RU 006

ANNUAL REPORT

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Research Unit #6
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The distribution, abundance, diversity and productivity of the western Beaufort Sea benthos.

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I. Summary of Objectives, Conclusions and Implications with Respect to OCS Oil and Gas Development.

Extensive oil and gas development on the Alaskan and Canadian north slope has the potential to significantly influence the marine environment of the Beaufort Sea continental shelf. It is impossible with our present knowledge to accurately predict the consequences of petroleum development on the marine benthos. The goal of this study is to begin acquiring the knowledge of the ecology of benthic invertebrate faunas of the Beaufort Sea continental shelf necessary to evaluate the consequences of petroleum development. The spatial and temporal variability of benthic communities are being examined in detail, and will provide a baseline from which future changes in the benthic environment and community structure can be evaluated.

II. Introduction

A. General nature and scope of the problem.

The distribution, abundance and natural variability of benthic macro-infauna will be described on the southwestern Beaufort Sea continental shelf. Patterns of faunal distributions will be described and characterized using suitable bio-indices and multivariate techniques. Seasonal changes in the structure of benthic populations will be studied by sampling four times within a single year.

B. Specific Objectives

We propose to describe the benthic infauna of the western Beaufort Sea continental shelf including studies of both geographic and seasonal variability. Data are to be obtained on the faunal composition and abundance to form baselines to which potential future changes can be compared.

Specific objectives include the continuation of studies and analyses to:

1. Describe the distribution, species composition, numerical density, and biomass of the benthos in the area of interest.
2. Describe the spatial and seasonal variability of faunal distributions and abundances.
3. Describe the benthic communities present and delineate their geographical and environmental extent.

4. Describe the effect of seasons on population size and reproductivity activity of dominant species.

5. Determine the degree of correlation of species distributions and of various bio-indices with features of the benthic environment.

C. Relevance to Problems Associated with Petroleum Development.

Extensive drilling for oil and gas on the Alaskan and Canadian north slope has the potential to significantly influence the marine environment across the Beaufort Sea continental shelf. It is impossible with our present state of knowledge to accurately predict either the short or long term consequences of petroleum development on the marine benthos. Comprehensive descriptive studies of the benthic fauna in the Beaufort have only been initiated in the last few years. These studies are a necessary first step in providing a baseline from which any future changes in the benthic environment and community structure can be evaluated.

To date, little is known about the functioning of the benthic ecosystem in the Beaufort Sea. There have been no studies on the dynamics of the benthic populations in this region. No reliable estimates of natural mortality are available, and recruitment rates remain unknown. Little research has been done on the metabolism and growth rates of these organisms living under ice for a large part of the year. Lacking this information it is

very difficult to predict how quickly benthic populations could recover from an extinction event caused by a large-scale oil spill or by other industry-related pollution.

The benthic invertebrates constitute a major source of food for the top level carnivores, including birds, seals, and occasional walrus. Any decrease in benthic populations caused by oil pollution might eventually be reflected in the populations of these larger animals. Nearshore areas would seem to be the most sensitive since it would be in these regions that pollutants would be most likely to mix to the benthic boundary.

The"timing of environmental disturbances in this strongly seasonal environment may be extremely critical in determining the stresses experienced by the benthic community. For example, an oil spill in the winter on top of the pack ice could be cleaned up with little or no resultant damage to the marine benthos, while a spill of the same magnitude during a summer of open water might have significant impact. It remains to be determined if the bottom-dwelling invertebrates are more or less sensitive to oil related pollution during the summer months, but the pelagic larvae of the benthic organisms would be vulnerable to spills during periods of open water conditions.

It seems likely that the development of the oil and gas resources will bring about changes in the marine environment, but the extent of degradation in the benthic environment cannot be predicted. There remains a great scientific need for long term studies on the dynamics of the benthic populations, including year round sampling with measurements on growth, metabolism, and reproductive activity.

III. Current State of Knowledge.

The history of benthic sampling in the Beaufort Sea and the results of all previous studies was documented in great detail in the final report of Con-tract No. 03-5-022-68, Task Order No. 4 submitted to NOAA/BLM by the Benthic Ecology Group at Oregon State University under Dr. Andrew G. Carey, Jr.

IV. Study Area.

The Beaufort Sea is one of the seven satellite seas bordering the Arctic Ocean. In contrast to the other six shallow seas, the Beaufort is deep, has a limited continental shelf, and is physically and oceanographically a part of the Arctic Ocean (Coachman, 1963). It forms one of the boundaries for the Canada Basin and extends along the northern coast of Alaska to the western edge of the Canadian Archipelago.

The continental shelf in this region is very narrow with a break that averages 70 meters in depth in the southwestern portion (Carsola, 1954; Carsola et al., 1961). The continental shelf in general is covered with mud (Carsola, 1954), although sands occur nearshore and patches of gravel are found particularly near the shelf break (Barnes and Reimnitz, 1975). The sediments in the region of the shelf off Prudhoe Bay are unusually patchy, are highly oxidized and contain low amounts of organic carbon (Carsola, 1954; Naidu and Mowatt, 1975).

Ice forms on the surface of the southern Beaufort Sea in September and October and covers the continental shelf until June or July (Barnes and Reimnitz, 1975). Shorefast ice increases in thickness until the end of May and extends seaward to a water depth of 10-20 m where it impinges on the main polar ice pack. Beyond this shear zone the pack moves in a generally westward direction as part of the clockwise polar gyre. During the short arctic summer the ice breaks up and the edge of the pack usually recedes beyond the shelf break, though its location is highly variable from year to year (U.S. Navy Hydrographic Office, 1958). Drifting and grounded ice floes can be present on the continental shelf throughout the summer. From the work of Kovacks and Mellor (1975), Reimnitz and Barnes (1975), and Barnes and Reimnitz (1975), it is evident that grounded

sea ice is a major process influencing the shelf sediments. Offshore beyond the shear zone, grounded pressure ridge keels and ice islands plow along the shelf at random intervals and rework the sediments to a significant extent.

Hydrographically, the Beaufort Sea contains three major identifiable water masses: (1) a mixed Arctic surface water (0-250 m), (2) an intermediate Atlantic water layer (250-900 m) with temperatures slightly above 0°C, and (3) the Arctic bottom water (below 900 m) with uniform salinities and temperatures always below 0°C (Coachman and Barnes, 1961; Coachman, 1963). The surface layer is a mixture of continental runoff, seasonal ice melt, and intrusions of water from the Bering and Chukchi Seas. The surface water may occasionally be enriched by coastal upwelling in certain areas; it has been detected at the shelf edge north of the Barter Island region during open water conditions (Hufford, 1975; Mountain, 1975).

Because of the highly stratified water column, the Beaufort Sea is thought to support very low levels of annual primary production (English, 1961; Meguro et al., 1966). The short summer season coupled with high variability in ice cover and insolation should contribute toward a low carbon input to the ecosystem. However, recent work has demonstrated a significant population of under-ice diatoms in polar regions (Meguro et al., 1966; Bunt and Lee, 1970; Homer and Alexander, 1972; Homer, 1974). These shade-adapted species, in conjunction with recently detected upwelling, may support higher annual production levels adjacent to the continent than previously anticipated (McRoy et al., 1972).

