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BASELINE SEDIMENT AND TISSUE TRACE METALS IN BARKLEY SOUND, QUATSINO SOUND, SURF INLET AND LAREDO SOUND, BRITISH COLUMBIA

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By

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ABSTRACT

Marine sediments and biota samples were collected during March 1984 in Barkley Sound, Quatsino Sound, Surf Inlet and Laredo Sound for trace metal analysis. The purpose of this study was to measure natural variation of these parameters in nearshore coastal environments.

Considerable variation was found in several trace metals in sediments. Barkley Sound was noted for relatively higher levels of aluminum, cadmium, chromium, tin and zinc; Quatsino Sound for chromium, copper, magnesium, manganese, strontium, vanadium and titanium; Surf Inlet for arsenic, cadmium, and mercury; and Laredo for barium, mercury, and lead.

In biota, arsenic, cadmium, copper, mercury and lead — the only trace metals analysed in detail — showed significant differences between areas, but were not correlated with sediment concentrations. In bottom fish, cadmium tended to be higher in liver than in muscle tissue, while mercury concentrated more in muscle tissue. Overall there was very little bioaccumulation, i.e., trace metal levels in tissues were generally not higher than metal levels in sediments. Some exceptions were noted for cadmium and mercury in sole species.

Species composition of trawls showed diverse and variable epibenthic communities at all stations.

RÉSUMÉ

Des échantillons de sédiments et du biotope marins ont été prélevés en mars 1984 dans le détroit Barkley, le détroit Quatsino, l'inlet Surf et le détroit Laredo pour être soumis à l'analyse des métaux à l'état de traces. Ces endroits étaient considérés à ce temps comme représentatifs des conditions de base de d'un variété milieux prélittoraux.

On a relevé une grande variation dans les teneurs de plusieurs métaux à l'état de traces dans les sédiments. Le détroit Barkley était reconnu pour ses teneurs relativement élevées en aluminium, cadmium, chrome, étain et zinc; le détroit Quatsino, pour ses teneurs en chrome, cuivre, magnésium, manganèse, strontium, vanadium et titane; l'inlet Surf, pour ses teneurs en arsenic, cadmium et mercure; et le détroit Laredo, pour ses teneurs en baryum, mercure et plomb.

Dans le cas du biotope, les teneurs en arsenic, cadmium, cuivre, mercure et plomb, les seuls métaux à l'état de traces analysés en détail, variaient considérablement d'un endroit à l'autre, mais n'étaient pas corrélées aux concentrations pour les sédiments. Dans le cas des poissons de fond, la teneur en cadmium avait tendance à être plus élevée dans le foie que dans les tissus musculaires, tandis que les concentrations de mercure étaient supérieures dans les tissus musculaires. Dans l'ensemble, il n'y avait que très peu de bioaccumulation, c.-à-d. que les teneurs en métaux à l'état de traces dans les tissus n'étaient généralement pas supérieures aux teneurs dans les sédiments. Il y avait cependant quelques exceptions en ce qui a trait au cadmium et au mercure chez certaines espèces de soles.

La composition des espèces capturées par les chaluts indiquait que les communautés épibenthiques étaient diversifiées et variées à toutes les stations.

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1 INTRODUCTION

1.1 Purpose

One of the objectives of Environment Canada is to reduce releases of pollutants which are causing, or may cause, losses to fish habitat. Assessment of fish habitat losses, or threats to fish habitat, often involves detection of increases in chemicals associated with waste discharges. However, many of these chemicals also occur naturally. To interpret measurements of toxic chemicals in pollution studies, a knowledge of natural or background variations in chemicals of interest is essential (Beanlands and Duinker, 1983).

This study was undertaken to provide baseline trace metal concentrations in sediments and biota tissue in four, relatively unpolluted nearshore locations on the west coast of Canada: Quatsino Sound, Barkley Sound, Surf Inlet and Laredo Sound (Figure 1). The sampling program and statistical approach were designed to test the hypotheses:

1. There are no significant differences in trace metal levels in marine benthic animals tissues between the four study areas, and between sampling sites within some of the areas.

2. Any significant differences detected (i.e., Hypothesis 1 is rejected) are correlated with levels of trace metals in sediments.

1.2 Study Areas

Barkley Sound, located centrally on the west coast of Vancouver Island, includes part of Pacific Rim National Park. Trace metal contamination occurs in the head of Alberni Inlet associated with a pulp mill (Sullivan, 1982). Relatively high levels of cadmium (1-5 mg/kg) have also been measured in deep sediment cores from Trevor Channel and Ucluelet Inlet (Brothers and Nelson, unpubl.), apparently due to natural mineralization in the area.

Quatsino Sound is located on the northern west coast of Vancouver Island. From it branch three major inlets: Neroutsos to the south, and

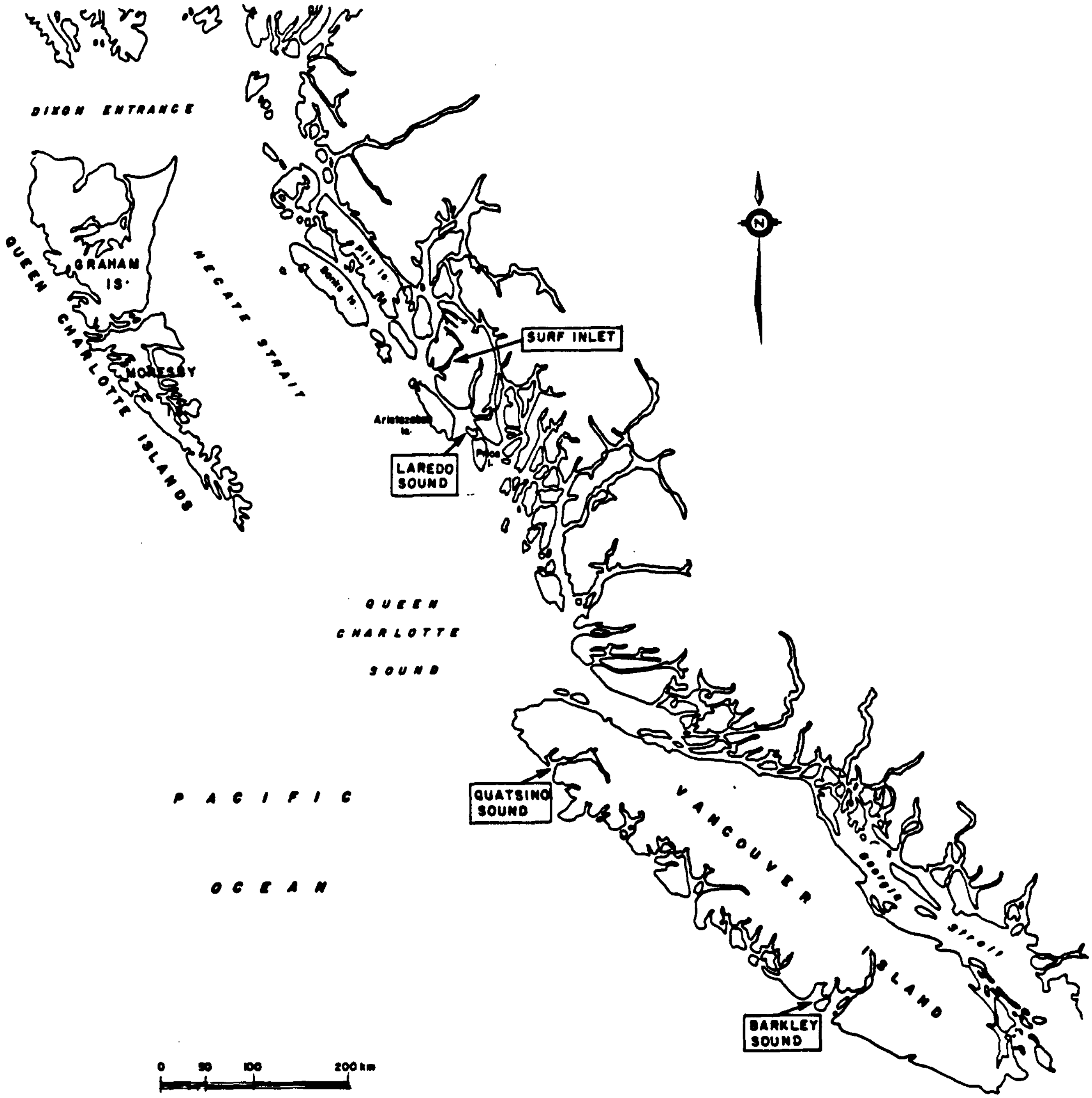


FIGURE 1 LOCATION OF BASELINE SURVEYS ALONG THE COAST OF BRITISH COLUMBIA

Holberg and Rupert Inlets to the north. A copper mine is located on Rupert Inlet and a pulp mill on Neroutsos Inlet. Mine tailings from Island Copper mine have extended to the eastern end of Quatsino Sound (Harding, 1983) but the extent of contamination in the area sampled in this study was not known at the time of sampling. Although water quality impacts associated with the pulp mill have reached the eastern end of Quatsino Sound, trace metal contamination is limited to the immediate mill area (Pomeroy and Goyette, 1983). Goyette and Christie (1982) previously reported Quatsino Sound baseline fish and invertebrate trace metals from one of the same stations trawled in this study.

Surf Inlet, located on Princess Royal Island, south of Kitimat, B.C., has no industrialization, and no previous studies of trace metals. A hydroelectric dam and shipping wharf serviced a gold mine on Bear Lake, at the head of Surf Inlet.

Laredo Sound, located just south of Surf Inlet, also has no industrialization. Fish and invertebrate tissue trace metal levels for 1981 are reported by Goyette and Christie (1982).

2 MATERIALS AND METHODS

Samples for this study were collected during March 1984, onboard the research vessel, CSS Vector. Sampling station positions were established using Loran C and the ship's radar. Station locations are shown in Figures 2-5 and their coordinates are given in Appendix I.

2.1 Sample Collection

2.1.1 Sediment. Sediment surface grabs were taken using a 0.1 m^2 stainless steel Smith-MacIntyre grab. The top two centimetres were retained for trace metal analysis. Cores were taken with a Benthos gravity corer equipped with a 60 kg weight, plastic tube and core catcher. The sediment core was extruded from the core tube by inserting a wooden plunger and pushing the sediment out onto a plastic collecting trough. Samples at 2 cm intervals, from the surface, were frozen onboard in heavy kraft paper bags provided by the laboratory for later trace metal analysis.

2.1.2 Tissues. Biota samples were collected using a small otter trawl which consisted of a 3.8 cm mesh net with a 5.8 metre throat. The trawl was towed with a 3:1 scope for approximately 0.9 km. Trawl catches were enumerated by species and lengths and weights were recorded. Tissue samples were taken from selected specimens using a stainless steel scalpel and forceps as follows:

- fish: dorsal muscle with skin removed, liver and gills.
- shrimp: tail muscle (composites of 2) and hepatopancreas (composites of 6).
- crab: leg and claw muscle and hepatopancrease (composites of 6).

All tissue samples were frozen individually (except composites) in whirlpac bags for later chemical trace metal analysis.

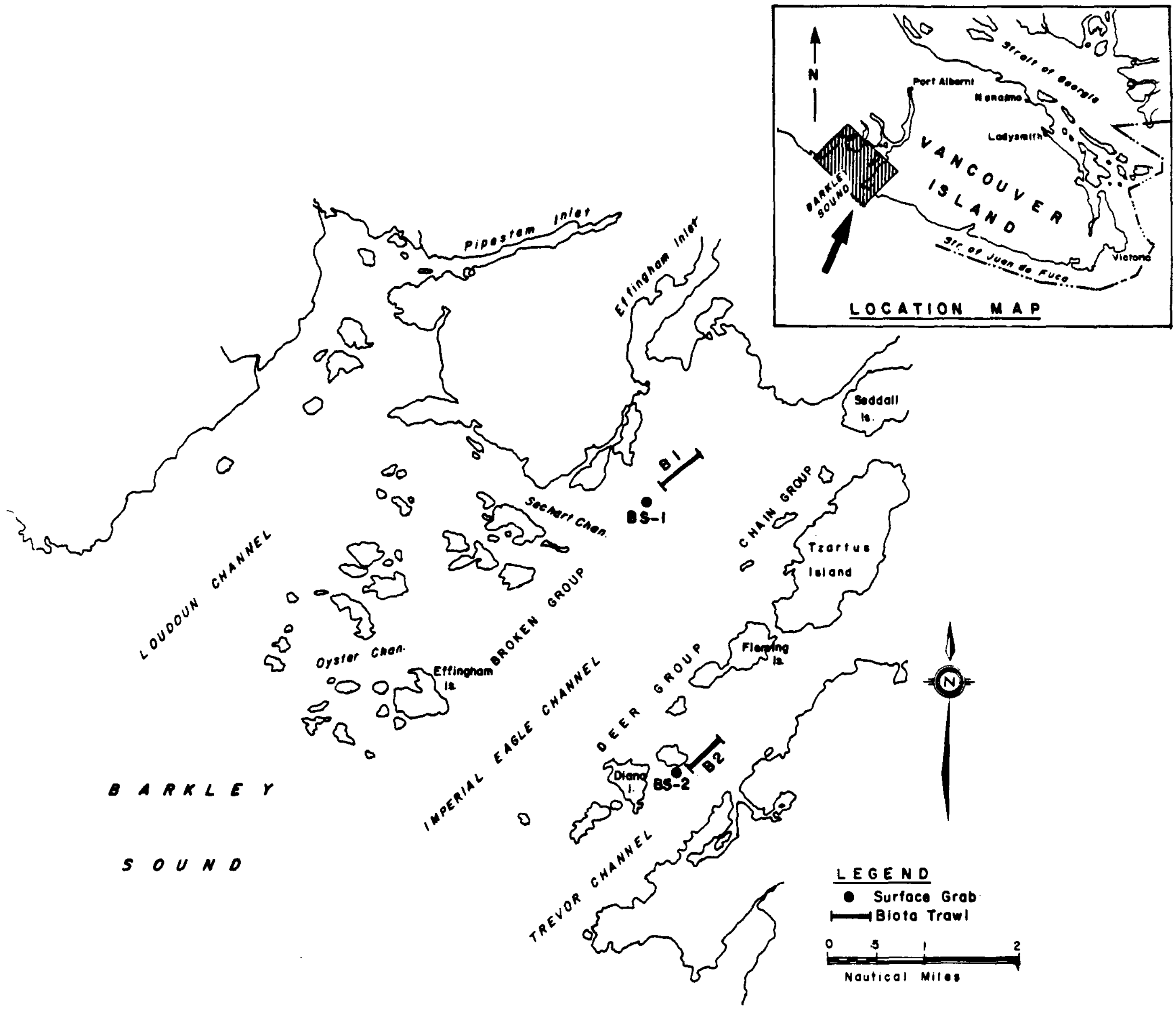


FIGURE 2 BARKLEY SOUND - LOCATION AND SAMPLING STATIONS

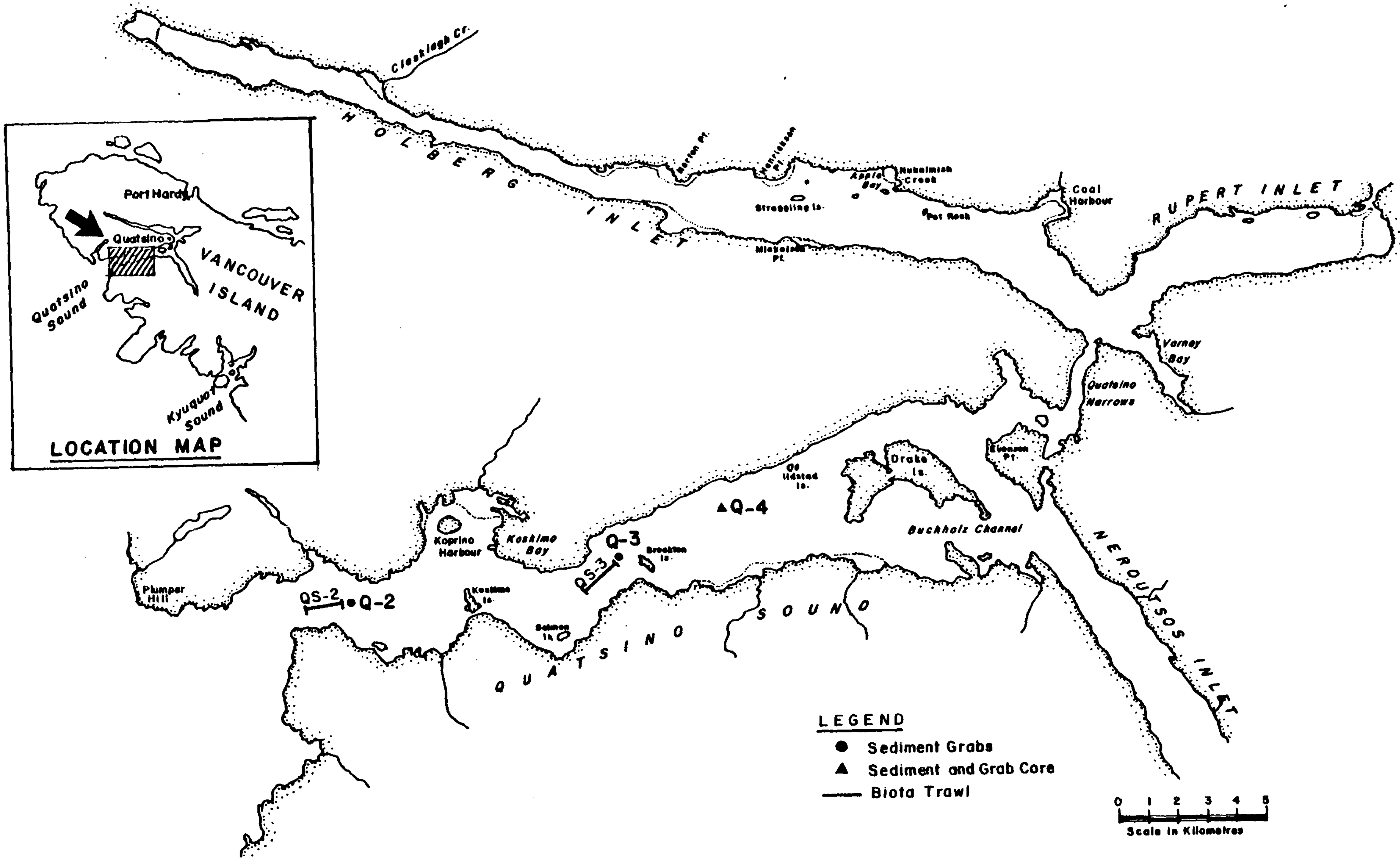


FIGURE 3 QUATSINO SOUND - LOCATION AND SAMPLING STATIONS

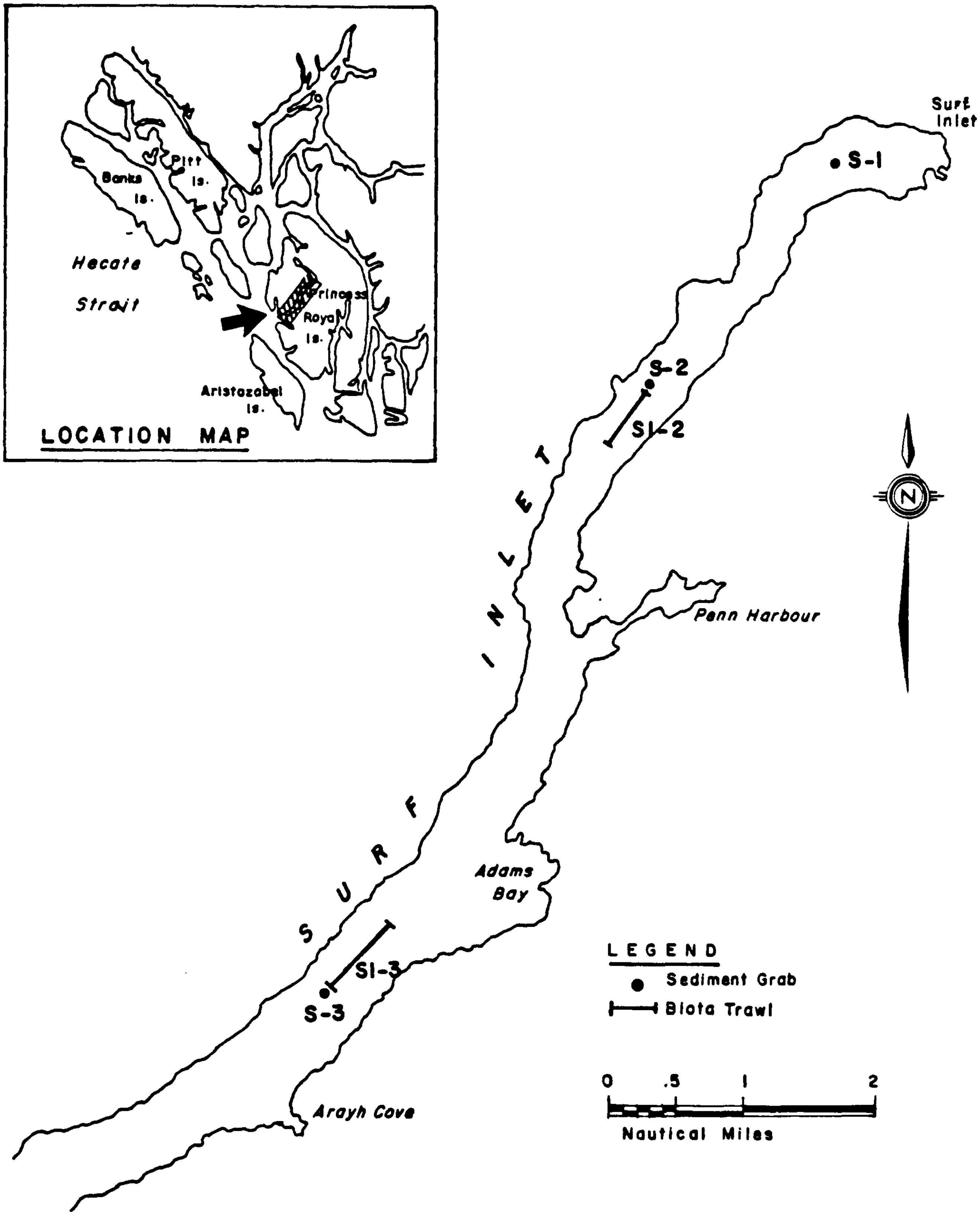


FIGURE 4 SURF INLET - LOCATION AND SAMPLING STATIONS

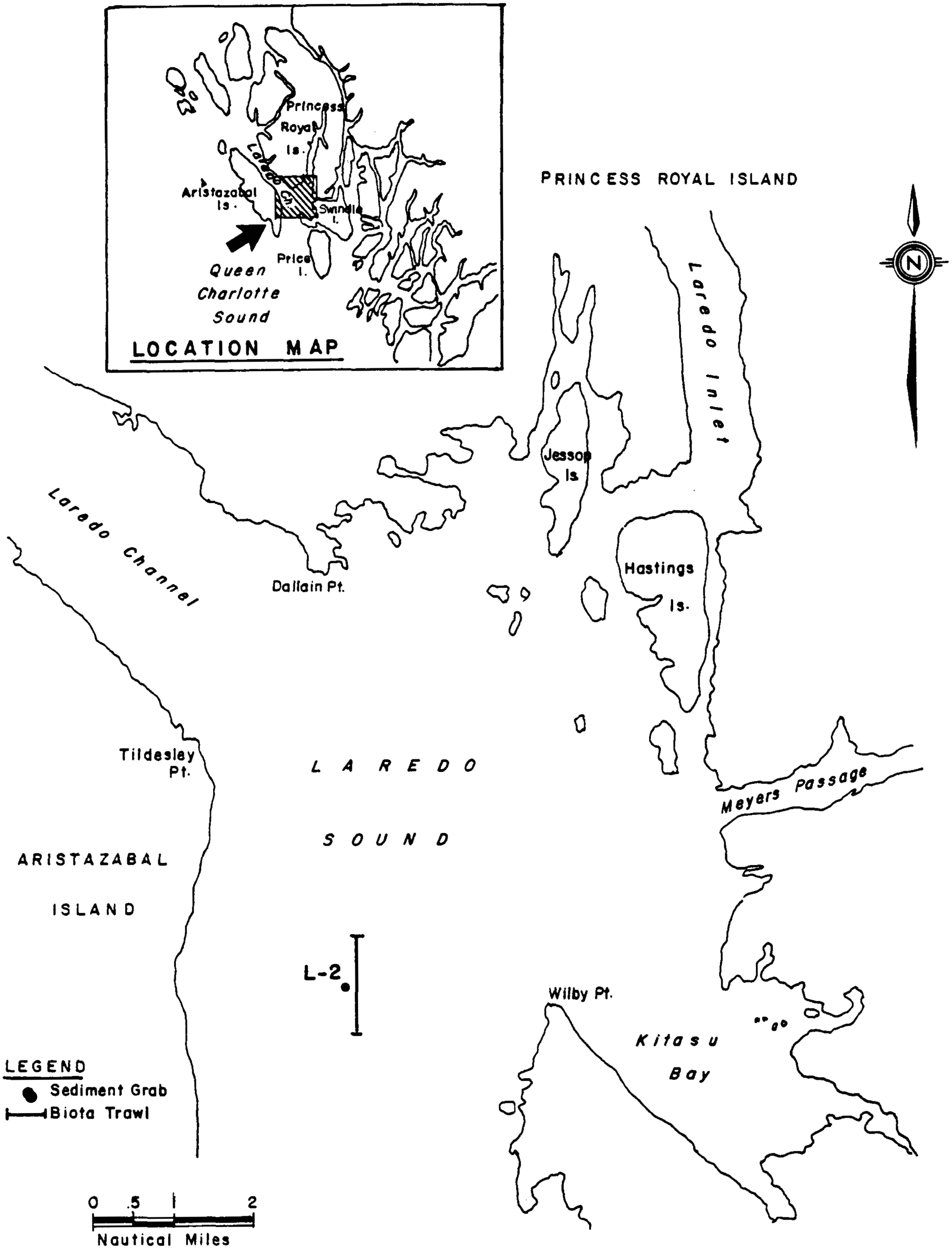


FIGURE 5 LAREDO SOUND - LOCATION AND SAMPLING STATIONS

2.2 Analytical Procedures

2.2.1 Sediment. Frozen sediment samples were analysed by the West Vancouver Laboratory for trace metals according to the procedures outlined by Swingle and Davidson (1979). The samples were freeze-dried and sieved through a 100-mesh nylon sieve. They were then digested in a 4:1 nitric-hydrochloric acid mixture and analysed for trace metals using a Perkin-Elmer Inductively Coupled Argon Plasma (ICAP) Optical Emission Spectrometer. Low-level cadmium and lead levels were obtained using a Jarrel Ash 850 Atomic Absorption Spectrophotometer (AAS) with a FLA 100 graphite tube furnace.

2.2.2 Tissue. Tissue trace metals were analysed at the West Vancouver Laboratory according to procedures described by Swingle and Davidson (1979) as follows: tissue samples were thawed, blended, freeze-dried and oxidized in a low temperature asher. The ash containing the metallic salts was then dissolved in warm concentrated nitric acid. Samples were analysed on the Inductively Coupled Argon Plasma (ICAP) Optical Emission Spectrometer. Tissue levels that were below the ICAP detection limit for cadmium and lead were analysed by the Jarell Ash 850 Atomic Absorption Spectrometer (AAS) with a FLA 100 graphite tube furnace.

For mercury, the blended and freeze-dried samples were dissolved in a 4:1 sulfuric acid-water mixture. These solutions were further oxidized with 50% peroxide, heated, cooled and diluted with potassium permanganate. The resultant solutions were then analysed by "cold vapour" AAS with background correction. All results are reported as concentration in mg/kg dry weight unless otherwise stated. For comparison with Canadian Guidelines for Chemical Contaminants in Fish Protection (Fish Inspection Branch, 1983), the guideline values were converted from wet weight using a wet: dry weight ratio of 4.54 (Goyette and Christie, 1982). These guidelines apply to edible fish products for mercury and to fish protein for arsenic and lead. Measurements of trace metals in extractable fish protein are not directly comparable to measurements in edible tissues, however, the guidelines are useful as a reference for comparison.

2.3 Quality Control

Standard reference materials lobster tail (NRC), oyster tissue (NBS), bovine liver (NBS) and BCSS marine sediment (NRC), or MESS marine sediment (NRC), as appropriate, are analysed with each batch of samples processed. Results are accepted if within 10% of certified values. If significant differences are observed between measured and certified values, methods and materials are checked and the samples re-run. Quality control results are recorded, and are available at the Environment Canada laboratory in West Vancouver.

2.4 Statistical Analysis

2.4.1 Summary Statistics. Summary statistics were prepared in "MultiPlan" electronic spreadsheets on a "DataPoint" minicomputer using standard functions for mean, standard deviation, maximum and minimum and user-supplied formulae for variation. For summary statistics all values less than chemical analytical detection limits were assigned the value of the detection limits. Advanced statistics were performed on an IBM PC microcomputer running "StatPro" (Penton Software, Inc., 1985) package programs. Significance was tested at the probability level of 5%. Data sets of $n < 5$ and values of $x <$ detection limit were not included in the analyses.

2.4.2 Tests for Normality. Because the sample design called for detection of differences in tissue trace metals between areas by analysis of variance, which assumes a normal distribution, normality was tested for several of the larger shrimp data sets. The method used was a quantile-quantile (Q-Q) correlation which measures the correlation between the cumulative probability distribution of the raw data and the corresponding values of the standard normal distribution. Results were variable: A metal that was normally distributed in one data set was not necessarily normally distributed in the same species from a different location. Log transformations ($Z = \log(x+1)$) as suggested by Greene (1979) and others did not improve the normality. Zar (1984) notes that the validity of ANOVA is affected only slightly by even considerable deviation from normality if the distribution is very narrow (i.e. the kurtosis is high). Examination of descriptive statistics (Appendix II) for shrimp and prawns showed that while skewness was generally slight, positive kurtosis was often high. Therefore, for these data, even though assumptions of normality were frequently violated, parametric ANOVA could validly test for significant differences between groups.

2.4.3 **Between-Area Comparisons.** Differences in trace metal levels in shrimp between stations were tested for significance using one-way analysis of variance using a type A model for equal sample sizes. If unequal numbers of specimens of a particular species were analysed chemically, sample sizes were equalized by only using the first n samples submitted, where n = the minimum size data set for that species. Sample sizes in the range 12-24 were found to be suitable to determine the mean within 10% of the actual population mean, based on these data and formulae given by Zar (1984), although the number of variates needed was different from metal to metal. Sample sizes less than 5 were not included in the analysis. Results are reported at the 5% confidence level.

2.4.4 **Bioaccumulation.** Linear correlation was tested between mean levels of arsenic, cadmium, copper, mercury and lead in all shrimp and sole species with concentrations of these metals in surface sediments. The relationship between these metal levels in all three fish tissues, and with tail muscle in the shrimp species, was also tested by correlating the log of the sediment concentration with the log of the bioconcentration factor (Ray, et al., 1979). Linear correlation was also tested between sole muscle tissue and gill and liver tissue. Results are reported at the 95% confidence level.

3 RESULTS

3.1 Sediment Trace Metals

3.1.1 Barkley Sound.

From the two Barkley Sound grabs, station B-1 tended to have slightly higher trace metal levels, although levels from both stations are quite similar (Table 1). Relatively higher metals at Barkley Sound, compared to the other three areas, include aluminum (35,900 and 32,250 ug/g), cobalt (19.0 and 13.5), cadmium (1.3 ug/g), chromium (54.0 and 44.2 ug/g) and zinc (117 and 131 ug/g) at B1 and B2, respectively.

3.1.2 Quatsino Sound.

Sediment trace metal levels from stations Q-2, Q-3, and Q-4 in Quatsino Sound are generally similar (Table 1). An exception was high copper concentrations at Q-4 (139.0 ug/g) which is located nearest to the mine. Other elevated metals in Quatsino Sound were manganese (415-594 ug/g), zinc (96.2-117.0 ug/g) and titanium (1,550-2,090 ug/g).

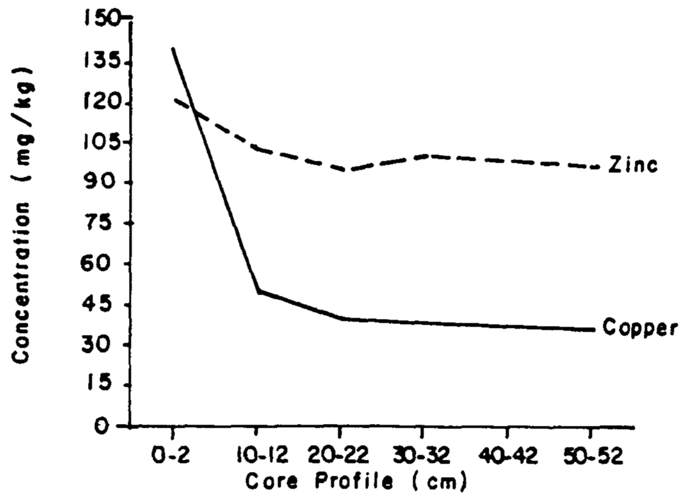
Figure 6 shows elevated surface metal concentrations for copper, manganese and lead at Q-4. Other metals showed a more even distribution throughout the core (Table 2). This may be due to drift of heavy metal contaminated sediments into Quatsino Sound from tailings deposited into Rupert Inlet by the Island Copper Mine. This drift has been shown to extend to near Q-4 by Goyette (unpublished data) and Island Copper Mine (1986). Cadmium levels were less in sediments closer to the surface, and were highest at a core depth of 50 cm.

