16"N	124°08'06"W	Schooner Cove
7	49°17'56"N	124°07'48"W	Island between Nankivell Point and Yeo Islands
8	49°18'22"N	124°07'52"W	Yeo Islands
9	49°17'30"N	124°09'16"W	Small cove across from Amelia Island
10	49°17'42"N	124°09'51"W	More westerly small cove across from Amelia Island
11	49°18'06"N	124°10'10"W	Small cove across from Gerald Island
12	49°18'22"N	124°10'28"W	More northerly small cove across from Gerald Island
13	49°18'42"N	124°11'00"W	Dorcas Point
14	49°18'20"N	124°11'30"W	Head of bay between Dorcas and Cottam points
15	49°19'24"N	124°12'54"W	Mistaken Island
16	49°18'51"N	124°12'50"W	Cottam Point
17	49°18'24"N	124°12'17"W	Northwest Bay
18	49°18'42"N	124°14'24"W	Madrona Point
19	49°18'42"N	124°14'36"W	Craig Bay
20	49°18'39"N	124°14'37"W	South end of Rathtrever Beach
21	49°18'58"N	124°14'48"W	Middle of Rathtrever Beach
22	49°19'15"N	124°14'49"W	North end of Rathtrever Beach
23	49°19'41"N	124°15'36"W	Point at Rathtrever Beach Park
24	49°20'03"N	124°17'02"W	Half way between Rathtrever Beach and Parksville Bay
25	49°19'43"N	124°18'23"W	Parksville Bay - onshore from town outfall
26	49°19'53"N	124°18'27"W	East side of Parksville Bay
27	49°20'06"N	124°18'23"W	Over Parksville outfall
28	49°19'34"N	124°18'56"W	Middle of Parksville Bay
29	49°19'54"N	124°19'18"W	West side of Parksville Bay
30	49°21'02"N	124°21'11"W	Mouth of French Creek boat basin
31	49°21'00"N	124°21'30"W	Mouth of French Creek
32	49°21'38"N	124°25'54"W	East end of Qualicum Beach
33	49°21'29"N	124°26'42"W	Off creek at east end of Qualicum Beach
34	49°21'24"N	124°27'29"W	Middle of Qualicum Beach
35	49°21'48"N	124°28'00"W	West end of Qualicum Beach
36	49°22'15"N	124°30'10"W	Near mouth of Little Qualicum River
37	49°22'30"N	124°31'18"W	Off point near Dashwood
38	49°23'03"N	124°34'32"W	Near mouth of Annie Creek
39	49°23'45"N	124°35'56"W	Near mouth of Big Qualicum River
40	49°24'24"N	124°37'36"W	Middle of Qualicum Bay

APPENDIX III

FRESHWATER SAMPLE STATION LOCATIONS

APPENDIX III FRESHWATER SAMPLE STATION LOCATIONS

Sample Station	Location
S1	Englishman River
S2	French Creek
S3	Creek between contamination warnings at east end of Qualicum Beach
S4	Culvert under parking lot west of store - Qualicum Beach
S5	Culvert under houses next to parking lot - Qualicum Beach
S6	Storm drain beside Shady Rest Hotel
S7	Ditch east of West Crescent Road
S8	Upstream on ditch at Beach Terrace Road
S9	Mouth of ditch at Beach Terrace Road
S10	Culvert at end of Buller Road
S11	Little Qualicum River
S12	Annie Creek
S13	Big Qualicum River

APPENDIX IV

BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR
MARINE SAMPLES

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 1

Location: Winchelsea Islands

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1530	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1015	0515	4.3	14.2	Nil	NW @ 6	25.3	<2
		1245	0.5					
June 11	1420	1320	0.4	14.1	Nil	NW @ 12	26.0	<2
		2050	4.7					
June 17	0930	0715	1.9	14.1	Nil	W @ 15	22.0	<2
		1325	3.4					
June 18	0945	0805	1.5	14.9	Nil	W @ 10	22.9	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 2

Location: Ada Islands

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1525	1205	0.5	-	Nil	-	-	< 2
		1935	4.5					
June 10	1010	0515	4.3	14.5	Nil	W @ 7	25.2	< 2
		1245	0.5					
June 11	1415	1320	0.4	15.0	Nil	W @ 8	25.6	< 2
		2050	4.7					
June 17	0925	0715	1.9	14.0	Nil	W @ 12	22.0	< 2
		1325	3.4					
June 18	0940	0805	1.5	15.1	Nil	SW @ 4	22.2	< 2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 3

