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# **Preliminary Investigation on Aquatic Invasive Species of Marine and Estuarine Macrobenthic Invertebrates on Floating Structures in Five British Columbia Harbours**

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PRELIMINARY INVESTIGATION ON AQUATIC INVASIVE SPECIES  
OF MARINE AND ESTUARINE MACROBENTHIC INVERTEBRATES  
ON FLOATING STRUCTURES IN FIVE BRITISH COLUMBIA  
HARBOURS

by

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## ABSTRACT

Lu, L., Levings, C.D., and Piercey, G.E. 2007. Preliminary investigation on aquatic invasive species of marine and estuarine macrobenthic invertebrates on floating structures in five British Columbia harbours. Can. Manuscr. Rep. Fish. Aquat. Sci. 2814: iii + 30 p.

Samples of invertebrate communities on buoys and floating docks at Vancouver, Esquimalt, Nanaimo, Port Alberni and Prince Rupert, British Columbia, were obtained in August and September 2005. The purpose of the preliminary survey was to provide baseline data on the taxonomic composition of the invertebrates, with specific reference to possible aquatic invasive species. Thirty-five invasive or cryptogenic species were found. *Conopeum seurati* (Canu, 1928), a bryozoan native to the Atlantic Ocean, was confirmed from Port Alberni and may be the first record of the species from the northeast Pacific.

## RESUME

Lu, L., Levings, C.D., and Piercey, G.E. 2007. Preliminary investigation on aquatic invasive species of marine and estuarine macrobenthic invertebrates on floating structures in five British Columbia harbours. Can. Manuscr. Rep. Fish. Aquat. Sci. 2814: iii + 30 p.

Nous avons prélevé des échantillons des communautés d'invertébrés sur les bouées et les quais flottants à Vancouver, à Esquimalt, à Nanaimo, à Port Alberni et à Prince Rupert (Colombie-Britannique) en août et en septembre 2005. Le but du relevé préliminaire était d'obtenir des données de référence sur la composition taxonomique des invertébrés, en traitant particulièrement des espèces aquatiques envahissantes possibles. Nous avons observé 35 espèces envahissantes ou d'origine indéterminée. Nous avons confirmé la présence de *Conopeum seurati* (Canu, 1928), un bryozoaire indigène de l'océan Atlantique, à Port Alberni, ce qui pourrait constituer la première observation de l'espèce dans le Nord-Est du Pacifique.

## INTRODUCTION

Biological invasions are a major global environmental and economic problem. In recent decades, the world has witnessed an array of harmful invasions by exotic marine organisms (Cohen and Carlton 1998; Cohen et al. 2005). Marine and estuarine invasive species are transported into coastal regions mainly through ballast water, ship hulls and introduced aquaculture organisms (Levings et al. 2002). Aquatic invasive species (AIS) of marine origin are most likely found at coastal harbours with past and present ship traffic.

A number of surveys of marine and estuarine invasive species were carried out along the Pacific coast in the United States in the recent decade (Cohen 1998; Cohen et al. 1998; Cohen et al. 2001; Boyd et al. 2002; Cohen et al. 2002; DFG 2002; Fairey et al. 2002; Cohen and Moyle 2004; Cohen et al. 2005). However, few surveys of hard-bottom benthic invertebrates have been undertaken to determine the presence of AIS along the Pacific coast in Canada. Other than the preliminary surveys of Richoux et al. (2006) and Macdonald et al. (2000), no studies have been conducted on macrobenthic invertebrates on floating structures in BC waters. The artificial nature of the surfaces of buoys and floating docks may contribute to the abundance of aquatic invasive organisms, based on the theory that a disturbed or altered environment is more easily invaded (Cohen and Carlton 1998).

The objectives of this study were to develop a preliminary inventory of invertebrate aquatic invasive and cryptogenic species (as defined by Carlton 1996) on buoys and floating docks at harbours in BC, to compare the differences in AIS between regions, and to provide quantitative reference data of benthic communities for future assessments.

## MATERIALS AND METHODS

### Sample Collection

Five harbours along the BC coast, i.e. Vancouver, Nanaimo (Nanaimo Harbour and Departure Bay), Esquimalt, Prince Rupert and Port Alberni, were selected for this study, and a total of 25 floats or buoys were sampled between 18 Aug 2005 and 20 Sept 2005 (Figure 1). The number of structures sampled in each harbour ranged from three in Port Alberni to eight in Prince Rupert. Sample locations were recorded with a Garmin GPS Model 76. A description of the sampling sites is given in Table 1, and a description of biotic communities in Table 2.

The floating structures were constructed from wood, concrete, and steel. Most had been in the water for at least one year so the communities were of varying age, probably up to at least 10 y in some instances such as the concrete docks in the Navy facilities at Esquimalt. Navigational buoys maintained by the Canadian Coast Guard in BC are hauled out of the water on a three year rotational schedule in British Columbia so the

buoys that were sampled had been in the water for no more than three years. Some of the wood structures were creosoted.

Three quantitative replicate samples were taken from each structure from the water surface downwards using a 0.1m x 0.1m quadrat and a hand scraper. A net with 0.5 mm mesh was used for collecting scraped organisms. The samples were put in plastic jars and fixed in a 10% buffered formalin seawater solution in situ. In the laboratory the benthic samples were washed through a 0.5 mm mesh sieve. Animals retained on the sieve were sorted using a Wild M5 binocular dissecting microscope, identified to the lowest possible taxonomic levels and enumerated. After enumeration samples were stored in 70% isopropyl alcohol. Mussels (*Mytilus* sp.) at Sites 1 and 2 in Vancouver harbour were not counted because they were very abundant at these sites.

### Identification of Specimens

All specimens were identified by Lin Lu, except for tanaids, isopods, amphipods and decapods from several samples, which were identified by Phil Hoover, Biologica Environmental Services Ltd., and tunicates which were identified by Debbie Paltzat, Pacific Biological Station, Nanaimo, BC.

### Statistical Analysis

Combined data from three replicates at each site were used in all analyses. Non-metric multi-dimensional scaling (MDS), based on similarity using Bray-Curtis coefficient on  $\sqrt{\sqrt{}}$ -transformed abundance data, was employed to analyse differences in community structure of benthic invertebrates among sampling sites (Clarke and Warwick 2001). For all colonial species, a value of 10 was input as their abundance. For *Mytilus* sp. mussels at Sites 1 and 2 in Vancouver harbour, an estimate of 2000 was used as its abundance for each replicate sample.

## RESULTS

A total of 174 taxa, consisting primarily of polychaetes (50 taxa), amphipods (30 taxa), isopods (11 taxa), gastropods (11 taxa), decapods (nine taxa), bryozoans and tunicates (eight taxa), and cirripeds (seven taxa), were recorded in the survey (Appendix). The results should be considered preliminary, however, as some taxonomic groups may require further identification. All samples have been archived at CAER for possible further identification. For instance, platyhelminths and insect larvae were not identified to the genus level., In addition, *Mytilus* species may include *M. trossulus*, *M. galloprovincialis* and *M. edulis*, or hybrids thereof, which are not readily distinguished morphologically (see Richoux et al. 2006).