3.1.3 Surf Inlet.

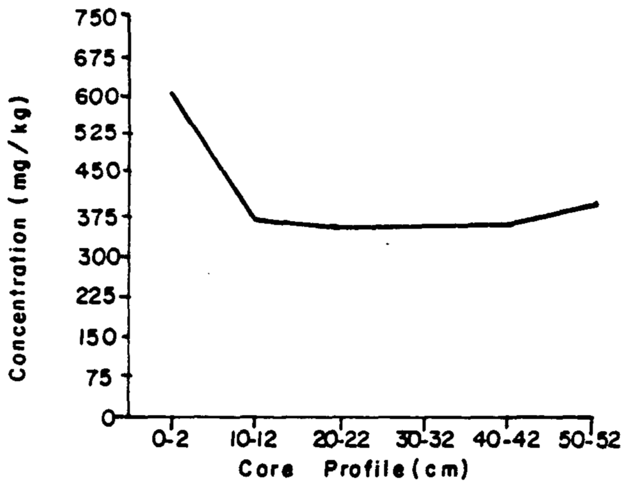
The three Surf Inlet stations have similar trace metals levels to the other three areas (Table 1). Stations S-1 and S-3 have higher levels in several metals than those found at S-2. These include arsenic, mercury, titanium and vanadium. The Surf Inlet levels show relatively higher levels of mercury (0.092-0.150 ug/g), arsenic (22.0-28.0 ug/g) and barium (65.0-81.5 ug/g), compared to the other three areas sampled.

3.1.4 Laredo Sound.

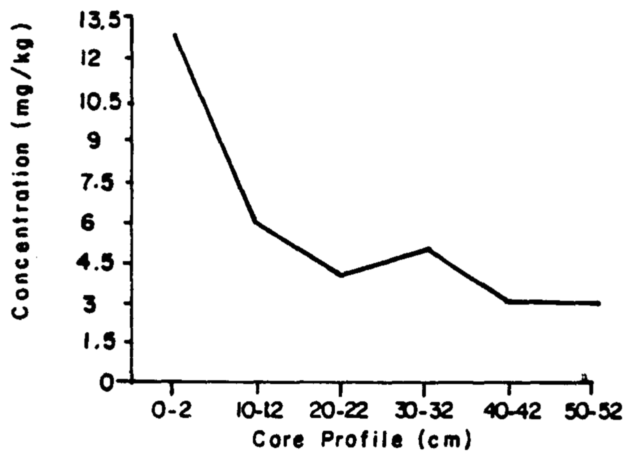
Table 1(d) provides results of duplicate sediment grabs collected in Laredo Sound. Values exhibit both higher (barium and mercury) and lower (manganese and arsenic) levels compared to the other locations.



(a) COPPER AND ZINC



(b) MANGANESE



(c) LEAD

FIGURE 6 CORE PROFILES OF SEDIMENT COPPER, ZINC, MANGANESE AND LEAD IN QUATSINO SOUND

3.2 Tissue Trace Metals

Chemical analysis was completed for 24 trace metals. Of these, only aluminum, arsenic, barium, cadmium, chromium, copper, iron, mercury, magnesium, manganese, molybdenum, nickel, lead and zinc are reported here. The others are archived on computer tape or disk.

Mean, sample size, standard deviation, variance and maximum/minimum ranges of the reported metals in all species are shown in Tables 3 to 9. Raw data are given in Appendices III to IX. Only arsenic, cadmium, copper, mercury and lead are examined in detail.

Results of between-area comparisons for sidestripe, crangon and pink shrimp and prawns are shown in Table 10. Results for each metal in shrimp and fish are discussed separately below.

Although mean trace metal values are discussed, in some cases for fish the concentration value is for a single specimen, as only one of that species was collected.

3.2.1 Arsenic. Arsenic in tail muscle tissue showed significant between-station differences for sidestripe and pink shrimp (Table 10). At one station in Barkley Sound (B-1), arsenic in sidestripe shrimp was lower than the other stations (mean of 42.6 mg/kg compared to means of approximately 60-70 mg/kg at the other stations) (Figure 7). In pink shrimp, arsenic was also lower (52.9 mg/kg) at B-1 than at the other stations (approximately 60-63 mg/kg). The relatively high levels of arsenic in prawns from Surf Inlet (Figure 7a) were not significantly different from Barkley Sound stations, possibly due to the small sample sizes (n = 5).

Arsenic concentrations in shrimp and prawns hepatopancreas were higher in Surf Inlet (mean range of 196-306 mg/kg) than in Quatsino and Barkley Sound (mean range of 46-182 mg/kg).

In fish, arsenic in sole muscle ranged from 9.8 to over 200 mg/kg, with most values in the 50 to 100 mg/kg range (Figure 7b). There were no clear differences between species and between areas, and insufficient sample sizes to test statistically. Arsenic levels above 100 mg/kg occurred in flathead and English soles from Barkley Sound, petrale, English and Dover soles from Surf Inlet and Rex sole from Quatsino Sound. Almost all values were above the 15.9 mg/kg Canadian guideline for arsenic in fish protein.

Arsenic levels in sole livers were similar, generally ranging from 10.7 to 245 mg/kg (Figure 7c); however, one value of 558 mg/kg was recorded in a petrale sole from Surf Inlet -- the same individual that had an arsenic concentration of 148.0 mg/kg in its muscle tissue.

The Canadian guideline for arsenic in fish protein is 3.5 ppm wet weight (Fisheries and Oceans Canada, 1983), which corresponds to 15.9 mg/kg dry weight assuming a wet-dry ratio of 4.54:1 (Goyette and Christie, 1982). Clearly, the guideline is set well below these natural levels. Arsenic in seafood is predominantly in the form of non-toxic arseno-organic complexes that are readily excreted and do not pose a health hazard to consumers (Freeman et al., 1979).

3.2.2 **Cadmium.** Cadmium was significantly different between stations in both crangon shrimp and prawns (Table 10). In crangon shrimp the means ranged from a low of 0.116 mg/kg at Barkley-B2 to a high of 0.145 mg/kg at Barkley-B1 (Figure 8a). Prawns had cadmium concentrations from a mean of 0.107 mg/kg at both Barkley stations to 0.138 mg/kg at Surf (SI-2).

Cadmium in hepatopancreas varied considerably with respect to location and species (mean range of 0.2-63.8 mg/kg).

Cadmium in sole muscle was consistently below 0.2 mg/kg, except for a petrale sole from Surf Inlet with 2.3 mg/kg, English sole from Surf Inlet and Laredo Sound with 0.27 mg/kg and 0.22 mg/kg respectively (Figure 8b).

In sole liver the levels of cadmium were much higher, often exceeding 10 mg/kg (Figure 8c). Highest concentrations were found in Surf Inlet.

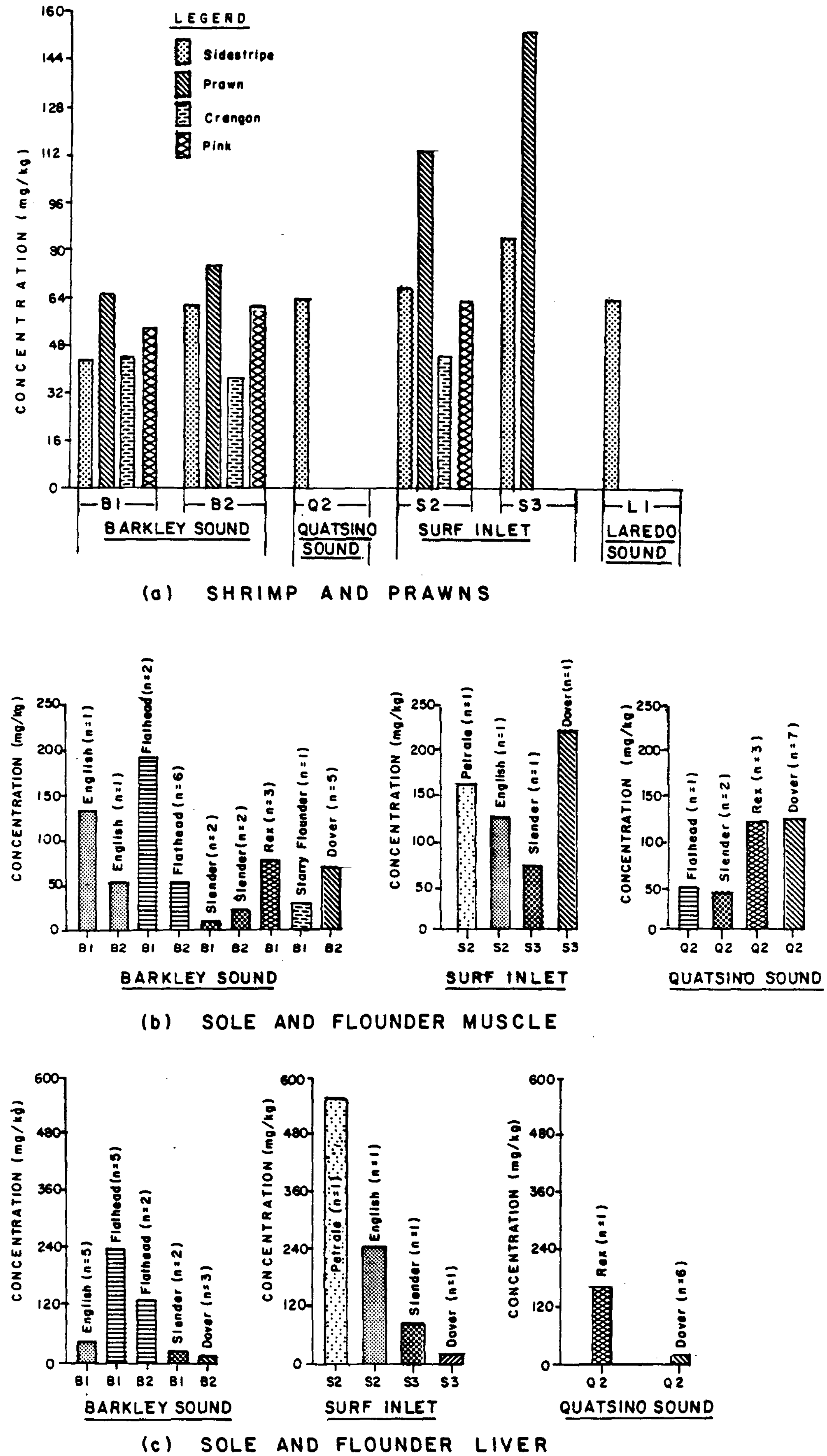


FIGURE 7 MEAN ARSENIC CONCENTRATIONS (mg/kg)

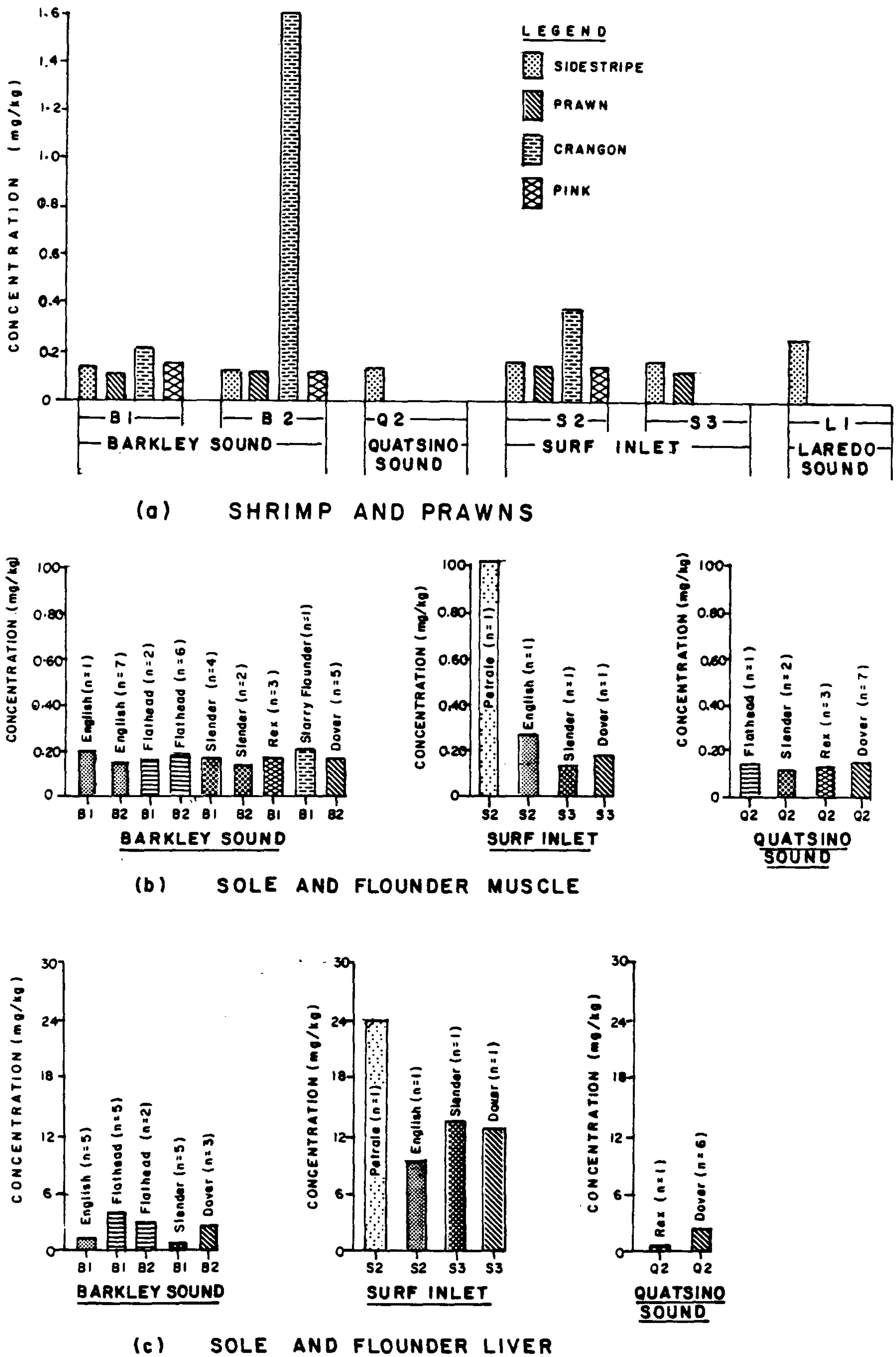


FIGURE 8 MEAN CADMIUM CONCENTRATIONS (mg/kg)

3.2.3 Copper. Copper in crangon and pink shrimp and prawns had significant differences between stations (Table 10). In crangon shrimp, means ranged from a low of 12.2 mg/kg at Quatsino Sound-Q2 to a high of 36.0 at Barkley-B2 (Figure 9a). Barkley-B1 had the lowest copper concentration in prawn muscle of 14.0 mg/kg while Barkley-B2 had the highest mean (19.6 mg/kg). Pink shrimp mean copper levels ranged between 10.1 mg/kg at Barkley-B1 to 16.41 mg/kg at Barkley-B2. Generally, shrimp had greater copper concentrations in the hepatopancreas than prawns (respective mean ranges were 846-1586 mg/kg and 383-710 mg/kg).

In fish muscle, most copper levels were below 2.0 mg/kg; however, a level of 7.1 mg/kg was found in a petrale sole from Surf Inlet -- the same individual with high arsenic and cadmium levels (Figure 9b). There is no Canadian guideline for the concentration of copper in edible fish protein.

Copper was higher in sole livers than in their muscle, generally ranging from approximately 30 to 90 mg/kg (Figure 9c). Higher values were observed in a flathead sole from Barkley Sound (221 mg/kg), and an English sole from Surf Inlet (111 mg/kg).

3.2.4 Mercury. Mean mercury levels ranged between 0.034 mg/kg and 0.560 mg/kg for all shrimp (Figure 10a). Significant differences were in sidestripe (0.074 mg/kg at Laredo to 0.167 mg/kg at Quatsino-Q2) and crangon (0.034 mg/kg at Surf-S1 to 0.124 mg/kg at Barkley-B2) shrimp, and prawns (0.12 mg/kg at Surf-S2 to 0.147 mg/kg at Barkley-B2). The high value of 0.560 mg/kg in pink shrimp from Barkley Sound was not significantly different from other locations (Table 10), possibly due to small sample size. Mercury in hepatopancreas ranged between 0.08-0.84 mg/kg in shrimp and prawns.

Mercury in sole muscle was generally less than 0.5 mg/kg (Figure 10b). Higher values were observed in slender sole from Barkley Sound (mean of 0.66 mg/kg), a petrale sole from Surf and a slender sole from Surf Inlet (1.58 mg/kg). These values are all below the Canadian guideline for mercury in edible fish protein (2.3 mg/kg dry weight).

Mercury levels in sole livers (Figure 10c) generally ranged between 0.5 mg/kg and 1.0 mg/kg. The highest, in an English sole from Surf Inlet-S2, was 2.64 mg/kg.

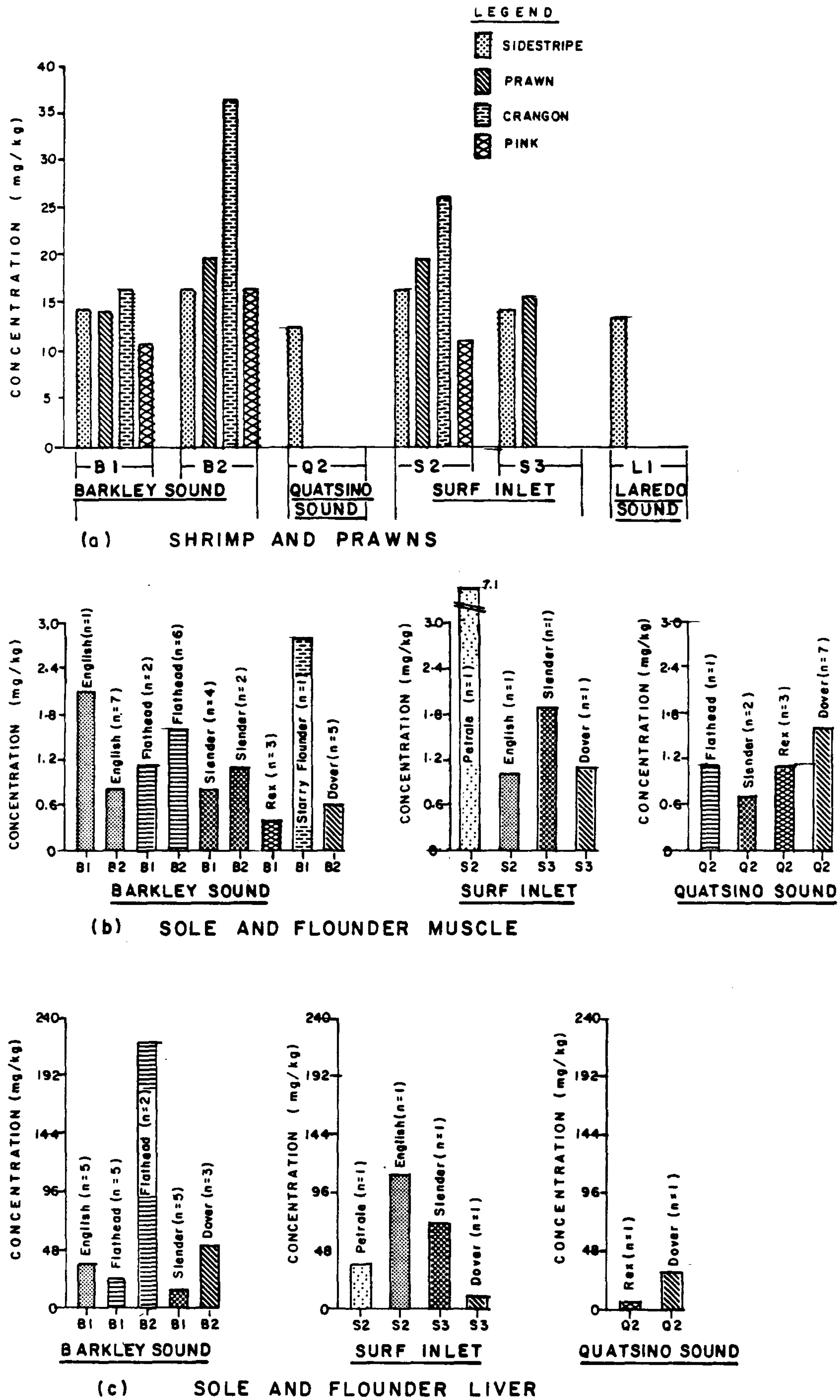


FIGURE 9 MEAN COPPER CONCENTRATIONS (mg/kg)

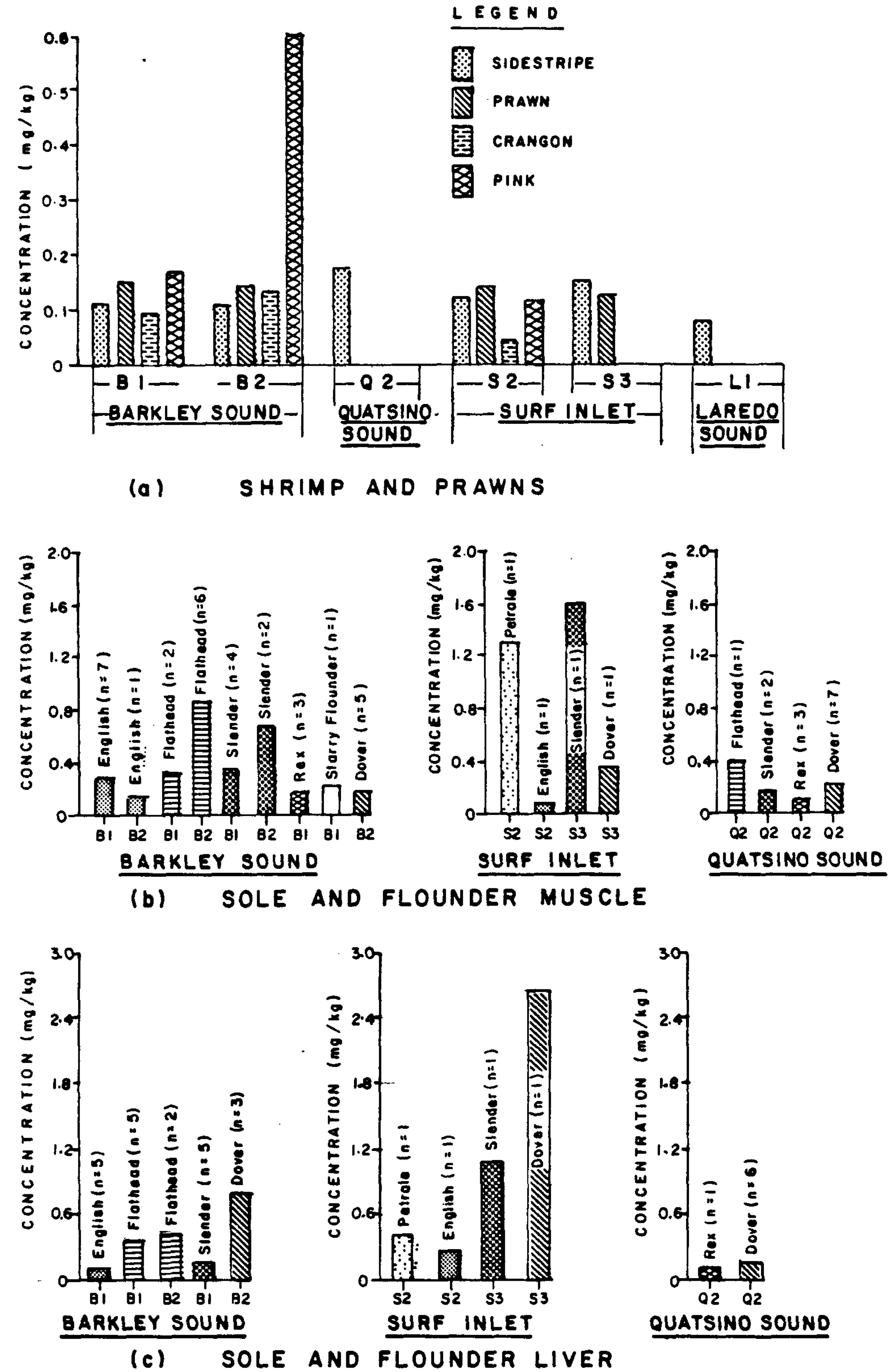


FIGURE 10 MEAN MERCURY CONCENTRATIONS (mg/kg)

3.2.5 **Lead.** Lead in shrimp tail muscle was not significantly different at any station (Table 10). Values ranged from approximately 0.6 to 1.2 mg/kg (Figure 11a), which is well below the Canadian guideline level of 2.3 mg/kg dry weight for edible fish protein. Higher lead levels in hepatopancreas were found in shrimp and prawns from Barkley Sound (0.72-1.26 mg/kg) compared to Surf Inlet and Laredo Sound (< 0.15 mg/kg).

In sole muscle tissue, lead varied from approximately 1.5 to 3.0 mg/kg, with no clear differences between areas or species (Figure 11b). Values exceeding the Canadian guideline were observed in slender sole from Barkley Sound (mean of 3.14 mg/kg), a petrale sole from Surf Inlet (2.86 mg/kg), an English sole for Surf Inlet and Dover sole from Quatsino Sound (mean of 2.85 mg/kg).

In liver tissue most levels were generally below 2.0 mg/kg (Figure 11c). One extreme value of 9.0 mg/kg was recorded in an English sole from Surf Inlet.

3.3 Bioaccumulation

Bioconcentration is the bioaccumulation of chemicals above the background concentration. Where the source of contamination is in sediments, bioconcentration is calculated as the level in tissue divided by the sediment concentration.

3.3.1 **Shrimp.** Bioconcentration factors for cadmium and mercury in three species of shrimp and prawn are shown in Tables 11 and 12, respectively. There was slight bioconcentration of cadmium in only one species (*Crangon communis*) at one location, Station B-2 in Barkley Sound. Significantly, this area is known to have relative high (> 1.0 mg/kg) levels of cadmium in sediments (Nelson and Brothers, EPS unpubl. data), apparently due to natural mineralization. There was no statistical correlation between the log of cadmium in sediments and the log of the bioconcentration factor, (Table 15) as was reported by Ray et al. (1983) for a polluted location in Atlantic Canada.

As expected, mercury was accumulated more than cadmium (Table 14). Bioconcentration factors for mercury in shrimp ranged from less than 1.0 to

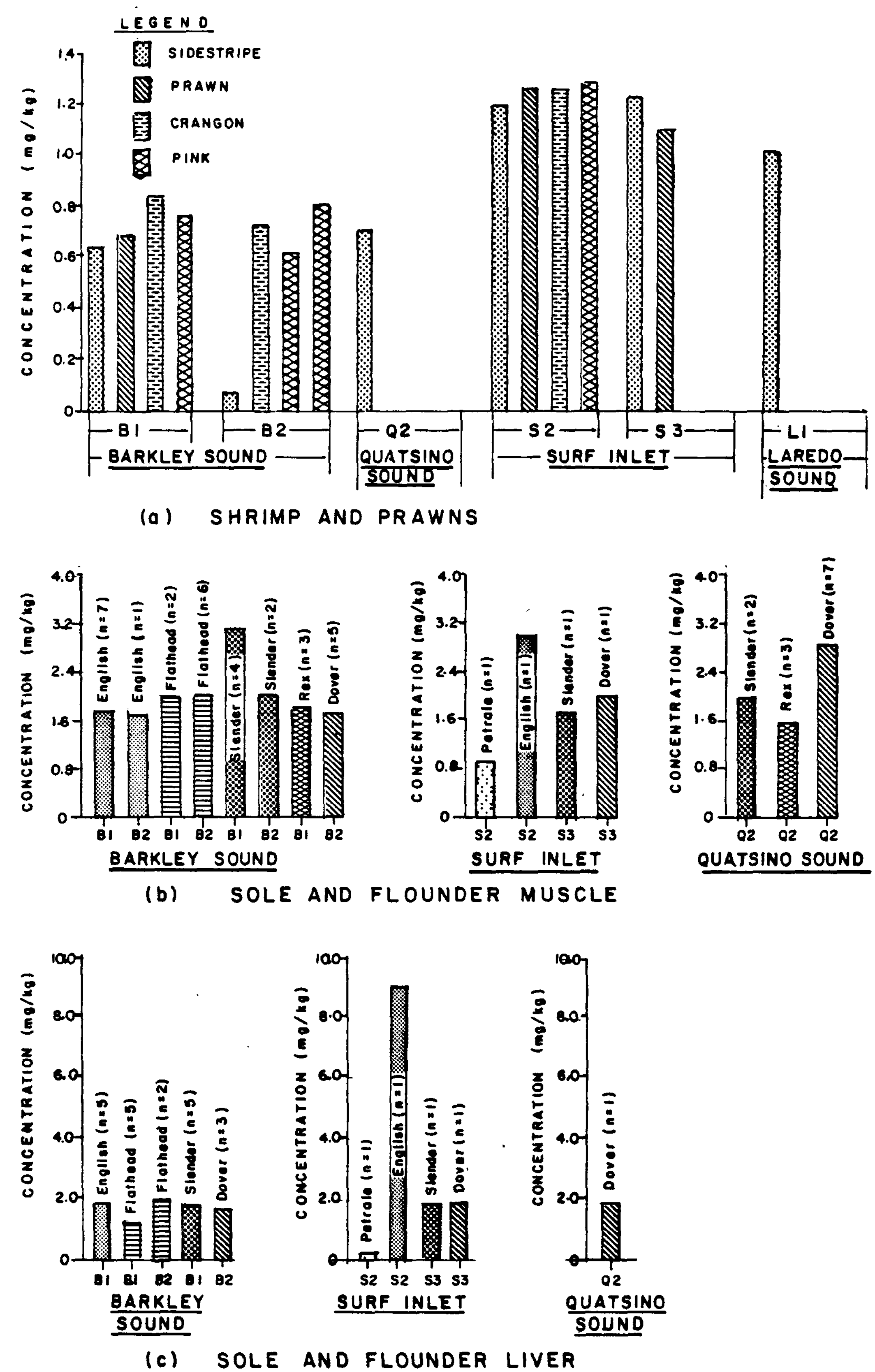


FIGURE 11 MEAN LEAD CONCENTRATIONS (mg/kg)

5.1. At Barkley Sound-B1 and Surf Inlet-S2, there was slight bioconcentration in sidestripe and pink shrimp as well as prawns. At Laredo Sound, the bioconcentration factor was over 5 in sidestripe shrimp, the only species analysed. Although the correlations were stronger between the log of the sediment levels and the log of the bioconcentration factors, they were not statistically significant (Table 13).

Because of absence or very slight bioaccumulation of cadmium and mercury in shrimp and prawn tissues, bioconcentration factors of other trace metals were not calculated.

3.3.2 **Fish.** Bioconcentration factors for cadmium and mercury in sole and flounders are given in Table 16. Virtually no bioconcentration of cadmium occurred in fish muscle; in fish livers, cadmium bioconcentration was variable, with factors ranging from less than 1.0 (indicating no bioconcentration) to 26.7 in a petrale sole liver. Mercury, also highly variable, tended to concentrate more in muscle tissue than livers. Bioconcentration factors of mercury in fish muscle ranged from less than 1.0 to 14.2 (Dover sole), and in fish livers from less than 1.0 to 17.6 (Dover sole).

Too few fish of any species were obtained for statistical comparison of trace metal uptake between areas, or for correlation between sediment trace metals and tissue trace metals.

3.4 Species Composition of Trawls

Species composition for each station is given in Appendix X.

3.4.1 **Barkley Sound.** Barkley Sound had a diverse and moderately abundant shrimp community including sidestripes, pinks, spirontocaris, crangon and prawns. Fish caught included slender, Rex, flathead and English soles, hake, midshipman and ratfish.

3.4.2 Quatsino Sound. At Quatsino Sound the shallow (70-110 m), well flushed and oxygenated waters and sand/gravel bottom support a diverse epibenthic community. Brittle stars were numerous at Q2, but not at Q3. Sidestripe was the dominant shrimp at Q2, while pinks and prawns were more numerous at Q3. Dover sole and ratfish were the most numerous fish at Q2, while at Q3 the most abundant bottom fish was the slender sole.

3.4.3 Surf Inlet. Surf Inlet is deeper (175-280 m), with a soft mud bottom. The S2 trawl consisted mostly of sea cucumbers (Molpadia sp.). Heart urchins, sidestripe and pink shrimp, crangons and prawns made up the invertebrate catch. Slender sole, hake, and ratfish were the most numerous fish. Other fish present included petrale sole, English sole, black cod and red snapper. At S3 brittle stars, glass sponges, brachiopods and heart urchins comprised 80% of the catch, with numerous anemones, Yoldia spp. clams, and cniderians included. There were fewer shrimp at S3. Ratfish was the most abundant fish species at S3; others included slender sole, Dover sole and black cod.

3.4.4 Laredo Sound. Laredo Sound trawl catches were typical of relatively deep (220-250 m), soft-bottom communities. Few fish were caught, the dominant species being ratfish. English sole, halibut, sidestripe shrimp and shortfin eelpouts were also caught. The bulk of the trawl was heart urchins.

4 DISCUSSION

4.1 Sediment Trace Metals

4.1.1 Variation by Time. Of the four areas reported here, previous data were available only for Quatsino Sound, which had been sampled in 1978, 1979, and 1981, (Goyette, unpubl.). These earlier data sets showed no changes of trace metals in central or western Quatsino Sound which can be attributed to the copper mine in Rupert Inlet, although the 1981 data did show a moderate elevation of copper (from about 30 to 61.7 mg/kg) west of Drake Island, near Station Q-4 of this study. The present study shows a doubling of copper levels in that area (139.0 mg/kg) although stations further west are apparently not affected.

4.1.2 Variation by Area. Of the areas sampled in this study, Barkley Sound tended to have the highest overall metal levels, except for copper at Quatsino Sound as noted above. Trace metals in Hecate Strait sediments (Harding et al., 1986), by comparison, were generally lower than those in the four areas reported here.

Several factors work independently or together to cause natural variation in metals levels. These include sediment particle size, tidal activity, freshwater inflow, depth of bottom, organic content, and redox potential. Of these, particle size, or more particularly, the amount of clay, is the most consistent determinant of trace metal content in unpolluted sediments. Since most clays are primarily alumina-silicate, in which the aluminum content varies directly with the clay fraction, aluminum can be used to relate heavy metals to clay content using linear correlations (c.f. National Oceanic and Atomospheric Administration, 1987). It is therefore not surprising that Barkley Sound, which tended to have the highest overall metal levels, also had the highest aluminum levels (32000-35900 mg/kg), indicating a higher clay content. Similarly Hecate Strait, with lower aluminum levels (5030-10850 mg/kg: Harding et al. 1985), had generally lower trace metal levels.