Location: Wallis Point

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1515	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1000	0515	4.3	14.9	Nil	W @ 8	24.7	<2
		1245	0.5					
June 11	1410	1320	0.4	15.0	Nil	S @ 8	25.4	<2
		2050	4.7					
June 17	0920	0715	1.9	14.3	Nil	NW @ 12	21.9	<2
		13.25	3.4					
June 18	0935	0805	1.5	14.7	Nil	NW @ 7	22.2	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 4

Location: Cove at Wallis Point

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1515	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1000	0515	4.3	14.9	Nil	NW @ 11	24.6	<2
		1245	0.5					
June 11	1405	1320	0.4	15.6	Nil	W @ 6-10	25.3	<2
		2050	4.7					
June 13	0945	0740	4.0	-	0.8	-	-	<2
		1455	0.7					
June 17	0920	0715	1.9	14.5	Nil	NW @ 12	21.7	<2
		1325	3.4					
June 18	0930	0805	1.5	14.6	Nil	NW @ 8	22.5	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 5

Location: Dolphin Bay

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1500	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	0945	0515	4.3	14.6	Nil	NW @ 6	24.7	<2
		1245	0.5					
June 11	1350	1320	0.4	14.9	Nil	SW @ 3-5	25.6	<2
		2050	4.7					
June 13	1010	0740	4.0	-	0.8	-	-	<2
		1455	0.7					
June 17	0905	0715	1.9	14.5	Nil	NW @ 4	20.1	<2
		1325	3.4					
June 18	0920	0805	1.5	14.6	Nil	NNW @ 4	22.1	<2
		1455	3.7					
June 19	0935	0950	1.2	15.4	Nil	N @ 10	22.4	<2
		1615	4.0					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 6

Location: Schooner Cove

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 18	1035	0805	1.5	15.6	Nil	N @ 2	22.6	< 2
		1455	3.7					
June 19	0940	0905	1.2	16.0	Nil	SW @ 3	22.3	< 2
		1615	4.0					
June 20	0940	0220	4.5	16.5	Nil	NE @ 12	19.5	< 2
		0945	0.9					
June 23	1410	1210	0.6	13.7	4.8	NE @ 7	22.0	< 2
		1940	4.6					
June 24	0930	0525	4.2	14.8	Nil	SE @ 4	15.7	< 2
		1245	0.6					
June 25	1005	0605	4.1	13.5	Nil	E @ 12	-	5
		1315	0.7					
June 26	1000	0650	3.9	-	9.2	NE @ 5	-	11
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 7

Location: Island between Nankivell Point and Yeo Islands

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1035	0515	4.3	14.0	Nil	W @ 8-11	26.1	< 2
		1245	0.5					
June 11	1440	1320	0.4	14.5	Nil	W @ 10-15	25.9	< 2
		2050	4.7					
June 17	1000	0715	1.9	14.0	Nil	W @ 10	22.7	< 2
		1325	3.4					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 8

Location: Yeo Islands

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1030	0515	4.3	14.0	Nil	W @ 7-11	26.1	<2
		1245	0.5					
June 11	1435	1320	0.4	14.6	Nil	SW @ 9	25.8	<2
		2050	4.7					
June 17	0955	0715	1.9	14.4	Nil	W @ 9	22.4	5
		1325	3.4					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 9

Location: Small cove across from Amelia Island

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1615	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1045	0515	4.3	14.9	Nil	NW @ 6-8	26.0	<2
		1245	0.5					
June 11	1445	1320	0.4	15.7	Nil	SW @ 7	26.0	<2
		2050	4.7					
June 13	1030	0740	4.0	-	0.8	-	-	<2
		1455	0.7					
June 17	1010	0715	1.9	14.5	Nil	W @ 12	22.5	5
		1325	3.4					
June 18	1145	0805	1.5	15.4	Nil	NW @ 8	23.2	<2
		1455	3.7					
June 19	0950	0905	1.2	15.5	Nil	NW @ 9	22.6	<2
		1615	4.0					
June 20	0945	0945	0.9	14.5	Nil	NE @ 12	22.0	<2
		1725	4.3					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 10