V. Sources, Methods and Rationale of Data Collection.

A. General

In order to examine the spatial and temporal variability of the Beaufort Sea continental shelf benthos, two transect lines were sampled seasonally. This sampling strategy enabled us to obtain samples from benthic infauna populations from all seasons and from the full range of depths represented on the continental shelf. These two transect lines were selected because they were located in areas of potential importance to petroleum development (see Figure 1).

B. Field Sampling

The field techniques utilized in this study have been described in detail in previous reports to NOAA/BLM and will therefore be presented only in summary fashion here. A 0.1 m^2 Smith-McIntyre grab has been used exclusively to collect quantitative samples of benthic infauna populations. Summer sampling was done off the U.S.C.G.C. GLACIER and the R/V ALUMIAK. Sampling during the other seasons involved the use of a helicopter and special "through-the-ice" sampling techniques. At all stations occupied at least five biological samples and one sediment sample were collected. The biological samples were processed using a Cascading Multiple Siever System retaining all animals larger than 0.42 mm. The animals were preserved in buffered formalin and shipped back to O.S.U. for further processing.

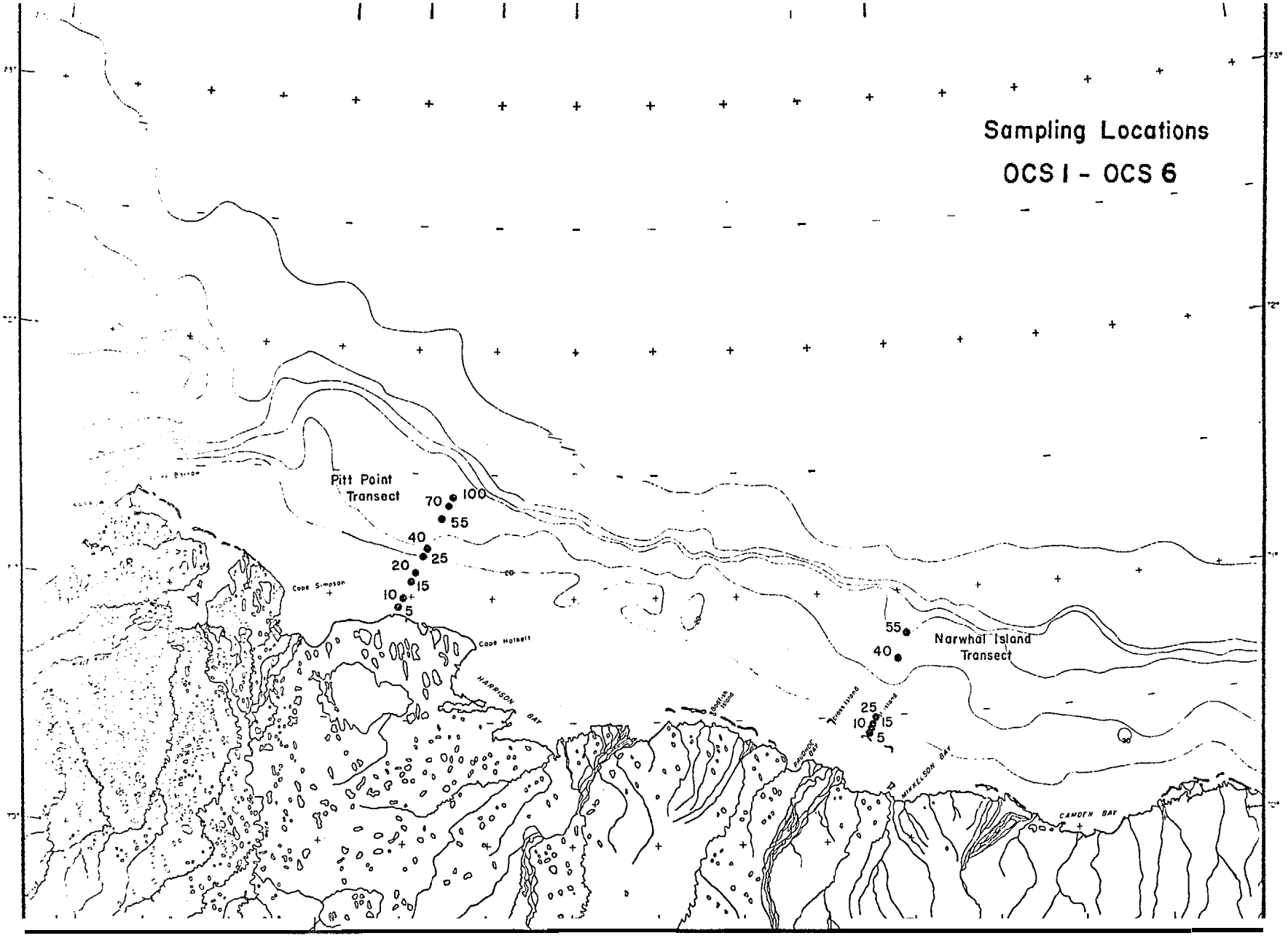

Figure 1. Station

C. Laboratory Methods

The processing of infaunal samples in the laboratory is a time consuming process involving the picking of all the animals from the sediment debris of the 1 mm fraction. The picked animals are sorted to phylum, weighed, and counted. The animals are stored in 70% ethanol while awaiting species identification. Presently, the gammarid amphipods are being identified. It is hoped that the molluscs, polychaetes, and other crustaceans will be identified in the future. The data from these infaunal samples is being tabulated and keypunched in order to be submitted to NOAA/BLM. Further details of sample workup have been reported in previous reports to NOAA/BLM.

VI. Results

Over two hundred grab samples have been collected during the six OCS field trips (Table 1). The major sampling effort was directed toward obtaining a complete set of seasonal samples from the Pitt Point Stations between 25 and 100 meters. Sample picking and sorting, as well as subsequent determinations of animal density and biomass have been completed for all samples collected through OCS-4. The density and biomass data are summarized in Tables 2 and 3. Detailed data for individual. grab samples have been reported in previous quarterly reports (see October 1976, December 1976, and March 1977).

The gammarid amphipods from OCS-1, OCS-2, and OCS-3 have been identified to species. Tables 4-8 list the dominant species at each station for each field trip. Complete species lists for the amphipods may be found in quarterly reports for December 1976 and March 1977.

Table 1. A List of Benthic Biological Samples Collected During the Six Field Trips by the OCS Program.

PPB-5	OCS-1 Ott. 75	OCS-2 Mar. 76	OCS-3 May 76	OCS-4 Aug. 76	OCS-5 Aug. 76	OCS-6 NOV. 76
10					5	
15					5	
20					5	
25	5	9	10	5	5	5
40		6	10	5		
55	5	10	10	5		5
70		5	10	5		5
100	5	10	10	5		5
NIB-5					5	
10					5	
15					5	
25				5		
40			7			
55			7			

Table 2. Mean animal densities per meter squared for the benthic macro-infauna. Number in parenthesis represents the number of samples from which the density values were-derived.

