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Technical Report No. 286

**Numerical Abundance of Dominant Copepods  
from the Northeast Pacific Ocean:  
Columbia River Effluent Area, 1963**

by

Mohammad Jawed

Office of Naval Research  
Contract N00014-67-A-0103-0014  
Project NR 083 012

and

U. S. Atomic Energy Commission  
Contract AT(45-1)-2225  
(Ref: RLO-2225-T26-13)

Reference M73-40  
June 1973

*seattle, washington 98195*

UNIVERSITY OF WASHINGTON  
DEPARTMENT OF OCEANOGRAPHY  
Seattle, Washington 98195

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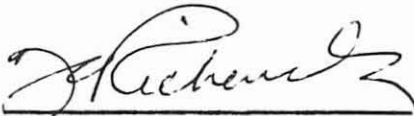
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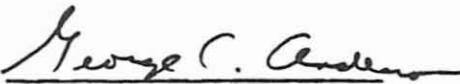
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TABLE OF CONTENTS

ABSTRACT . . . . . 1

GENERAL INTRODUCTION . . . . . 2

CRUISE

*Brown Bear* 318 . . . . . 6

*Brown Bear* 320 . . . . . 19

*Brown Bear* 322 . . . . . 30

*Brown Bear* 323 . . . . . 42

*Brown Bear* 324 . . . . . 47

*Brown Bear* 329 . . . . . 59

*Brown Bear* 332 . . . . . 65

*Brown Bear* 335 . . . . . 76

*Oshawa* 004 . . . . . 97

ACKNOWLEDGMENTS . . . . . 105

REFERENCES . . . . . 106

## ABSTRACT

This report contains results of analyses on the species composition of copepods off the coasts of Washington and Oregon. It is based on the examination of 349 zooplankton samples obtained from March to December, 1963, with special reference to the Columbia River plume. Results are presented as number of zooplankters per cubic meter. A checklist of copepod species identified from these samples is also included.

## GENERAL INTRODUCTION

The Department of Oceanography, University of Washington, is engaged in research on physical, chemical, geological and biological aspects of the northeast Pacific Ocean, with special reference to the region influenced by the Columbia River effluent. One of the long-term objectives of this program is to establish the community structure and to study the seasonal and spatial distribution patterns of biological populations in this area. Comprehensive studies of phytoplankton and zooplankton data for the year 1961, 1962 and 1963 are now being completed with a view to formulate ecological simulation models of primary productivity in this area. This report contains data on the species composition of zooplankton samples obtained during the year 1963. Similar study for 1961 and 1962 was made by Peterson and Anderson (1966).

Table 1. Summary of cruises during which zooplankton samples were obtained off the coasts of Washington and Oregon in 1963.

Cruise No.	Date	Number of Zooplankton Stations	Number of Samples
BB 318	27 February - 20 March	12	45
BB 320	28 March - 10 April	10	40
BB 322	16 April - 1 May	11	44
BB 323	13 May - 19 May	4	16
BB 324	21 May - 4 June	11	41
BB 329	8 July - 19 July	4	20
BB 332	24 August - 28 August	5	40
BB 335	20 September - 26 October	20	75
OSH 004	10 December - 20 December	7	28
Total:		84	349

Zooplankton samples were obtained off the Washington-Oregon coasts, during cruises of research vessels *Brown Bear* and *Oshawa* (Table 1) using Clarke-Bumpus samplers (diameter, 12.5 cm) as modified by Paquette and Frolander (1957). Samplers were provided with #12 nylon netting (mesh size, 110  $\mu$ ) and towed horizontally at four pre-determined depths for a period of 10-20 minutes. In general, the sampling depths were: surface, 35 m, 70 m and 100 m. Most of the samples were obtained in offshore regions and at about midnight. Only nine stations were occupied in inshore waters, depth of water less than 183 m. Samples were preserved in 4% formaldehyde solution buffered with sodium borate.

The flow meters were calibrated by towing the samplers without nets at constant speeds over known distances. Although the filtration coefficient for Clarke-Bumpus samplers has been found to be between 90-94% (Yentsch and Duxbury, 1956; Tranter and Heron, 1965), for reasons of simplicity, 100% acceptance has been assumed in the calculations reported here.

In the laboratory, large organisms such as fish larvae, mysids and euphausiids were separated from the samples. The samples were then divided into two halves using a Folsom plankton splitter. One half of the sample was used to determine species composition; the other was used in the determination of dry weight. Samples were analyzed by taking aliquots (2 ml or more) that would contain at least 100 zooplankters. In some cases, where only a few specimens were present in a sample, either one half or the entire sample was examined. All results are expressed as number of organisms per cubic meter. Any discrepancy between total zooplankton and the sum of individual zooplankton groups is due to rounding-off errors during preliminary calculations. All stations are classified according to their location in the Columbia River plume, ambient seawater, or inshore waters. Columbia River plume in the offshore region was distinguished from ambient seawater by 32.5‰ salinity isopleth (Budinger, Coachman and Barnes 1964).

Identifications of copepod species were made with reference to Campbell (1929, 1930), Rose (1933), Davis (1949), Brodskii (1950), Fulton (1968) and von Vaupel-Klein (1970). Occasionally reference was also made to Professor O. Tanaka's work which has been published periodically since 1956 by Seto Marine Biological Laboratory, Japan. This study is not a taxonomic survey of zooplankton in this area, but provides the abundance and distribution of copepods which are either abundant throughout the year or show marked seasonal variability. Thus, many small copepods such as *Microcalanus* sp., *Paracalanus* sp., *Ctenocalanus* sp., *Corycaeus* sp., and *Clytemmestra* sp. have been grouped as "other copepods." Many unidentified copepods are also included in this category.

Gastropods, foraminiferans, chaetognaths, salps, appendicularians and *Doliolum* sp. are grouped as "miscellaneous." Special attention was given to the abundance of copepodite stages of *Calanus pacificus*, *Calanus plumchrus*, *Calanus cristatus* and *Eucalanus bungii*. Results of this study will be presented elsewhere. Many species, not found in the aliquots, were observed when the entire sample was examined for copepodites of the four species. Their presence has been noted for each station. A list of copepod species identified during the present study is given in Table 2.

Presently, some confusion exists regarding the status of *Metridia pacifica* Brodskii, and the identification of *Calanus pacificus* Brodskii. In this study *M. pacifica* was identified as *M. lucens* Boeck. Two forms of *Calanus pacificus* were noted. The smaller form was similar to the description of species by Brodskii (1950); the larger form has been identified as *Calanus finmarchicus* and *Calanus glacialis* (Park 1968). Since it was not possible to distinguish between the copepodite stages of the two forms, both forms were classified as *Calanus pacificus*. The two subspecies of *Eucalanus bungii*, *E. bungii bungii* and *E. bungii californicus*, were also grouped together.

General characteristics of *Pareuchaeta elongata*, found in these samples, followed the description by Tanaka (1958). This species was

not reported by either Fulton (1968) or von Vaupel-Klein (1970). It is quite possible that specimens identified as *Euchaeta japonica* by Fulton (1968) and *Paraeuchaeta japonica* by von Vaupel-Klein (1970) belong to the species *Pareuchaeta elongata* (see Tanaka, 1958).

Table 2. A list of copepod species identified from zooplankton samples, March-December 1963.

*Acartia danae* Giesbrecht  
*Acartia longiremis* Lilljeborg  
*Acartia tonsa* Giesbrecht  
*Aetidius armatus* Boeck  
*Arietellus* sp.  
*Calanus cristatus* Krøyer  
*Calanus pacificus*\*  
*Calanus plumchrus* Marukawa  
*Calanus tenuicornis* Dana  
*Calocalanus* sp.  
*Candacia bipinnata* Giesbrecht  
*Candacia columbiae* Campbell  
*Clausocalanus* sp.  
*Clytemnestra* sp.  
*Corycaeus* sp.  
*Corycaeus anglicus* Lubbock  
*Ctenocalanus* sp.  
*Epilabidocera amphitrite* McMurrich  
*Eucalanus bungii*\*  
*Eucalanus elongatus* Dana  
*Euchirella* sp.  
*Euchirella curticauda* Giesbrecht  
*Euchirella pulchra* Lubbock  
*Gaetanus* sp.  
*Gaetanus armiger* Giesbrecht  
*Gaetanus simplex* Brodskii  
*Gaidius* sp.  
*Gaidius pungens* Giesbrecht  
*Heterorhabdus* sp.  
*Heterorhabdus pacificus* Brodskii  
*Heterorhabdus papilliger* Claus  
*Heterorhabdus tanneri* Giesbrecht  
*Lubbockia* sp.  
*Lucicutia* sp.  
*Lucicutia flavicornis* Claus  
*Metridia* sp.  
*Metridia lucens* Boeck  
*Microcalanus* sp.  
*Oithona* sp.  
*Oithona similis* Claus  
*Oithona spinirostris* Claus  
*Oncaea* sp.

*Paracalanus* sp.  
*Paracalanus parvus* Claus  
*Pareuchaeta* sp.  
*Pareuchaeta elongata* Esterly  
*Pleuromamma abdominalis* Lubbock  
*Pleuromamma quadringulata* Dahl  
*Pleuromamma scutullata* Brodskii  
*Pleuromamma xiphias* Giesbrecht  
*Pseudocalanus minutus* Krøyer  
*Racovitzanus antarcticus* Giesbrecht  
*Rhincalanus nasutus* Giesbrecht  
*Scaphocalanus* sp.  
*Undeuchaeta plumosa* Lubbock

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\* for explanation, see text.

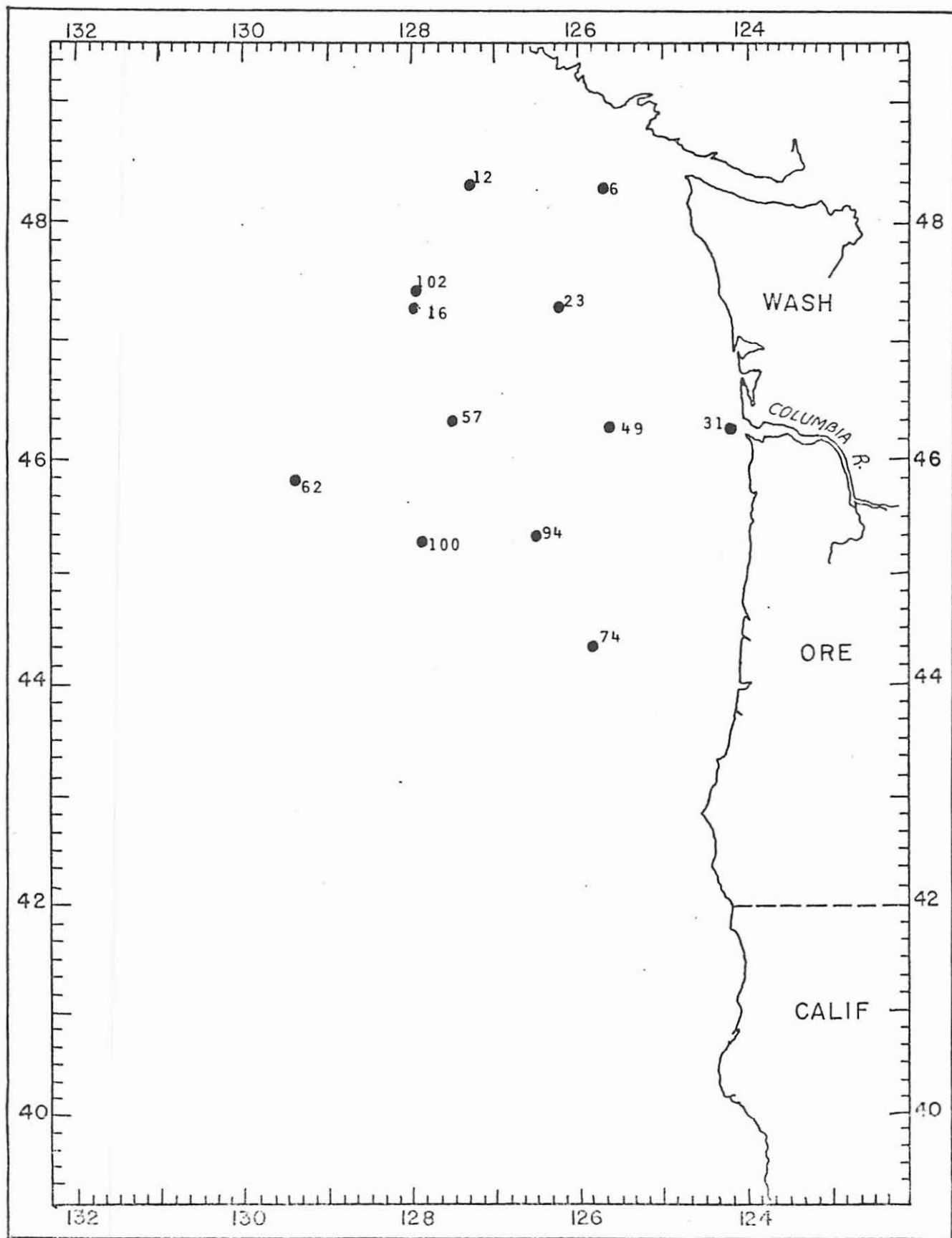


Figure 1 - Zooplankton sampling stations during *Brown Bear* cruise 318, 27 February - 20 March, 1963.

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	912	2375	164	472
<i>Pseudocalanus minutus</i>	1419	303	10	79
<i>Paracalanus parvus</i>	405	202		
<i>Acartia</i> spp.			6	
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>	304	66	12	79
<i>Calanus plumchrus</i>	7	33	6	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	152			
Other copepods	355	505	6	157
Nauplii	253	606	216	
Copepodites	1064	809	56	
Euphausiid larvae				
Amphipods				
Miscellaneous	101	101	36	
TOTAL:	5068	5054	514	786

Notes: *Calanus tenuicornis*, *Pareuchaeta elongata* also present.

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	259	1756	375	363
<i>Pseudocalanus minutus</i>	52			
<i>Paracalanus parvus</i>	78			
<i>Acartia</i> spp.	3			
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	3			41
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	43	319	32	
Other copepods	3		246	134
Nauplii	241	1118	354	363
Copepodites	155	798		
Euphausiid larvae				
Amphipods				
Miscellaneous	5	1277	54	134
TOTAL:	862	5322	1072	1036

Notes: *Pareuchaeta elongata*, chaetognaths, appendicularians and few *Metridia lucens* present.

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	74	406	286	66
<i>Pseudocalanus minutus</i>	18			66
<i>Paracalanus parvus</i>	12	41		
<i>Acartia</i> spp.				
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				66
<i>Calanus plumchrus</i>			14	66
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	18	80	57	
Other copepods	12	116	100	132
Nauplii	117	406	114	211
Copepodites	99	600	86	211
Euphausiid larvae			14	
Amphipods				
Miscellaneous	6	271	43	488
TOTAL:	354	1936	716	1320

Notes: *Calanus tenuicornis*, *Pareuchaeta elongata*, *E. bungii bungii*, *Metridia pacifica*, planktonic annelids also present.