Location: More westerly small cove
across from Amelia Island

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1610	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1050	0515	4.3	14.5	Nil	NW @ 8	26.0	<2
		1245	0.5					
June 11	1450	1320	0.4	15.5	Nil	W @ 6	26.0	<2
		2050	4.7					
June 13	1040	0740	4.0	-	0.8	-	-	-
		1455	0.7					
June 17	1020	0715	1.9	14.9	Nil	SW @ 4	22.5	<2
		1325	3.4					
June 18	1050	0805	1.5	15.4	Nil	NW @ 8	23.5	<2
		1455	3.7					
June 19	0950	0905	1.2	15.8	Nil	NW @ 5-9	22.8	<2
		1615	4.0					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 11

Location: Small cove across from Gerald Island

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1615	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1055	0515	4.3	14.9	Nil	NW @ 11-14	26.0	<2
		1245	0.5					
June 11	1455	1320	0.4	16.0	Nil	S @ 5	26.0	<2
		2050	4.7					
June 13	1055	0740	4.0	-	0.8	-	-	<2
		1455	0.7					
June 17	1030	0715	1.9	14.3	Nil	NW @ 12	22.6	5
		1325	3.4					
June 18	1055	0805	1.5	15.0	Nil	NW @ 5	23.5	<2
		1455	3.7					
June 19	0955	0905	1.2	15.8	Nil	NW @ 9	22.8	<2
		1615	4.0					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 12

Location: More northerly small cove across from Gerald Island

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1635	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1105	0515	4.3	15.6	Nil	SE @ 3-8	25.6	<2
		1245	0.5					
June 11	1505	1320	0.4	15.5	Nil	N @ 9	25.5	<2
		2050	4.7					
June 17	1045	0715	1.9	-	Nil	NW @ 8	-	<2
		1325	3.4					
June 18	1110	0805	1.5	-	Nil	W @ 9	-	<2
		1455	3.7					
June 19	1000	0905	1.2	-	Nil	NW @ 14	-	<2
		1615	4.0					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 13

Location: Dorcas Point

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1115	0515	4.3	15.8	Nil	NE @ 5	25.9	<2
		1245	0.5					
June 11	1510	1320	0.4	16.4	Nil	N @ 5	25.5	<2
		2050	4.7					
June 12	1140	0655	4.1	15.0	Nil	N @ 7	25.4	<2
		1410	0.5					
June 13	1340	0740	4.0	-	.03	-	-	<2
		1455	0.7					
June 17	1105	0715	1.9	15.1	Nil	NW @ 10	23.2	<2
		1325	3.4					
June 18	1115	0805	1.5	16.0	Nil	W @ 9	23.7	<2
		1455	3.7					
June 19	1005	0905	1.2	16.0	Nil	N @ 4	22.8	<2
		1615	4.0					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 14

Location: Head of bay between Dorcas Point and Cottam Point

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1650	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1130	0515	4.3	15.2	Nil	W @ 10	25.3	2
		1245	0.5					
June 11	1530	1320	0.4	17.3	Nil	SW @ 7	26.6	<2
		2050	4.7					
June 12	1115	0655	4.1	15.1	Nil	SW @ 7	25.2	<2
		1410	0.5					
June 13	1350	0740	4.0	-	0.8	-	-	<2
		1455	0.7					
June 17	1115	0715	1.9	14.7	Nil	NW @ 6	23.9	<2
		1325	3.4					
June 18	1125	0805	1.5	15.1	Nil	NW @ 9	23.7	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 15

Location: Mistaken Island

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1655	1205	0.5	-	Nil	-	-	8
		1935	4.5					
June 10	1135	0515	4.3	15.0	Nil	NW @ 8	26.1	<2
		1245	0.5					
June 11	1525	1320	0.4	15.2	Nil	SW @ 5	25.8	<2
		2050	4.7					
June 12	1105	0655	4.1	14.7	Nil	W @ 7	25.9	<2
		1410	0.5					
June 17	1125	0715	1.9	14.2	Nil	W @ 7	23.9	<2
		1325	3.4					
June 18	1130	0805	1.5	15.1	Nil	NW @ 8	24.1	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 16

