



## **NOAA Technical Memorandum NMFS F/NWC-40**

### **An Atlas of Demersal Fish and Invertebrate Community Structure in the Eastern Bering Sea: Part 2, 1971-77**

**by Gary E. Waiters**

**February 1983**

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One of the major advantages of maintaining historic data in the biological sciences is the opportunity to examine aspects of temporal variability. The natural variability of biological systems is extremely important to our understanding. Annual resource assessment trawl surveys of the eastern Bering Sea have been conducted by the Northwest and Alaska Fisheries Center (NWAFC) since 1971. These surveys now provide the material for an examination of the community structure of Bering Sea demersal fish and macroinvertebrates. This study described the various patterns of community structure and their variability for the years 1978-81. The objectives of this study, using the NWAFC trawl survey data from the years 1971-77, are (1) to describe the major communities by their component species and associations, (2) to describe the geographic patterns of community organization, and (3) to extend the descriptions of these characteristics and their variability to the full time span for which data are available.

KEYWORDS: \*Marine fishes, \*Invertebrates, \*Ecology, \*Bering  
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AN ATLAS OF DEMERSAL FISH AND INVERTEBRATE COMMUNITY

STRUCTURE IN THE EASTERN BERING SEA:

PART 2, 1971-77

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## ABSTRACT

This report presents the results from the second of two studies using numerical classification, i.e., "cluster analysis," techniques to investigate the community structure of demersal fish and invertebrates in the eastern Bering Sea. Annual summer trawl survey data for the years 1971-77 were used to describe apparent habitat areas and species associations, and to examine interannual variability.

The results of the analyses for each year are presented as 1) a dendrogram summarizing the grouping relationships between trawling sites; 2) maps of these site groups at successively lower levels of dissimilarity; 3) lists of the species assemblages occurring at the site groups and their relative abundance; and 4) a dendrogram summarizing the relationships between species, based on the similarity of their geographic distributions.

Apparent habitat areas are described by the contiguous distribution of samples in the site groups which result from the analyses. The geographic distributions of some site groups were relatively constant features during the entire seven-year time period, while others showed considerable temporal variability.

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## INTRODUCTION

One of the major advantages of maintaining historic data in the biological sciences is the opportunity to examine aspects of temporal variability. The natural variability of biological systems is extremely important to our understanding.

Annual resource assessment trawl surveys of the eastern Bering Sea have been conducted by the Northwest and Alaska Fisheries Center (NWAFC) since 1971. These surveys now provide the material for an examination of the community structure of Bering Sea demersal fish and macroinvertebrates. Part 1 of this study (Walters and McPhail 1982) described the various patterns of community structure and their variability for the years 1978-81. The objectives of this study, using the NWAFC trawl survey data from the years 1971-77, are 1) to describe the major communities by their component species and associations, 2) to describe the geographic patterns of community organization, and 3) to extend the descriptions of these characteristics and their variability to the full time span for which data are available.

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## METHODS

The data sources, computer programs, and methods of analysis are fully described in Part 1 of this study (Walters and McPhail 1982). Briefly, the analysis is based on numerical classification techniques performed by a clustering program implemented on the Burroughs B7800 computer<sup>1/</sup> installed at the NWAFC. Trawling sites were selected from the data for each year to give complete and even geographic coverage of the area surveyed. A selected list of fish and macroinvertebrate taxa was derived from the total catch list based on consistent identification and the occurrence of each taxon in at least 1% of the trawling sites. The analysis was then conducted in two steps. First, the trawling sites of each survey were compared and clustered on the basis of the similarity of the quantitative catches (biomass) for each taxon. These site clusters were then examined graphically to determine the extent of their geographic association. Second, the species were compared and clustered on the basis of the similarity of their geographic distributions.

The only difference between the analyses for the years 1978-81 and this study, i.e., for the years 1971-77, was the selection of taxonomic categories. The data for the earlier years, particularly 1971-74, did not contain the same categories and details of species identification that were used in later years. For this reason, it was necessary to combine a number of species into higher taxonomic levels, usually genera (Table 1). For example, all species of snow (Tanner) crab were combined as Chionoecetes spp. for the years 1971:74. All shrimp species were also combined for those years. Some fish, such as members of the family Cottidae, were combined to genus or family levels. The total number of biological taxa included in the analyses for each year is given in Table 2.

Table 1. List of fish and invertebrates used in the cluster analyses, 1971-77  
Bering Sea surveys.

1/ Taxon	2/ Year						
	1971	1972	1973	1974	1975	1976	1977
<u>Fish</u>							
Agonidae							
<u>Agonus acipenserinus</u>	x	x	x	x	x	x	x
<u>Anoplagonus inermis</u>					x	x	x
<u>Ocella dodecaedron</u>			x	x			
<u>O. verrucosa</u>		x		x	x	x	x
<u>Sarritor frenatus</u>				x	x	x	
Unid. agonids		x	x	x	x	x	x
Ammodytidae							
<u>Ammodytes hexapterus</u>	x	x	x	x	x	x	x
Anoplopomatidae							
<u>Anoplopoma fimbria</u>	x		x	x	x	x	x
Bathymasteridae							
<u>Bathymaster signatus</u>			x	x	x	x	x
Unid. bathymasterids (2)			x				
Clupeidae							
<u>Clupea harengus pallasii</u>	x	x	x	x	x	x	x
Cottidae							
<u>Dasycottus setiger</u>	x	x	x	x	x	x	x
<u>Gymnocanthus</u> spp. (4)			x	x	x	x	x
<u>Hemilepidotus</u> spp. (3)			x	x	x	x	x
<u>H. jordani</u>	x	x	x	x	x	x	x
<u>Hemitripterus bolini</u>	x	x	x	x	x	x	x
<u>Icelus</u> spp. (6)					x	x	x
<u>Malacocottus kincaidi</u>						x	x
<u>Myoxocephalus</u> spp. (10)	x	x	x	x	x	x	x
<u>Triglops</u> spp. (6)	x	x	x	x	x	x	x
Unid. cottids	x	x	x	x	x	x	x
Cyclopteridae							
<u>Careproctus rastrinus</u>						x	x
<u>Eumicrotremus orbis</u>			x	x	x	x	x
Unid. cyclopterids	x	x	x	x	x	x	x
Gadidae							
<u>Eleginus gracilis</u>	x				x		x
<u>Microgadus proximus</u>			x				
<u>Gadus macrocephalus</u>	x	x	x	x	x	x	x
<u>Theragra chalcogramma</u>	x	x	x	x	x	x	x
Hexagrammidae							
<u>Hexagrammos</u> spp. (2)		x	x	x			x
<u>H. stelleri</u>					x	x	x
<u>Pleurogrammus monopterygius</u>	x	x	x	x	x	x	x

Table 1. (Continued).

1/ Taxon	2/ Year						
	1971	1972	1973	1974	1975	1976	1977
<u>Fish</u>							
Osmeridae							
<u>Mallotus villosus</u>	x	x	x	x	x	x	x
<u>Osmerus mordax</u>	x	x	x	x			
<u>Thaleichthys pacificus</u>	x	x	x	x	x	x	x
Unid. osmerids		x	x		x	x	
Pleuronectidae							
<u>Atheresthes spp. (2)</u>	x	x	x	x	x	x	x
<u>Glyptocephalus zachirus</u>	x	x	x	x	x	x	x
<u>Hippoglossoides elassodon</u>	x	x	x	x	x	x	x
<u>Hippoglossus stenolepis</u>	x	x	x	x	x	x	x
<u>Isopsetta isolepis</u>		x	x				x
<u>Lepidopsetta bilineata</u>	x	x	x	x	x	x	x
<u>Limanda aspera</u>	x	x	x	x	x	x	x
<u>L. proboscidea</u>	x	x	x	x	x	x	x
<u>Microstomus pacificus</u>	x		x	x			
<u>Platichthys stellatus</u>	x	x	x	x	x	x	x
<u>Pleuronectes quadrituberculatus</u>	x	x	x	x	x	x	x
<u>Reinhardtius hippoglossoides</u>			x	x	x	x	x
Rajidae							
<u>Raja spp. (11)</u>	x	x	x	x	x	x	x
Scorpaenidae							
<u>Sebastes aleutianus</u>				x			
<u>S. alutus</u>			x	x	x	x	
<u>S. crameri</u>							x
Stichaeidae							
<u>Delolepis-gigantea</u>						x	
<u>Lumpenella longirostris</u>	x		x	x			x
<u>Lumpenus maculatus</u>					x	x	
<u>L. sagitta</u>	x	x	x	x	x	x	x
Unid. stichaeids			x	x	x		
Trichodontidae							
<u>Trichodon trichodon</u>	x	x	x	x	x	x	x
Zoarcidae							
<u>Lycodes brevipes</u>	x	x	x	x	x		x
<u>L. palearis</u>	x	x	x	x	x	x	x
kid. zoarcids		x	x	x	x	x	x

Table 1. (Continued).

1/ Taxon	2/ Year					
	1971	1972	1973	1974	1975	1976 1977
<u>Invertebrates</u>						
Caridean shrimp						
<u>Argis</u> spp. (5)						x
<u>Cransonidae</u>					x	x x
<u>Pandalopsis dispar</u>						x
<u>Pandalus</u> spp. (4)					x	x x
Unid. carideans	x	x	x	x		
Anomuran crabs						
<u>Lithodes aequispina</u>			x			
<u>Paralithodes camtschatica</u>	x	x	x	x	x	x x
<u>P. platypus</u>	x		x	x	x	x x
Brachyuran crabs						
<u>Cancer magister</u>		x				
<u>C. productus</u>			x			
<u>Chionoecetes</u> (hybrid)					x	x x
<u>C. angulatus</u>						x
<u>c. bairdi</u>					x	x x
<u>C. opilio</u>					x	x x
<u>c. spp. (4)</u>	x	x	x	x		
<u>Erimacrus isenbeckii</u>	x	x	x	x	x	x x
<u>Hyas</u> spp. (2)	x	x	x	x	x	x x
<u>Oregonia gracilis</u>						x x
<u>Telmessus cheiragonus</u>					x	x x
Echinoderms						
<u>Echinarachnius parma</u>		x	x	x	x	x
<u>Gorgonocephalus caryi</u>	x	x	x	x	x	x x
<u>Strongylocentrotus droebachiensis</u>		x	x	x	x	x x

1/ Numbers in parentheses indicate the number of species possibly represented.

2/ Taxa that were included in each year's analysis are indicated by an x.

Table 2. Number of fish and invertebrate taxa used in the cluster analyses of Bering Sea survey data, 1971-77.

Year	Fish taxa	Invertebrate taxa	Total
1971	34	7	41
1972	36	9	45
1973	48	11	59
1974	47	9	56
1975	47	13	60
1976	47	15	62
1977	48	15	63

The sampling gear used during all years was a 400-mesh Eastern trawl (Wathne 1977) with a 32-mm mesh cod-end liner. However, the trawl doors used with these nets during the years 1971-76 were different from those used in 1977-81. Standard V-doors with dimensions of 1.52 x 2.13 m (5 x 7 ft) were used in the later years. From 1973 to 1976, the doors were 1.83 x 2.74 m (6 x 9 ft) and 200-400 lb of chain was also added to the footrope. Slightly, smaller doors measuring 1.68 x 2.59 m (5.5 x 8.5 ft) were used, without footrope weights, during 1971-72.

Information on the coverage of each survey, geographically and by depth, is given in Table 3.

As in Part 1, the emphasis in this preliminary study was site group classification. The results of species group classifications, showing species relationships based on the similarity of the distribution patterns, are presented as dendrograms without further analysis.



Table 3. Summary of Bering Sea trawl survey coverage, 1971-77.

Year	Total number of stations in survey	Total number of stations in analysis <sup>1/</sup>	Geographic area (km <sup>2</sup> )	Depth range (m)	Latitude	Longitude
1971	52	51	110,000	31-327	54°40'N to 58°41'N	160°18'W to 170°15'W
1972	103	99	82,000	37-327	54°38'N to 58°40'N	159°36'W to 167°05'W
1973	157	124	103,000	26-512	54°39'N to 58°00'N	158°58'W to 171°32'W
1974	198	176	155,000	31-331	54°37'N to 58°43'N	158°16'W to 172°32'W
1975	155	148	119,000	26-878	54°40'N to 58°01'N	158°20'W to 172°40'W
1976	186	124	104,000	27-305	54°41'N to 58°20'N	158°21'W to 172°34'W
1977	173	163	103,000	31-300	54°40'N to 58°41'N	158°19'W to 172°59'W

<sup>1/</sup> Some stations were excluded to give an approximately even sampling density or because of poor trawl performance.

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## RESULTS

The results are presented chronologically. For each year, a summary of the site group dendrogram is followed by a description of site group characteristics and maps showing the geographical distributions of the site groups at three levels of dissimilarity (only two levels are shown for the 1972 results). A dendrogram summarizing the relationships between species, based on similarity of distribution patterns, follows the maps of site groups. Descriptions of species assemblages associated with the various site groups, and their abundance relations, are given in Appendices A-G.

## Bering Sea Survey, 1971

Although the area covered by the 1971 survey was relatively large, the number of stations sampled was the smallest of the 1971-77 time series (Table 3). A large section of the central shelf was not sampled.

At a dissimilarity level of 0.60 (Level 11, the total area had two major components .(See Figures 1-5, Table 4, Appendix A). A central shelf group (Group 1) was dominated by yellowfin sole (Limanda aspera) and an outer shelf group (Group 2) had high densities of walleye pollock (Theragra chalcogramma). At Level 2 ( $D = 0.50$ ), both of these groups divided on a north-south basis. Both components of the central shelf group were dominated by yellowfin sole, but the northern group (Group 1B) also contained high densities of Alaska plaice (Pleuronectes quadrituberculatus) and snow crab. The southern central shelf group (Group 1A) was dominated by yellowfin sole, walleye pollock, and red king crab (Paralithodes camtschatica). The northern component of the outer shelf group (Group 2B) had high densities of snow crab, in addition to walleye pollock, and the southern outer shelf group (Group 2A) contained

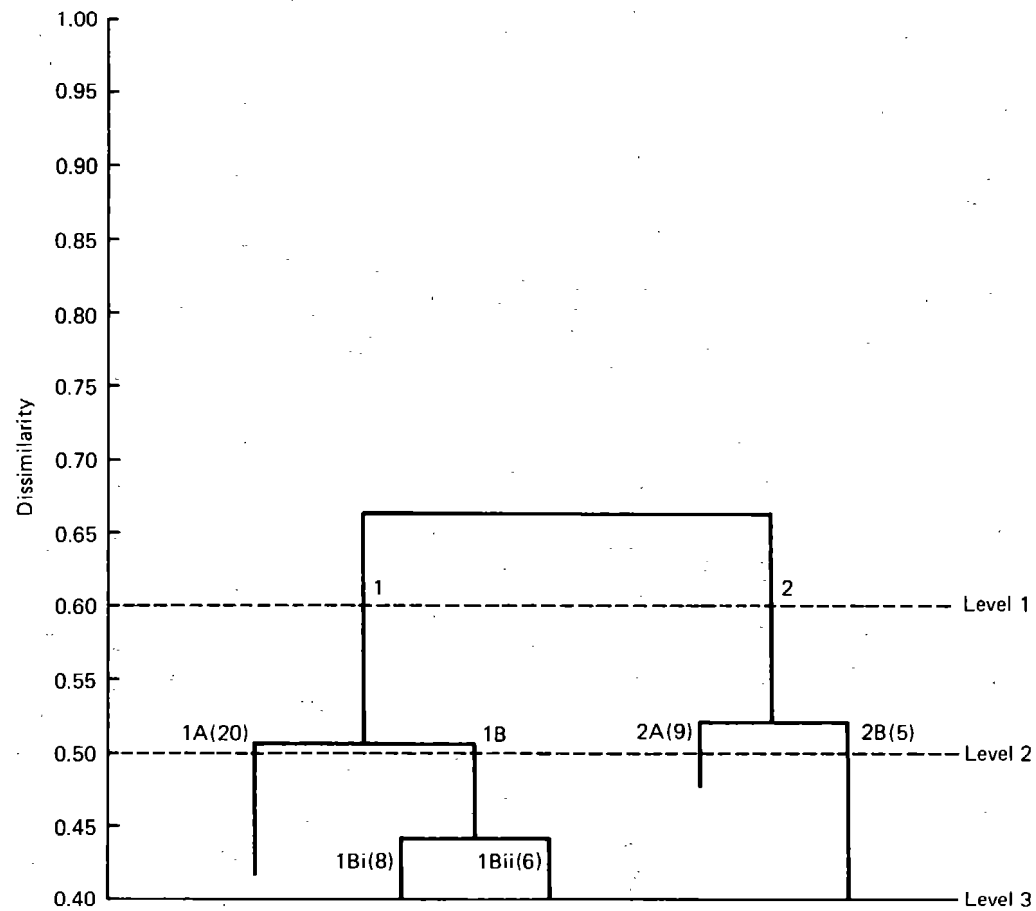


Figure 1. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, 1971 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.

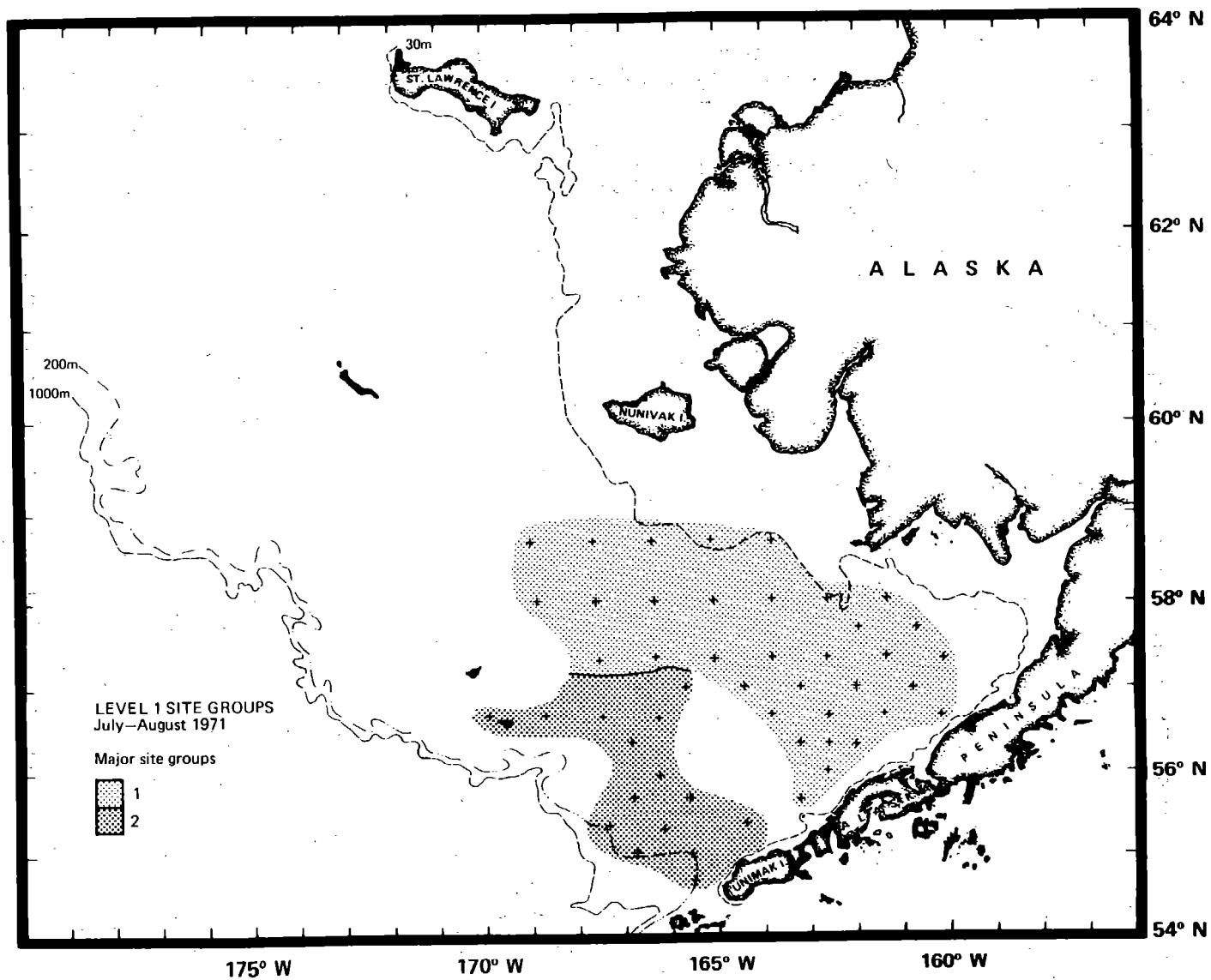


Figure 2. Map of level 1 site groups, -1971 Bering Sea trawl survey. Plus signs indicate sampling locations.

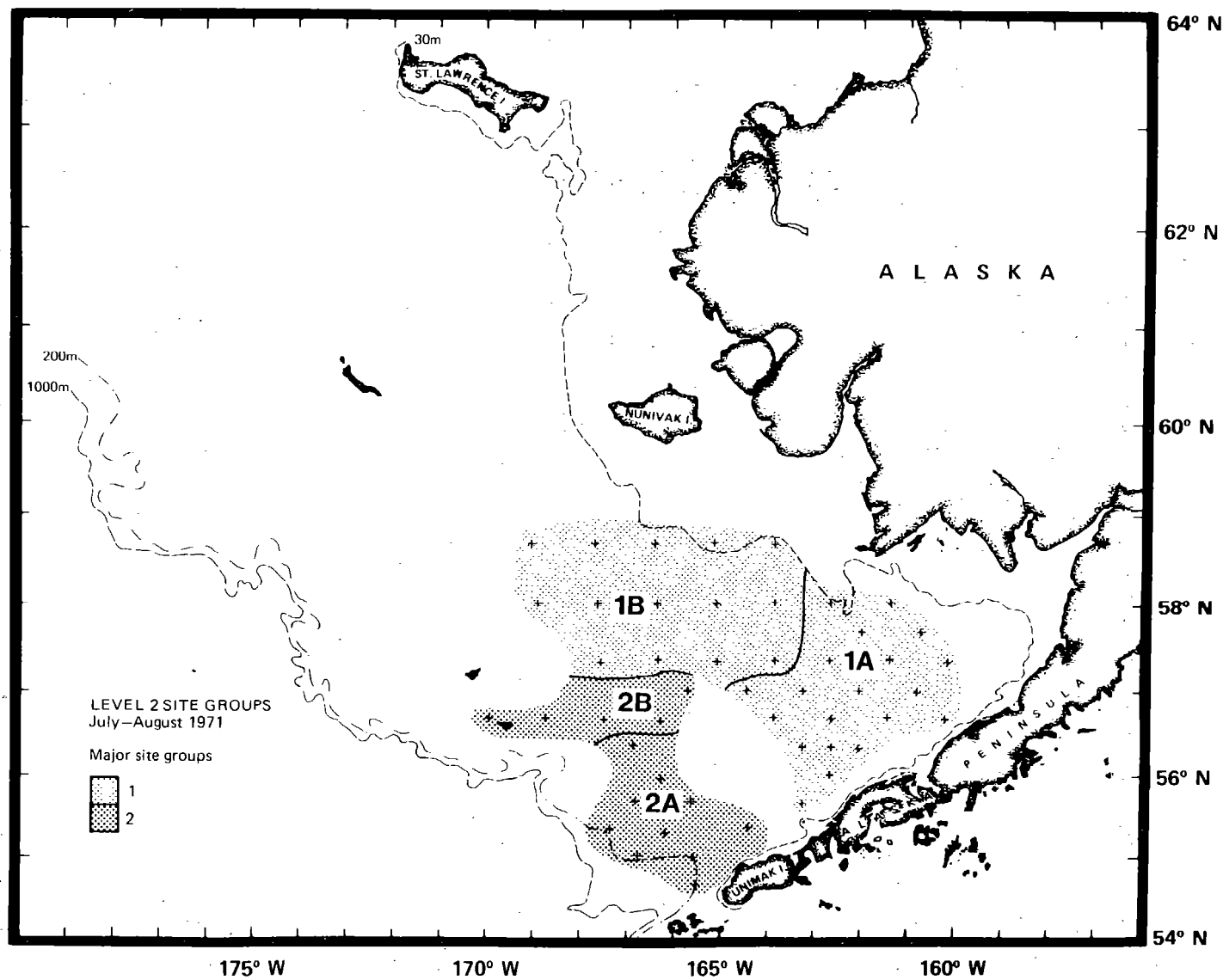


Figure 3. Map of level 2 site groups, 1971 Bering Sea trawl survey. Plus signs indicate sampling locations.

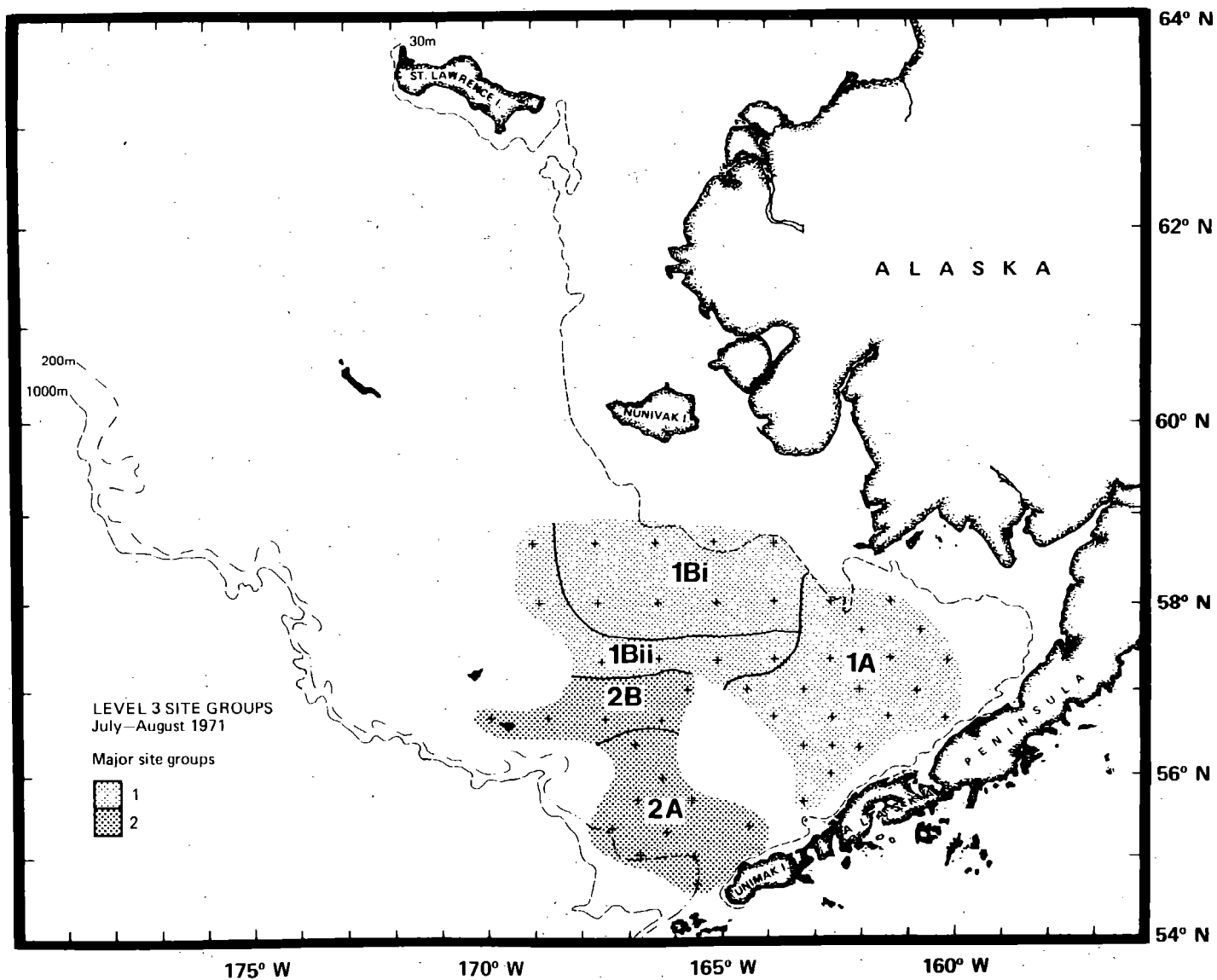


Figure 4. Map of level 3 site groups, 1971 Bering Sea trawl survey. Plus signs indicate sampling locations.

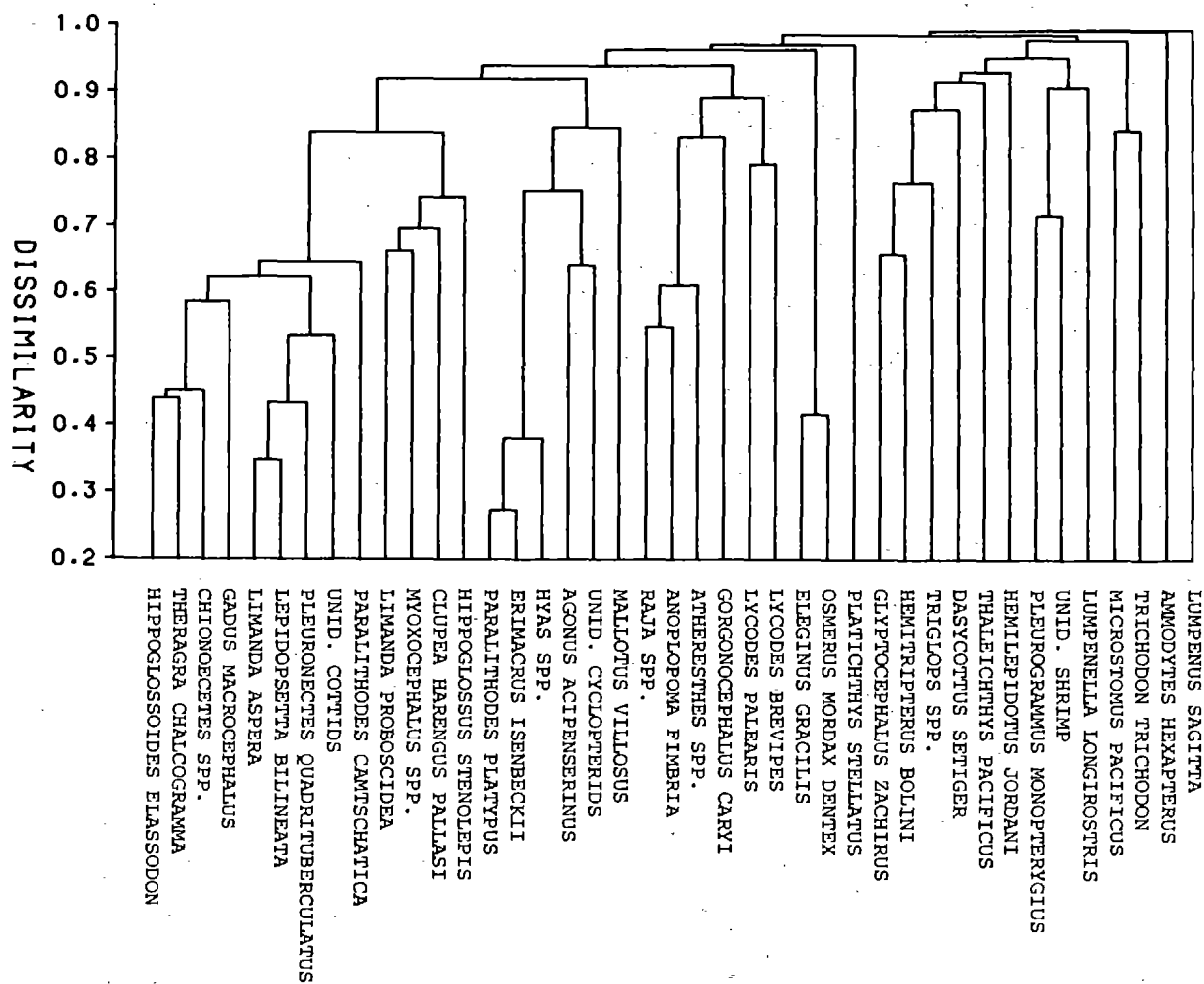


Figure 5. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1971 Bering Sea trawl survey.