The sponge *Halichondria bowerbanki*, the tanaid *Anatanais pseudonormani*, the isopod *Janiralata occidentalis*, the bryozoans *Schizoporella unicornis* and *Schizoporella pseudoerrata*, and all colonial tunicates were only found in Esquimalt. The hydrozoan

*Cordylophora caspia*, the oligochaetes *Nais elinguis* and Enchytraeidae species, the bivalve *Modiolus* sp., the barnacle *Balanus improvisus*, and the bryozoan *Conopeum seurati* were only recorded in the brackish water of Port Alberni. The amphipod *Ampithoe dalli* was only found in Prince Rupert. The tanaid *Zeuxo normani* was recorded in large numbers in Port Alberni, but it was also found in Vancouver and Nanaimo. There are no obvious patterns in species composition between substrates or among sites, except for the three sites in Port Alberni, formed a distinct group in the MDS plots (Figure 2). The community structure in Port Alberni was significantly different from other sites possibly because the taxa there were adapted to brackish water as the sample area was in the Somass River estuary.

A total of 23 aquatic invasive species and 13 cryptogenic species were recorded during this survey (Table 3). Most of them derived from the North Atlantic or the West Pacific. Three aquatic invasive species (*Cordylophora caspia*, *Balanus improvisus* and *Conopeum seurati*) were only found in Port Alberni, in large numbers. Three cryptogenic species, *Boccardia columbiana* and *Jassa slatteryi* in Nanaimo and *Zeuxo normani* in Port Alberni, were found in large numbers, but only a few or none were found in other locations. These results suggest that invasive species may establish their populations in certain environments which are suitable for their growth.

The highest total number of species (98) was found in Prince Rupert and the highest mean number (55) of species per quadrat was found in Esquimalt, while the lowest total number and mean number (15 and 11 species, respectively) were found in the brackish water of Port Alberni (Figure 3). However, the proportions of AIS and AIS or cryptogenic species combined were highest in Port Alberni (Figure 4).

## DISCUSSION

There were different designations of status for some species in previous reports of AIS from the northeast Pacific. The polychaetes *Capitella capitata* and *Harmothoe imbricate* have been reported as cryptogenic species in this region (Cohen and Carlton 1995; Golden et al. 1998; DFG 2002; Fairey et al. 2002; T N and Associates 2002). Boyd et al. (2002) reported the amphipod *Jassa slatteryi* as a non-indigenous species from the Eastern Pacific, but DFG (2002) and Fairey et al. (2002) considered it a native species. *Ianiropsis tridens* was reported as an exotic species by some reports (Cohen et al. 1998; Cohen et al. 2002; DFG 2002; Cohen et al. 2005), but Fairey et al. (2002) considered it a native species.

The bryozoan *Conopeum seurati* typically occurs in estuarine and brackish habitats of Northern Europe and the Mediterranean. It shows large tolerance to salinity and temperature variations, including freezing and drying out, and has been collected in estuaries where salinity is less than 1 psu. Prior to Winston's (1982) study, this species had not been reported in the western hemisphere. *C. seurati* was found in the brackish habitat of Port Alberni in this survey and may have been introduced from the east coast of

the United States. This may be the first record of this species on the Pacific coast of North America.

The theory that species-poor communities are more vulnerable to invasion than are other communities and species-rich communities could resist invasions (Cohen and Carlton 1998) is relevant to this survey. There were only 15 species found in Port Alberni, fewer than found in the other four harbours (56-98 species), possibly due to the harsh conditions of a brackish environment. However, the relative number of invasive/cryptogenic species (26.7% and 33.3%, respectively) was higher in the brackish water of Port Alberni harbour during this survey. Our results are consistent with the above-cited theory and suggest that estuarine/brackish environments may be more easily invaded by exotic species.

Due to sampling limitations, we were able to only collect quantitative samples from the water surface downwards to a depth of 0.1m. The sampling method excluded intertidal species and those living deeper than 0.1 m. We suggest that more surveys on aquatic invasive species should be carried out at more sites on the coast of BC. When navigation buoys are lifted for cleaning, the organisms on the bottoms of the structures would be easily accessible. On the Atlantic coast, where numerous buoys are lifted every year by the Canadian Coast Guard because of ice conditions, such sampling has been considered as a monitoring method for AIS (McKindsey and Landry 2006). However on the Pacific coast, because the buoys are lifted every three years on a rotating cycle in various harbours, an annual monitoring survey would not be possible. As well, harbours on the Pacific coast seem to have fewer navigational buoys. For example Vancouver has only 14 lighted floating navigational buoys maintained by the Canadian Coast Guard, of which 13 are either at Roberts Bank, or off Point Grey, outside Burrard Inlet.

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Table 1. Descriptions of sampling sites. \* position estimated from hydrographic chart

Site No.	Site Location	Latitude	Longitude	Sampling Date (dd/mm/yy)	Substrate
1	Buoy Q41, Vancouver	49°17'6.9''N	123°08'55.5''W	18/08/05	Metal
2	Buoy Q52, Vancouver	49°16'53.4''N	123°08'58.3''W	18/08/05	Metal
3	Buoy QC, Vancouver	49°18'12.2''N	123°09'59.9''W	18/08/05	Metal
4	Buoy Q65, Vancouver	49°18'40.8''N	123°07'37.8''W	18/08/05	Metal
5	CAER dock, West Vancouver	49°20'24.4''N	123°13'59.0''W	18/08/05	Concrete
6	Floatplane dock, Nanaimo	49°10'14.3''N	123°56'1.0''W	25/08/05	Concrete
7	Lighthouse Restuarant dock, Nanaimo	49°10'7.6''N	123°56'7.2''W	25/08/05	Concrete
8	Buoy P9, Nanaimo	49°10'24.3''N	123°56'7.0''W	25/08/05	Metal
9	Buoy P11, Nanaimo	49°10'33.8''N	123°56'14.3''W	25/08/05	Metal
10	Buoy P12, Nanaimo	49°10'35.0''N	123°56'10.0''W	25/08/05	Metal
11	PBS dock, Nanaimo	49°12'37.0''N	123°57'22.4''W	25/08/05	Concrete
12	B Jetty, Esquimalt *	48°25'57''N	123°25'57''W	09/09/05	Wood
13	C Jetty Camber, Esquimalt *	48°25'56''N	123°25'55''W	09/09/05	Concrete
14	C Jetty Westside, Esquimalt *	48°25'58''N	123°25'55''W	09/09/05	Wood
15	DFO dock, Seal Cove, Prince Rupert	54°19'51.6''N	130°16'45.3''W	12/09/05	Wood
16	Float, Cow Bay, Prince Rupert	54°19'6.9''N	130°19'16.1''W	12/09/05	Concrete
17	Barge Mooring Buoy, Prince Rupert	54°19'23.7''N	130°20'39.7''W	12/09/05	Metal
18	Digby Island dock, Prince Rupert	54°18'47.0''N	130°24'13.1''W	12/09/05	Concrete
19	Fairview Terminal, Prince Rupert	54°17'19.9''N	130°21'35.7''W	12/09/05	Metal
20	Buoy D43, Prince Rupert	54°13'14.9''N	130°21'43.0''W	12/09/05	Metal
21	Floating dock, Port Edward	54°14'44.2''N	130°17'52.3''W	12/09/05	Wood
22	Mooring Buoy, Porpoise Harbour, Prince Rupert	54°14'1.9''N	130°18'2.7''W	12/09/05	Metal
23	Government dock, Port Alberni	49°14'12.4''N	124°48'56.0''W	20/09/05	Concrete
24	Government dock inside, Port Alberni	49°14'12.8''N	124°48'45.2''W	20/09/05	Concrete
25	Harbour Quay Marina, Port Alberni	49°13'55.4''N	124°48'50.5''W	20/09/05	Concrete