	OCS-1 October 1975	OCS-2 March 1976	OCS-3 May 1976	OCS-4 August 1976
PPB-25	1390 (5)	1190 (lo)	1120 (5)	1510 (5)
PPB-40	----	650 (5}	1370 (5)	3280 (5)
PPB-55	4800 (5)	4690 (6)	953o (6)	4500 (5)
PPB-70	----	8680 (5)	7750 (5)	7440 (5)
PPB-100	6540 (4)	4470 (10)	16,010 (5)	8830"(5)
NIB-25				950 (5)
NIB-40			5150 (5)	
NIB-55			2300 (5)	

Table 3. Mean wet preserved weight in grams per meter squared for the benthic macro-infauna. Number in parenthesis represents the number of samples from which the density values were derived.

	OCS-1 October 1975	OCS-2 March 1976	OCS-3 May 1976	OCS-4 August 1976
PPB-25	44.5 (5)	24.4 (10)	26.1 (5)	22*0 (5)
PPB-40	---	11.8 (6)	85.6 (5)	110.7 (5)
PPB-55	38.1 (5)	37.5 (lo)	67.0 (6)	151.8 (5)
PPB-70	---	64.4 (5)	71.0 (5)	193.7 (5)
PPB-100	68.7 (4)	45.0 (10)	187.0 (5)	66.3 (5)
NIB-25				23.9 (5)
NIB-40			44.1 (5)	
NIB-55			29.0 (5)	

Table 4. Dominant Amphipod Species Collected During OCS-2 and OCS-3 From PPB-40. S = Number of Species N= Number of specimens.

OCS-2	OCS- 3
Byblis arcticus	Harpinia kobjakouae
Harpinia kabjakouae	Aceroides latipes
Ampelisca eschricti	Ampelisca eschricti
Monoculopsis longicornis	Arrhinopsis longicornis
Aceroides latipes	Gammarus sp. AA
Protomedeia fasciata	Byblis arcticus
Haploops tubicola	
Byblis gaimardi	
Haploops laeuis	
S = 15	S = 11
N = 5 2	N = 4 2

Table 5. Dominant Amphipod Species Collected During OCS-1, OCS-2 and OCS-3 from PPB-25. S = Number of Species; N=Number of Specimens.

Haploops tubicola	*Aceroides latipes*	*Gammarus* sp. AA
Arrhis phyllonyx	*Roxinate fragilis*	*Byblis gaimardi*
Aceroides latipes	*Monoculodes packardi*	*Harpinia kobjakouae*
Pontogeneia sp. A	*Monoculopsis longicornis*	*Haploops laeuis*
Gammarus sp. A	*Onisimus litoralis*	
Ampelisca eschricti		
Byblis gaimardi		
s= 12	s= 10	s= 13
N= 31	N= 35	N= 26

Table 6. Dominant Amphipod Species Collected During OCS-1, OCS-2, and OCS-3 From PPB-55. S=Number of Species; N = Number of Species.

OCS-1	OCS-2	OCS- 3
Photis vinogradova	Unciola leucopsis	Photis vinogradova
Unciola leucopis	Photis vinogradova	Tiron spinifera
Tiron spinifera	Paraphoxus oculatus	Byblis arcticus
Haploops setosa	Tiron spinifera	Harpinia serrata
Harpinia serrata	Guernea nordenskioldi	Paraphoxus oculatus
Goesia depressa	Haploops setosa	Photis rheinhardi
Paraphoxus oculatus	Harpinia serrata	Guernea nordenskioldi
Guernea nordenskioldi	Ampelisca eschricti	Unciola leucopis
Podoceropsis lindhaldi	Podoceropsis lindhaldi	Westwoodilla megalops
Protomedeia fasciata	Byblis arcticus	Byblis sp. BB
S = 38	s = 34	s = 34
N = 350	N = 547	N = 810

Table 7. Dominant Amphipod Species Collected During OCS-1, OCS-2, and OCS-3 for From PPB-100. S = Number of Species; N = Number of Specimens.

OCS-1	OCS-2	OCS-3
Haploops laeuis	Unciola leucopis	Unciola leucopis
Harpinia serrata	Harpinia serrata	Guernea nordenskiol di
Hippomedon abyssi	Photis vinogradova	Podoceropsis inaequistylis
Unciola leucopis	Hippomedon abyssi	Photis rheinhardi
Guernea nordenskioldi	Guernea nordenskioldi	Tiron spinifera
Anonyx nugax	Photis rheinhardi	Podoceropsis lindhaldi
Pontogeneia sp. A	Protomedeia fasciata	Photis vinogradova
Pontoporeia femorata	Pontoporeia femorata	Harpinia serrata
Monoculodes latimanus	Anonyx nugax	Protomedeia fasciata
	Paraphoxus oculatus	Ischyrocerus meqalops
s = 23	S = 31	S = 38
N = 197	N = 743	N = 826

Table 8. Dominant Amphipod Species Collected During OCS-2 and ocs -3 from PPB- 70. S = Number of Species; N = Number of Specimens.

OCS-2	OCS-3
Unciola leucopis	*Unciola leucopis*
Photis vinogradova	*Photis vinogradova*
Tiron spinifera	*Tiron spinifera*
Podocerapsis inaequistylis	*Podoceropsis lindhaldi*
Goesia depressa	*Ampelisca birulai*
Ampelisca birulai	*Lembos arcticus*
Podocerapsis lindhaldi	*Protomedeia fasciata*
Protomedeia fasciata	*Paraphoxus oculatus*
Ericthonius megalops	*Photis rheinhardi*
s = 42	s = 37.
N = 1041	N = 755

VII. Discussion

A. Animal Densities and Biomass on the Pitt Point Transect.

Since samples have now been processed for the first four OCS field trips, it is possible to evaluate the degree to which benthic populations fluctuate throughout an annual cycle on the Pitt Point transect. Careful examination of Tables 2 and 3 reveals that at most stations the benthic infaunal populations seem very stable with rather similar values of animal abundance from season to season. There is little indication of any significant die-off of the benthos during the winter months. A few anomalous values in animal densities are recorded, particularity at the deeper stations taken during May, 1976. However, it is difficult to interpret whether these values are indicative of real seasonal trends, or if they are merely reflecting spatial rather than temporal variability. An additional series of benthic samples during the winter and spring months would go far toward elucidating the effects of seasonality on the benthos. Also, additional analysis of the existing samples at the species level may be helpful in interpreting the density values.

The biomass values (grams wet preserved weight) also exhibit no order of magnitude changes, indicative of a stable benthic populations through time.