For all the stations reported here and including Hecate Strait data referred to above, the logarithms of cadmium, chromium, copper and mercury were significantly correlated with the logarithm of aluminum (r=0.92, 0.52, 0.92 and 0.49 respectively; prob. @ 0.05=0.48); the log of lead, however, was not (r=-.15). Correlation with Arsenic could not be calculated because most values were below the detection limit of 8.0 mg/kg. Figure 12 shows the natural range of cadmium, copper and mercury according to the aluminum content, based on the data from these five locations.

4.2 Biota

4.2.1 Variation by Time. Summary results of 1978, 1979 and 1981 trawls have been reported by Goyette and Christie (1982) for Quatsino Sound and 1981 trawls for Laredo Sound. Laredo Sound trawls did not catch the same species, however, precluding comparisons for that location.

In Quatsino Sound, the 1981 trawl, which was used as a reference location for surveys of mine tailings in Rupert Inlet, was at the mouth of the Sound approximately 7 km seaward of Q-2. The 1978 and 1979 trawls were near Q-4, a sediment station that was not trawled in 1984. Whether differences of several km in trawls means that different populations were sampled is not known, but suggests caution in interpreting the following comparisions.

In Quatsino Sound, mean arsenic levels showed a generally increasing trend in the five species common to several years. Pink shrimp contained slightly less arsenic in this study (44.5 mg/kg at Q-2 and 58.4 mg/kg at Q-3) than in 1981 (65.0 mg/kg); however, these values were all above 22 mg/kg and 12 mg/kg observed in 1978 and 1979, respectively. The same trend was observed in sidestripe shrimp (28.0, 36.0, 40.0 and 62.9 mg/kg in 1978, 1979, 1981 and 1984, respectively). In the three sole species common to more than one year, all showed increases in arsenic: Dover sole arsenic in muscle tissue increased from 60 to 121.4 mg/kg from 1978 to 1984, slender sole showed a rise of 16 to 40 mg/kg in the same period, and Rex sole arsenic in muscle tissue went from 45.0 mg/kg in 1979 to 117.7 mg/kg in 1984. Riemer et al. (1985) found that although the Rupert-Holberg Inlet/Quatsino Sound system is characterized by a "normal" arsenic load, methylarsenicals and dissoved arsenic were

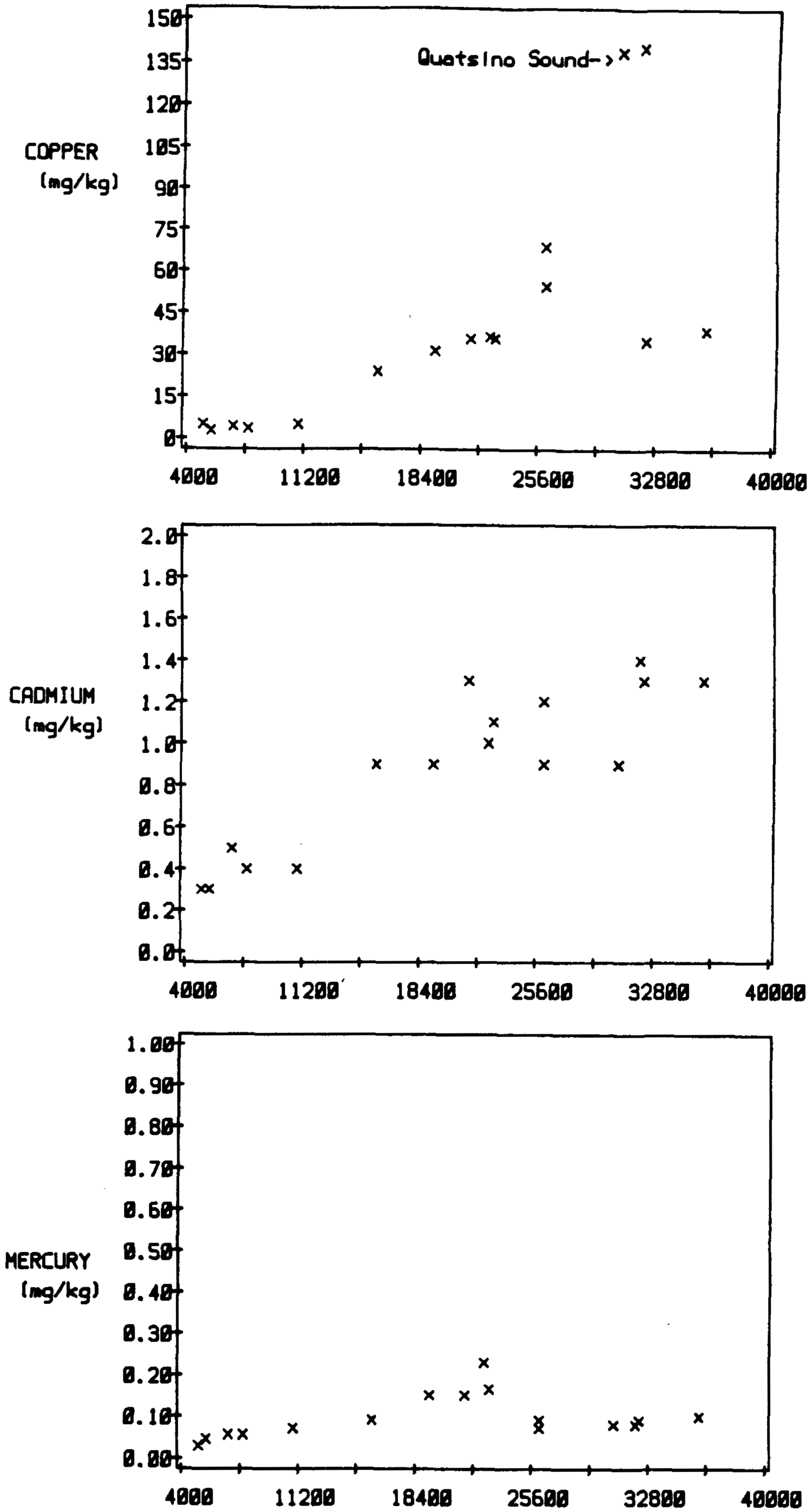


FIGURE 12 CADMIUM, COPPER AND MERCURY CONCENTRATIONS AS A FUNCTION OF ALUMINUM CONCENTRATION (mg/kg)

highest in eastern Quatsino Sound, in the area of light tailings deposition. It is conceivable that progressive intrusion of mine tailings into Quatsino Sound provides arsenic for methylation and dissolution in interstitial waters, and hence increasing bioavailability, that does not occur in pure tailings where reduced biological activity would preclude diagenic processes. In any case, it is clear that no part of Quatsino Sound can qualify as a baseline or unpolluted reference area for arsenic in biota.

The 1978 lead and cadmium samples, which were analysed by ICAP, can not be compared to later surveys, in which low-level detection (¨.05 mg/kg) was provided by flameless AA/graphite furnace. Both metals seemed to increase during 1979-84, although the differences were slight and the ranges overlapped.

Copper apparently decreased in the two shrimp species (33.0 to 22.2 mg/kg from 1978 to 1984 in pink shrimp and 41.0 to 12.2 mg/kg for the same period in sidestripe shrimp. In fish, copper levels in muscle tissue were lower in this study than in all years reported by Goyette and Christie (op. cit.): for Dover sole, a mean of 1.6 mg/kg was found in 1984 compared to a high of 4.9 in a single specimen in 1979; and slender sole had a mean of 0.7 mg/kg versus a mean of 3.7 mg/kg in 1979. Reasons for the decline in copper are not known, but are clearly not related to sediment levels, which increased as noted above.

Mercury showed no changes between years in biota of Quatsino Sound.

4.2.2 Variation by Area. In shrimp, significant variation between areas occurred in most metals analysed statistically (lead excepted). Laboratory QA/QC results eliminate chemical analysis as a source of variation. Trace metals in tissue were not correlated with sediment trace metals, and no significant bioaccumulation occurred. The sources of variation, although unknown, are probably natural.

There may be differences between areas in trace metal uptake, or relationships between bottom fish and sediment metal concentrations, that would be revealed with higher sample numbers. An obvious source of variation is age of fish: although attempts were made to collect only "medium" size sole, larger or smaller ones were sampled if that was all in the trawl. With a maximum of seven specimens analysed, standard deviations were still occassionally in excess of 50% of the mean. Sample sizes of sole species would need to be at least 24 specimens/species/area to obtain an estimated mean within 10% of the actual population mean, based on these data and formulae given by Zar (1984). Unequal sample sizes further restricted the type of analysis that could be used. It is recommended for future studies of this type that a small number of target species be identified beforehand, that at least six of the target species be obtained and rigorously standardized to size; and that investigators concentrate more on obtaining the same number of specimens of each species from each station than sampling different species and different stations.

4.2.3 Differences between Tissues. In shrimp, hepatopancreas consistently had higher concentrations of most trace metals (lead excepted) than tail muscle tissue. However, the small size of this organ makes chemical analysis difficult, which may be a source of the wide variation in results (QA/QC results, which were run on a batch basis with other tissues, would not show analytical variations for a specific tissue). As well, few samples were obtained, making statistical comparisons impossible. If analytical precision and accuracy can be verified, hepatopancreas may be a good indicator of trace metal uptake.

Livers of sole clearly contained more arsenic, cadmium and copper than muscle tissue, and standard deviations were low enough to permit statistical comparisons, when sufficient numbers of specimens were analysed. Livers are good indicators of food chain effects, because they accumulate contaminants from dietary sources (Buckley et al., 1982; Saltes and Bailey 1984). Muscle tissue is also a good monitoring parameter because of the availability of explicit human health standards for comparison.

Gill tissue, however, was difficult to collect in sufficient quantity for analysis, and several samples were rejected by the laboratory. Gills accumulate trace metals, particularly zinc (Skidmore 1972), primarily from the aqueous phase, and results are difficult to interpret without data on dissolved metal concentrations (Saltes & Bailey 1984).

Where analysed, the levels of the metals in gills were generally the same as those in muscle tissue, but much more variable (probably due to the analytical difficulties for very low tissue weights), providing no additional information on trace metal uptake. We recommend for future studies that gill tissue not be sampled unless objectives relate to short term uptake of trace metals from the liquid phase.

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TABLES

TABLE 1a SEDIMENT TRACE METAL ANALYSIS - SURFACE GRABS, MARCH 1984
BARKLEY SOUND

STATION	DEPTH (m)	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	Hg	Mg
B-1	106	35900	10.0	69.5	0.3	13900	1.3	19.0	54.0	39.0	38500	0.10	12200
B-2	105	32250	8.0	63.6	0.4	21900	1.3	13.5	44.2	35.4	34000	0.09	11300

STATION	DEPTH (m)	Mn	Mo	Na	Ni	P	Pb	Si	Sn	Sr	Ti	V	Zn
B-1	106	362.0	1.0	13300	32.0	1080	10.0	2070	6.0	96.6	1760	99.0	131.0
B-2	105	394.0	0.8	11300	26.0	928	4.0	1400	8.0	136.0	1860	99.0	117.0

TABLE 1b SEDIMENT TRACE METAL ANALYSIS - GRAB SAMPLES, MARCH 1984
QUATSINO SOUND

STATION	DEPTH (m)	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	Hg	Mg
Q-2	201	26000	9.0	44.9	0.2	77600	1.2	13.5	44.2	54.7	30400	0.09	13500
Q-3	158	26000	8.0	41.3	0.2	48600	0.9	14.8	43.1	68.8	34600	0.07	13500
Q-4	124	30600	8.0	40.7	0.2	30000	0.9	13.6	55.5	139.0	37400	0.08	15900

STATION	DEPTH (m)	Mn	Mo	Na	Ni	P	Pb	Si	Sn	Sr	Ti	V	Zn
Q-2	201	415.0	0.8	12800	30.0	1070	10.0	1050	5.0	460.0	1550	89.0	101.0
Q-3	158	529.0	0.8	8890	25.0	1000	7.0	1140	6.0	231.0	2090	108.0	96.2
Q-4	124	594.0	0.8	13900	27.0	1130	8.0	1370	4.0	172.0	1590	116.0	117.0

TABLE 1c SEDIMENT TRACE METAL ANALYSIS - GRAB SAMPLES, MARCH 1984
SURF INLET

STATION	DEPTH (m)	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	Hg	Mg
S-1		19200	28.0	74.9	0.2	25300	0.9	4.8	26.5	31.4	22000	0.150	9970
S-2		15700	8.0	65.0	0.2	50700	0.9	10.6	22.5	23.9	16900	0.092	7290
S-3		21400	22.0	81.5	0.2	31500	1.3	9.4	30.7	36.3	22200	0.149	11100

STATION	DEPTH (m)	Mn	Mo	Na	Ni	P	Pb	Si	Sn	Sr	Ti	V	Zn
S-1		357.0	0.8	17000	16.0	1320	3.0	2250	2.0	148.0	1520	71.0	74.6
S-2		219.0	0.8	15700	21.0	975	10.0	2290	2.0	252.0	822	53.0	66.9
S-3		255.0	0.8	26000	23.0	1240	10.0	1930	2.0	190.0	1270	73.0	82.3

TABLE 1d SEDIMENT TRACE METAL ANALYSIS - GRAB SAMPLES, MARCH 1984
LAREDO SOUND

STATION	DEPTH (m)	Al	As	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	Hg	Mg
L-2		22600	8.0	101.0	0.2	54100	1.0	11.4	35.4	36.6	21600	0.230	12200
L-2		22900	8.0	103.0	0.2	53900	1.1	9.4	34.8	35.9	21400	0.164	12200

STATION	DEPTH (m)	Mn	Mo	Na	Ni	P	Pb	Si	Sn	Sr	Ti	V	Zn
L-2		281.0	0.8	23500	32.0	1110	11.0	2450	2.0	295.0	1120	63.0	97.8
L-2		277.0	0.8	21900	33.0	1120	12.0	2270	2.0	296.0	1110	62.0	102.0

TABLE 2 SEDIMENT TRACE METAL ANALYSIS - SEDIMENT CORES - QUATSINO SOUND, MARCH 1984

STATION	DEPTH (m)	CORE DEPTH (cm)	Al	As	Ba	Cd	Cr	Cu	Fe	Hg	Mg	Mn	Mo	Ni	Pb	Zn
Q-4	124	0-2	32000	16.0	46.8	1.4	59.6	140.0	38800	0.08	16200	601.0	0.8	32.0	13.0	122.0
		10-12	29200	14.0	43.4	1.5	51.0	51.1	33800	0.13	13700	364.0	0.3	34.0	6.0	104.0
		20-22	28250	8.0	41.6	1.6	49.8	39.6	33300	0.08	13200	354.0	0.8	34.0	4.0	96.5
		30-32	29200	12.0	41.9	2.4	52.1	39.0	34300	0.07	13600	360.0	0.8	36.0	5.0	101.0
		40-42	29100	8.0	40.3	2.2	52.9	38.2	33800	0.08	13700	360.0	0.8	37.0	3.0	98.9
		50-52	28300	8.0	38.1	2.4	50.4	36.4	36000	0.06	13800	395.0	0.8	37.0	3.0	97.4

TABLE 3 MEAN TRACE METALS IN SHRIMP AND PRAWNS FROM BARKLEY SOUND, MARCH 1984 (ug/g dry wt.)

STATION		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
CRANGON SHRIMP – Crangon communis – MUSCLE															
B-1	MEAN(12)	29.7	43.6	0.32	0.20	0.6	16.2	52.6	0.10	2075	2.0	0.5	2.0	0.82	45.5
	S.D.	15.3	8.0	0.17	0.06	0.2	2.9	19.9	0.06	428	0.5	0.1	0.4	0.54	13.9
	VAR.	233.3	63.4	0.03	0.00	0.0	8.6	397.6	0.00	183245	0.3	0.0	0.2	0.30	191.9
	MAX.	63.0	61.0	0.67	0.28	1.2	20.1	105.0	0.21	2790	3.2	0.7	3.0	1.90	59.9
	MIN.	15.0	33.0	0.10	0.07	0.5	10.9	33.7	0.02	1330	1.1	0.3	1.0	0.20	23.3
CRANGON SHRIMP – Crangon communis – HEPATOPANCREAS															
B-1	VALUE	54.0	174.0	0.40	40.30	1.6	1090.0	567.0		1240	14.5	3.2	17.0	1.40	236.0
SIDESTRIPE SHRIMP – Pandalopsis dispar – MUSCLE															
B-1	MEAN(37)	15.1	42.6	0.14	0.13	0.5	14.2	23.1	0.11	1580	1.2	0.4	2.0	0.63	48.2
	S.D.	11.8	22.1	0.05	0.10	0.3	4.2	11.1	0.06	571	0.3	0.0	0.0	0.61	15.7
	VAR.	140.2	488.2	0.00	0.01	0.1	17.4	123.2	0.00	325583	0.1	0.0	0.0	0.37	246.5
	MAX.	71.0	165.0	0.30	0.69	2.0	34.2	54.9	0.26	4770	2.7	0.5	2.0	2.73	135.0
	MIN.	4.0	28.0	0.08	0.06	0.4	8.4	11.3	0.02	1060	0.8	0.4	2.0	0.08	34.6
SIDESTRIPE SHRIMP – Pandalopsis dispar – HEPATOPANCREAS															
B-1	MEAN (2)	20.0	50.5	0.27	19.70	0.5	846.0	76.9	0.27	559	10.7	0.8	2.0	0.72	104.0
	S.D.	4.2	4.9	0.01	5.52	0.1	66.5	1.2	0.03	18	0.2	0.1	0.0	0.45	5.7
	MAX.	23.0	54.0	0.28	23.60	0.6	893.0	77.7	0.29	572	10.9	0.8	2.0	1.04	108.0
	MIN.	17.0	47.0	0.26	15.80	0.4	799.0	76.0	0.25	546	10.5	0.7	2.0	0.40	100.0
PINK SHRIMP – Pandalus borealis – MUSCLE															
B-1	MEAN(35)	16.9	52.9	0.17	0.15	0.5	10.6	30.9	0.17	1646	1.4	0.4	5.6	0.75	44.1
	S.D.	14.9	12.5	0.15	0.12	0.2	1.9	34.1	0.08	177	0.6	0.0	10.3	0.51	5.4
	VAR.	220.6	157.2	0.02	0.02	0.0	3.6	1162.4	0.01	31472	0.4	0.0	106.8	0.26	29.4
	MAX.	65.0	83.0	0.73	0.83	1.3	14.9	181.0	0.47	2060	4.2	0.5	43.0	1.83	53.4
	MIN.	4.0	30.0	0.08	0.07	0.4	6.9	6.5	0.03	1300	0.8	0.4	2.0	0.08	35.9

TABLE 3 Mean Trace Metals in Shrimp and Prawns from Barkley Sound (Continued)

STATION		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
PINK SHRIMP – Pandalus borealis – HEPATOPANCREAS															
B-1	VALUE	37.0	99.0	0.84	0.20	0.8	1460.0	302.0	0.84	1150	16.3	1.4	3.0	1.02	171.0
PRAWN – Pandalus platyceros – MUSCLE															
B-1	MEAN(12)	10.3	64.7	0.10	0.11	0.5	14.1	21.1	0.12	1641	1.02	0.4	7.4	0.68	48.4
	S.D.	6.8	18.8	0.02	0.05	0.1	2.7	10.8	0.08	110	0.20	0.0	12.7	0.51	4.6
	VAR.	45.8	353.3	0.00	0.00	0.0	7.2	116.5	0.01	12081	0.04	0.0	160.4	0.26	21.4
	MAX.	25.0	99.0	0.13	0.16	0.6	19.2	38.4	0.26	1840	1.32	0.4	36.0	1.37	53.8
	MIN.	4.0	32.0	0.08	0.04	0.4	10.7	7.6	0.02	1410	0.74	0.4	2.0	0.11	42.3
PRAWN – Pandalus platoceros – HEPATOPANCREAS															
B-1	MEAN (5)	7.0	45.6	0.24	4.40	0.6	458.8	396.9		479	8.15	1.1	4.8	0.61	102.9
	S.D.	3.0	15.2	0.12	1.65	0.2	142.7	256.7		169	2.65	0.7	2.6	0.38	36.2
	VAR.	9.0	230.3	0.01	2.71	0.0	2037.4	6590.8		28464	7.04	0.4	6.7	0.14	1312.9
	MAX.	11.0	63.0	0.40	6.50	0.9	571.0	643.0		770	11.50	2.1	9.0	1.10	142.0
	MIN.	4.0	23.0	0.08	2.70	0.4	213.0	84.4		336	4.20	0.4	2.0	0.30	45.8
CRANGON SHRIMP – Crangon communis -MUSCLE															
B-2	MEAN(16)	44.6	36.0	0.34	0.10	0.6	19.9	81.9	0.12	1492	7.33	0.5	2.0	0.61	55.3
	S.D.	31.9	15.3	0.24	0.04	0.2	9.2	58.5	0.11	633	5.40	0.1	0.0	0.61	28.9
	VAR.	1020.3	232.8	0.06	0.00	0.0	83.9	3425.0	0.01	400768	29.14	0.0	0.0	0.37	836.8
	MAX.	99.0	59.0	0.84	0.15	0.9	32.2	183.0	0.40	2380	17.60	0.5	2.0	1.58	107.0
	MIN.	7.0	17.0	0.09	0.05	0.4	8.4	20.4	0.02	586	1.94	0.4	2.0	0.08	24.6
SIDESTRIPE SHRIMP – Pandalopsis dispar -MUSCLE															
B-2	MEAN(23)	22.0	60.8	0.16	0.10	0.5	16.2	35.7	0.10	1568	1.96	0.4	2.3	0.60	48.0
	S.D.	9.3	7.4	0.08	0.04	0.1	2.8	9.8	0.07	214	0.71	0.0	0.9	0.53	5.6
	VAR.	85.9	55.0	0.01	0.00	0.0	7.9	96.0	0.01	45781	0.50	0.0	0.7	0.28	31.3
	MAX.	52.0	75.0	0.46	0.18	0.6	21.5	65.2	0.28	2110	4.84	0.4	5.0	1.56	56.2
	MIN.	4.0	45.0	0.08	0.05	0.4	12.3	21.5	0.02	1210	1.34	0.4	2.0	0.08	39.4

CONTINUED...

Table 3 Mean Trace Metals in Shrimp and Prawns From Barkley Sound, March, 1984. (Continued)

(ug/g dry wt.)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
SIDESTRIPE SHRIMP - Pandalopsis dispar					-HEPATOPANCREAS										
B-2	VALUE	38.0	92.0	0.25	31.80	0.4	1050.0	113.0		695	13.90	0.4	2.0	0.08	134.0
PINK SHRIMP -Pandalus borealis					-MUSCLE										
B-2	MEAN(17)	23.9	60.6	0.17	0.12	0.5	16.4	40.5	0.67	1858	2.21	0.4	2.0	0.80	52.0
	S.D.	13.1	17.9	0.11	0.06	0.1	5.3	17.0	2.08	357	0.70	0.0	0.0	0.58	9.2
	VAR.	170.3	321.9	0.01	0.00	0.0	28.6	290.1	4.34	127762	0.49	0.0	0.0	0.33	83.7
	MAX.	60.0	90.0	0.50	0.26	0.7	27.7	81.9	8.20	2490	3.60	0.5	2.0	1.66	62.5
	MIN.	7.0	20.0	0.09	0.04	0.4	6.5	13.5	0.02	782	0.86	0.4	2.0	0.08	20.5
PINK SHRIMP -Pandalus borealis					-HEPATOPANCREAS										
B-2	VALUE	59.0	182.0	0.93	34.20	0.9	2020.0	489.0		1320	25.80	1.8	3.0	1.31	189.0
PRAWN -Pandalus platyceros					-MUSCLE										
B-2	MEAN(7)	9.0	75.1	0.10	0.11	0.5	19.6	19.9	0.14	1636	1.35	0.4	2.0	0.72	49.3
	S.D.	1.4	29.5	0.02	0.05	0.1	3.3	4.4	0.08	55	0.37	0.0	0.0	0.57	5.7
	VAR.	2.0	870.1	0.00	0.00	0.0	11.1	19.4	0.01	3029	0.14	0.0	0.0	0.32	32.0
	MAX.	11.0	119.0	0.13	0.15	0.6	24.8	25.6	0.28	1750	1.95	0.4	2.0	1.25	57.9
	MIN.	7.0	42.0	0.08	0.04	0.4	15.1	13.4	0.03	1580	1.05	0.4	2.0	0.11	43.5
PRAWN -Pandalus platyceros					-HEPATOPANCREAS										
B-2	MEAN(5)	21.6	70.0	0.40	7.30	1.1	709.8	812.8		978	17.08	2.0	10.2	1.26	148.0
	S.D.	9.5	21.3	0.19	1.90	0.2	178.8	308.6		441	5.19	1.2	4.4	0.67	35.4
	VAR.	90.3	452.0	0.04	3.62	0.1	31968	95207		194120	26.93	1.4	19.7	0.44	1256.0
	MAX.	30.0	92.0	0.60	10.50	1.4	865.0	1290.0		1620	25.30	3.4	15.0	1.90	207.0
	MIN.	10.0	40.0	0.20	5.90	0.9	498.0	490.0		660	12.40	0.9	6.0	0.50	119.0

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.

(ug/g dry wt.)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						REX SOLE -Glyptocephalus zachirus						-MUSCLE			
B-1	MEAN(3)	4.0	76.3	0.08	0.16	1.0	0.4	13.1	0.16	1270	0.82	0.4	2.0	1.89	14.9
	S.D.	0.0	20.4	0.00	0.02	0.2	0.0	1.6	0.07	60	0.16	0.0	0.0	0.11	1.0
	VAR.	0.0	416.3	0.00	0.00	0.0	0.0	2.5	0.00	3600	0.02	0.0	0.0	0.01	0.9
	MAX.	4.0	94.0	0.08	0.17	1.2	0.4	14.4	0.22	1330	0.99	0.4	2.0	2.00	15.9
	MIN.	4.0	54.0	0.08	0.13	0.8	0.4	11.3	0.09	1210	0.68	0.4	2.0	1.78	14.0
						FLAT HEAD SOLE -Hippoglossoides ellasodon						-MUSCLE			
B-1	MEAN(6)	4.2	52.7	0.09	0.18	0.7	1.6	17.0	0.84	1258	0.87	0.4	2.0	2.00	18.6
	S.D.	0.4	13.7	0.02	0.06	0.1	0.9	9.4	0.32	96	0.73	0.0	0.0	0.00	1.5
	VAR.	0.2	187.9	0.00	0.00	0.0	0.9	89.0	0.10	9177	0.53	0.0	0.0	0.00	2.4
	MAX.	5.0	76.0	0.14	0.26	0.8	3.0	32.7	1.17	1380	2.34	0.4	2.0	2.00	21.7
	MIN.	4.0	40.0	0.08	0.12	0.5	0.5	7.1	0.40	1170	0.46	0.4	2.0	2.00	17.6
						FLAT HEAD SOLE -Hippoglossoides ellasodon						-MUSCLE			
B-2	MEAN(2)	5.5	190.5	0.17	0.16	0.7	1.1	15.7	0.33	1405	1.81	0.4	2.0	2.00	20.7
	S.D.	2.1	44.5	0.13	0.01	0.3	0.5	2.0	0.08	21	1.04	0.0	0.0	0.00	2.1
	MAX.	7.0	222.0	0.26	0.17	0.9	1.4	17.1	0.39	1420	2.54	0.4	2.0	2.00	22.1
	MIN.	4.0	159.0	0.08	0.15	0.5	0.7	14.3	0.27	1390	1.07	0.4	2.0	2.00	19.2

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.
(Continued: Page 2)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						FLAT HEAD SOLE -Hippoglossoides ellasodon -LIVER									
B-1	MEAN(5)	5.0	235.6	0.15	3.88	0.6	24.8	1618.4	0.37	621	3.40	0.4	2.0	1.21	118.2
	S.D.	1.4	145.2	0.16	1.36	0.2	30.4	1010.8	0.14	269	0.57	0.0	0.0	0.64	49.5
	VAR.	2.0	21096	0.02	1.85	0.0	924.4	1E+06	0.02	72368	0.33	0.0	0.0	0.40	2453.2
	MAX.	7.0	425.0	0.43	6.20	0.9	75.1	3390.0	0.55	921	3.91	0.4	2.0	2.00	183.0
	MIN.	4.0	75.0	0.08	2.90	0.4	3.6	957.0	0.19	293	2.45	0.4	2.0	0.52	61.0
						FLAT HEAD SOLE -Hippoglossoides ellasodon -LIVER									
B-2	MEAN(2)	10.0	127.0	0.09	2.65	0.6	221.0	622.0	0.42	901	7.50	0.5	2.0	1.88	172.0
	S.D.	8.5	24.0	0.01	1.91	0.1	80.6	746.8	0.24	17	1.00	0.1	0.0	0.17	25.5
	MAX.	16.0	144.0	0.09	4.00	0.7	278.0	1150.0	0.59	913	8.20	0.6	2.0	2.00	190.0
	MIN.	4.0	110.0	0.08	1.30	0.5	164.0	93.9	0.25	889	6.79	0.4	2.0	1.76	154.0
						FLAT HEAD SOLE -Hippoglossoides ellasodon -GILL									
B-1	MEAN(5)	257.2	11.0	1.57	0.28	1.9	3.4	536.0	0.11	1318	12.86	0.5	2.0	2.55	74.7
	S.D.	262.1	1.6	1.10	0.36	0.7	1.3	457.4	0.16	274	5.33	0.1	0.0	2.12	11.1
	VAR.	68690	2.5	1.22	0.13	0.4	1.8	209209	0.02	75170	28.44	0.0	0.0	4.50	122.9
	MAX.	680.0	13.0	3.39	0.90	2.9	5.1	1240.0	0.34	1730	18.70	0.5	2.0	6.00	82.5
	MIN.	44.0	9.0	0.60	0.02	1.4	1.7	123.0	0.02	960	7.40	0.4	2.0	0.53	57.3

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.
(Continued: Page 3)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							FLAT HEAD SOLE -*Hippoglossoides ellasodon* -GILL								
B-2	MEAN(2)	63.0	25.5	0.75	0.10	1.4	4.8	181.5	0.1	1195	22.85	0.5	3.0	0.85	77.9
	S.D.	15.6	19.1	0.64	0.07	0.3	1.8	61.5		318	15.20	0.0	1.4	0.92	15.0
	MAX.	74.0	39.0	1.20	0.15	1.6	6.0	225.0		1420	33.60	0.5	4.0	1.50	88.5
	MIN.	52.0	12.0	0.30	0.05	1.2	3.5	138.0		970	12.10	0.5	2.0	0.20	67.3
							SLENDER SOLE -*Lyopsetta exilis* -MUSCLE								
B-1	MEAN(4)	4.0	9.8	0.14	0.15	0.9	0.8	18.0	0.34	1308	0.53	0.4	2.0	3.14	15.4
	S.D.	0.0	4.3	0.05	0.02	0.5	0.7	4.7	0.18	26	0.20	0.0	0.0	2.00	0.8
	VAR.	0.0	18.2	0.00	0.00	0.2	0.5	22.1	0.03	692	0.04	0.0	0.0	4.00	0.7
	MAX.	4.0	16.0	0.18	0.17	1.6	1.9	23.5	0.55	1330	0.80	0.4	2.0	6.00	16.0
	MIN.	4.0	7.0	0.08	0.12	0.6	0.4	13.3	0.12	1270	0.35	0.4	2.0	1.60	14.2
							SLENDER SOLE -*Lyopsetta exilis* -MUSCLE								
B-2	MEAN(2)	16.0	22.0	0.29	0.13	1.1	1.1	41.0	0.66	1395	3.98	0.4	2.0	2.04	20.3
	S.D.	5.7	17.0	0.27	0.03	0.2	0.6	32.5	0.71	49	3.79	0.0	0.0	0.05	0.0
	MAX.	20.0	34.0	0.48	0.15	1.2	1.5	63.9	1.16	1430	6.66	0.4	2.0	2.07	20.3
	MIN.	12.0	10.0	0.10	0.11	0.9	0.6	18.0	0.15	1360	1.30	0.4	2.0	2.00	20.3

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.
(Continued: Page 4)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						SLENDER SOLE -Lyopsetta exilis -LIVER									
B-1	MEAN(5)	4.0	22.4	0.08	0.59	0.8	15.6	815.2	0.16	979	3.08	0.4	7.2	1.76	98.6
	S.D.	0.0	16.8	0.00	0.59	0.5	5.2	364.7	0.07	227	0.70	0.0	11.6	0.23	10.1
	VAR.	0.0	283.3	0.00	0.35	0.3	27.3	133023	0.00	51597	0.49	0.0	135.2	0.05	102.0
	MAX.	4.0	52.0	0.08	1.60	1.7	23.0	1300.0	0.25	1350	3.86	0.4	28.0	2.00	110.0
	MIN.	4.0	10.0	0.08	0.11	0.5	10.7	385.0	0.10	764	2.07	0.4	2.0	1.48	83.5
						SLENDER SOLE -Lyopsetta exilis -GILL									
B-1	MEAN(5)	29.2	6.2	3.93	0.04	4.9	2.5	141.0		1644	9.85	0.4	5.0	0.84	80.4
	S.D.	2.9	1.9	2.02	0.01	6.9	0.4	49.6		196	2.52	0.1	6.7	0.43	7.9
	VAR.	8.7	3.7	4.06	0.00	47.1	0.2	2462.5		38330	6.33	0.0	45.0	0.18	61.9
	MAX.	32.0	9.0	7.27	0.05	17.2	2.9	227.0		1820	12.20	0.5	17.0	1.39	92.9
	MIN.	25.0	4.0	2.05	0.04	1.7	1.9	101.0		1350	6.00	0.4	2.0	0.47	71.5
						DOVER SOLE -Microstomus pacificus -MUSCLE									
B-2	MEAN(5)	5.0	68.2	0.08	0.16	0.6	0.6	16.5	0.15	1226	0.82	0.4	2.0	1.75	17.1
	S.D.	2.2	35.9	0.00	0.03	0.1	0.1	4.3	0.05	53	0.13	0.0	0.0	0.21	1.7
	VAR.	5.0	1286.7	0.00	0.00	0.0	0.0	18.1	0.00	2830	0.02	0.0	0.0	0.05	2.8
	MAX.	9.0	125.0	0.08	0.21	0.8	0.8	22.3	0.23	1300	1.03	0.4	2.0	2.00	19.7
	MIN.	4.0	35.0	0.08	0.13	0.5	0.5	12.7	0.10	1170	0.69	0.4	2.0	1.41	15.2