Table 2. Characterization of the benthic communities at sampling sites

Site No.	Description of Biotic Community
1	A relative diverse community highly dominated by mussels, with amphipods, polychaetes, barnacles and insects
2	A relative diverse community highly dominated by mussels, with amphipods, polychaetes, barnacles and insects
3	< 5% biotic coverage, green algae, barnacle
4	A relative diverse community highly dominated by mussels, with barnacles, polychaetes and insects
5	A relative diverse community highly dominated by mussels, with barnacles, isopods, polychaetes, insects and amphipods
6	A diverse community highly dominated by mussels, with high abundances of amphipods, polychaetes and barnacles
7	A diverse community dominated by amphipods, with green and brown algae, polychaetes, small barnacles and mussels
8	20% biotic coverage, dominated by amphipods, with green algae, polychaetes, mussels, barnacles and hydrozoans
9	10% biotic coverage, dominated by amphipods, with green algae, small numbers of mussels and barnacles
10	10% biotic coverage, amphipods, mussels, decapods and hydrozoans
11	A diverse community dominated by mussels and polychaetes
12	A diverse community dominated by amphipods, with ascidians and high abundance of tanaids, large barnacles and polychaetes
13	A diverse community with sponge, ascidians and high abundances of amphipods, polychaetes, isopods and barnacles
14	A diverse community with sponge, ascidians and high abundances of tanaids, amphipods, polychaetes and isopods
15	A relative simple community with tube polychaetes and barnacles
16	A relative simple community with barnacles, tube polychaetes, limpets, bivalves, and amphipods
17	20% biotic coverage, green algae, insects, barnacles, and other invertebrates
18	A diverse community dominated by amphipods, with high abundance of isopods and polychaetes, and a number of gastropods, bivalves, barnacles, sea spiders and insects
19	A relative diverse community dominated by barnacles, with a number of amphipods, polychaetes and limpets
20	A relative simple community dominated by amphipods, with high abundances of barnacles and insects
21	A sparse community with green algae, barnacles, polychaetes, and other invertebrates
22	A relative simple community dominated by barnacles, with green algae and high abundance of amphipods and insects
23	A brackish community dominated by barnacles and tanaids, with oligochaetes, amphipods, insects, hydrozoans and bryozoans
24	A brackish community dominated by tanaids and oligochaetes, with barnacles, amphipods, insects, hydrozoans and bryozoans
25	A brackish community dominated by tanaids and oligochaetes, with barnacles, amphipods, insects, hydrozoans and bryozoans

Table 3. Aquatic invasive and cryptogenic (\*) species found in this survey

Species	Recorded Harbour	Source
<b>Cnidaria: Hydrozoa</b>		
<i>Cordylophora caspia</i> (Pallas, 1771)	Port Alberni	Black/Caspian Seas
<i>Obelia cf. dichotoma</i> (Linnaeus, 1758)*	Nanaimo, Prince Rupert, Vancouver, Esquimalt	N Atlantic
<i>Sarsia tubulosa</i> (Sars, 1835)	Prince Rupert, Esquimalt	N Atlantic
<b>Annelida: Polychaeta</b>		
<i>Amblyosyllis cf. speciosa</i> Izuka, 1912	Esquimalt	NW Pacific
<i>Amphiglena cf. mediterranea</i> (Leydig, 1851)	Esquimalt	N Atlantic
<i>Boccardia columbiana</i> Berkeley, 1927*	Nanaimo, Prince Rupert, Esquimalt	NW Pacific
<i>Capitella capitata</i> (Fabricius, 1780)*	Prince Rupert, Vancouver	N Atlantic or E Pacific
<i>Eteone longa</i> (Fabricius, 1780)*	Nanaimo	N Atlantic
<i>Eusyllis blomstrandii</i> Malmgren, 1867	Prince Rupert	N Atlantic
<i>Eusyllis japonica</i> Imajima and Hartman, 1964	Prince Rupert	NW Pacific
<i>Harmothoe imbricate</i> (Linnaeus, 1767)*	Nanaimo, Prince Rupert, Vancouver, Esquimalt	N Atlantic
<i>Nereis pelagica</i> Linnaeus, 1758	Nanaimo, Prince Rupert, Vancouver, Esquimalt	N Atlantic
<i>Perinereis</i> sp.	Vancouver	Unknown
<i>Pholoe minuta</i> (Fabricius, 1780)	Nanaimo, Vancouver	N Atlantic
<i>Platynereis bicanaliculata</i> (Baird, 1863)*	Nanaimo, Prince Rupert, Vancouver, Esquimalt	NW Pacific
<i>Polydora cornuta</i> Bosc, 1802	Vancouver	N Atlantic
<i>Polydora limicola</i> Annenkova, 1934	Prince Rupert, Esquimalt	NW Pacific, Bering Sea
<i>Polydora websteri</i> Hartman, 1943	Esquimalt	N Atlantic
<i>Proceraea cornuta</i> (Agassiz, 1862)*	Nanaimo, Prince Rupert, Vancouver, Esquimalt	NW Atlantic
<i>Serpula vermicularis</i> Linnaeus, 1767	Prince Rupert	N Atlantic
<i>Typosyllis alternata</i> (Moore, 1908)*	Prince Rupert, Vancouver, Esquimalt	NW Pacific
<i>Typosyllis armillaris</i> (Müller, 1776)	Prince Rupert	N Atlantic
<i>Typosyllis cf. pulchra</i> (Berkeley and Berkeley, 1938)*	Nanaimo, Prince Rupert, Vancouver, Esquimalt	NW Pacific, Bering Sea
<b>Arthropoda: Cirripedia</b>		
<i>Balanus improvisus</i> Darwin, 1854	Port Alberni	N Atlantic
<b>Arthropoda: Tanaidacea</b>		
<i>Leptochelia dubia</i> (Krøyer, 1842)*	Nanaimo	N Atlantic
<i>Zeuxo normani</i> (Richardson, 1905)*	Nanaimo, Vancouver, Port Alberni	Unknown
<b>Arthropoda: Isopoda</b>		
<i>Ianiropsis tridens</i> Menzies, 1952	Prince Rupert	NW Pacific

Table 3 (continued)

Species	Recorded Harbour	Source
<b>Arthropoda: Amphipoda</b> <i>Ampithoe valida</i> Smith, 1873	Nanaimo, Prince Rupert, Vancouver, Esquimalt	NW Atlantic
<i>Caprella drepanochir</i> Mayer, 1890*	Prince Rupert	Unknown
<i>Ischyrocerus anguipes</i> Krøyer, 1838	Prince Rupert	N Atlantic
<i>Jassa marmorata</i> Holmes, 1903 <i>Jassa slatteryi</i> Conlan, 1990*	Port Alberni Nanaimo	NW Atlantic E Pacific?
<b>Bryozoa</b> <i>Bowerbankia gracilis</i> Leidy, 1855 <i>Conopeum seurati</i> (Canu, 1928) <i>Schizoporella unicornis</i> (Johnston, 1874)	Prince Rupert, Esquimalt Port Alberni Esquimalt	NW Atlantic N Atlantic NW Pacific
<b>Tunicata: Ascidiacea</b> <i>Botrylloides violaceus</i> Oka, 1927	Esquimalt	NW Pacific