B. Distribution of the Gammarid Amphipods on the 'Pitt Point Transect.

Careful examination of Tables 4-8 reveals several trends in the distribution of the dominant species of gammarid amphipods collected on the Pitt Point Transect during the three field trips. Station PPB-25 was characterized by low numbers of amphipods and low similarities of the dominant species when comparing the three collections. The four deeper stations (PPB-40, PPB-55, PPB-70 and PPB-100) have both larger numbers

of amphipods and much higher within station similarities. The variability at the inner shelf station probably reflects the much higher environmental heterogeneity found in this area due to the disturbances of ice impinging on the bottom. The data from the deeper stations suggests that these areas are sufficiently homogeneous that the same communities can be sampled repeatedly.

In comparing the amphipod faunas from the different depths, there seems to be clear evidence of depth zonation. Three amphipod assemblages seem to be identifiable by comparing the dominant species: 1) an inner shelf group found at PPB-25 and PPB-40; 2) a mid-shelf group found at PPB-55 and PPB-70; and 3) an outer-shelf fauna found at PPE-100. The validity of these three assemblages will be tested in the near future through the use of multivariate techniques such as cluster analysis.

Conclusions

The amount of data presently available make any conclusions rather tenuous, but there are a few significant trends in the data sets.

1) Benthic infaunal populations of the Beaufort Sea Continental Shelf show little evidence of strong seasonal fluctuations in abundance. In fact, temporal variability seems much less than spatial variability.

2) The gammarid amphipod fauna of the Beaufort Sea Continental Shelf shows clear depth zonation with a inner-, mid-, and outer-shelf assemblages being identifiable.

IX. Needs for Further Study

Present knowledge of the benthic ecosystem of the Beaufort Sea is still very much in the descriptive phase. There is a great need for future research if we are going to access and predict the impact of petroleum development in this area. In particular, there is a need to study the dynamic processes of the benthic ecosystem. Such studies should include a description of the benthic food web, and measurement of reproductive and repopulation rates of dominant species.

X. Summary of 4th Quarter Operations.

A. Ship and Laboratory Activities

1. Field Work

No field work has been undertaken this quarter. Plans have been initiated for a cruise on the USCGC GLACIER this summer to study the benthic components of the food web in the Beaufort Sea.

2. Laboratory Activities

a. Personnel

1. Andrew G. Carey, Jr. Principal Investigator
Associate Professor

Responsibilities: coordination, evaluation, analysis, and reporting.

2. John J. Dickinson Research Associate Postdoctoral

Responsibilities: direction of Laboratory personnel, gammarid amphipod systematic, sample processing, data compilation and analysis, and field collection.

3. R. Eugene Ruff Research Assistant

Responsibilities: species list compilation, reference museum curation, and field collection.

4. James B. Gish Research Assistant

Responsibilities: data management, statistical analysis, and field collection.

5. Paul Montagna Research Assistant

Responsibilities: sample processing, biomass, and. Harpacticoid Copepod systematic.

b. Methods

The techniques for sample processing have not been altered this quarter.

c. Data analyzed

During this quarter, 40 Smith-McIntyre grabs have been processed including 15 samples from the Narwhal Island Transect and 25 samples from the Pitt Point Transect. These samples were sorted to phyla, and determinations of animal density and biomass have also been completed (see Tables 9-18). Fifty-five samples from OCS-5 and OCS-6 remain to be sorted to phyla.

The gammarid amphipods from OCS-2 and OCS-3 have been identified to species (see Tables 19-28).

B. Problems Encountered

No new problems have developed this quarter.

C. Estimate of Funds Expended. Contract No. 03-5-022-68 (FY76 + 77) Task Order No. 5 R.U. #6.

	Budget	Spent	Committed	Balance
Salaries	94,128	53,151	30,977	
Materials & Services	16,595	18,380	750	<2,535>
Trave 1	9,300	8 , 0 2 2		1,278
Equipment	47,617	47,224		393
Payroll Assessment	14,260	7,691	6,946	
Overhead	45,260	24,671	20,589	
TOTAL	227,537	159,139	59,262	<864>

DATA MANAGEMENT
PROGRESS CHART

01 March 77

	Processed	'Coded	Keypunched	Final Verification	Expected Submission	FILE ID
WEBSEC 1971					FEB. 1977	WBSC71
WEBSEC 1972					FEB. 1977	WBSC72
OCS 1 Station					MARCH 1977	OCS-1
OCS 1 Taxonomic						
OCS 2 Stat ion					MARCH 1977	OCS-2
OCS 2 Taxonomic						
OCS 3 Station					01 APRIL 1977	
OCS 3 Taxonomic					01 JULY 1977	
Ocs 4 station					01 APRIL 1977	
Ocs 4 Taxonomic					01 OCT. 1977	
OCS 5 Station					01 MAY 1977	
OCS 5 Taxonomic					01 OCT. 1977	
OCS 6 Station					01 MAY 1977	
OCS 6 Taxonomic					01 OCT. 1977	

No dates for the expected submission of information have been changed.

Table 9. Animal densities for NIB-4(I (OCS-3) collected on 1 June 1976.

Phylum: Class: Order			Grab Number 1198	1199	1200	1202	1204	Total
Cnidaria:	Anthozoa		3	7	1	6	4	21
Nematoda			318	230	139	20	171	878
Nemertinea			4	5	3		8	20
Annelida:	Polychaeta		140	150	148	46	172	656
Sipuncula							1	1
Echiura			1					1
Arthropoda:	Crustacea:	Amphipoda	115	15	20	14	21	185
		Harpacticoida	8	3				11
		Isopoda	5	5	1		7	18
		Ostracoda	89	83	17	3	63	255
		Tanaidacea	20	4	1	1	11	37
		Cumacea	21	6	6		6	39
Mollusca:	Bivalvia		65	88	115	82	67	417
	Gastropoda		1	3	2	1		7
Brachiopoda			1	2			1	4
Echinodennata:	Holothuroidea		1					1
	Ophiuroidea		4		7	1		12
Hemichordata			2	2	2	1	2	9
TOTAL			798	603	462	175	534	2573

Table 10. Animal densities for NIB-55 (OCS-3) collected on 1 June 1976.

Phylum:	Class:	Order	Grab Number 1192	1193	1194	1195	1197	Total
Cnidaria:	Anthozoa		1	7	5	1	1	15
Nematoda			35	54	156	40	61	346
Nemertinea			1	1	6	2	2	12
Annelida:	Polychaeta		77	65	145	81	83	451
Sipuncula					1	1	1	3
Arthropoda:	Crustacea:	Amphipoda	7	3	12	11	2	34
		Harpacticoida		1	2			3
		Isopoda		2				2
		Ostracoda	3	7	.43	6	1	60
		Tanaidacea	3					3
		Cumacea	1	5	17	1	1	25
Mollusca:	Bivalvia		16	43	95	19	11	184
	Gastropod				3	2	1	6
	Polyplacophora				1			1
Brachiopoda				1	1			2
Echinodermata:	Holothuroidea			1				1
	Ophiuroidea					1		1
TOTAL			144	190	487	165	164	1150

Table 11. Animal densities for NIB-25 (OCS-4) collected on 25 August 1976.