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.
(Continued: Page 5)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						DOVER SOLE -Microstomus pacificus						-LIVER			
B-2	MEAN(3)	43.0	10.7	0.19	2.80	0.6	52.1	1310.3	0.28	604	6.59	0.5	4.0	1.64	164.3
	S.D.	63.2	7.4	0.18	2.02	0.3	3.7	808.3	0.25	173	4.76	0.1	3.5	0.62	36.0
	VAR.	3997.0	54.3	0.03	4.09	0.1	13.3	653410	0.06	29996	22.66	0.0	12.0	0.38	1297.3
	MAX.	116.0	19.0	0.40	5.10	1.0	54.7	2200.0	0.46	718	11.90	0.5	8.0	2.00	189.0
	MIN.	6.0	5.0	0.08	1.30	0.4	47.9	621.0	0.10	405	2.70	0.4	2.0	0.93	123.0
						DOVER SOLE -Microstomus pacificus						-GILL			
B-2	MEAN(4)	132.0	8.0	1.37	0.24	1.8	6.4	543.5		1455	15.18	0.6	2.3	1.14	80.2
	S.D.	64.8	0.8	0.90	0.13	0.3	2.5	316.2		331	3.90	0.1	0.5	0.54	18.6
	VAR.	4195.3	0.7	0.80	0.02	0.1	6.1	99988		109700	15.22	0.0	0.3	0.29	345.5
	MAX.	194.0	9.0	2.57	0.34	2.2	9.2	1000.0		1910	20.10	0.8	3.0	1.60	108.0
	MIN.	67.0	7.0	0.40	0.05	1.6	4.0	274.0		1190	11.80	0.5	2.0	0.37	69.6
						ENGLISH SOLE -Parophrys vetulus						-MUSCLE			
B-1	MEAN(7)	4.0	132.9	0.12	0.19	1.3	2.1	29.5	0.28	1229	0.92	0.4	2.0	1.86	21.7
	S.D.	0.0	80.0	0.10	0.07	1.3	0.9	22.8	0.18	74	1.02	0.0	0.0	0.21	2.4
	VAR.	0.0	6399.5	0.01	0.01	1.7	0.9	521.1	0.03	5448	1.04	0.0	0.0	0.04	5.9
	MAX.	4.0	277.0	0.34	0.33	4.2	3.2	72.1	0.63	1300	3.22	0.4	2.0	2.03	25.3
	MIN.	4.0	61.0	0.08	0.13	0.6	0.8	7.4	0.10	1080	0.34	0.4	2.0	1.49	19.4

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.
(Continued: Page 6)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						ENGLISH SOLE -Parophrys vetulus -MUSCLE									
B-2	VALUE	<4.0	51.0	0.18	0.14	0.6	0.8	17.8	0.14	1150	1.43	<0.4	<2.0	1.76	17.6
						ENGLISH SOLE -Parophrys vetulus -LIVER									
B-1	MEAN(5)	9.6	43.6	0.08	1.08	0.6	37.3	658.6	0.10	728	5.16	0.4	2.6	1.73	172.6
	S.D.	3.4	22.0	0.00	0.52	0.2	11.2	205.9	0.05	135	2.00	0.1	1.3	0.26	42.2
	VAR.	11.8	484.3	0.00	0.27	0.0	125.8	42401	0.00	18166	4.00	0.0	1.8	0.07	1777.3
	MAX.	13.0	72.0	0.08	1.60	0.8	48.5	896.0	0.18	966	8.52	0.5	5.0	2.00	238.0
	MIN.	4.0	15.0	0.08	0.21	0.4	19.9	433.0	0.06	635	3.51	0.4	2.0	1.46	120.0
						ENGLISH SOLE -Parophrys vetulus -GILL									
B-1	MEAN(5)	94.4	10.8	0.65	0.14	0.9	3.5	297.3	0.04	1206	9.95	0.4	6.2	1.56	69.4
	S.D.	62.9	11.4	0.07	0.04	0.3	1.2	132.5	0.04	214	2.44	0.0	9.4	0.28	12.5
	VAR.	3955.3	129.7	0.01	0.00	0.1	1.4	17543	0.00	45687	5.95	0.0	88.2	0.08	156.9
	MAX.	182.0	31.0	0.74	0.17	1.2	4.5	454.0	0.10	1420	13.40	0.5	23.0	1.94	77.5
	MIN.	15.0	4.0	0.54	0.07	0.5	1.6	89.6	0.02	898	7.15	0.4	2.0	1.21	47.8

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.
(Continued: Page 7)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						STARRY FLOUNDER -Platichthys stellatus -MUSCLE									
B-1	VALUE	<4.0	28.0	0.10	0.19	0.5	2.8	11.6	0.20	1290	0.50	<0.4	<2.0	<2.00	15.7
						PACIFIC HAKE -Merluccius productus -MUSCLE									
B-1	MEAN(5)	4.2	12.2	0.11	0.18	1.5	2.1	23.9	0.09	1430	0.69	0.4	2.0	1.86	14.8
	S.D.	0.4	4.4	0.05	0.03	2.0	0.8	21.5	0.07	80	0.18	0.0	0.0	0.15	1.0
	VAR.	0.2	19.7	0.00	0.00	4.2	0.7	464.3	0.00	6400	0.03	0.0	0.0	0.02	0.9
	MAX.	5.0	16.0	0.19	0.22	5.2	3.5	62.1	0.17	1530	1.00	0.4	2.0	1.99	16.2
	MIN.	4.0	5.0	0.08	0.14	0.5	1.5	9.6	0.03	1340	0.55	0.4	2.0	1.64	13.8
						PACIFIC HAKE -Merluccius productus -MUSCLE									
B-2	MEAN(3)	4.3	11.0	0.08	0.15	1.9	2.0	30.0	0.07	1600	1.13	0.4	2.0	2.00	17.3
	S.D.	0.6	1.0	0.00	0.02	2.0	0.6	19.4	0.05	82	0.24	0.0	0.0	0.00	2.0
	VAR.	0.3	1.0	0.00	0.00	4.1	0.3	375.4	0.00	6700	0.06	0.0	0.0	0.00	4.0
	MAX.	5.0	12.0	0.08	0.17	4.2	2.5	52.2	0.11	1690	1.40	0.4	2.0	2.00	18.7
	MIN.	4.0	10.0	0.08	0.14	0.7	1.4	16.5	0.02	1530	0.97	0.4	2.0	2.00	15.0

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.
(Continued: Page 8)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						PACIFIC HAKE -Merluccius productus -LIVER									
B-1	MEAN(5)	4.0	13.2	0.08	0.35	0.4	14.3	232.6	0.06	255	6.69	0.4	7.6	0.50	67.7
	S.D.	0.0	6.7	0.00	0.15	0.0	8.6	110.8	0.02	117	3.59	0.0	11.4	0.29	24.9
	VAR.	0.0	45.2	0.00	0.02	0.0	74.0	12275	0.00	13763	12.87	0.0	130.8	0.08	621.4
	MAX.	4.0	24.0	0.08	0.50	0.4	28.4	387.0	0.10	411	12.70	0.4	28.0	0.86	101.0
	MIN.	4.0	6.0	0.08	0.10	0.4	5.8	79.0	0.05	107	3.23	0.4	2.0	0.20	37.1
						PACIFIC HAKE -Merluccius productus -LIVER									
B-2	MEAN(2)	4.0	12.0	0.08	0.70	0.4	25.0	229.0	0.05	243	7.80	0.4	2.0	0.80	88.2
	S.D.	4.0	14.0	0.08	0.95	0.4	32.1	411.0	0.08	387	12.50	0.5	16.0	0.99	143.6
	VAR.	0.0	2.8	0.00	0.35	0.0	10.0	257.4	0.04	203	6.65	0.1	19.8	0.27	78.3
	MAX.	4.0	16.0	0.08	1.20	0.4	39.1	593.0	0.10	530	17.20	0.6	30.0	1.18	199.0
	MIN.	4.0	12.0	0.08	0.70	0.4	25.0	229.0	0.05	243	7.80	0.4	2.0	0.80	88.2
						PACIFIC HAKE -Merluccius productus -GILL									
B-1	MEAN(4)	231.0	6.0	1.18	0.16	1.2	5.5	584.3	0.02	1215	10.72	0.4	17.8	3.69	92.3
	S.D.	84.8	1.8	0.49	0.02	0.3	0.2	157.8	0.00	126	1.97	0.0	28.3	3.14	16.0
	VAR.	7192.7	3.3	0.24	0.00	0.1	0.0	24900	0.00	15833	3.89	0.0	798.9	9.85	254.5
	MAX.	342.0	8.0	1.92	0.18	1.6	5.7	746.0	0.03	1360	13.10	0.4	60.0	8.00	110.0
	MIN.	149.0	4.0	0.91	0.14	1.0	5.2	432.0	0.02	1100	8.54	0.4	2.0	1.08	72.0

TABLE 4. Mean Trace Metals in Fish From Barkley Sound, March 1984.
(Continued: Page 9)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						PACIFIC HAKE -Merluccius productus -GILL									
B-2	MEAN(2)	543.5	5.5	1.95	0.14	1.9	8.2	1050.5	0.02	1545	24.85	0.4	2.0	1.19	116.5
	S.D.	600.3	0.7	0.05	0.02	0.9	1.9	932.7	0.00	318	14.50	0.0	0.0	0.06	19.1
	MAX.	968.0	6.0	1.98	0.15	2.5	9.5	1710.0	0.02	1770	35.10	0.4	2.0	1.23	130.0
	MIN.	119.0	5.0	1.91	0.12	1.2	6.8	391.0	0.02	1320	14.60	0.4	2.0	1.14	103.0
						LONGNOSE SKATE -Raja rhina -MUSCLE									
B-2	VALUE	9.0	137.0	0.71	0.11	0.7	8.4	31.2	0.69	1010	2.85	<0.4	<2.0	1.47	31.5
						GREENSTRIPED ROCKFISH -Sebastes elongatus -MUSCLE									
B-2	VALUE	5.0	14.0	<0.08	0.11	2.9	1.4	46.5	0.48	1320	1.05	<0.4	<2.0	1.55	14.7
						GREENSTRIPED ROCKFISH -Sebastes elongatus -LIVER									
B-2	VALUE	<4.0	10.0	<0.08	2.10	0.7	25.4	921.0	0.13	362	3.27	<0.4	<2.0	1.15	163.0
						GREENSTRIPED ROCKFISH -Sebastes elongatus -GILL									
B-2	VALUE	33.0	7.0	0.34	0.16	23.5	7.1	381.0		981	5.25	0.5	<2.0	1.82	94.4

Table 5. Mean Trace Metals in Shrimp From Quatsino Sound, March 1984.

MEAN VALUES (ug/g dry wt.)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
CRANGON SHRIMP -Crangon communis -MUSCLE															
Q-2	MEAN(4)	16.3	44.0	0.35	0.39	0.7	20.0	34.3	0.09	1940	1.88	0.6	2.5	0.85	56.6
	S.D.	7.0	29.5	0.31	0.18	0.2	10.5	12.3	0.09	1187	0.96	0.3	1.0	0.86	28.6
	VAR.	48.3	867.3	0.10	0.03	0.1	109.3	150.9	0.01	1E+06	0.93	0.1	1.0	0.73	818.3
	MAX.	24.0	70.0	0.80	0.66	1.0	35.0	46.2	0.15	3480	3.20	1.0	4.0	2.00	84.1
	MIN.	9.0	18.0	0.11	0.27	0.5	12.4	20.8	0.02	789	0.89	0.4	2.0	0.10	24.4
SIDESTRIPE SHRIMP -Pandalopsis dispar -MUSCLE															
Q-2	MEAN(32)	12.4	62.9	0.11	0.12	0.5	12.3	24.5	0.17	1863	2.01	0.4	3.9	0.69	48.8
	S.D.	5.9	11.5	0.04	0.04	0.1	3.0	10.7	0.08	220	1.90	0.0	8.2	0.55	4.7
	VAR.	35.1	131.5	0.00	0.00	0.0	8.9	115.1	0.01	48422	3.60	0.0	67.4	0.30	21.8
	MAX.	26.0	85.0	0.20	0.26	0.7	20.2	48.7	0.34	2320	11.50	0.5	45.0	1.57	58.0
	MIN.	4.0	37.0	0.08	0.06	0.4	5.4	8.2	0.02	1540	0.64	0.4	2.0	0.08	36.9
SIDESTRIPE SHRIMP -Pandalopsis dispar -HEPATOPANCREAS															
Q-2	MEAN(3)	24.3	135.3	0.37	0.33	0.8	1586.0	145.9	0.37	1027	15.53	1.6	4.0	0.13	127.4
	S.D.	14.2	62.1	0.16	0.00	0.2	676.9	74.7	0.15	472	6.76	0.6	1.7	0.07	57.3
	VAR.	201.3	3861.3	0.02	0.00	0.0	458000	5582.5	0.02	222433	46	0.4	3.0	0.00	3287.1
	MAX.	37.0	186.0	0.51	0.33	1.0	2040.0	190.0	0.47	1410	20.30	2.1	5.0	0.21	161.0
	MIN.	9.0	66.0	0.20	0.33	0.7	808.0	59.6	0.26	500	7.80	0.9	2.0	0.08	61.2

Table 5. Mean Trace Metals in Shrimp From Quatsino Sound, March 1984.
(Continued: Page 2)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							PINK SHRIMP -Pandalus borealis					-MUSCLE			
Q-2	MEAN(6)	20.7	44.5	0.23	0.43	3.7	22.2	60.5	0.15	1828	1.50	1.0	2.8	0.70	39.8
	S.D.	24.8	23.2	0.15	0.44	7.5	8.9	54.9	0.11	1009	1.20	1.0	1.6	0.47	24.1
	VAR.	6E+02	538.7	0.02	0.19	56.1	79.8	3E+03	0.01	1E+06	1	1.0	2.6	0.22	579.2
	MAX.	70.0	86.0	0.50	1.30	19.0	30.4	129	0.33	3390	3.6	3.0	6.0	1.29	83.5
	MIN.	5.0	25.0	0.10	0.13	0.5	9.5	6.6	0.07	700	0.40	0.5	2.0	0.10	18.4
							PINK SHRIMP -Pandalus borealis					-MUSCLE			
Q-3	MEAN(20)	22.9	58.4	0.17	0.12	0.5	10.2	50.3	0.21	1691	2.12	0.4	2.0	0.70	42.8
	S.D.	13.7	21.6	0.06	0.05	0.2	2.3	35.6	0.14	363	1.16	0.0	0.2	0.54	8.8
	VAR.	186	465.0	0.00	0	0.0	5	1E+03	0.02	1E+05	1.3	0.0	0.1	0.29	77.0
	MAX.	52.0	102.0	0.30	0.28	1.1	15.5	142.0	0.78	2300	4.89	0.5	2.0	1.44	53.4
	MIN.	4.0	12.0	0.08	0.06	0.4	6.4	5.3	0.11	763	0.77	0.3	1.0	0.08	18.6

Table 6. Mean Trace Metals in Fish and Clams From Quatsino Sound, March 1984.

(ug/g dry wt.)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						REX SOLE -Glyptocephalus zachirus						-MUSCLE			
QS-2	MEAN(3)	10.3	117.7	0.14	0.13	0.7	1.1	19.9	0.10	1380	1.44	0.4	2.0	1.57	17.2
	S.D.	10.1	67.1	0.03	0.01	0.1	1.0	16.8	0.01	115	0.42	0.0	0.0	0.40	3.0
	VAR.	102.3	4497.3	0.00	0.00	0.0	1.0	283.5	0.00	13300	0.17	0.0	0.0	0.16	8.9
	MAX.	22.0	183.0	0.17	0.14	0.8	2.3	39.3	0.11	1500	1.90	0.4	2.0	2.00	20.4
	MIN.	4.0	49.0	0.11	0.12	0.6	0.4	9.1	0.09	1270	1.09	0.4	2.0	1.22	14.5
						REX SOLE -Glyptocephalus zachirus						-LIVER			
QS-2	VALUE	14.0	162.0	<0.08	0.80	0.7	5.7	352.0	0.12	852	5.97	<0.4	<2.0	<2.00	104.0
						FLATHEAD SOLE -Hippoglossoides ellasodon						-MUSCLE			
QS-2	VALUE	<4.0	42.0	0.10	0.14	0.7	1.1	16.8	0.39	1450	0.93	<0.4	<2.0	<2.00	18.9
						SLENDER SOLE -Lyopsetta exilis						-MUSCLE			
QS-2	MEAN(2)	5.5	40.0	0.09	0.12	0.6	0.7	24.9	0.17	1355	0.74	0.4	2.0	1.97	14.4
	S.D.	2.1	5.7	0.01	0.00	0.1	0.2	22.6	0.03	35	0.13	0.0	0.0	0.09	0.4
	MAX.	7.0	44.0	0.09	0.12	0.7	0.8	40.8	0.19	1380	0.83	0.4	2.0	2.03	14.6
	MIN.	4.0	36.0	0.08	0.12	0.5	0.5	8.9	0.15	1330	0.65	0.4	2.0	1.90	14.1

Table 6. Mean Trace Metals in Fish and Clams From Quatsino Sound, March 1984.
(Continued: Page 2)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							DOVER SOLE -Microstomus pacificus					-MUSCLE			
QS-2	MEAN(7)	4.0	121.4	0.17	0.15	0.6	1.6	11.3	0.22	1239	1.44	0.4	2.0	2.85	17.9
	S.D.	0.0	78.1	0.15	0.03	0.1	1.4	2.9	0.08	91	1.14	0.0	0.0	2.72	4.1
	VAR.	0.0	6100.0	0.02	0.00	0.0	2.1	8.5	0.01	8314	1.31	0.0	0.0	7.37	16.9
	MAX.	4.0	236.0	0.49	0.19	0.7	4.2	16.5	0.33	1360	3.70	0.4	2.0	9.00	26.9
	MIN.	4.0	38.0	0.08	0.11	0.4	0.4	8.4	0.13	1100	0.56	0.4	2.0	1.63	15.0
							DOVER SOLE -Microstomus pacificus					-LIVER			
QS-2	MEAN(6)	6.2	21.7	0.10	2.28	0.6	30.9	1492.3	0.17	603	4.08	0.4	2.3	1.91	174.2
	S.D.	3.4	14.9	0.04	1.50	0.2	6.3	530.5	0.18	239	0.87	0.1	0.8	0.22	33.2
	VAR.	11.8	223.1	0.00	2.25	0.0	39.4	281465	0.03	57166	0.76	0.0	0.7	0.05	1102.2
	MAX.	13.0	43.0	0.17	3.90	0.8	35.4	2100.0	0.52	1070	5.57	0.5	4.0	2.00	227.0
	MIN.	4.0	9.0	0.08	0.40	0.4	18.7	624.0	0.07	400	3.06	0.4	2.0	1.47	140.0
							DOVER SOLE -Microstomus pacificus					-GILL			
QS-2	MEAN(6)	119.3	11.0	0.65	0.16	1.2	5.2	457.2	0.04	1603	15.75	0.6	3.5	1.02	69.5
	S.D.	77.0	4.1	0.23	0.02	0.3	0.9	199.8	0.02	249	4.75	0.2	1.9	0.24	10.8
	VAR.	5924.3	16.0	0.05	0.00	0.1	0.8	39924	0.00	62066	22.57	0.0	3.5	0.06	116.0
	MAX.	249.0	17.0	0.90	0.18	1.5	6.1	784.0	0.06	1870	21.80	0.9	7.0	1.40	83.5
	MIN.	39.0	7.0	0.30	0.14	0.8	4.2	247.0	0.03	1130	8.60	0.5	2.0	0.70	54.8

Table 6. Mean Trace Metals in Fish and Clams From Quatsino Sound, March 1984.
(Continued: Page 3)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						RATFISH -Hydrolagus colliei						-MUSCLE			
QS-2	VALUE	<4.0	54.0	<0.08	0.15	0.9	0.9	12.5	0.91	1210	1.24	<0.4	<2.0	1.60	18.9
						RATFISH -Hydrolagus colliei						-GILL			
QS-2	VALUE	<5.0	21.0	0.11	0.37	0.5	4.7	272.0	0.60	842	10.80	<0.4	<2.0	1.24	63.7
						BLACK-BELLIED EELPOUT -Lycodopsis pacifica-MUSCLE									
QS-2	VALUE	12.0	45.0	5.02	0.19	0.6	1.4	26.3	0.20	1800	0.88	<0.4	<2.0	<2.00	28.5
						PACIFIC HAKE -Merluccius productus						-MUSCLE			
QS-2	VALUE	<4.0	9.0	<0.08	0.17	0.7	2.3	10.6	0.23	1550	0.61	<0.4	<2.0	<2.00	13.9
						PACIFIC HAKE -Merluccius productus						-LIVER			
QS-2	VALUE	<4.0	7.0	<0.08	0.45	0.4	25.7	127.0	0.04	320	5.65	<0.4	<2.0	1.53	204.0
						PACIFIC HAKE -Merluccius productus						-GILL			
QS-2	VALUE	<5.0	7.0	0.13	0.17	0.9	5.0	366.0		1450	4.04	<0.4	<2.0	1.24	78.6

Table 6. Mean Trace Metals in Fish and Clams From Quatsino Sound, March 1984.
(Continued: Page 4)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						LONGNOSE SKATE -*Raja rhina*						-MUSCLE			
QS-2	VALUE	<4.0	182.0	<0.08	0.16	0.5	0.9	15.1	0.64	1180	0.83	<0.4	<2.0	14.00	12.2
						LONG NOSE SKATE -*Raja rhina*						-LIVER			
QS-2	VALUE	<4.0	82.0	<0.08	0.90	<0.4	27.5	341.0	0.09	216	2.76	<0.4	<2.0	0.93	38.4
						WALLEYE POLLOCK -*Theragra chalcogramma*						-MUSCLE			
QS-2	MEAN(2)	4.0	54.0	0.15	0.35	0.6	1.4	13.9	0.27	1515	0.81	0.4	2.0	1.58	19.4
	S.D.	0.0	48.1	0.01	0.00	0.2	0.2	2.0	0.11	35	0.29	0.0	0.0	0.60	4.0
	MAX.	4.0	88.0	0.15	0.35	0.7	1.5	15.3	0.34	1540	1.01	0.4	2.0	2.00	22.2
	MIN.	4.0	20.0	0.14	0.35	0.4	1.2	12.5	0.19	1490	0.60	0.4	2.0	1.15	16.6
						WALLEYE POLLOCK -*Theragra chalcogramma*						-LIVER			
QS-2	MEAN(2)	10.0	36.5	0.08	0.20	0.5	25.0	65.0	0.04	344	4.14	0.4	2.0	1.61	56.7
	S.D.	8.5	33.2	0.00	0.01	0.1	12.3	14.7	0.01	277	0.95	0.0	0.0	0.55	7.4
	MAX.	16.0	60.0	0.08	0.20	0.5	33.7	75.4	0.05	540	4.81	0.4	2.0	2.00	61.9
	MIN.	4.0	13.0	0.08	0.19	0.4	16.3	54.6	0.03	148	3.46	0.4	2.0	1.22	51.4

Table 6. Mean Trace Metals in Fish and Clams From Quatsino Sound, March 1984.
(Continued: Page 5)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							WALLEYE POLLOCK -Theragra chalcogramma -GILL								
QS-2	MEAN(2)	25.0	11.5	0.85	0.17	0.9	8.5	397.0		1455	4.30	0.5	2.0	1.20	99.5
	S.D.	22.6	7.8	0.92	0.05	0.0	2.1	58.0		742	1.41	0.0	0.0	0.57	117.7
	MAX.	41.0	17.0	1.50	0.20	0.9	9.9	438.0		1980	5.3	0.5	2.0	1.60	112.0
	MIN.	9.0	6.0	0.20	0.13	0.9	7.0	356.0		930	3.3	0.5	2.0	0.80	87.0
							MUSSEL -Yoldia spp. -MUSCLE								
QS-3	MEAN(4)	1382.5	61.8	10.08	0.60	2.6	602.3	2495.0	0.41	5153	37.90	1.3	5.3	2.85	241.0
	S.D.	324.0	30.4	4.53	0.00	0.5	363.4	662.6	0.10	1163	12.73	0.5	1.0	2.40	112.6
	VAR.	104958	925.0	20.55	0.00	0.2	132057	438967	0.01	1E+06	161.95	0.2	0.9	5.77	12689
	MAX.	1650.0	90.0	16.60	0.60	3.0	921.0	3080.0	0.47	6710	51.80	2.0	6.0	6.10	406.0
	MIN.	980.0	20.0	6.10	0.60	2.0	102.0	1570.0	0.26	3960	26.90	1.0	4.0	0.30	152.0

Table 7. Mean Trace Metals in Shrimp and Prawns from Surf Inlet, March 1984.

(ug/g dry wt.)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					CRANGON SHRIMP -Crangon communis							-MUSCLE			
SI-2	MEAN(3)	10.0	43.7	0.21	0.36	0.5	25.8	58.3	0.04	1693	1.21	0.4	2.0	1.24	52.0
	S.D.	2.6	3.2	0.05	0.09	0.1	5.0	29.3	0.03	100	0.19	0.0	0.0	0.19	3.6
	VAR.	7.0	10.3	0.00	0.01	0.0	24.9	858.9	0.00	10033	0.04	0.0	0.0	0.03	12.7
	MAX.	12.0	46.0	0.26	0.46	0.6	29.5	89.2	0.07	1770	1.41	0.4	2.0	1.39	55.9
	MIN.	7.0	40.0	0.16	0.29	0.5	20.1	30.9	0.02	1580	1.03	0.4	2.0	1.03	48.9
					SIDESTRIPE SHRIMP -Pandalopsis dispar							-MUSCLE			
SI-2	MEAN(24)	9.3	67.1	0.18	0.14	0.5	16.4	48.4	0.11	1379	0.96	0.4	2.0	1.19	52.3
	S.D.	6.8	6.1	0.11	0.08	0.1	3.1	107.0	0.05	114	0.14	0.0	0.0	0.15	3.4
	VAR.	45.7	37.8	0.01	0.01	0.0	9.8	11450	0.00	13090	0.02	0.0	0.0	0.02	11.8
	MAX.	35.0	80.0	0.43	0.52	0.7	23.2	535.0	0.24	1640	1.38	0.4	2.0	1.54	61.8
	MIN.	4.0	57.0	0.08	0.10	0.4	10.4	13.1	0.02	1210	0.75	0.4	2.0	0.98	47.1
					SIDESTRIPE SHRIMP -Pandalopsis dispar							-HEPATOPANCREAS			
SI-2	MEAN(3)	12.7	195.7	0.30	63.83	0.6	1373.3	107.7	0.18	677	12.13	1.3	2.0	0.10	149.7
	S.D.	1.2	14.2	0.08	18.85	0.2	212.2	15.5	0.14	33	0.35	0.3	0.0	0.01	7.8
	VAR.	1.3	201.3	0.01	355.32	0.0	45033	238.8	0.02	1086	0.12	0.1	0.0	0.00	60.3
	MAX.	14.0	211.0	0.39	79.20	0.7	1520.0	123.0	0.29	713	12.50	1.6	2.0	0.11	156.0
	MIN.	12.0	183.0	0.25	42.80	0.4	1130.0	92.1	0.03	648	11.80	1.0	2.0	0.09	141.0

Table 7. Mean Trace Metals in Shrimp and Prawns from Surf Inlet, March 1984.
(Continued: Page 2)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					SIDESTRIPE SHRIMP -Pandalopsis dispar							-MUSCLE			
SI-3	MEAN(24)	10.8	84.0	0.15	0.15	0.5	14.2	26.3	0.14	1483	1.65	0.4	2.0	1.22	50.1
	S.D.	4.7	14.0	0.06	0.03	0.1	3.4	10.4	0.06	183	0.74	0.0	0.0	0.15	2.1
	VAR.	22.5	197.3	0.00	0.00	0.0	11.2	107.3	0.00	33465	0.55	0.0	0.0	0.02	4.5
	MAX.	22.0	116.0	0.33	0.25	0.7	26.1	52.0	0.29	2010	4.43	0.4	2.0	1.64	56.5
	MIN.	4.0	67.0	0.08	0.12	0.4	9.9	10.7	0.04	1230	1.04	0.4	2.0	0.93	46.8
					SIDESTRIPE SHRIMP -Pandalopsis dispar							-HEPATOPANCREAS			
SI-3	MEAN(2)	44.5	306.0	2.25	45.75	0.9	1355.0	426.5		1327	17.85	2.2	5.0	0.18	172.5
	S.D.	26.2	128.7	2.34	14.21	0.6	91.9	382.5		655	4.88	0.5	2.8	0.04	51.6
	MAX.	63.0	397.0	3.90	55.80	1.3	1420.0	697.0		1790	21.30	2.5	7.0	0.20	209.0
	MIN.	26.0	215.0	0.59	35.70	0.5	1290.0	156.0		864	14.40	1.8	3.0	0.15	136.0
					PINK SHRIMP -Pandalus borealis							-MUSCLE			
SI-2	MEAN(18)	5.9	62.3	0.17	0.13	0.6	11.0	15.4	0.13	1483	0.90	0.4	2.0	1.27	48.1
	S.D.	2.8	7.9	0.10	0.02	0.3	2.0	4.0	0.03	156	0.14	0.0	0.0	0.30	3.3
	VAR.	7.6	62.8	0.01	0.00	0.1	4.0	15.9	0.00	24480	0.02	0.0	0.0	0.09	11.2
	MAX.	15.0	76.0	0.42	0.20	1.2	14.3	23.9	0.19	1800	1.30	0.5	2.0	1.97	53.4
	MIN.	4.0	49.0	0.08	0.10	0.4	6.9	9.4	0.08	1150	0.73	0.4	2.0	0.85	39.9

Table 7. Mean Trace Metals in Shrimp and Prawns from Surf Inlet, March 1984.
(Continued: Page 3)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							PINK SHRIMP -Pandalus borealis					-HEPATOPANCREAS			
SI-2	VALUE	27.0	198.0	1.48	41.20	0.7	1280.0	513.0		901	11.70	2.5	<2.0	0.12	152.0
							PINK SHRIMP -Pandalus borealis					-MUSCLE			
SI-3	MEAN(12)	26.0	96.8	0.71	0.53	0.6	12.0	56.2	0.17	1824	3.02	0.5	2.0	1.47	47.4
	S.D.	13.5	13.3	0.77	1.02	0.1	1.7	26.5	0.04	322	0.67	0.1	0.0	0.54	5.7
	VAR.	182.5	177.1	0.60	1.03	0.0	2.8	701.9	0.00	103627	0.44	0.0	0.0	0.30	32.0
	MAX.	58.0	132.0	3.10	3.75	0.8	15.5	126.0	0.21	2330	4.80	0.6	2.0	3.00	54.5
	MIN.	11.0	81.0	0.18	0.16	0.4	9.7	33.0	0.08	1340	2.20	0.4	2.0	1.00	34.9
							PRAWN -Pandalus platyceros					-MUSCLE			
SI-2	MEAN(4)	6.0	113.5	0.10	0.14	0.6	19.5	68.9	0.13	1343	0.82	0.5	2.0	1.25	52.9
	S.D.	3.4	24.4	0.04	0.02	0.2	3.3	87.2	0.08	221	0.27	0.1	0.0	0.24	6.3
	VAR.	11.3	593.7	0.00	0.00	0.1	10.8	7611.4	0.01	48892	0.07	0.0	0.0	0.06	39.4
	MAX.	11.0	143.0	0.16	0.15	0.9	23.8	198.0	0.25	1530	1.14	0.7	2.0	1.45	59.3
	MIN.	4.0	84.0	0.08	0.12	0.4	15.8	11.4	0.07	1030	0.53	0.4	2.0	0.94	46.0
							PRAWN -Pandalus platyceros					-HEPATOPANCREAS			
SI-2		9.0	213.0	0.29	5.10	0.6	383.0	1640.0	0.08	556	9.74	2.6	6.0	0.15	120.0

Table 7. Mean Trace Metals in Shrimp and Prawns from Surf Inlet, March 1984.
(Continued: Page 4)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					PRAWN -Pandalus platyceros					-MUSCLE					
SI-3	MEAN(4)	9.0	153.0	2.03	0.12	0.5	15.4	16.0	0.12	1399	1.10	0.4	2.0	1.09	49.3
	S.D.	3.6	17.8	3.83	0.02	0.1	5.4	13.0	0.06	310	0.12	0.0	0.0	0.15	7.2
	VAR.	12.7	315.3	14.64	0.00	0.0	28.9	170.0	0.00	95940	0.01	0.0	0.0	0.02	52.1
	MAX.	13.0	167.0	7.77	0.14	0.6	21.5	35.1	0.17	1670	1.26	0.4	2.0	1.23	53.9
	MIN.	6.0	127.0	0.09	0.10	0.4	9.1	7.6	0.04	955	0.99	0.4	2.0	0.92	38.5
						PRAWN -Pandalus platyceros						-HEPATOPANCREAS			
SI-3		10.0	268.0	3.97	18.80	0.8	556.0	660.0	0.12	786	14.70	2.8	9.0	0.11	153.0

Table 8. Mean Trace Metals In Mussels, Clams and Fish From Surf Inlet, March 1984.