\* Cryptogenic species

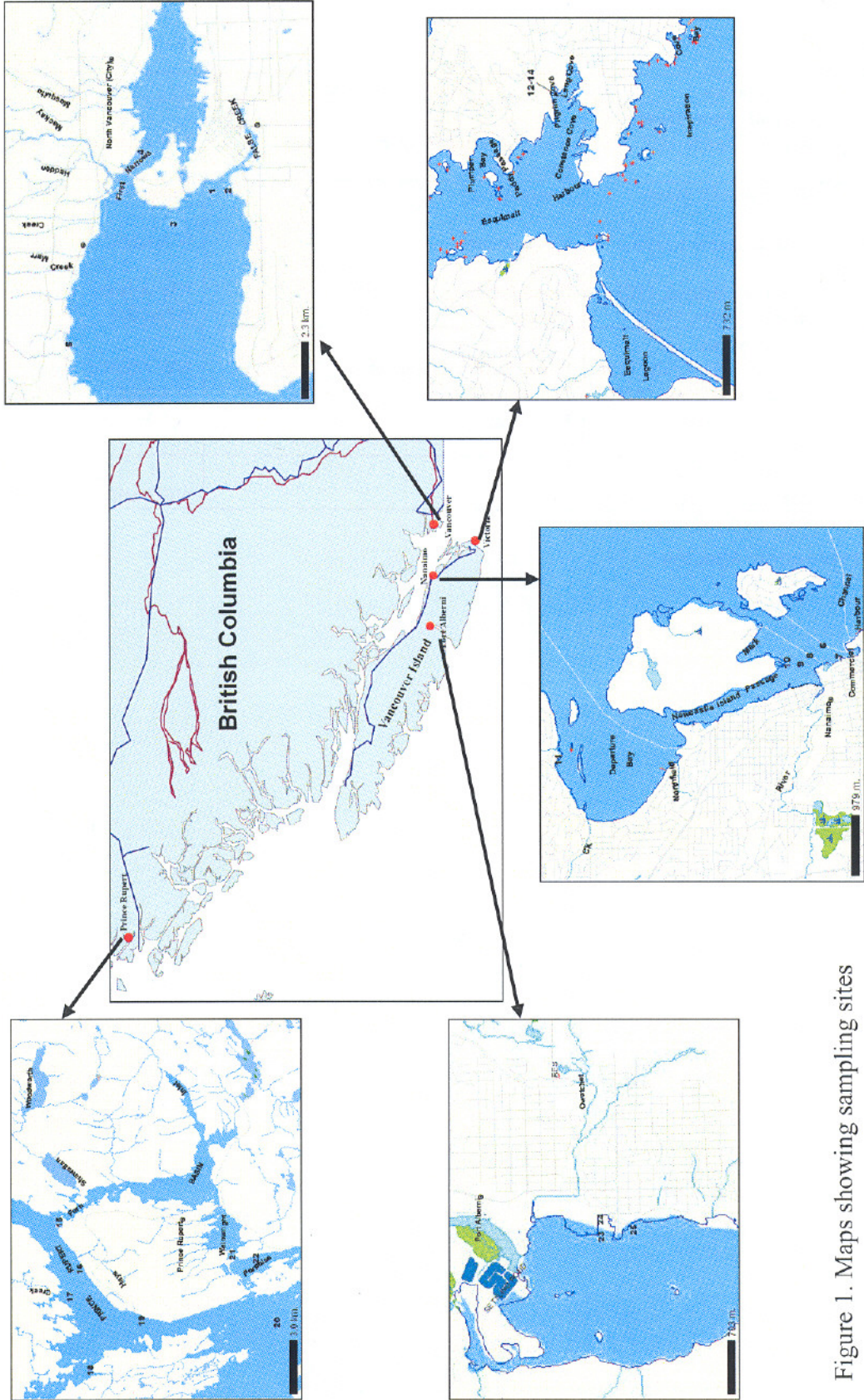


Figure 1. Maps showing sampling sites



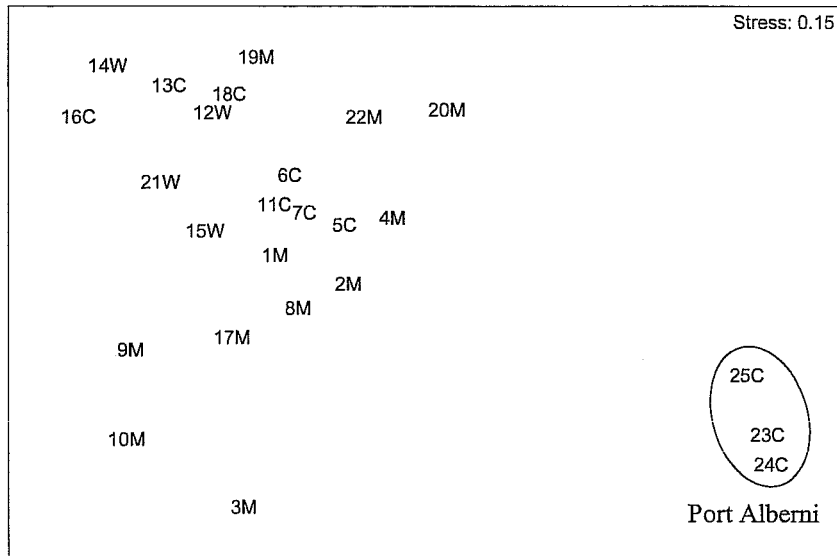


Figure 2. MDS ordination of macrobenthic invertebrates (using Bray-Curtis similarities on  $\sqrt{\sqrt{\cdot}}$ -transformed abundance) for the 25 sampling sites in this survey. Numbers denote sampling sites (1-5: Vancouver; 6-11: Nanaimo; 12-14: Esquimalt; 15-22: Prince Rupert; 23-25: Port Alberni). Letters stand for substrates (M: metal; C: concrete; W: wood)

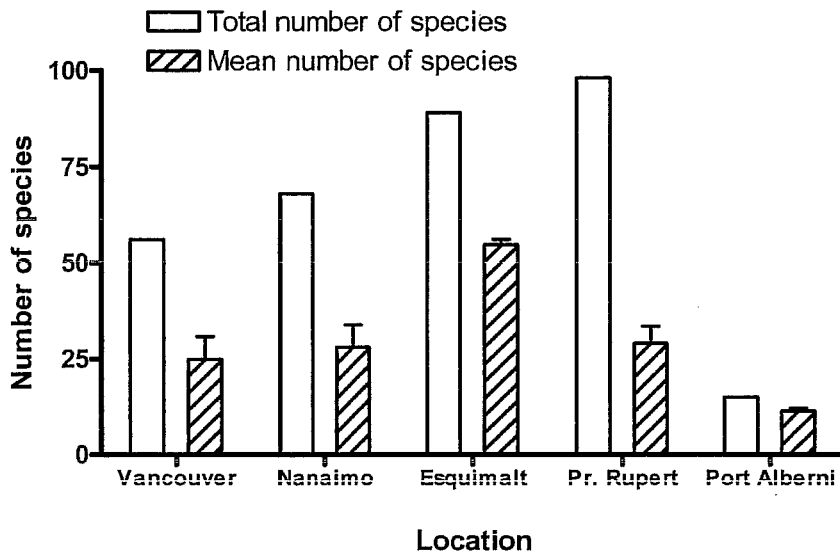


Figure 3. Total number over all structures and mean number of species per structure recorded on buoys and floating docks in the five harbours during this survey