Phylum: Class: Order			Grab Number 1294	1295	1296	1297	1298	Total
Cnidaria:	Anthozoa			6		2		8
Nematoda			1	10	5	10	7	33
Nemertinea				9	7	6	9	31
Annelida:	Polychaeta		4	51	33	72	31	191
Sipuncula				3				3
Priapulida					1	3	1	5
Arthropods:	Crustacea:	Amphipoda	5	13	1	10	12	41
		Isopoda		2	2	1		5
		Ostracoda	1		1		1	3
		Tanaidacea		9	2	1	3	15
		Cumacea	6	14	4	12	6	42
	Pycnogonida				1			1
Mollusca:	Bivalvia			34	7	11	14	66
	Gastropoda			1	1	6	3	11
Echinodermata:	Holothuroidea				1		1	2
	Ophiuroidea		1	4	3	2	3	13
Chordata:	Urochordata:	Ascidacea		3				3
TOTAL			18	159	69	136	91	473

Table 12. Animal densities for PPB-25 (OCS-4) collected on 1 September 1976.

Phylum:	Class:	Order	Grab Number 1360	1361	1362	1363	1364	Total
Cnidaria:	Anthozoa				1			1
Nematoda			9		2	1	7	19
Nemertinea			2	4			2	8
Annelida:	Polychaeta		113	143	69	55	80	460
	Oligochaeta						1	1
Sipuncula							2	2
Echiura			1					1
Arthropoda:	Crustacea:	Amphi.pods	5	4	7	5	6	27
		Harpacticoida	1			2		3
		Isopoda		2	2	2	1	7
		Ostracoda		2			3	5
		Tanaidacea	2		3		1	6
		Cumacea	4		3		1	8
Mollusca:	Bivalvia		50	32	25	32	35	174
	Gastropod		3	6	4	8	4	25
Echinodermata:	Holothuroide a		1					1
	Ophiuroidea		2		3	1		6
TOTAL			193	193	119	106	143	754

Table 13. Animal densities for PPB-40 (OCS-4) collected on 31 August 1976.

Phylum : Class: Order		Grab Number 1353	1354	1355	1356	1357	Total
Cnidaria: Anthozoa		4	9	7	1	7	28
Nematoda		55	30	59	31	73	248
Nemertinea		3	3	4	3	2	15
Annelida: Polychaeta		88	103	198	121	152	662
Sipuncula			1	1		4	6
Echiura			1				1
Arthropoda: Crustacea:	Amphipoda	55	93	71	76	41	336
	Isopoda					1	1
	Ostracoda	14	19	13	16	15	76
	Tanaidacea	14	15	3	10	6	48
	Cumacea	25	30	26	38	12	131
Mollusca: Bivalvia		3	12	12	5	23	55
Gastropod		3	1	5	4	5	18
Aplacophora				1			1
Echinodermata: Ophiuroidea		1	2	3	3	3	12
TOTAL		265	319	403	308	344	1638

Table 14. Animal densities for PPB-55 (OCS-4) collected on 31 August 1976.

Phylum: Class: Order	Grab Number 1330	1335	1336	1340	1541	Total
Cnidaria: Anthozoa	5	2	2	4	5	18
Nematoda	71	97	51	38	128	385
Nemertinea	8	8	3	8	3	30
Annelida: Polychaeta	240	227	182	152	145	946
Sipuncula	8	7	4	1	6	26
Echiura	2	1				3
Priapulida					2	2
Arthropoda: Crustacea: Amphipoda	49	63	63	23	43	241
Harpacticoida	3	5	2	2	1	13
Isopoda		1	1	1		3
Ostracoda	35	95	34	18	66	248
Tanaidacea	13	12	10	9	10	54
Cumacea	26	27	22	15	27	117
Decapoda	1					1
Mollusca: Bivalvia	12	36	18	11	13	90
Gastropoda	7	7	5	5	11	35
Aplacophora		2	1			3
Echinodermata: Holothuroidea	1				2	3
Ophiuroidea	5	3	2	1	5	16
Hemichordata	2	2	6		3	13
Chordata: Urochordata: Ascidacea		1				1
TOTAL	488	596	406	288	470	2248

Table 15. Animal densities for PPB-70 (OCS-4) collected on 31 August 1976.

Phylum: Class: Order	Grab Number 1325	1326	1327	1328	1329	Total
Cnidaria: Anthozoa	5	24	8	7	7	51
Nematoda	115	179	164	149	226	833
Nemertinea	4	3	3	4	6	20
Annelida: Polychaeta	335	409	298	370	217	1629
Sipuncula	4	4	1	1	4	14
Echiura			1			1
Anthropoda: Crustacea: Amphipoda	81	135	85	61	96	458
Cirripedia		1				1
Harpacticoida					1	1
Isopoda	6	5	4	34	14	63
Ostracoda	35	37	43	25	22	162
Tanaidacea		11	3	3	5	22
Cumacea	36	37	31	16	21	141
Pycnogonida	5	6				11
Mollusca: Bivalvia	55	55	27	51	59	247
Gastropod	11	10	2	1	5	29
Aplacophora		3				3
Polyplacophora	2	3	3		1	9
Brachiopoda	3	2		1		6
Echinodermata: Holothuroidea	1					1
Ophiuroidea	2	2	4	1	2	11
Hemichordata	1	3				4
Chordata: Urochordata: Ascidacea		1			2	3
TOTAL	701	930	677	724	688	3720

Table 16. Animal densities for PPB-100 (OCS-4) collected on 30 August 1976.

Phylum: Class: Order			Grab Number 1318	1319	1320	1322	1323	Total
Cnidaria:	Anthozoa		12	9	15	14	13	63
Nematoda			275	168	545	95	146	1229
Nemertinea			9	5	12	5	6	37
Annelidea:	Polychaeta		311	281	309	261	259	1421
Sipuncula			3	5	8	1	3	20
Priapulida							1	1
Arthropods:	Crustacea:	Amphipoda	116	137	212	151	117	733
		Cirripedia					1	1
		Harpacticoida	7	1	10	1	2	21
		Isopoda	6	8	8	7	6	35
		Ostracoda	96	64	108	53	64	385
		Tanaidacea	4	4	9	2	6	25
		Cumacea	29	30	59	14	38	170
	Pycnogonida		3	3	2	2	1	11
Mollusca:	Bivalvia		35	25	35	27	40	162
	Gastropod		6	8	9	5	10	38
	Aplacophora					1	1	2
Brachiopoda			2	2		2	1	7
Echinodermata:	Holothuroidea		1	1		1		3
	Ophiuroidea		5	3	6	5	7	26
Hemichordata			3		1	1	1	6
Chordata:	Urochordata:	Ascidacea	5	4	3		5	17
TOTAL			928	758	1351	648	728	4413

Table 17. Wet Weight in Grams of Major Groups, for NIB stations cruises OCS-3 and OCS-4.