(mg/g dry weight)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							BLUE MUSSEL -Mytilus edulis					-MUSCLE			
Pilings	MEAN(10)	183.0	22.0	1.76	4.64	3.0	12.7	989.1	0.60	3228	14.65	-	<0.9	9.21	99.6
	S.D.	116.7	9.2	1.02	1.37	1.1	3.4	1493.4	0.72	484	8.20	-	-	4.88	17.6
	VAR.	1E+04	84.4	1.05	1.87	1.1	11.3	2E+06	0.52	233818	67.29	-	-	23.77	311.3
	MAX.	490.0	40.0	3.70	8.10	5.0	18.0	5200.0	2.22	3800	28.60	3.0	<0.9	20.00	129.0
	MIN.	80.0	10.0	0.80	3.00	2.0	8.0	350.0	0.10	2510	7.20	<1.0	<20.0	1.10	74.6
							BLUE MUSSEL -Mytilus edulis					-MUSCLE			
Rocks	MEAN(10)	138.2	23.1	1.04	7.03	2.9	13.7	540.6	0.31	3498	10.15	<0.9	-	7.00	106.1
	S.D.	36.8	9.5	0.27	2.69	0.9	9.2	187.1	0.20	371	3.22	-	-	5.62	24.4
	VAR.	1352.4	90.8	0.07	7.21	0.8	85.1	4E+04	0.04	137907	10.39	-	-	31.61	594.0
	MAX.	200.0	40.0	1.60	11.30	4.0	36.0	836.0	0.63	4250	15.90	<3.0	10.0	20.00	150.0
	MIN.	90.0	10.0	0.60	3.20	2.0	6.0	311.0	<0.8	2960	6.10	<0.8	<4.0	0.50	86.8
							YOLDIA -Yoldia spp.					-MUSCLE			
SI-2	MEAN(2)	1870.0	145.0	17.45	3.55	3.5	171.5	3460.0	0.07	4910	26.85	<1.5	<4.5	6.50	537.5
	MAX.	2420.0	190.0	25.10	4.70	4.0	263.0	3620.0	0.09	5230	27.60	<1.0	<5.0	7.00	874.0
	MIN.	1320.0	100.0	9.80	2.40	3.0	80.0	3300.0	0.05	4590	26.10	<2.0	<4.0	6.00	201.0

Table 8. Mean Trace Metals In Mussels, Clams and Fish From Surf Inlet, March 1984.

(Continued: Page 2)

(mg/g dry weight)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						YOLDIA -Yoldia spp.						-MUSCLE			
SI-3	MEAN(4)	1785.0	165.8	18.38	1.58	3.3	74.2	3452.5	0.23	5328	25.63	1.6	5.5	8.50	896.3
	S.D.	569.5	15.8	5.66	0.23	0.8	33.4	1044.5	0.18	497	8.89	0.4	1.7	4.36	305.8
	VAR.	3E+05	249.6	31.98	0.05	0.6	1115.8	1E+06	0.03	247025	79.11	0.2	3.0	19.00	9E+04
	MAX.	2340.0	188.0	21.50	1.90	3.8	122.0	4310.0	0.42	6050	35.20	1.9	7.0	14.00	1210.0
	MIN.	1020.0	151.0	9.90	1.36	2.1	48.7	1980.0	0.07	4940	14.00	1.3	3.0	5.00	580.0
						PETRALE SOLE -Eopsetta jordani						-MUSCLE			
SI-2	VALUE	8.0	148.0	<0.08	2.30	0.5	7.1	222.0	1.28	1240	2.35	<0.4	<2.0	2.86	39.5
						PETRALE SOLE -Eopsetta jordani						-GILL			
SI-2	VALUE	138.0	20.0	0.90	0.17	0.7	3.8	398.0	1.24	1140	5.50	<0.5	<2.0	1.80	112.0
						PETRALE SOLE -Eopsetta jordani						-LIVER			
SI-2	VALUE	7.0	558.0	0.10	24.40	0.6	35.7	1330.0	0.41	620	3.90	<0.5	<2.0	2.00	189.0
						SLENDER SOLE -Lyopsetta exilis						-MUSCLE			
SI-3	VALUE	<4.0	59.0	<0.08	0.14	0.7	1.9	15.1	1.58	1350	0.52	<0.4	<2.0	1.72	17.1

Table 8. Mean Trace Metals In Mussels, Clams and Fish From Surf Inlet, March 1984.

(Continued: Page 3)

(mg/g dry weight)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
SLENDER SOLE -Lyopsetta exilis -LIVER															
SI-3	VALUE	26.0	87.0	0.10	13.50	0.5	70.2	1280.0	1.07	830	5.90	<0.5	<2.0	1.90	217.0
DOVER SOLE -Microstomus pacificus -MUSCLE															
SI-3	VALUE	<4.0	207.0	0.16	0.18	0.6	1.1	14.2	0.32	1230	0.63	<0.4	<2.0	1.96	16.2
DOVER SOLE -Microstomus pacificus -LIVER															
SI-3	VALUE	6.0	23.0	<0.08	12.50	0.5	9.0	830.0	2.64	489	3.69	<0.4	<2.0	1.87	198.0
ENGLISH SOLE -Parophrys vetulus -MUSCLE															
SI-2	VALUE	7.0	112.0	<0.08	0.27	0.6	1.0	56.0	0.05	1360	0.84	<0.4	<2.0	2.94	19.0
ENGLISH SOLE -Parophrys vetulus -GILL															
SI-2	VALUE	47.0	9.0	0.40	0.08	0.6	3.2	641.0	<0.02	1270	6.30	<0.5	<2.0	2.10	72.8
ENGLISH SOLE -Parophrys vetulus -LIVER															
SI-2	VALUE	23.0	245.0	<0.08	9.30	0.7	111.0	1820.0	0.25	706	4.10	0.5	<3.0	9.00	287.0

Table 8. Mean Trace Metals In Mussels, Clams and Fish From Surf Inlet, March 1984.

(Continued: Page 4)

(mg/g dry weight)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						BLACKCOD -Anoplopoma fimbria						-MUSCLE			
SI-2	MEAN(2)	<4.0	14.5	-	0.29	0.8	3.2	28.8	-	1525	0.86	<0.4	<2.0	5.71	18.0
	MAX.	<0.4	17.0	0.09	0.30	0.8	4.4	33.2	0.20	1550	1.00	<0.4	<2.0	8.00	18.8
	MIN.	<0.4	12.0	<0.08	0.27	0.7	1.9	24.4	<0.02	1500	0.71	<0.4	<2.0	3.41	17.2
						BLACKCOD -Anoplopoma fimbria						-MUSCLE			
SI-3	VALUE	<4.0	18.0	<0.08	0.23	0.5	2.3	22.3	<0.03	1580	0.79	<0.4	<2.0	2.09	23.8
						BLACKCOD -Anoplopoma fimbria						-GILL			
SI-2	MEAN(2)	64.5	17.5	1.86	0.30	1.7	9.0	989.5	0.09	795	9.25	<0.5	-	3.50	65.0
	MAX.	68.0	19.0	2.50	0.40	2.9	13.3	1650.0	0.14	1080	12.40	<0.5	5.0	5.00	92.8
	MIN.	61.0	16.0	1.22	0.20	0.5	4.6	329.0	0.03	510	6.10	<0.4	<0.2	2.00	37.2
						BLACKCOD -Anoplopoma fimbria						-GILL			
SI-3	VALUE	39.0	6.0	0.93	0.20	0.4	2.9	225.0	<0.02	674	3.88	<0.4	<2.0	2.00	43.7
						BLACKCOD -Anoplopoma fimbria						-LIVER			
SI-2	MEAN(2)	<4.0	13.0	<0.08	16.40	0.5	178.7	1837.5	0.16	501	4.37	<0.4	<2.0	1.75	119.0
	MAX.	<4.0	16.0	<0.08	27.20	0.5	312.0	2970.0	0.29	522	4.46	<0.4	<2.0	1.79	132.0
	MIN.	<4.0	10.0	<0.08	5.60	0.4	45.4	705.0	0.03	479	4.28	<0.4	<2.0	1.71	106.0

Table 8. Mean Trace Metals In Mussels, Clams and Fish From Surf Inlet, March 1984.

(Continued: Page 5)

(mg/g dry weight)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						BLACKCOD -Anoplopoma fimbria					-LIVER				
SI-3	VALUE	<4.0	28.0	0.08	19.60	0 6	42.2	2090.0	0.17	776	5.07	<0.4	<2.0	2.18	162.0
						RATFISH -Hydrolagus colliei					-MUSCLE				
SI-2	MEAN(2)	19.0	98.5	0.13	0.19	0.7	2.1	63.4	0.87	1160	1.85	<0.4	<2.0	2.34	25.5
	MAX.	26.0	127.0	0.16	0.20	0.7	3.4	64.4	1.28	1180	2.43	<0.4	<2.0	2.66	33.9
	MIN.	12.0	70.0	0.10	0.18	0.6	0.7	62.3	0.45	1140	1.27	<0.4	<2.0	2.02	17.0
						RATFISH -Hydrolagus colliei					-MUSCLE				
SI-3	MEAN(2)	<4.0	59.0	-	0.22	0.7	1.1	17.3	0.36	1195	1.23	<0.4	<2.0	7.19	15.7
	MAX.	<4.0	61.0	0.12	0.22	0.7	1.2	20.5	0.67	1210	1.31	<0.4	<2.0	12.00	16.1
	MIN.	<4.0	57.0	<0.08	0.21	0.6	0.9	14.1	0.05	1180	1.15	<0.4	<2.0	2.38	15.3
						RATFISH -Hydrolagus colliei					-GILL				
SI-2	MEAN(2)	28.5	22.5	0.16	0.20	0.5	3.1	368.0	0.29	595	4.46	-	<2.0	2.16	45.7
	MAX.	40.0	28.0	0.20	0.20	0.5	4.0	490.0	0.49	750	5.32	3.7	<2.0	2.31	64.2
	MIN.	17.0	17.0	0.11	0.19	0.4	2.1	246.0	0.09	440	3.60	<0.4	<2.0	2.00	27.1

Table 8. Mean Trace Metals In Mussels, Clams and Fish From Surf Inlet, March 1984.

(Continued: Page 6)

(mg/g dry weight)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							RATFISH -Hydrolagus colliei					-GILL			
SI-3	MEAN(2)	71.5	57.0	0.52	0.30	0.4	4.8	131.5	0.32	914	6.56	<0.4	<2.0	2.00	63.5
	MAX.	118.0	91.0	0.61	0.30	0.4	5.4	150.0	0.36	941	6.85	<0.4	<2.0	2.00	64.3
	MIN.	25.0	23.0	0.42	0.30	0.4	4.1	113.0	0.28	886	6.27	<0.4	<2.0	2.00	62.7
							RATFISH -Hydrolagus colliei					-LIVER			
SI-2	MEAN(2)	213.5	186.0	-	0.80	0.5	6.7	428.5	-	72	0.91	<0.4	<2.0	2.00	10.0
	MAX.	400.0	299.0	0.17	0.90	0.6	7.0	513.0	-	75	0.94	<0.4	<2.0	2.00	11.7
	MIN.	27.0	73.0	<0.08	0.70	0.4	6.4	344.0	-	69	0.87	<0.4	<2.0	2.00	8.3
							RATFISH -Hydrolagus colliei					-LIVER			
SI-3	MEAN(2)	180.0	144.0	-	0.95	0.4	7.8	260.5	0.38	69	0.80	<0.4	<2.0	2.00	8.1
	MAX.	343.0	261.0	0.09	1.30	0.4	9.2	385.0	-	76	0.88	<0.4	<2.0	2.00	8.9
	MIN.	17.0	27.0	<0.08	0.60	0.4	6.3	136.0	-	61	0.71	<0.4	<2.0	2.00	7.2
							PACIFIC HAKE -Merluccius productus					-MUSCLE			
SI-2	MEAN(3)	15.7	44.7	0.18	0.27	0.5	2.8	65.5	0.43	1390	2.36	<0.4	<2.0	4.06	25.2
	S.D.	3.1	40.4	0.09	0.03	0.1	1.2	22.5	0.30	66	2.05	0.0	0.0	2.55	7.8
	VAR.	9.3	1630.3	0.01	0.00	0.0	1.5	508.4	0.09	4300	4.21	0.0	0.0	6.49	60.4
	MAX.	19.0	89.0	0.26	0.29	0.6	3.9	91.4	0.77	1450	4.73	<0.4	<2.0	7.00	31.2
	MIN.	13.0	10.0	0.09	0.23	0.5	1.5	50.5	0.23	1320	1.10	<0.4	<2.0	2.48	16.4

Table 8. Mean Trace Metals In Mussels, Clams and Fish From Surf Inlet, March 1984.

(Continued: Page 7)

(mg/g dry weight)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							PACIFIC HAKE -Merluccius productus					-GILL			
SI-2	MEAN(3)	180.3	9.0	1.18	0.22	0.5	5.3	513.3	0.34	992	4.56	<0.5	<2.0	2.15	65.8
	S.D.	143.8	5.0	0.30	0.02	0.2	1.4	97.7	0.25	302	1.59	-	-	0.15	29.1
	VAR.	2E+04	25.0	0.09	0.00	0.0	1.9	9550.3	0.06	90946	2.53	-	-	0.02	848.0
	MAX.	332.0	14.0	1.51	0.24	0.7	6.2	589.0	0.59	1290	5.88	<0.5	<2.0	2.30	92.9
	MIN.	46.0	4.0	0.92	0.20	0.4	3.7	403.0	0.10	687	2.79	<0.4	<2.0	2.00	35.0
							PACIFIC HAKE -Merluccius productus					-LIVER			
SI-2	MEAN(3)	8.3	66.0	-	1.72	0.5	123.7	382.7	0.10	516	8.78	<0.4	<2.0	1.36	145.9
	S.D.	4.9	84.9	-	1.02	0.1	92.4	186.4	0.05	225	6.89	-	-	0.92	96.1
	VAR.	24.3	7204.0	-	1.04	0.0	8534.2	3E+04	0.00	50772	47.45	-	-	0.84	9237.6
	MAX.	14.0	164.0	0.09	2.80	0.5	224.0	579.0	0.14	748	15.90	<0.4	<2.0	1.90	233.0
	MIN.	5.0	16.0	<0.08	0.77	0.4	42.1	208.0	0.05	298	2.15	<0.4	<2.0	0.30	42.8
							RED SNAPPER -Sebastodes ruberrimus					-MUSCLE			
SI-2	VALUE	<4.0	46.0	<0.08	0.18	0.5	2.4	19.5	0.59	1500	0.44	<0.4	<2.0	1.56	19.2
							RED SNAPPER -Sebastodes ruberrimus					-GILL			
SI-2	VALUE	99.0	7.0	0.82	0.20	0.4	3.3	811.0	<0.02	1120	5.62	<0.4	<3.0	1.88	73.0
							RED SNAPPER -Sebastodes ruberrimus					-LIVER			
SI-2	VALUE	5.0	19.0	<0.08	5.70	0.7	11.1	185.0	0.45	680	4.09	<0.4	<2.0	1.27	123.0

Table 9. Mean Trace Metals In Shrimp and Fish From Laredo Sound, March 1984.

(ug/g dry wt.)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							SIDESTRIPE SHRIMP -Pandalopsis dispar					-MUSCLE			
L-2	MEAN(12)	24.1	62.4	0.44	0.23	0.6	13.3	40.6	0.15	1929	1.63	0.4	2.0	1.01	52.8
	S.D.	13.2	5.5	0.18	0.12	0.1	5.5	18.5	0.06	270	0.50	0.1	0.0	0.22	4.4
	VAR.	173.2	30.4	0.03	0.01	0.0	29.9	341.9	0.00	72681	0.25	0.0	0.0	0.05	19.2
	MAX.	51.0	72.0	0.80	0.45	0.9	23.8	90.6	0.26	2380	2.42	0.5	2.0	1.35	60.8
	MIN.	14.0	55.0	0.20	0.13	0.4	7.3	23.3	0.11	1590	1.09	0.4	2.0	0.60	47.9
							ENGLISH SOLE -Parophrys vetulus					-MUSCLE			
L-2	MEAN(2)	20.0	74.0	0.32	0.22	0.7	1.1	38.4		1205	1.34	0.4	2.0	1.27	26.8
	S.D.	17.0	4.2	0.18	0.01	0.0	0.9	25.1		21	0.77	0.0	0.0	0.11	10.0
	MAX.	32.0	77.0	0.45	0.22	0.7	1.7	56.1		1220	1.88	0.4	2.0	1.34	33.8
	MIN.	8.0	71.0	0.19	0.21	0.7	0.4	20.6		1190	0.79	0.4	2.0	1.19	19.7
							HALIBUT -Hippoglossus stenolepis					-MUSCLE			
L-2	MEAN(2)	6.0	9.0	0.11	0.25	0.7	3.0	22.3		1780	0.70	0.4	2.0	1.37	18.8
	S.D.	1.4	0.0	0.01	0.02	0.1	3.0	1.1		240	0.07	0.0	0.0	0.37	0.2
	MAX.	7.0	9.0	0.11	0.26	0.8	5.1	23.0		1950	0.75	0.4	2.0	1.63	18.9
	MIN.	5.0	9.0	0.10	0.23	0.6	0.9	21.5		1610	0.65	0.4	2.0	1.10	18.6

Table 9. Mean Trace Metals In Shrimp and Fish From Laredo Sound, March 1984.
(Continued: Page 2)

(ug/g dry wt.)

Station		AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					HALIBUT -Hippoglossus stenolepis							-LIVER			
L-2	VALVE	<4.0	32.0	0.08	15.80	<0.4	22.7	1400.0		682	4.26	<0.4	<2.0	1.35	100.0
					SHORTFIN EELPOUT -Lycodes brevipes							-MUSCLE			
L-2	MEAN(3)	46.0	7.7	2.18	0.16	1.1	3.0	79.8		1973	7.45	0.4	2.0	3.04	74.2
	S.D.	25.9	0.6	0.34	0.04	0.1	1.4	23.3		242	1.69	0.0	0.0	1.66	10.3
	VAR.	669.0	0.3	0.12	0.00	0.0	2.1	542.1		58633	2.86	0.0	0.0	2.75	106.6
	MAX.	74.0	8.0	2.48	0.19	1.2	4.7	106.0		2250	9.36	0.4	2.0	4.00	84.9
	MIN.	23.0	7.0	1.81	0.11	1.0	2.2	61.4		1800	6.14	0.4	2.0	1.13	64.3

TABLE 10 **ANALYSIS OF VARIANCE (F-TEST) BETWEEN-STATION DIFFERENCES FOR TRACE METALS IN PRAWNS AND SHRIMP**

METAL	SPECIES			
	SIDESTRIPE	CRANGON	PINK	PRAWN
As	19.08*	1.41	19.2*	10.7
Cd	0.88	8.33*	1.61	2.68
Cu	2.53	53.69*	15.2*	2.45
Hg	4.32*	5.22*	1.13	0.319
Pb	2.07	3.66	3.38	3.02
Critical Value	2.55	5.10	3.42	20.1
Stations Included In Analysis	Barkley B1 Barkley B2 Quatsino Q2 Surf S2 Surf S3 Laredo L1	Barkley B1 Barkley B2	Barkley B1 Barkley B2 Surf S1 Surf S2	Barkley B1 Barkley B2 Surf S2 Surf S3

* significant between-station differences

TABLE 11 **SEDIMENT CONCENTRATION AND BIOCONCENTRATION FACTORS FOR CADMIUM IN SHRIMP***

STATION	SEDIMENT (mg/kg)	SIDESTRIPE FACTOR	PRAWN FACTOR	CRANGON FACTOR	PINK FACTOR
B-1	1.3	0.10	0.08	0.15	0.11
B-2	1.3	0.08	0.08	1.2	0.08
Q-2	1.2	0.10	N.S.	N.S.	N.S.
S-1	0.9	N.S.	N.S.	0.40	N.S.
S-2	0.9	0.16	0.15	N.S.	0.14
S-3	1.3	0.12	0.09	N.S.	N.S.
L-1	1.0	0.24	N.S.	N.S.	N.S.

* N.S. = not sampled

TABLE 12 SEDIMENT CONCENTRATION AND BIOCONCENTRATION FACTORS FOR MERCURY IN SHRIMP*

STATION	SEDIMENT (mg/kg)	SIDESTRIPE FACTOR	PRAWN FACTOR	CRANGON FACTOR	PINK FACTOR
B-1	0.1	1.07	1.47	0.85	1.65
B-2	0.9	0.12	0.15	0.14	0.66
Q-2	0.09	1.86	N.S.	N.S.	N.S.
S-1	0.15	N.S.	N.S.	0.23	N.S.
S-2	0.09	1.25	1.45	N.S.	1.22
S-3	0.15	0.96	0.81	N.S.	N.S.
L-1	0.2	5.05	N.S.	N.S.	N.S.

* N.S. = not sampled

TABLE 13 CORRELATION BETWEEN SEDIMENT AND SHRIMP MUSCLE TRACE METAL CONCENTRATIONS*

SPECIES	CORRELATION (r)*	
	CADMIUM	MERCURY
Sidestripe	.067	.403
Prawns	.136	.314
Crangon communis	.242	.058
Pink	.221	.082

* r = correlation between the log of the concentration in sediment and the log of the bioconcentration factor (Critical value @ p = 0.5, degrees of freedom = 0.754) for cadmium and mercury.

TABLE 14 **BIOCONCENTRATION FACTORS* FOR CADMIUM AND MERCURY IN INDIVIDUAL SOLE AND FLOUNDER MUSCLE AND LIVER TISSUE**

SPECIES/STATION		BIOCONCENTRATION FACTOR			
		Cd MUSCLE	Cd LIVER	Hg MUSCLE	Hg LIVER
Barkley Sound					
Flathead	/ B1	0.1231	2.0385	0.3667	0.4667
Flathead	/ B2	0.1385	2.9846	8.4000	3.7000
English	/ B1	0.1462	0.8308	2.8000	1.0000
English	/ B2	0.1077	N.S.	0.1556	N.S.
Slender	/ B1	0.1154	0.4538	3.4000	1.6000
Slender	/ B2	0.1000	N.S.	0.7333	N.S.
Starry Flounder	/ B1	0.1462	N.S.	2.0000	N.S.
Rex	/ B1	0.1231	N.S.	1.6000	N.S.
Dover	/ B2	0.1231	2.1538	0.1667	0.8889
Quatsino Sound					
Rex	/ Q2	0.1085	0.6667	1.1111	1.3333
Flathead	/ Q2	0.1167	N.S.	4.3333	N.S.
Slender	/ Q2	0.1000	N.S.	1.8889	N.S.
Dover	/ Q2	0.1250	1.9000	2.4444	1.8889
Surf Inlet					
Petrale	/ S2	2.5556	26.6667	14.2222	4.5556
English	/ S2	0.3000	10.3333	0.5556	2.778
Slender	/ S2	0.1077	10.3846	10.5333	7.1333
Dover	/ S3	0.1385	9.6154	2.1333	17.6000
Laredo Sound					
English	/ L1	0.2200	N.S.	N.S.	N.S.

* Values greater than 1.0 indicate bioconcentration in fish tissues greater than ambient sediment concentration.

** N.S. = "Not Sampled"

APPENDIX I

STATION LOCATION COORDINATES

APPENDIX I STATION LOCATION COORDINATES

STATION		COORDINATES (Latitude/Longitude)	DEPTH (m)
Barkley Sound	B-1	48°56.63'N / 125°10.91'W	106
	B-2	48°50.77'N / 125°09.2' W	105
Quatsino Sound	Q-2	50°28.30'N / 127°55.4' W	201
	Q-3	50°28.65'N / 127°47.75'W	158
	Q-4	50°30.27'N / 127°43.07'W	124
Surf Inlet	S-1	53°01.70'N / 128°55.2' W	137
	S-3	52°55.40'N / 129°01.7' W	208
Laredo Sound	L-2	52°33.7' N / 128°52.7' W	220

APPENDIX II

DESCRIPTIVE STATISTICS FOR:

(a) SIDESTRIPE SHRIMP
(b) CRANGON SHRIMP
(c) PINK SHRIMP
(d) PRAWNS

APPENDIX II(a). DESCRIPTIVE STATISTICS FOR SIDESTRIPE SHRIMP

BARKLEY SOUND, STATION B-1

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	37	1577.0000	42.6216	488.1862	22.0949	3.6324
CD	37	4.9000	0.1324	0.0104	0.1020	0.0168
CU	37	526.8000	14.2378	17.4319	4.1751	0.6864
HG	37	3.9400	0.1065	3.1e-3	0.0552	9.3e-3
PB	37	23.3200	0.6303	0.3695	0.6079	0.0999

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	37	0.51840	40.12067	1.04949	4.80826	26.95208
CD	37	0.76993	0.11595	2.9e-3	4.56092	25.60318
CU	37	0.29324	13.79651	0.36312	2.92414	15.25588
HG	37	0.51873	0.09094	2.0e-3	0.72088	3.46623
PB	37	0.96445	0.33792	4.9e-3	1.10472	4.64350

BARKLEY SOUND, STATION B-2

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	23	1399.0000	60.8261	54.9684	7.4141	1.5459
CD	23	2.4100	0.1048	1.4e-3	0.0379	8.0e-3
CU	23	371.9000	16.1696	7.8595	2.8035	0.5846
HG	23	2.3900	0.1039	5.3e-3	0.0729	0.0152
PB	23	13.8500	0.6022	0.2848	0.5337	0.1113

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	23	0.12189	60.38792	2.60619	0.04004	2.77335
CD	23	0.36155	0.09822	4.0e-3	0.32266	1.86978
CU	23	0.17338	15.94011	0.68332	0.26542	1.76993
HG	23	0.70164	0.07878	2.4e-3	0.87595	3.16312
PB	23	0.88629	0.34237	8.5e-3	0.31655	1.42616

QUATSINO SOUND

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	32	2014.0000	62.9375	131.5444	11.4693	2.0275
CD	32	3.8300	0.1197	2.0e-3	0.0447	8.0e-3
CU	32	391.9000	12.2469	8.8445	2.9740	0.5257
HG	32	5.3500	0.1672	6.0e-3	0.0776	0.0137
PB	32	22.2700	0.6959	0.3041	0.5515	0.0975

APPENDIX II(a). (Continued)

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	32	0.18223	61.83591	1.89477	-0.37393	2.66901
CD	32	0.37334	0.11204	3.2e-3	0.82763	4.00992
CU	32	0.24284	11.89118	0.35977	0.45763	3.55832
HG	32	0.46387	0.14643	3.6e-3	0.49740	3.01970
PB	32	0.79242	0394427	6.1e-3	0.02995	1.40726

SURF INLET, STATION S-2

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	24	1610.0000	67.0833	37.8188	6.1497	1.2553
CD	24	3.4300	0.1429	6.7e-3	0.0820	0.0167
CU	24	392.8000	16.3667	9.7945	3.1296	0.6388
HG	24	2.7500	0.1146	2.6e-3	0.0516	0.0105
PB	24	28.6100	1.1921	0.0235	0.1532	0.0313

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	24	0.09167	66.81433	2.77279	0.17770	2.15089
CD	24	0.57347	0.13311	5.3e-3	4.29332	20.34466
CU	24	0.19122	16.07483	0.65729	0.21446	3.00222
HG	24	0.45017	0.10186	3.5e-3	0.48776	3.01985
PB	24	0.12849	1.18306	0.04893	0.69773	2.77609

SURF INLET, STATION S-3

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	24	2017.0000	84.0417	197.3460	14.0480	2.8675
CD	24	3.6000	0.1500	8.3e-4	0.0289	5.8e-3
CU	24	341.4000	14.2250	11.2341	3.3517	0.6842
HG	24	3.4200	0.1425	3.1e-3	0.0559	0.0114
PB	24	29.2200	1.2175	0.0236	0.1537	0.0314

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	24	0.16716	82.98176	3.41612	0.77509	2.90400
CD	24	0.19262	0.14773	6.0e-3	1.81196	6.98438
CU	24	0.23562	13.91068	0.567840	1.89214	7.72817
HG	24	0.39222	0.13112	4.9e-3	0.55879	3.59690
PB	24	0.12628	1.20869	0.05001	0.93470	4.18330

APPENDIX II(a). (Continued)

LAREDO SOUND

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	12	749.0000	62.4167	30.4470	5.5179	1.5929
CD	12	2.7500	0.2292	0.0134	0.1156	0.0334
CU	12	159.1000	13.2583	29.8681	5.4652	1.5777
HG	12	0.8900	0.0742	7.4e-3	0.0861	0.0248
PB	12	12.1600	0.0133	0.0473	0.2175	0.0628

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	12	0.08840	62.19318	5.16419	0.09466	1.91888
CD	12	0.50426	0.20750	0.01595	1.02155	2.37241
CU	12	0.41221	12.29738	0.95511	0.60097	2.03361
HG	12	1.16052			0.70665	2.56308
PB	12	0.21466	0.98989	0.08036	-0.33217	2.38946

APPENDIX II(b). DESCRIPTIVE STATISTICS FOR CRAGON SHRIMP

BARKLEY SOUND, STATION B-2

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	16	576.000	36.0000	232.8000	15.2578	3.8144
CD	16	1.5900	0.0994	1.4e-3	0.0386	9.6e-3
CU	16	318.3000	19.8938	83.9020	9.1598	2.2900
HG	16	1.9800	0.1238	1.0111	0.1054	0.0264
PB	16	9.7100	0.6069	0.3677	0.6064	0.1516

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	16	0.42383	32.72050	1.84774	2.2e-3	1.38934
CD	16	0.38794	0.09194	5.2e-3	0.07066	1.46942
CU	16	0.46044	17.79022	0.98996	0.06350	1.24697
HG	16	0.85207	0.08287	3.2e-3	1.16362	3.94834
PB	16	0.99921	0.31219	0.01100	0.48348	1.48857

BARKELY SOUND, STATION B-1

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	12	523.0000	43.5833	63.3561	7.9597	2.2978
CD	12	2.4300	0.2025	3.0e-3	0.0556	0.0161
CU	12	194.4000	16.2000	8.5855	2.9301	0.8458
HG	12	1.0200	0.0850	4.0e-3	0.0645	0.0186
PB	12	9.7900	0.8158	0.2955	0.5436	0.1569

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kukrtosis
AS	12	0.18263	42.92881	3.52378	0.44229	3.07542
CD	12	0.27465	0.19295	0.01493	-0.76189	3.97136
CU	12	0.18087	15.92994	1.30272	-0.66054	2.42729
HG	12	0.75830			0.33295	2.28267
PB	12	0.66635	0.63587	0.04001	0.49923	2.29250

SURF INLET

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	3	131.0000	43.6667	10.3333	3.2146	1.8559
CD	3	1.0900	0.3633	7.6e-3	0.0874	0.0504
CU	3	77.3000	25.7667	24.8933	4.9893	2.8806
HG	3	0.1100	0.0367	8.3e-4	0.0289	0.0167
PB	3	3.7100	1.2367	0.0345	0.1858	0.1073

APPENDIX II(b). (Continued)

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	3	0.07362	43.58564	14.50088	-0.63090	1.50000
CD	3	0.24046	0.35662	0.11678	0.45564	1.50000
CU	3	0.19363	25.41944	8.35069	-0.60498	1.50000
HG	3	0.78730	0.03037	8.7e-3	0.70711	1.50000
PB	3	0.15027	1.22691	0.40560	-0.48382	1.50000

APPENDIX II(c). DESCRIPTIVE STATISTICS FOR PINK SHRIMP

BARKLEY SOUND, STATION B-1

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	35	1853.0000	52.9429	157.1731	12.5369	2.1191
CD	35	5.0900	0.1454	0.0153	0.1235	0.0209
CU	35	372.4000	10.6400	3.5719	1.8899	0.3195
HG	35	5.7600	0.1646	6.4e-3	0.0800	0.0135
PB	35	26.3900	0.7540	0.2648	0.5146	0.0870

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	35	0.23680	51.62117	1.43979	0.98120	3.64888
CD	35	0.84945	0.12769	3.4e-3	5.04048	28.57333
CU	35	0.17763	10.47531	0.29453	0.21404	2.84319
HG	35	0.48641			1.23919	7.52447
PB	35	0.68253	0.48433	7.3e-3	-0.14303	1.75283

BARKELY SOUND, STATION B-2

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	17	1030.0000	60.5882	321.8824	17.9411	4.3514
CD	17	1.9700	0.1159	3.2e-3	0.0568	0.0138
CU	17	278.9000	16.4059	28.6043	5.3483	1.2972
HG	17	10.1200	0.5953	3.8500	1.9621	0.4759
PB	17	13.5900	0.7994	0.3349	0.5787	0.1404

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kukrtosis
AS	17	0.29611	57.38873	3.12764	-0.54154	2.94260
CD	17	0.49011	0.10323	5.3e-3	0.86354	3.61205
CU	17	0.32600	15.50725	0.85366	0.13341	2.69182
HG	17	3.29609			3.73410	14.98809
PB	17	0.72392	0.52829	0.01794	0.03128	1.47513

SURF INLET, STATION S-2

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	18	1112.0000	62.3333	62.8235	7.9261	1.8682
CD	18	2.3200	0.1289	6.1e-4	0.0247	5.3e-3
CU	18	198.0000	11.0000	4.0294	2.0073	0.4731
HG	18	2.0200	0.1122	3.5e-3	0.0594	0.0140
PB	18	22.9100	1.2728	0.0876	0.2959	0.0697

APPENDIX II(c). (Continued)

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	18	0.12716	61.85739	3.41013	0.16183	2.27147
CD	18	0.19170	0.12691	6.9e-3	1.40706	5.13458
CU	18	0.18249	10.80573	0.58831	-0.70418	2.54405
HG	18	0.52899			-0.93207	2.71815
PB	18	0.23249	1.24195	0.06738	0.67627	2.93750

SURF INLET, STATION S-3

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	12	1162.0000	96.8333	177.0606	13.3064	3.8412
CD	12	6.3500	0.5292	1.0322	1.0160	0.2933
CU	12	143.7000	11.9750	2.7948	1.6718	0.4826
HG	12	1.5600	0.1300	7.3e-3	0.0855	0.0247
PB	12	17.6800	1.4733	0.2950	0.5432	0.15681

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kukrtosis
AS	12	0.13742	96.07641	7.94910	1.47236	5.18276
CD	12	1.91997	0.29065	0.02037	2.99747	10.02555
CU	12	0.13960	11.87051	0.98071	0.46370	2.77695
HG	12	0.65764			-0.74305	1.84228
PB	12	0.36866	1.40511	0.11283	1.96560	6.32901

APPENDIX II(d). DESCRIPTIVE STATISTICS FOR PRAWNS

BARKLEY SOUND, STATION B-1

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	12	776.0000	64.6667	353.3333	18.7972	5.4263
CD	12	1.2900	0.1075	2.5e-3	0.0503	0.0145
CU	12	169.0000	14.0833	7.1961	2.6825	0.7744
HG	12	1.4700	0.1225	6.4e-3	0.0804	0.0232
PB	12	8.1100	0.6758	0.2635	0.5134	0.1482

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	12	0.29068	62.06903	4.94508	0.26490	2.54093
CD	12	0.46786	0.09397	6.6e-3	-0.40163	1.31255
CU	12	0.19048	13.85971	1.13734	0.57955	2.26596
HG	12	0.65595	0.09805	6.1e-3	0.64971	2.00539
PB	12	0.75959	0.42839	0.02079	-0.05303	1.35618

BARKLEY SOUND, STATION B-2

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	7	526.0000	75.1429	870.1429	29.4982	11.1493
CD	7	0.7500	0.1071	2.6e-3	0.0512	0.0194
CU	7	137.5000	19.6429	11.1362	3.3371	1.2613
HG	7	0.9500	0.1357	6.2e-3	0.0793	0.0300
PB	7	5.0600	0.7229	0.3197	0.5654	0.2137

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Cokeff. of Kurtosis
AS	7	0.39256	70.55885	9.50269	0.62567	1.84583
CD	7	0.47808	0.09427	0.01157	-0.36017	1.24770
CU	7	0.16989	19.39488	2.73479	-8.1e-3	2.10344
HG	7	0.58463	0.11365	0.01273	0.63692	2.78806
PB	7	0.78219	0.44130	0.03505	-0.27314	1.09680

SURF INLET, STATION S-2

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	4	454.0000	113.5000	593.6667	24.3653	12.1826
CD	4	0.5500	0.1375	2.2e-4	0.0150	7.5e-3
CU	4	78.1000	19.5250	10.7692	3.2816	1.6408
HG	4	0.5300	0.1325	6.4e-3	0.0802	0.0401
PB	4	4.9800	1.2450	0.0588	0.2426	0.1213

APPENDIX II(d). (Continued)

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Coeff. of Kurtosis
AS	4	0.21467	111.48873	27.36228	0.00000	1.91111
CD	4	0.10909	0.13688	0.03406	-0.21383	1.27984
CU	4	0.16807	19.32071	4.78001	0.28748	2.01785
HG	4	0.60495	0.11779	0.02675	0.99578	2.23127
PB	4	0.19482	1.22623	0.30167	-0.37869	1.49502

SURF INLET, STATION S-3

Field	Number	Sum	Mean	Variance	Standard Deviation	Standard Error
AS	4	612.0000	153.0000	315.3333	17.7576	8.8788
CD	4	0.4700	0.1175	4.2e-4	0.0206	0.0103
CU	4	61.4000	15.3500	28.8567	5.3718	2.6859
HG	4	0.4800	0.1200	3.1e-3	0.0560	0.0280
PB	4	4.3400	1.0850	0.0222	0.1489	0.0744

Field	Number	Coeff. of Variation	Geometric Mean	Harmonic Mean	Coeff. of Skewness	Cokeff. of Kurtosis
AS	4	0.11606	152.16834	37.81983	-0.98734	2.22778
CD	4	0.17545	0.11615	0.02871	0.11532	1.15225
CU	4	0.34996	14.60130	3.46048	-0.02503	1.60303
HG	4	0.46647	0.10547	0.02187	-0.82953	2.14486
PB	4	0.13722	1.07723	0.26736	-0.10496	1.22743

APPENDIX III

TRACE METALS IN FISH TISSUES FROM BARKLEY SOUND, MARCH, 1984

Appendix III. Trace Metals In Fish Tissues From Barkley Sound, March, 1984.