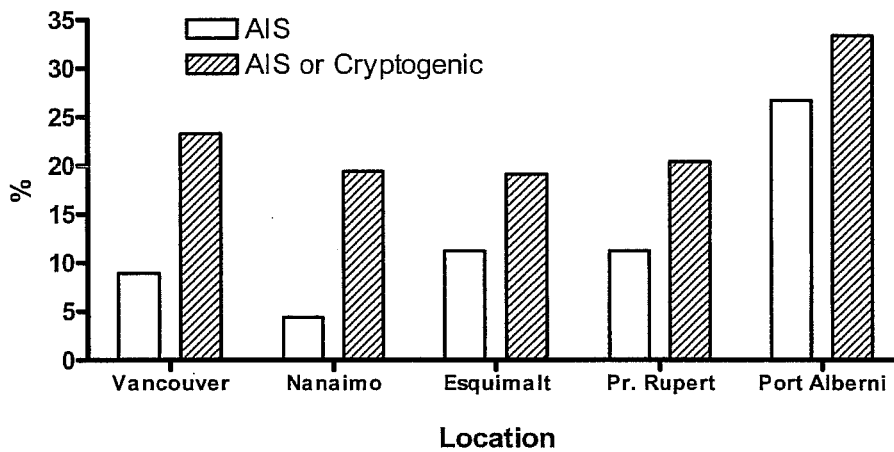


Figure 4. Proportion of AIS and AIS or cryptogenic species combined of benthic invertebrates recorded on buoys and floating docks in the five harbours of BC

Appendix. List of taxa and their abundance (no. 0.01 m<sup>-2</sup>) recorded at the 25 sites in this survey  
 "x" = present (if colonial) or in very large numbers

Taxon	Vancouver					Nanaimo					Esquimalt			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Porifera</b>														
<i>Halichondria bowerbanki</i> Burton, 1930													x	x
<b>Cnidaria</b>														
<b>Cnidaria: Hydrozoa</b>					1						1		3	6
<i>Bougainvillia</i> sp.													x	x
<i>Clava</i> sp.														
<i>Cordylophora caspia</i> (Pallas, 1771)														
<i>Eutonina</i> sp.													x	
<i>Garveia annulata</i> Nutting, 1901														x
<i>Obelia</i> cf. <i>dichotoma</i> (Linnaeus, 1758)	x	x	x	x	x	x		x	x	x		x	x	x
<i>Sarsia tubulosa</i> (Sars, 1835)														
<b>Platyhelminthes</b>														
Platyhelminth		1		2	22	7		9			8			
<b>Nemertea</b>														
<i>Amphiporus</i> sp.		15		2	12	9	2			2		4		1
<i>Emplectonema gracile</i> (Johnston, 1837)	25	1		55			1					2	1	
<i>Paranemertes peregrina</i> Coe, 1901	1	1			1	1	1			1				
<b>Sipunculida</b>														
<i>Phascolosoma agassizii</i> Keferstein 1866														
<b>Annelida: Polychaeta</b>														
<i>Amblyosyllis</i> cf. <i>speciosa</i> Izuka, 1912													1	7
<i>Amphiglena</i> cf. <i>mediterranea</i> (Leydig, 1851)														8
<i>Armandia brevis</i> (Moore, 1906)			2			2	1	1		1				1
<i>Arcteoobia</i> sp.														
<i>Autolytus</i> cf. <i>magnus</i> Berkeley, 1923												6	28	9
<i>Boccardia columbiana</i> Berkeley, 1927					2	164	13			514		5	9	12

Appendix (continued)

Taxon	Vancouver					Nanaimo					Esquimalt			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Brania brevipharyngea</i> Banse, 1972												2	11	14
<i>Capitella capitata</i> (Fabricius, 1780)		1										4	4	10
<i>Chone minuta</i> Hartman, 1944													1	
<i>Clavadoce</i> sp.														
<i>Crucigera zygophora</i> (Johnson, 1901)										1			2	
<i>Eteone longa</i> (Fabricius, 1780)														
<i>Eudistylia vancouveri</i> (Kinberg, 1867)		25	7		19	14	3			16				
<i>Eulalia aviculisetata</i> Hartman, 1936	19													
<i>Eusyllis blomstrandii</i> Malmgren, 1867														
<i>Eusyllis japonica</i> Imajima and Hartman, 1964														
<i>Exogone (Exogone) dwivula</i> Kudenov and Harris, 1905						1				2		15	67	127
<i>Halosydna brevisetosa</i> Kinberg, 1855					8	13				4		2	2	
<i>Harmothoe imbricata</i> (Linnaeus, 1767)	3												1	
Maldanidae														
<i>Micropodarke dubia</i> (Hessle, 1925)						2								
<i>Minuspio cirrifera</i> (Wren, 1883)					1									
<i>Nereis vexillosa</i> Grube, 1851	13	8	59		12	4	7			3		7	7	
<i>Nereis pelagica</i> Linnaeus, 1758	7	2					3					2	2	
<i>Nereis cf. zonata</i> Malmgren, 1867		4			5	3				2				
<i>Palaenotus bellis</i> (Johnson, 1897)						12	9	4		2		1		
<i>Paradexiospira cf. vitrea</i> (Fabricius, 1780)							4						4	1
<i>Perinereis</i> sp.	1	5												
<i>Pholoe minuta</i> (Fabricius, 1780)	2					1				2				
<i>Pionosyllis</i> sp.														
<i>Platynereis bicanaliculata</i> (Baird, 1863)						124	139	21	1	10		11	16	1
<i>Podarke pugettensis</i> Johnson, 1901						1							8	
<i>Polydora cornuta</i> Bosc, 1802					1									
<i>Polydora limicola</i> Annenkova, 1934														
<i>Polydora pigdialis</i> Blake and Woodwick, 1972						1						1	15	4

Appendix (continued)

Taxon	Vancouver					Nanaimo					Esquimalt			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Polydora websteri</i> Hartman, 1943							2						2	1
<i>Proceraea cornuta</i> (Agassiz, 1862)	1				4	2		4			3	9	19	18
Questidae sp.														
Sabellidae sp.														
<i>Schizobranchia insignis</i> Bush, 1904													2	5
<i>Serpula vermicularis</i> Linnaeus, 1767														
<i>Sphaerosyllis californiensis</i> Hartman, 1966														
Spionidae sp.														
<i>Spirorbella</i> sp.														
<i>Thelepus</i> sp.														
<i>Typosyllis adamanteus</i> (Treadwell, 1914)	38	52		213	52	15	15	3			6		1	
<i>Typosyllis alternata</i> (Moore, 1908)	2											44	4	39
<i>Typosyllis armillaris</i> (Müller, 1776)														
<i>Typosyllis cf. pulchra</i> (Berkeley and Berkeley, 1938)	27	5		4	10	5						6	6	
<i>Typosyllis cf. hyalina</i> (Grube, 1863)	7				5	152	8				37	11	1	
<b>Annelida: Oligochaeta</b>														
Enchytraeidae sp.														
<i>Nais elinguis</i> Müller, 1773														
<i>Tubificoides</i> sp.		5			3									
<b>Mollusca: Polyplacophora</b>														
<i>Katharina tunicata</i> (Wood, 1815)														
<i>Mopalia</i> sp.1														
<i>Mopalia</i> sp.2														
<i>Mopalia ciliata</i> (Sowerby II, 1840)														
<i>Mopalia cirrata</i> Berry, 1919							1						1	
<b>Mollusca: Gastropoda</b>														
<i>Dentronotus</i> sp.														
<i>Dotu columbiana</i> O'Donoghue, 1921														1