Table 4. Summary of site group characteristics, 1971 Bering Sea survey.

Site group <sup>1/</sup>	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		mean	SD	range	
1	34	58.1	13.9	29-82	76.5
1A	20	61.6	13.7	37-82	72.2
1B	14	53.0	13.1	29-70	82.7
1Bi	8	45.0	11.5	29-64	64.3
1Bii	6	63.7	4.8	57-70	107.3
2	14	110.3	23.0	70-148	163.4
2A	9	123.2	16.5	95-148	230.8
2B	5	87.1	11.6	70-99	42.0

<sup>1/</sup> See Figure 1.

relatively high densities of flathead sole (Hippoglossoides elassodon). Further division of the north central shelf group occurred at the lowest level of dissimilarity, Level 3 ( $D = 0.40$ ).

#### Bering Sea Survey, 1972

The 1972 survey was the smallest of the time series in terms of area surveyed (Table 3). It also gave the most difficult results to interpret. At Level 1 ( $D = 0.70$ ), the highest level of dissimilarity, two major site groups were found (See Figures 6-9, Table 5, Appendix B). A central shelf group (Group 1) was dominated by yellowfin sole and an outer shelf group (Group 2) was dominated by walleye pollock. At the much lower level of dissimilarity, Level 2 ( $D = 0.50$ ), the central shelf group divided into a large southeast component (Group 1A) dominated by yellowfin sole and snow crab, and an unusual northern component dominated by yellowfin sole, asteroids, and cottids. At lower levels of dissimilarity the site groups broke into small, non-contiguous elements.

#### Bering Sea Survey, 1973

The 1973 survey extended farther east and west than the previous years and sampled a greater portion of the deep water shelf edge. At the 0.70 level of dissimilarity, Level 1, three groups were distinct (See Figures 10-14, Table 6, Appendix C). Group 1, occurring in the central shelf region and nearshore along the Alaska Peninsula, was dominated by yellowfin sole. High densities of snow crab, red king crab, asteroids, and rock sole (Lepidopsetta bilineata) were also present. An outer shelf group (Group 2) was dominated primarily by walleye pollock, Pacific cod (Gadus macrocephalus), and deep water species such as Pacific ocean perch (Sebastes alutus), flounders

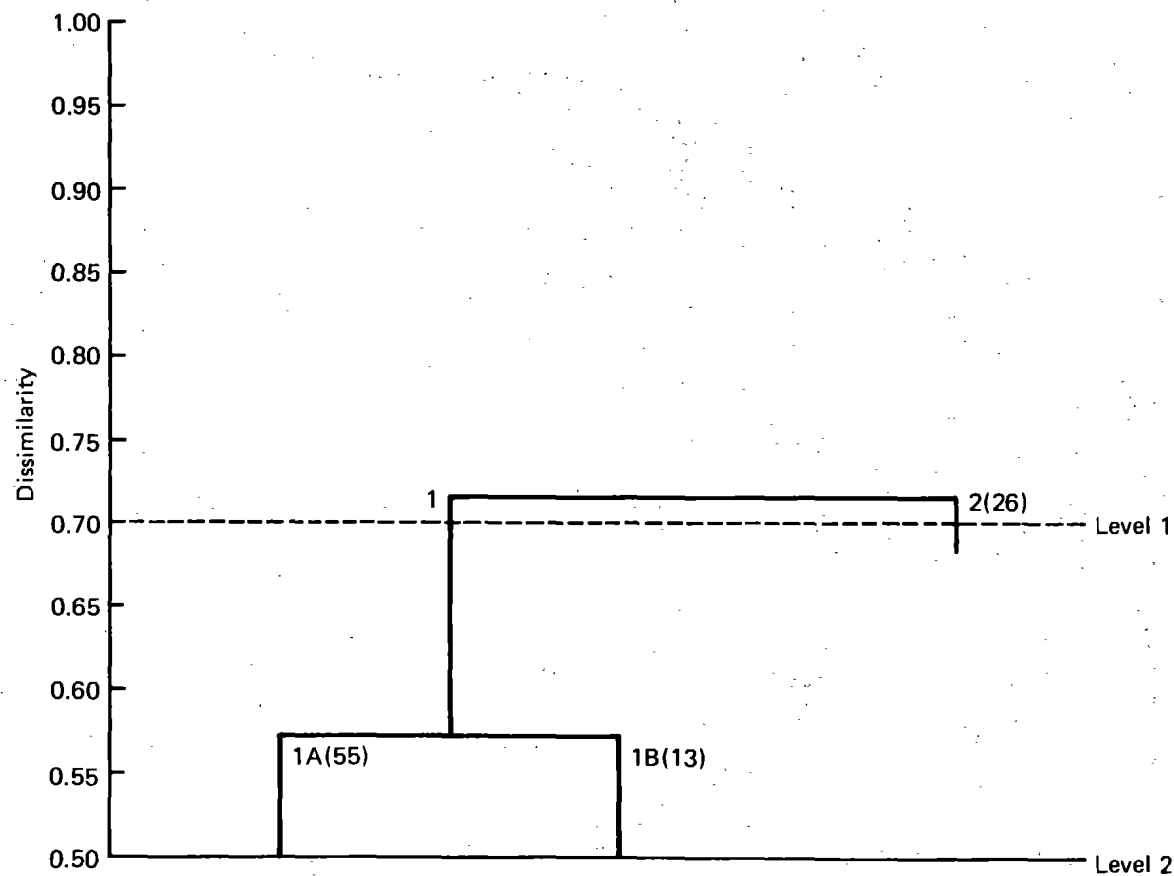


Figure 6. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, 1972 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.

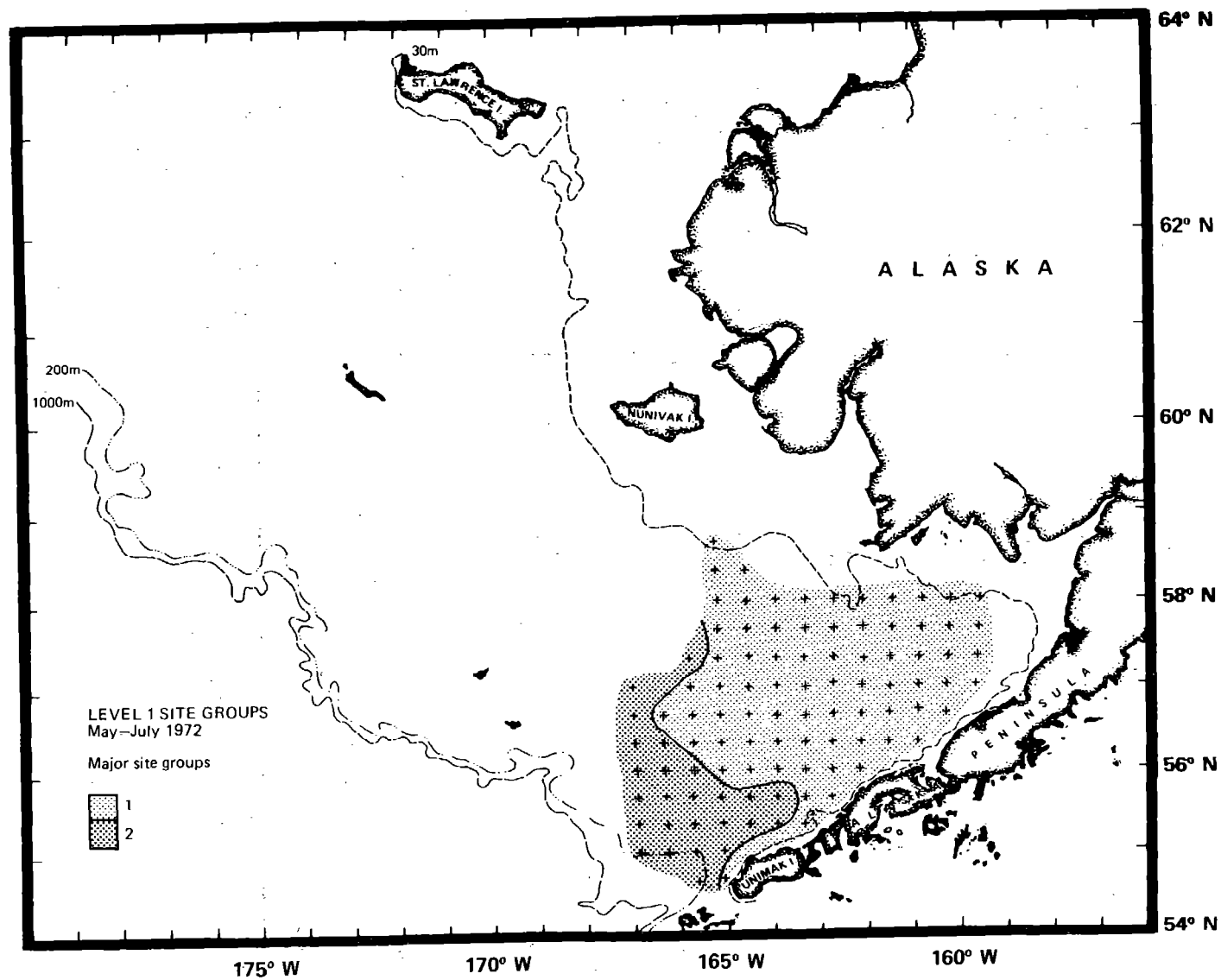


Figure 7. Map of level 1 site groups, 1972 Bering Sea trawl survey. Plus signs indicate sampling locations.

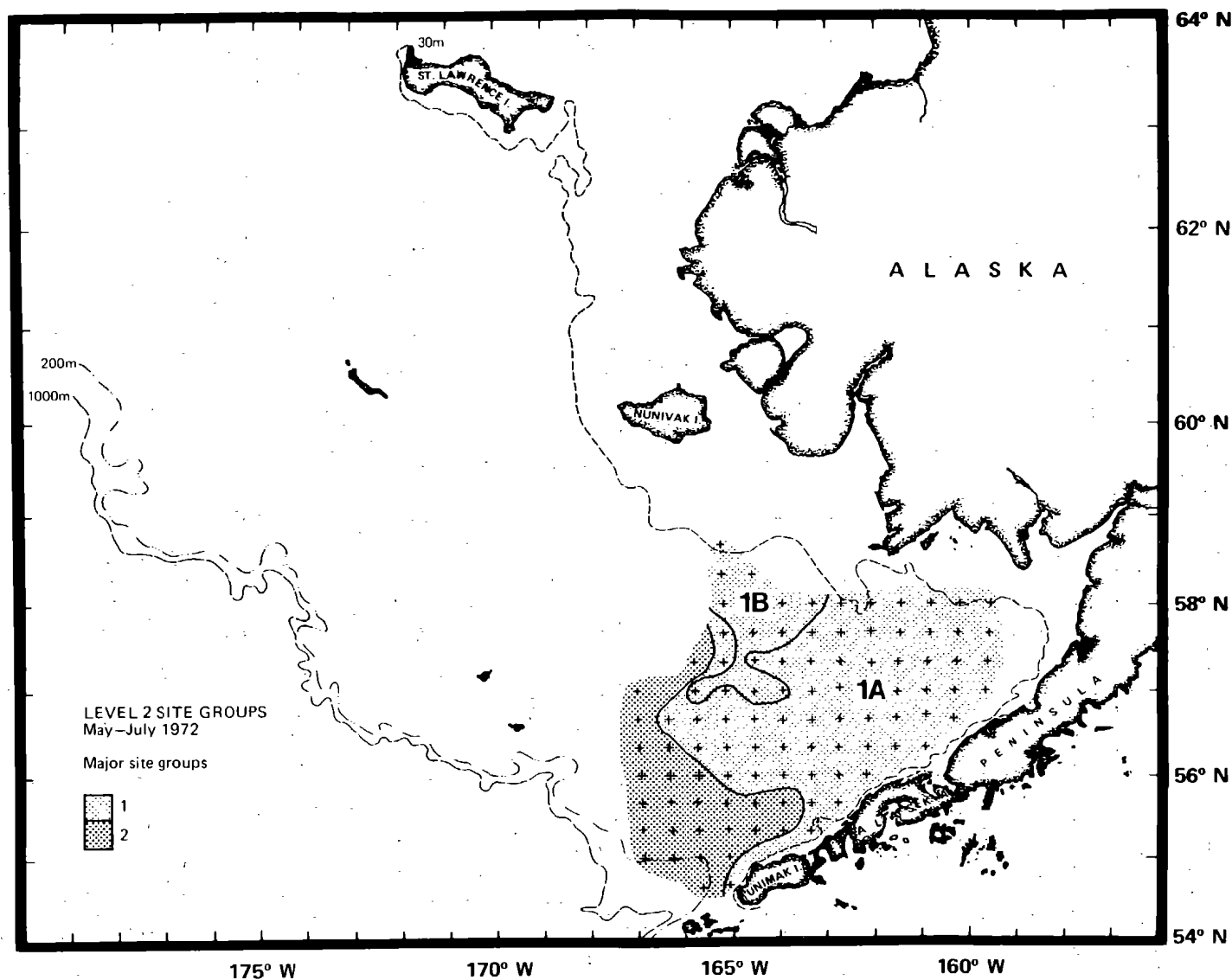


Figure 8. Map of level 2 site groups, 1972 Bering Sea trawl survey. Plus signs indicate sampling locations.

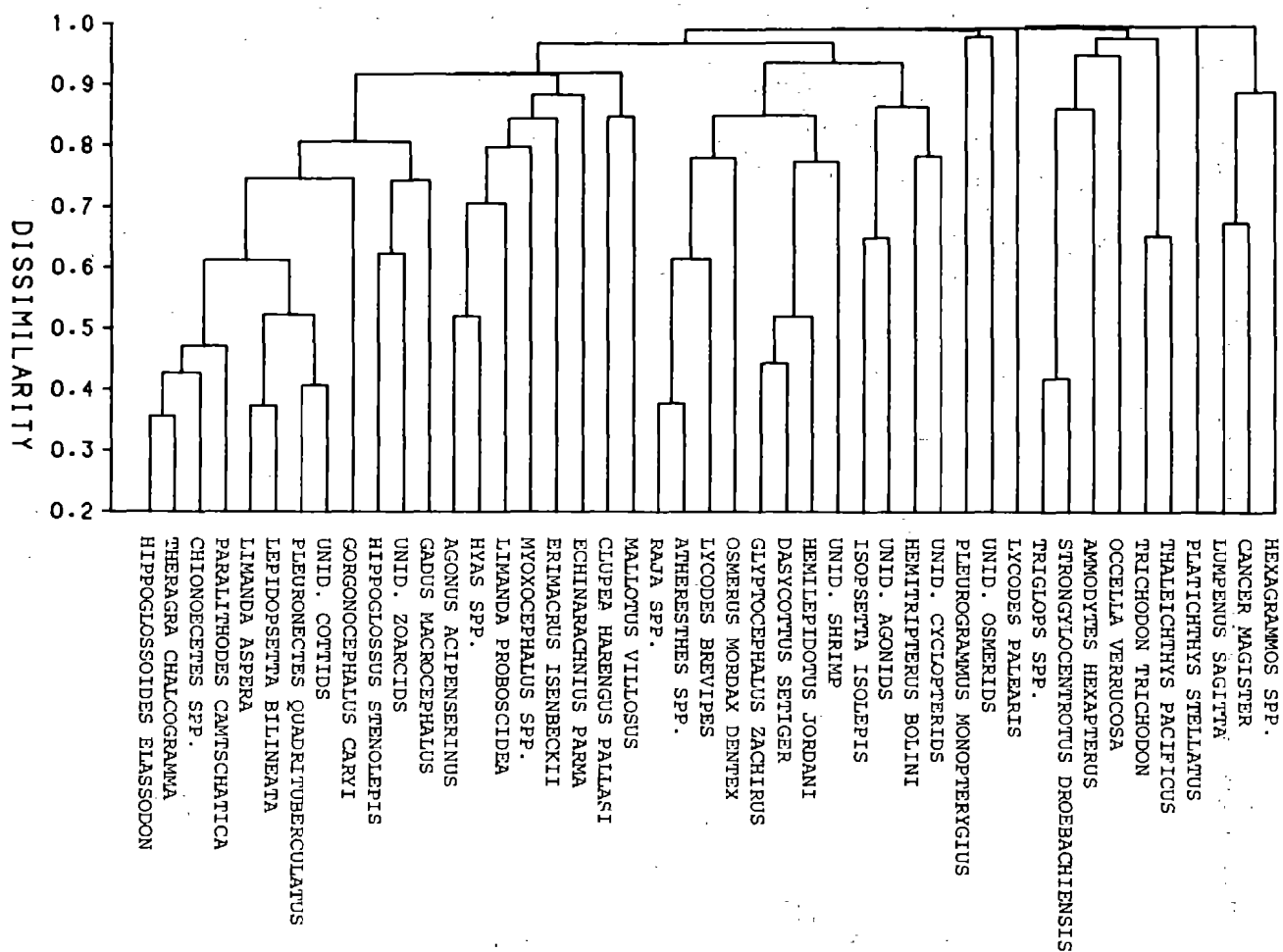


Figure 9. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1972 Bering Sea trawl survey.

Table 5. Summary of site group characteristics, 1972 Bering Sea survey.

Site group <sup>1/</sup>	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		mean	SD	range	
1	69	61.8	17.2	29-97	61.9
1A	55	64.1	17.0	35-97	69.3
1B	13	50.8	13.7	29-75	27.6
2	26	119.2	49.6	48-326	86.7

<sup>1/</sup> See Figure 6.

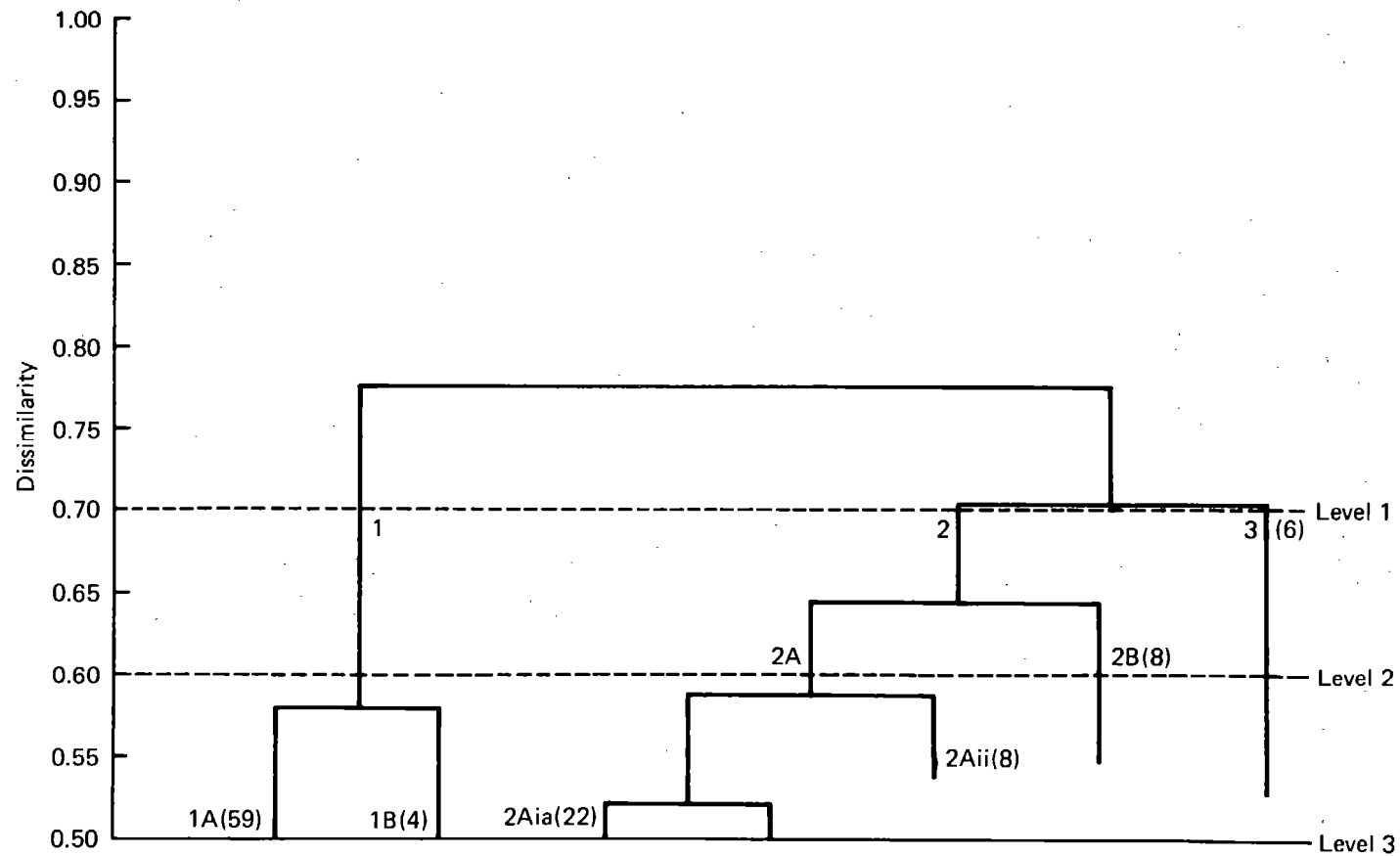


Figure 10. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, 1973 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.



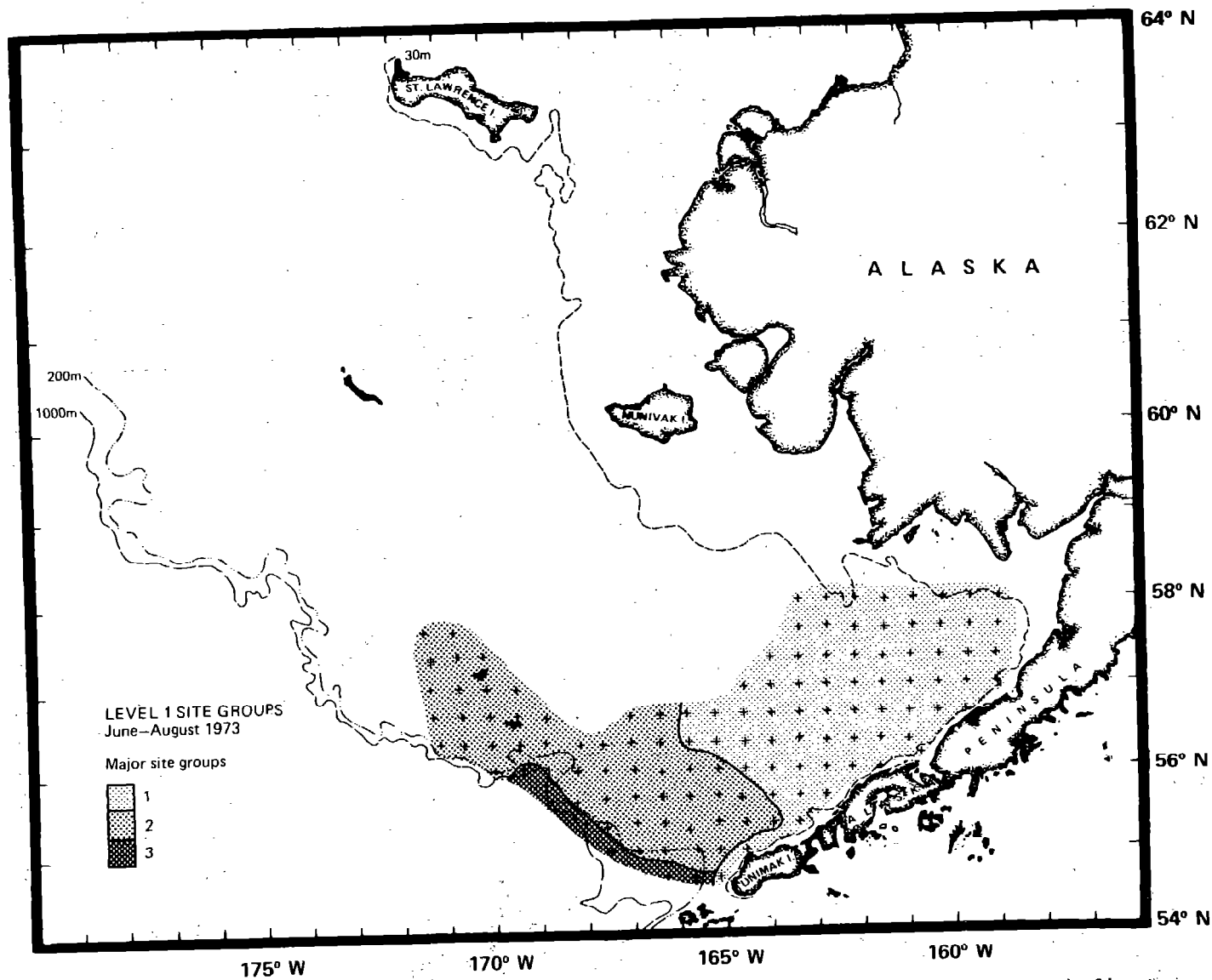


Figure 11. Map of level 1 site groups, 1973 Bering Sea trawl survey. Plus signs indicate sampling locations.

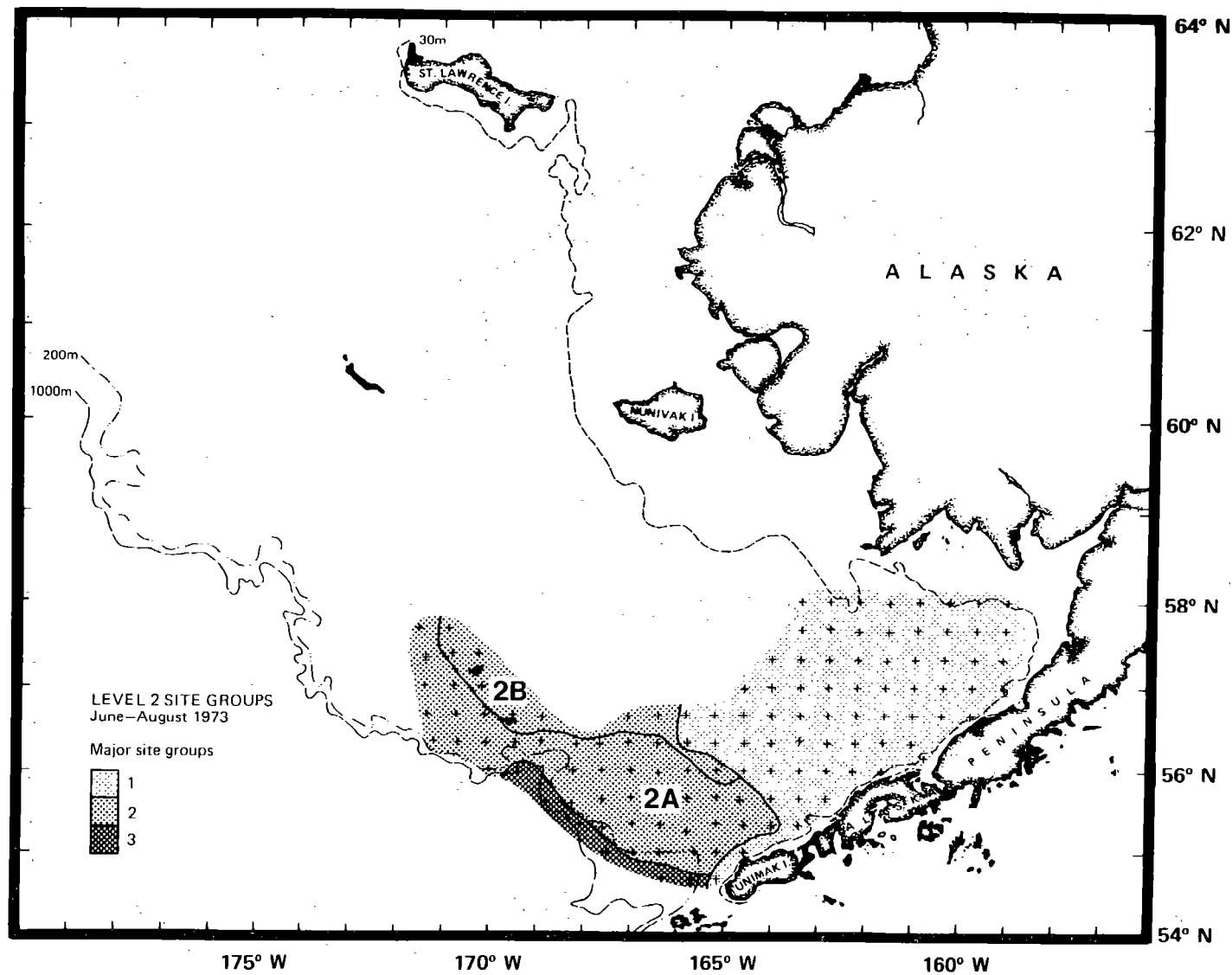


Figure 12. Map of level 2 site groups, 1973 Bering Sea trawl survey. Plus signs indicate sampling locations.