Location: Cottam Point

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 19	1015	0905	1.2	16.0	Nil	NW @ 10	23.3	<2
		1615	4.0					
June 20	1000	0945	0.9	15.5	Nil	NW @ 3	22.0	2
		1725	4.3					
June 23	1425	1210	0.6	12.2	4.8	NW @ 6	23.0	<2
		1940	4.6					
June 24	1010	0525	4.2	14.0	Nil	SW @ 10	-	<2
		1245	0.6					
June 25	1025	0605	4.1	-	Nil	SE @ 7	-	<2
		1315	0.7					
June 26	1025	0650	3.9	-	9.2	NE @ 5	-	2
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 17

Location: Northwest Bay

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1705	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1140	0515	4.3	15.2	Nil	NW @ 4.9	25.0	2
		1245	0.5					
June 11	1545	1320	0.4	16.7	Nil	NW @ 11	24.9	<2
		2050	4.7					
June 12	1055	0655	4.1	15.8	Nil	NW @ 9	25.1	<2
		1410	0.5					
June 13	1405	0740	4.0	-	0.8	-	-	11
		1455	0.7					
June 17	1130	0715	1.9	14.8	Nil	NW @ 7	24.2	<2
		1325	3.4					
June 18	1140	0805	1.5	15.1	Nil	W @ 11	23.5	14
		1455	3.7					
June 23	1445	1210	0.6	11.0	4.8	W @ 9	23.0	<2
		1940	4.6					
June 25	1035	0605	4.1	13.0	Nil	SE @ 8	-	2
		1315	0.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 18

Location: Madrona Point

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1710	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1430	1245	0.5	18.4	Nil	W @ 8	28.1	2
		2020	4.6					
June 11	1550	1320	0.4	17.5	Nil	SW @ 11	26.0	<2
		2050	4.7					
June 12	1045	0655	4.1	16.0	Nil	W @ 12	25.1	8
		1410	0.5					
June 17	1205	0715	1.9	15.4	Nil	W @ 10	24.4	2
		1325	3.4					
June 18	1205	0805	1.5	14.9	Nil	W @ 8	24.4	<2
		1455	3.7					
June 19	1045	0905	1.2	16.0	Nil	NW @ 12	24.4	<2
		1615	4.0					
June 20	1030	0945	0.9	17.5	Nil	S @ 9	22.0	<2
		1725	4.3					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 19

Location: Craig Bay

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1720	1205	0.5	-	Nil	-	< 2	< 2
		1935	4.5					
June 10	1430	1245	0.5	16.5	Nil	NW @ 10	26.5	2
		2020	4.6					
June 11	1555	1320	0.4	16.3	Nil	W @ 10	25.3	< 2
		2050	4.7					
June 12	1040	0655	4.1	15.1	Nil	W @ 12	25.7	< 2
		1410	0.5					
June 17	1210	0715	1.9	14.9	Nil	W @ 9	24.4	< 2
		1325	3.4					
June 18	1210	0805	1.5	15.0	Nil	NW @ 9	23.9	< 2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 20

Location: South end of Rathtrevor Beach

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 19	1350	0905	1.2	-	Nil	-	-	79
		1615	4.0					
June 20	1350	0945	0.9	-	Nil	-	-	2
		1725	4.3					
June 25	0920	0605	4.1	-	Nil	-	-	5
		1315	0.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 21

Location: Middle of Rathtrevor Beach

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 19	1340	0905	1.2	-	Nil	-	-	<2
		1615	4.0					
June 20	1340	0945	0.9	-	Nil	-	-	2
		1725	4.3					
June 25	0910	0605	4.1	-	Nil	-	-	<2
		1315	0.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 22

Location: North end of Rathtrevor Beach

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 19	1330	0905	1.2	-	Nil	-	-	<2
		1615	4.0					
June 20	1330	0945	0.9	-	Nil	-	-	2
		1725	4.3					
June 25	0900	0605	4.1	-	Nil	-	-	5
		1315	0.7					
June 26	1125	0650	3.9	-	9.2	-	-	<2
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 23