Appendix (continued)

Taxon	Vancouver					Nanaimo					Esquimalt			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Doto</i> sp.						2							1	
<i>Flabellina</i> sp.					2		1				8			
Gastropod sp.1						2	9				1			
<i>Haminoea</i> cf. <i>vesicula</i> (Gould, 1855)						1	2				2	1		1
<i>Lacuna</i> sp.					9	32	9				22	9		
<i>Lotia</i> spp.	1						1							
<i>Littorina</i> sp.														
Nudibranch spp.								1						
<i>Polinices</i> sp.														
<b>Mollusca: Bivalvia</b>														
<i>Entodesma</i> sp.														
<i>Lyonsia</i> sp.														
<i>Modiolus</i> sp.														
<i>Mytilus trossulus</i> complex Gould, 1850	x	x	15	15207	9386	3562	129	2	6	11	497	1	2	4
<b>Arthropoda: Crustacea: Ostracoda</b>														
Cypridinidae spp.	3	6			1									
<b>Arthropoda: Crustacea: Cirripedia</b>														
<i>Balanus crenatus</i> Bruguiere, 1789	7	3	5		10	34								
<i>Balanus glandula</i> Darwin, 1854	6	39	2	388	197	124	21				1	37	14	5
<i>Balanus improvisus</i> Darwin, 1854														
<i>Balanus nubilus</i> Darwin, 1854				2	1	130	182		1		32		12	7
<i>Chthamalus dalli</i> Pilsbry, 1916													5	1
<i>Semibalanus cariosus</i> (Pallas, 1788)												76	29	14
<i>Solidobalanus hesperius</i> (Pilsbry, 1916)									1	1				
<b>Arthropoda: Crustacea: Tanaidacea</b>														
<i>Anatanais pseudonormani</i> Sieg and Winn, 1981														
<i>Leptochelia dubia</i> (Krøyer, 1842)														
<i>Zeuxo normani</i> (Richardson, 1905)		1			1	1	32	2					9	540

Appendix (continued)

Taxon	Vancouver					Nanaimo					Esquimalt			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Arthropoda: Crustacea: Cumacea</b>														
Leuconidae spp.	1	3									1			
<b>Arthropoda: Crustacea: Isopoda</b>														
Asellota indet. (head only)			1		1									
<i>Elthusa californica</i> (Schioedte and Meinert, 1884)						1								
Epicaridea indet.														
<i>Gnorimosphaeroma oregonensis</i> (Dana, 1853)							7					11	1	
<i>Ianropsis analoga</i> Menzies, 1952														
<i>Ianropsis tridens</i> Menzies, 1952														
<i>Idotea schmittii</i> Menzies, 1950												1		
<i>Idotea wosnesenskii</i> (Brandt, 1851)					65	1				1		1		
<i>Idotea</i> sp.							1							
<i>Limmoria</i> sp.														
<i>Janivalata occidentalis</i> (Walker, 1898)												21	105	24
<i>Munna stephenseni</i> Gurjanova, 1933												24	29	130
<b>Arthropoda: Crustacea: Amphipoda</b>														
<i>Americorophium brevis</i> (Shoemaker, 1949)														
<i>Americorophium spinicorne</i> (Stimpson, 1857)					1									
<i>Ampithoe dalli</i> Shoemaker, 1938														
<i>Ampithoe valida</i> Smith, 1873														
<i>Aoroidea columbiae</i> Walker, 1898														
<i>Caprella alaskana</i> Mayer, 1903														
<i>Caprella drepanochir</i> Mayer, 1890							240							
<i>Caprella irregularis</i> Mayer, 1890														
<i>Caprella laeviscula</i> Mayer, 1903														
<i>Eogammarus confervicolus</i> (Stimpson, 1856)						3	4	8				12	17	50
<i>Eogammarus oclairi</i> Bousfield, 1979								1				1		1
<i>Exampithoe</i> sp.														
Gammaridea indet.					2	122					1			

Appendix (continued)

Taxon	Vancouver					Nanaimo					Esquimalt			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Hyale frequens</i> (Stout, 1913)												67		
<i>Hyale pugettensis</i> (Dana, 1853)														
<i>Ischyrocerus anguipes</i> Kroyer, 1838														
<i>Jassa marmorata</i> Holmes, 1903						241	824	1	453	41	1	839	5	63
<i>Jassa slatteryi</i> Conlan, 1990							1		14	30		1		1
<i>Jassa staudei</i> Conlan, 1990												7	14	54
<i>Metacaprella anomala</i> (Mayer, 1903)					2		2							
<i>Metacaprella kenerlyi</i> (Stimpson, 1864)					2									
<i>Microjassa cf. litotes</i> Barnard, 1954					7		639		240	2	1			1
<i>Micropleustes nautilus</i> (Barnard, 1969)														
<i>Micropleustes</i> sp.														
<i>Monocorophium carlottensis</i> Bousfield and Hoover, 1997	66	8				85							15	1
<i>Pontogeneia cf. rostrata</i> Gurjanova, 1938					17	10								
<i>Protohyale</i> sp.	27	13		5								1		
<i>Ptilohyale plumulosa</i> (Stimpson, 1857)														
Stenothoidae sp.	44	14		11	24	242	2	16	2	1	2	171	61	59
<i>Trachyleustes trevori</i> Bousfield and Hendrycks, 1995														
<b>Arthropoda: Crustacea: Decapoda</b>					1									
<i>Cancer gracilis</i> Dana, 1852														
<i>Cancer magister</i> Dana, 1852	12	1												
<i>Cancer oregonensis</i> (Dana, 1852)												2		
<i>Cancer productus</i> Randall, 1840						1								
<i>Hemigrapsus oregonensis</i> (Dana, 1851)					3	6	8	2	1	3	29			
<i>Heptacarpus brevirostris</i> (Dana, 1852)														
<i>Hippolyte clarki</i> Chace, 1951							13	3	1	6				
<i>Pugettia dalli</i> Rathbun, 1893														
<i>Pugettia richii</i> Dana, 1851												1		
<b>Arthropoda: Pycnogonida</b>					1									
<i>Anoplodactylus viridintestinalis</i> Cole, 1904												15	1	71



Appendix (continued)