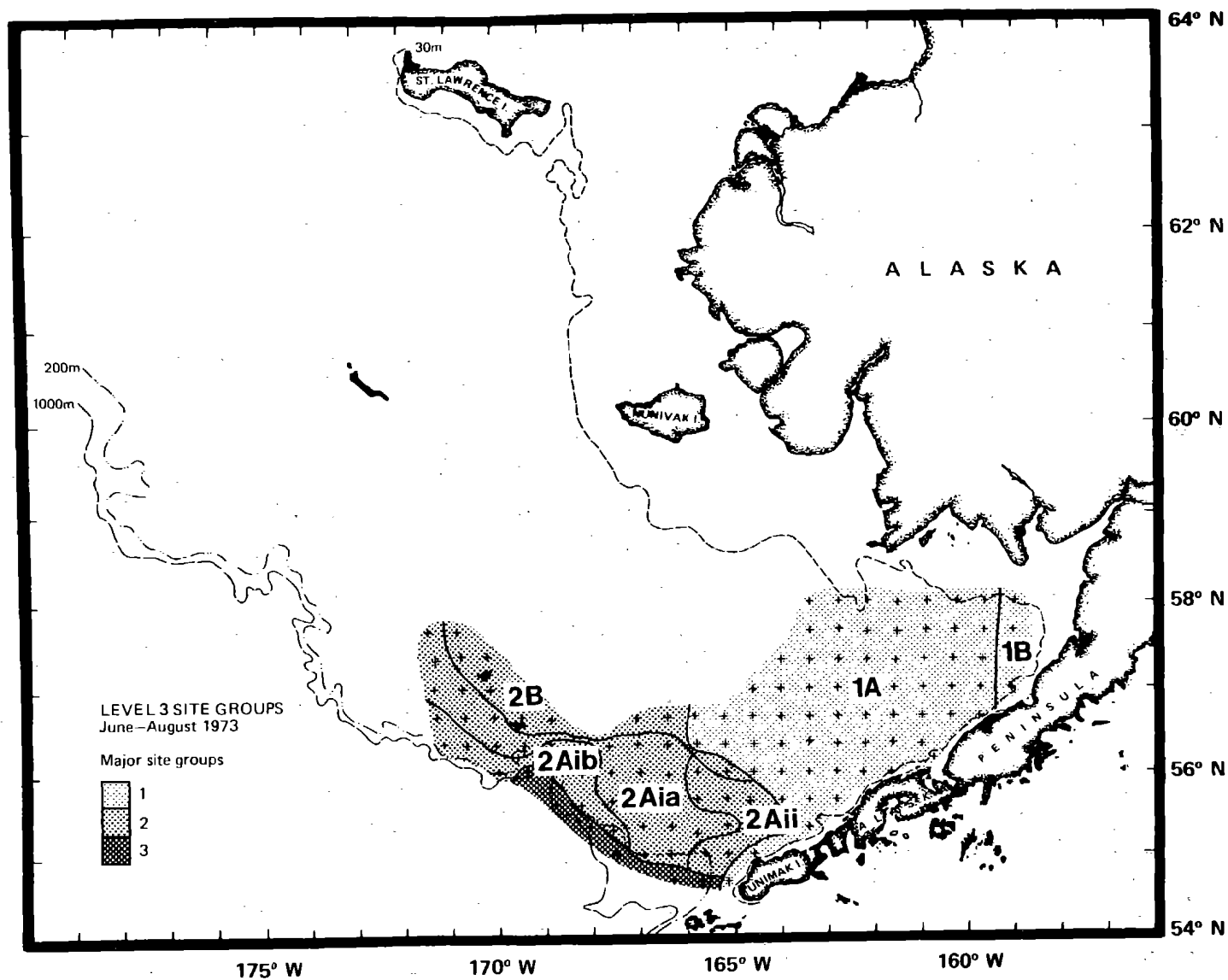


Figure 13. Map of level 3 site groups, 1973 Bering Sea trawl survey. Plus signs indicate sampling locations.

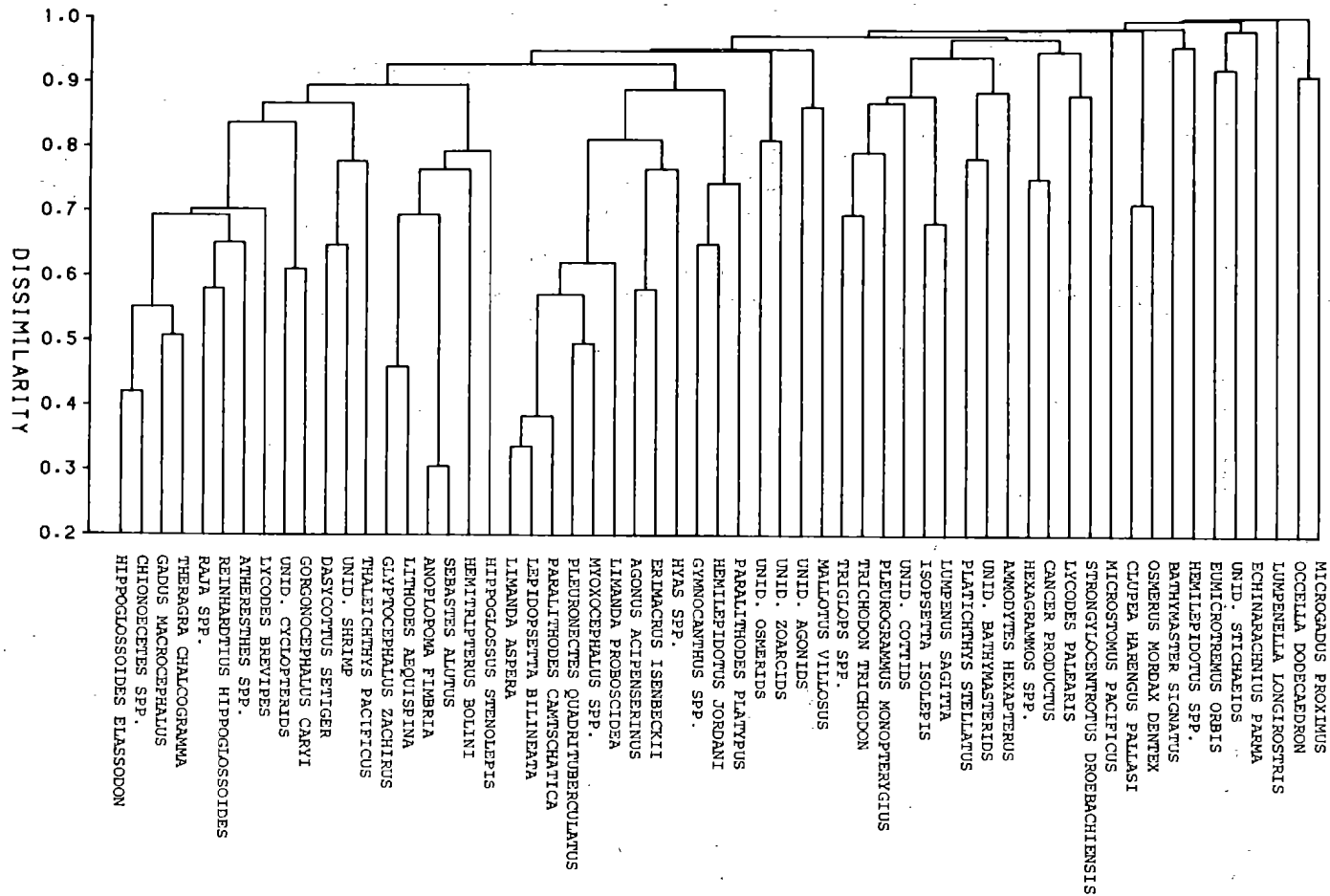


Figure 14. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1973 Bering Sea trawl survey.

Table 6. Summary of site group characteristics, 1973 Bering Sea survey.

Site group <sup>1/</sup>	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		mean	SD	range	
1	63	60.3	16.4	29-90	181.6
1A	59	61.7	15.8	29-90	186.7
1B	4	38.9	7.2	33-48	106.4
2	49	112.2	23.9	55-157	111.9
2A	39	118.5	18.1	66-150	129.8
2Ai	31	122.9	16.1	88-150	107.3
2Aia	22	119.4	16.8	88-150	77.4
2Aib	9	131.5	10.6	117-143	180.6
2Aii	8	101.5	16.1	66-121	216.7
2B	8	83.0	13.6	60-101	43.4
3	6	311.2	85.0	260-476	86.8

<sup>1/</sup> See Figure 10.

(Atheresthes spp.), and Greenland turbot (Reinhardtius hippoglossoides). At Level 2 ( $D = 0.601$ , the intermediate level of dissimilarity, the outer shelf group divided into a Pribilof Islands group (Group 2B) and a main outer shelf group (Group 2A). The Pribilof Islands group was dominated by snow crab and the main outer shelf group was characterized by high densities of walleye pollock. At Level 3, the lowest level of dissimilarity ( $D = 0.501$ , a small, inner Bristol Bay component (Group 1B) was split off from the central shelf group. This small distinct group was dominated by asteroids, ascidians, and red king crab. The main portion of the outer shelf group (Group 2A) divided into three components in a general east-west pattern. All of these were dominated by walleye pollock but had different incidental species.

#### Bering Sea Survey, 1974

The 1974 survey was the largest, both in terms of area covered and number of samples, for the 1971-77 time period (Table 3). Two major site groups were formed at a dissimilarity level of 0.65, Level 1 (See Figures 15-19, Table 7, Appendix D). A large central and inner shelf group (Group 1) was dominated by yellowfin sole, snow crab, asteroids, rock sole, and red king crab. An outer shelf group (Group 2) was dominated primarily by walleye pollock. At Level 2 ( $D = 0.601$ , the central and inner shelf group divided into three components. The inner shelf group (Group 1Ai) also included the Pribilof Islands. This group was characterized by a particularly high density of yellowfin sole. A north-central shelf group (Group 1Aii) was dominated by a mixed assemblage that included asteroids, yellowfin sole, Alaska plaice, and cottids (Myoxocephalus spp.). A central shelf group (Group 1B) was dominated by snow crab. At Level 3 ( $D = 0.551$ , the north-central group split and the outer shelf group divided into a central component (Group 2B), bounded on the north

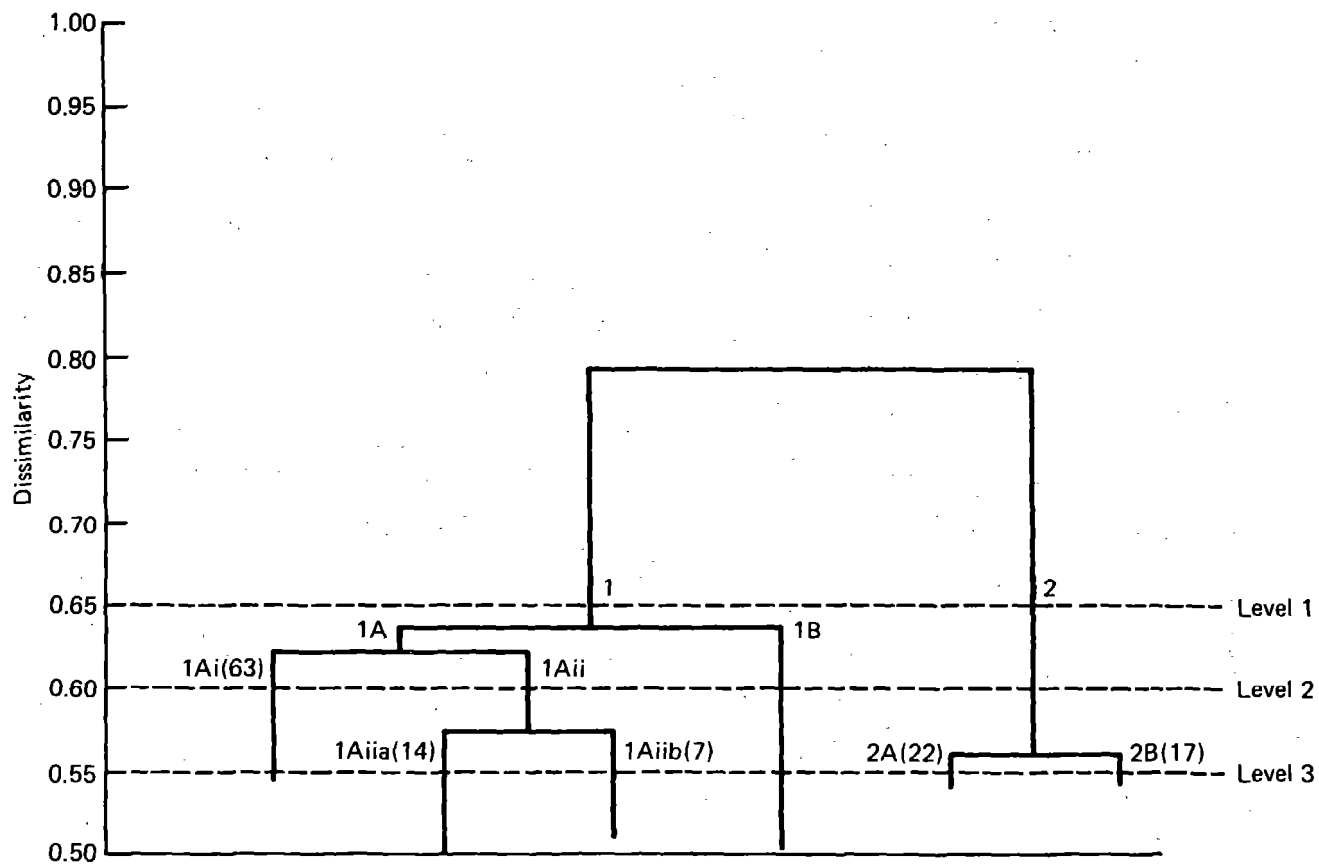


Figure 15. Schematic dendrogram showing the major site groups (areas of similar: species composition) and their relationships at different levels of dissimilarity, 1974 Bering sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.

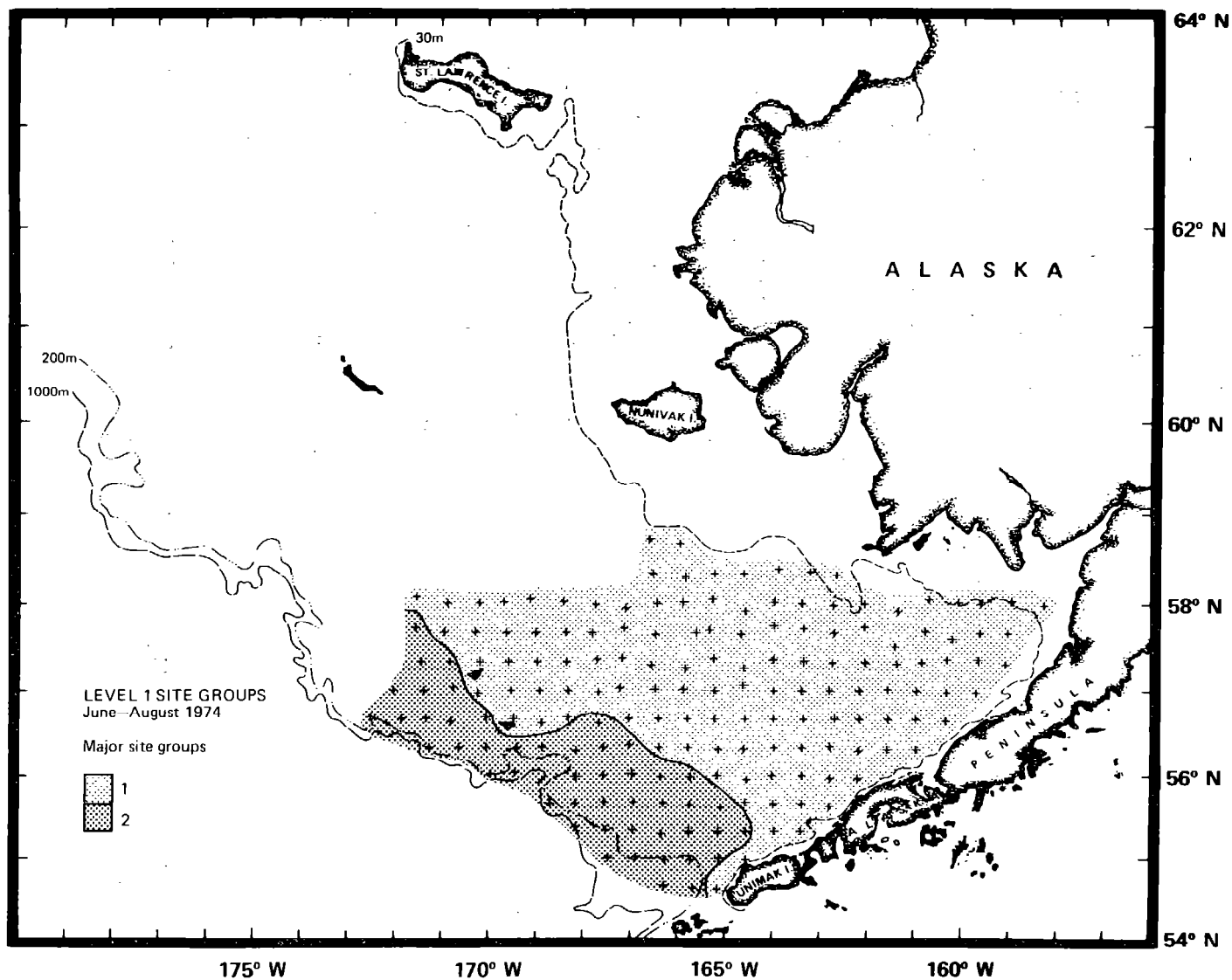


Figure 16 Map of level 1 site groups, 1974 Bering Sea trawl survey. Plus signs indicate sampling locations.



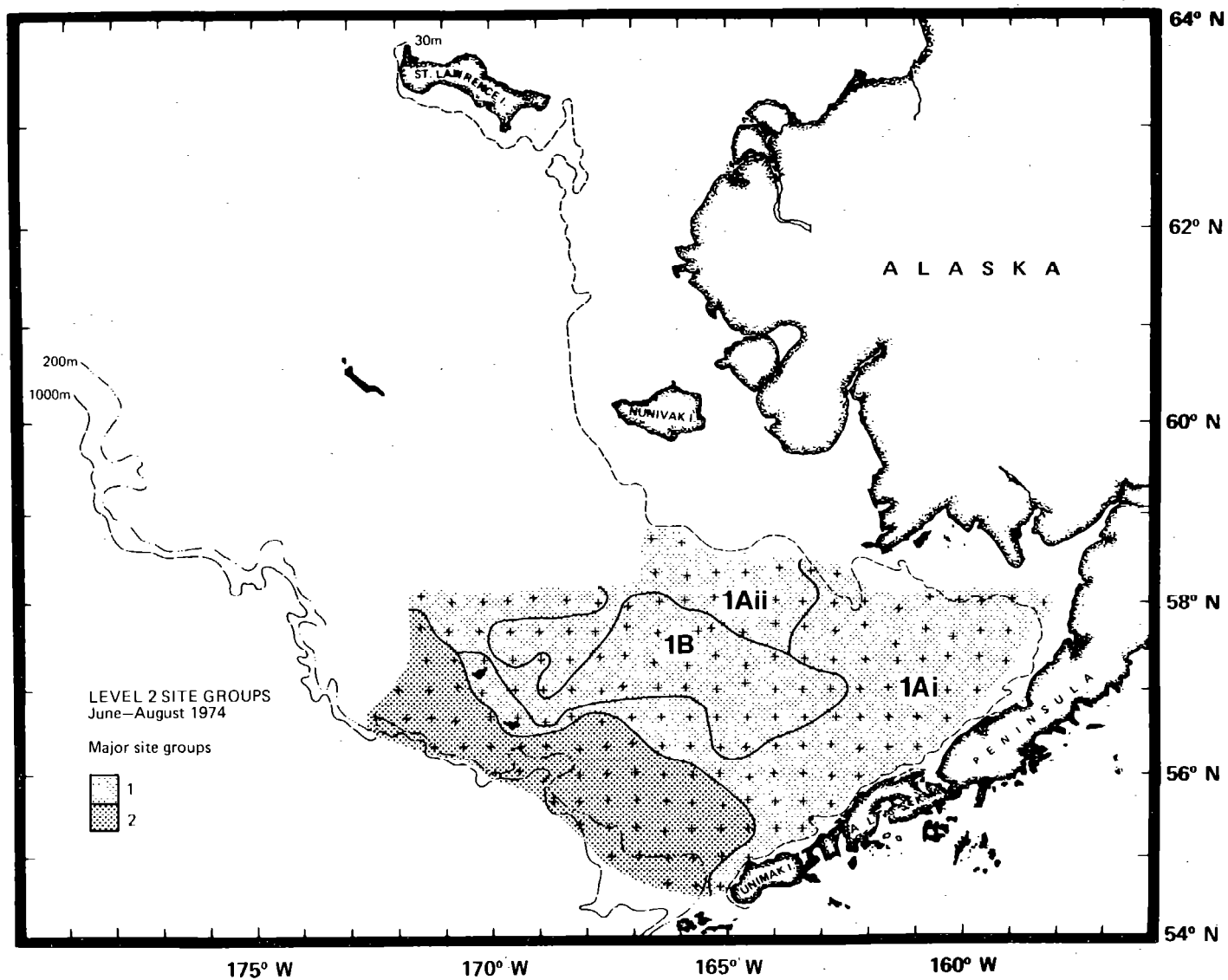


Figure 17. Map of level 2 site groups, 1974 Bering Sea trawl survey. Plus, signs indicate sampling locations.

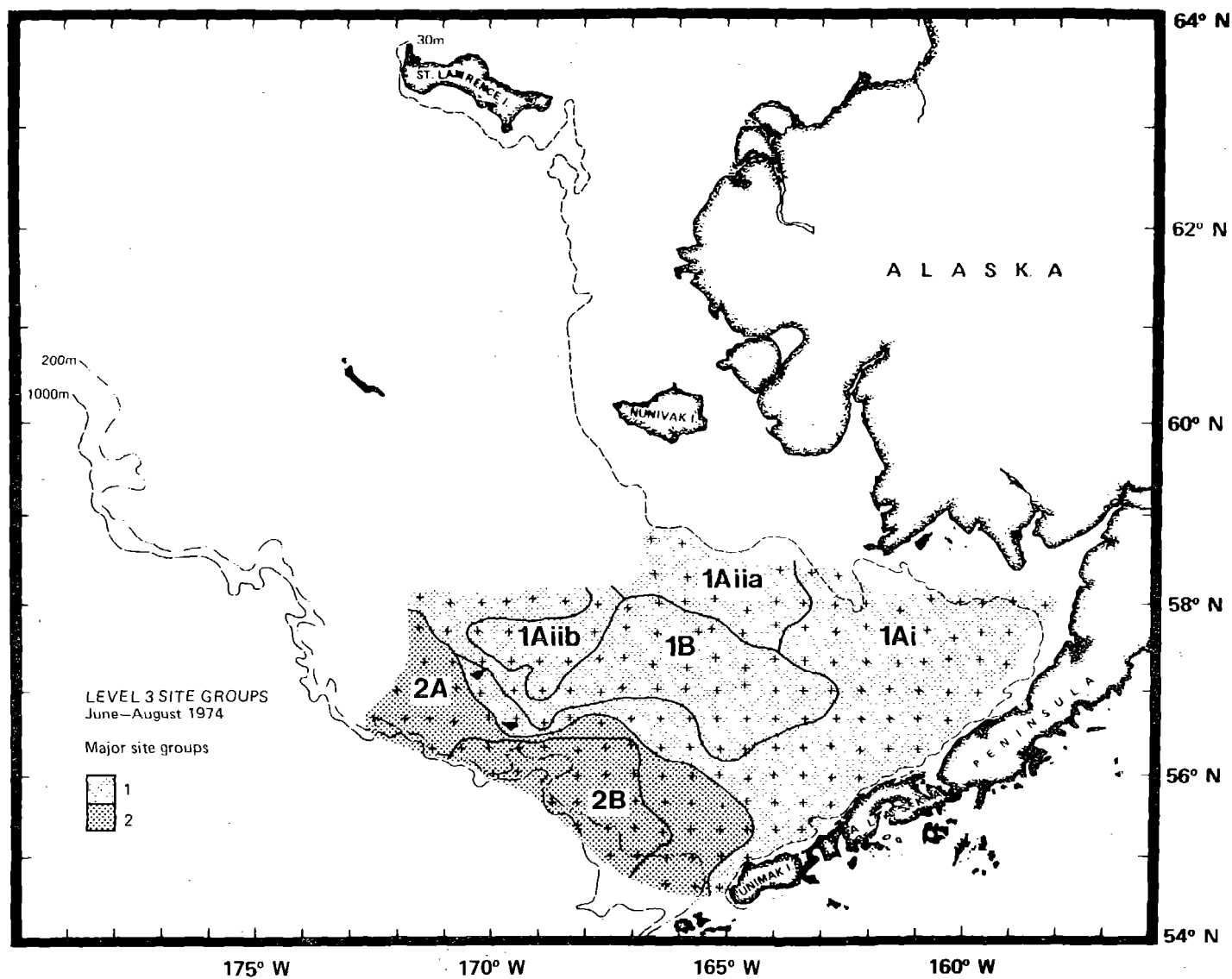


Figure 18. Map of level 3 site groups, 1974 Bering Sea trawl survey. Plus signs indicate sampling locations.

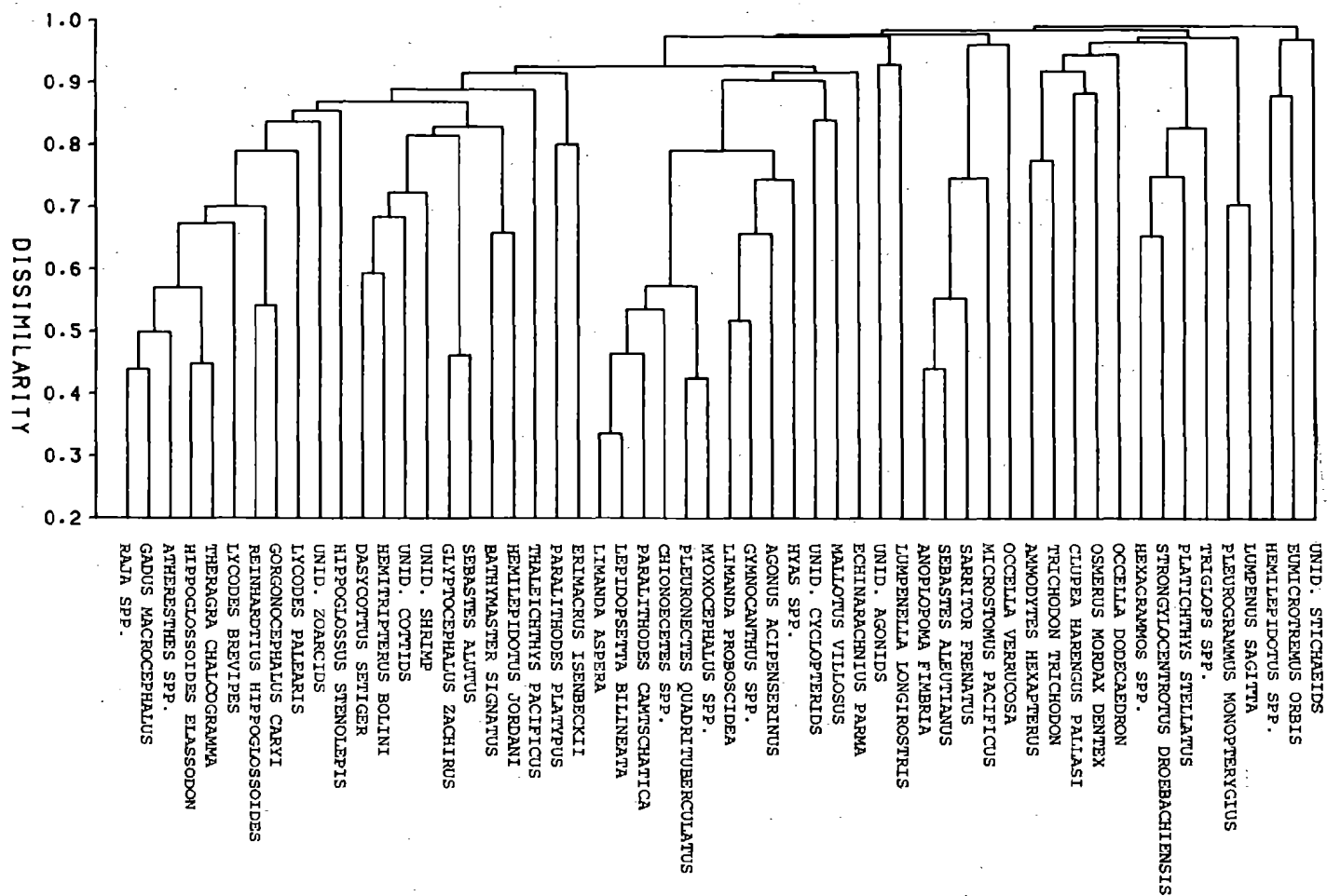


Figure 19. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1974 Bering Sea trawl survey.

Table 7. Summary of site group characteristics, 1974 Bering Sea survey.

Site group <sup>1/</sup>	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		mean	SD	range	
1	128	62.5	18.0	29-132	161.5
1A	84	58.2	18.5	29-101	194.3
1Ai	63	60.9	19.4	29-101	237.0
1Aii	21	50.1	12.8	35-75	66.3
1Aiaa	14	41.8	3.9	35-48	75.4
1Aiib	7	66.6	5.5	57-75	48.0
1B	36	71.7	14.0	53-132	102.8
2	39	121.0	27.7	77-252	181.0
2A	22	108.1	14.4	77-137	174.2
2B	17	137.8	32.0	106-252	189.7

<sup>1/</sup> See Figure 15.

and south by Group 2A. Both of these outer shelf groups were dominated by walleye pollock. However, the pollock were accompanied primarily by flathead sole in the central shelf edge group and snow crab to the north and south.

#### Bering Sea Survey, 1975

At the dissimilarity level 0.60 (Level 1), two major site groups were shown (See Figures 20-24, Table 8, Appendix E). A central and inner shelf group (Group 1) was dominated by yellowfin sole and the snow crab, Chionoecetes opilio. A major outer shelf group, Group 2, was dominated by walleye pollock and two species of snow crab, C. opilio and C. bairdi.