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	466	391	71	23
<i>Pseudocalanus minutus</i>	37	67	15	3
<i>Paracalanus parvus</i>	74	23	7	
<i>Acartia</i> spp.	37		15	
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>		12	7	
<i>Calanus plumchrus</i>	19	12	7	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	205		7	3
Other copepods	56	57		6
Nauplii	410	220	39	13
Copepodites	429	318	54	36
Euphausiid larvae				
Amphipods				
Miscellaneous	148	134	15	6
TOTAL:	1864	1222	246	92

Notes: *Aetidius* sp., *Metridia pacifica*, *Pareuchaeta elongata*, *Eucalanus bungii bungii* also present.

BB 318-31

March 5, 1963

0031

inshore

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	148	124		
<i>Pseudocalanus minutus</i>	264	46		
<i>Paracalanus parvus</i>	66	21		
<i>Acartia</i> spp.	296			
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>	27	21		
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	20	5		
Other copepods	61	31		
Nauplii	329	703		
Copepodites	455	51		
Euphausiid larvae	13			
Amphipods				
Miscellaneous		46		
TOTAL:	1643	1048		

Notes: *Metridia* sp. also present.

BB 318-49

March 7, 1963

0145

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1682	322	65	
<i>Pseudocalanus minutus</i>		99		
<i>Paracalanus parvus</i>		17		
<i>Acartia</i> spp.	36		10	
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	72	33	20	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	95			
Other copepods	36	33		
Nauplii	571	396	47	
Copepodites	444	268	47	
Euphausiid larvae		17		
Amphipods				
Miscellaneous	254	116	10	
TOTAL:	3174	1276	196	

Notes: *Pareuchaeta elongata*, *E. bungii*, *C. pacificus*, *Microcalanus* sp. also present.

BB 318-57

March 7, 1963

0131

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	237	230	79	23
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	27			
<i>Acartia</i> spp.			15	
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>		33	15	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		33	30	37
Other copepods	54	66	15	23
Nauplii	107	66	109	23
Copepodites	344	361	203	85
Euphausiid larvae				
Amphipods				
Miscellaneous		33	30	
TOTAL:	764	820	496	194

Notes: *Metridia* sp., *Pareuchaeta* sp., *C. tenuicornis*, amphipods and salps also present.

BB 318-62

March 9, 1963

0109

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	264	32	66	23
<i>Pseudocalanus minutus</i>	50	4	12	
<i>Paracalanus parvus</i>	50	4	26	
<i>Acartia</i> spp.			6	
<i>Metridia</i> spp.			39	
<i>Calanus pacificus</i>	12			
<i>Calanus plumchrus</i>	73	8	28	18
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	37		28	18
Other copepods	74	20	25	18
Nauplii	293	16	72	18
Copepodites	249	12	166	36
Euphausiid larvae			12	
Amphipods			6	
Miscellaneous	366	12	55	6
TOTAL:	1466	108	554	138

Notes: *C. tenuicornis*, *Microsetella* sp., *Pareuchaeta* sp., *C. pacificus*, *E. bungii*, *Pareuchaeta tonsa*, *Heterorhabdus* sp. also present.

BB 318-74

March 13, 1963

0042

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	2303	135	75	558
<i>Pseudocalanus minutus</i>	96	7		97
<i>Paracalanus parvus</i>	144	14	8	64
<i>Acartia</i> spp.				32
<i>Metridia</i> spp.	103			
<i>Calanus pacificus</i>	16			128
<i>Calanus plumchrus</i>	96			32
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				32
<i>Pareuchaeta elongata</i>			8	32
<i>Oncaea</i> spp.	192	39	8	223
Other copepods	89	14	8	232
Nauplii	912	14	30	251
Copepodites	624	103	52	1005
Euphausiid larvae			8	
Amphipods				
Miscellaneous	226	25	30	97
TOTAL:	4798	356	228	2792

Notes: *Rhincalanus nasutus*, *Acartia* sp., *Microsetella* sp., and *Calanus pacificus* also present.

BB 318-94

March 15, 1963

0335

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	212	124	232	79
<i>Pseudocalanus minutus</i>	23		9	
<i>Paracalanus parvus</i>			27	10
<i>Acartia</i> spp.	11	10		
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>		20	27	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				10
<i>Oncaea</i> spp.	23	10	36	10
Other copepods	11	10	45	10
Nauplii	77	42	197	
Copepodites	67	20	250	20
Euphausiid larvae				
Amphipods				
Miscellaneous	58	10	54	40
TOTAL:	482	246	894	180

Notes: *Microsetella* sp., *Heterorhabdus* sp., *Eucalanus bungii*, *C. pacificus*, *Metridia* sp., also present.

BB 318-100                      March 17, 1963                      0127                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1970	3833	70	194
<i>Pseudocalanus minutus</i>	112	111		
<i>Paracalanus parvus</i>	84	260		15
<i>Acartia</i> spp.				
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	54	148		
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	36	186		15
Other copepods	45	260		
Nauplii	169	520	70	
Copepodites	310	844	70	60
Euphausiid larvae				
Amphipods		37		
Miscellaneous	45	148	70	15
TOTAL:	2814	6496	280	298

Notes: *C. pacificus*, *E. bungii*, *Metridia* sp., *Gaetanus* sp., also present.

BB 318-102

March 18, 1963

0033

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1228	743	202	3
<i>Pseudocalanus minutus</i>		25	20	1
<i>Paracalanus parvus</i>		25		1
<i>Acartia</i> spp.			20	
<i>Metridia</i> spp.			20	
<i>Calanus pacificus</i>	36			
<i>Calanus plumchrus</i>	162		30	1
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	210	45	10	
Other copepods	126	12		
Nauplii	306	136	60	1
Copepodites	612	148	93	4
Euphausiid larvae				1
Amphipods				
Miscellaneous	252	87	71	4
TOTAL:	2998	1238	546	14

Notes: *C. cristatus*, *Pareuchaeta* sp., *Heterorhabdus* sp., also present.

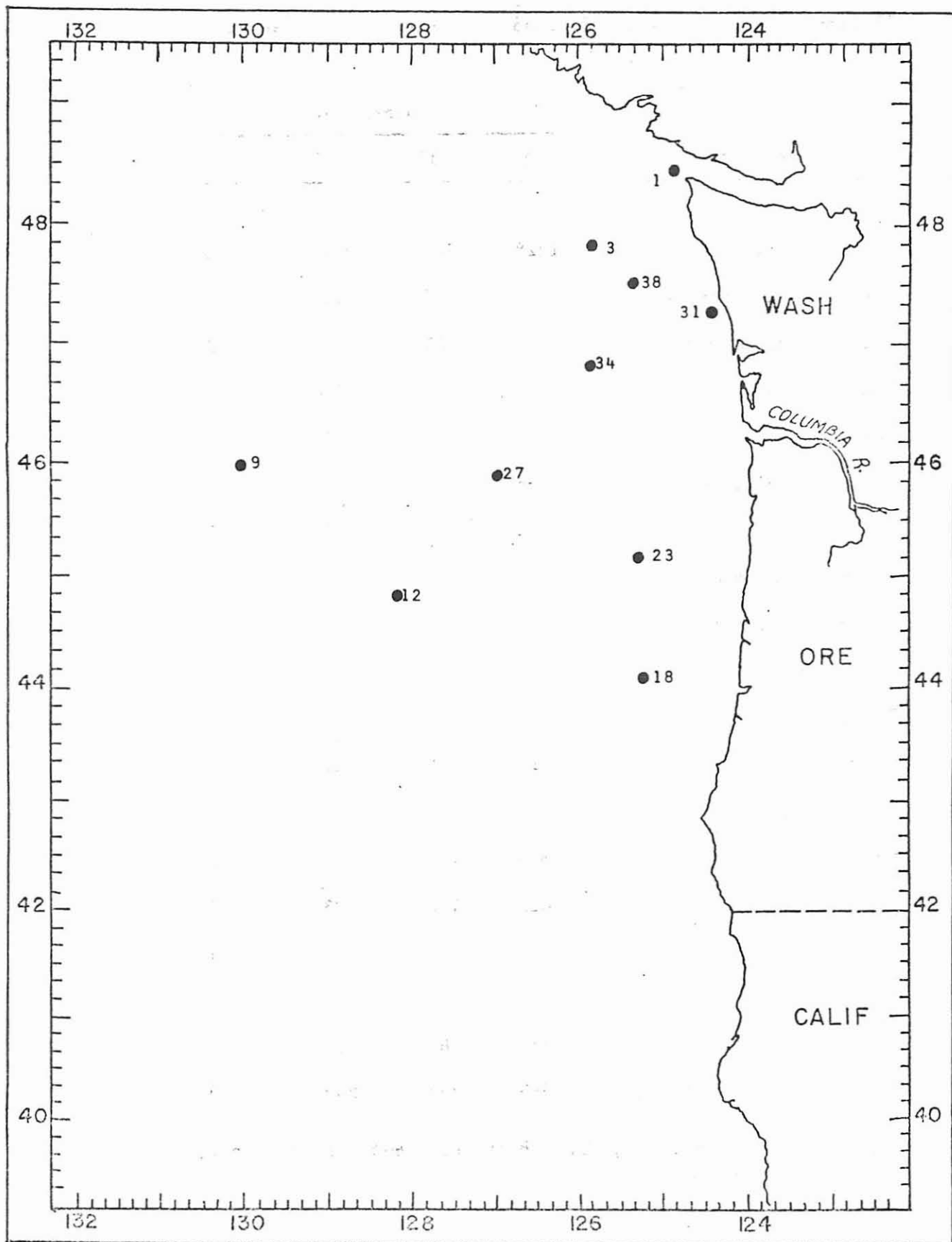


Figure 2 - Zooplankton sampling stations during *Brown Bear* cruise 320, 28 March - 10 April, 1963.

BB 320-1

March 29, 1963

0300

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	196	444	217	125
<i>Pseudocalanus minutus</i>	49	194	122	
<i>Paracalanus parvus</i>		148	40	
<i>Acartia</i> spp.	98		40	
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>	98	55	20	18
<i>Calanus plumchrus</i>		18	20	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		305		
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		92	136	36
Other copepods			40	
Nauplii	637	693	408	89
Copepodites	441	471	272	125
Euphausiid larvae				
Amphipods				
Miscellaneous	98	277	59	54
TOTAL:	1634	2772	1358	446

Notes: *Eucalanus bungii*, *Heterorhabdus papilliger* also present.

BB 320-3 March 30, 1963 0139 plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	68	176	75	91
<i>Pseudocalanus minutus</i>	34	26		30
<i>Paracalanus parvus</i>				8
<i>Acartia</i> spp.				
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>		13	2	
<i>Calanus plumchrus</i>			2	4
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				8
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		13		
Other copepods	11			19
Nauplii	21	64	8	15
Copepodites	34	76	19	54
Euphausiid larvae				
Amphipods				
Miscellaneous	11	40	4	20
TOTAL:	178	400	110	246

Notes:

BB 320-9      April 1, 1963      0055      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	382	755	580	30
<i>Pseudocalanus minutus</i>	40		94	
<i>Paracalanus parvus</i>	62	108	69	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	25		23	21
<i>Calanus pacificus</i>			23	
<i>Calanus plumchrus</i>	25	34	23	3
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	13	162	23	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				3
<i>Oncaea</i> spp.	170	324	150	20
Other copepods	40	137		29
Nauplii	326	513	299	3
Copepodites	396	457	449	27
Euphausiid larvae		34		
Amphipods				
Miscellaneous	99	162	131	14
TOTAL:	1516	2698	1870	150

Notes: *C. Cristatus*, *Eucalanus bungii*, *C. tenuicornis*, *Lucicutia flavicornis*, *Heterorhabdus pacificus*, *Pleuromamma abdominalis*, *Euchirella* sp., also present.

BB 320-12

April 1, 1963

2350

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	451	219	531	367
<i>Pseudocalanus minutus</i>			17	
<i>Paracalanus parvus</i>	226	29	17	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	15	14	17	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	91		52	
<i>Eucalanus bungii</i>		14		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	30	204	157	
Other copepods	45	29	17	
Nauplii	394	188	413	92
Copepodites	451	188	432	367
Euphausiid larvae	30			
Amphipods				
Miscellaneous	3892	689	314	278
TOTAL:	5640	1566	1966	1112

Notes: *Pareuchaeta elongata*, *C. cristatus*, *C. tenuicornis*,  
*C. plumchrus*, *Euchirella* sp. also present.

BB 320-18      April 3, 1963      0115      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	204	6471	136	27
<i>Pseudocalanus minutus</i>	12	60		2
<i>Paracalanus parvus</i>		451	39	1
<i>Acartia</i> spp.				
<i>Metridia</i> spp.		60		2
<i>Calanus pacificus</i>				1
<i>Calanus plumchrus</i>		30		
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		90		2
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	96	240		11
Other copepods	60	180		4
Nauplii	503	6471	39	16
Copepodites	263	903	78	18
Euphausiid larvae		30		
Amphipods				
Miscellaneous	60	150	20	15
TOTAL:	1198	15048	310	96

Notes: *C. cristatus*, *Eucalanus bungii*, *Pareuchaeta elongata*, *Aetidius armatus*, *Candacia columbiae*, *Pleuromamma abdominalis*, *Pleuromamma scutullata*, *Calanus tenuicornis*, *Euchirella* sp., *Scaphocalanus* sp., also present.

BB 320-23

April 5, 1963

0151

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	853	1708	243	1808
<i>Pseudocalanus minutus</i>	19			
<i>Paracalanus parvus</i>	72	569		
<i>Acartia</i> spp.	31			
<i>Metridia</i> spp.	19	64		
<i>Calanus pacificus</i>	10	64		
<i>Calanus plumchrus</i>	19			
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	72	64		
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		1044		337
Other copepods	31	129		
Nauplii	310	3036	71	826
Copepodites	310	1518	142	672
Euphausiid larvae	19	64		
Amphipods				
Miscellaneous	155	1233	53	1498
TOTAL:	1938	9488	506	5166

Notes: *C. cristatus*, *Eucalanus bungii*, *Lucicutia flavicornis*, *Euchirella* sp., *Arietellus* sp., and *Scaphocalanus* sp. also present.

BB 320-27

April 6, 1963

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	677	860	1187	16
<i>Pseudocalanus minutus</i>	36			
<i>Paracalanus parvus</i>	19	96	102	1
<i>Acartia</i> spp.	9		51	
<i>Metridia</i> spp.	19	19		
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	9	38		1
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		57	51	1
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	66	134	314	1
Other copepods			102	2
Nauplii	1924	573	663	4
Copepodites	142	334	628	14
Euphausiid larvae				
Amphipods				
Miscellaneous	642	263	349	22
TOTAL:	3564	2388	3490	60

Notes: *C. pacificus*, *C. cristatus*, *Eucalanus bungii*, *Pareuchaeta elongata*, *Lucicutia flavicornis*, *Euchirella* sp., and *Gaetanus* sp., also present.