Taxon	Vancouver					Nanaimo					Esquimalt			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Arthropoda: Arachnida</b>														
Acarid					58	3					1		3	1
<b>Arthropoda: Insecta</b>														
Chironomidae spp.	24	48	1	31	186	13	3	1			2	2	1	
<b>Bryozoa</b>														
<i>Bowbankia gracilis</i> Leidy, 1855												x	x	
<i>Celleporella hyalina</i> (Linnaeus, 1767)														
<i>Conopeum seurati</i> (Canu, 1928)														
<i>Dendrobeania lichenoides</i> (Robertson, 1900)														x
<i>Membranipora serrilamella</i> Osburn, 1950				x										
<i>Schizoporella pseudoerrata</i> Soule, Soule & Chaney, 1995												x		x
<i>Schizoporella unicornis</i> (Johnston, 1874)													x	x
<i>Tegella armifera</i> (Hincks, 1880)												x		
<b>Echinodermata: Holothurioidea</b>														
<i>Eupentacta quinquesemita</i> (Selenka, 1867)														13
<b>Echinodermata: Asteroidea</b>														
Sea star						1								
<b>Tunicata: Ascidiacea</b>														
<i>Aplidium californicum</i> (Ritter and Forsyth, 1917)												x	x	x
<i>Ascidia columbiana</i> (Hunziman, 1912)												x	x	x
<i>Botrylloides violaceus</i> Oka, 1927												x		
<i>Corella willmeriana</i> Herdman, 1898														
<i>Distaplia occidentalis</i> Bancroft, 1899												x		
<i>Perphora annectens</i>														x
<i>Ritterella rubra</i> Abbott & Trason, 1968													x	
<i>Styela truncate</i> Ritter, 1901														1

Appendix (continued)

Taxon	Vancouver				Nanaimo				Esquimalt					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Vertebrata: Osteichthyes</b>														
Liparidae sp.														
<b>Others</b>														
Ctenophora								1	1	1				

Appendix (continued)

Taxon	Prince Rupert										Port Alberni		
	15	16	17	18	19	20	21	22	23	24	25		
<b>Porifera</b>													
<i>Halichondria bowerbanki</i> Burton, 1930													
<b>Cnidaria</b>													
Coral													
Actinia	1			2						1			
<i>Bougainvillia</i> sp.					x								
<i>Clava</i> sp.		x							x				
<i>Cordylophora caspia</i> (Pallas, 1771)												x	
<i>Eutonina</i> sp.													
<i>Garveia annulata</i> Nutting, 1901			x										
<i>Obelia cf. dichotoma</i> (Linnaeus, 1758)	x	x	x	x	x								
<i>Sarsia tubulosa</i> (Sars, 1835)		x	x										
<b>Platyhelminthes</b>													
Platyhelminth	1			1	2							2	
<b>Nemertea</b>													
<i>Amphiporus</i> sp.				2				1					
<i>Emplectonema gracile</i> (Johnston, 1837)								1					
<i>Paramerites peregrina</i> Coe, 1901	3			1									
<b>Sipunculida</b>													
<i>Phascolosoma agassizii</i> Keferstein 1866		1											
<b>Annelida: Polychaeta</b>													
<i>Amblyosyllis cf. speciosa</i> Izuka, 1912													
<i>Amphiglena cf. mediterranea</i> (Leydig, 1851)													
<i>Armandia brevis</i> (Moore, 1906)													
<i>Arcteobia</i> sp.													
<i>Autolytus cf. magnus</i> Berkeley, 1923													
<i>Boccardia columbiana</i> Berkeley, 1927	105			2	10								

Appendix (continued)

Taxon	Prince Rupert										Port Alberni		
	15	16	17	18	19	20	21	22	23	24	25		
<i>Brania brevipharyngea</i> Banse, 1972	10												
<i>Capitella capitata</i> (Fabricius, 1780)													
<i>Chone minuta</i> Hartman, 1944													
<i>Clavadoce</i> sp.													
<i>Crucigera zygophora</i> (Johnson, 1901)				1									
<i>Eteone longa</i> (Fabricius, 1780)				18	4		1						
<i>Eudistylia vancouveri</i> (Kinberg, 1867)		5		3	2	1							
<i>Eulalia aviculisetata</i> Hartman, 1936				16	3		4						
<i>Eusyllis blomstrandii</i> Malmgren, 1867							1						
<i>Eusyllis japonica</i> Imajima and Hartman, 1964													
<i>Exogone (Exogone) dwivisula</i> Kudenov and Harris, 1905		2											
<i>Halosydna brevisetosa</i> Kinberg, 1855	2			1									
<i>Harmothoe imbricata</i> (Linnaeus, 1767)	2			1									
Maldanidae													
<i>Micropodarke dubia</i> (Hessle, 1925)	8												
<i>Minuspio cirrifera</i> (Wiren, 1883)													
<i>Nereis vexillosa</i> Grube, 1851	2							1					
<i>Nereis pelagica</i> Linnaeus, 1758	1	4		6			1						
<i>Nereis cf. zonata</i> Malmgren, 1867													
<i>Palaenotus bellis</i> (Johnson, 1897)		1					1						
<i>Paradextiospira cf. vitrea</i> (Fabricius, 1780)				54	12								
<i>Perinereis</i> sp.													
<i>Pholoe minuta</i> (Fabricius, 1780)													
<i>Pionosyllis</i> sp.		1											
<i>Platynereis bicanaliculata</i> (Baird, 1863)	11			10	3	12	14						
<i>Podarke puggettensis</i> Johnson, 1901													
<i>Polydora cornuta</i> Bosc, 1802													
<i>Polydora limicola</i> Annenkova, 1934		3											
<i>Polydora pigdialis</i> Blake and Woodwick, 1972	1				23								

Appendix (continued)

Taxon	Prince Rupert										Port Alberni		
	15	16	17	18	19	20	21	22	23	24	25		
<i>Polydora websteri</i> Hartman, 1943	6	6	12	14	3		8						
<i>Proceraea cornuta</i> (Agassiz, 1862)				1									
Questidae sp.				1									
Sabellidae sp.													
<i>Schizobranchia insignis</i> Bush, 1904	9	29	24	18	18	4							
<i>Serpula vermicularis</i> Linnaeus, 1767					1		1						
<i>Sphaerosyllis californiensis</i> Hartman, 1966		2			1		1						
Spionidae sp.													
<i>Spirorbella</i> sp.					1								
<i>Thelepus</i> sp.													
<i>Typosyllis adamanteus</i> (Treadwell, 1914)													
<i>Typosyllis alternata</i> (Moore, 1908)				1									
<i>Typosyllis armillaris</i> (Müller, 1776)		5											
<i>Typosyllis cf. pulchra</i> (Berkeley and Berkeley, 1938)	2	11		25	3								
<i>Typosyllis cf. hyalina</i> (Grube, 1863)	1	4											
<b>Annelida: Oligochaeta</b>													
Enchytraeidae sp.									46				
<i>Nais elinguis</i> Müller, 1773									35	193	237		
<i>Tubificoides</i> sp.							1						
<b>Mollusca: Polyplacophora</b>													
<i>Katharina tunicata</i> (Wood, 1815)					3								
<i>Mopalia</i> sp.1		3		1									
<i>Mopalia</i> sp.2				3									
<i>Mopalia ciliata</i> (Sowerby II, 1840)													
<i>Mopalia cirrata</i> Berry, 1919													
<b>Mollusca: Gastropoda</b>													
<i>Dentronotus</i> sp.			9			1							
<i>Doto columbiana</i> O'Donoghue, 1921				13									

Appendix (continued)