At Level 2 ( $D = 0.501$ ), an inner shelf area was differentiated from the central shelf group, and each of these areas also divided into two additional components. The main, inner shelf group (Group 1Ai) was dominated by yellowfin sole. The nearshore, Alaska Peninsula group (Group 1Aii) had even higher densities of yellowfin sole, as well as high densities of asteroids and red king crab. The central shelf group was further divided by the formation of a Pribilof Islands group (Group 1Bii), dominated by blue king crab (Paralithodes platypus), and a group formed on the remainder of the central shelf (Group 1Bi) with very high densities of C. opilio. The outer shelf group (Group 2) divided into a northwest group (Group 2B) and two small southeast outer shelf groups (Groups 2Ai and 2Aii). The northwest group was dominated by C. opilio and walleye pollock. Group 2Aii was dominated by approximately equal densities of walleye pollock, C. bairdi, and yellowfin sole. This site group appeared to be a transition area between the central and outer shelf groups. The effects of deep water on the species composition of site group 2Ai were shown by the dominance of wattle eelpout (Lycodes palearis), flathead sole, and the basket starfish (Gorgonocephalus caryi). Further divisions of the inner shelf group

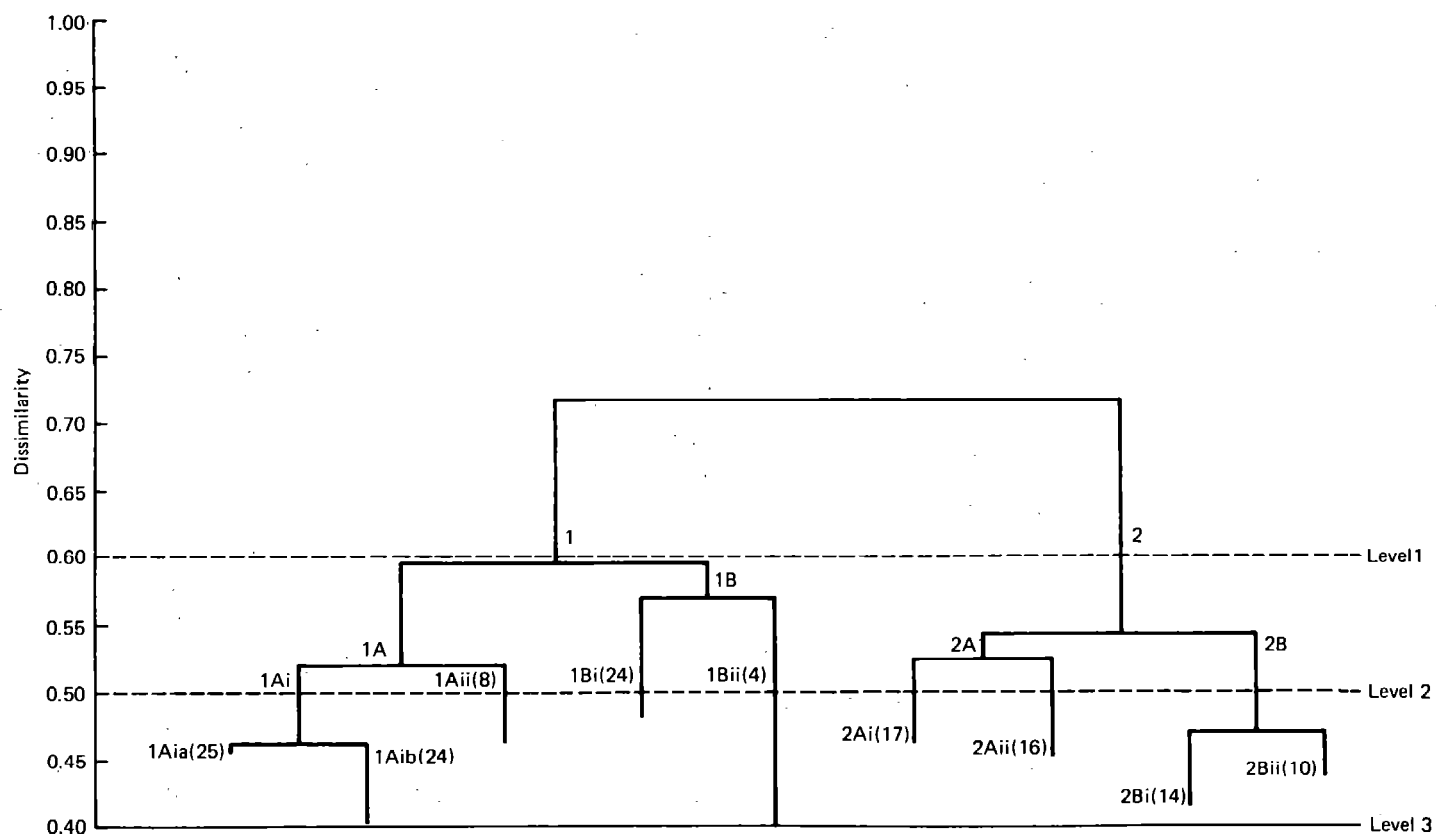


Figure 20. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, 1975 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number, of stations.

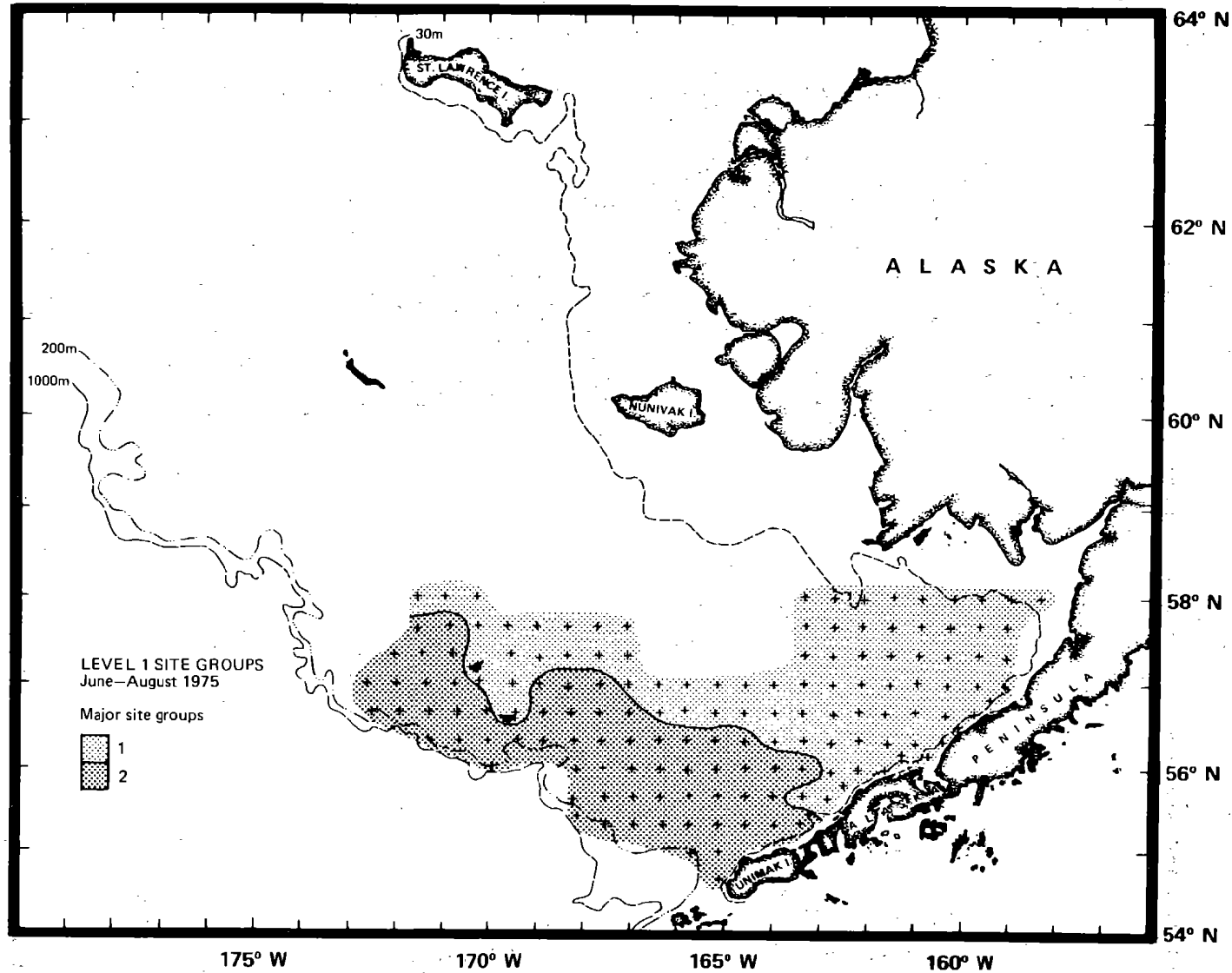


Figure 21. Map of level 1 site groups, 1975 Bering Sea trawl survey. Plus signs indicate sampling locations.

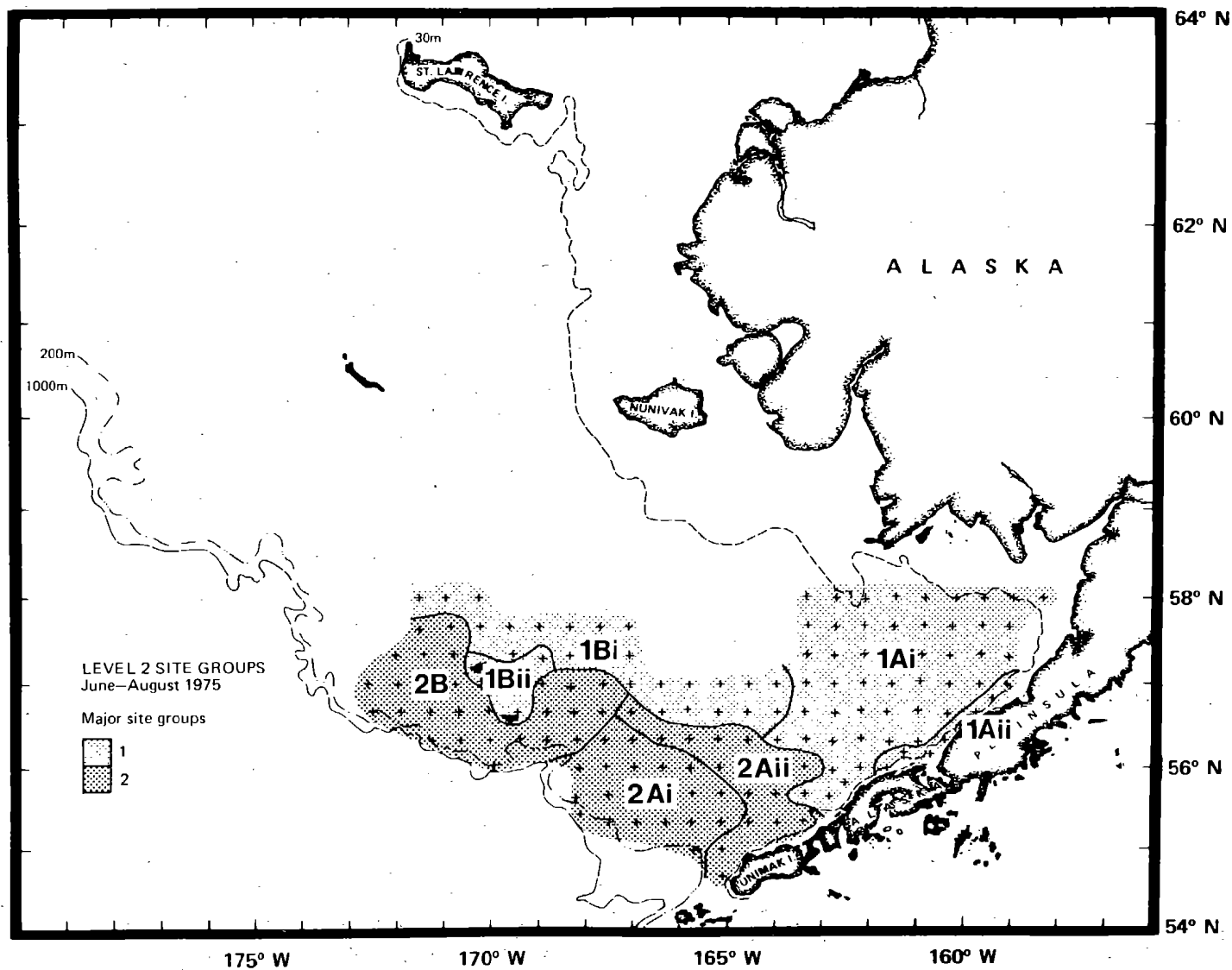


Figure 22. Map of level 2 site groups, 1975 Bering Sea trawl survey. Plus signs indicate sampling locations.



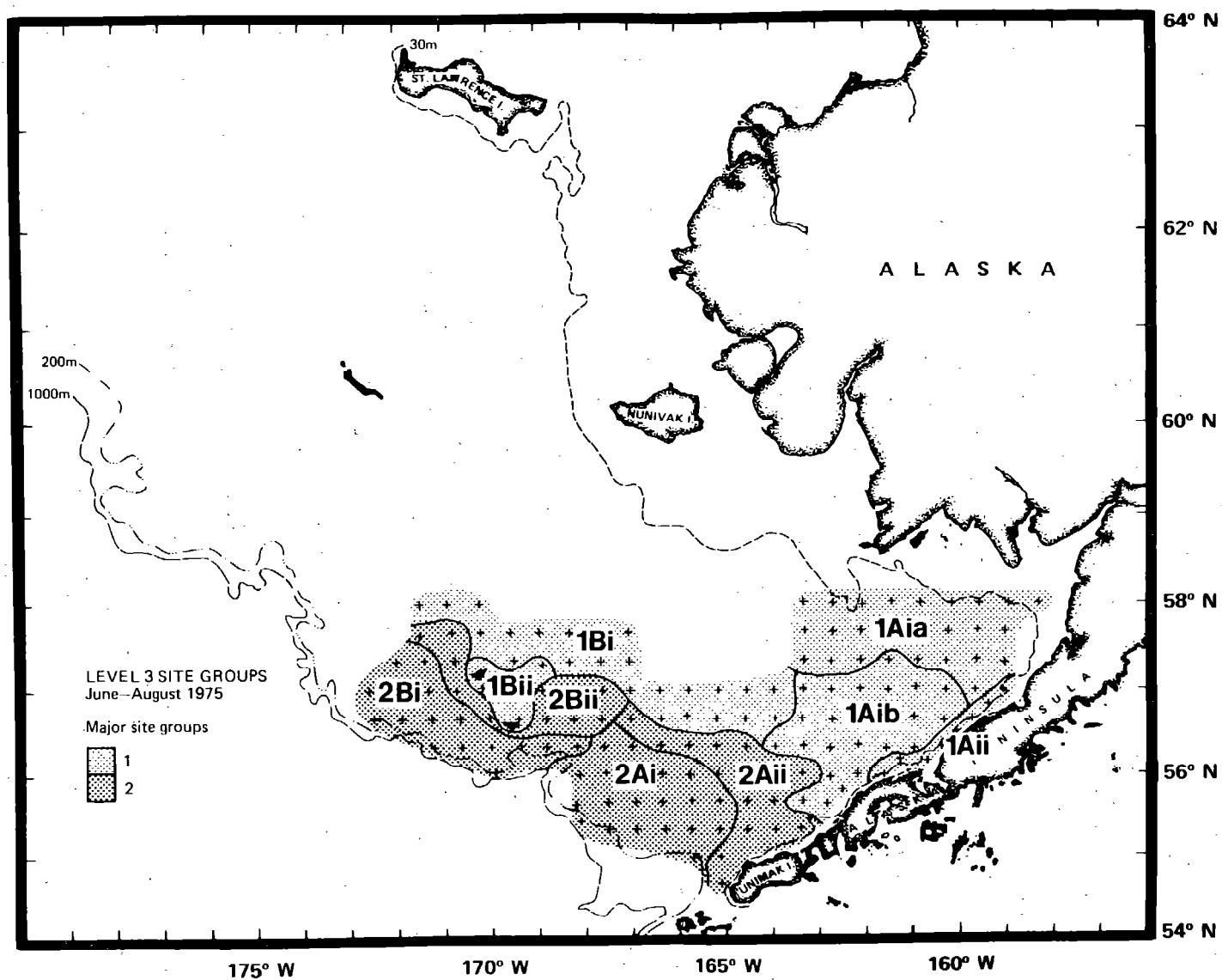


Figure 23. Map of level 3 site groups, 1975 Bering sea trawl survey. plus signs indicate sampling locations.

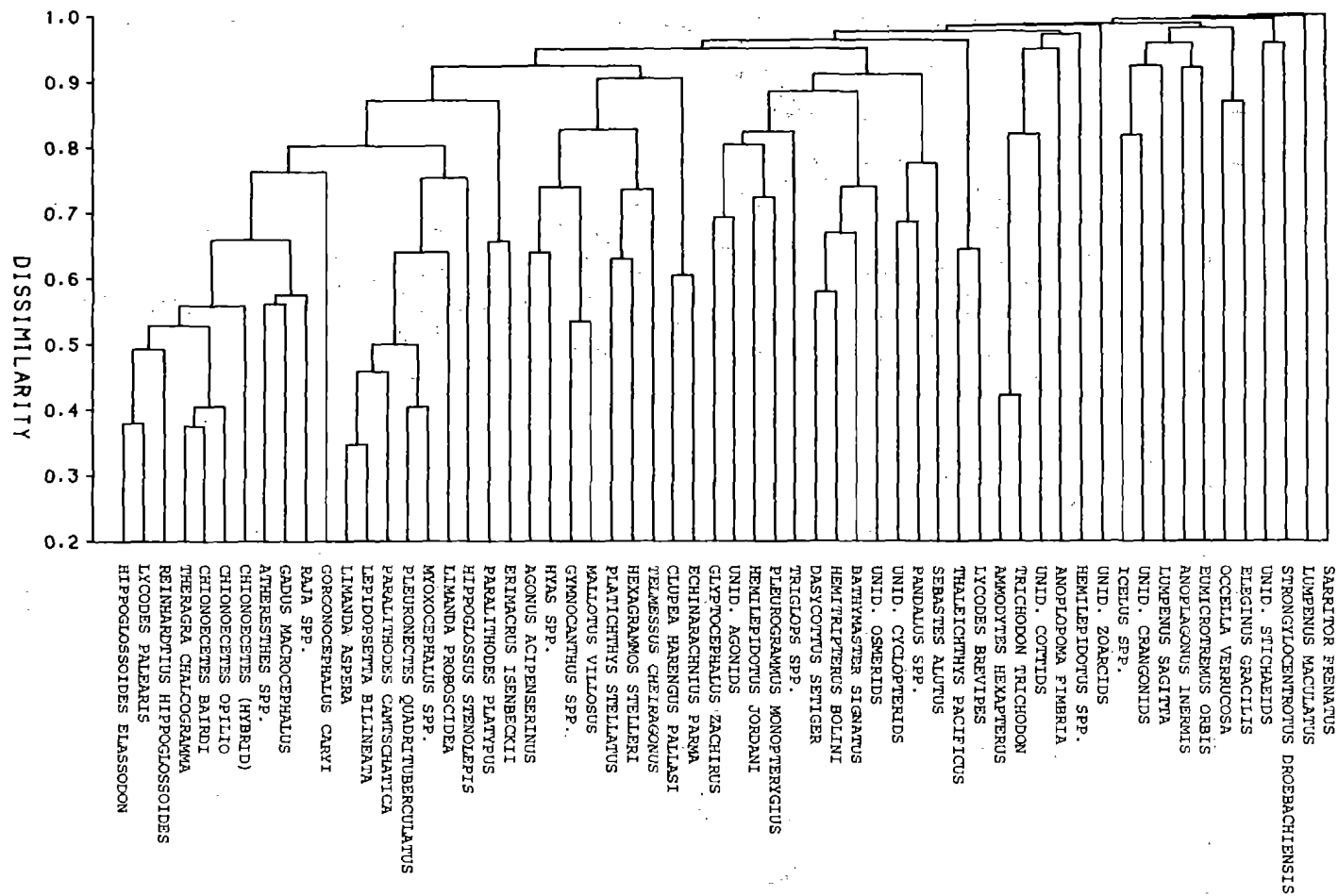


Figure 24. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1975 Bering Sea trawl survey.

Table 8. Summary of site group characteristics, 1975 Bering Sea survey.

Site group <sup>1/</sup>	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		mean	SD	range	
1	85	58.4	15.1	26-93	269.7
1A	57	52.8	14.9	26-84	246.1
1Ai	49	56.3	13.0	33-84	225.5
1Aia	25	46.9	6.8	33-59	265.6
1Aib	24	66.0	10.4	49-84	183.6
1Aii	8	31.6	4.6	26-38	373.2
1B	28	69.8	7.1	57-93	317.6
1Bi	24	70.6	6.8	60-93	314.0
1Bii	4	64.9	8.1	57-75	339.6
2	57	104.2	20.4	48-146	205.6
2A	33	105.1	22.0	48-143	241.2
2Ai	17	122.5	11.7	104-143	191.2
2Aii	16	86.6	13.2	48-106	294.3
2B	24	102.9	18.3	73-146	156.7
2Bi	14	114.2	13.8	91-146	149.4
2Bii	10	87.1	10.3	73-102	166.8

<sup>1/</sup> See Figure 20.

(Group 1Ai) and the northwest outer shelf group (Group 2B) occurred at Level 3 ( $D = 0.40$ ).

#### Bering Sea Survey, 1976

As in most of the previous years, at Level 1 ( $D = 0.70$ ) the total area divided into an inner-central shelf group (Group 1) and an outer shelf group (Group 2) (See Figures 25-29, Table 9, Appendix F). Group 1 was dominated by yellowfin sole but also had a relatively high proportion of walleye pollock. The outer shelf group (Group 2) was characterized by an extremely high density of walleye pollock. At the dissimilarity level of 0.60 (Level 2), a small northern group (Group 2B) was differentiated from the rest of the outer shelf (Group 2A). This northern group had high densities of invertebrates such as the snow crabs *C. bairdi* and *C. opilio*. At Level 3 ( $D = 0.50$ ), Group 1 differentiated into four components including a Pribilof Islands group (Group 1B).

#### Bering Sea Survey, 1977

At Level 1 ( $D = 0.70$ ), the division of the total area in 1977, as in earlier years, formed an inner-central shelf group and an outer shelf group (See Figures 30-34, Table 10, Appendix G). However, the outer shelf group extended much farther east than in previous years. The inner-central shelf group (Group 1) was dominated by yellowfin sole, *C. opilio*, and asteroids. The outer shelf group (Group 2) was dominated by walleye pollock and *C. opilio*. At Level 2 ( $D = 0.60$ ), both site groups split into two components. The inner-central shelf group divided on an east-west basis with an eastern group (Group 1B) dominated by yellowfin sole and a western group (Group 1A) dominated by *C. opilio* and yellowfin sole. The outer shelf group divided north and south near latitude 57°N. Both groups were dominated by walleye pollock and *C. opilio*, but the

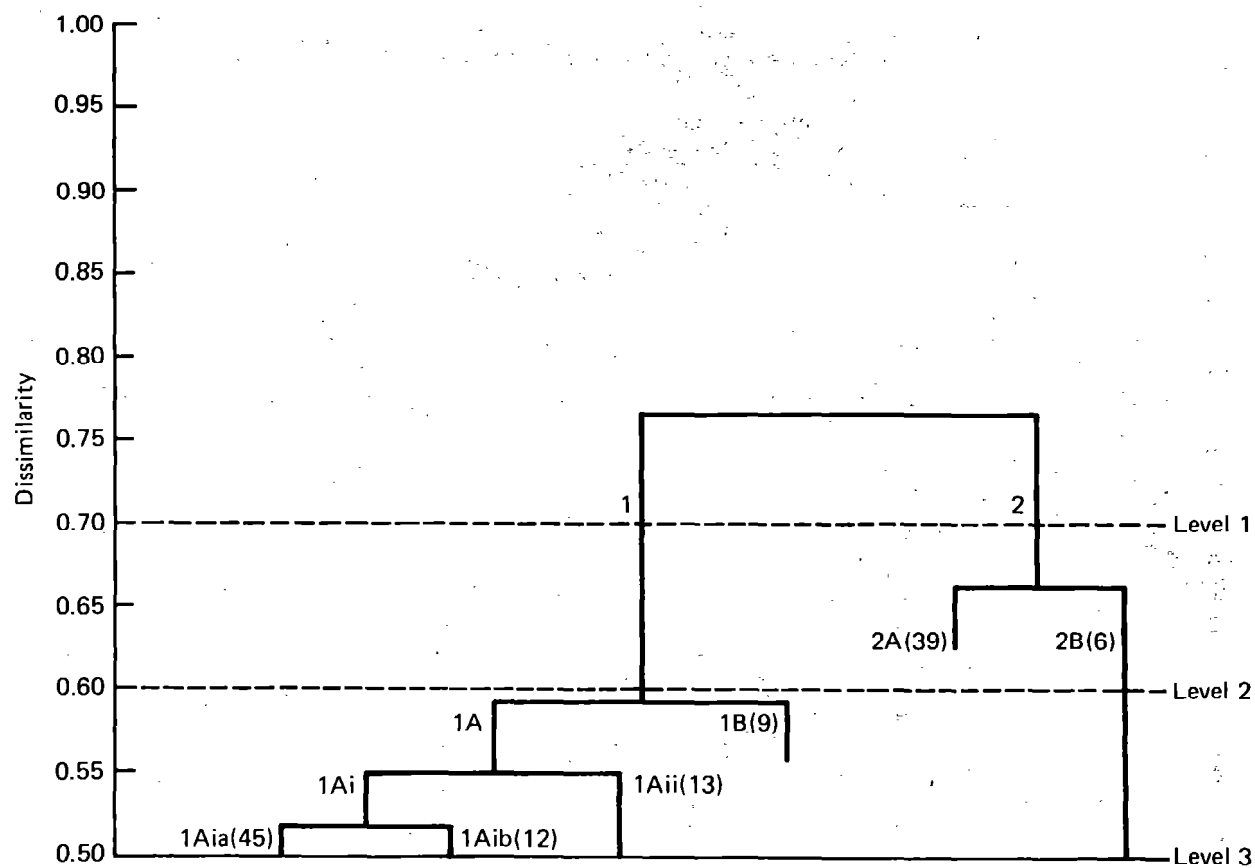


Figure 25. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, -1976 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.

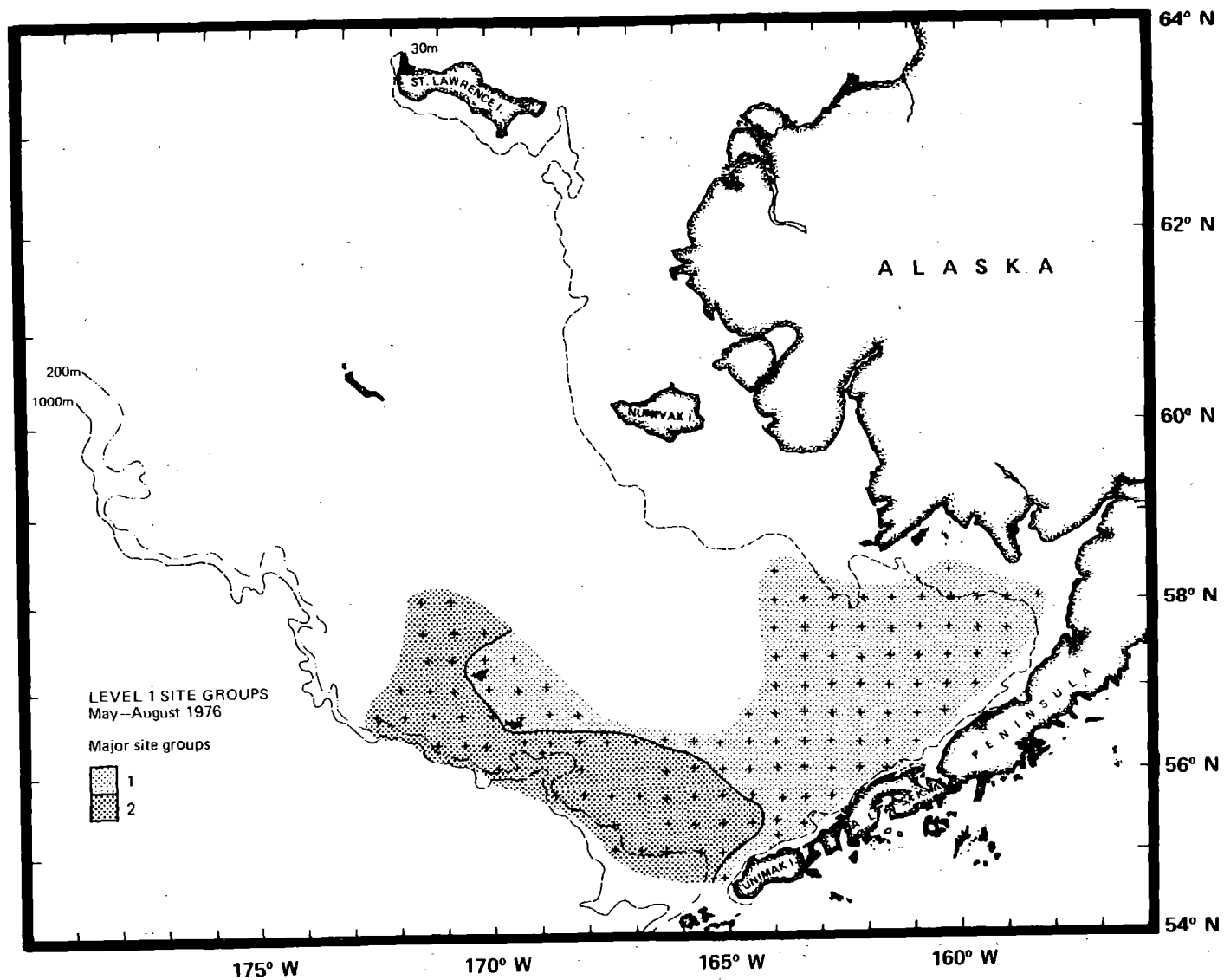


Figure 26. Map of level 1 site groups, 1976 Bering Sea trawl survey. Plus signs indicate sampling locations.

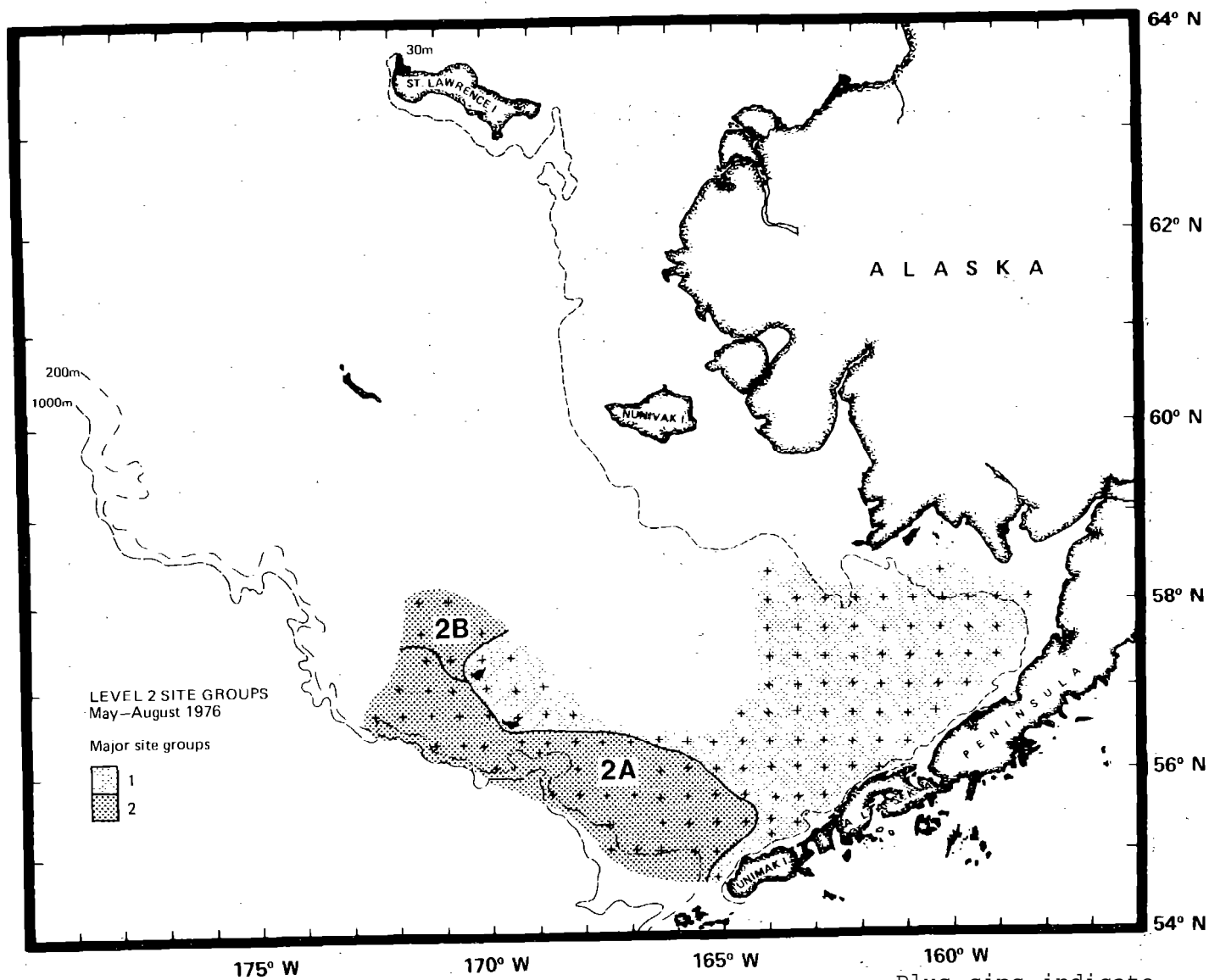


Figure 27. Map of level 2 site groups, 1976 Bering Sea trawl survey. Plus signs indicate sampling locations.