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
REX SOLE -Glyptocephalus zachirus -MUSCLE														
B-1	<4.0	54.0	<0.08	0.17	1.2	<0.4	14.4	0.22	1330	0.79	<0.4	<2.0	1.78	14.8
	<4.0	94.0	<0.08	0.17	1.0	<0.4	11.3	0.16	1270	0.99	<0.4	<2.0	1.90	15.9
	<4.0	81.0	<0.08	0.13	0.8	<0.4	13.5	0.09	1210	0.68	<0.4	<2.0	<2.00	14.0
FLATHEAD SOLE -Hippoglossoides ellasodon -MUSCLE														
B-1	<4.0	41.0	0.14	0.26	0.7	3.0	32.7	0.51	1380	0.70	<0.4	<2.0	<2.00	18.1
	<4.0	40.0	<0.08	0.24	0.6	2.0	16.6	0.84	1260	0.58	<0.4	<2.0	<2.00	17.6
	5.0	60.0	<0.08	0.12	0.5	1.5	22.4	0.40	1370	0.65	<0.4	<2.0	<2.00	18.0
	<4.0	53.0	<0.08	0.14	0.8	1.9	14.0	1.17	1170	2.34	<0.4	<2.0	<2.00	18.1
	<4.0	76.0	<0.08	0.15	0.6	0.6	9.1	1.01	1190	0.46	<0.4	<2.0	<2.00	18.0
	<4.0	46.0	<0.08	0.15	0.8	0.5	7.1	1.09	1180	0.47	<0.4	<2.0	1.93	21.7
FLATHEAD SOLE -Hippoglossoides ellasodon -MUSCLE														
B-2	<4.0	159.0	<0.08	0.15	0.5	0.7	14.3	0.39	1390	1.07	<0.4	<2.0	<2.00	19.2
	7.0	222.0	0.26	0.17	0.9	1.4	17.1	0.27	1420	2.54	<0.4	<2.0	<2.00	22.1
FLATHEAD SOLE -Hippoglossoides ellasodon -LIVER														
B-1	<4.0	271.0	<0.08	3.60	0.9	75.1	1330.0	0.40	866	3.91	<0.4	<2.0	<2.00	183.0
	<4.0	302.0	0.43	2.90	0.5	4.9	1420.0	0.42	577	3.68	<0.4	<2.0	0.78	97.0
	7.0	425.0	<0.08	6.20	0.7	32.1	3390.0	0.55	921	3.33	<0.4	<2.0	1.74	155.0
	<4.0	75.0	<0.08	2.90	<0.4	3.6	957.0	0.28	293	2.45	<0.4	33.0	0.52	61.0
	6.0	105.0	<0.08	3.80	<0.4	8.4	995.0	0.19	448	3.64	<0.4	<2.0	0.99	95.0

Appendix III. Trace Metals In Fish Tissues From Barkley Sound, March, 1984.
(Continued: Page 2)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					FLATHEAD SOLE -Hippoglossoides ellasodon -LIVER									
B-2	<4.0	110.0	<0.08	1.30	0.5	278.0	93.9	0.25	913	8.20	<0.4	<2.0	<2.00	154.0
	16.0	144.0	0.09	4.00	0.7	164.0	1150.0	0.59	889	6.79	0.6	<2.0	1.76	190.0
					FLATHEAD SOLE -Hippoglossoides ellasodon -GILL									
B-1	95.0	9.0	1.29	<0.05	1.4	2.6	235.0	<0.03	1300	9.00	0.5	<2.0	0.53	57.3
	680.0	13.0	1.70	0.28	2.3	5.1	1240.0		1330	18.70	0.5	<2.0	1.70	82.3
	126.0	12.0	0.60	0.15	1.4	3.5	341.0	<0.02	960	7.40	0.5	<2.0	1.50	82.5
	341.0	10.0	0.85	<0.02	1.7	4.3	741.0	<0.03	1270	10.80	<0.4	<2.0	3.00	81.5
	44.0	11.0	3.39	0.90	2.9	1.7	123.0	0.34	1730	18.40	<0.4	<2.0	6.00	69.8
					FLATHEAD SOLE -Hippoglossoides ellasodon -GILL									
B-2	74.0	39.0	0.30	0.15	1.6	3.5	225.0		970	12.10	0.5	4.0	1.50	88.5
	52.0	12.0	1.20	<0.05	1.2	6.0	138.0	0.12	1420	33.60	0.5	<2.0	0.20	67.3
					SLENDER SOLE -Lyopsetta exilis -MUSCLE									
B-1	<4.0	7.0	0.18	0.14	1.6	<0.4	23.5	0.28	1270	0.80	<0.4	<2.0	1.95	16.0
	<4.0	16.0	0.17	0.12	0.6	1.9	15.0	0.12	1320	0.55	<0.4	<2.0	1.60	15.3
	<4.0	7.0	<0.08	0.17	0.6	0.5	20.2	0.42	1310	0.35	<0.4	<2.0	3.00	14.2
	<4.0	9.0	0.13	0.17	0.8	<0.4	13.3	0.55	1330	0.40	<0.4	<2.0	6.00	15.9

Appendix III. Trace Metals In Fish Tissues From Barkley Sound, March, 1984.
(Continued: Page 3)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					SLENDER SOLE -Lyopsetta exilis						-MUSCLE			
B-2	20.0	10.0	0.10	0.15	1.2	0.6	63.9	0.15	1360	1.30	<0.4	<2.0	2.07	20.3
	12.0	34.0	0.48	0.11	0.9	1.5	18.0	1.16	1430	6.66	<0.4	<2.0	<2.00	20.3
					SLENDER SOLE -Lyopsetta exilis						-LIVER			
B-1	<4.0	10.0	<0.08	0.39	0.5	18.8	525.0	0.14	987	2.07	<0.4	<2.0	<2.00	101.0
	<4.0	52.0	<0.08	0.60	0.7	11.3	385.0	0.10	963	3.10	<0.4	28.0	1.74	94.7
	<4.0	18.0	<0.08	0.11	0.7	10.7	1300.0	0.25	830	3.86	<0.4	<2.0	1.60	83.5
	<4.0	17.0	<0.08	0.24	1.7	23.0	936.0	0.22	1350	3.57	<0.4	<2.0	1.48	110.0
	<4.0	15.0	<0.08	1.60	0.5	14.3	930.0	0.10	764	2.80	<0.4	<2.0	<2.00	104.0
					SLENDER SOLE -Lyopsetta exilis						-GILL			
B-1	32.0	<4.0	7.27	<0.04	17.2	2.9	227.0		1820	12.20	<0.4	17.0	1.20	79.2
	32.0	9.0	3.92	<0.05	2.0	1.9	101.0	0.30	1810	8.76	0.5	<2.0	1.39	92.9
	25.0	<5.0	2.70	<0.05	1.8	2.3	124.0		1560	6.00	0.5	<2.0	0.60	71.5
	29.0	6.0	2.05	<0.04	1.9	2.5	135.0		1350	10.70	<0.4	<2.0	0.52	81.2
	28.0	7.0	3.73	<0.04	1.7	2.8	118.0	<0.07	1680	11.60	<0.4	<2.0	0.47	77.2
					DOVER SOLE -Microstomus pacificus						-MUSCLE			
B-2	<4.0	64.0	<0.08	0.17	0.6	0.5	19.8	0.12	1170	0.69	<0.4	<2.0	1.77	16.3
	<4.0	41.0	<0.08	0.21	0.8	0.5	14.4	0.10	1300	1.03	<0.4	<2.0	1.77	17.5
	9.0	35.0	<0.08	0.13	0.7	0.5	22.3	0.16	1190	0.85	<0.4	<2.0	1.41	15.2
	<4.0	125.0	<0.08	0.14	0.6	0.8	12.7	0.15	1260	0.79	<0.4	<2.0	1.81	19.7
	<4.0	76.0	<0.08	0.16	0.5	0.7	13.5	0.23	1210	0.72	<0.4	<2.0	<2.00	16.7

Appendix III. Trace Metals In Fish Tissues From Barkley Sound, March, 1984.
(Continued: Page 4)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					DOVER SOLE -Microstomus pacificus						-LIVER			
B-2	116.0	8.0	0.40	5.10	1.0	54.7	2200.0		690	11.90	0.5	8.0	<2.00	189.0
	7.0	19.0	0.09	2.00	0.5	47.9	1110.0	0.46	718	5.18	0.5	<2.0	<2.00	181.0
	6.0	5.0	0.08	1.30	0.4	53.6	621.0	0.10	405	2.70	<0.4	<2.0	0.93	123.0
					DOVER SOLE -Microstomus pacificus						-GILL			
B-2	194.0	8.0	2.57	<0.05	1.8	4.0	423.0	<0.04	1910	16.50	0.5	<2.0	0.37	69.6
	181.0	9.0	1.30	0.27	1.6	4.6	477.0		1190	12.30	0.6	<2.0	1.40	70.3
	86.0	8.0	0.40	0.29	2.2	7.6	1000.0		1490	20.10	0.8	3.0	1.60	108.0
	67.0	7.0	1.20	0.34	1.7	9.2	274.0		1230	11.80	0.6	<2.0	1.20	72.9
					ENGLISH SOLE -Parophrys vetulus						-MUSCLE			
B-1	<4.0	67.0	<0.08	0.13	0.7	1.5	32.8	0.30	1260	0.51	<0.4	<2.0	1.74	23.7
	<4.0	119.0	<0.08	0.33	4.2	1.6	45.8	0.10	1080	0.61	<0.4	<2.0	<2.00	19.4
	<4.0	61.0	<0.08	0.22	0.8	3.2	13.7	0.19	1200	0.72	<0.4	<2.0	<2.00	20.7
	<4.0	277.0	0.09	0.16	0.9	3.0	18.3	0.40	1260	0.41	<0.4	<2.0	2.03	19.4
	<4.0	177.0	<0.08	0.14	0.7	1.7	16.4	0.63	1280	0.65	<0.4	<2.0	1.49	23.4
	<4.0	166.0	<0.08	0.20	0.6	0.8	7.4	0.15	1220	0.34	<0.4	<2.0	<2.00	19.7
	<4.0	63.0	0.34	0.13	1.0	3.0	72.1	0.20	1300	3.22	<0.4	<2.0	1.74	25.3

Appendix III. Trace Metals In Fish Tissues From Barkley Sound, March, 1984.
(Continued: Page 5)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							ENGLISH SOLE -Parophrys vetulus				-MUSCLE			
B-2	<4.0	51.0	0.18	0.14	0.6	0.8	17.8	0.14	1150	1.43	<0.4	<2.0	1.76	17.6
							ENGLISH SOLE -Parophrys vetulus				-LIVER			
B-1	11.0	38.0	<0.08	1.60	0.7	33.5	781.0	0.07	635	4.00	0.5	<2.0	1.53	167.0
	13.0	35.0	<0.08	1.30	0.6	19.9	730.0	0.18	663	3.51	<0.4	5.0	1.46	120.0
	<4.0	15.0	<0.08	0.21	0.4	40.0	896.0	0.10	685	5.38	<0.4	<2.0	1.66	171.0
	11.0	72.0	<0.08	1.10	0.7	48.5	433.0	0.11	966	8.52	<0.4	<2.0	<2.00	238.0
	9.0	58.0	<0.08	1.20	0.8	44.6	453.0	0.06	692	4.39	0.5	<2.0	<2.00	167.0
							ENGLISH SOLE -Parophrys vetulus				-GILL			
B-1	182.0	8.0	0.74	0.14	1.2	4.5	454.0	0.10	1420	13.40	<0.4	<2.0	1.21	76.6
	57.0	31.0	0.65	0.15	1.0	4.0	300.0	<0.02	1350	7.15	<0.4	<2.0	1.38	77.5
	106.0	<4.0	0.64	0.16	1.1	3.1	296.0	<0.02	1280	10.90	<0.4	<2.0	1.62	76.0
	15.0	<5.0	0.54	0.07	0.5	1.6	89.6		898	10.10	0.5	23.0	1.94	47.8
	112.0	6.0	0.67	0.17	0.9	4.3	347.0	<0.03	1080	8.18	<0.4	<2.0	1.67	69.1
							STARRY FLOUNDER -Platichthys stellatus				-MUSCLE			
B-1	<4.0	28.0	0.10	0.19	0.5	2.8	11.6	0.20	1290	0.50	<0.4	<2.0	<2.00	15.7

Appendix III. Trace Metals In Fish Tissues From Barkley Sound, March, 1984.
(Continued: Page 6)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
PACIFIC HAKE -Merluccius productus -MUSCLE														
B-1	<4.0	11.0	<0.08	0.22	5.2	1.5	62.1	0.15	1360	0.71	<0.4	<2.0	1.98	15.2
	<4.0	5.0	<0.08	0.16	0.6	3.5	15.7	0.09	1340	0.57	<0.4	<2.0	1.64	14.0
	<4.0	14.0	0.09	0.17	0.5	1.9	17.9	0.03	1480	0.64	<0.4	<2.0	1.77	14.7
	5.0	16.0	0.19	0.19	0.8	1.8	14.4	0.17	1530	1.00	<0.4	<2.0	1.93	16.2
	<4.0	15.0	0.09	0.14	0.6	1.6	9.6	0.03	1440	0.55	<0.4	<2.0	1.99	13.8
PACIFIC HAKE -Merluccius productus -MUSCLE														
B-2	<4.0	10.0	<0.08	0.17	4.2	2.5	52.2	0.11	1530	0.97	<0.4	<2.0	<2.00	18.2
	5.0	11.0	<0.08	0.14	0.7	2.1	21.3	0.08	1690	1.40	<0.4	<2.0	<2.00	18.7
	<4.0	12.0	<0.08	0.15	0.7	1.4	16.5	0.02	1580	1.01	<0.4	<2.0	<2.00	15.0
PACIFIC HAKE -Merluccius productus -LIVER														
B-1	<4.0	24.0	<0.08	0.10	<0.4	5.8	79.0	0.10	321	6.63	<0.4	<2.0	0.67	37.1
	<4.0	14.0	<0.08	0.50	<0.4	28.4	387.0	0.06	411	12.70	<0.4	<2.0	0.86	101.0
	<4.0	12.0	<0.08	0.33	<0.4	9.6	250.0	0.05	189	5.81	<0.4	28.0	0.22	83.0
	<4.0	10.0	<0.08	0.40	<0.4	12.7	248.0	0.05	245	5.08	<0.4	<2.0	0.55	54.1
	<4.0	6.0	<0.08	0.40	<0.4	14.8	199.0	0.05	107	3.23	<0.4	4.0	0.20	63.1

Appendix III. Trace Metals In Fish Tissues From Barkley Sound, March, 1984.
(Continued: Page 7)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					PACIFIC HAKE -Merluccius productus						-LIVER			
B-2	<4.0	16.0	<0.08	1.20	<0.4	39.1	593.0	0.10	530	17.20	0.6	30.0	1.18	199.0
	<4.0	12.0	<0.08	0.70	<0.4	25.0	229.0	0.05	243	7.80	<0.4	<2.0	0.80	88.2
					PACIFIC HAKE -Merluccius productus						-GILL			
B-1	249.0	<4.0	0.91	0.15	1.6	5.7	692.0	<0.02	1120	8.54	<0.4	60.0	4.00	97.7
	184.0	5.0	0.93	0.14	1.0	5.2	467.0	<0.02	1360	9.83	<0.4	<2.0	1.67	72.0
	342.0	7.0	0.96	0.18	1.1	5.6	746.0	<0.03	1280	13.10	<0.4	7.0	8.00	110.0
	149.0	8.0	1.92	0.16	1.2	5.4	432.0	<0.02	1100	11.40	<0.4	<2.0	1.08	89.3
					PACIFIC HAKE -Merluccius productus						-GILL			
B-2	119.0	5.0	1.91	0.12	1.2	6.8	391.0	<0.02	1320	14.60	<0.4	<2.0	1.14	103.0
	968.0	6.0	1.98	0.15	2.5	9.5	1710.0	<0.02	1770	35.10	<0.4	<2.0	1.23	130.0
					LONGNOSE SKATE -Raja rhina						-MUSCLE			
B-2	9.0	137.0	0.71	0.11	0.7	8.4	31.2	0.69	1010	2.85	<0.4	<2.0	1.47	31.5

Appendix III. Trace Metals In Fish Tissues From Barkley Sound, March, 1984.
(Continued: Page 8)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							GREENSTRIPED ROCKFISH -Sebastes elongatus -MUSCLE							
B-2	5.0	14.0	<0.08	0.11	2.9	1.4	46.5	0.48	1320	1.05	<0.4	<2.0	1.55	14.7
							GREENSTRIPED ROCKFISH -Sebastes elongatus -LIVER							
B-2	<4.0	10.0	<0.08	2.10	0.7	25.4	921.0	0.13	362	3.27	<0.4	<2.0	1.15	163.0
							GREENSTRIPED ROCKFISH -Sebastes elongatus -GILL							
B-2	33.0	7.0	0.34	0.16	23.5	7.1	381.0		981	5.25	0.5	<2.0	1.82	94.4

APPENDIX IV

TRACE METALS IN SHRIMPS AND PRAWNS FROM BARKLEY SOUND, MARCH, 1984

Appendix IV. Trace Metals In Shrimp and Prawns From Barkley Sound, March, 1984.

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
						CRANGON SHRIMP -Crangon communis					-MUSCLE			
B-1	22.0	47.0	0.38	0.07	0.5	18.1	40.6		1520	2.26	<0.3	<1.0	1.27	54.8
	17.0	33.0	0.25	0.23	0.6	16.6	38.5		2150	1.75	<0.4	<2.0	1.44	49.4
	30.0	43.0	0.40	0.20	<0.5	20.1	61.9	0.07	2500	2.50	<0.5	<2.0	1.00	59.5
	15.0	45.0	0.20	0.18	<0.5	17.1	62.9	0.07	2110	1.80	<0.5	<2.0	1.90	50.7
	28.0	48.0	0.30	0.19	<0.5	13.5	44.1	0.14	2180	1.90	<0.5	<2.0	1.00	31.1
	16.0	46.0	0.20	0.28	<0.5	16.1	39.8	0.12	2790	2.10	<0.5	<2.0	0.90	27.5
	16.0	38.0	0.10	0.18	<0.5	19.6	33.7	0.21	1590	1.30	<0.5	<2.0	0.80	23.3
	46.0	46.0	0.67	0.28	0.7	16.0	66.3	0.12	2430	2.29	<0.5	<2.0	0.27	59.8
	20.0	35.0	0.60	0.23	0.7	17.5	41.1	0.02	2320	2.00	<0.5	<2.0	0.30	56.7
	40.0	33.0	0.22	0.18	0.6	11.3	40.1	0.15	1330	1.16	<0.4	<2.0	0.22	30.9
	43.0	48.0	0.20	0.18	1.2	17.6	57.4	0.06	1930	2.00	<0.7	<3.0	0.20	59.9
	63.0	61.0	0.37	0.23	0.8	10.9	105.0	0.06	2050	3.25	<0.4	<2.0	0.49	42.1
						CRANGON SHRIMP -Crangon communis					-HEPATOPANCREAS			
B-1	54.0	174.0	0.40	40.30	1.6	1090.0	567.0		1240	14.50	3.5	17.0	1.40	236.0
						SIDESTRIPE SHRIMP -Pandalopsis dispar					-MUSCLE			
B-1	31.0	56.0	0.14	0.17	0.4	14.0	54.9	0.10	1260	1.86	<0.4	<2.0	0.62	39.4
	17.0	32.0	0.14	0.15	0.5	14.2	26.9	0.22	1460	1.28	<0.4	<2.0	0.95	40.1
	13.0	34.0	0.17	0.13	0.4	10.4	24.0	0.21	1710	1.20	<0.4	<2.0	2.73	45.7
	7.0	33.0	0.10	0.13	0.6	15.5	11.4	0.12	1070	1.04	<0.4	<2.0	0.76	40.0
	8.0	35.0	0.25	0.15	0.5	14.7	12.7	0.18	1330	1.25	<0.4	<2.0	0.63	39.6
	10.0	28.0	0.13	0.13	0.6	12.0	15.6	0.10	1330	1.05	<0.4	<2.0	1.23	38.2

Appendix IV. Trace Metals In Shrimp and Prawns From Barkley Sound, March, 1984.
(Continued: Page 2)

(ug/g dry wt.)

SIDESTRIPE SHRIMP -Pandalopsis dispar -MUSCLE (Continued)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
B-1	7.0	35.0	0.10	0.13	0.6	13.0	13.6	0.07	1360	0.95	<0.4	<2.0	1.14	38.9
	4.0	33.0	<0.08	0.18	0.4	13.5	16.9	0.07	1340	0.85	<0.4	<2.0	1.22	40.1
	9.0	35.0	0.12	0.14	0.5	12.0	19.1	0.02	1360	1.04	<0.4	<2.0	1.23	40.0
	9.0	36.0	0.16	0.13	<0.4	11.5	14.9	0.03	1350	0.97	<0.4	<2.0	0.95	38.1
	7.0	40.0	<0.08	0.12	0.4	11.3	11.3	0.10	1340	0.90	<0.4	<2.0	1.05	36.7
	7.0	38.0	<0.08	0.11	0.4	11.4	12.0	0.07	1410	0.92	<0.4	<2.0	1.45	40.5
	10.0	32.0	0.11	0.12	<0.4	11.9	16.3	0.10	1060	1.04	<0.4	<2.0	0.91	34.6
	11.0	31.0	0.12	0.11	0.4	15.4	19.0	0.08	1390	1.12	<0.4	<2.0	1.25	40.7
	12.0	38.0	0.12	0.13	<0.4	18.0	24.3	0.12	1490	1.17	<0.4	<2.0	1.05	49.8
	11.0	39.0	0.11	0.23	0.6	17.9	22.0	0.09	1370	1.30	<0.4	<2.0	1.08	49.8
	15.0	44.0	0.14	0.69	0.4	12.6	27.2	0.07	1620	1.21	<0.4	<2.0	1.25	50.6
	14.0	39.0	0.14	0.13	0.5	17.7	16.9	0.06	1400	1.26	<0.4	<2.0	0.99	47.7
	19.0	38.0	0.14	0.13	0.6	13.4	38.8	0.07	1500	1.18	<0.4	<2.0	0.98	46.3
	17.0	39.0	0.10	0.06	0.5	12.6	27.0	0.12	1680	1.14	<0.4	<2.0	0.11	49.4
	7.0	35.0	0.11	0.08	0.5	16.9	18.0	0.12	1450	1.13	<0.4	<2.0	0.14	49.3
	22.0	37.0	0.16	0.09	<0.4	14.7	47.0	0.09	1710	1.51	<0.4	<2.0	0.12	51.1
	18.0	69.0	0.15	0.11	<0.4	8.6	35.5	0.02	1780	1.11	<0.4	<2.0	0.11	53.4
	20.0	42.0	0.12	0.07	0.5	15.6	19.7	0.12	1460	1.21	<0.4	<2.0	0.11	47.7
	23.0	165.0	0.25	0.18	2.0	34.2	52.1	0.06	4770	2.74	<0.4	<2.0	0.14	135.0
	34.0	38.0	0.30	0.06	0.4	15.5	33.3	0.15	1530	1.32	<0.4	<2.0	0.08	49.0
	18.0	33.0	0.18	0.07	0.5	15.3	36.2	0.02	1770	1.27	<0.4	<2.0	0.08	50.0
	7.0	34.0	0.09	0.06	0.4	11.8	14.4	0.15	1410	1.10	<0.4	<2.0	0.08	45.7
	71.0	43.0	0.17	0.15	0.5	16.3	28.9	0.14	1590	1.28	<0.4	<2.0	0.08	51.9
	15.0	41.0	0.15	0.10	0.6	11.5	23.6	0.12	1620	1.32	<0.4	<2.0	0.09	50.7

Appendix IV. Trace Metals In Shrimp and Prawns Rrom Barkley Sound, March, 1984.
(Continued: Page 3)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					SIDESTRIPE SHRIMP -Pandalopsis dispar -MUSCLE (Continued)									
B-1	9.0	41.0	0.26	0.15	0.4	15.0	15.2	0.14	1810	1.08	<0.4	<2.0	0.10	50.3
	15.0	45.0	0.15	0.07	0.5	16.0	21.1	0.09	1660	1.17	<0.4	<2.0	0.08	55.6
	8.0	39.0	0.11	0.10	<0.4	12.2	16.3	0.18	1480	1.14	<0.4	<2.0	0.10	47.8
	28.0	47.0	0.14	0.11	0.6	8.4	19.9	0.26	1680	0.95	0.4	<2.0	0.08	50.1
	6.0	35.0	0.14	0.06	0.6	11.4	15.0	0.14	1430	1.05	0.4	<2.0	0.17	44.8
	12.0	42.0	<0.08	0.07	0.7	12.9	17.4	0.07	1820	0.96	0.5	<2.0	0.10	49.3
	8.0	56.0	0.10	0.10	0.4	17.5	16.7	0.07	1660	1.27	<0.4	<2.0	0.08	54.1
					SIDESTRIPE SHRIMP -Pandalopsis dispar -HEPATOPANCREAS									
B-1	17.0	47.0	0.26	15.80	<0.4	799.0	76.0	0.25	572	10.50	0.8	<2.0	1.04	100.0
	23.0	54.0	0.28	23.60	0.6	893.0	77.7	0.29	546	10.90	0.7	<2.0	0.40	108.0
					PINK SHRIMP -Pandalus borealis -MUSCLE									
B-1	33.0	79.0	0.18	0.15	0.6	10.6	69.6	0.19	1820	2.49	<0.4	<2.0	1.13	37.2
	38.0	55.0	0.11	0.18	0.5	11.1	76.2	0.20	1630	2.14	<0.4	<2.0	1.28	38.5
	11.0	45.0	0.26	0.13	<0.4	9.7	16.4	0.16	1530	1.13	<0.4	6.0	0.98	38.2
	19.0	65.0	0.11	0.15	0.4	11.7	33.3	0.22	1470	1.47	<0.4	<2.0	1.38	39.2
	24.0	58.0	0.12	0.83	<0.4	11.9	44.5	0.10	1520	1.62	<0.4	33.0	1.07	39.1
	40.0	59.0	0.20	0.14	0.4	12.1	68.8	0.09	1670	2.13	<0.4	<2.0	0.98	38.5
	19.0	64.0	0.13	0.14	0.5	12.2	30.4	0.10	1710	1.37	<0.4	<2.0	0.85	41.0
	27.0	83.0	0.13	0.17	0.5	13.2	45.2	0.22	1830	1.63	<0.4	<2.0	1.18	41.0
	65.0	78.0	0.29	0.16	0.5	8.0	181.0	0.20	1830	4.23	<0.4	<2.0	1.15	40.1

Appendix IV. Trace Metals In Shrimp and Prawns From Barkley Sound, March, 1984.
(Continued: Page 4)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					PINK SHRIMP -Pandalus borealis						-MUSCLE	(Continued)		
B-1	59.0	83.0	0.39	0.16	0.5	11.8	104.0	0.15	1840	3.05	<0.4	<2.0	1.15	42.6
	7.0	41.0	0.16	0.20	<0.5	7.9	9.5		1620	0.99	<0.5	43.0	0.71	36.8
	9.0	41.0	0.09	0.15	0.5	8.4	13.2	0.15	1300	0.86	<0.4	<2.0	0.75	35.9
	11.0	51.0	0.11	0.15	<0.4	8.5	22.7	0.24	1340	1.09	<0.4	16.0	0.75	37.1
	8.0	50.0	0.10	0.14	0.5	11.5	14.8	0.19	1400	1.29	<0.4	<2.0	0.74	39.6
	4.0	50.0	0.11	0.13	0.5	13.8	21.1	0.47	1740	1.10	<0.4	37.0	1.83	52.6
	15.0	30.0	0.73	0.10	0.5	12.0	24.1	0.03	1760	1.33	<0.4	<2.0	0.92	39.1
	14.0	37.0	0.58	0.13	0.5	10.1	23.8	0.06	1300	1.42	<0.4	<2.0	1.16	37.4
	19.0	42.0	0.14	0.15	<0.4	14.6	29.5	0.14	1560	1.12	<0.4	<2.0	1.20	46.9
	<4.0	43.0	<0.08	0.15	0.7	10.1	6.5	0.15	1630	1.00	<0.4	<2.0	1.26	46.6
	8.0	44.0	0.23	0.13	0.5	10.9	19.1	0.13	1760	1.10	<0.4	<2.0	0.95	48.8
	8.0	44.0	0.10	0.14	<0.4	10.6	11.2	0.12	1720	1.05	<0.4	<2.0	1.26	50.2
	11.0	50.0	0.10	0.12	<0.4	10.1	11.2	0.20	1490	1.01	<0.4	<2.0	1.11	46.6
	10.0	56.0	<0.08	0.14	0.4	11.3	16.5	0.23	1610	0.94	<0.4	<2.0	1.28	53.4
	13.0	44.0	0.11	0.09	<0.4	6.9	28.4	0.17	1680	1.19	<0.4	<2.0	0.13	45.7
	7.0	43.0	0.08	0.08	0.7	8.8	11.7	0.10	1600	1.42	<0.4	<2.0	0.14	49.6
	4.0	48.0	<0.08	0.08	<0.4	10.6	7.0	0.11	1620	1.06	<0.4	<2.0	0.12	50.0
	6.0	51.0	0.08	0.09	0.5	7.6	15.0	0.17	1640	0.85	<0.4	<2.0	0.13	47.4
	5.0	53.0	0.08	0.09	0.5	9.9	16.4	0.19	1690	1.42	<0.4	<2.0	0.14	48.6
	7.0	51.0	0.40	0.10	0.6	10.4	11.7	0.11	2060	1.24	0.4	<2.0	0.12	49.4
	33.0	52.0	0.12	0.10	0.7	10.7	15.0	0.17	1920	1.08	<0.4	<2.0	0.11	49.3
	13.0	53.0	0.17	0.09	0.5	10.4	16.3	0.27	1920	1.09	<0.4	<2.0	0.08	51.6
	9.0	54.0	0.08	0.08	1.3	14.9	16.7	0.20	1770	1.20	<0.4	<2.0	0.08	50.9
	9.0	54.0	0.13	0.09	0.4	11.8	17.8	0.19	1660	1.05	<0.4	<2.0	0.08	47.0
	9.0	59.0	0.10	0.09	0.7	8.8	12.3	0.22	1520	0.80	<0.4	<2.0	0.08	45.9
	13.0	43.0	0.12	0.07	0.5	9.5	21.8	0.12	1440	0.88	<0.4	<2.0	0.11	43.2