Location: Point at Rathrevor Beach Park

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1725	1205	0.5	-	Nil	-	< 2	< 2
		1935	4.5					
June 10	1445	1245	0.5	16.3	Nil	W @ 10	25.9	< 2
		2020	4.6					
June 11	1600	1320	0.4	15.6	Nil	W @ 11	25.1	< 2
		2050	4.7					
June 12	1035	0655	4.1	14.9	Nil	SE @ 14	25.7	< 2
		1410	0.5					
June 17	1715	0715	1.9	14.6	Nil	W @ 9	22.7	< 2
		1325	3.4					
June 18	1215	0805	1.5	15.3	Nil	NW @ 7	20.2	< 2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 24

Location: Half way between Rathtrevor Beach and Parksville Bay

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1730	1205	0.5	-	Nil	-	<2	<2
		1935	4.5					
June 10	1455	1245	0.5	15.6	Nil	W @ 7	26.2	2
		2020	4.6					
June 11	1610	1320	0.4	15.8	Nil	W @ 14	22.3	8.2
		2050	4.7					
June 12	1030	0655	4.1	14.7	Nil	S @ 12	20.0	8
		1410	0.5					
June 17	1220	0715	1.9	14.8	Nil	W @ 8	21.4	2
		1325	3.4					
June 18	1220	0805	1.5	14.9	Nil	NW @ 9	23.0	<2
		1455	3.7					
June 23	1440	1210	0.6	14.0	.19	NW @ 6	20.5	<2
		1940	4.6					
June 25	1045	0605	4.1	12.7	Nil	E @ 10	-	17
		1315	0.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 25

Location: Parksville Bay - onshore from town outfall

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 19	1410	0905	1.2	-	Nil	-	-	5
		1615	4.0					
June 20	1410	0945	0.9	-	Nil	-	-	<2
		1725	4.3					
June 24	1300	1245	0.6	-	Nil	-	-	17
		2030	4.6					
June 25	0940	0605	4.1	-	Nil	-	-	2
		1315	0.7					
June 26	1155	0650	3.9	-	9.2	-	-	49
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 26

Location: East side of Parksville Bay

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1735	1205	0.5	-	Nil	-	-	49
		1935	4.5					
June 10	1510	1245	0.5	18.8	Nil	W @ 7	24.6	< 2
		2020	4.6					
June 11	1615	1320	0.4	17.5	Nil	NW @ 12	25.8	170
		2050	4.7					
June 12	1020	0655	4.1	16.0	Nil	NW @ 14	25.7	33
		1410	0.5					
June 17	1230	0715	1.9	19.8	Nil	W @ 6	20.3	5
		1325	3.4					
June 18	1230	0805	1.5	15.0	Nil	NW @ 10	24.3	1600
		1455	3.7					
June 23	1455	1210	0.6	11.0	4.8	W @ 7	23.0	< 2
		1940	4.6					
June 24	1030	0525	4.2	-	Nil	NW @ 6	-	< 2
		1245	0.6					
June 25	1100	0605	4.1	12.7	Nil	E @ 8	-	2
		1315	0.7					
June 26	1045	0650	3.9	-	9.2	NE @ 9	-	2
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 27

Location: Over Parksville outfall

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 20	1045	0945	0.9	15.0	Nil	E @ 7	22.0	11
		1725	4.3					
June 25	1055	0605	4.1	12.6	Nil	E @ 10	-	2
		1315	0.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 28

Location: Middle of Parksville Bay

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 19	1420	0905	1.2	-	Nil	-	-	8
		1615	4.0	-	Nil	-	-	
June 20	1420	0945	0.9	-	Nil	-	-	49
		1725	4.3	-	Nil	-	-	
June 25	0950	0605	4.1	-	Nil	-	-	2
		1315	0.7	-	Nil	-	-	
June 26	1210	0650	3.9	-	9.2	-	-	8
		1355	0.9	-		-	-	

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 29

Location: West side of Parksville Bay

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1740	1205	0.5	-	Nil	-	-	<2
		1935	4.5					
June 10	1515	1245	0.5	16.0	Nil	NW @ 11	26.5	<2
		2020	4.6					
June 11	1620	1320	0.4	14.9	Nil	NW @ 13	25.6	2
		2050	4.7					
June 12	1015	0655	4.1	15.1	Nil	SW @ 16	26.1	2
		1410	0.5					
June 17	1235	0715	1.9	14.9	Nil	NW @ 6	23.1	<2
		1325	3.4					
June 18	1235	0805	1.5	14.6	Nil	NW @ 11	24.2	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 30