Station	Grab	Anthozoa	Sipuncula	Polychaeta	Arthropoda	Mollusca	Ophiuroidea	Misc. Phyla	Total
NIB-55	1192	.39		.65	.11	.59		.02	1.76
	13.93	.58		.62	.83	1.05		.02	3.10
	1194	.30	.02	2.16	.26	.84		.09	3.67
	1195	.15	.01	.96	.50	.62	.54	.54* (.01)	3.32
	1197	.20	.01	1.21	.06	1.14		.03	2.65
NIB-40	1198	.48	.01	1.39	1.18	1.65	.28	.04	5.03
	1199	.35		1.76	.38	1.50		.02	4.01
	1200	.09		3.29* (2.60)	.13	4.34* (1.59)	.16	.05	8.06
	1202	.19		3.10	.43	4.25	.01	.04	8.02
	1204	. 2 0		2.33	.30	2.09		.04	4.96
NIB-25	1294			.01	.10		.07	.01	.19
	1295	.24	.03	1.25	.19	2.06	.08	.20* (.04)	4.05
	1296			.68* (.12)	.19	3.'32	.57	.07	5.43
	1297	,05		. 98* (,30)	.17	.32	.07	.03	1.62
	1298			.08	.09	.40	.05	.02	.64

* Weight biased by a large and rare organism, number in parenthesis is weight with bias excluded.

Table 18. Wet Weight in Grams of Major Groups, for P Stations Taken During Cruise OCS-4.

Station	Grab	Anthozoa	Sipuncula	Polychaeta	Arthropods	Mollusca	Ophiuroidea	Misc. Phyla	To tal
PPB-100	1318	.56	.03	2.13	.65	3.25* (.92)	.08	.16	6.96
	1319	.72	.05	2.13	.64	.37	.14	.10	4.15
	1320	.44	.02	2.99	1.30	.57	.47	.21	6.00
	1322	.15	.01	3.01	.70	6.99* (.60)	.14	.39	11.39
	1323	.29	.01	2.56	.44	1.15	.09	.11	4.65
PPB-70	1325	1.47* (.43)	.08	3.24	1.02	14.06	.01	.46	20.34
	1326	.92	.02	2.66	.61	8.60	.01	.06	12.88
	1327	.73	.01	6.47	.34	13.65	.02	.18	21.40
	1.328	.11		7.70	.39	11.85	.0	.21	20.33
	1329	2.54	.03	5.75	.27	12.82	.06	.45	21.92
PPB-55	1330	.04	2.40* (.15)	5.03	.93	2.24	.27	.08	10.99
	1335	.54	.25	3.82	1.52	12.84* (1.70)	.07	.09	19.13
	1336	.19	.01	4.36	1.27	3.03	.01	3.56* (.26)	12.43
	1340	.25	.01	5.73	1.80* (.80)	2.71	.20	.04	10.74
	1341	.13	.10. 04* (.02)	4.18	.90	6.83* (1.48)	.49	.04	22.61
PPB-40	1353	.43		2.40	.81	.92* (1.23)	.01	.41* (.05)	4.98
	1354	.33	.01	3.22	1.56	.63	.27	.12	6.14
	1355	.06	.01	5.82	.54	.11	.32	.02	6.88
	1356	.08		3.69	.79	2.46	.77	.02	7.81
	1357	.52	.01	11.69* (5.14)	5.96* (2.46)	11.23	.07	.08	29.56
PPB-25	1360			.56	.61	1.62	.54	.02	3.35
	1361			.90	.16	.67		.02	1.75
	1362	.06		.44	.16	1.09	.01	.01	1.77
	1363			1.27	.03	.57			1.87
	1364		.02	1.07	.16	3.00		.01	2.26

* Weight biased by a large and rare organism, number in parenthesis is weight with bias excluded.

Table 19. The Gammarid Amphipods from PPB-25 Collected During OCS-3. 13 Species were Reported in the 26 Specimens.

Family	Mean Number/m^2	Frequency	Rank
Ampeliscidae			
Ampelisca eschricti	1	1/9	4
Byblis gaimardi	3	3/9	2
Haploops laevis	2	1/9	3
Haploops sibirica	1	1/9	4
Corophiidae			
Geosia depressa	1	1/9	4
Eusiridae			
Rozinante fragilis	1	1/9	4
Gammaridae			
Gammarus sp. AA	10	7/9	1
Haustoriidae			
Pontoporeia femorata	1	1/9	4
Ischyroceridae			
Ischyrocerus sp. AA	1	1/9	4
Lysianasidae			
Hippomedon abyssi	1	1/9	4
Onisimus littorals	1	1/9	4
Oedicerotidae			
Aceroidea latipes	3	1/9	2
Phoxocephalidae			
Harpinia kobjakovae	1	1/9	4

Table 20. The Gammarid Amphipods from PPB-40 Collected During OCS-3. 19 Species were Reported in the 42 Specimens.

Family	Mean Number/m^2	Frequency	Rank
Ampeliscidae			
Ampelisca eschricti	2	1/5	7
Byblis affinis	4	1/5	6
Byblis gaimardi	2	1/5	7
Haploops tubicola	2	1/5	7
Argissidae			
Argissa hamatipes	2	1/5	7
Corophiidae			
Podoceropsis inaequistylus	2	1/5	7
Unciola leueopis	2	1/5	7
Gammaridae			
Gammarus sp. A	4	2/5	5
Ischyroceridae			
Ischyrocerus chamissoni	2	1/5	7
Lysianassidae			
Anonyx sp. AA	2	1/5	7
Anonyx nugax	2	1/5	7
Tryphosella sp. AA	2	1/5	7
Oedicerotidae			
Aceroides latipes	10	3/5	2
Arrinopsis longicornis	6	2/5	4
Arrhis phyllanyx	2	1/5	7
Bathymedon obtusifrons	2	1/5	7
Phoxocephalidae			
Harpinia kobjakovae	26	5/5	1
Harpinia serrata	2	1/5	1
Pleustidae			
Pleusymtes karianus	2	1/5	1

Table 21. The Gammarid Amphipods from PPB-55 Collected During OCS-3. 34 Species were Represented in the 810 Specimens.

Family	Mean Number/m^2	Frequency	Rank
Ampeliscidae			
Ampelisca birulai	22	4/6	13
Ampelisca eschricti	7	2/6	19
Byblis arcticus	150	6/6	3
Byblis sp. BB	32	2/6	20
Haploops laeuis	5	3/6	20
Haploops setosa	10	2/6	18
Haploops sibirica	2	1/6	21
Aoridae			
Lembos arcticus	10	2/6	18
Argissidae			
Argissa hamatipes	15	5/6	16
Corophiidae			
Corophium clarencense	13	5/6	17
Goesia depressa	20	4/6	14
Photis rheinhardi	67	5/6	6
Photis vinogradova	350	6/6	1
Podoceropsis inaequistvlus	10	4/6	18
Podoceropsis Lindhaldi	2 3	4/6	12
Protomedia fasciata	25	4/6	11
Unciola leucopsis	62	6/6	8
Dexaminidae			
Gurnea nordenskioldi	63	6/6	7
Eusiridae			
Rhachotropis aculeta	2	1/6	21
Gammaridae			
Gammarus sp. AA	2	1/6	21
Maera danae	17	1/6	15
Lysianassidae			
Anonyx nugax	10	3/6	18
Boeckonesimus platus	2	1/6	21
Onisimus littorals	2	1/6	21
Oedicerotidae			
Aceroides latipes	2	1/6	21
Bathymedon obtusifrons	3	2/6	20
Monoculodes diamesus	2	1/6	21
Monoculodes tuberculatus	2	1/'6	21
Westwoodilla megalops	35	5/6	9

Table 21. (cont.)