Appendix IV. Trace Metals In Shrimp and Prawns From Barkley Sound, March, 1984.
(Continued: Page 5)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
PINK SHRIMP -Pandalus borealis -HEPATOPANCREAS														
B-1	37.0	99.0	0.84	0.20	0.8	1460.0	302.0	0.84	1150	16.30	1.4	3.0	1.02	171.0
PRAWN -Pandalus platyceros -MUSCLE														
B-1	25.0	57.0	0.09	0.15	<0.4	15.1	37.7	0.08	1580	1.11	<0.4	33.0	1.37	43.9
	4.0	99.0	<0.08	0.14	0.6	16.1	7.6	0.15	1610	0.74	<0.4	<2.0	1.03	46.8
	4.0	67.0	<0.08	0.14	<0.4	18.0	11.3	0.07	1410	0.87	<0.4	36.0	0.98	43.3
	19.0	79.0	0.12	0.15	0.5	11.3	38.4	0.05	1570	1.03	<0.4	<2.0	0.81	42.3
	6.0	63.0	<0.08	0.15	<0.4	14.8	11.9	0.09	1580	0.83	<0.4	<2.0	1.07	44.2
	9.0	91.0	0.09	0.16	0.5	12.6	17.9	0.07	1680	1.32	<0.4	<2.0	0.90	44.5
	8.0	47.0	<0.08	0.14	0.5	19.2	18.1	0.23	1600	0.89	<0.4	<2.0	1.34	53.5
	9.0	51.0	0.08	0.04	0.5	11.7	15.7	0.08	1730	0.86	<0.4	<2.0	0.11	53.7
	12.0	74.0	<0.08	0.08	0.4	14.3	19.4	0.13	1660	1.21	<0.4	<2.0	0.13	53.8
	6.0	32.0	0.11	0.04	0.4	10.7	12.9	0.24	1760	0.92	<0.4	<2.0	0.12	51.2
	17.0	58.0	0.12	0.05	0.4	12.1	27.2	0.26	1840	1.20	<0.4	<2.0	0.14	51.9
	<4.0	58.0	0.13	0.05	0.5	13.1	34.8	0.02	1670	1.29	<0.4	<2.0	0.11	52.0
PRAWN -Pandalus platyceros -HEPATOPANCREAS														
B-1	<4.0	54.0	0.21	6.50	0.5	474.0	183.0		457	8.47	0.8	4.0	0.94	104.0
	<8.0	40.0	0.20	4.00	0.9	543.0	643.0		420	7.50	<0.8	4.0	1.10	142.0
	11.0	63.0	0.40	5.70	0.6	493.0	638.0	0.19	770	11.50	2.1	9.0	0.40	124.0
	8.0	23.0	0.30	2.70	<0.5	213.0	84.4		410	4.20	1.4	5.0	0.30	45.8
	<4.0	48.0	0.08	3.10	<0.4	571.0	436.0	0.11	336	9.06	0.4	2.0	0.32	98.9

Appendix IV. Trace Metals In Shrimp and Prawns From Barkley Sound, March, 1984.
(Continued: Page 6)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					CRANGON SHRIMP -Crangon communis						-MUSCLE			
B-2	65.0	56.0	0.50	0.15	0.5	32.2	93.4	0.40	2190	7.56	<0.4	<2.0	1.58	67.1
	99.0	44.0	0.84	0.14	0.5	27.4	173.0	0.19	1980	13.90	<0.4	<2.0	1.43	69.6
	86.0	40.0	0.40	0.15	0.7	28.9	183.0	0.27	1770	11.10	<0.5	<2.0	1.30	74.1
	90.0	50.0	0.70	0.13	0.7	23.8	131.0	0.17	2340	17.60	<0.5	<2.0	1.50	64.4
	25.0	50.0	0.40	0.13	0.8	28.6	61.3	0.10	1690	6.60	<0.5	<2.0	0.90	89.0
	59.0	41.0	0.60	0.12	0.9	30.6	144.0	0.16	1820	17.40	<0.5	<2.0	1.00	104.0
	32.0	49.0	0.60	0.15	0.9	31.0	71.9	0.11	2380	10.00	<0.5	<2.0	1.00	107.0
	23.0	59.0	0.17	0.08	0.6	14.3	45.9	0.07	2020	1.94	<0.4	<2.0	0.08	52.6
	24.0	21.0	<0.09	0.05	<0.5	8.4	31.1	0.02	819	2.55	<0.5	<2.0	0.15	24.6
	14.0	21.0	<0.09	0.09	<0.5	11.0	20.4	0.02	697	2.40	<0.5	<2.0	0.12	25.1
	44.0	23.0	0.17	0.05	0.4	10.7	52.5	0.02	903	4.02	<0.4	<2.0	0.09	31.6
	89.0	46.0	0.28	0.09	0.4	25.0	168.0	0.20	1830	9.70	<0.4	<2.0	0.16	65.5
	16.0	17.0	0.23	0.05	<0.4	14.1	34.4	0.10	1020	3.76	<0.4	<2.0	0.11	30.9
	7.0	18.0	0.10	0.07	<0.4	12.3	24.1	0.04	586	2.43	<0.4	<2.0	0.09	27.1
	29.0	23.0	0.20	0.06	<0.5	9.5	54.1	0.09	970	4.00	<0.5	<2.0	0.10	27.6
	11.0	18.0	<0.09	0.08	<0.4	10.5	21.7	0.02	849	2.38	<0.4	<2.0	0.10	25.2
					SIDESTRIPE SHRIMP -Pandalopsis dispar						-MUSCLE			
B-2	36.0	66.0	0.23	0.16	0.6	13.6	53.0	0.06	1530	4.84	<0.4	<2.0	0.95	41.0
	29.0	67.0	0.17	0.15	0.6	13.8	51.7	0.13	1700	2.58	<0.04	<2.0	1.56	50.7
	17.0	54.0	0.10	0.12	0.4	13.9	33.5	0.10	1320	1.62	<0.4	5.0	0.95	42.1
	21.0	64.0	0.20	0.15	<0.4	13.0	36.2	0.15	1460	1.90	<0.4	<2.0	0.83	43.9
	21.0	57.0	0.15	0.13	0.5	13.4	33.9	0.17	1440	1.75	<0.4	<2.0	0.87	41.2

Appendix IV. Trace Metals In Shrimp and Prawns From Barkley Sound, March, 1984.
(Continued: Page 7)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
SIDESTRIPE SHRIMP -Pandalopsis dispar -MUSCLE (Continued)														
	17.0	49.0	0.10	0.14	0.5	14.5	27.4	0.07	1210	1.37	<1.4	<2.0	1.26	41.4
	20.0	73.0	0.17	0.15	0.5	13.1	33.7	0.28	1520	1.58	<0.4	<2.0	1.37	39.4
	18.0	55.0	0.13	0.18	0.6	12.3	33.4	0.14	1580	1.75	<0.4	<2.0	1.19	41.4
	21.0	73.0	0.23	0.11	<0.4	12.5	32.3	0.02	1680	2.02	<0.4	5.0	1.17	43.1
	20.0	62.0	0.11	0.10	0.4	17.9	32.0	0.26	1380	1.57	<0.4	<2.0	1.07	40.8
	52.0	75.0	0.22	0.13	0.6	19.6	65.2	0.19	1980	2.33	<0.4	<2.0	1.15	54.0
	23.0	62.0	0.12	0.07	0.5	15.3	35.7	0.04	1550	1.67	<0.4	<2.0	0.18	51.5
	18.0	59.0	0.11	0.07	0.5	15.0	26.4	0.07	1720	1.92	<0.4	<2.0	0.23	55.2
	19.0	55.0	0.10	0.06	0.5	20.4	38.5	0.14	1420	1.64	<0.4	<2.0	0.08	51.6
	16.0	60.0	0.12	0.09	0.4	18.7	35.3	0.06	1490	1.78	<0.4	<2.0	0.08	54.1
	14.0	56.0	<0.08	0.05	0.6	18.6	21.5	0.09	1360	1.34	<0.4	<2.0	0.11	48.2
	11.0	61.0	0.12	0.10	0.5	17.5	26.0	0.02	1620	1.53	<0.4	<2.0	0.16	51.7
	<4.0	45.0	<0.08	0.07	<0.4	15.5	23.6	0.09	1490	1.50	<0.4	<2.0	0.11	51.1
	28.0	58.0	0.19	0.06	0.6	16.7	38.1	0.04	2110	2.04	<0.4	<2.0	0.11	49.7
	22.0	66.0	0.11	0.10	0.6	16.6	33.8	0.02	1570	2.12	<0.5	<2.0	0.11	52.1
	26.0	65.0	0.26	0.08	0.6	19.3	40.5	0.09	1850	2.08	<0.4	<2.0	0.13	56.2
	28.0	62.0	0.14	0.07	0.6	19.2	33.4	0.14	1350	1.72	<0.4	<2.0	0.09	51.1
	25.0	55.0	0.46	0.07	0.5	21.5	35.8	0.02	1730	2.37	<0.4	<2.0	0.09	53.3
SIDESTRIPE SHRIMP -Pandalopsis dispar -HEPATOPANCREAS														
B-2	38.0	92.0	0.25	31.80	<0.4	1050.0	113.0		695	13.90	0.4	2.0	0.08	134.0

Appendix IV. Trace Metals In Shrimp and Prawns From Barkley Sound, March, 1984.
(Continued: Page 8)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					PINK SHRIMP -Pandalus borealis					-MUSCLE				
	21.0	47.0	0.13	0.26	0.5	18.9	38.2	0.20	1920	2.27	<0.4	<2.0	1.17	53.4
	17.0	45.0	0.19	0.13	0.5	17.1	31.3	0.07	1900	2.41	<0.5	<2.0	1.07	52.9
	18.0	42.0	0.14	0.13	0.6	20.8	31.7	0.12	2060	2.46	<0.4	<2.0	1.15	62.5
	20.0	71.0	0.10	0.13	<0.4	27.7	29.8	0.17	1670	1.86	<0.4	<2.0	1.42	54.8
	60.0	62.0	0.50	0.14	0.6	16.7	81.9	0.16	2210	3.60	<0.4	<2.0	1.42	54.8
	25.0	58.0	0.13	0.20	0.5	11.1	43.1	8.20	2110	2.25	<0.4	<2.0	1.56	50.1
	18.0	67.0	0.12	0.12	0.6	10.2	35.5	0.25	2160	2.11	<0.4	<2.0	0.92	46.9
	21.0	66.0	0.23	0.12	<0.4	12.5	41.9	0.31	1720	2.38	<0.4	<2.0	0.78	47.5
	21.0	71.0	0.10	0.13	0.5	19.5	32.2	0.25	1650	2.20	<0.4	<2.0	1.04	55.1
	8.0	86.0	0.10	0.16	0.5	23.2	43.6	0.20	1750	1.48	<0.4	<2.0	1.53	56.1
	38.0	75.0	0.20	0.05	0.7	15.4	60.8	0.06	2490	2.60	<0.5	<2.0	0.40	55.7
	22.0	90.0	0.10	0.04	0.5	21.2	29.8	0.02	1650	1.1	<0.4	<2.0	0.22	55.2
	30.0	35.0	0.37	0.08	<0.4	17.3	69.3		1830	3.29	<0.4	<2.0	0.17	59.9
	29.0	65.0	0.10	0.07	0.5	10.1	35.8	0.02	1870	1.80	<0.4	<2.0	0.14	52.2
	41.0	64.0	0.26	0.08	0.6	16.2	48.4		1950	2.94	<0.4	<2.0	0.16	50.9
	7.0	20.0	0.09	0.05	0.5	6.5	13.5	0.02	782	0.86	<0.5	<2.0	0.12	20.5
	11.0	66.0	0.09	0.08	<0.4	14.5	21.4	0.07	1860	1.92	<0.4	<2.0	0.08	50.1
					PINK SHRIMP -Pandalus borealis					-HEPATOPANCREAS				
B-2	59.0	182.0	0.93	34.20	0.9	2020.0	489.0		1320	25.80	1.8	3.0	1.31	189.0

Appendix IV. Trace Metals In Shrimp and Prawns From Barkley Sound, March, 1984.
(Continued: Page 9)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					PRAWN -Pandalus platyceros						-MUSCLE			
B-2	10.0	119.0	0.13	0.14	0.6	19.0	17.1	0.03	1580	1.95	<0.4	<2.0	1.19	44.9
	10.0	57.0	0.08	0.15	0.5	20.5	25.6	0.09	1650	1.17	<0.4	<2.0	1.25	43.5
	8.0	57.0	<0.08	0.15	0.6	24.8	16.7	0.18	1600	1.15	<0.4	<2.0	1.13	49.0
	9.0	42.0	0.10	0.15	0.5	15.1	13.4	0.10	1620	1.11	<0.4	<2.0	1.13	44.1
	7.0	73.0	0.08	0.05	0.5	15.9	21.2	0.15	1620	1.05	<0.4	<2.0	0.12	50.6
	8.0	113.0	0.09	0.07	0.4	21.4	24.5	0.28	1630	1.20	<0.4	<2.0	0.11	57.9
	11.0	65.0	0.12	0.04	0.5	20.8	20.8	0.12	1750	1.82	<0.4	<2.0	0.13	55.3
					PRAWN -Pandalus platyceros						-HEPATOPANCREAS			
	10.0	60.0	0.60	6.20	<1.0	858.0	642.0		670	15.80	1.0	6.0	1.50	149.0
	25.0	70.0	0.20	7.60	1.4	498.0	1290.0		660	12.40	0.9	15.0	0.50	119.0
	30.0	40.0	0.30	6.30	<1.0	792.0	490.0		1620	13.30	3.0	7.0	1.90	122.0
	30.0	88.0	0.60	10.50	1.4	865.0	920.0	0.20	1260	25.30	3.4	15.0	1.80	207.0
	13.0	92.0	0.30	5.90	0.9	536.0	722.0	1	680	18.60	1.5	8.0	0.60	143.0

APPENDIX V

TRACE METALS IN FISH AND CLAMS FROM QUATSINO SOUND, MARCH, 1984

Appendix V. Trace Metals In Fish and Clams From Quatsino Sound, March, 1984.

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					REX SOLE -Glyptocephalus zachirus						-MUSCLE			
QS-2	<4.0	183.0	0.14	0.14	0.6	0.4	9.1	0.10	1500	1.09	<0.4	<2.0	1.48	14.5
	<5.0	121.0	0.11	0.13	0.8	2.3	11.3	0.09	1270	1.33	<0.4	<2.0	<2.00	20.4
	22.0	49.0	0.17	0.12	0.7	0.7	39.3	0.11	1370	1.90	<0.4	<2.0	1.22	16.6
					REX SOLE -Glyptocephalus zachirus						-LIVER			
QS-2	14.0	162.0	<0.08	0.80	0.7	5.7	352.0	0.12	852	5.97	<0.4	<2.0	<2.00	104.0
					FLATHEAD SOLE -Hippoglossoides ellasodon						-MUSCLE			
QS-2	<4.0	42.0	0.10	0.14	0.7	1.1	16.8	0.39	1450	0.93	<0.4	<2.0	<2.00	18.9
					SLENDER SOLE -Lyopsetta exilis						-MUSCLE			
QS-2	7.0	36.0	0.09	0.12	0.7	0.8	40.8	0.15	1380	0.83	<0.4	<2.0	1.90	14.6
	<4.0	44.0	<0.08	0.12	0.5	0.5	8.9	0.19	1330	0.65	<0.4	<2.0	2.03	14.1
					DOVER SOLE -Microstomus pacificus						-MUSCLE			
QS-2	<4.0	236.0	0.15	0.14	0.4	<0.4	9.6	0.22	1220	1.33	<0.4	<2.0	1.64	15.0
	<4.0	168.0	0.09	0.19	0.5	0.6	16.5	0.29	1240	0.90	<0.4	<2.0	1.71	16.1
	<4.0	47.0	<0.08	0.14	0.7	1.6	9.6	0.14	1100	0.66	<0.4	<2.0	<2.00	16.3
	<4.0	170.0	<0.08	0.11	0.6	0.5	8.4	0.17	1190	0.74	<0.4	<2.0	1.63	15.9
	<4.0	45.0	0.49	0.19	0.7	1.0	14.2	0.13	1360	3.70	<0.4	<2.0	<2.00	26.9
	<4.0	38.0	0.19	0.15	0.5	2.9	10.3	0.33	1350	2.20	<0.4	<2.0	<2.00	18.3
	<4.0	146.0	0.09	0.15	0.5	4.2	10.6	0.23	1210	0.56	<0.4	<2.0	9.00	16.5

Appendix V. Trace Metals In Fish and Clams From Quatsino Sound, March, 1984.
(Continued: Page 2)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
DOVER SOLE -Microstomus pacificus -LIVER														
QS-2	6.0	17.0	<0.08	3.20	0.6	35.0	1570.0	0.20	596	5.57	<0.4	<2.0	<2.00	160.0
	13.0	38.0	0.17	0.40	0.7	18.7	2100.0	0.52	1070	4.55	<0.4	<2.0	<2.00	191.0
	<4.0	13.0	<0.08	0.50	0.5	31.3	624.0	0.09	400	3.06	<0.4	<2.0	1.47	143.0
	<5.0	43.0	<0.08	3.90	0.8	30.9	1910.0	0.08	566	3.89	<0.5	4.0	<2.00	184.0
	<5.0	9.0	<0.08	3.30	0.5	35.4	1570.0	0.08	520	3.70	<0.5	<2.0	<2.00	227.0
	<4.0	10.0	<0.08	2.40	0.4	34.2	1180.0	0.07	468	3.68	<0.4	<2.0	<2.00	140.0
DOVER SOLE -Microstomus pacificus -GILL														
QS-2	39.0	14.0	<0.08	0.15	1.3	6.0	247.0	0.06	1670	21.80	<0.5	<2.0	0.90	80.5
	249.0	12.0	<0.08	0.14	1.1	4.7	784.0	0.03	1640	17.90	<0.5	<2.0	1.40	64.0
	123.0	7.0	0.50	0.18	0.8	4.2	378.0	0.03	1700	17.80	<0.5	7.0	1.10	68.3
	142.0	7.0	0.60	0.17	1.1	4.2	610.0		1870	11.80	<0.7	<3.0	0.70	54.8
	120.0	9.0	0.90	0.18	1.5	6.1	341.0		1610	16.60	<0.7	<3.0	0.90	83.5
	43.0	17.0	0.30	0.16	1.5	5.9	383.0		1130	8.60	<0.9	<4.0	1.10	65.6
RATFISH -Hydrolagus colliei -MUSCLE														
QS-2	<4.0	54.0	<0.08	0.15	0.9	0.9	12.5	0.91	1210	1.24	<0.4	<2.0	1.60	18.9
RATFISH -Hydrolagus colliei -GILL														
QS-2	<5.0	21.0	0.11	0.37	0.5	4.7	272.0	0.60	842	10.80	<0.4	<2.0	1.24	63.7

Appendix V. Trace Metals In Fish and Clams From Quatsino Sound, March, 1984. (Continued: Page 3)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
BLACK-BELLIED EELPOUT -Lycodopsis pacifica-MUSCLE														
QS-2	12.0	45.0	5.02	0.19	0.6	1.4	26.3	0.20	1800	0.88	<0.4	<2.0	<2.00	28.5
PACIFIC HAKE -Merluccius productus -MUSCLE														
QS-2	<4.0	9.0	<0.08	0.17	0.7	2.3	10.6	0.23	1550	0.61	<0.4	<2.0	<2.00	13.9
PACIFIC HAKE -Merluccius productus -LIVER														
QS-2	<4.0	7.0	<0.08	0.45	<0.4	25.7	127.0	0.04	320	5.65	<0.4	<2.0	1.53	204.0
PACIFIC HAKE -Merluccius productus -GILL														
QS-2	<5.0	7.0	0.13	0.17	0.9	5.0	366.0		1450	4.04	<0.4	<2.0	1.24	78.6
LONGNOSE SKATE -Raja rhina -MUSCLE														
QS-2	<4.0	182.0	<0.08	0.16	0.5	0.9	15.1	0.64	1180	0.83	<0.4	<2.0	14.00	12.2
LONG NOSE SKATE -Raja rhina -LIVER														
QS-2	<4.0	82.0	<0.08	0.90	<0.4	27.5	341.0	0.09	216	2.76	<0.4	<2.0	0.93	38.4

Appendix V. Trace Metals In Fish and Clams From Quatsino Sound, March, 1984.
(Continued: Page 4)

(ug/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					WALLEYE POLLOCK -Theragra chalcogramma -MUSCLE									
QS-2	<4.0	20.0	0.14	0.35	0.7	1.5	15.3	0.19	1540	1.01	<0.4	<2.0	<2.00	22.2
	<4.0	88.0	0.15	0.35	<0.4	1.2	12.5	0.34	1490	0.60	<0.4	<2.0	1.15	16.6
					WALLEYE POLLOCK -Theragra chalcogramma -LIVER									
QS-2	<4.0	60.0	<0.08	0.19	0.5	16.3	54.6	0.05	540	4.81	<0.4	<2.0	1.22	61.9
	16.0	13.0	<0.08	0.20	<0.4	33.7	75.4	0.03	148	3.46	<0.4	<2.0	<2.00	51.4
					WALLEYE POLLOCK -Theragra chalcogramma -GILL									
QS-2	41.0	17.0	1.50	0.20	0.9	9.9	356.0		1980	5.30	<0.5	<2.0	1.60	112.0
	9.0	6.0	0.20	0.13	0.9	7.0	438.0		930	3.30	<0.5	<2.0	0.80	87.0
					MUSSEL -Yoldia spp. -MUSCLE									
QS-3	1650.0	60.0	8.90	0.60	3.0	811.0	3080.0	0.46	4700	51.80	<1.0	6.0	0.30	199.0
	1260.0	77.0	8.70	0.80	2.5	102.0	2490.0	0.47	5240	26.90	1.3	5.0	2.50	406.0
	1640.0	90.0	6.10	2.00	3.0	575.0	2840.0	0.26	6710	45.60	<2.0	6.0	6.10	207.0
	980.0	20.0	16.60	0.60	2.0	921.0	1570.0	0.44	3960	27.30	<1.0	<4.0	2.50	152.0

APPENDIX VI

TRACE METALS IN SHRIMP FROM QUATSINO SOUND, MARCH, 1984

APPENDIX VI TISSUE METAL LEVELS QUATSINO SOUND, MARCH 1984

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
CRANGON SHRIMP - Crangon communis - MUSCLE														
Q-2														
	9.0	18.0	0.20	0.27	0.6	13.3	20.8		789	0.89	<0.4	<2.0	0.31	24.4
	12.0	69.0	0.11	0.66	<0.5	19.4	27.0		2220	1.73	<0.5	<2.0	1.00	76.9
	20.0	70.0	0.80	0.30	<1.0	35.0	43.0	0.15	3480	3.20	<1.0	<4.0	2.00	84.1
	24.0	19.0	0.30	0.34	<0.6	12.4	46.2	0.02	1270	1.70	<0.6	<2.0	0.10	40.8
SIDESTRIPE SHRIMP - Pandalopsis dispar - MUSCLE														
Q-2														
	5.0	77.0	0.10	0.17	0.6	9.6	12.7	0.16	1820	1.19	<0.4	<2.0	1.41	46.1
	9.0	68.0	0.16	0.17	0.7	11.1	25.1	0.15	1730	1.34	<0.4	<2.0	1.28	47.7
	13.0	52.0	<0.08	0.15	<0.4	10.3	21.4	0.22	1540	1.87	<0.4	45.0	1.02	40.4
	10.0	65.0	0.09	0.17	0.4	9.2	18.4	0.22	1630	1.20	<0.4	<2.0	0.79	37.7
	10.0	60.0	0.15	0.12	0.6	8.9	17.0	0.15	2170	1.06	<0.4	<2.0	1.04	36.9
	13.0	77.0	<0.08	0.13	0.4	9.4	19.2	0.07	2220	1.58	<0.4	<2.0	1.12	46.9
	26.0	57.0	0.13	0.26	0.5	17.8	41.8	0.16	1940	3.06	<0.4	<2.0	1.03	58.0
	20.0	58.0	0.12	0.13	0.5	14.3	28.7	0.33	1620	2.34	<0.4	<2.0	1.14	55.4
	22.0	85.0	0.11	0.15	0.5	11.5	34.3	0.13	1920	1.15	<0.4	<2.0	1.05	50.1
	19.0	63.0	0.12	0.14	<0.4	14.2	33.3	0.09	1760	11.50	<0.4	<2.0	1.51	51.0
	11.0	65.0	0.09	0.16	<0.4	10.6	23.1	0.34	2320	1.95	<0.4	21.0	1.57	49.6
	14.0	64.0	0.10	0.15	0.4	11.3	23.9	0.32	1830	2.31	<0.4	<2.0	1.55	50.2
	5.0	63.0	<0.08	0.12	0.4	16.4	16.0	0.15	1860	1.02	<0.4	<2.0	1.00	50.2
	10.0	65.0	<0.08	0.13	0.5	20.2	16.8	0.20	1600	1.12	<0.4	<2.0	1.20	50.8
	5.0	66.0	<0.08	0.12	0.4	16.3	11.1	0.19	1570	1.01	<0.4	<2.0	1.03	49.2
	7.0	70.0	<0.08	0.14	<0.4	14.6	15.8	0.19	1760	0.88	<0.4	<2.0	0.99	49.9
	20.0	72.0	0.19	0.15	<0.4	11.7	38.6	0.11	2270	3.58	<0.4	<2.0	1.01	47.7
	<4.0	69.0	<0.08	0.17	<0.4	5.4	8.2	0.16	2080	0.64	<0.4	<2.0	0.88	43.9
	13.0	50.0	0.20	0.10	<0.5	10.7	12.0	0.25	1590	1.70	<0.5	<2.0	0.30	45.3
	17.0	78.0	0.09	0.07	<0.4	10.6	35.4	0.02	1950	1.59	<0.4	<2.0	0.11	49.8
	6.0	37.0	<0.08	0.09	0.4	13.6	11.9	0.15	1630	1.05	<0.4	<2.0	0.11	50.6
	7.0	50.0	<0.08	0.08	<0.4	10.0	13.7	0.12	1790	0.91	<0.4	<2.0	0.08	47.6

CONTINUED...

APPENDIX VI (Continued)

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
SIDESTRIPE SHRIMP - Pandalopsis dispar - MUSCLE														
Q-2														
	17.0	53.0	0.15	0.07	0.6	14.8	41.9	0.27	1840	2.84	<0.4	<2.0	0.08	55.6
	18.0	50.0	0.19	0.07	0.6	13.2	48.7	0.14	2020	2.23	<0.4	<2.0	0.08	56.3
	10.0	70.0	0.15	0.08	0.5	11.5	25.0	0.18	1760	2.62	<0.4	<2.0	0.09	48.1
	9.0	63.0	0.10	0.09	0.5	10.3	39.6	0.19	2170	2.20	<0.5	<2.0	0.20	50.0
	18.0	57.0	0.12	0.08	0.5	13.9	34.0	0.09	2230	2.85	<0.4	<2.0	0.08	54.1
	12.0	39.0	0.13	0.06	0.5	12.5	24.1	0.22	1740	1.19	<0.4	<2.0	0.12	46.6
	8.0	75.0	<0.08	0.09	0.5	9.0	11.0	0.14	1770	1.43	<0.4	<2.0	0.08	47.4
	16.0	48.0	0.11	0.07	0.5	14.0	32.7	0.04	1820	1.16	<0.4	<2.0	0.08	49.2
	<4.0	71.0	<0.08	0.09	0.5	13.0	14.9	0.11	1820	0.89	<0.4	<2.0	0.08	49.4
	20.0	77.0	0.10	0.06	0.5	12.0	21.6	0.09	1850	2.91	<0.4	<2.0	0.08	50.1
SIDESTRIPE SHRIMP - Pandalopsis dispar - HEPATOPANCREAS														
Q-2														
	27.0	154.0	0.40		0.8	1910.0	188.0		1170	20.30	2.1	5.0	0.21	160.0
	9.0	66.0	0.20	0.33	0.7	808.0	59.6	0.26	500	7.80	0.9	2.0	0.10	61.2
	37.0	186.0	0.51		1.0	2040	190.0	0.47	1410	18.50	1.9	5.0	0.08	161.0
PINK SHRIMP - Pandalus borealis - MUSCLE														
Q-2														
	<20.0	30.0	<0.30	1.30	19.0	23.0	129.0		1350	2.10	3.0	<6.0	0.50	28.7
	11.0	46.0	0.20	0.15	<.5	27.4	20.2	0.09	2280	1.10	<0.5	<2.0	1.10	37.1
	<5.0	25.0	<0.10	0.31	<.5	12.9	6.6	0.33	700	0.40	<0.5	<2.0	0.90	18.4
	12.0	53.0	0.15	0.36	0.5	30.4	101.0	0.15	2280	1.28	<0.5	<2.0	1.29	49.0
	70.0	86.0	0.50	0.35	1.4	29.7	98.4	0.07	3390	3.60	<0.7	<3.0	0.10	83.5

CONTINUED...

APPENDIX VI (Continued)

PINK SHRIMP - Pandalus borealis - MUSCLE

Q-3

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
	31.0	55.0	0.23	0.14	0.6	10.6	69.2	0.16	1580	2.87	<0.4	<2.0	1.36	40.1
	34.0	50.0	0.18	0.15	0.4	10.7	57.4	0.11	1460	2.01	<0.4	<2.0	1.05	38.0
	<4.0	39.0	<0.08	0.12	<0.4	6.7	5.3	0.22	1420	4.89	<0.4	<2.0	0.71	34.9
	10.0	43.0	0.11	1.13	0.4	7.9	19.9	0.19	1230	1.02	<0.4	<2.0	0.91	34.4
	5.0	43.0	<0.08	0.13	<0.4	9.2	9.1	0.21	1340	1.06	<0.4	<2.0	1.05	35.4
	31.0	72.0	0.14		<0.5	8.8	61.4	0.21	1640	2.10	<0.5	<2.0	1.37	37.7
	16.0	12.0	0.20	0.28	0.6	11.6	18.9	0.18	763	0.77	<0.4	<2.0	0.25	18.6
	7.0	41.0	0.11	0.13	0.4	9.8	12.2	0.78	1610	1.06	<0.4	<2.0	1.32	39.4
	19.0	41.0	0.17	0.10	<0.4	6.4	28.9	0.13	1860	0.93	<0.4	<2.0	0.78	35.2
	9.0	45.0	0.20	0.12	0.5	15.5	16.8	0.17	1480	1.09	<0.4	<2.0	1.28	50.3
	18.0	68.0	0.26	0.14	0.5	10.1	142.0	0.16	2150	4.20	<0.3	<1.0	1.44	48.1
	30.0	74.0	0.19	0.16	0.5	10.8	64.8	0.23	1790	3.78	<0.4	<2.0	1.31	48.5
	11.0	39.0	0.20	0.16	<0.5	12.3	31.1	0.17	2180	1.50	<0.5	<2.0	0.30	51.2
	11.0	55.0	0.14	0.09	<0.4	7.6	20.3	0.25	1630	0.99	<0.4	<2.0	0.13	46.5
	52.0	102.0	0.30	0.10	1.1	9.7	70.1	0.17	2100	2.30	<0.5	<2.0	0.08	52.5
	31.0	83.0	0.11	0.08	0.5	9.1	68.6	0.23	2300	2.26	<0.4	<2.0	0.08	50.2
	39.0	76.0	0.11	0.08	0.6	8.5	92.1	0.19	1840	2.96	<0.4	<2.0	0.08	42.5
	41.0	81.0	0.20	0.08	0.7	11.8	97.0	0.19	1890	2.65	<0.4	<2.0	0.09	49.6
	30.0	85.0	0.22	0.106	0.5	12.7	69.2	0.12	1810	2.19	<0.4	<2.0	0.18	53.4
	28.0	63.0	0.23	0.08	0.6	13.1	51.6	0.14	1750	2.11	<0.4	<2.0	0.30	50.2

APPENDIX VII

TRACE METALS IN FISH FROM SURF INLET, MARCH, 1984

Appendix VII. Trace Metals In Clams and Fish From Surf Inlet, March, 1984.