Location: Mouth of French Creek boat basin

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 19	1055	0905	1.2	-	Nil	NW @ 10	-	< 2
		1615	4.0					
June 20	1100	0945	0.9	15.5	Nil	N @ 5	22.0	46
		1725	4.3					
June 23	1500	1210	0.6	13.0	4.8	W @ 7	22.5	2
		1940	4.6					
June 24	1035	0525	4.2	-	Nil	W @ 7	-	< 2
		1245	0.6					
June 25	1245	0605	4.1	-	Nil	-	-	70
		1315	0.7					
June 26	1050	0650	3.9	-	9.2	SW @ 3	-	4
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 31

Location: Mouth of French Creek

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 9	1745	1205	0.5	-	Nil	-	-	2
		1935	4.5					
June 10	1525	1245	0.5	15.2	Nil	W @ 10	25.6	5
		2020	4.6					
June 11	1110	1320	0.4	14.9	Nil	NW @ 15	25.3	2
		2050	4.7					
June 12	0955	0655	4.1	14.9	Nil	SE @ 15	25.5	2
		1410	5.0					
June 17	1245	0715	1.9	15.0	Nil	NW @ 5	23.0	<2
		1325	3.4					
June 18	1435	0805	1.5	16.8	Nil	NW @ 10	24.1	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 32

Location: East end of Qualicum Beach

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1455	1245	0.5	19.0	Nil	NE @ 7	24.0	<2
		2020	4.6					
June 11	1100	0600	4.3	15.7	Nil	NW @ 12	27.9	17
		1320	0.4					
June 12	1425	1410	0.5	-	Nil	-	-	<2
		2135	4.7					
June 13	1105	0740	4.0	17.0	0.8	-	27.5	<2
		1455	0.7					
June 16	0917	0620	2.3	14.5	Nil	-	27.0	49
		1135	3.4					
June 17	0935	0715	1.9	16.5	Nil	-	27.0	13
		1325	3.4					
June 18	0940	0805	1.5	16.0	Nil	-	28.0	2
		1455	3.7					
June 19	1410	0905	1.2	18.0	Nil	-	28.0	<2
		1615	4.0					
June 20	0850	0220	4.5	16.0	Nil	-	27.0	<2
		0945	0.9					
June 24	0955	0525	4.2	14.5	Nil	-	22.0	<2
		1245	0.6					

continued...

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 32 (continued) Location:

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 25	1005	0605	4.1	-	-	-	-	2
		1315	0.7					
June 26	0835	0650	3.9	-	9.2	-	-	49
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 33

Location: Off creek at east end of Qualicum Beach

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1545	1245	0.5	17.8	Nil	W @ 4	27.9	<2
		2020	4.6					
June 11	1055	0600	4.3	15.0	Nil	NW @ 11	24.9	2
		1320	0.4					
June 12	1415	1410	0.5	-	Nil	-	-	13
		2135	4.7					
June 13	1100	0740	4.0	17.5	0.8	-	27.0	5
		1455	0.7					
June 16	0915	0620	2.3	14.5	Nil	-	26.0	33
		1135	3.4					
June 17	0930	0715	1.9	16.5	Nil	-	20.0	23
		1325	3.4					
June 18	0935	0805	1.5	18.0	Nil	-	27.0	2
		1455	3.7					
June 19	1405	0905	1.2	21.5	Nil	-	24.0	49
		1615	4.0					
June 20	0840	0220	4.5	16.5	Nil	-	26.0	2
		0945	0.9					
June 24	0945	0525	4.2	-	Nil	-	-	2
		1245	0.6					

continued...

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 33 (continued)

Location:

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 25	0955	0605	4.1	-	Nil	-	-	7
		1315	0.7					
June 26	0845	0650	3.9	-	9.2	-	-	920
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 34

Location: Middle of Qualicum Beach

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 20	0835	0220	4.5	16.5	Nil	-	26.0	8
		0945	0.9					
June 24	0935	0525	4.2	-	Nil	-	-	2
		1245	0.6					
June 25	0950	0605	4.1	-	Nil	-	-	31
		1315	0.7					
June 26	0855	0650	3.9	-	9.2	-	-	8
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 35