Taxon	Prince Rupert										Port Alberni		
	15	16	17	18	19	20	21	22	23	24	25		
<i>Doto</i> sp.				1			1						
<i>Flabellina</i> sp.							2						
Gastropod sp.1													
<i>Haminoea cf. vesicula</i> (Gould, 1855)													
<i>Lacuna</i> sp.		24	3	41	24	3	1	2					
<i>Lotita</i> spp.				1									
<i>Littorina</i> sp.													
Nudibranch spp.									19	4	2		
<i>Polinices</i> sp.		1	6	10			2	10					
<b>Mollusca: Bivalvia</b>													
<i>Entodesma</i> sp.				3									
<i>Lyonsia</i> sp.		14		25	12								
<i>Modiolus</i> sp.		4	3	3					1			8	
<i>Mytilus trossulus</i> complex Gould, 1850													
<b>Arthropoda: Crustacea: Ostracoda</b>													
Cypridimidae spp.													
<b>Arthropoda: Crustacea: Cirripedia</b>													
<i>Balanus crenatus</i> Bruguere, 1789	36				1		4						
<i>Balanus glandula</i> Darwin, 1854		6	10	1	75	137	1	284		74	201		
<i>Balanus improvisus</i> Darwin, 1854									667				
<i>Balanus nubilus</i> Darwin, 1854													
<i>Chthamalus dalli</i> Pilsbry, 1916		209		4	115								
<i>Semibalanus cariosus</i> (Pallas, 1788)		3	13	5	39								
<i>Solidobalanus hesperius</i> (Pilsbry, 1916)				16									
<b>Arthropoda: Crustacea: Tanaidacea</b>													
<i>Anatanais pseudonormani</i> Sieg and Winn, 1981													
<i>Leptochelia dubia</i> (Krøyer, 1842)													
<i>Zeuxo normani</i> (Richardson, 1905)									450	221		578	

Appendix (continued)

Taxon	Prince Rupert										Port Alberni		
	15	16	17	18	19	20	21	22	23	24	25		
<b>Arthropoda: Crustacea: Cumacea</b>													
Leuconidae spp.													
<b>Arthropoda: Crustacea: Isopoda</b>													
Asellota indet. (head only)													
<i>Elihusa californica</i> (Schioedte and Meinert, 1884)													
Epicaridea indet.													
<i>Gnorinosphaeroma oregonensis</i> (Dana, 1853)								2	4			3	
<i>Ianiropsis analoga</i> Menzies, 1952				93	2								
<i>Ianiropsis tridens</i> Menzies, 1952													
<i>Idotea schmittii</i> Menzies, 1950													
<i>Idotea vosnesenskii</i> (Brandt, 1851)								1					
<i>Idotea</i> sp.	3						1						
<i>Limnoria</i> sp.													
<i>Janirata occidentalis</i> (Walker, 1898)													
<i>Munna stephenseni</i> Gurjanova, 1933		1		83	8		12	8					
<b>Arthropoda: Crustacea: Amphipoda</b>													
<i>Americorophium brevis</i> (Shoemaker, 1949)													
<i>Americorophium spinicorne</i> (Stimpson, 1857)													
<i>Ampithoe dalli</i> Shoemaker, 1938	1			52	1	344	6	44	22	21		26	
<i>Ampithoe valida</i> Smith, 1873			3				2						
<i>Aoroides columbiae</i> Walker, 1898		16		354	14		1	3					
<i>Caprella alaskana</i> Mayer, 1903													
<i>Caprella drepanochir</i> Mayer, 1890			7										
<i>Caprella irregularis</i> Mayer, 1890				84									
<i>Caprella laeviuscula</i> Mayer, 1903													
<i>Eogammarus confervicolus</i> (Stimpson, 1856)							31	10					
<i>Eogammarus oclairi</i> Bousfield, 1979									2			12	
<i>Exampithoe</i> sp.													
Gammaridea indet.													

Appendix (continued)

Taxon	Prince Rupert										Port Alberni		
	15	16	17	18	19	20	21	22	23	24	25		
<i>Hyale frequens</i> (Stout, 1913)						1					1		
<i>Hyale pugettensis</i> (Dana, 1853)													
<i>Ischyrocerus anguipes</i> Kroyer, 1838					5		7				2		
<i>Jassa marmorata</i> Holmes, 1903													1
<i>Jassa slatteryi</i> Conlan, 1990				581		657					1		
<i>Jassa staudei</i> Conlan, 1990	1												
<i>Metacaprella anomala</i> (Mayer, 1903)											1		
<i>Metacaprella kenerlyi</i> (Stimpson, 1864)			1			1	1						
<i>Microjassa cf. litotes</i> Barnard, 1954				1			3				1		
<i>Micropleustes nautilus</i> (Barnard, 1969)													
<i>Micropleustes</i> sp.													
<i>Monocorophium carlottensis</i> Bousfield and Hoover, 1997	2			6			14						
<i>Pontogeneia cf. rostrata</i> Gurjanova, 1938							1						
<i>Protohyale</i> sp.													
<i>Ptilohyale plumulosa</i> (Stimpson, 1857)													
<i>Stenothoidae</i> sp.				79	62	1	4						
<i>Trachypleustes trevori</i> Bousfield and Hendrycks, 1995	22	5	11	267	45		24				45		
<b>Arthropoda: Crustacea: Decapoda</b>													
<i>Cancer gracilis</i> Dana, 1852													
<i>Cancer magister</i> Dana, 1852													
<i>Cancer oregonensis</i> (Dana, 1852)	2	1											
<i>Cancer productus</i> Randall, 1840													
<i>Hemigrapsus oregonensis</i> (Dana, 1851)											1		
<i>Heptacarpus brevirostris</i> (Dana, 1852)													
<i>Hippolyte clarki</i> Chace, 1951									5				
<i>Pugettia dalli</i> Rathbun, 1893													
<i>Pugettia richii</i> Dana, 1851													
<b>Arthropoda: Pycnogonida</b>													
<i>Anoplodactylus viridintestinalis</i> Cole, 1904				12									1



Appendix (continued)

Taxon	Prince Rupert										Port Alberni	
	15	16	17	18	19	20	21	22	23	24	25	
<b>Arthropoda: Arachnida</b>												
Acarid		1		1	1							
<b>Arthropoda: Insecta</b>												
Chironomidae spp.	4		23	14	5	59	5	51	22	5	54	
<b>Bryozoa</b>												
<i>Bowenbankia gracilis</i> Leidy, 1855							x					
<i>Celleporella hyalina</i> (Linnaeus, 1767)				x	x		x					
<i>Conopeum seurati</i> (Canu, 1928)									x		x	
<i>Dendrobeatia lichenooides</i> (Robertson, 1900)												
<i>Membranipora serrilamella</i> Osburn, 1950		x					x					
<i>Schizoporella pseudoerrata</i> Soule, Soule & Chaney, 1995												
<i>Schizoporella unicornis</i> (Johnston, 1874)												
<i>Tegella armifera</i> (Hincks, 1880)												
<b>Echinodermata: Holothurioida</b>												
<i>Eupentacta quinquesemita</i> (Selenka, 1867)												
<b>Echinodermata: Asteroidea</b>												
Sea star												
<b>Tunicata: Ascidiacea</b>												
<i>Aplidium californicum</i> (Ritter and Forsyth, 1917)												
<i>Ascidia columbiana</i> (Huntsman, 1912)												
<i>Botrylloides violaceus</i> Oka, 1927												
<i>Corella willmeriana</i> Herdman, 1898												
<i>Distaplia occidentalis</i> Bancroft, 1899												
<i>Perphora amnectens</i>												
<i>Ritterella rubra</i> Abbott & Trason, 1968												
<i>Styela truncate</i> Ritter, 1901							1					

Appendix (continued)

Taxon	Prince Rupert							Port Alberni			
	15	16	17	18	19	20	21	22	23	24	25
Vertebrata: Osteichthyes											
Liparidae sp.	1										
Others											
Ctenophora											