BB 320-31

April 7, 1963

0050

inshore

Species	Depth (m)			
	1	35	50	75
<i>Oithona</i> spp.	1733	335	1061	1028
<i>Pseudocalanus minutus</i>	551	52	245	
<i>Paracalanus parvus</i>	394	104	51	268
<i>Acartia</i> spp.	315	13		107
<i>Metridia</i> spp.	40			
<i>Calanus pacificus</i>	236	13	26	54
<i>Calanus plumchrus</i>	27	26	26	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	551		204	160
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	27	26	102	54
Other copepods	67	13	51	
Nauplii	2915	139	898	597
Copepodites	945	208	734	696
Euphausiid larvae				
Amphipods				
Miscellaneous	67	231	612	321
TOTAL:	7878	1156	4080	3316

Notes: *C. cristatus*, *C. tenuicornis*, and *Gaidius* sp. also present.

BB 320-34

April 8, 1963

0054

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	14	772	632	139
<i>Pseudocalanus minutus</i>	1	82	65	
<i>Paracalanus parvus</i>	4	318	22	7
<i>Acartia</i> spp.		10	22	
<i>Metridia</i> spp.		10	1	
<i>Calanus pacificus</i>	1	70		
<i>Calanus plumchrus</i>	1	30	44	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		318	153	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>	1		2	
<i>Oncaea</i> spp.	2	60	65	
Other copepods	1	30	44	14
Nauplii	4	1271	480	40
Copepodites	12	863	436	88
Euphausiid larvae				
Amphipods				
Miscellaneous	14	681	153	77
TOTAL:	56	4540	2118	366

Notes: *C. cristatus*, *Eucalanus bungii*, *Pleuromamma abdominalis*, *Pleuromamma scutullata*, *Gaidius* sp., *Gaetanus* sp., and *Euchirella* sp. also present.

Several *Pareuchaeta elongata* females carried eggs.

BB 320-38

April 8, 1963

2349

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	856	2865	1144	53
<i>Pseudocalanus minutus</i>	285	140	156	15
<i>Paracalanus parvus</i>	122	427	109	10
<i>Acartia</i> spp.	142	48		
<i>Metridia</i> spp.	2	7		5
<i>Calanus pacificus</i>	20			10
<i>Calanus plumchrus</i>	122	48	31	5
<i>Calanus cristatus</i>			16	
<i>Clausocalanus</i> spp.	321	305	172	5
<i>Eucalanus bungii</i>				5
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	61	97	31	
Other copepods	40	48	16	15
Nauplii	963	914	265	
Copepodites	571	914	520	98
Euphausiid larvae				5
Amphipods				
Miscellaneous	61	336	203	40
TOTAL:	3566	6096	2600	264

Notes: *Pareuchaeta elongata*, *Euchirella* sp., also present.

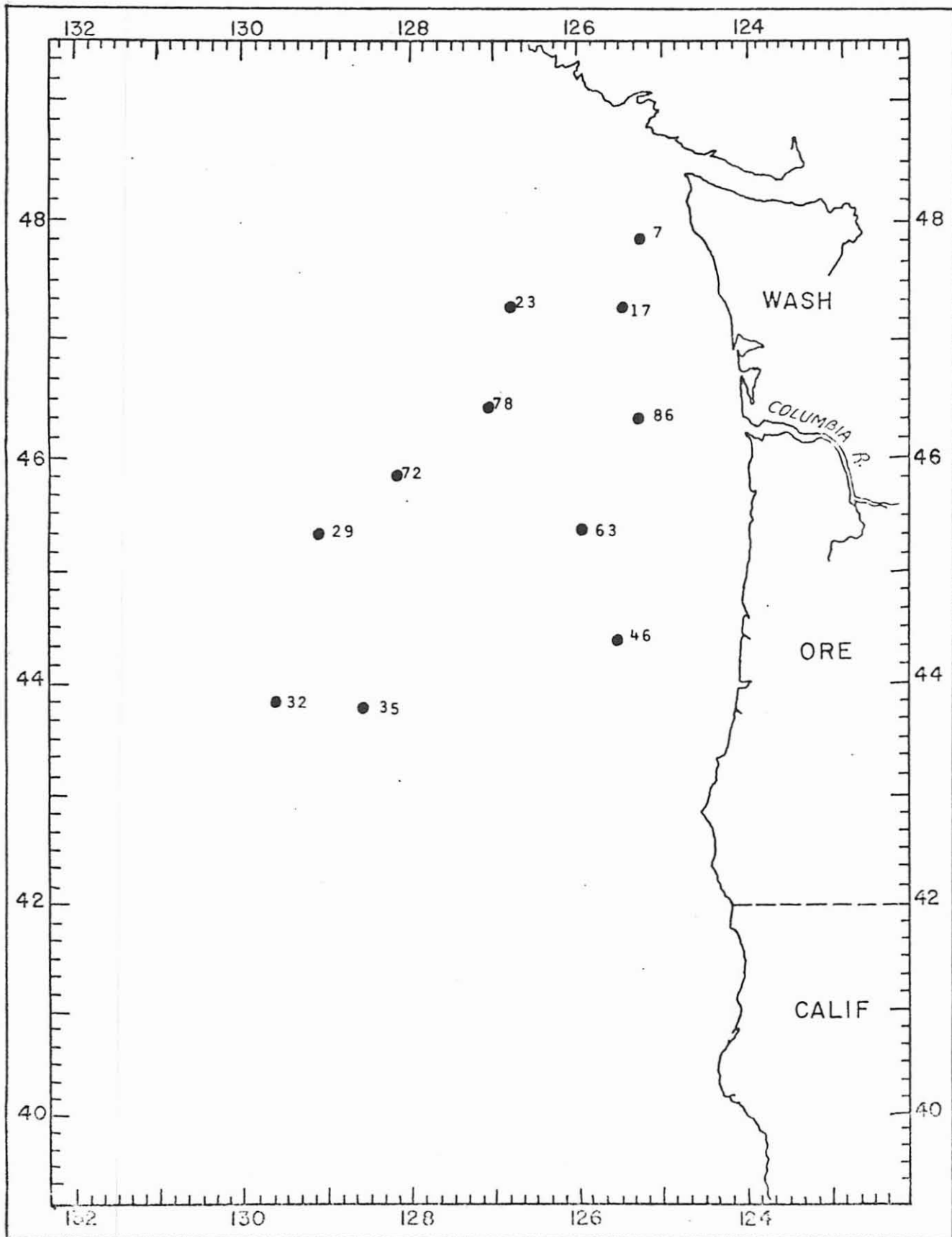


Figure 3 - Zooplankton sampling stations during *Brown Bear* cruise 322, 16 April - 1 May, 1963.

BB 322-7

April 18, 1963

0230

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1508	187	448	98
<i>Pseudocalanus minutus</i>	251	34	23	
<i>Paracalanus parvus</i>	56	8		
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	18	8	3	
<i>Calanus pacificus</i>	56			
<i>Calanus plumchrus</i>	28			
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	168	17	34	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	36		23	11
Other copepods	36	24	23	
Nauplii	363	181	796	65
Copepodites	140	112	207	33
Euphausiid larvae				
Amphipods				
Miscellaneous	47	43	91	33
TOTAL:	2792	624	1658	240

Notes: *C. cristatus*, *Pareuchaeta* sp., *C. tenuicornis*, *Pleuromamma abdominalis*, *Lucicutia flavicornis*, *Aetidius armatus*, *Heterorhabdus papilliger*, *Euchirella* sp., *Acartia* sp., also present.

BB 322-17                      April 19, 1963                      0100                      plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	588	635	246	223
<i>Pseudocalanus minutus</i>	145	15	34	
<i>Paracalanus parvus</i>	8			
<i>Acartia</i> spp.		15		
<i>Metridia</i> spp.	8		12	12
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	8	15		
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	77	61	34	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	17	30		
Other copepods	8	45	12	23
Nauplii	197	153	117	117
Copepodites	241	153	82	47
Euphausiid larvae				
Amphipods				
Miscellaneous	68	47	140	23
TOTAL:	1368	1176	682	446

Notes: *C. pacificus*, *C. tenuicornis*, *C. cristatus*, *Eucalanus bungii*, *Heterorhabdus papilliger*, *Gaidius* sp., *Gaetanus* sp., *Pleuromamma abdominalis*, *Aetidius armatus*, *Lucicutia flavicornis*, *Pareuchaeta* sp., *Scaphocalanus* sp., also present.

BB 322-23

April 20, 1963

0100

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	363	916	336	234
<i>Pseudocalanus minutus</i>	9	21		20
<i>Paracalanus parvus</i>	28	52	30	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	5		10	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	18	31	10	
<i>Calanus cristatus</i>			10	
<i>Clausocalanus</i> spp.	18	52	59	10
<i>Eucalanus bungii</i>	9	31	39	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	77	104	104	49
Other copepods	14	62	59	50
Nauplii	290	874	448	136
Copepodites	120	535	448	148
Euphausiid larvae		10		
Amphipods				
Miscellaneous	77	104	59	68
TOTAL:	1036	2818	1600	716

Notes: *C. cristatum*, *C. pacificus*, *Pareuchaeta* sp., *C tenuicornis*, *Candacia columbiae*, *Clytemnestra* sp., *Lucicutia flavicornis*, *Euchirella* sp., *Acartia* sp., *Pleuromamma abdominalis*, *Gaetanus* sp., also present.

Considerable amount of phytoplankton in samples.

BB 322-29                      April 21, 1963                      0100                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	439	108	1844	87
<i>Pseudocalanus minutus</i>		7		
<i>Paracalanus parvus</i>	22	21	299	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	8		16	
<i>Calanus pacificus</i>				
<i>Calanus plumehrus</i>	30		32	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	22		96	
<i>Eucalanus bungii</i>	22		64	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	38	45	349	11
Other copepods	60	27	112	
Nauplii	248	95	1196	54
Copepodites	135	99	797	65
Euphausiid larvae				
Amphipods				
Miscellaneous	84	45	199	
TOTAL:	1126	452	4984	218

Notes: *C. cristatus*, *C. pacificus*, *Canadacia columbiae*, *Calanus tenuicornis*, *Lucicutia flavicornis*, *Pareuchaeta elongata*, *Pleuromamma abdominalis*, *Euchirella* sp., *Gaidius* sp., *Gaetanus* sp., and *Heterorhabdus papilliger* also present.

BB 322-32                      April 21, 1963                      0100                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	304	578	541	533
<i>Pseudocalanus minutus</i>			29	
<i>Paracalanus parvus</i>	76	56	58	48
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	25			
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>			29	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		28		24
<i>Eucalanus bungii</i>		84		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	76	111	200	48
Other copepods	50	111	147	24
Nauplii	152	356	494	121
Copepodites	323	511	400	206
Euphausiid larvae	50			
Amphipods				
Miscellaneous	817	378	470	176
TOTAL:	1900	2222	2352	1212

Notes: *C. cristatus*, *C. pacificus*, *C. tenuicornis*, *Candacia columbiae*, *Lucicutia flavicornis*, *Pleuromamma abdominalis*, *Heterorhabdus tanneri*, *Scaphocalanus* sp., *Euchirella* sp., also present.

Lots of phytoplankton in samples.

BB 322-35

April 23, 1963

0100

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	739	440	378	92
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	40	157	76	
<i>Acartia</i> spp.			38	
<i>Metridia</i> spp.	81	44		
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		66	114	24
<i>Eucalanus bangii</i>		44	38	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	81	283	319	24
Other copepods		66	152	
Nauplii	295	660	290	24
Copepodites	369	943	871	47
Euphausiid larvae				
Amphipods				
Miscellaneous	2065	660	639	70
TOTAL:	3688	3142	2904	278

Notes: *C. pacificus*, *C. plumchrus*, *C. tenuicornis*, *Candacia columbiae*, *Pleuromamma scutulla*, *Pareuchaeta elongata*, *Heterorhabdus tanneri*, *Heterorhabdus papilliger*, *Pleuromamma abdominalis*, *Gaidius* sp., *Gaetanus* sp., also present.

A large quantity of small gastropods in all samples.

Large amount of phytoplankton in 1 and 35 m samples.

BB 322-46                      April 24, 1963                      0100                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	3301	442	134	731
<i>Pseudocalanus minutus</i>	171	63		111
<i>Paracalanus parvus</i>	512	147	26	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	102	84		
<i>Calanus pacificus</i>	17			
<i>Calanus plumchrus</i>	17			
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	228	42		55
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	455	126		55
Other copepods	171	263	51	177
Nauplii	5009	221		177
Copepodites	683	526	80	731
Euphausiid larvae	51			
Amphipods				
Miscellaneous	683	211	26	177
TOTAL:	11384	2106	320	2216

Notes: *C. cristatus*, *Pareuchaeta elongata*, *Calanus tenuicornis*, *Pleuromamma abdominalis*, *Amallothrix inornata*, *Aetidius armatus*, *Euchirella* sp., also present.

Samples contain some phytoplankton.

Adult and copepodite V stages of *C. plumchrus* with large quantities of fat.

BB 322-63

April 26, 1963

0100

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	2593	423	724	172
<i>Pseudocalanus minutus</i>		14	35	
<i>Paracalanus parvus</i>	243	83	52	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	84		18	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	105	27		
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	168	110	35	
Other copepods	105	69	52	53
Nauplii	12316	233	161	
Copepodites	405	292	228	36
Euphausiid larvae	63			
Amphipods				
Miscellaneous	84	219	35	17
TOTAL:	16206	1458	1340	278

Notes: *C. cristatus*, *C. pacificus*, *Eucalanus bungii*, *C. tenuicornis*, *Pareuchaeta* sp., *Aetidius armatus*, *Lucicutia flavicornis*, *Pleuromamma abdominalis*, *Heterorhabdus papilliger*, *Pleuromamma scutullata* also present.

Surface samples with large amount of phytoplankton.

BB 322-72

April 27, 1963

0100

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1959	346	452	101
<i>Pseudocalanus minutus</i>	21		18	
<i>Paracalanus parvus</i>	126	21		
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	21	21	18	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	42		36	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.			60	18
<i>Eucalanus bungii</i>				9
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	84	82	60	9
Other copepods	42	42		9
Nauplii	4339	182	345	54
Copepodites	210	164	143	46
Euphausiid larvae				
Amphipods				
Miscellaneous	182	64	36	27
TOTAL:	6998	912	1190	272

Notes: *C. pacificus*, *C. cristatus*, *C. tenuicornis*, *Lucicutia flavicornis*, *Euchirella* sp., *Scaphocalanus* sp., *Scaphocalanus magus*, *Pareuchaeta elongata*, *Scolecithricella* sp., *Pleuromamma abdominalis*, *Racovitzanus antarcticus*, *Gaidius* sp., also present.