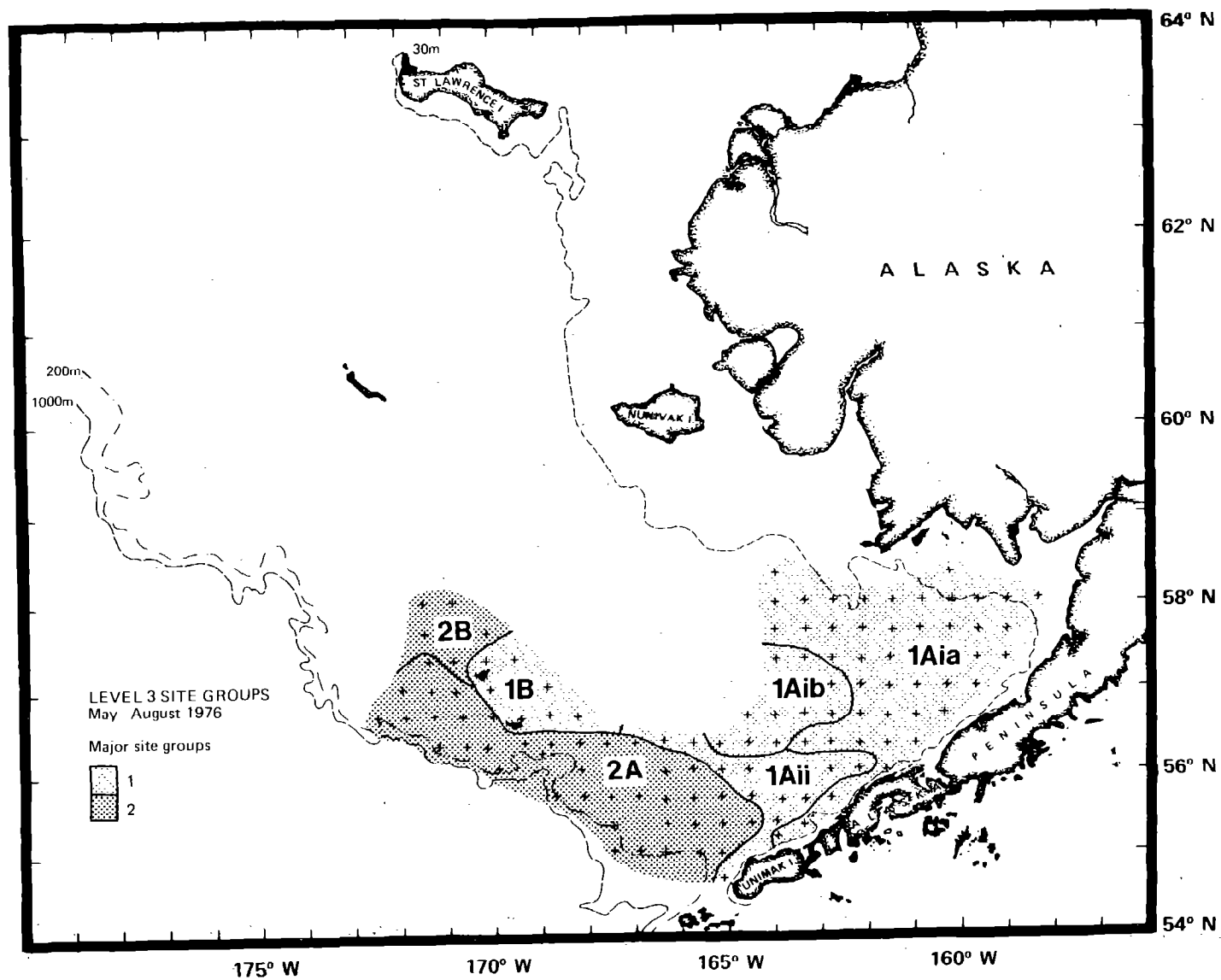


Figure 28. Map of level 3 site groups, 1976 Bering Sea trawl survey. Plus signs indicate sampling locations.



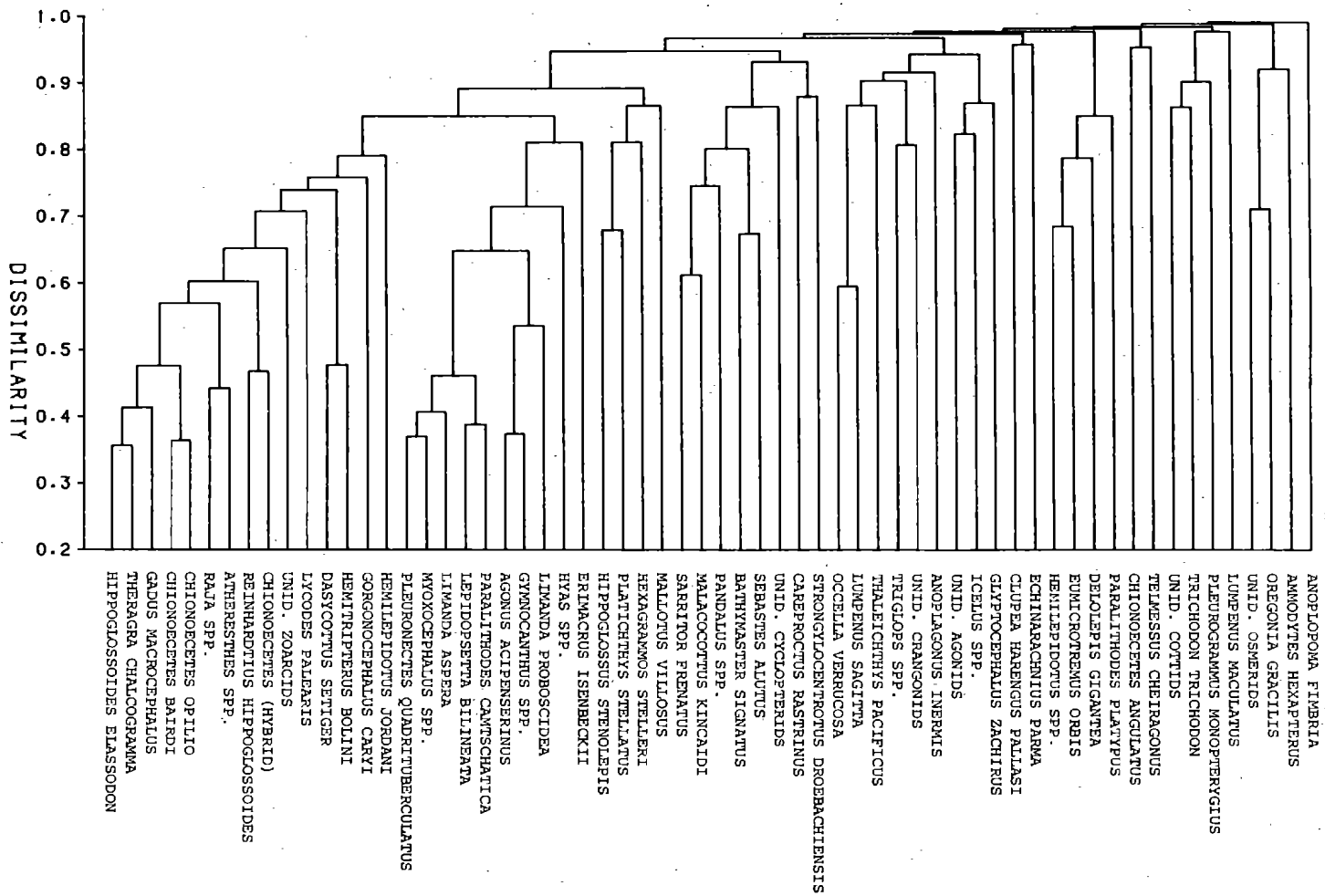


Figure 29. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1976 Bering Sea trawl survey.

Table 9. Summary of site group characteristics, 1976 Bering Sea survey.

Site group <sup>1/</sup>	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		mean	SD	range	
1	79	62.8	18.7	27-104	288.8
1A	70	61.5	18.5	27-101	347.7
1Ai	57	55.6	14.8	27-86	323.0
1Aia	45	51.8	13.3	27-84	362.3
1Aib	12	70.1	11.1	51-86	236.8
1Aii	13	87.1	8.3	70-101	445.1
1B	9	72.8	18.1	53-104	198.9
2	45	123.2	35.9	71-305	241.3
2A	39	128.9	35.0	93-305	271.6
2B	6	86.3	9.8	71-99	141.5

<sup>1/</sup> See Figure 25.

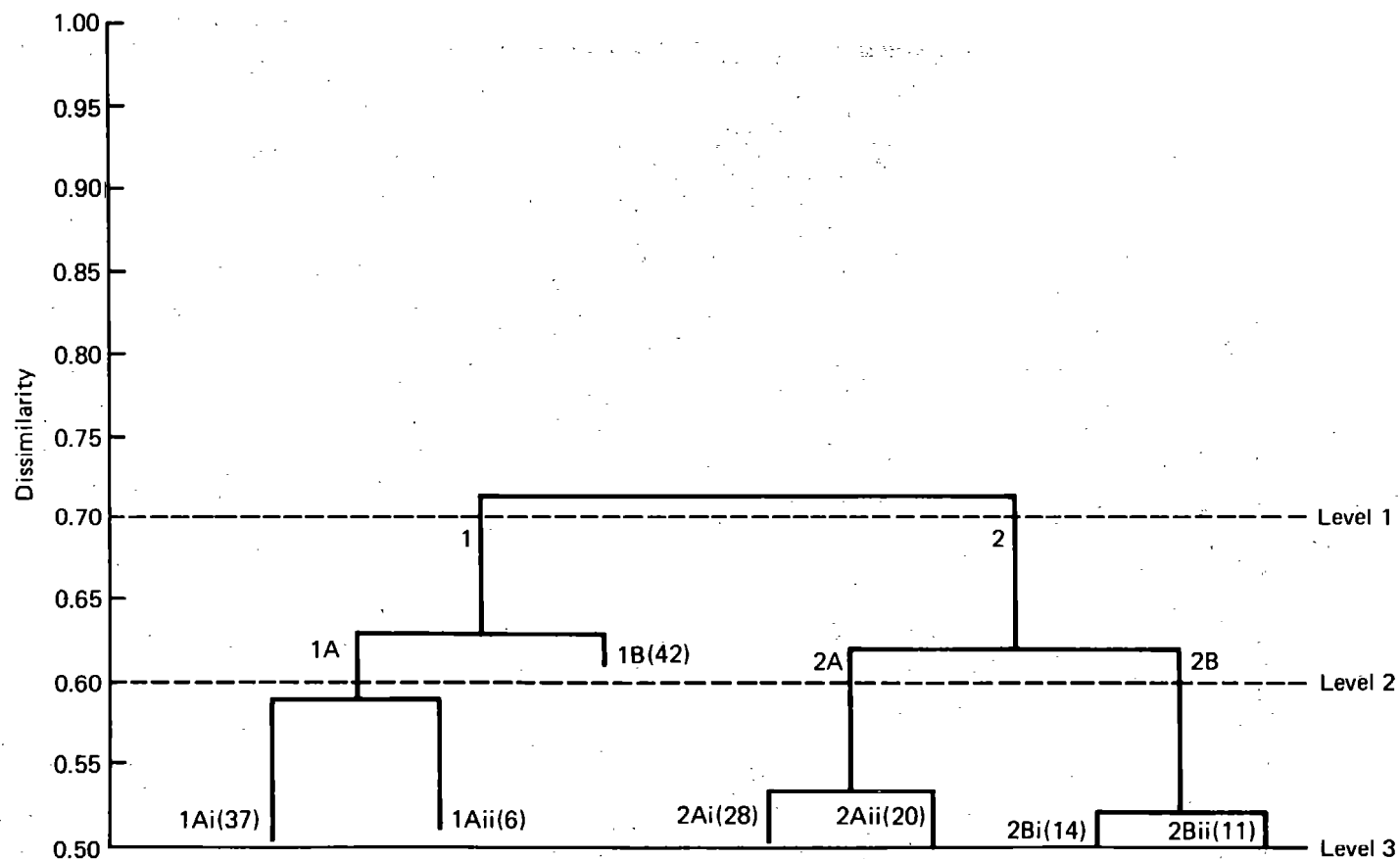


Figure 30. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, 1977 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.

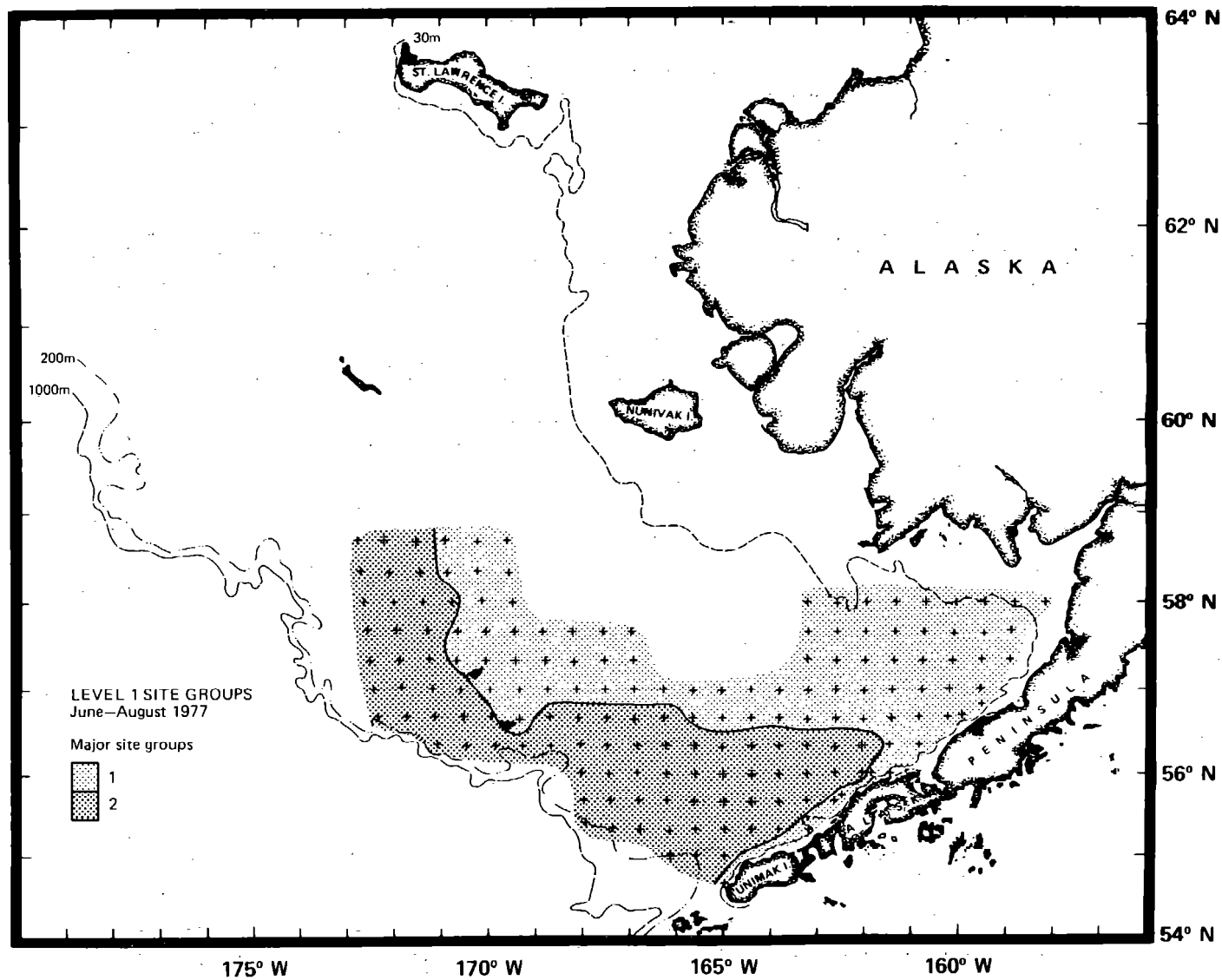


Figure 31. Map of level 1 site groups, 1977 Bering Sea trawl survey. Plus signs indicate sampling locations.

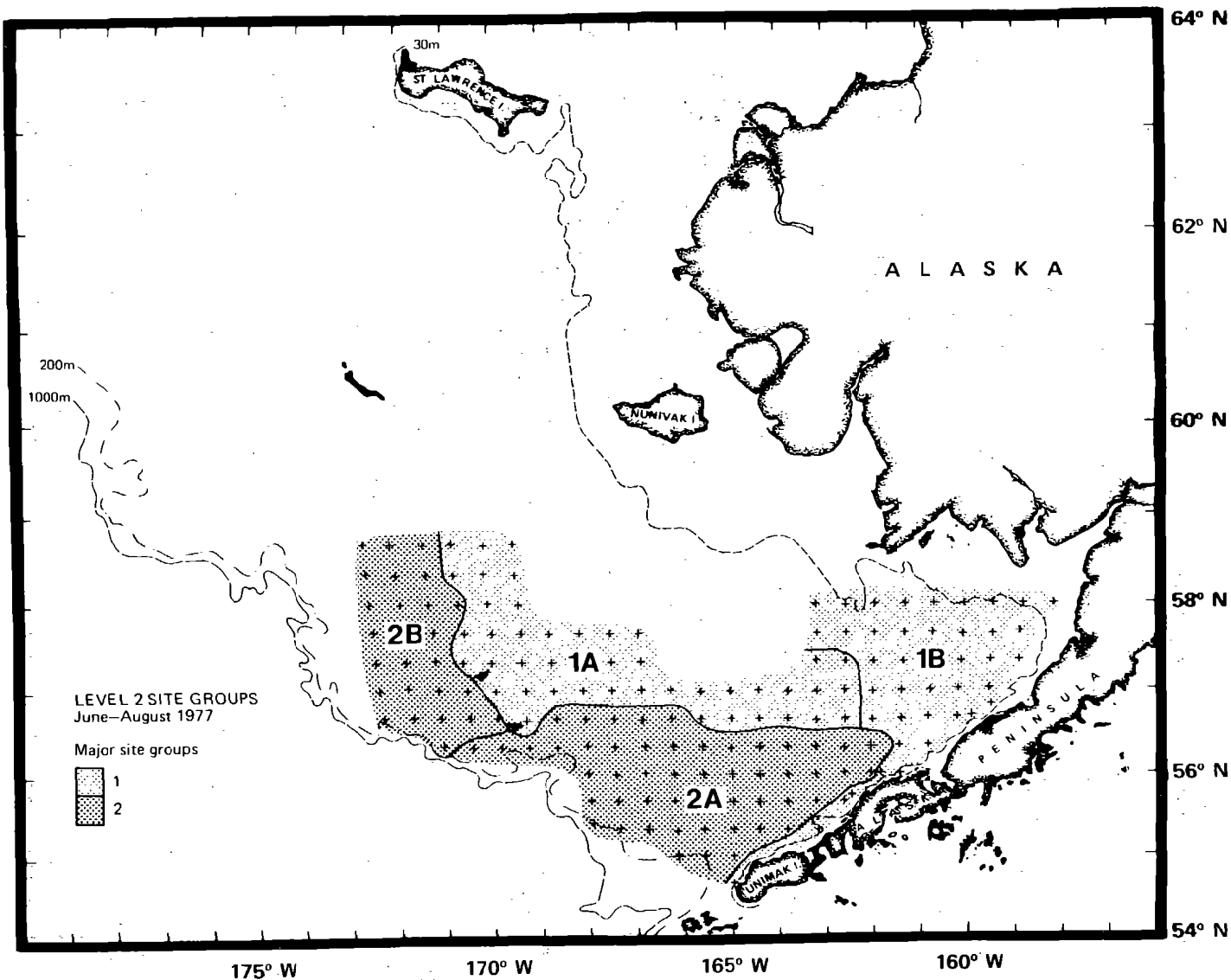


Figure 32. Map of level 2 site groups, 1977 Bering Sea trawl survey. Plus signs indicate sampling locations.

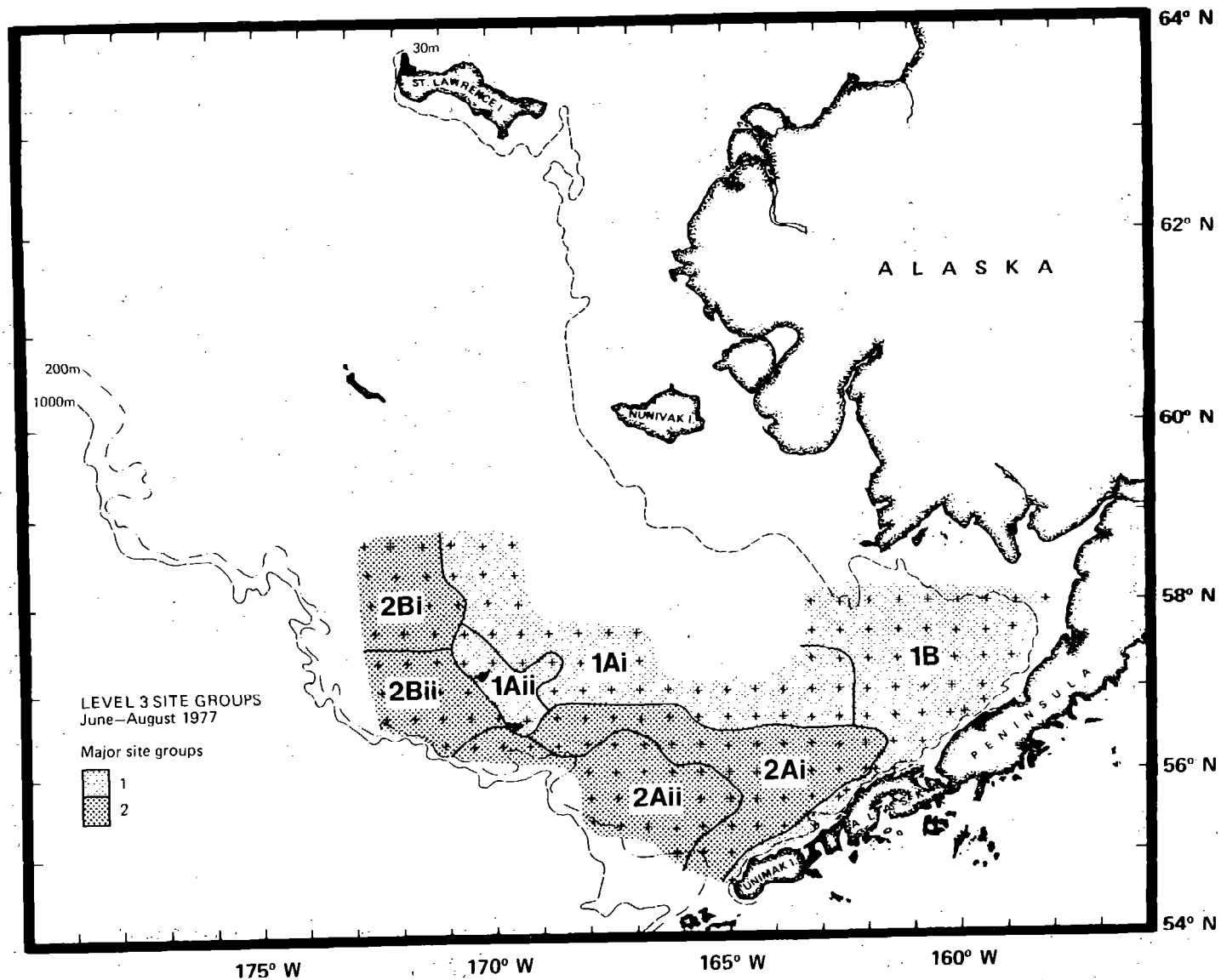


Figure 33. Map of level 3 site groups, 1977 Bering Sea trawl survey. Plus signs indicate sampling locations.

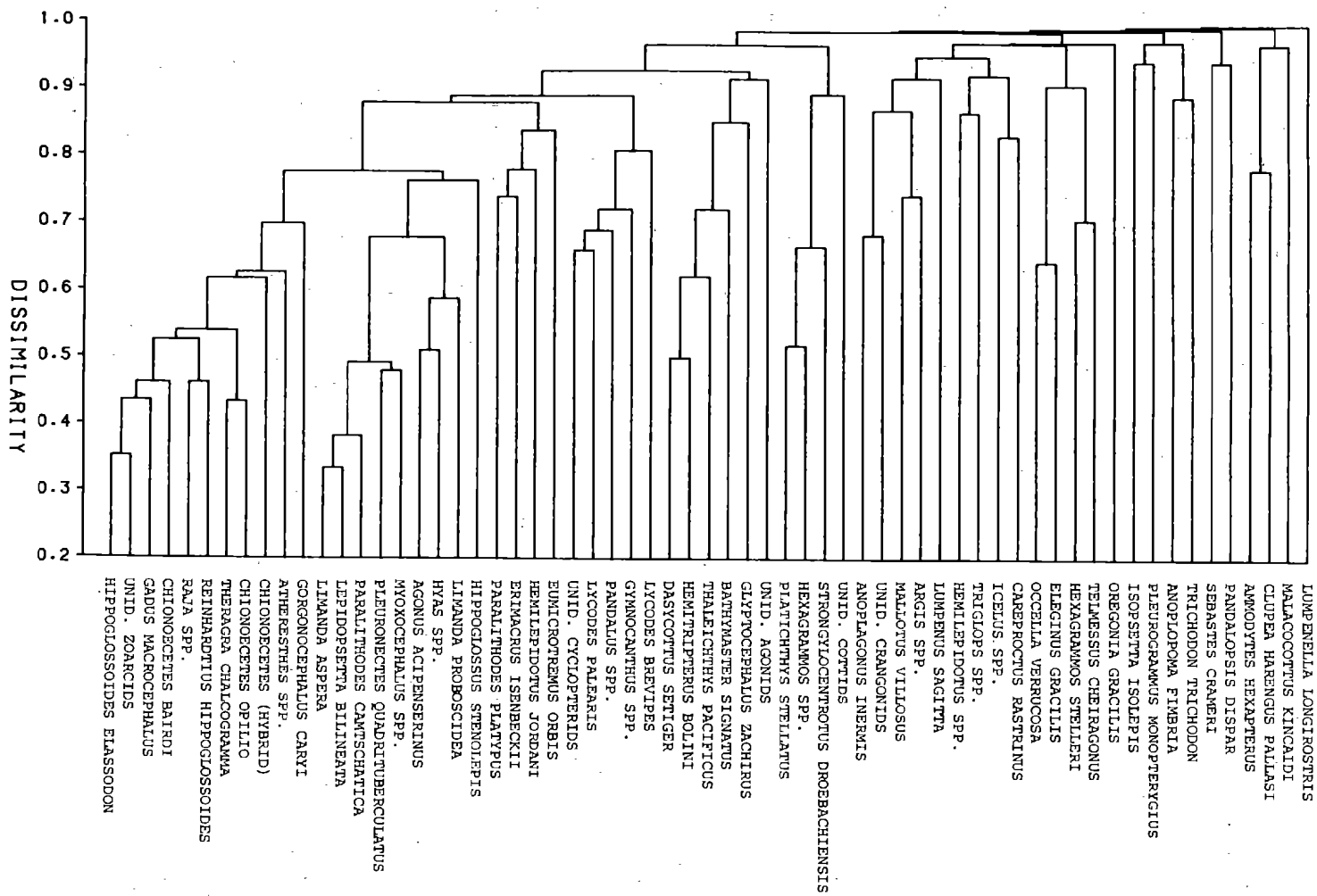


Figure 34. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1977 Bering Sea trawl survey.

Table 10. Summary of site group characteristics, 1977 Bering Sea survey.

Site group <sup>1/</sup>	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		mean	SD	range	
1	85	60.3	13.1	31-86	251.8
1A	43	68.9	7.1	48-82	268.3
1Ai	37	68.7	6.9	48-82	263.3
1Aii	6	70.7	8.6	59-80	365.8
1B	42	51.4	11.8	31-86	301.5
2	76	105.3	19.3	59-148	174.7
2A	48	104.1	20.9	59-143	246.9
2Ai	28	90.4	14.3	59-124	305.8
2Aii	20	123.2	11.6	104-143	164.3
2B	25	103.1	10.5	82-128	130.7
2Bi	14	99.4	8.7	82-113	92.9
2Bii	11	107.7	11.1	91-128	135.0

<sup>1/</sup> See Figure 30.



southern group (Group 2A) was distinguished by relatively high densities of red king crab and zoarcids. At the lowest level of dissimilarity, Level 3 ( $D = 0.50$ ), a Pribilof Islands group (Group 1Aii) was formed from the central shelf group. This group was dominated by Pacific cod and relatively high densities of *C. opilio* and blue king crab. The remainder of the central shelf (Group 1Ai) was dominated by yellowfin sole and *C. opilio*. Each of the outer shelf groups differentiated into two more components at Level 3.

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## DISCUSSION

In the analyses of the years 1978-81, described in Walters and McPhail (1982), three major site groups emerged at the highest levels of dissimilarity (Level 1). In addition to inner-central shelf and outer shelf site groups, a third group was defined at the periphery of the surveyed area in each year. These small groups were found either on the continental slope, at the northern extremity of the survey area, or in inner Bristol Bay. The earlier surveys of 1971-77, described here, were much smaller in scope. The areas that produced the third major site groups in later years were either not covered at all or were only partially surveyed. As a result, the first differentiation of all trawling sites at high levels of dissimilarity was usually into two major groups. The only exception was the occurrence of a shelf edge site group in 1973 (Figure 11). It should be noted that the selection of the dissimilarity value used for displaying these grouping relationships is somewhat subjective. However, the range of values used in this report is the same, or within the range, used for the later years.