Location: West end of Qualicum Beach

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1555	1245	0.5	16.1	Nil	W @ 2	25.1	<2
		2020	4.6					
June 11	1045	0600	4.3	15.0	Nil	NW @ 9	25.3	<2
		1320	0.4					
June 12	1400	0655	4.1	-	Nil	-	-	4
		1410	0.5					
June 13	1050	0740	4.0	18.0	0.8	-	28.0	8
		1455	0.7					
June 16	0900	0620	2.3	14.0	Nil	-	26.0	4
		1135	3.4					
June 17	0920	0715	1.9	16.0	Nil	-	23.0	4
		1325	3.4					
June 18	0850	0805	1.5	17.0	Nil	-	27.5	2
		1455	3.7					
June 19	1355	0905	1.2	-	Nil	-	-	2
		1615	4.0					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 36

Location: Near mouth of Little Qualicum River

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1600	1245	0.5	16.9	Nil	NW @ 25	27.5	<2
		2020	4.6					
June 11	1035	0600	4.3	14.9	Nil	NW @ 10	22.0	11
		1320	0.4					
June 12	0930	0655	4.1	14.8	Nil	NE @ 7	22.5	11
		1410	0.5					
June 17	1515	0715	1.9	15.9	Nil	NE @ 5	23.9	2
		1325	3.4					
June 18	1500	1455	3.7	16.7	Nil	NW @ 5	22.7	5
		1930	2.9					
June 23	1145	0445	4.3	-	4.8	NW @ 7	-	2
		1210	0.6					
June 25	1135	0605	3.9	12.9	Nil	E @ 5	-	<2
		1355	0.9					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 37

Location: Off point near Dashwood

Date (1975)	Sample Time	Tide		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1610	1245	0.5	17.3	Nil	N @ 2	26.0	<2
		2020	4.6					
June 11	1025	0600	4.3	15.4	Nil	NW @ 8	27.9	<2
		1320	0.4					
June 12	0920	0655	4.1	16.0	Nil	NE @ 5	24.3	2
		1410	0.5					
June 17	1510	1325	3.4	17.0	Nil	E @ 5	23.9	<2
		1815	2.5					
June 18	0855	0805	1.5	15.7	Nil	NW @ 4	25.0	2
		1455	3.7					
June 23	1140	0445	4.3	-	4.8	NW @ 6	-	<2
		1210	0.6					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 38

Location: Near mouth of Annie Creek

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1620	1205	0.5	17.5	Nil	E @ 4	25.1	<2
		1935	4.5					
June 11	1015	0515	4.3	15.1	Nil	NE @ 8	25.1	<2
		1245	0.5					
June 12	1350	0655	4.1	-	Nil	-	-	<2
		1410	0.5					
June 13	1025	0740	4.0	18.5	0.8	-	29.0	2
		1455	0.7					
June 16	0840	0620	2.3	14.0	Nil	-	30.0	<2
		1135	3.4					
June 17	0855	0715	1.9	15.0	Nil	-	26.0	<2
		1325	3.4					
June 18	0850	0805	1.5	17.0	Nil	-	27.5	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 39

Location: Near mouth of Big Qualicum River

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1625	1245	0.5	17.3	Nil	E @ 5	25.0	<2
		2020	4.6					
June 11	1005	0600	4.3	15.1	Nil	NW @ 5	24.6	3.6
		1320	0.4					
June 12	1340	0655	4.1	-	Nil	-	-	<2
		1410	0.5					
June 13	1025	0740	4.0	18.5	0.8	-	29.0	<2
		1455	0.7					
June 16	0840	0620	2.3	14.0	Nil	-	30.0	2
		1135	3.4					
June 17	0855	0715	1.9	15.0	Nil	-	26.0	<2
		1325	3.4					
June 18	0850	0805	1.5	17.0	Nil	-	27.5	<2
		1455	3.7					

APPENDIX IV BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS FOR MARINE SAMPLES