*Oncaea* sp. and *Lucicutia flavicornis* with eggs.  
Many unattached copepod eggs in the samples.

BB 322-78                      April 28, 1963                      0100                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1671	1186	389	588
<i>Pseudocalanus minutus</i>		50		8
<i>Paracalanus parvus</i>	85	42		33
<i>Acartia</i> spp.	24			
<i>Metridia</i> spp.	12	42		17
<i>Calanus pacificus</i>	12			
<i>Calanus plumchrus</i>	61			
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	61	42		33
<i>Eucalanus bungii</i>	12	33	12	
<i>Pareuchaeta elongata</i>			12	
<i>Oncaea</i> spp.		208	155	17
Other copepods	96	75	25	17
Nauplii	716	860	155	135
Copepodites	512	297	194	306
Euphausiid larvae				
Amphipods	12			
Miscellaneous	170	119	25	67
TOTAL:	3410	2966	972	1224

Notes: *C. cristatus*, *C. tenuicornis*, *Heterorhabdus tanneri*, *Lucicutia flavicornis*, *Aetidius armatus*, *Gaetanus simplex*, *Racovitzanus antarcticus*, *Euchirella* sp., *Pleuromamma abdominalis*, *Scaphocalanus* sp., also present.

Many stage V and adult *C. plumchrus* contained large quantities of fat.

BB 322-86

April 29, 1963

0100

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1973	232	791	134
<i>Pseudocalanus minutus</i>	759	72	144	
<i>Paracalanus parvus</i>	228	16	90	
<i>Acartia</i> spp.	58			
<i>Metridia</i> spp.	83	2	22	
<i>Calanus pacificus</i>	8	16	45	
<i>Calanus plumchrus</i>			11	14
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	50	16	33	
<i>Eucalanus bungii</i>		8		
<i>Pareuchaeta elongata</i>		8		
<i>Oncaea</i> spp.	33	25	360	34
Other copepods	66	24	122	34
Nauplii	3794	259	5106	63
Copepodites	417	112	180	105
Euphausiid larvae	8	8	56	
Amphipods				
Miscellaneous	83	98	180	34
TOTAL:	7588	894	7192	420

Notes: *C. cristatus*, *C. tenuicornis*, *Heterorhabdus papilliger*, *Pleuromamma abdominalis*, *Lucicutia flavicornis*, *Scaphocalanus* sp., *Euchirella* sp., *Pleuromamma scutullata*, *Gaidius* sp., also present.

Many detached eggs.

Many *C. plumchrus* adult and stage V contained large amounts of fat.

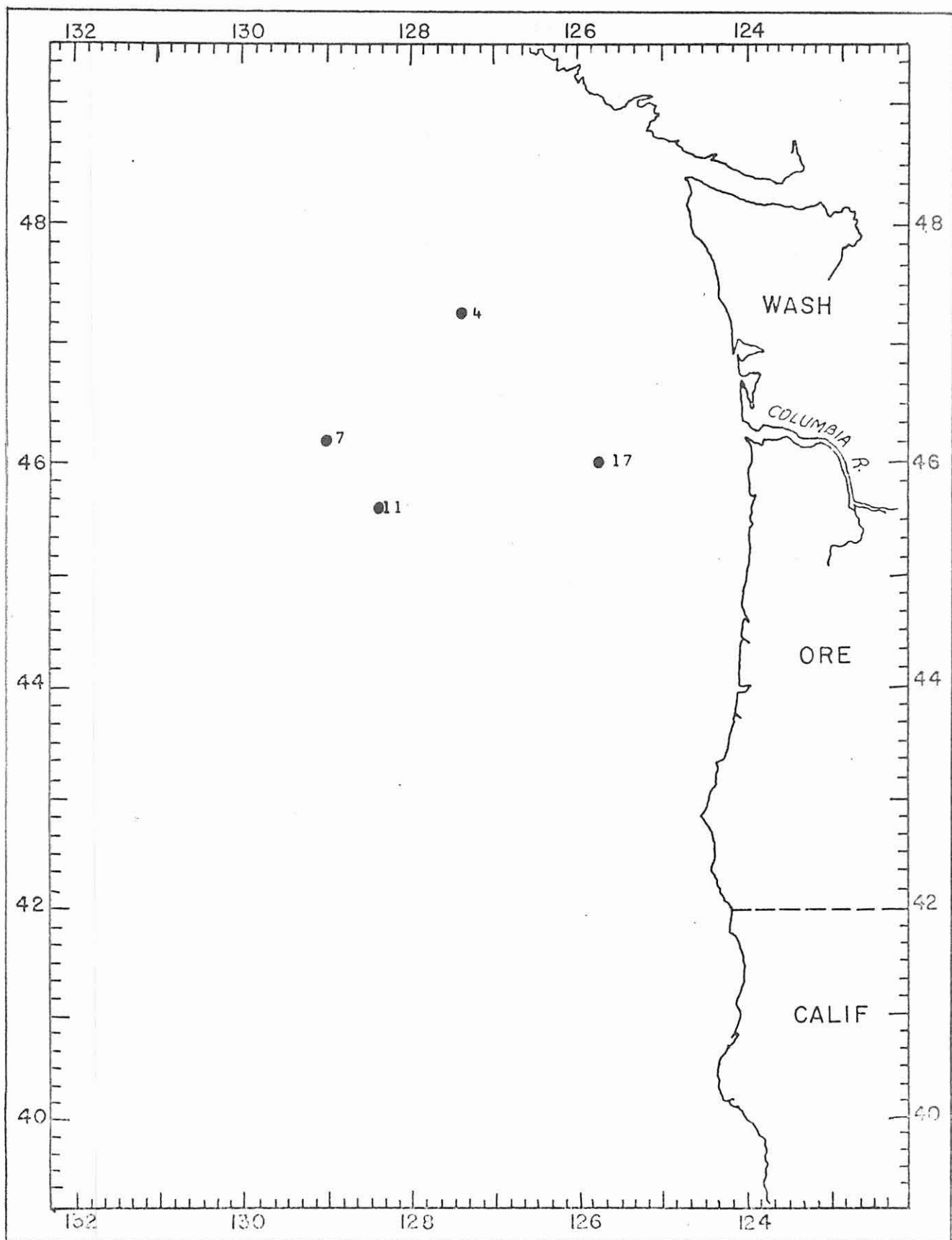


Figure 4 - Zooplankton sampling stations during *Brown Bear* cruise 323, 13 May - 19 May, 1963.

BB 323-4

May 15, 1963

0135

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	338	4500	1045	222
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	19	76	124	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	6	45		17
<i>Calanus pacificus</i>	6			
<i>Calanus plumchrus</i>		60	7	8
<i>Calanus cristatus</i>		15		
<i>Clausocalanus</i> spp.	63	165	37	8
<i>Eucalanus bungii</i>		15	15	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	84	106	104	77
Other copepods	12	45	118	33
Nauplii	370	3718	597	298
Copepodites	137	880	298	162
Euphausiid larvae				
Amphipods				
Miscellaneous	25	196	124	51
TOTAL:	1056	9794	2488	852

Notes: *C. tenuicornis*, *Heterorhabdus pacificus*, *Heterorhabdus tanneri*, *Pleuromamma abdominalis*, *Lucicutia flavicornis*, *Candacia columbiae*, *Pareuchaeta* sp., *Gaetanus* sp., also present.

BB 323-7                      May 16, 1963                      0100                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	725	387	488	380
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	105	107	45	98
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	30			12
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	30	13		
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		40	134	24
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	60	94	134	71
Other copepods	30	40	60	48
Nauplii	1181	163	283	109
Copepodites	322	456	299	206
Euphausiid larvae				
Amphipods				
Miscellaneous	188	121	120	119
TOTAL:	2684	1382	1574	1086

Notes: *C. pacificus*, *C. cristatus*, *C. tenuicornis*, *Pareuchaeta elongata*, *Pleuromamma* sp., *Eucalanus bungii*, *Pleuromamma abdominalis*, *Lucicutia flavicornis*, *Heterorhabdus papilliger*, *Heterorhabdus pacificus*, *Gaidius* sp., also present.

BB 323-11

May 17, 1963

0015

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1255	816	627	507
<i>Pseudocalanus minutus</i>			33	
<i>Paracalanus parvus</i>	39	43	33	110
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	39	14	11	22
<i>Calanus pacificus</i>	13			
<i>Calanus plumchrus</i>	26	14		
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	104	118	22	44
<i>Eucalanus bungii</i>	13	43	22	
<i>Pareuchaeta elongata</i>			11	
<i>Oncaea</i> spp.		86	77	110
Other copepods	39	87	66	22
Nauplii	759	172	214	137
Copepodites	438	451	363	301
Euphausiid larvae				
Amphipods	13			
Miscellaneous	175	236	182	274
TOTAL:	2918	2148	1650	1470

Notes: *C. cristatus*, *C. tenuicornis*, *Lucicutia flavicornis*, *Pleuromanna abdominalis*, *Heterorhabdus pacificus*, *Heterorhabdus papilliger*, *Candacia columbiae*, *Gaidius* sp., and *Gaetanus* sp., also present.

Diatoms and *Ceratius* sp. also present.

BB 323-17

May 18, 1963

0245

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1405	1385	408	51
<i>Pseudocalanus minutus</i>	625	33		6
<i>Paracalanus parvus</i>	390	129		1
<i>Acartia</i> spp.	24		24	
<i>Metridia</i> spp.	24		48	
<i>Calanus pacificus</i>				1
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	468	16	36	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>			12	1
<i>Oncaea</i> spp.		198	48	3
Other copepods	48	16	36	
Nauplii	3279	4353	550	17
Copepodites	937	330	157	17
Euphausiid larvae		16	24	1
Amphipods				
Miscellaneous	625	264	220	3
TOTAL:	7808	6596	1570	102

Notes: *C. plumchrus*, *C. cristatus*, *Eucalanus bungii*, *Lucicutia flavicornis*, *C. tenuicornis*, *Heterorhabdus papilliger*, *Heterorhabdus pacificus* and *Aetidius armatus* also present.

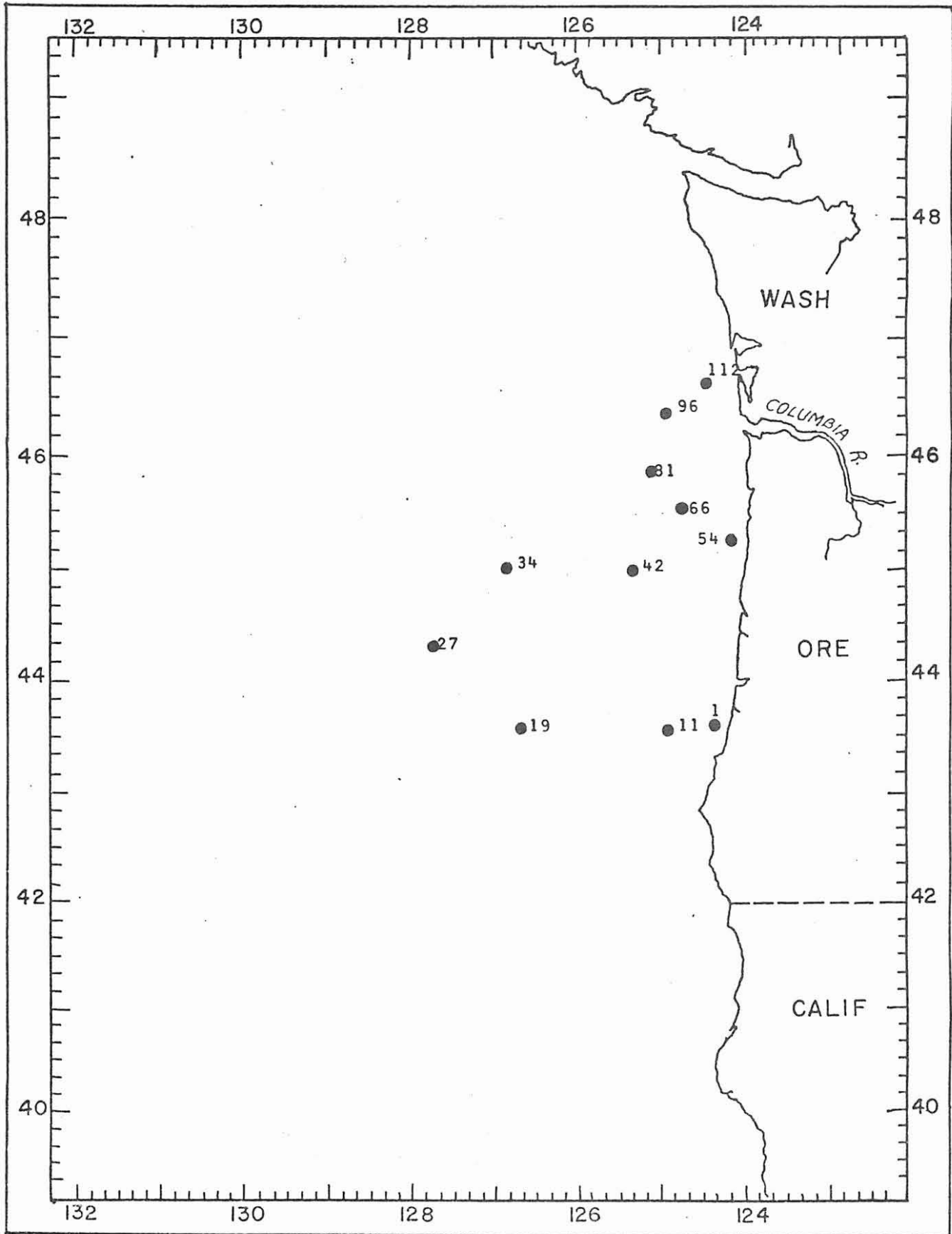


Figure 5 - Zooplankton sampling stations during *Brown Bear* cruise 324  
21 May - 4 June, 1963.

BB 324-1

May 22, 1963

0055

inshore

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	428	239	439	
<i>Pseudocalanus minutus</i>	256	41	205	
<i>Paracalanus parvus</i>	137		102	
<i>Acartia</i> spp.	51		25	
<i>Metridia</i> spp.	14		25	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	86	24	88	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		12	81	
Other copepods	68	12	6	
Nauplii	205	412	292	
Copepodites	503	124	167	
Euphausiid larvae				
Amphipods				
Miscellaneous	20	82	19	
TOTAL:	1710	924	1462	

Notes: *Calanus plumchrus*, *Calanus tenuicornis*, *Aetidius armatus*, *Eucalanus bungii* and *Metridia* sp., also present.