(mg/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
							BLUE MUSSEL -Mytilus edulis				-MUSCLE			
Pilings	150.0	20.0	1.70	5.00	2.0	13.0	489.0	0.20	3530	13.80	<2.0	<9.0	1.10	98.2
	220.0	30.0	1.40	4.00	3.0	18.0	588.0	<0.05	3620	12.50	<3.0	<10.0	10.00	119.0
	120.0	20.0	1.00	4.30	2.0	10.0	350.0	0.10	2620	8.30	<2.0	<8.0	8.00	106.0
	490.0	40.0	3.20	5.00	5.0	18.0	1060.0	0.20	3570	27.10	<4.0	<20.0	20.00	129.0
	140.0	20.0	1.80	4.60	3.0	13.0	441.0	0.30	3660	11.20	2.0	<8.0	8.00	93.1
	170.0	30.0	3.70	3.00	4.0	14.0	405.0	2.22	3050	8.50	3.0	<10.0	10.00	100.0
	120.0	20.0	0.80	3.50	3.0	8.0	368.0	1.40	2670	7.20	<2.0	<7.0	8.00	74.6
	80.0	10.0	0.90	4.30	2.0	9.0	5200.0	0.30	2510	28.60	<1.0	<5.0	8.00	79.0
	120.0	20.0	0.80	8.10	4.0	12.0	497.0	0.40	3250	7.40	<2.0	<6.0	13.00	83.9
	220.0	10.0	2.30	4.60	2.0	12.0	493.0	0.30	3800	21.90	<1.0	<6.0	6.00	113.0
							BLUE MUSSEL -Mytilus edulis				-MUSCLE			
Rocks	90.0	10.0	0.60	4.10	2.0	11.0	311.0	0.08	3310	10.20	<1.0	<4.0	0.50	92.8
	130.0	30.0	1.10	9.00	3.0	36.0	699.0	0.25	3510	15.90	<3.0	<10.0	10.00	112.0
	110.0	10.0	1.30	3.20	2.0	23.0	314.0	0.63	3300	15.40	<1.0	<4.0	4.00	150.0
	170.0	40.0	1.00	4.00	4.0	6.0	637.0	0.40	3340	9.40	<4.0	<20.0	20.00	104.0
	142.0	18.0	1.00	7.30	2.0	6.0	667.0	0.07	3750	8.20	<0.8	<3.0	1.50	88.4
	130.0	23.0	0.90	9.30	2.8	10.7	664.0	0.50	3760	7.60	<0.8	3.0	3.00	150.0
	200.0	30.0	1.60	11.30	4.0	12.0	836.0	0.20	4250	11.30	<2.0	<7.0	7.00	86.8
	180.0	30.0	1.10	8.00	4.0	14.0	405.0	0.48	2960	8.90	<3.0	10.0	10.00	94.0
	140.0	20.0	0.90	8.50	2.0	9.0	532.0	0.17	3140	8.50	<2.0	5.0	7.00	90.2
	90.0	20.0	0.90	5.60	3.0	9.0	341.0	<0.08	3660	6.10	<2.0	<7.0	7.00	92.3

Appendix VII. Trace Metals In Clams and Fish From Surf Inlet, March, 1984.
(Continued: Page 2)

(mg/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					YOLDIA -Yoldia spp.						-MUSCLE			
SI-2	2420.0	190.0	25.10	2.40	4.0	80.0	3620.0	0.09	5230	26.10	<2.0	<4.0	6.00	874.0
	1320.0	100.0	9.80	4.70	3.0	263.0	3300.0	0.05	4590	27.60	<1.0	<5.0	7.00	201.0
					YOLDIA -Yoldia spp.						-MUSCLE			
SI-3	1720.0	160.0	21.50	1.50	3.6	48.7	3460.0	<0.03	4940	24.60	<0.8	6.0	10.00	695.0
	2340.0	151.0	20.90	1.56	3.5	72.1	4310.0	0.07	6050	35.20	<0.8	6.0	5.00	1100.0
	2060.0	188.0	21.20	1.90	3.8	122.0	4060.0	0.42	5240	28.70	1.3	7.0	14.00	1210.0
	1020.0	164.0	9.90	1.36	2.1	54.0	1980.0	0.21	5080	14.00	1.9	3.0	5.00	580.0
					PETRALE SOLE -Eopsetta jordani						-MUSCLE			
SI-2	8.0	148.0	<0.08	2.30	0.5	7.1	222.0	1.28	1240	2.35	<0.4	<2.0	2.86	39.5
					PETRALE SOLE -Eopsetta jordani						-GILL			
SI-2	138.0	20.0	0.90	0.17	0.7	3.8	398.0	1.24	1140	5.50	<0.5	<2.0	1.80	112.0
					PETRALE SOLE -Eopsetta jordani						-LIVER			
SI-2	7.0	558.0	0.10	24.40	0.6	35.7	1330.0	0.41	620	3.90	<0.5	<2.0	2.00	189.0
					SLENDER SOLE -Lyopsetta exilis						-MUSCLE			
SI-3	<4.0	59.0	<0.08	0.14	0.7	1.9	15.1	1.58	1350	0.52	<0.4	<2.0	1.72	17.1

Appendix VII. Trace Metals In Clams and Fish From Surf Inlet, March, 1984.
(Continued: Page 3)

(mg/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					SLENDER SOLE -Lyopsetta exilis						-LIVER			
SI-3	26.0	87.0	0.10	13.50	0.5	70.2	1280.0	1.07	830	5.90	<0.5	<2.0	1.90	217.0
					DOVER SOLE -Microstomus pacificus						-MUSCLE			
SI-3	<4.0	207.0	0.16	0.18	0.6	1.1	14.2	0.32	1230	0.63	<0.4	<2.0	1.96	16.2
					DOVER SOLE -Microstomus pacificus						-LIVER			
SI-3	6.0	23.0	<0.08	12.50	0.5	9.0	830.0	2.64	489	3.69	<0.4	<2.0	1.87	198.0
					ENGLISH SOLE -Parophrys vetulus						-MUSCLE			
SI-2	7.0	112.0	<0.08	0.27	0.6	1.0	56.0	0.05	1360	0.84	<0.4	<2.0	2.94	19.0
					ENGLISH SOLE -Parophrys vetulus						-GILL			
SI-2	47.0	9.0	0.40	0.08	0.6	3.2	641.0	<0.02	1270	6.30	<0.5	<2.0	2.10	72.8
					ENGLISH SOLE -Parophrys vetulus						-LIVER			
SI-2	23.0	245.0	<0.08	9.30	0.7	111.0	1820.0	0.25	706	4.10	0.5	<3.0	9.00	287.0
					BLACKCOD -Anoplopoma fimbria						-MUSCLE			
SI-2	<4.0	12.0	0.09	0.30	0.8	1.9	33.2	0.20	1550	1.00	<0.4	<2.0	3.41	18.8
	<4.0	17.0	<0.08	0.27	0.7	4.4	24.4	<0.02	1500	0.71	<0.4	<2.0	8.00	17.2

Appendix VII. Trace Metals In Clams and Fish From Surf Inlet, March, 1984.
(Continued: Page 4)

(mg/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					BLACKCOD -Anoplopoma fimbria						-MUSCLE			
SI-3	<4.0	18.0	<0.08	0.23	0.5	2.3	22.3	<0.03	1580	0.79	<0.4	<2.0	2.09	23.8
					BLACKCOD -Anoplopoma fimbria						-GILL			
SI-2	68.0	19.0	1.22	0.40	2.9	13.3	1650.0	0.14	1080	12.40	<0.4	5.0	5.00	92.8
	61.0	16.0	2.50	0.20	0.5	4.6	329.0	0.03	510	6.10	<0.5	<2.0	2.00	37.2
					BLACKCOD -Anoplopoma fimbria						-GILL			
SI-3	39.0	6.0	0.93	0.20	0.4	2.9	225.0	<0.02	674	3.88	<0.4	<2.0	2.00	43.7
					BLACKCOD -Anoplopoma fimbria						-LIVER			
SI-2	<4.0	10.0	<0.08	5.60	0.5	312.0	705.0	0.03	522	4.28	<0.4	<2.0	1.71	106.0
	<4.0	16.0	<0.08	27.20	0.4	45.4	2970.0	0.29	479	4.46	<0.4	<2.0	1.79	132.0
					BLACKCOD -Anoplopoma fimbria						-LIVER			
SI-3	<4.0	28.0	0.08	19.60	0.6	42.2	2090.0	0.17	776	5.07	<0.4	<2.0	2.18	162.0
					RATFISH -Hydrolagus colliei						-MUSCLE			
SI-2	12.0	70.0	0.10	0.18	0.6	3.4	62.3	1.28	1180	2.43	<0.4	<2.0	2.66	33.9
	26.0	127.0	0.16	0.20	0.7	0.7	64.4	0.45	1140	1.27	<0.4	<2.0	2.02	17.0

Appendix VII. Trace Metals In Clams and Fish From Surf Inlet, March, 1984.
(Continued: Page 5)

(mg/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					RATFISH -Hydrolagus colliei						-MUSCLE			
SI-3	<4.0	57.0	<0.08	0.21	0.6	0.9	14.1	0.67	1180	1.15	<0.4	<2.0	2.38	15.3
	<4.0	61.0	0.12	0.22	0.7	1.2	20.5	0.05	1210	1.31	<0.4	<2.0	12.00	16.1
					RATFISH -Hydrolagus colliei						-GILL			
SI-2	17.0	17.0	0.11	0.19	0.4	4.0	246.0	0.09	750	5.32	<0.4	<2.0	2.31	64.2
	40.0	28.0	0.20	0.20	0.5	2.1	490.0	0.49	440	3.60	3.7	<2.0	2.00	27.1
					RATFISH -Hydrolagus colliei						-GILL			
SI-3	25.0	23.0	0.61	0.30	0.4	4.1	150.0	0.28	941	6.85	<0.4	<2.0	2.00	64.3
	118.0	91.0	0.42	0.30	0.4	5.4	113.0	0.36	886	6.27	<0.4	<2.0	2.00	62.7
					RATFISH -Hydrolagus colliei						-LIVER			
SI-2	27.0	73.0	<0.08	0.70	0.6	6.4	344.0		69	0.94	<0.4	<2.0	2.00	8.3
	400.0	299.0	0.17	0.90	0.4	7.0	513.0		75	0.87	<0.4	<2.0	2.00	11.7
					RATFISH -Hydrolagus colliei						-LIVER			
SI-3	343.0	261.0	<0.08	1.30	0.4	9.2	385.0	0.38	76	0.88	<0.4	<2.0	2.00	8.9
	17.0	27.0	0.09	0.60	0.4	6.3	136.0		61	0.71	<0.4	<2.0	2.00	7.2
					PACIFIC HAKE -Merluccius productus						-MUSCLE			
SI-2	13.0	89.0	0.09	0.28	0.5	2.9	50.5	0.23	1400	4.73	<0.4	<2.0	7.00	31.2
	19.0	35.0	0.20	0.29	0.5	3.9	91.4	0.77	1320	1.26	<0.4	<2.0	2.70	27.9
	15.0	10.0	0.26	0.23	0.6	1.5	54.5	0.28	1450	1.10	<0.4	<2.0	2.48	16.4

Appendix VII. Trace Metals In Clams and Fish From Surf Inlet, March, 1984.
(Continued: Page 6)

(mg/g dry wt.)

Station	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
PACIFIC HAKE -Merluccius productus -GILL														
SI-2	163.0	9.0	1.10	0.24	0.5	6.0	548.0	0.59	1290	5.00	<0.5	<2.0	2.30	92.9
	46.0	4.0	0.92	0.22	0.4	6.2	403.0	0.10	1000	2.79	<0.4	<2.0	2.15	69.4
	332.0	14.0	1.51	0.20	0.7	3.7	589.0	0.33	687	5.88	<0.5	<2.0	2.00	35.0
PACIFIC HAKE -Merluccius productus -LIVER														
SI-2	14.0	16.0	0.09	0.77	0.4	105.0	208.0	0.14	298	2.15	<0.4	<2.0	0.30	42.8
	6.0	164.0	<0.08	1.60	0.5	224.0	361.0	0.05	748	8.28	<0.4	<2.0	1.87	233.0
	5.0	18.0	<0.08	2.80	0.5	42.1	579.0	0.10	502	15.90	<0.4	<2.0	1.90	162.0
RED SNAPPER -Sebastodes ruberrimus -MUSCLE														
SI-2	<4.0	46.0	<0.08	0.18	0.5	2.4	19.5	0.59	1500	0.44	<0.4	<2.0	1.56	19.2
RED SNAPPER -Sebastodes ruberrimus -GILL														
SI-2	99.0	7.0	0.82	0.20	0.4	3.3	811.0	<0.02	1120	5.62	<0.4	<3.0	1.88	73.0
RED SNAPPER -Sebastodes ruberrimus -LIVER														
SI-2	5.0	19.0	<0.08	5.70	0.7	11.1	185.0	0.45	680	4.09	<0.4	<2.0	1.27	123.0

APPENDIX VIII

TRACE METALS IN SHRIMP AND PRAWNS FROM SURF INLET,
MARCH, 1984

Appendix VIII. Trace Metals In Shrimp and Prawns From Surf Inlet, March, 1984.

(ug/g dry wt.)

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
				CRANGON SHRIMP -Crangon communis							-MUSCLE			
SI-2	7.0	45.0	0.16	0.29	0.6	20.1	30.9	0.02	1580	1.03	<0.4	<2.0	1.39	51.2
	12.0	46.0	0.21	0.34	0.5	29.5	54.8	0.02	1730	1.20	<0.4	<2.0	1.29	55.9
	11.0	40.0	0.26	0.46	0.5	27.7	89.2	0.07	1770	1.41	<0.4	<2.0	1.03	48.9
				SIDESTRIPE SHRIMP -Pandalopsis dispar							-MUSCLE			
SI-2	4.0	68.0	0.17	0.12	0.4	20.8	26.4	0.02	1330	1.03	<0.4	<2.0	1.31	53.7
	8.0	73.0	0.20	0.11	0.5	15.0	42.0	0.08	1560	1.09	<0.4	<2.0	1.51	54.9
	4.0	70.0	0.09	0.16	0.5	15.2	15.5	0.12	1260	0.83	<0.4	<2.0	1.23	50.6
	10.0	62.0	0.40	0.13	0.6	17.2	25.6	0.10	1340	1.03	<0.4	<2.0	0.98	50.3
	12.0	63.0	0.15	0.14	0.7	12.2	26.7	0.09	1410	1.04	<0.5	<2.0	1.29	49.5
	8.0	71.0	0.39	0.14	0.7	14.1	18.0	0.09	1210	0.87	<0.4	<2.0	1.12	52.1
	15.0	74.0	0.12	0.52	0.5	18.2	25.5	0.10	1320	0.93	<0.4	<2.0	1.33	61.8
	18.0	65.0	0.22	0.12	0.7	16.5	147.0	0.04	1240	1.06	<0.4	<2.0	1.11	50.4
	5.0	58.0	<0.08	0.13	0.6	15.3	17.0	0.08	1270	0.83	<0.4	<2.0	1.14	48.3
	4.0	69.0	0.09	0.15	0.7	17.8	18.7	0.08	1270	0.79	<0.4	<2.0	1.54	50.7
	5.0	73.0	0.12	0.14	0.6	14.5	18.1	0.05	1450	0.85	<0.4	<2.0	1.32	54.0
	5.0	67.0	<0.08	0.13	0.5	15.5	13.1	0.08	1340	0.75	<0.4	<2.0	1.40	49.8
	15.0	74.0	0.17	0.13	<0.4	22.1	28.1	0.14	1550	1.01	<0.4	<2.0	1.06	56.7
	8.0	67.0	0.12	0.13	<0.4	17.9	16.6	0.09	1640	0.78	<0.4	<2.0	1.06	47.7
	<4.0	63.0	0.29	0.15	0.5	16.9	19.8	0.19	1390	0.96	<0.4	<2.0	1.11	51.6
	10.0	80.0	0.09	0.13	<0.4	18.5	13.1	0.14	1510	1.05	<0.4	<2.0	1.18	53.0
	5.0	61.0	0.18	0.14	0.7	15.1	19.9	0.12	1490	1.15	<0.4	<2.0	1.06	52.2
	9.0	76.0	0.13	0.12	<0.4	16.8	18.3	0.11	1330	0.91	<0.4	<2.0	1.16	56.9

Appendix VIII. Trace Metals In Shrimp and Prawns From Surf Inlet, March, 1984.
(Continued: Page 2)

(ug/g dry wt.)

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
SIDESTRIPE SHRIMP -Pandalopsis dispar -MUSCLE (Continued)														
	35.0	66.0	0.43	0.10	0.5	19.2	535.0	0.24	1330	1.38	<0.4	<2.0	1.02	55.3
	7.0	57.0	0.09	0.11	<0.4	10.4	32.5	0.19	1280	0.98	<0.4	<2.0	1.19	52.2
	6.0	59.0	0.09	0.10	0.4	14.4	15.2	0.18	1350	0.82	<0.4	<2.0	1.05	47.1
	13.0	62.0	0.30	0.11	<0.4	15.2	37.3	0.16	1530	1.01	<0.4	<2.0	0.99	50.5
	8.0	71.0	0.15	0.12	0.5	23.2	18.3	0.12	1340	1.03	<0.4	<2.0	1.20	55.9
	5.0	61.0	0.14	0.10	0.4	10.8	14.0	0.14	1350	0.94	<0.4	<2.0	1.25	49.0
SIDESTRIPE SHRIMP -Pandalopsis dispar -HEPATOPANCREAS														
SI-2	12.0	183.0	0.25	42.80	0.7	1130.0	92.1	0.23	648	11.80	1.6	<2.0	0.11	141.0
	12.0	211.0	0.39	79.20	0.6	1520.0	108.0	0.29	713	12.50	1.0	<2.0	0.09	156.0
	14.0	193.0	0.25	69.50	0.4	1470.0	123.0	0.03	671	12.10	1.2	<2.0	0.11	152.0
SIDESTRIPE SHRIMP -Pandalopsis dispar -MUSCLE														
SI-3	10.0	86.0	0.12	0.15	0.5	14.0	25.5	0.10	1790	1.72	<0.4	<2.0	1.13	47.9
	6.0	72.0	0.13	0.12	<0.4	13.9	35.2	0.14	1460	1.36	<0.4	<2.0	1.64	52.9
	9.0	73.0	0.17	0.17	0.5	12.3	20.1	0.12	1310	1.43	<0.4	<2.0	1.07	51.3
	21.0	87.0	0.33	0.25	0.5	26.1	37.2	0.04	1480	2.75	<0.4	<2.0	1.07	52.5
	6.0	91.0	<0.08	0.15	0.5	14.1	17.0	0.15	1440	1.29	<0.4	<2.0	1.20	49.4
	14.0	68.0	0.18	0.13	0.6	15.9	36.1	0.10	1240	2.62	<0.4	<2.0	1.24	50.0
	6.0	101.0	0.10	0.19	0.5	11.9	11.2	0.20	1600	1.04	<0.4	<2.0	1.38	48.2
	7.0	115.0	0.13	0.17	0.6	11.9	15.6	0.21	1480	1.24	<0.4	<2.0	1.29	50.3
	8.0	80.0	0.17	0.15	0.6	14.1	26.3	0.05	1390	1.88	<0.4	<2.0	1.21	50.2
	12.0	81.0	0.18	0.18	0.6	10.9	25.2	0.11	1510	1.44	<0.4	<2.0	1.37	49.0
	22.0	91.0	0.31	0.16	<0.4	10.6	29.3	0.29	2010	1.80	<0.4	<2.0	1.20	46.8
	<4.0	74.0	0.11	0.15	0.5	14.0	10.7	0.23	1540	1.07	<0.4	<2.0	1.25	48.6
	16.0	84.0	0.18	0.15	0.4	16.9	30.6	0.17	1690	1.82	<0.4	<2.0	1.11	49.6

Appendix VIII. Trace Metals In Shrimp and Prawns From Surf Inlet, March, 1984.
(Continued: Page 3)

(ug/g dry wt.)

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
SIDESTRIPE SHRIMP -Pandalopsis dispar -MUSCLE														
	8.0	80.0	0.17	0.15	0.6	14.1	26.3	0.05	1390	1.88	<0.4	<2.0	1.21	50.2
	12.0	81.0	0.18	0.18	0.6	10.9	25.2	0.11	1510	1.44	<0.4	<2.0	1.37	49.0
	22.0	91.0	0.31	0.16	<0.4	10.6	29.3	0.29	2010	1.80	<0.4	<2.0	1.20	46.8
	<4.0	74.0	0.11	0.15	0.5	14.0	10.7	0.23	1540	1.07	<0.4	<2.0	1.25	48.6
	16.0	84.0	0.18	0.15	0.4	16.9	30.6	0.17	1690	1.82	<0.4	<2.0	1.11	49.6
	9.0	116.0	0.12	0.17	<0.4	11.5	17.7	0.19	1530	1.04	<0.4	<2.0	1.28	49.4
	<4.0	100.0	<0.08	0.14	0.5	13.8	16.6	0.14	1370	1.25	<0.4	<2.0	1.53	51.9
	9.0	68.0	0.18	0.13	0.5	16.8	25.0	0.09	1290	1.99	<0.4	<2.0	1.07	47.8
	12.0	71.0	<0.08	0.13	<0.4	11.3	21.8	0.12	1340	1.44	<0.4	<2.0	1.18	50.3
	14.0	90.0	0.17	0.13	0.7	19.3	28.0	0.15	1550	4.43	<0.4	<2.0	1.10	56.5
	14.0	75.0	0.12	0.14	0.4	14.3	38.8	0.16	1530	1.30	<0.4	<2.0	1.11	52.1
	8.0	88.0	0.11	0.14	<0.4	14.2	21.0	0.14	1550	1.12	<0.4	<2.0	1.16	50.3
	15.0	94.0	0.10	0.13	<0.4	15.2	26.1	0.10	1230	1.16	<0.4	<2.0	1.17	50.2
	9.0	77.0	0.16	0.12	0.6	13.9	52.0	0.11	1390	1.62	<0.4	<2.0	0.93	52.0
	13.0	67.0	0.14	0.12	0.4	14.6	44.9	0.14	1240	1.54	<0.4	<2.0	1.30	48.5
	11.0	68.0	0.12	0.13	<0.4	9.9	19.3	0.17	1630	1.29	<0.4	<2.0	1.23	47.8
SIDESTRIPE SHRIMP -Pandalopsis dispar -HEPATOPANCREAS														
SI-3	26.0	215.0	0.59	35.70	0.5	1420.0	156.0	0.23	864	14.40	1.8	3.0	0.15	136.0
	63.0	397.0	3.90	55.80	1.3	1290.0	697.0		1790	21.30	2.5	7.0	0.20	209.0

Appendix VIII. Trace Metals In Shrimp and Prawns From Surf Inlet, March, 1984.
(Continued: Page 4)

(ug/g dry wt.)

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
	PINK SHRIMP -Pandalus borealis -MUSCLE													
SI-2	<5.0	65.0	0.20	0.12	0.9	11.8	16.2	0.14	1520	0.90	<0.5	<2.0	1.60	49.8
	<4.0	76.0	0.12	0.11	0.4	12.4	14.1	0.14	1560	0.85	<0.4	<2.0	1.59	48.3
	<5.0	64.0	0.30	0.17	0.7	12.6	23.9	0.08	1700	1.30	<0.5	<2.0	1.70	48.5
	5.0	62.0	<0.08	0.13	0.4	10.1	12.5		1150	0.78	<0.4	<2.0	1.30	50.3
	4.0	73.0	0.14	0.13	1.2	12.4	13.6	0.09	1250	0.86	<0.4	<2.0	1.22	53.4
	<4.0	59.0	<0.08	0.13	0.5	8.0	9.7	0.10	1410	0.79	<0.4	<2.0	1.21	44.2
	<4.0	49.0	<0.08	0.12	0.5	6.9	9.4	0.09	1560	0.73	<0.4	<2.0	1.41	46.0
	4.0	67.0	0.35	0.14	0.5	11.4	19.5		1540	1.04	<0.4	<2.0	1.33	49.5
	5.0	61.0	0.12	0.12	0.6	11.4	16.0		1480	1.05	<0.4	<2.0	1.97	48.7
	8.0	56.0	0.17	0.10	<0.4	10.7	20.1	0.16	1570	0.85	<0.4	<2.0	0.90	39.9
	9.0	54.0	0.18	0.10	<0.5	12.2	15.4	0.15	1800	1.01	<0.5	<2.0	0.99	44.7
	<5.0	51.0	0.10	0.14	1.2	11.8	12.8	0.17	1280	0.90	<0.5	<2.0	1.20	43.5
	<4.0	54.0	0.12	0.13	0.6	14.3	19.2	0.12	1500	0.94	<0.4	<2.0	1.28	47.8
	5.0	68.0	0.10	0.14	<0.4	8.2	9.4	0.19	1600	0.73	<0.4	<2.0	1.26	50.0
	8.0	65.0	0.12	0.12	0.4	7.9	19.1	0.14	1410	0.75	<0.4	<2.0	1.10	48.8
	7.0	76.0	0.10	0.12	0.4	12.0	17.0	0.15	1510	0.89	<0.4	<2.0	0.98	51.6
	5.0	63.0	0.24	0.10	0.5	11.2	13.8	0.16	1480	0.92	<0.5	<2.0	0.85	49.2
	15.0	59.0	0.42	0.20	<0.4	12.7	15.9	0.14	1370	0.96	<0.4	<2.0	1.02	51.9
	PINK SHRIMP -Pandalus borealis -HEPATOPANCREAS													
SI-2	27.0	198.0	1.48	41.20	0.7	1280.0	513.0		901	11.70	2.5	<2.0	0.12	152.0

Appendix VIII. Trace Metals In Shrimp and Prawns From Surf Inlet, March, 1984.
(Continued: Page 5)

(ug/g dry wt.)

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
					PINK SHRIMP -Pandalus borealis						-MUSCLE			
SI-3	58.0	90.0	3.10	0.24	0.7	15.5	84.9	0.08	1620	4.80	<0.5	<2.0	3.00	42.6
	39.0	98.0	0.50	0.40	0.6	12.9	53.5		1700	3.06	<0.4	<2.0	1.63	48.8
	15.0	81.0	0.30	0.16	0.5	9.8	35.2	0.20	1340	2.20	<0.5	<2.0	1.10	34.9
	20.0	96.0	0.43	0.26	0.8	11.6	68.2	0.16	1680	3.23	<0.4	<2.0	1.16	47.8
	11.0	105.0	0.40	0.22	0.7	9.7	33.0	0.18	1520	2.80	<0.5	<2.0	1.80	43.0
	16.0	87.0	0.70	3.75	0.4	10.5	49.2		2010	2.34	<0.4	<2.0	1.62	43.0
	20.0	84.0	0.70	0.24	0.8	13.6	51.5	0.17	2330	3.10	<0.5	<2.0	1.50	54.5
	25.0	90.0	0.35	0.21	0.7	12.3	46.9		1710	2.43	0.6	<2.0	1.20	51.7
	38.0	100.0	0.70	0.24	0.5	12.9	126.0	0.21	2280	3.20	<0.5	<2.0	1.10	52.3
	16.0	132.0	0.18	0.24	<0.4	11.7	41.1	0.19	1530	3.23	<0.4	<2.0	1.37	48.8
	22.0	97.0	0.60	0.20	<0.5	10.8	34.3	0.16	2110	2.80	<0.5	<2.0	1.20	47.4
	32.0	102.0	0.52	0.19	<0.4	12.4	50.8	0.21	2060	3.00	<0.4	<2.0	1.00	53.5
					PRAWN -Pandalus platyceros						-MUSCLE			
SI-2	5.0	84.0	0.09	0.15	0.9	23.8	198.0	0.07	1460	0.93	0.7	<2.0	1.43	56.9
	<4.0	109.0	<0.08	0.12	0.4	15.8	11.4	0.11	1030	0.53	<0.4	<2.0	1.16	46.0
	<4.0	118.0	<0.08	0.13	<0.4	19.2	20.8	0.25	1350	0.69	<0.4	<2.0	0.94	49.2
	11.0	143.0	0.16	0.15	0.5	19.3	45.5	0.10	1530	1.14	<0.4	<2.0	1.45	59.3

Appendix VIII. Trace Metals In Shrimp and Prawns From Surf Inlet, March, 1984.
(Continued: Page 6)

(ug/g dry wt.)

STATION	AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
				PRAWN -Pandalus platyceros							-HEPATOPANCREAS			
SI-2	9.0	213.0	0.29	5.10	0.6	383.0	1640.0	0.08	556	9.74	2.6	6.0	0.15	120.0
				PRAWN -Pandalus platyceros							-MUSCLE			
SI-3	11.0	127.0	7.77	0.10	0.6	17.6	35.1	0.04	1450	1.06	<0.4	<2.0	1.23	52.4
	6.0	160.0	0.13	0.10	0.6	9.1	7.6	0.13	955	1.08	<0.4	<2.0	0.92	38.5
	6.0	167.0	0.13	0.14	0.5	21.5	7.8	0.17	1520	0.99	<0.4	<2.0	1.19	52.3
	13.0	158.0	0.09	0.13	0.4	13.2	13.3	0.14	1670	1.26	<0.4	<2.0	1.00	53.9
				PRAWN -Pandalus platyceros							-HEPATOPANCREAS			
SI-3	10.0	268.0	3.97	18.80	0.8	556.0	660.0	0.12	786	14.70	2.8	9.0	0.11	153.0

APPENDIX IX

TRACE METALS IN FISH AND SHRIMP FROM LAREDO SOUND, MARCH, 1984

Appendix IX. Trace Metals In Fish and Shrimp From Laredo Sound, March, 1984.

(ug/g dry wt.)

AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
SIDESTRIPE SHRIMP -Pandalopsis dispar										-MUSCLE			
48.0	66.0	0.46	0.14	0.5	8.6	52.9		1830	1.33	<0.4	<2.0	1.24	47.9
14.0	66.0	0.21	0.13	0.6	11.4	25.1		1590	1.09	<0.4	<2.0	0.87	48.4
15.0	72.0	0.51	0.19	0.5	8.1	33.8		2380	1.31	<0.4	<2.0	1.35	49.8
26.0	61.0	0.29	0.14	0.6	7.3	23.3		1860	1.16	<0.4	<2.0	1.15	48.8
26.0	57.0	0.61	0.20	<0.4	18.3	42.2		2100	2.38	<0.4	<2.0	1.03	52.1
14.0	64.0	0.50	0.23	<0.5	23.8	41.7		1600	1.60	<0.5	<2.0	1.10	51.4
15.0	55.0	0.20	0.17	0.6	9.3	36.9	0.14	1630	1.10	<0.5	<2.0	0.90	49.3
16.0	64.0	0.50	0.41	0.7	14.9	25.4	0.12	1750	1.50	<0.5	<2.0	1.00	55.4
31.0	56.0	0.80	0.38	0.9	19.7	43.4	0.13	2110	2.30	<0.5	<2.0	0.60	59.3
18.0	69.0	0.36	0.15	0.6	8.6	90.6	0.26	2340	2.42	<0.4	<2.0	1.22	53.7
51.0	56.0	0.58	0.45	0.8	17.7	46.6	0.11	2000	1.91	<0.4	<2.0	0.97	60.8
15.0	63.0	0.26	0.16	0.6	11.4	25.4	0.13	1960	1.40	<0.5	<2.0	0.73	56.6
ENGLISH SOLE -Parophrys vetulus										-MUSCLE			
32.0	71.0	0.45	0.21	0.7	1.7	56.1		1190	1.88	<0.4	<2.0	1.19	33.8
8.0	77.0	0.19	0.22	0.7	<0.4	20.6		1220	0.79	<0.4	<2.0	1.34	19.7
HALIBUT -Hippoglossus stenolepis										-MUSCLE			
7.0	9.0	0.11	0.23	0.6	0.9	21.5		1610	0.75	<0.4	<2.0	1.63	18.9
5.0	9.0	0.10	0.26	0.8	5.1	23.0		1950	0.65	<0.4	<2.0	1.10	18.6

Appendix IX. Trace Metals In Fish and Shrimp From Laredo Sound, March, 1984.
(Continued: Page 2)

(ug/g dry wt.)

AL	AS	BA	CD	CR	CU	FE	HG	MG	MN	MO	NI	PB	ZN
HALIBUT -Hippoglossus stenolepis -LIVER													
<4.0	32.0	0.08	15.80	<0.4	22.7	1400.0		682	4.26	<0.4	<2.0	1.35	100.0
SHORTFIN EELPOUT -Lycodes brevipes -MUSCLE													
23.0	8.0	1.81	0.19	1.0	4.7	61.4		1800	6.14	<0.4	<2.0	4.00	73.4
74.0	7.0	2.48	0.11	1.1	2.2	106.0		2250	9.36	<0.4	<2.0	1.13	64.3
41.0	8.0	2.24	0.18	1.2	2.2	72.1		1870	6.86	<0.4	<2.0	4.00	84.9

APPENDIX X

INTERSTATION DIFFERENCES IN TRAWL CATCHES FOR EACH SPECIES

APPENDIX X INTERSTATION DIFFERENCES IN TRAWL CATCHES FOR EACH SPECIES

SPECIES	COMMON NAME	STATIONS (mean number/trawl) LS	S1-2	S1-3	QS-2	QS-3	BS-1	BS-2
PORIFERA				lots				
GORGANCEA				lots				
BRANCHIOPODA				lots				
CNIDARIA - ANTHOZOA	anemones		1	20				
MOLLUSCA - GASTROPODA	nudibranchs			2				
	other			1		4		
- PELECYPODA	axe yoldia		4	11	3	13		
Yoldia spp.								
- CEPHALOPODA								
Loligo opalescens	squid		1	1		1		1
Octopus sp.	octopus					1	1	1
- CARIDEA								
Crangon communis	common crangon	5	16		19	29	165	90
Pandalopsis dispar	sidestripe shrimp	18	294	48	81	22	1083	118
Pandalus borealis	pink shrimp (spiny)	3	271	42	11	324	300	366
Pandalus platyceros	prawn		4	4		12	12	12
Spirontocaris spina			33	8	1	2	59	
Pasiphaea pacifica	glass shrimp			20	2			
- ANOMERA								
Munida quadrispina	squat lobster		7			4		
Pagurus sp.	hermit crab					2		

CONTINUED....

APPENDIX X (Continued)

SPECIES	COMMON NAME	LS	S1-2	S1-3	QS-2	QS-3	BS-1	BS-2
		STATIONS (mean number/trawl)						
- BRACHYURA								
Cancer magister	dungeness crab							
Chiomeceter bairds	tanner crab							
Hyas Iyratus	lyre crab			11				
Cancer gracilis	rock crab							
ECHINODERMATA								
- HOLOTHUROIDEA								
Parastichopus sp.	sea cucumber		3					
Molpadia sp.		2		12		1		
- ECHINOIDEA								
Briastaer sp.	heart urchin	lots	104	lots	4	5	48	
Strongylocentrotus sp.	red sea urchin					2		
- ASTEROIDEA								
Hippastena spinoser				1				
Luidia foliolata					2			
Pediaster aegralis						4		
Orthaderias sp.						4		
-OPHIUROIDEA								
Gorgonocephalus	basket star							
Chiridota sp.	brittle star			lots	lots			
CHORDATA - PISCES								
- AGONIDAEE								
Agonus acipenserinus	sturgeon poacher			1		1	40	9

CONTINUED...

APPENDIX X (Continued)

SPECIES	COMMON NAME	LS	S1-2	S1-3	QS-2	QS-3	BS-1	BS-2
		STATIONS (mean number/trawl)						
- BATHRACHOIDIDAE	toad fish							
Porichthys notatus	midshipman					1	70	11
- CHIMAERIDAE	chimaeras							
Hydrolagus colliei	ratfish	15	16	8	10	3	63	12
- CULUPEIDAE								
Clupea harengus pallasi	pacific herring							
-CYCLOPTERIDAE	lumpfish			1				
- GADIDAE	cods							
Theragra chalocogramma	walleye pollock				2		1	
Anaplopoma fimbria	blackcod		1	1				
Merluccius productus	pacific hake		16		1		134	19
- HEXAGRAMMIDAE								
Ophiodon elongatus	ling cod						1	
- PLEURONECTIDAE	soles							
Glyptocephalus zachirus	rex		2		3	1	59	
Hippoglossoides ellasodon	flathead				1		42	
Lyopsetta exilis	slender		13			10	296	17
Microstomus pacifica	dover					1		8
Parophrys vetulus	english	1	1			1	6	
Hippoglossus stenolepis	halibut	1						
- RAJIDAE	skates							
Raja rhina	longnose				1			

CONTINUED...

APPENDIX X (Continued)

SPECIES	COMMON NAME	STATIONS (mean number/trawl) LS	S1-2	S1-3	QS-2	QS-3	BS-1	BS-2
Sebastes aleutianus	rougheye rockfish	1						
Sebastes ruberrmus	red snapper		1	2	1			
- ZOARCIDAE	eelpouts							
Lycodopsis pacfica	blackbelly				1		9	4
Lycodes brevipes	shortfin		1	1				

NB: LS = Laredo Sound
SI = Surf Inlet
QS = Quatsino Sound
BS = Barkley Sound