Family	Mean Number/m^2	Frequency	Rank
Paradaliscidae			
Paradaliscella lauroui	2	1/6	21
Phoxocephalidae			
Harpinia serrata	87	6/6	4
Paraphoxus oculatus	75	6/6	5
Pleustidae			
Pleusymtes karianus	2	1/6	21
Synopiidae			
Tiron spinifera	220	6/6	2

Table 22. The Gammarid Amphipods from PPB-70 Collected During OCS-3. 37 Species were Represented in the 755 Specimens.

Family	Mean Number/m^2	Frequency	Rank
Ampeliscidae			
Ampelisca birulai	96	5/5	5
Ampelisca eschricti	2	1/5	20
Ampelisca macrocephala	4	2/5	19
Byblis arcticus	10	3/5	16
Byblis gaimardi	2	1/5	20
Haploops laevis	2	1/5	20
Haploops setosa	2	1/5	20
Haploops tubicola	6	2/5	18
Aoridae			
Lembos arcticus	82	4/5	6
Argissidae			
Argissa hamatipes	4	2/5	19
Corophiidae			
Corophium clarencense	20	4/5	14
Erichthonius megalops	24	3/5	12
Goesia depressa	26	5/5	11
Photis rheinhardi	44	5/5	10
Photis vinogradova	216	5/5	2
Podoceropsis inequistylis	26	5/5	11
Podoceropsis lindhaldi	172	5/5	4
Protomedia fasciata	54	4/5	8
Unciola leucopis	318	5/5	1
Dexaminidae			
Guernea nordenskioldii	56	5/5	7
Gammaridae			
Gammarus sp. AA	2	1/5	20
Marae danae	22	3/5	13
Melita dentata	24	5/5	12
Haustoriidae			
Pontoporeia femorata	2	1/5	20
Ischyroceridae			
Ischyrocerus commensalis	4	2/5	19
Ischyrocerus megalops	2	l/5	20
Lysianassidae			
Anonyx nugax	4	1/5	19

Table 22. (cont.)

Family	Mean Number/m^2	Frequency	Rank
Oedicerotidae			
Aceroides latipes	4	1/5	19
Arrhinopsis longicornis	4	2/5	19
Bathymedon obtusifrons	8	3/5	17
Monoculodes diamesus	4	1/5	19
Monoculodes tuberculatus	8	2/5	17
Westwoodilla megalops	12	3/5	15
Phoxocephalidae			
Harpinia serrata	46	5/5	9
Paraphoxus oculatus	10	3/5	16
Pleustidae			
Pleusvmtes karianus	2	1/5	20
Synopiidae			
Tiron spinifera	186	5/5	3

Table 23. The Gammarid Amphipods from PPB-100 Collected During OCS-3. 38 Species were Represented in the 825 Specimens.

Family	Mean Number/m^2	Frequency	Rank
Acanthonoto zomatidae			
Odius kelleri	4	1/5	19
Ampeliscidae			
Ampelisca birulai	2	1/5	20
Ampelisca eschricti	2	1/5	20
Byblis affinis	6	1/5	18
Byblis arcticus	2	1/5	20
Byblis sp. BB	2	1/5	20
Haploops tubicola	4	2/5	19
Aoridae			
Lembos arcticus	2	1/5	20
Argissidae			
Argissa hamatipes	2	1/5	20
Corophiidae			
Corophium clarencense	4	2/5	20
Ericthonius megalops	6	1/5	18
Goesia depressa	30	4/5	12
Photis rheinhardi	116	5/5	4
Photis vinogradova	72	4/5	6
Podoceropsis inaequistylis	176	5/5	3
Podoceropsis lindhaldi	76	5/5	5
Protomedia fasciata	64	5/5	8
Unciola leucopis	444	5/5	1
Dexaminidae			
Guernea nordenskioldi	242	5/5	2
Haustoriidae			
Pontoporeia femorata	20	3/5	14
Ischyroceridae			
Ischyrocerus megacheir	14	2/5	16
ischyrocerus megalops	38	3/5	9
Lysianassidae			
Anonyx sp. AA	2	1/5	20
Anonyx nugax	6	1/5	18
Hippomedon abyssi	26	4/5	13

Table 23. (cont.)

Family	Mean Number/m^2	Frequency	Rank
Oedicerotidae			
Aceroides latipes	2	1/5	20
Arrhinopsis longicornis	4	2/5	19
Bathymedon obtusifrons	32	.5/.5	11
Bathymedon sp. AA	2	1/5	20
Monoculodes diamesus	14	4/5	16
Westwoodilla megalops	10	3/5	17
Phoxocephalidae			
Harpinia kobjakovae	2	1 / 5	20
Harpinia serrata	68	5/5	7
Paraphoxus oculatus	16	5/5	15
Pleustidae			
Pleusymtes karianus	2	1/5	20
Podoceridae			
Dulichia falcata	24	2/5	13
Paradulichia typica	2	1/5	20
Synopiidae			
Tiron spinifera	76	5/5	5

Table 24. The Gammarid Amphipods From PPB-25 Collected During OCS-2. 10 Species Reported in the 35 Specimens.

Family	mean numbe r/m²	Frequency	Rank
Ampeliscidae			
Haploops sibirica	1	1/10	5
Eusiridae			
Rozinate fragilis	8	3/10	2
Gammaridae			
Gammarus sp. AA	1	1/10	5
Lysianasidae			
Onisimus litoralis	4	3/10	4
Oedicerotidae			
Aceroides latipes	9	4/10	1
Monoculodes borealis	1	1/10	5
Monoculodes longicornis	4	3/10	4
Monoculodes packardi	5	3/10	3
Pleustidae			
Pleusymtes varianus	1	1/10	5
Stenothidae			
Metopa tenuimana	1	1/10	5

Table 25. The Gammarid Amphipods From PPB-40 Collected During OCS-2. 15 Species were Represented in the 52 Specimens.