BB 324-11                      May 23, 1963                      1300                      plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	320	504	601	242
<i>Pseudocalanus minutus</i>				36
<i>Paracalanus parvus</i>	192	158	288	57
<i>Acartia</i> spp.	11			
<i>Metridia</i> spp.	205	20	16	36
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	34	40	216	
<i>Eucalanus bungii</i>				21
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		40	96	21
Other copepods	22		224	10
Nauplii	179	30	144	10
Copepodites	269	365	745	214
Euphausiid larvae				
Amphipods				
Miscellaneous	34	107	90	71
TOTAL:	1282	1260	2404	712

Notes: *C. pacificus*, *C. plumchrus*, *C. cristatus*, *C. tenuicornis*, *Pareuchaeta elongata*, *Heterorhabdus papilliger*, *Heterorhabdus spiniformis*, *Candacia columbiae*, *Aetidius armatus*, *Gaidius pungens*, *Euchirella* sp., and *Amallothrix* sp. also present.

BB 324-19

May 24, 1963

0043

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	770	982	971	283
<i>Pseudocalanus minutus</i>		10	43	
<i>Paracalanus parvus</i>	317		156	38
<i>Acartia</i> spp.		10		
<i>Metridia</i> spp.	589	10	11	37
<i>Calanus pacificus</i>	34			
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	23	10	95	31
<i>Eucalanus burgii</i>				9
<i>Pareuchaeta elongata</i>				9
<i>Oncaea</i> spp.	272	131	55	46
Other copepods	136	32	66	46
Nauplii	362	65	43	
Copepodites	1541	742	260	168
Euphausiid larvae	11			
Amphipods	11			
Miscellaneous	408	164	687	92
TOTAL:	4532	2182	2368	766

Notes: *C. pacificus*, *C. cristatus*, *C. tenuicornis*, *Candacia columbiae*, *Aetidius armatus*, *Heterorhabdus norvegicum*, *Pleuromamma abdominalis*, *Heterorhabdus papilliger*, *Heterorhabdus tanneri*, *Scaphocalanus* sp., *Euchirella* sp., and *Gaidius* sp., also present.

BB 324-27

May 25, 1963

0330

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	320	431	749	248
<i>Pseudocalanus minutus</i>	60		52	24
<i>Paracalanus parvus</i>	240	179	142	103
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	96	57	41	24
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	180	144	233	
<i>Eucalanus bungii</i>		58	21	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	220		82	57
Other copepods	184	115	217	69
Nauplii	180	130	114	165
Copepodites	1999	1758	646	279
Euphausiid larvae	36		21	
Amphipods				
Miscellaneous	480	610	258	57
TOTAL:	3998	3588	2584	1032

Notes: *C. pacificus*, *C. plumchrus*, *Pareuchaeta elongata*, *Candacia columbiae*, *Calanus tenuicornis*, *Heterorhabdus papilliger*, *Pleuromamma abdominalis*, *Euchirella* sp., and *Scaphocalanus* sp., also present.

Considerable quantity of phytoplankton in the surface sample.

BB 324-34                      May 26, 1963                      0104                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	657	141	447	1276
<i>Pseudocalanus minutus</i>			141	109
<i>Paracalanus parvus</i>	82		35	255
<i>Acartia</i> spp.				32
<i>Metridia</i> spp.	33			32
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	16	13	70	80
<i>Eucalanus bungii</i>			17	16
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	41	64	70	128
Other copepods	41	26	50	138
Nauplii	254		35	200
Copepodites	378	104	200	912
Euphausiid larvae				
Amphipods				
Miscellaneous	115	52	118	456
TOTAL:	1642	402	1176	3646

Notes: *C. pacificus*, *C. plumchrus*, *C. tenuicornis*, *Candacia columbiae*, *Pareuchaeta elongata*, *Aetidius armatus*, *Heterorhabdus papilliger*, *Heterorhabdus norvegicus*, *Pleuromamma abdominalis* also present.

*Pareuchaeta elongata* females carried eggs. Detached eggs were also seen in the sample.

BB 324-42

May 27, 1963

0204

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	386	1324	267	355
<i>Pseudocalanus minutus</i>		388	64	36
<i>Paracalanus parvus</i>	177	163	10	73
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	27	122	21	
<i>Calanus pacificus</i>			31	
<i>Calanus plumchrus</i>		20		36
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	122	122	42	
<i>Eucalanus bungii</i>			10	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	82	176	10	104
Other copepods	54	329	10	
Nauplii	1159	265	21	73
Copepodites	741	1170	127	209
Euphausiid larvae	14			
Amphipods				
Miscellaneous	419	331	21	146
TOTAL:	3220	4414	636	1044

Notes: *Pareuchaeta elongata*, *Aetidius armatus*, *Candacia columbiae*, *Heterorhabdus papilliger*, *Calocalanus* sp., *Microstella* sp., also present.

BB 324-54

May 28, 1963

0305

inshore

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1040	132	126	
<i>Pseudocalanus minutus</i>	400	71	36	
<i>Paracalanus parvus</i>	180	8	7	
<i>Acartia</i> spp.	173	28	11	
<i>Metridia</i> spp.	8	4	7	
<i>Calanus pacificus</i>	120	4	4	
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	480	56	25	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	132		7	
Other copepods	32	4	7	
Nauplii	165	41	14	
Copepodites	1160	112	60	
Euphausiid larvae				
Amphipods				
Miscellaneous	128	45	28	
TOTAL:	3999	509	332	

Notes: *Eucalanus bungii*, *Calanus tenuicornis*, *Lucicutia flavicornis*, *Aetidius armatus*, *Pareuchaeta* sp. also present.

BB 324-66                      May 29, 1963                      0100                      plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	149	342	233	35
<i>Pseudocalanus minutus</i>	20	76	19	6
<i>Paracalanus parvus</i>	133	177	66	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.			19	3
<i>Calanus pacificus</i>		10		
<i>Calanus plumchrus</i>			10	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	30	76	38	6
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	10	28	87	3
Other copepods	20	10	10	19
Nauplii	108	291		
Copepodites	257	229	102	29
Euphausiid larvae	30			
Amphipods				
Miscellaneous	71	19	138	19
TOTAL:	830	1266	728	120

Notes: *C. tenuicornis*, *Lucicutia flavicornis*, *Pareuchaeta elongata*, *Eucalanus bungii*, *Candacia columbiae*, *Euchirella* sp., and *Microstella* sp., also present.

A large number of euphausiid larvae present.

BB 324-81                      May 30, 1963                      0200                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	459	906	173	141
<i>Pseudocalanus minutus</i>	43	173	44	15
<i>Paracalanus parvus</i>	246	55	27	56
<i>Acartia</i> spp.				3
<i>Metridia</i> spp.	43	35	9	3
<i>Calanus pacificus</i>			9	
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	112	76	9	15
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		97		34
Other copepods	43	28	18	12
Nauplii	29	388		43
Copepodites	640	237	109	60
Euphausiid larvae				
Amphipods				
Miscellaneous	29	173	64	43
TOTAL:	1640	2158	494	428

Notes: *C. plumchrus*, *C. tenuicornis*, *Eucalanus bungii*, *Pareuchaeta elongata*, *Aetidius armatus*, *Heterorhabdus papilliger*, *Heterorhabdus pacificus*, *Lucicutia flavicornis*, *Gaidius* sp., also present.

BB 324-96

May 31, 1963

0742

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	168	910		212
<i>Pseudocalanus minutus</i>	50	192		26
<i>Paracalanus parvus</i>	61	64		34
<i>Acartia</i> spp.		32		
<i>Metridia</i> spp.	18			9
<i>Calanus pacificus</i>	6			
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	76	80		
<i>Eucalanus bungii</i>		16		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	6	192		9
Other copepods	6	80		26
Nauplii	853	335		103
Copepodites	183	383		155
Euphausiid larvae	12			
Amphipods				
Miscellaneous	76	144		58
TOTAL:	1524	2394		644

Notes: *C. cristatus*, *Pareuchaeta elongata*, *Calanus tenuicornis*, *Heterorhabdus papilliger*, *Lucicutia flavicornis*, *Euchirella* sp., also present.

BB 324-112

June 1, 1963

0133

inshore

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	74	1068	73	138
<i>Pseudocalanus minutus</i>		274	10	15
<i>Paracalanus parvus</i>	19	107	31	31
<i>Acartia</i> spp.	19			
<i>Metridia</i> spp.			10	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		34		15
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		214	10	
Other copepods		34		15
Nauplii	3997	671	177	46
Copepodites	106	488	54	75
Euphausiid larvae				
Amphipods				
Miscellaneous	368	137	21	75
TOTAL:	4594	3050	384	418

Notes: *C. pacificus*, *C. plumchrus*, *C. cristatus*, *Eucalanus bungii*, *Lucicutia flavicornis*, *Pareuchaeta elongata*, *C. tenuicornis*, *Aetidius armatus*, *Heterorhabdus papilliger*, *Gaidius* sp., also present.

A large number of small appendicularians and gastropods also present.

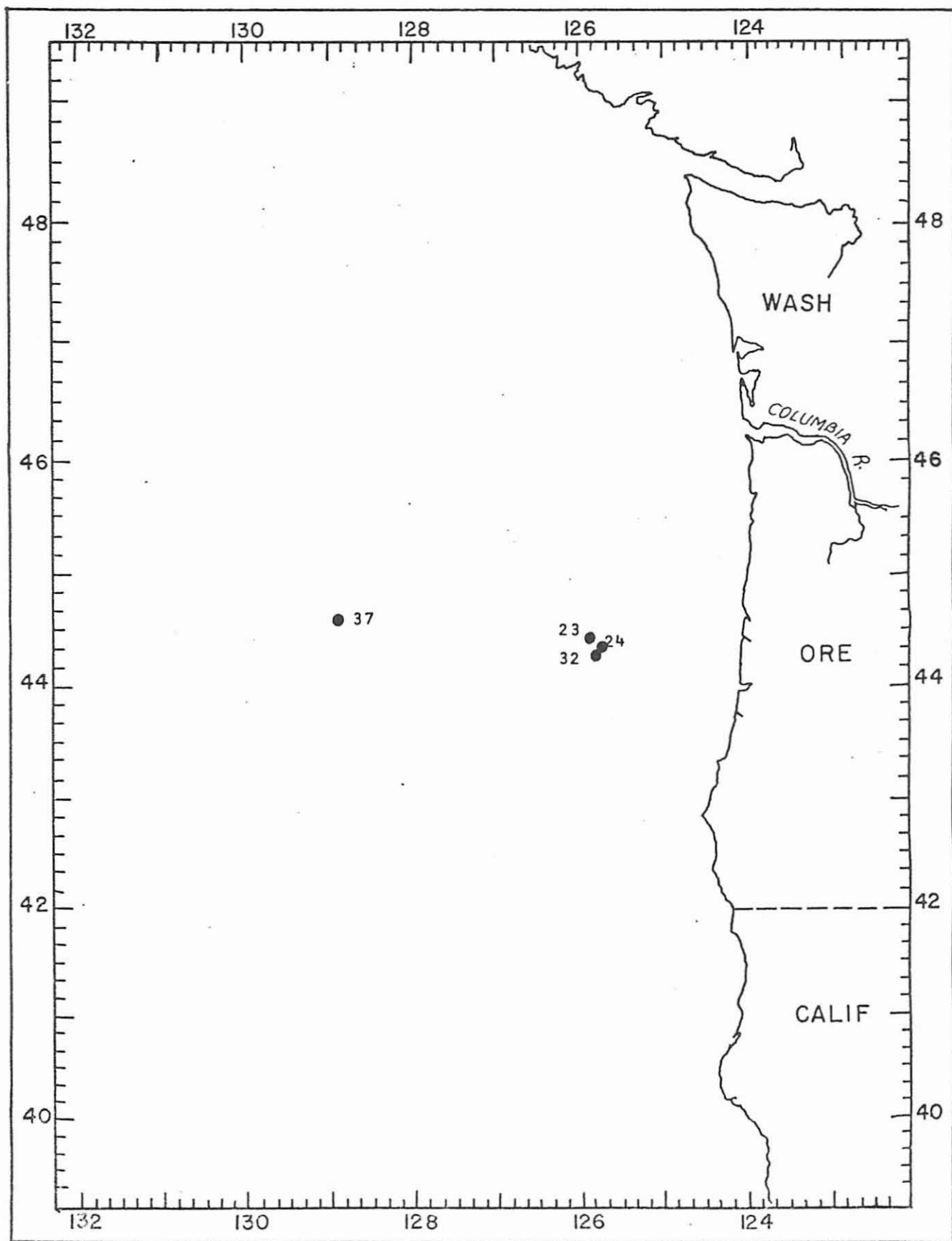


Figure 6 - Zooplankton sampling stations during *Brown Bear* cruise 329  
8 July - 19 July, 1963.

BB 329-23B

July 14, 1963

0857

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	11	31	160	212
<i>Pseudocalanus minutus</i>			34	22
<i>Paracalanus parvus</i>			201	121
<i>Acartia</i> spp.	5			
<i>Metridia</i> spp.			1	1
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	5		89	56
<i>Eucalanus bungii</i>			11	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		16	381	222
Other copepods			343	143
Nauplii			78	33
Copepodites	37	16	522	182
Euphausiid larvae				
Amphipods				
Miscellaneous	32	26	180	22
TOTAL:	90	88	2006	1010

Notes: *C. pacificus*, *Eucalanus bungii*, *C. tenuicornis*, *Clytemnestra* sp., *Eucalanus elongatus*, *Heterorhabdus papilliger*, *Candacia columbiae*, *Lucicutia flavicornis*, *Heterorhabdus pacificus*, *Euchirella* sp., also present.

BB 329-23B

July 15, 1963

0954

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	25	42	334	306
<i>Pseudocalanus minutus</i>				27
<i>Paracalanus parvus</i>			84	199
<i>Acartia</i> spp.				27
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.			10	54
<i>Eucalanus bungii</i>			10	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		21	278	321
Other copepods	66	3	63	67
Nauplii		10	223	81
Copepodites	16	60	1114	306
Euphausiid larvae				
Amphipods				
Miscellaneous	16	71	640	107
TOTAL:	124	208	2784	1530

Notes: *C. pacificus*, *C. tenuicornis*, *Eucalanus elongatus*, *Calanus plumchrus*, *Pareuchaeta elongata*, *Candacia columbiae*, *Aetidius armatus*, *Heterorhabdus tanneri*, *Lucicutia flavicornis*, *Clytemnestra* sp., and *Euchirella* sp., also present.