Perhaps the most striking result of the 1971-77 analyses was the repeated geographic position of the boundary line between the inner-central shelf and outer shelf site groups. The geographic range of that division, particularly in the southeast, was relatively small, indicating a characteristic faunal change. Even though that area was not surveyed in 1971 (Figure 2), the observed pattern indicated that further coverage would probably have produced a similar result. The typical faunal pattern is bounded by a line which runs northwest from a point near the eastern end of Unimak Island (Figures 7, 11, 16, 21, 26, and 31); This line closely follows the 100-m isobath and also corresponds to the hydrographic structure defined by Kinder and Schumacher (1981) as the

"middle front." Shifts in the positions of this boundary, such as in 1975 and 1977, always occurred to the east (Figures 21, 31). Even in these years, divisions along the 100-m isobath occurred at lower levels of dissimilarity (Figures 22, 33).

Examination of the species composition of the assemblages which characterized the major site groups (Appendices A-G) shows that there were fundamental differences in the dominant species. The inner-central shelf was dominated by yellowfin sole and the outer shelf was dominated by walleye pollock.

The differentiation of the Pribilof Islands area as a distinct faunal region was another result that was repeated in the analyses. This area was surveyed in five years of this series, 1973-77. In four years, 1974-77; the island region was initially classified as parts of inner-central shelf site groups (Figures 11, 16, 21, 26, and 31). Except for 1973-74, a small site group closely surrounding the islands was found at lower levels of dissimilarity, either Level 2 or Level 3 (Figures 22, 20, 33). In 1973, the island area was part of a narrow site group extending eastward toward the central shelf (Figure 12). In 1974, this area formed a westward extension of the central shelf site group (Figure 18). The species assemblages in the near-island habitat were distinguished by relatively high densities of invertebrates, particularly snow crab.

Other features of the classifications, such as the separation of the broad, central shelf site groups into smaller components, appeared to have little, if any., consistency from year to year. A number of factors could have caused these inconsistencies, such as several sources of sampling error. The summer sampling period for each survey extended over 2-3 months. Migratory movements of the animals during this time are not completely known. In addition, changes of personnel during the surveys could have introduced

artificial changes in taxonomic classification. The effects of past sampling errors are difficult to estimate, however.

Other factors which may have contributed to the variability in the community structure may be more amenable to investigation, and it is in this direction that further work should proceed. Climatic variations, hydrographic structure and its variability, bottom topography and sediment analyses, trophic interactions, and effects of fishing are promising areas of research which may help to explain underlying causes of these community patterns.

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## APPENDIX A

## Species Assemblages, 1971 Bering Sea Survey

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Table A-1. Site Group 1

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OC:URR.	TAXA
*****					
1	30.27	.396	.396	1.00	LIMANDA ASPERA
2	8.44	.110	.506	0.97	THERAGRA CHALCOGRAMMA
3	6.18	.081	.587	0.97	LEPIDOPSETTA BILINEATA
4	6.16	.080	.667	0.82	CHIONOECETES SP
5	5.00	.065	.733	0.26	FIVE RAY STARFISH
6	4.77	.062	.795	0.97	PLEURONECTES QUADRITUBERCULATUS
7	3.09	.040	.835	0.62	PARALITHODES CAMTSCHATICA
8	2.43	.032	.867	0.65	COTTIDAE
9	1.52	.020	.887	0.82	HIPPOGLOSSOIDES ELASSODON
10	1.15	.015	.902	0.62	PORIFERA
11	1.13	.015	.917	0.76	GADUS MACROCEPHALUS
12	0.97	.013	.929	0.15	BOLTENIA SP
13	0.95	.012	.942	0.06	WHELK UNIDENT
14	0.74	.010	.951	0.44	HIPPOGLOSSUS STENOLEPIS
15	0.46	.006	.958	0.12	PISASTER SP
16	0.45	.006	.964	0.59	CHYSAORA SP
17	0.44	.006	.969	0.50	MYOXOCEPHALUS SP
18	0.39	.005	.974	0.74	PAGURIDAE
19	0.32	.004	.979	0.74	NEPTUNEA SP
20	0.28	.004	.982	0.24	ARGOBUCCINUM SP
21	0.28	.004	.986	0.26	BUCCINUM SP
22	0.22	.003	.989	0.94	AGONUS ACIPENSERINUS
23	0.16	.002	.991	0.47	LIMANDA PROBOSCIDEA

TOTAL 76.51

\* NUMBER OF HAULS- 34, MEAN DEPTH= 58.1M (RANGE= 29- 82M)

Table A-2. Site Group 1A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	36.76	.509	.509	1.00	LIMANDA ASPERA
2	8.73	.121	.630	0.95	THERAGRA CHALCOGRAMMA
3	5.23	.072	.703	0.95	PARALITHODES CAMTSCHATICA
4	4.72	.065	.768	0.95	LEPIDOPSETTA BILINEATA
5	4.14	.057	.826	0.90	CHIONOECETES SP
6	2.39	.033	.859	1.00	HIPPOGLOSSOIDES ELASSODON
7	1.96	.027	.886	0.65	PORIFERA
8	1.65	.023	.909	0.25	BOLTENIA SP
9	1.34	.019	.927	0.95	PLEURONECTES QUADRITUBERCULATUS
10	0.99	.014	.941	0.65	GADUS MACROCEPHALUS
11	0.82	.011	.952	0.20	PISASTER SP
12	0.76	.010	.963	0.70	CHYSAORA SP
13	0.75	.010	.973	0.65	MYOXOCEPHALUS SP
14	0.68	.009	.983	0.30	HIPPOGLOSSUS STENOLEPIS
15	0.20	.003	.986	0.40	LIMANDA PROBOSCIDEA
16	0.18	.003	.988	0.20	GASTROPOD UNIDENT
17	0.18	.002	.991	0.40	CLUPEA HARENGUS PALLASI

TOTAL 72.15

\* NUMBER OF HAULS- 20, MEAN DEPTH= 61.6M (RANGE= 37- 82M)

Table A-3. Site Group 1B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	21.00	.254	.254	1.00	LIMANDA ASPERA
2	12.13	.147	.401	0.64	FIVE RAY STARFISH
3	9.66	.117	.517	1.00	PLEURONECTES QUADRITUBERCULATUS
4	9.04	.109	.627	0.71	CHIONOECETES SP
5	8.25	.100	.726	1.00	LEPIDOPSETTA BILINEATA
6	8.03	.097	.823	1.00	THELAGRA CHALCOGRAMMA
7	5.78	.070	.893	0.93	COTTIDAE
8	2.30	.028	.921	0.14	WHELK UNIDENT
9	1.32	.016	.937	0.93	GADUS MACROCEPHALUS
10	0.87	.010	.947	0.79	PAGURIDAE
11	0.83	.010	.958	0.64	HIPPOGLOSSUS STENDOLEPIS
12	0.68	.008	.966	0.71	NEPTUNEA SP
13	0.68	.008	.974	0.64	BUCCINUM SP
14	0.68	.008	.982	0.50	ARGOBUCCINUM SP
15	0.42	.005	.987	0.93	AGONUS ACIPENSERINUS
16	0.28	.003	.991	0.57	HIPPOGLOSSOIDES ELASSODON

TOTAL 82.72

\* NUMBER OF HAULS- 14, MEAN DEPTH= 53.0M (RANGE= 29- 70M)

Table A-4. Site Group 1Bi

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	21.23	.330	.330	0.88	FIVE RAY STARFISH
2	12.74	.198	.528	1.00	LIMANDA ASPERA
3	7.37	.115	.643	1.00	COTTIDAE
4	7.28	.113	.756	1.00	LEPIDOPSETTA BILINEATA
5	6.79	.106	.861	1.00	THERAGRA CHALCOGRAMMA
6	4.90	.076	.938	1.00	PLEURONECTES QUADRITUBERCULATUS
7	1.24	.019	.957	0.75	HIPPOGLOSSUS STENDLEPIS
8	1.13	.018	.974	1.00	GADUS MACROCEPHALUS
9	0.64	.010	.984	1.00	AGONUS ACIPENSERINUS
10	0.43	.007	.991	0.63	MALLOTUS VILLOSUM

TOTAL 64.32

\* NUMBER OF HAULS= 6, MEAN DEPTH= 45.0M (RANGE= 29- 64M)

Table A-5. Site Group 1Bii

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	32.01	.298	.298	1.00	LIMANDA ASPERA
2	20.96	.195	.494	1.00	CHIONOECETES SP
3	15.99	.149	.643	1.00	PLEURONECTES QUADRITUBERCULATUS
4	9.68	.090	.733	1.00	THERAGRA CHALCOGRAMMA
5	9.55	.089	.822	1.00	LEPIDOPSETTA BILINEATA
6	5.36	.050	.872	0.33	WHELK UNIDENT
7	3.66	.034	.906	0.83	COTTIDAE
8	2.01	.019	.925	0.83	PAGURIDAE
9	1.58	.015	.940	0.67	BUCCINUM SP
10	1.58	.015	.955	0.67	NEPTUNEA SP
11	1.58	.015	.969	0.33	ARGOBUCCINUM SP
12	1.58	.015	.984	0.83	GADUS MACROCEPHALUS
13	0.62	.006	.990	0.67	HIPPOGLOSSOIDES ELASSODON
14	0.28	.003	.993	0.50	HIPPOGLOSSUS STENOLEPIS

TOTAL 107.26

\* NUMBER OF HAULS= 6, MEAN DEPTH= 63.7M (RANGE= 57- 70M)

Table A-6. Site Group 2

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	133.36	.816	.816	1.00	THERAGRA CHALCOGRAMMA
2	8.35	.051	.867	1.00	HIPPOGLOSSOIDES ELASSODON
3	7.14	.044	.911	1.00	CHIONDECETES SP
4	2.03	.012	.924	0.86	GADUS MACROCEPHALUS
5	1.75	.011	.934	0.64	GORGONOCEPHALUS CARYI
6	1.40	.009	.943	0.57	LEPIDOPSETTA BILINEATA
7	1.35	.008	.951	0.21	RAJA SP
8	0.89	.005	.957	0.71	ATHERESTHES SP
9	0.81	.005	.962	0.50	SEA PEN UNIDENT
10	0.72	.004	.966	0.14	PARALITHODES CAMTSCHATICA
11	0.67	.004	.970	0.29	LIMANDA ASPERA
12	0.66	.004	.974	0.79	LYCODES PALEARIS
13	0.63	.004	.978	0.64	COTTIDAE
14	0.63	.004	.982	0.14	OPHIUROID UNIDENT
15	0.41	.003	.984	0.29	HIPPOGLOSSUS STENOLEPIS
16	0.40	.002	.987	0.71	PAGURIDAE
17	0.29	.002	.989	0.07	OCTOPUS UNIDENT
18	0.29	.002	.990	0.50	NEPTUNEA SP

TOTAL 163.36

\* NUMBER OF HAULS- 14, MEAN DEPTH=110.3M (RANGE= 70-148M)



Table A-7. Site Group 2A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	200.37	.868	.868	1.00	THELAGRA CHALCOGRAMMA
2	12.06	.052	.921	1.00	HIPPOGLOSSOIDES ELASSODON
3	3.27	.014	.935	1.00	CHIONOECETES SP
4	2.71	.012	.946	0.56	GORGONOCEPHALUS CARYI
5	2.39	.010	.957	0.89	GADUS MACROCEPHALUS
6	2.10	.009	.966	0.33	RAJA SP
7	1.13	.005	.971	0.89	ATHERESTHES SP
8	1.12	.005	.976	0.22	PARALITHODES CAMTSCHATICA
9	1.01	.004	.980	0.89	LYCODES PALEARIS
10	0.58	.003	.983	0.22	HIPPOGLOSSUS STENDLEPIS
11	0.58	.003	.985	0.56	PAGURIDAE
12	0.48	.002	.987	0.33	LEPIDOPSETTA BILINEATA
13	0.45	.002	.989	0.11	OCTOPUS UNIDENT
14	0.36	.002	.991	0.56	COTTIDAE

TOTAL 230.77

\* NUMBER OF HAULS- 9, MEAN DEPTH=123.2M (RANGE= 95-148M)

Table A-8. Site Group 2B

\*\*\*\*\*  
 MEAN PROP. CUMUL. FREQ.  
 CPUE OF PROP. OF  
 (KG/HA) CPUE OF CPUE OCCURR. TAXA  
 \*\*\*\*\*

1	14.10	.335	.335	1.00	CHIONOECETES SP
2	12.75	.303	.639	1.00	THERAGRA CHALCOGRAMMA
3	3.05	.073	.711	1.00	LEPIDOPSETTA BILINEATA
4	1.77	.042	.754	0.40	SEA PEN UNIDENT
5	1.77	.042	.796	0.40	OPHIUROID UNIDENT
6	1.67	.040	.835	1.00	HIPPOGLOSSOIDES ELASSODON
7	1.39	.033	.868	0.80	GADUS MACROCEPHALUS
8	1.23	.029	.898	0.60	LIMANDA ASPERA
9	1.12	.027	.924	0.80	COTTIDAE
10	0.78	.019	.943	0.80	NEPTUNEA SP
11	0.70	.017	.959	0.40	BUCCINUM SP
12	0.46	.011	.970	0.40	ATHERESTHES SP
13	0.44	.010	.981	0.20	PISASTER SP
14	0.11	.003	.984	0.20	PLEURONECTES QUADRITUBERCULATUS
15	0.11	.003	.986	0.40	HIPPOGLOSSUS STENOLEPIS
16	0.10	.002	.989	0.20	MYOXOCEPHALUS SP
17	0.09	.002	.991	0.20	LUMPENUS SAGITTA

TOTAL 42.03

\* NUMBER OF HAULS- 5, MEAN DEPTH= 87.1M (RANGE= 70- 99M)

## APPENDIX B

## Species Assemblages, 1972 Bering Sea Survey

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Table B-1. Site Group 1

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	20.87	.337	.337	1.00	LIMANDA ASPERA
2	7.65	.124	.461	0.93	CHIONOECETES SP
3	5.43	.088	.549	1.00	LEPIDOPSETTA BILINEATA
4	5.05	.082	.630	0.42	FIVE RAY STARFISH
5	3.91	.063	.693	0.72	PARALITHODES CAMTSCHATICA
6	2.94	.047	.741	0.90	COTTIDAE
7	2.23	.036	.777	0.93	THERAGRA CHALCOGRAMMA
8	1.80	.029	.806	0.96	PLEURONECTES QUADRITUBERCULATUS
9	1.30	.021	.827	0.22	BOLTENIA SP
10	1.26	.020	.848	0.55	GORGONOCEPHALUS CARYI
11	0.87	.014	.862	0.78	HIPPOGLOSSOIDES ELASSODON
12	0.78	.013	.874	0.81	CHYSAORA SP
13	0.67	.011	.885	0.23	BUCCINUM SP
14	0.66	.011	.896	0.33	PORIFERA
15	0.65	.011	.906	0.75	PAGURIDAE
16	0.53	.009	.915	0.09	ARGOBUCCINUM SP
17	0.48	.008	.923	0.54	MALLOTUS VILLOSUS
18	0.44	.007	.930	0.30	MYOXOCEPHALUS SP
19	0.42	.007	.937	0.33	HALOCYNTHIA SP
20	0.40	.007	.943	0.25	INVERTEBRATE UNIDENT
21	0.38	.006	.949	0.29	STARFISH UNIDENT
22	0.28	.004	.954	0.55	GADUS MACROCEPHALUS
23	0.27	.004	.958	0.29	NEPTUNEA SP
24	0.25	.004	.962	0.04	ISOPSETTA ISOLEPIS
25	0.22	.004	.966	0.42	HIPPOGLOSSUS STENDLEPIS
26	0.21	.003	.969	0.54	LIMANDA PROBOSCIDEA
27	0.19	.003	.972	0.12	NEPTUNEA SATURA
28	0.15	.002	.974	0.19	HOLDTHUROIDEA UNIDENT
29	0.14	.002	.977	0.16	NEPTUNEA VENTRICOSA
30	0.13	.002	.979	0.20	WHELK UNIDENT
31	0.12	.002	.981	0.46	HYAS SP
32	0.11	.002	.983	0.16	ECHINARACHNIUS PARMA
33	0.11	.002	.984	0.20	ZOARCIDAE
34	0.10	.002	.986	0.58	AGONUS ACIPENSERINUS
35	0.08	.001	.987	0.10	THAIDIDAE
36	0.08	.001	.988	0.17	OPHIUROID UNIDENT
37	0.07	.001	.989	0.07	TRITONIA DIOMEDEA
38	0.06	.001	.990	0.48	ATHERESTHES SP
TOTAL 61.88					

\* NUMBER OF HAULS- 69, MEAN DEPTH= 61.8M (RANGE= 29- 97M)

Table B-2. Site Group 1A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	24.50	.354	.354	1.00	LIMANDA ASPERA
2	9.13	.132	.485	0.95	CHIONOECETES SP
3	6.63	.096	.581	1.00	LEPIDOPSETTA BILINEATA
4	5.23	.075	.656	0.38	FIVE RAY STARFISH
5	4.13	.060	.716	0.80	PARALITHODES CAMTSCHATICA
6	2.70	.039	.755	0.87	COTTIDAE
7	2.67	.039	.794	0.91	THERAGRA CHALCOGRAMMA
8	1.95	.028	.822	0.96	PLEURONECTES QUADRITUBERCULATUS
9	1.56	.022	.844	0.55	GORGONOCEPHALUS CARYI
10	1.47	.021	.866	0.24	BOLTENIA SP
11	1.00	.014	.880	0.89	HIPPOGLOSSOIDES ELASSODON
12	0.91	.013	.893	0.87	CHYSADRA SP
13	0.80	.012	.905	0.24	BUCCINUM SP
14	0.75	.011	.915	0.29	PORIFERA
15	0.67	.010	.925	0.11	ARGOBUCCINUM SP
16	0.54	.008	.933	0.73	PAGURIDAE
17	0.51	.007	.940	0.25	MYOXOCEPHALUS SP
18	0.47	.007	.947	0.33	STARFISH UNIDENT
19	0.35	.005	.952	0.44	MALLOTUS VILLOSUS
20	0.33	.005	.957	0.55	GADUS MACROCEPHALUS
21	0.29	.004	.961	0.25	HALOCYNTHIA SP
22	0.25	.004	.965	0.51	LIMANDA PROBOSCIDEA
23	0.22	.003	.968	0.29	NEPTUNEA SP
24	0.20	.003	.971	0.47	HIPPOGLOSSUS STENOLEPIS
25	0.19	.003	.973	0.22	HOLOTHUROIDEA UNIDENT
26	0.19	.003	.976	0.16	INVERTEBRATE UNIDENT
27	0.16	.002	.978	0.25	WHELK UNIDENT
28	0.16	.002	.981	0.09	NEPTUNEA SATURA
29	0.14	.002	.983	0.20	ECHINARACHNIUS PARMA
30	0.13	.002	.985	0.24	ZOARCIDAE
31	0.09	.001	.986	0.18	OPHIUROID UNIDENT
32	0.09	.001	.987	0.58	AGONUS ACIPENSERINUS
33	0.09	.001	.989	0.11	NEPTUNEA VENTRICOSA
34	0.09	.001	.990	0.09	THAIDIDAE
35	0.08	.001	.991	0.07	TRITONIA DIOMEDEA

TOTAL 69.29

\* NUMBER OF HAULS= 55, MEAN DEPTH= 64.1M (RANGE= 35- 97M)

Table B-3. Site Group 1B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	6.45	.234	.234	1.00	LIMANDA ASPERA
2	4.70	.170	.404	0.62	FIVE RAY STARFISH
3	3.66	.133	.537	1.00	COTTIDAE
4	1.36	.049	.586	0.62	INVERTEBRATE UNIDENT
5	1.35	.049	.635	0.85	CHIONOECETES SP
6	1.32	.048	.683	1.00	PLEURONECTES QUADRITUBERCULATUS
7	1.20	.043	.726	0.92	PAGURIDAE
8	1.08	.039	.765	0.92	MALLOTUS VILLOSUS
9	0.99	.036	.801	0.69	HALOCYNTHIA SP
10	0.69	.025	.826	0.15	BOLTENIA SP
11	0.50	.018	.845	0.31	NEPTUNEA SP
12	0.40	.014	.859	0.38	PARALITHODES CAMTSCHATICA
13	0.38	.014	.873	0.38	NEPTUNEA VENTRICOSA
14	0.35	.013	.885	1.00	THERAGRA CHALCOGRAMMA
15	0.35	.013	.898	1.00	LEPIDOPSETTA BILINEATA
16	0.33	.012	.910	0.23	NEPTUNEA SATURA
17	0.33	.012	.922	0.54	PORIFERA
18	0.30	.011	.933	0.77	HYAS SP
19	0.29	.010	.943	0.62	CHYSAORA SP
20	0.19	.007	.950	0.54	MYOXOCEPHALUS SP
21	0.15	.005	.955	0.23	BUCCINUM SP
22	0.14	.005	.960	0.08	NATICIDAE
23	0.13	.005	.965	0.62	AGONUS ACIPENSERINUS
24	0.13	.005	.970	0.62	COMPOUND ASCIDIAN UNIDENT
25	0.13	.005	.974	0.69	SERRIPES GROENLANDICUS
26	0.12	.004	.979	0.62	GORGONOCEPHALUS CARYI
27	0.07	.003	.981	0.08	HOLGULA SP
28	0.06	.002	.984	0.38	CIRRIPEDIA
29	0.06	.002	.986	0.54	GADUS MACROCEPHALUS
30	0.05	.002	.988	0.15	HIPPOGLOSSUS STENOLEPIS
31	0.04	.002	.989	0.15	THALIDIDAE
32	0.04	.001	.991	0.15	SEA ANEMONE UNIDENT

TOTAL 27.58

\* NUMBER OF HAULS- 13, MEAN DEPTH= 50.8M (RANGE= 29- 75M)

Table B-4. Site Group 2

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	57.15	.659	.659	1.00	THERAGRA CHALCOGRAMMA
2	8.26	.095	.754	0.96	HIPPOGLOSSOIDES ELASSODON
3	5.01	.058	.812	1.00	CHIONOECETES SP
4	3.27	.038	.850	0.62	PARALITHODES CAMTSCHATICA
5	1.66	.019	.869	0.77	GADUS MACROCEPHALUS
6	1.55	.018	.887	0.08	BOLTENIA SP
7	1.50	.017	.904	0.58	ZOARCIDAE
8	0.83	.010	.914	0.69	ATHERESTHES SP
9	0.83	.010	.923	0.31	SEA PEN UNIDENT
10	0.71	.008	.931	0.19	LYCODES BREVIPES
11	0.67	.008	.939	0.81	CHYSAORA SP
12	0.62	.007	.946	0.46	LIMANDA ASPERA
13	0.60	.007	.953	0.31	RAJA SP
14	0.59	.007	.960	0.92	COTTIDAE
15	0.55	.006	.966	0.73	LEPIDOPSETTA BILINEATA
16	0.54	.006	.973	0.50	SEA ANEMONE UNIDENT
17	0.30	.003	.976	0.38	GORGONOCEPHALUS CARYI
18	0.26	.003	.979	0.04	ANOPILOPOMA FIMBRIA
19	0.26	.003	.982	0.38	HIPPOGLOSSUS STENDOLEPIS
20	0.12	.001	.983	0.54	SHRIMP UNIDENT
21	0.11	.001	.985	0.23	FIVE RAY STARFISH
22	0.11	.001	.986	0.04	SEBASTES ALUTUS
23	0.10	.001	.987	0.08	MANY RAY STARFISH UNIDENT
24	0.08	.001	.988	0.08	NEPTUNEA LYRATA
25	0.08	.001	.989	0.54	PAGURIDAE
26	0.08	.001	.990	0.19	PORIFERA
27	0.07	.001	.991	0.04	SQUID UNIDENT

TOTAL 86.72

\* NUMBER OF HAULS- 26, MEAN DEPTH=119.2M (RANGE= 48-326M)



## APPENDIX C

## Species Assemblages, 1973 Bering Sea Survey

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Table C-1. Site Group 1

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	78.99	.435	.435	1.00	LIMANDA ASPERA
2	19.41	.107	.542	0.84	CHIONOECETES SP
3	14.84	.082	.624	0.84	PARALITHODES CAMTSCHATICA
4	13.74	.076	.699	0.46	FIVE RAY STARFISH
5	13.36	.074	.773	0.98	LEPIDOPSETTA BILINEATA
6	8.37	.046	.819	0.35	PORIFERA
7	6.43	.035	.854	0.63	PLEURONECTES QUADRITUBERCULATUS
8	4.58	.025	.880	0.33	STARFISH UNIDENT
9	2.75	.015	.895	0.94	MYOXOCEPHALUS SP
10	2.61	.014	.909	0.54	LIMANDA PROBOSCIDEA
11	2.58	.014	.923	0.57	WHELK UNIDENT
12	1.96	.011	.934	0.70	HIPPOGLOSSOIDES ELASSODON
13	1.65	.009	.943	0.62	THERAGRA CHALCOGRAMMA
14	1.64	.009	.952	0.32	BOLTENIA SP
15	1.13	.006	.958	0.43	GORGONOCEPHALUS CARYI
16	1.07	.006	.964	0.33	ASCIDIAN UNIDENT
17	0.97	.005	.970	0.43	PAGURIDAE
18	0.60	.003	.973	0.30	SCYPHOZOA
19	0.52	.003	.976	0.86	AGONUS ACIPENSERINUS
20	0.49	.003	.978	0.49	HOLOTHURIDEA UNIDENT
21	0.42	.002	.981	0.38	CYCLOPTERIDAE
22	0.39	.002	.983	0.52	ERIMACRUS ISENBECKII
23	0.33	.002	.985	0.41	REINHARDTIUS HIPPOGLOSSOIDES
24	0.27	.002	.986	0.14	HALOCYNTHIA SP
25	0.27	.001	.988	0.57	GADUS MACROCEPHALUS
26	0.25	.001	.989	0.51	GYMNOCANTHUS SP
27	0.21	.001	.990	0.03	GASTROPOD UNIDENT

TOTAL 181.61

\* NUMBER OF HAULS- 63, MEAN DEPTH= 60.3M (RANGE= 29- 90M)

Table C-2. Site Group 1A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	83.71	.448	.448	1.00	LIMANDA ASPERA
2	20.73	.111	.559	0.68	CHIONOECETES SP
3	15.10	.081	.640	0.63	PARALITHODES CAMTSCHATICA
4	14.06	.075	.716	0.98	LEPIDOPSETTA BILINEATA
5	10.48	.056	.772	0.44	FIVE RAY STARFISH
6	8.94	.048	.820	0.37	PORIFERA
7	6.87	.037	.856	0.68	PLEURONECTES QUADRITUBERCULATUS
8	4.89	.026	.883	0.36	STARFISH UNIDENT
9	2.86	.015	.898	0.95	MYOXOCEPHALUS SP
10	2.76	.015	.913	0.51	LIMANDA PROBOSCIDEA
11	2.76	.015	.927	0.59	WHELK UNIDENT
12	2.09	.011	.939	0.75	HIPPOGLOSSOIDES ELASSODON
13	1.75	.009	.948	0.34	BOLTENIA SP
14	1.74	.009	.957	0.61	THERAGRA CHALCUGRAMMA
15	1.21	.006	.964	0.46	GORGONOCEPHALUS CARYI
16	1.04	.006	.969	0.46	PAGURIDAE
17	0.64	.003	.973	0.32	SCYPHOZOA
18	0.51	.003	.975	0.86	AGONUS ACIPENSERINUS
19	0.45	.002	.978	0.41	CYCLOPTERIDAE
20	0.45	.002	.980	0.47	HOLOTHUROIDEA UNIDENT
21	0.41	.002	.982	0.51	ERIMACRUS ISENBECKII
22	0.35	.002	.984	0.44	REINHARDTIUS HIPPOGLOSSOIDES
23	0.29	.002	.986	0.15	HALOCYNTHIA SP
24	0.27	.001	.987	0.32	ASCIDIAN UNIDENT
25	0.23	.001	.989	0.56	GADUS MACROCEPHALUS
26	0.22	.001	.990	0.03	GASTROPOD UNIDENT
27	0.21	.001	.991	0.47	GYMNOCANTHUS SP

TOTAL 186.71

\* NUMBER OF HAULS= 59, MEAN DEPTH= 61.7M (RANGE= 29- 90M)

Table C-3. Site Group 1B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	61.79	.581	.581	0.75	FIVE RAY STARFISH
2	12.80	.120	.701	0.50	ASCIDIAN UNIDENT
3	11.00	.103	.805	1.00	PARALITHODES CANTISCHATICA
4	9.30	.087	.892	1.00	LIMANDA ASPERA
5	3.09	.029	.921	1.00	LEPIDOPSETTA BILINEATA
6	1.18	.011	.932	0.75	MYOXOCEPHALUS SP
7	1.18	.011	.943	0.75	HOLOTHUROIDEA UNIDENT
8	1.00	.009	.953	0.75	PLATICHTHYS STELLATUS
9	0.91	.009	.961	0.75	GADUS MACROCEPHALUS
10	0.82	.008	.969	1.00	GYMNOCANTHUS SP
11	0.72	.007	.976	0.75	HIPPOGLOSSUS STENOLEPIS
12	0.63	.006	.982	0.75	AGONUS ACIPENSERINUS
13	0.44	.004	.986	1.00	LIMANDA PROBDSCIDEA
14	0.32	.003	.989	0.50	SEA ANEMONE UNIDENT
15	0.29	.003	.992	0.75	THERAGRA CHALCOGRAMMA

TOTAL 106.37

\* NUMBER OF HAULS- 4, MEAN DEPTH= 38.9M (RANGE= 33- 48M)

Table C-4. Site Group 2

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	62.94	.562	.562	0.98	THERAGRA CHALCOGRAMMA
2	11.07	.099	.661	0.98	CHIONOECETES SP
3	5.70	.051	.712	0.92	HIPPOGLOSSOIDES ELASSODON
4	5.12	.046	.758	0.94	GADUS MACROCEPHALUS
5	5.04	.045	.803	0.14	ZOARCIDAE
6	4.71	.042	.845	0.24	PARALITHODES CAMTSCHATICA
7	3.82	.034	.879	0.45	LYCODES BREVIPES
8	1.56	.014	.893	0.61	LEPIDOPSETTA BILINEATA
9	1.40	.013	.906	0.02	AMMODYTES HEXAPTERUS
10	1.21	.011	.916	0.76	REINHARDTIUS HIPPOGLOSSOIDES
11	1.08	.010	.926	0.63	ATHERESTHES SP
12	0.98	.009	.935	0.43	SEA ANEMONE UNIDENT
13	0.73	.007	.941	0.35	LIMANDA ASPERA
14	0.72	.006	.948	0.47	RAJA SP
15	0.69	.006	.954	0.49	HEMILEPIDOTUS JORDANI
16	0.63	.006	.959	0.22	GORGONOCEPHALUS CARYI
17	0.50	.004	.964	0.55	WHELK UNIDENT
18	0.47	.004	.968	0.33	FIVE RAY STARFISH
19	0.39	.003	.972	0.16	ERIMACRUS ISENBECKII
20	0.36	.003	.975	0.59	SHRIMP UNIDENT
21	0.34	.003	.978	0.14	PARALITHODES PLATYPUS
22	0.34	.003	.981	0.41	MYOXOCEPHALUS SP
23	0.27	.002	.983	0.39	PAGURIDAE
24	0.25	.002	.986	0.43	HIPPOGLOSSUS STENOLEPIS
25	0.23	.002	.988	0.47	DASYCOTTUS SETIGER
26	0.21	.002	.989	0.27	THALEICHTHYS PACIFICUS
27	0.17	.002	.991	0.43	LYCODES PALEARIS