Sample Station: 40

Location: Middle of Qualicum Bay

Date (1975)	Sample Time	Tide Conditions		Water Temp. (°C)	Total Precip. (mm)	Wind (knots)	Salinity (ppt)	Fecal coliform MPN/100 ml
		Time	Height (m)					
June 10	1630	1245	0.5	17.5	Nil	SE @ 3.5	25.7	<2
		2020	4.6					
June 11	0955	0600	4.3	15.2	Nil	N @ 7	27.4	<2
		1320	0.4					
June 12	1330	0655	4.1	-	Nil	-	-	2
		1410	0.5					
June 13	1005	0740	4.0	17.0	0.8	-	28.0	5
		1455	0.7					
June 16	0815	0620	2.3	13.5	Nil	-	26.0	<2
		1135	3.4					
June 17	0817	0715	1.9	15.0	Nil	-	28.0	<2
		1325	3.4					
June 18	0830	0805	1.5	15.5	Nil	-	27.0	4
		1455	3.7					

APPENDIX V

BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR
FRESHWATER SAMPLES

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S1 Location: Englishman River

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 17	1000	Nil	2
June 18	0945	Nil	17
June 19	0935	Nil	2
June 20	0935	Nil	5
June 23	1030	4.8	17
June 24	1020	Nil	17
June 25	1030	Nil	13

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S2 Location: French Creek

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 17	0950	Nil	33
June 18	0935	Nil	5
June 19	0925	Nil	79
June 20	0925	Nil	49
June 23	1020	4.8	220
June 24	1005	Nil	33
June 25	1015	Nil	130

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S3 Location: Creek between Contamination Warnings
at east end of Qualicum Beach

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 11	1410	Nil	1600
June 17	0940	Nil	540
June 18	0925	Nil	110
June 19	0915	Nil	490
June 20	0915	Nil	2400
June 23	1010	4.8	3500
June 24	0945	Nil	790
June 25	1000	Nil	170

**APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES**

Sample Station: S4 **Location:** Culvert under parking lot west of
store - Qualicum Beach

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 24	1420	Nil	240
June 26	0830	9.2	330

**APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES**

Sample Station: S5 **Location:** Culvert under houses next to parking
lot - Qualicum Beach

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 24	1400	Nil	79
June 26	0840	9.2	1700

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S6 Location: Storm drain beside Shady Rest Hotel

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 24	1000	Nil	110
June 25	1430	Nil	790
June 26	0850	9.2	130

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S7 Location: Ditch east of West Crescent Road

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 24	1030	Nil	170
June 25	1420	Nil	5400
June 26	0900	9.2	490

**APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES**

Sample Station: S8 **Location:** Upstream on ditch along Beach Terrace
Road

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 24	1115	Nil	>1600
June 26	0910	9.2	5400

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S9 Location: Mouth of ditch at Beach Terrace Road

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 24	1050	Nil	>16000
June 25	1410	Nil	790
June 26	0920	9.2	2400

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S10

Location: Culvert at end of Buller Road

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 24	1045	Nil	1600
June 25	1400	Nil	5400
June 26	0930	9.2	1300

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S11 Location: Little Qualicum River

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 11	1400	Nil	4
June 17	0930	Nil	8
June 18	0915	Nil	8
June 19	0905	Nil	5
June 20	0905	Nil	13
June 23	1000	4.8	46
June 24	0920	Nil	33
June 25	0940	Nil	49

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S12 Location: Annie Creek

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 17	0915	Nil	540
June 18	0900	Nil	110
June 19	0850	Nil	3500
June 20	0850	Nil	700
June 23	0945	4.8	330
June 24	0900	Nil	1300
June 25	0920	Nil	170
June 26	0940	9.2	70

APPENDIX V BACTERIOLOGICAL ANALYSES RESULTS AND SAMPLING CONDITIONS
FOR FRESHWATER SAMPLES

Sample Station: S13 Location: Big Qualicum River

Date (1975)	Time of Collection	Total Precip. (mm)	Fecal Coliform MPN/100 ml
June 17	0905	Nil	79
June 18	0850	Nil	11
June 19	0840	Nil	13
June 20	0840	Nil	79
June 23	0935	4.8	49
June 24	0850	Nil	130
June 25	0910	Nil	33

APPENDIX VI

MEAN FLOW RATES FOR JUNE
FOR MAJOR FRESHWATER INPUTS

APPENDIX VI MEAN FLOW RATES FOR JUNE FOR MAJOR FRESHWATER INPUTS

River	Mean Flow Rate m ³ /s	Number of Years Recorded
Englishman	9.77	7
French	0.36	3
Little Qualicum	8.86	13
Big Qualicum	3.82	27