BB 329-24

July 15, 1963

2247

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	261	12	201	122
<i>Pseudocalanus minutus</i>				12
<i>Paracalanus parvus</i>	77	19	100	67
<i>Acartia</i> spp.		5		
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	67	5	14	18
<i>Eucalanus bungii</i>			7	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	77	5	125	85
Other copepods	67	9	70	48
Nauplii	48		50	24
Copepodites	292	49	201	146
Euphausiid larvae				
Amphipods				
Miscellaneous	630	25	50	79
TOTAL:	1536	136	836	610

Notes: *C. pacificus*, *Eucalanus elongatus*, *Pareuchaeta elongata*, *Lucicutia flavicornis*, *Heterorhabdus papilliger*, *Aetidius armatus*, *Euchirella curticauda*, *Epilabidocera amphitrite*, *C. tenuicornis*, *Scaphocalanus* sp., also present.

A large number of Foraminiferans also present.

BB 329-32

July 15, 1963

2151

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	47	181	442	181
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	20	52	107	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.			12	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		13	36	14
<i>Eucalanus bungii</i>			6	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		26	137	36
Other copepods	47	13	158	43
Nauplii	1920	103	107	41
Copepodites	258	129	504	77
Euphausiid larvae				
Amphipods				7
Miscellaneous	59	2070	18	114
TOTAL:	2342	2588	1526	516

Notes: *Pareuchaeta elongata*, *Pleuromamma abdominalis*, *Candacia columbicae*, *Heterorhabdus papilliger*, *Scaphocalanus* sp., *Euchirella* sp., and *Microstella* sp., also present.

A large number of Foraminiferans also present.

BB 329-37                      July 16, 1963                      2137                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	1215	420	511	222
<i>Pseudocalanus minutus</i>				26
<i>Paracalanus parvus</i>	810	140	131	13
<i>Acartia</i> spp.				
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	289		105	
<i>Eucalanus bungii</i>			10	
<i>Pareuchaeta elongata</i>				13
<i>Oncaea</i> spp.	58	112	68	80
Other copepods	675	56	60	13
Nauplii	347	47	131	
Copepodites	2835	434	236	154
Euphausiid larvae				
Amphipods				
Miscellaneous	405	112	59	51
TOTAL:	6750	1400	1310	570

Notes: *Calanus pacificus*, *C. tenuicornis*, *Eucalanus elongatus*, *Heterorhabdus tanneri*, *Pleuromanma xiphias*, *Aetidius armatus*, *Epilabidocera amphitrite*, *Euchirella* sp., *Candacia columbiae*, *Clytemnestra* sp., also present.

A large number of polychaeta larvae also present.

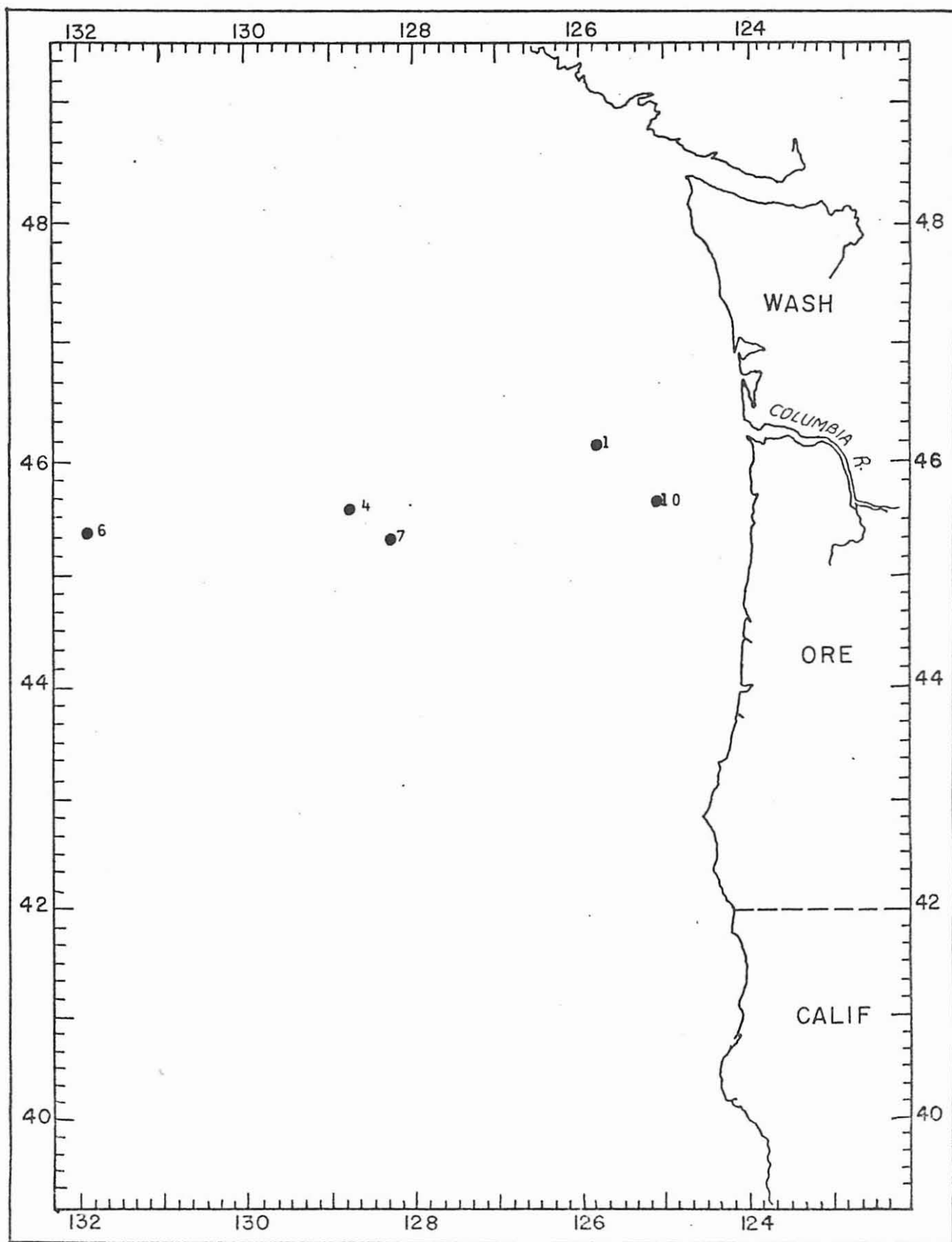


Figure 7 - Zooplankton sampling stations during *Brown Bear* cruise 332, 24 August - 28 August, 1963.

BB 332-1                      August 24, 1963                      2330                      plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	34	732	476	696
<i>Pseudocalanus minutus</i>	103	136	76	105
<i>Paracalanus parvus</i>	935	314	38	14
<i>Acartia</i> spp.	295	136		
<i>Metridia</i> spp.	34			
<i>Calanus pacificus</i>	17	17		
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	246	17		28
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		17		14
Other copepods	182	85	19	28
Nauplii	34	126	38	14
Copepodites	1870	272	170	342
Euphausiid larvae	443	51		
Amphipods				
Miscellaneous	640	209	38	85
TOTAL:	4920	2092	850	1314

Notes: *Eucalanus bungii*, *Pareuchaeta* sp., *C. tenuicornis*,  
*Lucicutia flavicornis* also present.

Some phytoplankton present in samples.

BB 332-4

August 25, 1963

2210

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	28	66	876	130
<i>Pseudocalanus minutus</i>	14		19	
<i>Paracalanus parvus</i>	28	44		6
<i>Acartia</i> spp.	198	155		
<i>Metridia</i> spp.	14	22	19	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	85	375	77	48
<i>Eucalanus bungii</i>			19	
<i>Pareuchaeta elongata</i>	14			
<i>Oncaea</i> spp.	70	22		25
Other copepods	183	286	476	32
Nauplii	113		77	
Copepodites	381	972	773	112
Euphausiid larvae		22		
Amphipods				
Miscellaneous	282	221	232	19
TOTAL:	1412	2208	2578	372

Notes: *Clytemnestra nostrata*, *Microsetella* sp., also present.

*Ctenocalanus* sp., *Calocalanus* sp., very abundant.

BB 332-4

August 25, 1963

2240

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	176	133	731	876
<i>Pseudocalanus minutus</i>	70	114		245
<i>Paracalanus parvus</i>	85	114		175
<i>Acartia</i> spp.	81	132	88	
<i>Metridia</i> spp.	70		70	21
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	44	50	281	70
<i>Eucalanus bungii</i>				35
<i>Pareuchaeta elongata</i>			18	10
<i>Oncaea</i> spp.	70	95	112	210
Other copepods	110	320	141	70
Nauplii	110	152	112	140
Copepodites	1032	607	1294	1541
Euphausiid larvae				10
Amphipods	11			
Miscellaneous	351	190	18	105
TOTAL:	2196	1898	2812	3502

Notes: *C. tenuicornis*, *Euchirella pulchra*, *Corycaeus* sp., *Clytemnestra* sp., *C. pacificus*, *Candacia* sp., also present.

A large number of *Ceratium* sp., and diatoms also present.

BB 332-4

August 25, 1963

0025

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	360	175	173	474
<i>Pseudocalanus minutus</i>	131	8	187	17
<i>Paracalanus parvus</i>	111	32	94	81
<i>Acartia</i> spp.	75	82		
<i>Metridia</i> spp.	19	8		8
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	56	49		8
<i>Eucalanus bungii</i>				8
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		49	76	17
Other copepods	187		57	34
Nauplii	309	82	76	104
Copepodites	1133	319	678	347
Euphausiid larvae		8		
Amphipods				8
Miscellaneous	206	185	94	52
TOTAL:	2574	1028	1442	1156

Notes: *Microsetella* sp., *Clytemnestra nostrata* also present.

Some diatoms and *Ceratium* sp., also present.

BB 332-6

August 26, 1963

1250

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	92	799	1422	633
<i>Pseudocalanus minutus</i>		63		
<i>Paracalanus parvus</i>	15		63	
<i>Acartia</i> spp.		11		
<i>Metridia</i> spp.		22		
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	123	95		31
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		32		46
Other copepods	77	360	253	46
Nauplii	31		158	92
Copepodites	346	1074	1074	586
Euphausiid larvae		22		
Amphipods				
Miscellaneous	92	330	190	46
TOTAL:	770	2754	3160	1542

Notes: *Eucalanus elongatus*, *Eucalanus bungii*, *Candacia bipinnata*, also present.

Many *Ceratium* sp., also present.

BB 332-7

August 26, 1963

2327

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	248	1075	439	322
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	99		26	
<i>Acartia</i> spp.	90	331		
<i>Metridia</i> spp.	20			
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	347	304	191	31
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>			26	
<i>Oncaea</i> spp.	31	413		31
Other copepods	121	1212	358	102
Nauplii	745	216	127	41
Copepodites	2979	3639	516	263
Euphausiid larvae				
Amphipods				
Miscellaneous	198	827	210	68
TOTAL:	4878	8270	1910	848

Notes: *Ctenocalanus* sp., *Microcalanus* sp., and *Calocalanus* sp., quite abundant. *Gaetanus* sp., *Calanus tenuicornis*, *Candacia* sp., also present.

Most copepodites belonged to *Acartia* sp., (*Acartia danae*).

A large amount of diatoms in the samples.

BB 332-7

August 26, 1963

2232

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	124	522	858	598
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	87	76		
<i>Acartia</i> spp.	124		16	14
<i>Metridia</i> spp.	1		16	14
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	142	230	202	14
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	99	153	303	171
Other copepods	223	306	156	219
Nauplii	638	230	278	86
Copepodites	1448	859	454	495
Euphausiid larvae	25			
Amphipods	12			
Miscellaneous	602	307	227	102
TOTAL:	3544	3068	2524	1708

Notes: *C. tenuicornis*, *Pareuchaeta* sp., *Eucalanus elongatus*, *Gaidius* sp., also present.

*Ctenocalanus* sp., quite abundant.

Most copepodites belonged to *Acartia* sp.

BB 332-7

August 26, 1963

2257

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	292	766	726	305
<i>Pseudocalanus minutus</i>	29			
<i>Paracalanus parvus</i>	102	122		
<i>Acartia</i> spp.	117	76		
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	292	225	124	46
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	117	90		15
Other copepods	365	362	195	78
Nauplii	817	541	124	15
Copepodites	3090	2119	461	279
Euphausiid larvae			14	
Amphipods				
Miscellaneous	467	270	89	140
TOTAL:	5838	4508	1772	872

Notes: *Clytemnestra* sp., *Microsetella* sp., *Gaidius* sp., *C. tenuicornis*, *Gaetanus* sp., *Heterorhabdus* sp., *Eucalanus elongatus*, *Pleuromamma* sp., also present.

Most copepodite stages belonged to *Acartia danae*.

Diatoms and dinoflagellates quite abundant.

BB 332-10

August 27, 1963

2205

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	150	617	264	300
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	40	72		
<i>Acartia</i> spp.				
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumehrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	138	36	16	
<i>Eucalanus burgii</i>		18		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	14	36	16	66
Other copepods	186	200	82	33
Nauplii	80	100		
Copepodites	368	562	165	198
Euphausiid larvae				
Amphipods				
Miscellaneous	172	145	119	132
TOTAL:	1150	1814	660	732

Notes: *C. pacificus*, *Eucalanus elongatus*, *Pareuchaeta* sp., *Aetidius armatus*, *Gaetanus* sp., and *Heterorhabdus* sp., also present.

BB 332-10

August 27, 1963

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	50	788	6	224
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	50	27	1	
<i>Acartia</i> spp.				
<i>Metridia</i> spp.		53		
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	101	71	2	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.			1	
Other copepods	278	318	6	111
Nauplii	76	364		37
Copepodites	273	1122	8	301
Euphausiid larvae	25		1	
Amphipods				
Miscellaneous	172	212	4	147
TOTAL:	1010	3032	26	772

Notes: *Microsetella* sp., *Corycaeus* sp., *Eucalanus bungii*, *Gaidius* sp., *Aetidius armatus*, *Heterorhabdus* sp., also present.