TOTAL 111.93

\* NUMBER OF HAULS= 49, MEAN DEPTH=112.2M (RANGE= 55-157M)

Table C-5. Site Group 2A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	78.09	.602	.602	0.97	THERAGRA CHALCOGRAMMA
2	9.77	.075	.677	1.00	CHIONOECETES SP
3	6.82	.053	.730	1.00	HIPPOGLOSSOIDES ELASSODON
4	6.31	.049	.778	0.15	ZOARCIDAE
5	6.07	.047	.825	0.97	GADUS MACROCEPHALUS
6	5.84	.045	.870	0.26	PARALITHODES CAMTSCHATICA
7	4.80	.037	.907	0.51	LYCODES BREVIPES
8	1.76	.014	.920	0.03	AMMODYTES HEXAPTERUS
9	1.32	.010	.931	0.74	REINHARDTIUS HIPPOGLOSSOIDES
10	1.28	.010	.941	0.77	ATHERESTHES SP
11	1.05	.008	.949	0.51	LEPIDOPSETTA BILINEATA
12	0.99	.008	.956	0.41	SEA ANEMONE UNIDENT
13	0.88	.007	.963	0.54	RAJA SP
14	0.77	.006	.969	0.26	GORGONOCEPHALUS CARYI
15	0.45	.003	.972	0.67	SHRIMP UNIDENT
16	0.40	.003	.976	0.21	LIMANDA ASPERA
17	0.32	.002	.978	0.26	MYOXOCEPHALUS SP
18	0.30	.002	.980	0.44	HIPPOGLOSSUS STENOLEPIS
19	0.28	.002	.983	0.56	DASYCOTTUS SETIGER
20	0.26	.002	.985	0.33	THALEICHTHYS PACIFICUS
21	0.22	.002	.986	0.36	PAGURIDAE
22	0.20	.002	.988	0.41	LYCODES PALEARIS
23	0.14	.001	.989	0.38	SEA PEN UNIDENT
24	0.14	.001	.990	0.10	OSMERIDAE

TOTAL 129.78

\* NUMBER OF HAULS- 39, MEAN DEPTH=118.5M (RANGE= 66-150M)

Table C-6. Site Group 2Ai

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	72.73	.678	.678	1.00	THERAGRA CHALCOGRAMMA
2	6.87	.064	.742	1.00	HIPPOGLOSSOIDES ELASSODON
3	6.52	.061	.802	0.97	GADUS MACROCEPHALUS
4	6.03	.056	.859	0.65	LYCODES BREVIPES
5	4.96	.046	.905	1.00	CHIONOECETES SP
6	1.47	.014	.919	0.77	REINHARDTIUS HIPPOGLOSSOIDES
7	1.47	.014	.932	0.77	ATHERESTHES SP
8	0.96	.009	.941	0.32	GORGONOCEPHALUS CARYI
9	0.95	.009	.950	0.45	SEA ANEMONE UNIDENT
10	0.80	.007	.958	0.06	PARALITHODES CAMTSCHATICA
11	0.74	.007	.964	0.52	RAJA SP
12	0.68	.006	.971	0.45	LEPIDOPSETTA BILINEATA
13	0.53	.005	.976	0.68	SHRIMP UNIDENT
14	0.36	.003	.979	0.52	HIPPOGLOSSUS STENOLEPIS
15	0.32	.003	.982	0.42	THALEICHTHYS PACIFICUS
16	0.26	.002	.984	0.52	LYCODES PALEARIS
17	0.18	.002	.986	0.45	SEA PEN UNIDENT
18	0.17	.002	.988	0.52	DASYCOTTUS SETIGER
19	0.16	.001	.989	0.45	HEMITRIPTERUS BOLINI
20	0.13	.001	.990	0.52	HEMILEPIDOTUS JORDANI

TOTAL 107.34

\* NUMBER OF HAULS- 31, MEAN DEPTH=122.9M (RANGE= 88-150M)



Table C-7. Site Group 2Aia

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	37.52	.485	.485	1.00	THERAGRA CHALCOGRAMMA
2	9.23	.119	.604	1.00	HIPPOGLOSSOIDES ELASSODON
3	8.50	.110	.714	0.91	LYCODES BREVIPE
4	5.38	.070	.784	1.00	CHIONOECETES SP
5	5.36	.069	.853	1.00	GADUS MACROCEPHALUS
6	2.02	.026	.879	0.91	REINHARDTIUS HIPPOGLOSSOIDES
7	1.31	.017	.896	0.68	ATHFRESTHES SP
8	1.22	.016	.912	0.55	SEA ANEMONE UNIDENT
9	1.13	.015	.926	0.09	PARALITHODES CAMTSCHATICA
10	0.81	.010	.937	0.55	RAJA SP
11	0.74	.010	.946	0.62	SHRIMP UNIDENT
12	0.67	.009	.955	0.32	LEPIDOPSETTA BILINEATA
13	0.64	.008	.963	0.23	GORGONOCEPHALUS CARYI
14	0.47	.006	.969	0.55	HIPPOGLOSSUS STENDLEPIS
15	0.46	.006	.975	0.59	THALEICHTHYS PACIFICUS
16	0.24	.003	.978	0.68	DASYCOTTUS SETIGER
17	0.21	.003	.981	0.45	SEA PEN UNIDENT
18	0.16	.002	.983	0.09	PARALITHODES PLATYPUS
19	0.15	.002	.985	0.27	FIVE RAY STARFISH
20	0.14	.002	.987	0.45	LYCODES PALEARIS
21	0.14	.002	.988	0.32	SCYPHOZOA
22	0.12	.002	.990	0.45	WHELK UNIDENT
23	0.12	.002	.991	0.36	HEMILEPIDOTUS JORDANI

TOTAL 77.39

\* NUMBER OF HAULS- 22, MEAN DEPTH=119.4M (RANGE= 88-150M)

Table C-8. Site Group 2Aib

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	158.81	.880	.880	1.00	THERAGRA CHALCOGRAMMA
2	9.38	.052	.932	0.89	GADUS MACROCEPHALUS
3	3.92	.022	.953	1.00	CHIONOECETES SP
4	1.88	.010	.964	1.00	ATHERESTHES SP
5	1.75	.010	.973	0.56	GORGONOCEPHALUS CARYI
6	1.10	.006	.979	1.00	HIPPOGLOSSOIDES ELASSODON
7	0.70	.004	.983	0.78	LEPIDOPSETTA BILINEATA
8	0.57	.003	.987	0.44	RAJA SP
9	0.55	.003	.990	0.67	LYCODES PALEARIS
10	0.27	.001	.991	0.33	HEMITRIPTERUS BOLINI

TOTAL 180.55

\* NUMBER OF HAULS- 9, MEAN DEPTH=131.5M (RANGE=117-143M)

Table C-9. Site Group 2Aii

\*\*\*\*\*  
 MEAN PROP. CUMUL. FREQ.  
 CPUE OF PROP. OF  
 (KG/HA) CPUE OF CPUE OCCURR. TAXA  
 \*\*\*\*\*

1	98.88	.456	.456	0.88	THERAGRA CHALCOGRAMMA
2	30.76	.142	.598	0.75	ZOARCIDAE
3	28.40	.131	.729	1.00	CHIONOECETES SP
4	25.38	.117	.846	1.00	PARALITHODES CAMTSCHATICA
5	8.59	.040	.886	0.13	AMMODYTES HEXAPTERUS
6	6.61	.030	.916	1.00	HIPPOGLOSSOIDES ELASSODON
7	4.29	.020	.936	1.00	GADUS MACROCEPHALUS
8	2.48	.011	.948	0.75	LEPIDOPSETTA BILINEATA
9	1.66	.008	.955	0.63	LIMANDA ASPERA
10	1.46	.007	.962	0.88	MYOXOCEPHALUS SP
11	1.42	.007	.969	0.63	RAJA SP
12	1.18	.005	.974	0.25	SEA ANEMONE UNIDENT
13	1.03	.005	.979	0.63	PAGURIDAE
14	0.74	.003	.982	0.63	REINHARDTIUS HIPPOGLOSSOIDES
15	0.73	.003	.986	0.75	DASYCOTTUS SETIGER
16	0.69	.003	.989	0.50	OSMERIDAE
17	0.56	.003	.991	0.25	ERIMACRUS ISENBECKII

TOTAL 216.73

\* NUMBER OF HAULS- 8, MEAN DEPTH=101.5M (RANGE= 66-121M)

Table C-10. Site Group 2B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	20.18	.465	.465	1.00	CHIONOECETES SP
2	3.91	.090	.555	1.00	LEPIDOPSETTA BILINEATA
3	2.97	.068	.623	0.75	HEMILEPIDOTUS JORDANI
4	2.67	.062	.685	1.00	THERAGRA CHALCOGRAMMA
5	2.37	.055	.739	0.75	WHELK UNIDENT
6	2.26	.052	.792	1.00	LIMANDA ASPERA
7	1.70	.039	.831	0.75	HIPPOGLOSSOIDES ELASSODON
8	1.57	.036	.867	0.50	PARALITHODES PLATYPUS
9	0.96	.022	.889	0.75	GADUS MACROCEPHALUS
10	0.93	.021	.911	0.88	REINHARDTIUS HIPPOGLOSSOIDES
11	0.68	.016	.926	0.50	SEA ANEMONE UNIDENT
12	0.58	.013	.940	0.75	FIVE RAY STARFISH
13	0.52	.012	.951	0.50	PAGURIDAE
14	0.35	.008	.960	1.00	MYDOXOCEPHALUS SP
15	0.27	.006	.966	0.25	PORIFERA
16	0.25	.006	.972	0.25	BATHYMASTER SIGNATUS
17	0.23	.005	.977	0.50	SCYPHOZOA
18	0.22	.005	.982	0.13	PARALITHODES CAMTSCHATICA
19	0.14	.003	.985	0.25	RAJA SP
20	0.10	.002	.988	0.25	ERIMACRUS ISENBECKII
21	0.09	.002	.990	0.13	ZOARCIDAE
22	0.07	.002	.991	0.63	PLEURONECTES QUADRITUBERCULATUS

TOTAL 43.43

\* NUMBER OF HAULS- 8, MEAN DEPTH= 83.0M (RANGE= 60-101M)

Table C-11. Site Group 3

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	41.55	.479	.479	1.00	THERAGRA CHALCOGRAMMA
2	8.20	.095	.573	1.00	GADUS MACROCEPHALUS
3	7.26	.084	.657	1.00	SEBASTES ALUTUS
4	6.57	.076	.733	1.00	ATHERESTHES SP
5	5.82	.067	.800	1.00	REINHARDTIUS HIPPOGLOSSOIDES
6	3.78	.044	.843	1.00	ANOPILOPOMA FIMBRIA
7	2.01	.023	.866	0.67	GONATUS SP
8	1.82	.021	.888	0.83	HIPPOGLOSSOIDES ELASSODON
9	1.63	.019	.906	1.00	CYCLOPTERIDAE
10	1.17	.013	.920	0.50	HIPPOGLOSSUS STENOLEPIS
11	1.16	.013	.933	0.63	GLYPTOCEPHALUS ZACHIRUS
12	0.90	.010	.944	0.67	RAJA SP
13	0.73	.008	.952	0.17	LITHODES AEQUISPINA
14	0.62	.007	.959	0.33	OPHIUROID UNIDENT
15	0.47	.005	.965	0.83	HEMITRIPTERUS BOLINI
16	0.42	.005	.969	0.50	GORGONOCEPHALUS CARYI
17	0.41	.005	.974	0.67	CHIONOCEPHALUS SP
18	0.39	.005	.979	0.67	SHRIMP UNIDENT
19	0.22	.003	.981	0.33	AGONIDAE
20	0.20	.002	.983	0.17	GONATUS (BERRYTEUTHIS) MAGISTER
21	0.17	.002	.985	0.17	PARALITHODES CAMTSCHATICA
22	0.14	.002	.987	0.67	SEA ANEMONE UNIDENT
23	0.14	.002	.989	0.33	SQUID UNIDENT
24	0.14	.002	.990	0.67	CTENODISCUS CRISPATUS

TOTAL 86.78

\* NUMBER OF HAULS- 6, MEAN DEPTH=311.2M (RANGE=260-476M)

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## APPENDIX D

## Species Assemblages, 1974 Bering Sea Survey

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Table D-1. Site Group 1

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	47.57	.295	.295	0.98	LIMANDA ASPERA
2	24.93	.154	.449	0.84	CHIONOCEETES SP
3	14.97	.093	.542	0.41	LEPTASTERIAS POLARIS
4	12.64	.078	.620	0.93	LEPIDOPSETTA BILINEATA
5	10.67	.066	.686	0.53	PARALITHODES CAMTSCHATICA
6	6.71	.042	.727	0.80	PLEURONECTES QUADRITUBERCULATUS
7	5.89	.036	.764	0.67	THERAGRA CHALCOGRAMMA
8	5.33	.033	.797	0.20	PORIFERA
9	3.84	.024	.821	0.66	MYOXOCEPHALUS SP
10	2.73	.017	.838	0.47	NEPTUNEA SP
11	2.55	.016	.853	0.30	LEPTASTERIAS SP
12	2.31	.014	.868	0.31	WHELK UNIDENT
13	1.73	.011	.878	0.54	HIPPOGLOSSOIDES ELASSODON
14	1.39	.009	.887	0.75	REINHARDTIUS HIPPOGLOSSOIDES
15	1.39	.009	.896	0.16	BOLTENIA OVIFERA
16	1.28	.008	.904	0.19	SEA ANEMONE UNIDENT
17	1.28	.008	.911	0.41	LIMANDA PROBOSCIDEA
18	1.09	.007	.918	0.49	GORGONOCEPHALUS CARYI
19	1.00	.006	.924	0.47	MALLOTUS VILLOSUS
20	0.99	.006	.931	0.37	GADUS MACROCEPHALUS
21	0.81	.005	.936	0.29	HALOCYNTHIA SP
22	0.75	.005	.940	0.01	MAJIDAE UNIDENT
23	0.73	.005	.945	0.20	STARFISH UNIDENT
24	0.59	.004	.948	0.34	GYMNOCANTHUS SP
25	0.58	.004	.952	0.56	HYAS SP
26	0.54	.003	.955	0.59	PAGURIDAE
27	0.51	.003	.958	0.05	PARALITHODES PLATYPUS
28	0.50	.003	.962	0.70	AGONUS ACIPENSERINUS
29	0.45	.003	.964	0.13	CUCUMARIA SP
30	0.42	.003	.967	0.26	HIPPOGLOSSUS STENOLEPIS
31	0.40	.002	.969	0.04	ASCIDIAN UNIDENT
32	0.38	.002	.972	0.19	INVERTEBRATE UNIDENT
33	0.38	.002	.974	0.28	SCYPHOZOA
34	0.36	.002	.976	0.02	LEPTASTERIAS CAMTSCHATICA
35	0.32	.002	.978	0.18	COMPOUND ASCIDIAN UNIDENT
36	0.32	.002	.980	0.13	ECHINARACHNIUS PARMA
37	0.29	.002	.982	0.10	ATHERESTHES SP
38	0.25	.002	.984	0.26	ERIMACRUS ISENBECKII
39	0.19	.001	.985	0.05	VOLUTOPIUS SP
40	0.19	.001	.986	0.08	HEMILEPIDOTUS JORDANI
41	0.19	.001	.987	0.02	HALOCYNTHIA AURANTIUM
42	0.17	.001	.988	0.13	ZOARCIDAE
43	0.15	.001	.989	0.25	CYCLOPTERIDAE

(CONTINUED ON NEXT PAGE)

Table D-1. Site Group 1 (continued)

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*****
      MEAN  PROP. CUMUL. FREQ.
      CPUE   OF  PROP.   OF
      (KG/HA) CPUE OF CPUE OCCURR. TAXA
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44      0.13  .001  .990  0.06  EVASTERIAS SP

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TOTAL  161.52

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*  NUMBER OF HAULS=126, MEAN DEPTH= 62.5M (RANGE= 29-132M)

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Table D-2. Site Group 1A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	63.73	.328	.328	1.00	LIMANDA ASPERA
2	22.45	.116	.444	0.50	LEPTASTERIAS POLARIS
3	19.93	.103	.546	0.82	CHIONOECETES SP
4	17.52	.090	.636	0.99	LEPIDOPSETTA BILINEATA
5	16.17	.083	.720	0.75	PARALITHODES CAMTSCHATICA
6	8.63	.044	.764	0.74	THERAGRA CHALCOGRAMMA
7	8.00	.041	.805	0.27	PORIFERA
8	4.67	.024	.829	0.80	PLEURONECTES QUADRITUBERCULATUS
9	4.35	.022	.852	0.90	MYOXOCEPHALUS SP
10	2.58	.013	.865	0.20	LEPTASTERIAS SP
11	2.30	.012	.877	0.32	WHELK UNIDENT
12	2.28	.012	.888	0.58	HIPPOGLOSSOIDES ELASSODON
13	2.11	.011	.899	0.24	BOLTENIA OVIFERA
14	1.94	.010	.909	0.61	LIMANDA PROBOSCIDEA
15	1.70	.009	.918	0.43	NEPTUNEA SP
16	1.38	.007	.925	0.20	SEA ANEMONE UNIDENT
17	1.14	.006	.931	0.01	MAJIDAE UNIDENT
18	0.93	.005	.936	0.27	HALOCYNTHIA SP
19	0.88	.005	.940	0.46	GYMNOCANTHUS SP
20	0.82	.004	.944	0.38	GADUS MACROCEPHALUS
21	0.76	.004	.948	0.20	STARFISH UNIDENT
22	0.75	.004	.952	0.62	REINHARDTIUS HIPPOGLOSSOIDES
23	0.75	.004	.956	0.56	HYAS SP
24	0.73	.004	.960	0.32	PARALITHODES PLATYPUS
25	0.72	.004	.963	0.80	AGONUS ACIPENSERINUS
26	0.69	.004	.967	0.20	CUCUMARIA SP
27	0.56	.003	.970	0.37	SCYPHOZOA
28	0.48	.002	.972	0.25	COMPOUND ASCIDIAN UNIDENT
29	0.46	.002	.975	0.37	HIPPOGLOSSUS STENOLEPIS
30	0.43	.002	.977	0.12	ATHERESTHES SP
31	0.43	.002	.979	0.17	ECHINARACHNIUS PARMA
32	0.40	.002	.981	0.17	INVERTEBRATE UNIDENT
33	0.38	.002	.983	0.32	GORGONOCEPHALUS CARYI
34	0.37	.002	.985	0.43	MALLOTUS VILLOSUS
35	0.35	.002	.987	0.49	PAGURIDAE
36	0.30	.002	.988	0.32	ERIMACRUS ISENBECKII
37	0.20	.001	.989	0.11	HEMILEPIDOTUS JORDANI
38	0.17	.001	.990	0.13	ZOARCIDAE

TOTAL 194.29

\* NUMBER OF HAULS- 84, MEAN DEPTH= 58.2M (RANGE= 29-101M)

Table D-3. Site Group 1Ai

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	81.85	.345	.345	1.00	LIMANDA ASPERA
2	26.10	.119	.464	0.60	LEPTASTERIAS POLARIS
3	26.28	.111	.575	0.89	CHIONOCEETES SP
4	21.74	.092	.667	1.00	LEPIDOPSETTA BILINEATA
5	21.50	.091	.757	0.90	PARALITHODES CAMTSCHATICA
6	11.48	.048	.806	0.71	THERAGRA CHALCOGRAMMA
7	10.64	.045	.851	0.30	PORIFERA
8	3.98	.017	.868	0.75	PLEURONECTES QUADRITUBERCULATUS
9	3.76	.016	.883	0.92	HYOXOCEPHALUS SP
10	3.04	.013	.896	0.70	HIPPOGLOSSOIDES ELASSODON
11	2.81	.012	.908	0.29	BOLTENIA OVIFERA
12	2.70	.011	.919	0.33	WHELK UNIDENT
13	2.57	.011	.930	0.65	LIMANDA PROBOSCIDEA
14	1.51	.006	.937	0.02	HAJIDAE UNIDENT
15	1.28	.005	.942	0.17	SEA ANEMONE UNIDENT
16	1.16	.005	.947	0.40	NEPTUNEA SP
17	1.10	.005	.952	0.52	GYMNOCANTHUS SP
18	1.08	.005	.956	0.40	GADUS MACROCEPHALUS
19	1.01	.004	.960	0.27	STARFISH UNIDENT
20	0.97	.004	.965	0.03	PARALITHODES PLATYPUS
21	0.92	.004	.968	0.27	CUCUMARIA SP
22	0.78	.003	.972	0.57	REINHARDTIUS HIPPOGLOSSOIDES
23	0.70	.003	.975	0.44	SCYPHOZOA
24	0.58	.002	.977	0.16	ATHERESTHES SP
25	0.57	.002	.979	0.22	ECHINARACHNIUS PARMA
26	0.54	.002	.982	0.27	COMPOUND ASCIDIAN UNIDENT
27	0.40	.002	.983	0.27	GORGONOCEPHALUS CARYI
28	0.38	.002	.985	0.37	ERIMACRUS ISENBECKII
29	0.37	.002	.987	0.59	HYAS SP
30	0.34	.001	.988	0.81	AGONUS ACIPENSERINUS
31	0.26	.001	.989	0.14	HEMILEPIDOTUS JORDANI
32	0.24	.001	.990	0.44	HIPPOGLOSSUS STENOLEPIS

TOTAL 236.96

\* NUMBER OF HAULS= 63, MEAN DEPTH= 60.9M (RANGE= 29-101M)

Table D-4. Site Group 1Aii

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	10.29	.155	.155	0.76	LEPTASTERIAS SP
2	9.38	.142	.297	1.00	LIMANDA ASPERA
3	6.73	.101	.398	0.95	PLEURONECTES QUADRITUBERCULATUS
4	6.10	.092	.490	0.86	MYOXOCEPHALUS SP
5	5.48	.083	.573	0.19	LEPTASTERIAS POLARIS
6	4.85	.073	.646	0.95	LEPIDOPSETTA BILINEATA
7	3.31	.050	.696	0.52	NEPTUNEA SP
8	3.17	.048	.744	0.67	HALOCYNTHIA SP
9	1.89	.029	.772	0.48	HYAS SP
10	1.85	.028	.800	0.76	AGONUS ACIPENSERINUS
11	1.67	.025	.825	0.29	SEA ANEMONE UNIDENT
12	1.32	.020	.845	0.48	INVERTEBRATE UNIDENT
13	1.25	.019	.864	0.86	MALLOTUS VILLOSUS
14	1.12	.017	.881	0.14	HIPPOGLOSSUS STENOLEPIS
15	1.09	.016	.898	0.29	WHELK UNIDENT
16	1.05	.016	.913	0.86	PAGURIDAE
17	0.87	.013	.926	0.62	CHIONOECETES SP
18	0.68	.010	.937	0.76	REINHARDTIUS HIPPOGLOSSOIDES
19	0.55	.008	.945	0.33	PUGETTIA SP
20	0.41	.006	.951	0.05	GASTROPOD UNIDENT
21	0.39	.006	.957	0.19	EVASTERIAS SP
22	0.32	.005	.962	0.48	GORGONOCEPHALUS CARYI
23	0.28	.004	.966	0.19	COMPOUND ASCIDIAN UNIDENT
24	0.23	.003	.970	0.29	GYMNOCANTHUS SP
25	0.22	.003	.973	0.10	NEPTUNEA EULIMATA
26	0.20	.003	.976	0.29	PARALITHODES CAMTSCHATICA
27	0.20	.003	.979	0.14	NEPTUNEA VENTRICOSA
28	0.18	.003	.982	0.76	SHRIMP UNIDENT
29	0.13	.002	.984	0.14	SCYPHOZOA
30	0.11	.002	.985	0.81	THERAGRA CHALCOGRAMMA
31	0.10	.001	.987	0.43	SPISULA POLYNIA
32	0.09	.001	.988	0.14	CYCLOPTERIDAE
33	0.09	.001	.990	0.29	SERRIPES GROENLANDICUS
34	0.08	.001	.991	0.19	PORIFERA

TOTAL 66.26

\* NUMBER OF HAULS- 21, MEAN DEPTH= 50.1M (RANGE= 35- 75M)

Table D-5. Site Group 1A11a

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	12.77	.169	.169	1.00	LIMANDA ASPERA
2	12.16	.161	.331	0.64	LEPTASTERIAS SP
3	9.35	.124	.455	1.00	PLEURONECTES QUADRITUBERCULATUS
4	8.68	.115	.570	0.93	MYOXOCEPHALUS SP
5	8.22	.109	.679	0.29	LEPTASTERIAS POLARIS
6	4.97	.066	.745	0.79	NEPTUNEA SP
7	3.30	.044	.788	0.93	LEPIDOPSETTA BILINEATA
8	2.76	.037	.825	0.93	AGONUS ACIPENSERINUS
9	2.72	.036	.861	0.50	HYAS SP
10	1.67	.022	.883	0.21	HIPPOGLOSSUS STENOLEPIS
11	1.37	.018	.901	0.79	MALLOTUS VILLOSUS
12	1.30	.017	.919	0.93	CHIONOECETES SP
13	1.13	.015	.934	0.71	HALOCYNTHIA SP
14	0.82	.011	.944	0.50	PUGETTIA SP
15	0.54	.007	.952	0.64	INVERTEBRATE UNIDENT
16	0.34	.004	.956	0.86	PAGURIDAE
17	0.34	.004	.961	0.36	GYMNOCANTHUS SP
18	0.33	.004	.965	0.14	NEPTUNEA EULIMATA
19	0.33	.004	.969	0.64	REINHARDTIUS HIPPOGLOSSOIDES
20	0.30	.004	.973	0.43	PARALITHODES CAMTSCHATICA
21	0.30	.004	.977	0.21	NEPTUNEA VENTRICOSA
22	0.26	.003	.981	0.71	SHRIMP UNIDENT
23	0.24	.003	.984	0.50	GORGONOCEPHALUS CARYI
24	0.16	.002	.986	0.14	COMPOUND ASCIDIAN UNIDENT
25	0.15	.002	.988	0.64	SPISULA POLYNIMA
26	0.13	.002	.990	0.71	THERAGRA CHALCOGRAMMA
27	0.13	.002	.992	0.36	SERRIPES GROENLANDICUS

TOTAL 75.41

\* NUMBER OF HAULS- 14, MEAN DEPTH= 41.8M (RANGE= 35- 48M)

Table D-6. Site Group 1Aiib

\*\*\*\*\*  
 MEAN PROP. CUMUL. FREQ.  
 CPUE OF PROP. OF  
 (KG/HA) CPUE OF CPUE OCCURR. TAXA  
 \*\*\*\*\*

1	7.94	.165	.165	1.00	LEPIDOPSETTA BILINEATA
2	7.25	.151	.316	0.57	HALOCYNTHIA SP
3	6.56	.137	.453	1.00	LEPTASTERIAS SP
4	5.00	.104	.557	0.86	SEA ANEMONE UNIDENT
5	3.27	.068	.625	0.86	WHELK UNIDENT
6	2.87	.060	.685	0.14	INVERTEBRATE UNIDENT
7	2.59	.054	.739	1.00	LINANDA ASPERA
8	2.47	.051	.790	0.86	PAGURIDAE
9	1.49	.031	.821	0.86	PLEURONECTES QUADRITUBERCULATUS
10	1.38	.029	.850	1.00	REINHARDTIUS HIPPOGLOSSOIDES
11	1.23	.026	.876	0.14	GASTROPOD UNIDENT
12	1.18	.025	.900	0.57	EVASTERIAS SP
13	1.02	.021	.921	1.00	MALLOTUS VILLOSUS
14	0.94	.020	.941	0.71	HYOXOCEPHALUS SP
15	0.51	.011	.951	0.29	COMPOUND ASCIDIAN UNIDENT
16	0.50	.010	.962	0.43	GORGONOCEPHALUS CARYI
17	0.40	.008	.970	0.43	SCYPHOZOA
18	0.26	.005	.975	0.43	CYCLOPTERIDAE
19	0.23	.005	.980	0.43	HYAS SP
20	0.17	.004	.984	0.29	PORIFERA
21	0.15	.003	.987	0.43	EUMICROTREMUS ORBIS
22	0.14	.003	.990	0.43	ERIMACRUS ISENBECKII
23	0.09	.002	.992	0.71	GADUS MACROCEPHALUS

TOTAL 48.02

\* NUMBER OF HAULS= 7, MEAN DEPTH= 66.6M (RANGE= 57- 75M)

Table D-7. Site Group 1B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OC:URR.	TAXA
*****					
1	41.00	.399	.399	0.97	CHIONOECETES SP
2	19.48	.190	.589	0.94	LIMANDA ASPERA
3	12.91	.126	.714	0.81	PLEURONECTES QUADRITUBERCULATUS
4	5.27	.051	.765	0.58	NEPTUNEA SP
5	2.88	.028	.793	0.83	GORGONOCEPHALUS CARYI
6	2.83	.028	.821	1.00	REINHARDTIUS HIPPOGLOSSOIDES
7	2.15	.021	.842	0.25	WHELK UNIDENT
8	1.99	.019	.861	0.75	MYOXOCEPHALUS SP
9	1.97	.019	.880	0.61	LEPIDOPSETTA BILINEATA
10	1.69	.016	.897	0.39	LEPTASTERIAS SP
11	1.29	.013	.910	0.08	LEPTASTERIAS CAMTSCHATICA
12	1.05	.010	.920	0.08	ASCIDIAN UNIDENT
13	0.84	.008	.928	0.22	STARFISH UNIDENT
14	0.84	.008	.936	0.28	LEPTASTERIAS POLARIS
15	0.68	.007	.943	0.14	VOLUTOPIUS SP
16	0.67	.007	.949	0.06	HALOCYNTHIA AURANTIUM
17	0.56	.005	.955	0.50	THERAGRA CHALCOGRAMMA
18	0.49	.005	.959	0.36	HALOCYNTHIA SP
19	0.41	.004	.963	0.50	HIPPOGLOSSOIDES ELASSODON
20	0.32	.003	.966	0.22	INVERTEBRATE UNIDENT
21	0.26	.003	.969	0.25	CYCLOPTERIDAE
22	0.25	.002	.971	0.58	HYAS SP
23	0.23	.002	.974	0.03	HEMILEPIDOTUS JORDANI
24	0.21	.002	.976	0.11	NEPTUNEA VENTRICOSA
25	0.21	.002	.978	0.72	PAGURIDAE
26	0.20	.002	.980	0.14	PARALITHODES CAMTSCHATICA
27	0.19	.002	.982	0.03	CLINOCARDIUM SP
28	0.19	.002	.983	0.06	NEPTUNEA EULIMATA
29	0.13	.001	.985	0.69	SHRIMP UNIDENT
30	0.13	.001	.986	0.06	ECHINARACHNIUS PARMA
31	0.12	.001	.987	0.14	PARALITHODES PLATYPUS
32	0.11	.001	.988	0.11	ZOARCIDAE
33	0.10	.001	.989	0.08	BOLTENIA SP
34	0.09	.001	.990	0.22	LYCODES PALEARIS
35	0.08	.001	.991	0.36	SNAIL (GASTROPOD) EGGS