Family	mean Numbe r/m^2	**Frequency**	Rank
Ampeliscidae			
Ampelisca eschricti	10	3/6	3
Byblis arcticus	22	5/6	1
Byblis gaimardi	3	2/6	8
Haploops laevis	3	2/6	9
Haploops tubicola	5	2/6	7
Argissidae			
Angissa hamatipes	2	2/6	9
Corophiidae			
Goesia depressa	2	1/6	9
Protomedia fasciata	5	3/6	6
Eusiridae			
Rozinante fragilis	2	1/6	9
Gammaridae			
Maera danae	2	1/6	9
Oedicerotidae			
Aceroides latipes	7	3/6	5
Monoculopsis longicornis	8	2/6	4
Phoxocephal idae			
Harpinia kobjakovae	13	4/6	2
Paraphoxus oculatus	2	1/6	9

Table 26. The Gammarid Amphipods from PPB-55 Collected During OCS-2. 34 Species were represented in the 547 Specimens.

Family	Mean Number/m^2	Frequency	Rank
Acanthonotozomatidae			
Odius kelleri	1	1/10	17
Ampeliscidae			
Ampelisca birulai	5	4/10	13
Ampelisca eschrichti	14	5/10	6
Byblis affinis	7	4/10	11
Byblis gaimardi	2	2/10	16
Haploops laeuis	1	1/10	17
Haploops setosa	14	2/10	6
Haploops tubicola	25	3/10	4
Argissidae			
Argissa hamatipes	2	1/10	16
Corophiidae			
Corophium clarencense	4	2/10	14
Goesia depressa	10	3/10	9
Photis rheinhardi	8	2/10	10
Photis vinogradova	143	7/10	2
Podoceropsis inaequistylis	6	2/10	12
Podoceropsis lindhaldi	10	3/10	9
Protomedia fasciata	11	2/10	8
Unciolo leucopis	182	9/10	1
Dexaminidae			
Guernea nordenskioldi	12	4/10	7
Eusiridae			
Rozanante fragilis	1	1/10	17
Gammaridae			
Maera danae	3	2/10	15
Lysianssidae			
Anonyx sp. AA	1	1/10	11
Anonyx nugax	1	1/10	17
Oedicerotidae			
Aceroides latipes	5	3/10	13
Bathymedon obtusifrons	2	2/10	16
Monoculodes diamesus	1	1/10	17
Monoculodes latimonus	1	1/10	12
Westwoodilla megalops	3	2/10	15

Table 26. (cont.]

Family	Mean Number/m^2	Frequency	Rank
Paradaliscidae			
Halite sp. AA	1	1/10	17
Phoxocephalidae			
Harpinia kobjakouae	2	2/10	16
Harpinia serrata	10	4/10	9
Paraphoxus oculatus	43	6/10	3
Pleustidae			
Pleusymtes karianus	1	1/10	17
Synopiidae			
Tiron spinifera	15	4/10	5

Table 27. The Gammarid Amphipods from PPB-70 Collected During OCS-2. 42 Species were Represented in **the 1041 Specimens.**

Family	Mean Number/m^2	Frequency	Rank
Acanthonotozomatidae			
Odius kelleri	2	1/5	24
Ampeliscidae			
Ampelisca birulai	44	5/5	8
Ampelisca eschricti	6	3/5	22
Byblis affinis	6	3/5	22
Haploops setosa	2	1/5	24
Haploops tubicola	32	4/5	12
Amphilochidae			
Gitana rostrata	2	1/5	24
Aoridae			
Lembos arcticus	10	2/5	20
Argissidae			
Argissa hamatipes	6	2/5	22
Atylidae			
Atylus bruggeni	2	1/5	24
Corophiidae			
Corophium clarencense	44	3/5	8
Erichtonius megalops	36	4/5	11
Goesia depressa	40	5/5	9
Photis rheinhardi	90	5/5	3
Photis vinogradova	454	5/5	2
Podoceropsis inaequistylis	30	2/5	13
Podoceropsis lindhaldi	24	3/5	14
Protomedia sp. AA	12	1/5	19
Protomedia fasciata	78	4/5	5
Unciola leucopis	712	5/5	1
Calliopiidae			
Apherusa glacialis	2	1/5	24
Dexaminidae			
Guernea nordenskioldi	62	4/5	6
Eusiridae			
Rozinante fragilis	12	4/5	19
Rhactropis inflata	2	1/5	24

Table 27. (cont.)

Family	Mean Number\m²	Frequency	Rank
Gammaridae			
Melita dentata	16	3/5	17
Melita formosa	4	1/5	23
Ischyroceridae			
Ischyrocerus commensalis	48	1/5	7
Ischyrocerus latipes	14	2/5	18
Lysianssidae			
Anoyx Sp. AA	8	3/5	21
Anonyx nugax	6	3/'5	22
Orchomene minuta	2	1/5	24
Oedicerotidae			
Aceroides latipes	82	5/5	4
Bathymedon obtusifrons	12	3/5	19
Monoculodes diamesus	2	1/5	24
Monoculodes longicornis	2	1/5	24
Monoculodes tuberculatus	4	1/'5	23
Westwoodilla megalops	22	4/5	15
Phoxocephalidae			
Harpinia serrata	38	5/5	10
Paraphoxus oculatus	20	4/5	16
Pleustidae			
Pleusymtes karianus	2	1/5	24
Stenothidae			
Metopella longimana	4	2./5	23
Synopiidae			
Tiron spinifera	84	4/5	4

Table 28. The Gammarid Amphipods from PPB-100 Collected During OCS-2. 31 Species were represented in the 743 specimens.

Family	Mean Number/m^2	Frequency	Rank
Ampeliscidae			
Ampelisca eschricti	2	1/10	18
Byblis arcticus	3	2/10	17
Haploops setosa	1	1/10	19
Haploops tubicola	3	3/10	17
Argissidae			
Argissa hamatipes	2	2/10	18
Corophiidae			
Goesia depressa	9	7/10	13
Photis rheinhaldi	44	6/6	6
Photis vinogradova	64	8/10	3
Podoceropsis inequistylis	16	5/10	10
Podoceropsis lindhaldi	4	2/10	15
Protomedia fasciata	26	9/10	7
Unciola leucopis	204	10/10	1
Dexaminidae			
Guernea nordenskioldi	51	7/10	5
Eusiridae			
Rozinante fragilis	5	4/10	15
Gammaridae			
Maera danae	1	1/10	19
Haustoriidae			
Pontoporeia femorata	23	9/10	8
Ischyroceridae			
Ichyrocerus megalops	4	4/10	16
Lysianassidae			
Anonyx nugox	21	5/10	9
Hippomedon abyssi	62	9/10	4
Onisimus litoralis	4	4/10	15
Oedicerotidae			
Aceroides latipes	4	3/10	15
Bathymedon obtusifrons	15	4/10	11
Monoculodes diamesus	3	2/10	17
Monoculodes packardi	13	6/10	12
Perioculodes longimanus	2	2/10	18
Westwoodilla megalops	6	6/'10	14

Table 28. (cent.)

Family	Mean Number/m^2	Frequency	Rank
Phoxocephalidae			
Harpinia kobjakovae	3	2/10	17
Harpinia serrata	125	10/10	2
Paraphoxus oculatus	20	8/10	10
Pleustidae			
Pleusymtes karianus	2	2/10	18
Synopiidae			
Syrrhoe crenulata	1	1/10	19