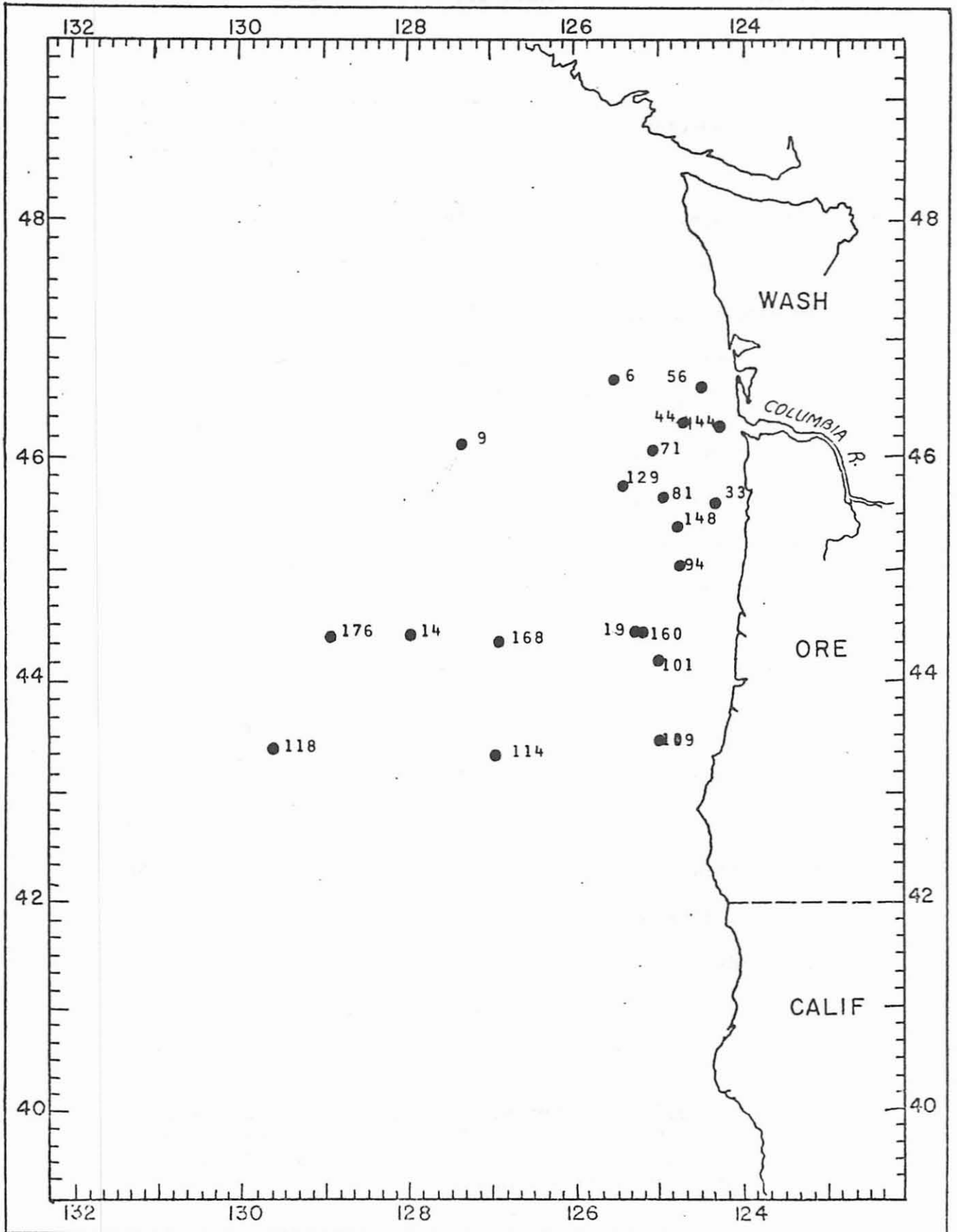


Figure 8 - Zooplankton sampling stations during *Brown Bear* cruise 335, 20 September - 26 October, 1963.

BB 335-6

September 22, 1963

1515

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	49	806	444	91
<i>Pseudocalanus minutus</i>	11	161		
<i>Paracalanus parvus</i>	130		71	
<i>Acartia</i> spp.	33			
<i>Metridia</i> spp.		24	10	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	11	48	30	6
<i>Eucalanus bungii</i>		24	20	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	22	484	20	28
Other copepods	139	72	30	6
Nauplii		524	125	6
Copepodites	187	1653	458	86
Euphausiid larvae			10	
Amphipods				
Miscellaneous	228	242	153	33
TOTAL:	814	4032	1388	254

Notes: *C. pacificus*, *Pareuchaeta elongata*, *C. tenuicornis*, *Heterorhabdus tanneri*, *Lucicutia flavicornis*, *Clytemnestra* sp., *Eucalanus elongatus*, and *Racovitzanus antarcticus* also present.

BB 335-9

September 23, 1963

0300

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	12	67	56	20
<i>Pseudocalanus minutus</i>	12			
<i>Paracalanus parvus</i>	83			
<i>Acartia</i> spp.	177	48	9	12
<i>Metridia</i> spp.			9	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.			9	7
Other copepods	59	20	18	
Nauplii	24	20		
Copepodites	100	191	72	16
Euphausiid larvae	12			
Amphipods				
Miscellaneous	118	67	138	16
TOTAL:	590	478	328	72

Notes: *C. pacificus*, *Eucalanus bungii*, *Eucalanus elongatus*, *Euchirella curticauda*, *Lucicutia flavicornis*, *Corycaeus* sp., *Clytemnestra* sp., and *Scaphocalanus* sp., also present.

*Corycaeus* sp., *Clytemnestra* sp., and *Oncaea* sp., with eggs.

BB 335-14

September 25, 1963

0320

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	28	244	43	78
<i>Pseudocalanus minutus</i>	28	13		
<i>Paracalanus parvus</i>	69	39	17	
<i>Acartia</i> spp.	468		9	
<i>Metridia</i> spp.			17	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.			9	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		52	17	7
Other copepods	14	13	9	
Nauplii	14	39		
Copepodites	374	237	43	58
Euphausiid larvae	14			
Amphipods				
Miscellaneous	347	104	43	43
TOTAL:	1338	740	238	186

Notes: *Calanus pacificus*, *C. tenuicornis*, *Eucalanus bungii*, *Candacia columbiae*, *Lucicutia flavicornis*, *Euchirella curticauda*, *Heterorhabdus papilliger*, *Heterorhabdus tanneri*, *Pareuchaeta elongata*, *Pleuromamma riphias* and *Gaetanus* sp., also present.

BB 335-19

September 26, 1963

0300

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	166	89	24	27
<i>Pseudocalanus minutus</i>	32	242	201	
<i>Paracalanus parvus</i>	16		33	9
<i>Acartia</i> spp.	67	226	40	9
<i>Metridia</i> spp.	73	13	24	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	10	6	24	17
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		13	8	54
Other copepods	6	19	16	9
Nauplii				17
Copepodites	260	153	96	54
Euphausiid larvae	10			
Amphipods				
Miscellaneous	21	13	16	44
TOTAL:	666	806	478	246

Notes: *Calanus pacificus*, *Pareuchaeta* sp., *Pareuchaeta elongata*, *Eucalanus bungii*, *Aetidius armatus*, *Rhincalanus nasutus*, *Euchirella pulchra*, *Pleuromamma abdominalis*, and *Lucicutia flavicornis* also present.

*Oncaea* sp., with eggs.

BB 335-33

September 28, 1963

0124

inshore

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	940	12		2
<i>Pseudocalanus minutus</i>	235	32	38	11
<i>Paracalanus parvus</i>	134	6	8	3
<i>Acartia</i> spp.	101	10	38	4
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>	10	23	8	3
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	10			1
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	20			1
Other copepods	10		30	5
Nauplii				
Copepodites	201	25		
Euphausiid larvae				
Amphipods				
Miscellaneous	10	6	15	
TOTAL:	1679	113	136	30

Notes: *Metridia* sp. also present.

BB 335-44

October 1, 1963

0005

inshore

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.		21	12	18
<i>Pseudocalanus minutus</i>		32		2
<i>Paracalanus parvus</i>		12	2	8
<i>Acartia</i> spp.		126	7	21
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>		4		
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.		4		
Other copepods		4	4	2
Nauplii		4		
Copepodites		64	7	11
Euphausiid larvae		4		
Amphipods				
Miscellaneous		21	12	5
TOTAL:		294	43	67

Notes: *Aetidius armatus*, *Metridia* sp., *Pareuchaeta* sp., *Pleuromamma* sp., and *Eucalanus* sp.

BB 335-56

October 2, 1963

0100

inshore

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	54	12		
<i>Pseudocalanus minutus</i>	15	23		
<i>Paracalanus parvus</i>	37	2		
<i>Acartia</i> spp.	179			
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>	22	5		
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	15	10		
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.				
Other copepods	7	2		
Nauplii	731			
Copepodites	268	20		
Euphausiid larvae				
Amphipods				
Miscellaneous	162	12		
TOTAL:	1492	87		

Notes: *Metridia* sp., also present.

BB 335-71

October 3, 1963 0053

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	61		66	30
<i>Pseudocalanus minutus</i>	12	10		
<i>Paracalanus parvus</i>	110	36		
<i>Acartia</i> spp.	305		36	30
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>		5		
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	37	5		
<i>Eucalanus bungii</i>		10		8
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	37	36	18	
Other copepods	212	35	27	16
Nauplii	37			
Copepodites	220	36	76	15
Euphausiid larvae	12	16		
Amphipods				
Miscellaneous	146	41	76	39
TOTAL:	1220	228	302	138

Notes: *Calanus tenuicornis*, *Aetidius armatus*, *Candacia columbiae*, *Pareuchaeta elongata*, *Lucicutia flavicornis*, *Heterorhabdus pacificus*, *Pleuromamma scutullata*, *Gaidius* sp., and *Gaetanus* sp., also present.

*Oncaea* sp., and *Clytemnestra* sp. with eggs.

BB 335-81

October 4, 1963

0050

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	20	10	51	3
<i>Pseudocalanus minutus</i>	20			1
<i>Paracalanus parvus</i>	81	31	4	2
<i>Acartia</i> spp.	286	47	8	2
<i>Metridia</i> spp.		31		
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.				1
<i>Eucalanus bungii</i>		31		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	118	62	8	1
Other copepods	80	149	8	1
Nauplii	707	102		
Copepodites	168	188	54	3
Euphausiid larvae		24		1
Amphipods				
Miscellaneous	202	110	27	5
TOTAL:	1684	782	158	18

Notes: *Calanus pacificus*, *C. tenuicornis*, *Candacia columbiae*, *Lucicutia flavicornis*, *Aetidius armatus*, *Pareuchaeta elongata*, and *Scaphocalanus* sp., also present.

*Oncaea* sp. with eggs.

BB 335-94

October 5, 1963

0130

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	133	62	60	
<i>Pseudocalanus minutus</i>	11			
<i>Paracalanus parvus</i>	121	19	8	
<i>Acartia</i> spp.	290	10		
<i>Metridia</i> spp.		10		
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	44			
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	44			
Other copepods	176	71	23	
Nauplii	22	30		
Copepodites	157	62	45	
Euphausiid larvae	22	30		
Amphipods				
Miscellaneous	290	90	38	
TOTAL:	1308	386	172	

Notes: *Calanus pacificus*, *Pareuchaeta elongata*, *Eucalanus bungii*, *Candacia columbiae*, *Heterorhabdus pacificus*, *Gaidius* sp., and *Scaphocalanus* sp., also present.

*Oncaea* sp. with eggs. *E. bungii* with eggs.

BB 335-101

October 6, 1963

0306

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	35	39	5	6
<i>Pseudocalanus minutus</i>		98	2	
<i>Paracalanus parvus</i>	20		9	2
<i>Acartia</i> spp.	139		12	
<i>Metridia</i> spp.		20	2	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		15	2	2
<i>Eucalanus bungii</i>		5	2	2
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.				4
Other copepods	82	10	2	2
Nauplii			5	
Copepodites	88	30	25	10
Euphausiid larvae				
Amphipods				
Miscellaneous	150	20	16	6
TOTAL:	516	218	84	36

Notes: *C. pacificus*, *Candacia columbiae*, *Heterorhabdus pacificus*, *Pareuchaeta elongata*, *Pleuromamma scutullata*, *Aetidius armatus*, *Gaidius* sp., and *Scaphocalanus* sp., also present.

BB 335-109

October 6, 1963

0050

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	493	21	20	33
<i>Pseudocalanus minutus</i>		79	3	7
<i>Paracalanus parvus</i>	164	11		3
<i>Acartia</i> spp.	16		3	
<i>Metridia</i> spp.		6		
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	33	16	6	
<i>Eucalanus bungii</i>		6		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	33	6	2	3
Other copepods	732	22	5	10
Nauplii	1068		2	
Copepodites	821	55	16	16
Euphausiid larvae	49		2	
Amphipods				
Miscellaneous	780	16	12	23
TOTAL:	4106	262	72	96

Notes: *C. pacificus*, *C. tenuicornis*, *Pareuchaeta elongata*, *Eucalanus elongatus*, *Heterorhabdus tanneri*, *Aetidius armatus*, *Pleuromamma xiphias*, *Euchirella pulchra*, *Scaphocalanus* sp., and *Gaidius* sp., also present.

*Corycaeus* sp., *Oncaea* sp., and *Microsetella* sp. with eggs.

BB 335-114                      October 7, 1963                      2200                      plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	307	80	44	11
<i>Pseudocalanus minutus</i>		12		
<i>Paracalanus parvus</i>	76	12		
<i>Acartia</i> spp.	1074	386	11	23
<i>Metridia</i> spp.			3	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	22			
<i>Eucalanus bungii</i>		8		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	409		8	3
Other copepods	300	23	8	9
Nauplii	1227	33		
Copepodites	767	133	25	14
Euphausiid larvae	32	12		
Amphipods				
Miscellaneous	920	613	25	28
TOTAL:	5114	1332	126	88

Notes: *Calanus pacificus*, *Pareuchaeta elongata*, *Candacia columbiae*, *Euchirella pulchra*, *Euchirella* sp., *Pleuromamma abdominalis*, *Pleuromamma xiphias*, *Gaetanus simplex*, *Heterorhabdus papilliger*, *Heterorhabdus tanneri*, *Gaidius pungens*, and *Lubbockia* sp., also present.

BB 335-118

October 8, 1963

2200

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	307		7	84
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	59	19		21
<i>Acartia</i> spp.	59	96	1	4
<i>Metridia</i> spp.			1	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		5	1	21
<i>Eucalanus bungii</i>			1	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	59	32	2	17
Other copepods	20	10	8	29
Nauplii				17
Copepodites	531	40	7	108
Euphausiid larvae				
Amphipods				
Miscellaneous	95	62	3	45
TOTAL:	1180	268	32	348

Notes: *Lucicutia flavicornis*, *Candacia columbiae*, *Pleuromamma abdominalis*, *Pleuromamma xiphias*, *Pleuromamma quadrangulata*, *Pareuchaeta elongata*, *Heterorhabdus papilliger*, *Heterorhabdus tanneri*, *Euchirella pulchra*, and *Lubbockia* sp., also present.

BB 335-129

October 11, 1963

0030

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	31	6	29	24
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>		6		
<i>Acartia</i> spp.	313	44	7	5
<i>Metridia</i> spp.		11	7	
<i>Calanus pacificus</i>	10			
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	10	6		
<i>Eucalanus bungii</i>		6		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	10	6	7	
Other copepods	75	18	7	5
Nauplii		11		2
Copepodites	72	38	65	7
Euphausiid larvae	10			1
Amphipods				
Miscellaneous	117	44	50	12
TOTAL:	652	190	172	58

Notes: *Calanus pacificus*, *Pareuchaeta elongata*, *Pleuromamma quadrangulata*, *Heterorhabdus papilliger*, *Heterorhabdus tanneri*, *Aetidius armatus*, *Rhincalanus nasutus*, *Candacia columbiae*, *Gaidius* sp., also present.

BB 335-144

October 11, 1963 0000

inshore

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.		56		
<i>Pseudocalanus minutus</i>		60		
<i>Paracalanus parvus</i>	9	21		
<i>Acartia</i> spp.	82	84		
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		40		
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.				
Other copepods	22	11		
Nauplii	22	7		
Copepodites	37	92		
Euphausiid larvae				
Amphipods				
Miscellaneous	45	28		
TOTAL:	217	398		

Notes: *Gaetanus* sp., *Heterorhabdus* sp., *Eucalanus* sp., and *Calanus pacificus* also present.

BB 335-148

October 12, 1963

2300

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	53	73	671	104
<i>Pseudocalanus minutus</i>	61		28	
<i>Paracalanus parvus</i>	138	8		13
<i>Acartia</i> spp.	367		291	
<i>Metridia</i> spp.	31			
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	23			26
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	15	16		13
Other copepods	138	8	168	39
Nauplii	61	8	84	26
Copepodites	596	82	761	52
Euphausiid larvae	8			
Amphipods				
Miscellaneous	183	24	224	52
TOTAL:	1675	221	2238	324

Notes: *Calanus pacificus*, *Eucalanus bungii*, *Pareuchaeta elongata*, *Candacia columbiae*, *Lucicutia flavicornis*, *Heterorhabdus papilliger*, and *Gaidius* sp., also present.

BB 335-160

October 17, 1963

0030

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	375	215	176	248
<i>Pseudocalanus minutus</i>		13		
<i>Paracalanus parvus</i>	46	26	14	
<i>Acartia</i> spp.	290	286	7	30
<i>Metridia</i> spp.	27		14	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	9	26	7	
<i>Eucalanus bungii</i>	27	13		
<i>Pareuchaeta elongata</i>			7	
<i>Oncaea</i> spp.	102	358	39	15
Other copepods	91	316	28	74
Nauplii	170	465	7	
Copepodites	494	1646	98	127
Euphausiid larvae				
Amphipods				
Miscellaneous	85	224	78	81
TOTAL:	1704	3578	488	576

Notes: *C. pacificus*, *C. tenuicornis*, *Aetidius armatus*, *Candacia columbiae*, *Eucalanus elongatus*, *Euchirella pulchra*, *Lucicutia flavicornis*, *Pleuromamma abdominalis*, *Pleuromamma xiphias*, *Undeuchaeta plumosa*, and *Gaidius* also present.

*Oncaea* sp. with eggs.

BB 335-168

October 18, 1963

0001

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	134	244	90	94
<i>Pseudocalanus minutus</i>		34		
<i>Paracalanus parvus</i>	38	27		
<i>Acartia</i> spp.	188	183	101	
<i>Metridia</i> spp.	13			
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	13	27		
<i>Eucalanus bungii</i>		7		
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	64	85	30	10
Other copepods	39	218	67	96
Nauplii	108	55	22	10
Copepodites	484	256	30	43
Euphausiid larvae		7		
Amphipods				
Miscellaneous	228	73	37	31
TOTAL:	1344	1218	374	286

Notes: *C. pacificus*, *Pareuchaeta elongata*, *Candacia columbiae*, *Eucalanus elongatus*, *Aetidius armatus*, *Heterorhabdus tanneri*, *Heterorhabdus papilliger*, *Pleuromamma abdominalis*, *Pleuromamma xiphias*, *Gaidius* sp., and *Euchirella* sp., also present.

*Microstella* sp., *Corycaeus* sp., and *Oncaea* sp., with eggs.  
*Pareuchaeta elongata* and *Euchirella* sp., with *Spermatheca* attached.

BB 335-176

October 18, 1963

2215

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	27	16	346	94
<i>Pseudocalanus minutus</i>	14		14	
<i>Paracalanus parvus</i>	41	3		
<i>Acartia</i> spp.	266	16	7	
<i>Metridia</i> spp.				
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>			7	
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	27		7	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>			7	
<i>Oncaea</i> spp.	348	3	63	14
Other copepods	165	9	35	
Nauplii	205	16	47	7
Copepodites	676	30	165	54
Euphausiid larvae				
Amphipods				
Miscellaneous	266	20	71	34
TOTAL:	2050	116	786	200

Notes: *C. pacificus*, *C. tenuicornis*, *Eucalanus bungii*, *Euchirella pulchra*, *Euchirella* sp., *Pleuromamma abdominalis*, *Pleuromamma quadrangulata*, *Lucicutia flavicornis*, *Gaidius* sp., *Gaetanus* sp., and *Scaphocalanus* sp., also present.

*Clytemnestra* sp., and *Oncaea* sp. with eggs.  
*Eucalanus bungii* with eggs.

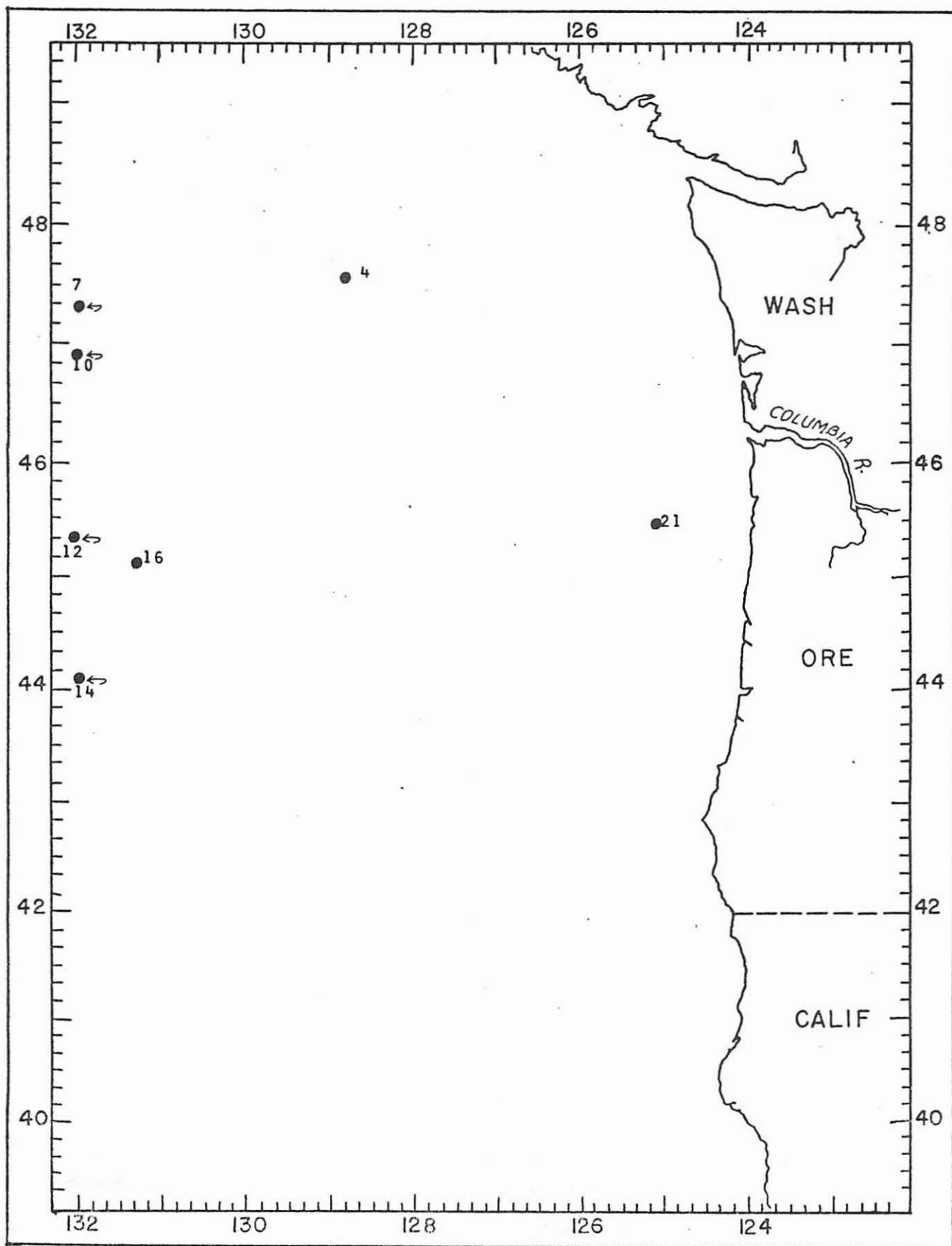


Figure 9 - Zooplankton sampling stations during *Oshawa* cruise 004, 10 December - 20 December, 1963.

OSH 004-4

December 12, 1963

0308

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	178	150	154	146
<i>Pseudocalanus minutus</i>	7		6	
<i>Paracalanus parvus</i>	59	78	20	7
<i>Acartia</i> spp.	53	52	60	
<i>Metridia</i> spp.	7	39	6	
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		8	6	
<i>Eucalanus bungii</i>			6	
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	7		6	33
Other copepods	67	56	16	
Nauplii	26	32	45	47
Copepodites	137	150	95	179
Euphausiid larvae		16		
Amphipods				
Miscellaneous	53	72	80	52
TOTAL:	594	652	498	472

Notes: *C. pacificus*, *C. tenuicornis*, *Eucalanus elongatus*, *Pareuchaeta elongata*, *Pleuromamma abdominalis*, *Pleuromamma xiphias*, *Lucicutia flavicornis*, *Euchirella* sp., *Gaidius* sp., and *Gaetanus* sp., also present.

OSH 004-7                      December 13, 1963                      0330                      ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	53	159	191	62
<i>Pseudocalanus minutus</i>		48	6	
<i>Paracalanus parvus</i>	13	35	42	6
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	56	96	12	12
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>	4			
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	9	15	42	6
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>		2		
<i>Oncaea</i> spp.	18	7	18	36
Other copepods	30	62	36	37
Nauplii	56	239	42	44
Copepodites	105	733	324	116
Euphausiid larvae	18	7		
Amphipods				
Miscellaneous	60	159	116	44
TOTAL:	376	1594	832	364

Notes: *C. plumchrus*, *Eucalanus bungii*, *C. pacificus*, *C. tenuicornis*, *Eucalanus elongatus*, *C. cristatus*, *Lucicutia flavicornis*, *Aetidius armatus*, *Candacia columbiae*, *Pleuromamma abdominalis*, *Gaetanus* sp., also present.

*Oncaea* sp. with eggs.

OSH 004-10

December 14, 1963

0315

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	318	131	127	10
<i>Pseudocalanus minutus</i>	15	6		
<i>Paracalanus parvus</i>	76	13	34	2
<i>Acartia</i> spp.				
<i>Metridia</i> spp.		6		1
<i>Calanus pacificus</i>				1
<i>Calanus plumchrus</i>				1
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	168	54	7	3
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	30	65	14	2
Other copepods	60	39	28	9
Nauplii	168	98	69	
Copepodites	954	621	176	22
Euphausiid larvae				2
Amphipods		6		2
Miscellaneous	94	54	28	4
TOTAL:	1870	1090	490	56

Notes: *Pareuchaeta elongata*, *Candacia columbiae*, *Lucicutia flavicornis*, and *Eucalanus elongatus* also present.

OSH 004-12

December 15, 1963

0130

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	143	98	128	57
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	95	31	6	7
<i>Acartia</i> spp.	25			
<i>Metridia</i> spp.	16	6	12	14
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	8	62	31	
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	25	25	20	21
Other copepods	57	70	43	21
Nauplii	143	12	6	43
Copepodites	536	518	194	160
Euphausiid larvae				
Amphipods	8			
Miscellaneous	143	72	61	36
TOTAL:	1190	894	510	356

Notes: *Calanus plumchrus*, *C. tenuicornis*, *Eucalanus bungii*, *Eucalanus elongatus*, *Heterorhabdus papilliger*, *Pareuchaeta elongata*, *Pleuromamma xiphias*, *Pleuromamma abdominalis* and *Gaetanus* sp., also present.

OSH 004-14

December 15, 1963

2219

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	130	104	86	35
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	37	5		6
<i>Acartia</i> spp.				
<i>Metridia</i> spp.	12	64		
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.		11		12
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	12	5	6	9
Other copepods	24	16	12	12
Nauplii	78	5	29	30
Copepodites	150	164	47	48
Euphausiid larvae				
Amphipods				
Miscellaneous	72	20	18	25
TOTAL:	518	402	196	176

Notes: *C. plumchrus*, *C. tenuicornis*, *Eucalanus bungii*, *Eucalanus elongata*, *Pareuchaeta elongata*, *Pleuromamma abdominalis*, *P. xiphias*, *Euchirella pulchra*, *Gaidius* sp., and *Gaetanus* sp., also present.

OSH 004-16

December 16, 1963

0140

ambient

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	164	170	80	99
<i>Pseudocalanus minutus</i>				
<i>Paracalanus parvus</i>	62	7	30	10
<i>Acartia</i> spp.	23	65	30	5
<i>Metridia</i> spp.	15	28	6	5
<i>Calanus pacificus</i>				
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	23	35		15
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	23	7	16	26
Other copepods	50	14	25	25
Nauplii	216	81	65	19
Copepodites	247	340	155	80
Euphausiid larvae				
Amphipods				
Miscellaneous	195	138	90	35
TOTAL:	1028	810	500	320

Notes: *Eucalanus bungii*, *Eucalanus elongatus*, *Calanus tenuicornis*, *Lucicutia flavicornis*, *Euchirella pulchra*, *Candacia columbiae*, *Heterorhabdus tanneri*, *Heterorhabdus papilliger*, *Pleuromamma abdominalis* and *Gaidius* sp., also present.

OSH 004-21

December 19, 1963

0030

plume

Species	Depth (m)			
	1	35	70	100
<i>Oithona</i> spp.	122	346	140	19
<i>Pseudocalanus minutus</i>				1
<i>Paracalanus parvus</i>	68	58		2
<i>Acartia</i> spp.	17	185		
<i>Metridia</i> spp.	51	7	11	4
<i>Calanus pacificus</i>		7		
<i>Calanus plumchrus</i>				
<i>Calanus cristatus</i>				
<i>Clausocalanus</i> spp.	258	7	35	4
<i>Eucalanus bungii</i>				
<i>Pareuchaeta elongata</i>				
<i>Oncaea</i> spp.	68	124	22	1
Other copepods	102	29	22	3
Nauplii	34	43	22	1
Copepodites	654	396	166	21
Euphausiid larvae				
Amphipods				
Miscellaneous	137	86	11	19
TOTAL:	1520	1236	438	76

Notes: *Calanus tenuicornis*, *Eucalanus bungii*, *Eucalanus elongatus*, *Euchirella pulchra*, *Candacia columbiae*, *Heterorhabdus papilliger*, *Heterorhabdus tanneri*, *Pleuromamma abdominalis*, and *Gaetanus* sp., also present.

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