TOTAL 102.75

\* NUMBER OF HAULS- 36, MEAN DEPTH= 71.7M (RANGE= 53-132M)



Table D-8. Site Group 2

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	OCCURR.	TAXA
*****					
1	68.14	.377	.377	1.00	THERAGRA CHALCOGRAMMA
2	17.93	.099	.476	0.64	CHIONOECETES SP
3	16.33	.090	.566	1.00	HIPPOGLOSSOIDES ELASSODON
4	10.57	.058	.624	0.59	SEA ANEMONE UNIDENT
5	10.41	.058	.682	0.46	LYCODES BREVIPES
6	9.14	.050	.732	0.23	ZOARCIDAE
7	7.12	.039	.772	0.90	GADUS MACROCEPHALUS
8	5.80	.032	.804	0.82	RAJA SP
9	5.37	.030	.833	0.41	GORGONOCEPHALUS CARYI
10	5.36	.030	.863	0.33	PARALITHODES CAMTSCHATICA
11	3.16	.017	.880	0.87	REINHARDTIUS HIPPOGLOSSOIDES
12	2.75	.015	.896	0.54	LYCODES PALEARIS
13	2.35	.013	.909	0.72	ATHERESTHES SP
14	2.34	.013	.922	0.18	CTENODISCUS CRISPATUS
15	1.70	.009	.931	0.36	WHELK UNIDENT
16	1.43	.008	.939	0.31	EVASTERIAS SP
17	1.23	.007	.946	0.59	LEPIDOPSETTA BILINEATA
18	1.06	.006	.952	0.59	DASYCOTTUS SETIGER
19	1.02	.006	.957	0.23	HIPPOGLOSSUS STENOLEPIS
20	0.88	.005	.962	0.67	HEMITRIPTERUS BOLINI
21	0.75	.004	.966	0.10	SEBASTES ALUTUS
22	0.56	.003	.969	0.36	GLYPTOCEPHALUS ZACHIRUS
23	0.51	.003	.972	0.15	OCTOPUS DOFLEINI
24	0.50	.003	.975	0.36	THALEICHTHYS PACIFICUS
25	0.39	.002	.977	0.59	SHRIMP UNIDENT
26	0.37	.002	.979	0.44	PAGURIDAE
27	0.31	.002	.981	0.46	HEMILEPIDOTUS JORDANI
28	0.28	.002	.982	0.08	LEPTASTERIAS SP
29	0.28	.002	.984	0.15	NEPTUNEA SP
30	0.28	.002	.986	0.33	CYCLOPTERIDAE
31	0.27	.001	.987	0.51	MYOXOCEPHALUS SP
32	0.25	.001	.988	0.38	BATHYMASTER SIGNATUS
33	0.24	.001	.990	0.15	SCYPHOZOA
34	0.23	.001	.991	0.28	LIMANDA ASPERA

TOTAL 180.97

\* NUMBER OF HAULS- 39, MEAN DEPTH=121.0M (RANGE= 77-252M)

Table D-9. Site Group 2A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	82.18	.472	.472	1.00	THERAGRA CHALCOGRAMMA
2	20.68	.119	.590	0.82	CHIONOECETES SP
3	16.20	.093	.683	0.41	ZOARCIDAE
4	9.47	.054	.738	0.50	PARALITHODES CAMTSCHATICA
5	7.14	.041	.779	0.41	SEA ANEMONE UNIDENT
6	6.84	.039	.818	0.82	GADUS MACROCEPHALUS
7	6.82	.039	.857	1.00	HIPPOGLOSSOIDES ELASSODON
8	3.40	.019	.877	0.95	REINHARDTIUS HIPPOGLOSSOIDES
9	2.69	.015	.892	0.14	CTENODISCUS CRISPATUS
10	2.66	.015	.907	0.59	LYCODES PALEARIS
11	2.64	.015	.922	0.27	GORGONOCEPHALUS CARYI
12	2.23	.013	.935	0.73	RAJA SP
13	1.52	.009	.944	0.32	EVASTERIAS SP
14	1.39	.008	.952	0.68	DASYCOTTUS SETIGER
15	1.13	.007	.958	0.64	LEPIDOPSETTA BILINEATA
16	0.90	.005	.963	0.32	LYCODES BREVIPIES
17	0.63	.004	.967	0.45	WHELK UNIDENT
18	0.60	.003	.971	0.50	ATHERESTHES SP
19	0.59	.003	.974	0.45	SHRIMP UNIDENT
20	0.53	.003	.977	0.50	PAGURIDAE
21	0.50	.003	.980	0.14	LEPTASTERIAS SP
22	0.50	.003	.983	0.27	NEPTUNEA SP
23	0.41	.002	.985	0.50	LIMANDA ASPERA
24	0.40	.002	.987	0.64	MYOXOCEPHALUS SP
25	0.33	.002	.989	0.14	SEA PEN UNIDENT
26	0.31	.002	.991	0.36	BATHYMASTER SIGNATUS

TOTAL 174.24

\* NUMBER OF HAULS= 22, MEAN DEPTH=108.1M (RANGE= 77-137M)

Table D-10. Site Group 2B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	49.97	.263	.263	1.00	THERAGRA CHALCOGRAMMA
2	28.64	.151	.414	1.00	HIPPOGLOSSOIDES ELASSODON
3	22.72	.120	.534	0.65	LYCODES BREVIPES
4	15.01	.079	.613	0.82	SEA ANEMONE UNIDENT
5	14.38	.076	.689	0.41	CHIONOECETES SP
6	10.41	.055	.744	0.94	RAJA SP
7	8.89	.047	.791	0.59	GORGONOCEPHALUS CARYI
8	7.49	.040	.830	1.00	GADUS MACROCEPHALUS
9	4.63	.024	.855	1.00	ATHERESTHES SP
10	3.10	.016	.871	0.24	WHELK UNIDENT
11	2.87	.015	.886	0.47	LYCODES PALEARIS
12	2.85	.015	.901	0.76	REINHARDTIUS HIPPOGLOSSOIDES
13	2.26	.012	.913	0.41	HIPPOGLOSSUS STENOLEPIS
14	1.88	.010	.923	0.24	CTENODISCUS CRISPATUS
15	1.71	.009	.932	0.18	SEBASTES ALUTUS
16	1.65	.009	.941	0.88	HEMITRIPTERUS BOLINI
17	1.36	.007	.948	0.53	LEPIDOPSETTA BILINEATA
18	1.33	.007	.955	0.29	EVASTERIAS SP
19	1.26	.007	.962	0.59	GLYPTOCEPHALUS ZACHIRUS
20	1.18	.006	.968	0.35	OCTOPUS DOFLEINI
21	1.07	.006	.974	0.35	THALEICHTHYS PACIFICUS
22	0.65	.003	.977	0.47	DASYCOTTUS SETIGER
23	0.60	.003	.980	0.47	HEMILEPIDOTUS JORDANI
24	0.60	.003	.983	0.47	CYCLOPTERIDAE
25	0.36	.002	.985	0.47	FUSITRITON OREGONENSIS
26	0.31	.002	.987	0.12	STARFISH UNIDENT
27	0.28	.001	.988	0.53	ERIMACRUS ISENBECKII
28	0.27	.001	.990	0.06	SCYPHOZOA
29	0.25	.001	.991	0.71	COTTIDAE

TOTAL 189.68

• NUMBER OF HAULS- 17, MEAN DEPTH=137.8M (RANGE=106-252M)

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## APPENDIX E

## Species Assemblages, 1975 Bering Sea Survey

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Table E-1. Site Group 1

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	98.06	.364	.364	1.00	LIMANDA ASPERA
2	39.38	.146	.510	0.59	CHIONOECETES OPILO
3	14.98	.056	.565	0.59	PARALITHODES CAMTSCHATICA
4	14.53	.054	.619	0.79	LEPIDOSETTA BILINEATA
5	12.87	.048	.667	0.42	STARFISH UNIDENT
6	12.60	.047	.713	0.38	PLEURONECTES QUADRITUBERCULATUS
7	9.45	.035	.748	0.31	EVASTERIAS ECHINOSOMA
8	9.15	.034	.782	0.55	SCYPHOZOA
9	8.67	.032	.814	0.81	CHIONOECETES BAIRDI
10	5.96	.022	.837	0.74	THERAGRA CHALCOGRAMMA
11	5.62	.021	.857	0.89	MYOXOCEPHALUS SP
12	5.20	.019	.877	0.75	PAGURIDAE
13	4.48	.017	.893	0.12	PARALITHODES PLATYPUS
14	3.76	.014	.907	0.36	GASTROPOD UNIDENT
15	3.13	.012	.919	0.26	BOLTENIA OVIFERA
16	3.05	.011	.930	0.08	ASCIDIAN UNIDENT
17	2.36	.009	.939	0.24	PORIFERA
18	2.32	.009	.947	0.54	LIMANDA PROBOSCIDEA
19	1.43	.005	.953	0.38	ERIMACRUS ISENBECKII
20	1.07	.004	.957	0.04	EVASTERIAS SP
21	1.03	.004	.961	0.38	GYMNOCANTHUS SP
22	1.03	.004	.964	0.25	GORGONOCEPHALUS CARYI
23	0.96	.004	.968	0.67	GADUS MACROCEPHALUS
24	0.96	.004	.971	0.56	MALLOTUS VILLOSUS
25	0.91	.003	.975	0.59	HIPPOGLOSSUS STENDLEPIS
26	0.81	.003	.978	0.56	REINHARDTIUS HIPPOGLOSSOIDES
27	0.81	.003	.981	0.53	HIPPOGLOSSOIDES ELASSODON
28	0.75	.003	.984	0.04	HOLOTHUROIDEA UNIDENT
29	0.60	.002	.986	0.38	CHIONOECETES HYBRID
30	0.46	.002	.988	0.31	PLATICHTHYS STELLATUS
31	0.43	.002	.989	0.76	AGONUS ACIPENSERINUS
32	0.33	.001	.990	0.59	MYAS SP

TOTAL 269.72

\* NUMBER OF HAULS= 85, MEAN DEPTH= 58.4M (RANGE= 26- 93M)

Table E-2. Site Group 1A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	DC:URR.	TAXA
*****					
1	117.63	.478	.478	1.30	LIMANDA ASPERA
2	22.31	.091	.568	0.78	PARALITHODES CANTSCHATICA
3	15.33	.062	.631	0.98	LEPIDOPSETTA BILINEATA
4	14.09	.057	.688	0.46	EVASTERIAS ECHINOSOMA
5	13.61	.055	.743	0.74	SCYPHOZOA
6	11.14	.045	.788	0.86	PLEURONECTES QUADRITUBERCULATUS
7	10.14	.041	.830	0.19	STARFISH UNIDENT
8	9.84	.040	.870	0.74	CHIONOCEOTES BAIRDI
9	4.92	.020	.890	0.88	MYOXOCEPHALUS SP
10	4.66	.019	.909	0.39	BOLTENIA OVIFERA
11	3.46	.014	.923	0.81	LIMANDA PROBOSCIDEA
12	3.15	.013	.935	0.39	CHIONOCEOTES OPILIO
13	1.60	.007	.942	0.15	EVASTERIAS SP
14	1.41	.006	.948	0.70	HALLOTUS VELLOUS
15	1.27	.005	.953	0.75	HIPPOGLOSSUS STENOLEPIS
16	1.21	.005	.958	0.51	GYMNOCANTHUS SP
17	1.15	.005	.962	0.79	THERAGRA CHALCOGRAMMA
18	1.12	.005	.967	0.05	MOLOTHUROIDEA UNIDENT
19	1.05	.004	.971	0.32	PORIFERA
20	0.98	.004	.975	0.47	HIPPOGLOSSOIDES ELASSODON
21	0.87	.004	.979	0.66	GADUS MACROCEPHALUS
22	0.68	.003	.981	0.46	PLATICHTHYS STELLATUS
23	0.49	.002	.983	0.67	PAGURIDAE
24	0.48	.002	.985	0.39	REINHARDTIUS HIPPOGLOSSOIDES
25	0.34	.001	.987	0.75	AGONUS ACIPENSERINUS
26	0.33	.001	.988	0.63	HEXAGRAMMOS STELLERI
27	0.31	.001	.989	0.19	ECHINARACHNIUS PARMA
28	0.31	.001	.991	0.39	WHELK UNIDENT

TOTAL 246.19

\* NUMBER OF HAULS- 57, MEAN DEPTH= 52.8M (RANGE= 26- 84M)



Table E-3. Site Group 1Ai

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OC:URR.	TAXA
*****					
1	107.74	.478	.478	1.00	LIMANDA ASPERA
2	17.25	.077	.554	1.00	PARALITHODES CANTSCHATICA
3	16.20	.072	.626	0.51	EVASTERIAS ECHINOSOMA
4	15.14	.067	.693	0.71	SCYPHOZOA
5	12.81	.057	.750	0.94	PLEURONECTES QUADRITUBERCULATUS
6	12.76	.057	.807	0.98	LEPIDOPSETTA BILINEATA
7	11.45	.051	.858	0.86	CHIONDECETES BAIRDI
8	5.42	.024	.882	0.45	BOLTENIA OVIFERA
9	5.30	.024	.905	0.90	MYOXOCEPHALUS SP
10	3.86	.017	.922	0.82	LIMANDA PROBOSCIDEA
11	3.66	.016	.939	0.45	CHIONDECETES OPILIO
12	1.86	.008	.947	0.06	EVASTERIAS SP
13	1.53	.007	.954	0.73	MALLOTUS VILLOSUS
14	1.33	.006	.959	0.86	THERAGRA CHALCOGRAMMA
15	1.29	.006	.965	0.45	GYMNOCANTHUS SP
16	1.22	.005	.971	0.37	PORIFERA
17	1.14	.005	.976	0.55	HIPPOGLOSSOIDES ELASSODON
18	0.65	.003	.978	0.71	HIPPOGLOSSUS STENDLEPIS
19	0.56	.002	.981	0.45	REINHARDTIUS HIPPOGLOSSOIDES
20	0.37	.002	.983	0.82	AGONUS ACIPENSERINUS
21	0.37	.002	.984	0.53	PAGURIDAE
22	0.37	.002	.986	0.22	ECHINARACHNIUS PARMA
23	0.36	.002	.987	0.43	WHELK UNIDENT
24	0.35	.002	.989	0.57	HYAS SP
25	0.30	.001	.990	0.35	COTTIDAE

TOTAL 225.45

\* NUMBER OF HAULS= 49, MEAN DEPTH= 56.3M (RANGE= 33- 84M)

Table E-4. Site Group 1Aia

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	142.30	.536	.536	1.00	LIMANDA ASPERA
2	31.06	.117	.653	0.56	EVASTERIAS ECHINODOMA
3	27.04	.102	.755	0.80	SCYPHOZOA
4	17.55	.066	.821	0.92	PLEURONECTES QUADRITUBERCULATUS
5	10.43	.039	.860	0.96	LEPIDOPSETTA BILINEATA
6	8.40	.032	.892	0.92	MYOXOCEPHALUS SP
7	6.71	.025	.917	0.64	BOLTENIA OVIFERA
8	4.79	.018	.935	0.92	LIMANDA PROBOUSCIDEA
9	4.03	.015	.950	1.00	PARALITHODES CANTSCHATICA
10	2.92	.011	.961	0.84	MALLOTUS VILLOSUS
11	2.51	.009	.970	0.72	GYMNOCANTHUS SP
12	1.02	.004	.974	0.72	CHIRONOECETES BAIRDI
13	0.85	.003	.977	0.36	PORIFERA
14	0.81	.003	.981	0.16	CHIRONOECETES OPILO
15	0.59	.002	.983	1.00	AGONUS ACIPENSERINUS
16	0.52	.002	.985	0.84	HYAS SP
17	0.45	.002	.986	0.20	COTTIDAE
18	0.44	.002	.988	0.76	THERAGRA CHALCOGRAMMA
19	0.43	.002	.990	0.24	ECHINARACHNIUS PARMA
20	0.29	.001	.991	0.44	WHELK UNIDENT

TOTAL 265.59

\* NUMBER OF HAULS- 25, MEAN DEPTH= 46.9M (RANGE= 33- 59M)

Table E-5. Site Group 1Aib

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	71.75	.391	.391	1.00	LIMANDA ASPERA
2	31.02	.169	.560	1.00	PARALITHODES CANTSHATICA
3	22.32	.122	.681	1.00	CHIONDECETES BAIRDI
4	15.18	.083	.764	1.00	LEPIDOPSETTA BILINEATA
5	7.87	.043	.807	0.96	PLEURONECTES QUADRITUBERCULATUS
6	6.64	.036	.843	0.75	CHIONDECETES OPILIO
7	4.08	.022	.865	0.25	BOLLENIA OVIFERA
8	3.55	.019	.884	0.38	EVASTERIAS SP
9	2.88	.016	.900	0.71	LIMANDA PROBOSCIDEA
10	2.74	.015	.915	0.53	SCYPHOZOA
11	2.25	.012	.927	0.96	THERAGRA CHALCOGRAMMA
12	2.22	.012	.939	0.88	HIPPOGLOSSOIDES ELASSODON
13	2.08	.011	.951	0.88	MYOXOCEPHALUS SP
14	1.60	.009	.959	0.38	PORIFERA
15	1.08	.006	.965	0.83	HIPPOGLOSSUS STENDLEPIS
16	0.95	.005	.970	0.75	REINHARDTIUS HIPPOGLOSSOIDES
17	0.72	.004	.974	0.46	EVASTERIAS ECHINOSOMA
18	0.60	.003	.978	0.53	PAGURIDAE
19	0.47	.003	.980	0.46	ERIMACRUS ISENBECKII
20	0.42	.002	.982	0.42	WHELK UNIDENT
21	0.35	.002	.984	0.13	SEA ANEMONE UNIDENT
22	0.29	.002	.986	0.50	CHIONDECETES HYBRID
23	0.29	.002	.988	0.21	ECHINARACHNIUS PARMA
24	0.27	.001	.989	0.38	CUCUMARIA SP
25	0.24	.001	.990	0.50	CLUPEA HARENGUS PALLASI

TOTAL 183.64

\* NUMBER OF HAULS- 24, MEAN DEPTH= 66.0M (RANGE= 49- 84M)

Table E-6. Site Group 1Aii

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	178.19	.477	.477	1.00	LIMANDA ASPERA
2	71.79	.192	.670	1.00	STARFISH UNIDENT
3	53.32	.143	.813	0.38	PARALITHODES CAMTSCHATICA
4	31.06	.083	.896	1.00	LEPIDOPSETTA BILINEATA
5	8.01	.021	.917	0.38	HOLOTHURIDEA UNIDENT
6	5.49	.015	.932	0.38	GADUS MACROCEPHALUS
7	5.06	.014	.946	1.00	HIPPOGLOSSUS STENDLEPIS
8	4.28	.011	.957	0.88	SCYPHOZOA
9	4.15	.011	.968	0.75	PLATICHTHYS STELLATUS
10	2.53	.007	.975	0.75	MYOXOCEPHALUS SP
11	1.91	.005	.980	1.00	HEXAGRAMMOS STELLERI
12	1.20	.003	.983	0.88	PAGURIDAE
13	1.14	.003	.986	0.13	EVASTERIAS ECHINOSOMA
14	1.00	.003	.989	0.75	LIMANDA PROBDSCIDEA
15	0.91	.002	.992	0.38	PLEURONECTES QUADRITUBERCULATUS

TOTAL 373.19

\* NUMBER OF HAULS- 8, MEAN DEPTH= 31.6M (RANGE= 26- 38M)

Table E-7. Site Group 1B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	113.13	.356	.356	1.00	CHIONOECETES OPILIO
2	58.21	.183	.539	1.00	LIMANDA ASPERA
3	18.42	.058	.597	0.89	STARFISH UNIDENT
4	15.74	.050	.647	0.94	THERAGRA CHALCOGRAMMA
5	15.58	.049	.696	0.93	PLEURONECTES QUADRITUBERCULATUS
6	14.78	.047	.743	0.93	PAGURIDAE
7	13.61	.043	.785	0.96	PARALITHODES PLATYPUS
8	12.90	.041	.826	1.00	LEPIDOPSETTA BILINEATA
9	11.41	.036	.862	0.96	GASTROPOD UNIDENT
10	9.27	.029	.891	0.25	ASCIDIAN UNIDENT
11	7.04	.022	.913	0.93	MYOXOCEPHALUS SP
12	6.28	.020	.933	0.96	CHIONOECETES BAIRDI
13	5.03	.016	.949	0.07	PORIFERA
14	3.89	.012	.961	0.64	ERIMACRUS ISENBECKII
15	2.77	.009	.970	0.57	GORGONOCEPHALUS CARYI
16	1.53	.005	.975	0.54	CHIONOECETES HYBRID
17	1.48	.005	.979	0.93	REINHARDTIUS HIPPOGLOSSOIDES
18	1.13	.004	.983	0.50	GADUS MACROCEPHALUS
19	0.67	.002	.985	0.11	GYMNOCANTHUS SP
20	0.62	.002	.987	0.79	AGONUS ACIPENSERINUS
21	0.54	.002	.989	0.86	LYCODES PALEARIS
22	0.53	.002	.990	0.95	CYCLOPTERIDAE

TOTAL 317.62

\* NUMBER OF HAULS= 28, MEAN DEPTH= 69.8M (RANGE= 57- 93M)

Table E-8. Site Group 1Bi

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	122.67	.391	.391	1.00	CHIONOECETES OPILIO
2	65.83	.210	.601	1.00	LIMANDA ASPERA
3	19.56	.062	.663	0.92	STARFISH UNIDENT
4	18.35	.058	.722	0.91	HERAGRA CHALCOGRAMMA
5	18.06	.058	.779	0.96	PLEURONECTES QUADRITUBERCULATUS
6	16.42	.052	.832	0.92	PAGURIDAE
7	12.76	.041	.872	0.96	GASTROPOD UNIDENT
8	10.81	.034	.907	0.29	ASCIDIAN UNIDENT
9	8.23	.026	.933	1.00	LEPIDOPSETTA BILINEATA
10	5.75	.018	.951	0.96	MYOXOCEPHALUS SP
11	3.93	.013	.964	0.96	CHIONOECETES BAIRDI
12	3.23	.010	.974	0.67	GORGONOCEPHALUS CARYI
13	1.68	.005	.979	0.96	REINHARDTIUS HIPPOGLOSSOIDES
14	0.79	.003	.982	0.58	ERINACRUS ISENBECKII
15	0.59	.002	.984	0.83	CYCLOPTERIDAE
16	0.54	.002	.985	0.75	HIPPOGLOSSOIDES ELASSODON
17	0.53	.002	.987	0.54	PANDALUS SP
18	0.50	.002	.989	0.25	PARALITHODES PLATYPUS
19	0.50	.002	.990	0.38	LYCODES PALEARIS

TOTAL 313.96

• NUMBER OF HAULS- 24, MEAN DEPTH= 70.6M (RANGE= 60- 93M)

Table E-9. Site Group lBii

*****					
	MEAN	PROP.	CUMUL. FREQ.		
	CPUE	OF	PROP. OF		
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	92.27	.272	.272	1.00	PARALITHODES PLATYPUS
2	54.67	.161	.433	1.00	CHIONOECETES OPILIO
3	40.96	.121	.553	1.00	LEPIDOPSETTA BILINEATA
4	35.22	.104	.657	0.50	PORIFERA
5	22.49	.066	.723	1.00	ERIMACRUS ISENBECKII
6	20.35	.060	.783	1.00	CHIONOECETES BAIRDI
7	14.76	.043	.827	0.75	MYDOXOCEPHALUS SP
8	12.49	.037	.864	1.00	LIHANDA ASPERA
9	11.59	.034	.898	0.75	STARFISH UNIDENT
10	8.05	.024	.921	1.00	CHIONOECETES HYBRID
11	5.73	.017	.938	1.00	GADUS MACROCEPHALUS
12	4.97	.015	.953	1.00	PAGURIDAE
13	4.67	.014	.967	0.75	GYMNOCANTHUS SP
14	3.32	.010	.976	1.00	GASTROPOD UNIDENT
15	2.78	.008	.985	1.00	AGONUS ACIPENSERINUS
16	0.95	.003	.987	0.25	OCTOPUS UNIDENT
17	0.87	.003	.990	0.25	HEMILEPIDOTUS JORDANI
18	0.77	.002	.992	0.75	LYCODES PALEARIS

TOTAL 339.56

\* NUMBER OF HAULS- 4, MEAN DEPTH= 64.9M (RANGE= 57- 75M)

Table E-10. Site Group 2

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	38.33	.186	.186	1.90	THERAGRA CHALCOGRAMMA
2	23.93	.116	.303	1.90	CHIONOECETES OPILIO
3	22.64	.110	.413	1.90	CHIONOECETES BAIRDI
4	15.71	.076	.489	0.89	LYCODES PALEARIS
5	14.55	.071	.560	0.47	LIMANDA ASPERA
6	12.73	.062	.622	0.26	GORGONOCEPHALUS CARYI
7	11.22	.055	.677	0.78	HIPPOGLOSSOIDES ELASSODON
8	10.17	.049	.726	0.81	GADUS MACROCEPHALUS
9	9.25	.045	.771	0.40	PARALITHODES CAMTSCHATICA
10	7.89	.038	.809	0.70	LEPIDOPSETTA BILINEATA
11	6.56	.032	.841	0.23	SEA ANEMONE UNIDENT
12	5.55	.027	.868	0.86	CHIONOECETES HYBRID
13	4.24	.021	.889	0.86	GASTROPOD UNIDENT
14	3.50	.017	.906	0.35	STARFISH UNIDENT
15	2.85	.014	.920	0.32	PLEURONECTES QUADRITUBERCULATUS
16	2.60	.013	.932	0.70	RAJA SP
17	2.15	.010	.943	0.84	REINHARDTIUS HIPPOGLOSSOIDES
18	2.10	.010	.953	0.56	ATHERESTHES SP
19	1.43	.007	.960	0.58	PAGURIDAE
20	1.20	.006	.966	0.02	EVASTERIAS ECHINOSOMA
21	1.11	.005	.971	0.18	OCTOPUS UNIDENT
22	0.70	.003	.975	0.97	PARALITHODES PLATYPUS
23	0.66	.003	.978	0.07	LYCODES BREVIPE
24	0.47	.002	.980	0.58	DASYCOTTUS SETIGER
25	0.43	.002	.982	0.53	HEMITRIPTERUS BOLINI
26	0.39	.002	.984	0.35	BATHYMASTER SIGNATUS
27	0.39	.002	.986	0.07	GYMNOCANTHUS SP
28	0.35	.002	.988	0.02	PORIFERA
29	0.31	.001	.989	0.35	MYOXOCEPHALUS SP
30	0.30	.001	.991	0.16	SCYPHOZOA

TOTAL 205.61

\* NUMBER OF HAULS- 57, MEAN DEPTH=104.2M (RANGE= 48-146M)



Table E-11. Site Group 2A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	37.18	.154	.154	1.00	THERAGRA CHALCOGRAMMA
2	29.98	.124	.278	1.00	CHIONOECETES BAIRDI
3	24.83	.103	.381	0.71	LYCODES PALEARIS
4	22.27	.092	.474	0.48	LIMANDA ASPERA
5	17.22	.071	.545	1.00	HIPPOGLOSSOIDES ELASSODON
6	15.98	.066	.611	0.70	PARALITHODES CANTSCHATICA
7	13.29	.055	.666	0.77	GADUS MACROCEPHALUS
8	12.52	.052	.718	0.24	GORGONOCEPHALUS CARYI
9	11.32	.047	.765	0.39	SEA ANEMONE UNIDENT
10	10.07	.042	.807	0.55	LEPIDOPSETTA BILINEATA
11	9.99	.041	.848	1.00	CHIONOECETES OPILIO
12	5.63	.023	.872	0.76	GASTROPOD UNIDENT
13	4.89	.020	.892	0.45	PLEURONECTES QUADRITUBERCULATUS
14	4.06	.017	.909	0.21	STARFISH UNIDENT
15	3.77	.016	.924	0.76	RAJA SP
16	3.03	.013	.937	0.67	ATHERESTHES SP
17	2.08	.009	.946	0.03	EVASTERIAS ECHINOSOMA
18	1.76	.007	.953	0.21	OCTOPUS UNIDENT
19	1.44	.006	.959	0.79	REINHARDTIUS HIPPOGLOSSOIDES
20	1.38	.006	.965	0.82	CHIONOECETES HYBRID
21	1.22	.005	.970	0.52	PAGURIDAE
22	1.12	.005	.974	0.09	LYCODES BREVIPES
23	0.64	.003	.977	0.73	DASYCOTTUS SETIGER
24	0.62	.003	.980	0.06	GYNNOCANTHUS SP
25	0.61	.003	.982	0.03	PORIFERA
26	0.59	.002	.985	0.33	BATHYMASTER SIGNATUS
27	0.52	.002	.987	0.21	SCYPHOZOA
28	0.45	.002	.989	0.61	HENIPTERUS BOLINI
29	0.42	.002	.990	0.39	OSMERIDAE

TOTAL 241.21

\* NUMBER OF HAULS= 33, MEAN DEPTH=105.1M (RANGE= 48-143M)

Table E-12. Site Group 2Ai

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	39.26	.205	.205	1.00	LYCODES PALEARIS
2	24.04	.126	.331	1.00	HIPPOGLOSSOIDES ELASSODON
3	23.98	.125	.456	0.29	GORGONOCEPHALUS CARYI
4	21.76	.114	.570	0.59	SEA ANEMONE UNIDENT
5	18.22	.095	.665	1.00	GADUS MACROCEPHALUS
6	14.91	.078	.743	1.00	THERAGRA CHALCOGRAMMA
7	10.52	.055	.798	1.00	CHIONOECETES BAIRDI
8	6.66	.035	.833	0.82	RAJA SP
9	6.47	.034	.867	1.00	CHIONOECETES OPILIO
10	4.87	.025	.893	0.53	PARALITHODES CANTSCHATICA
11	3.37	.018	.910	0.29	OCTOPUS UNIDENT
12	2.53	.013	.923	0.82	ATHERESTHES SP
13	2.18	.011	.935	0.18	LYCODES BREVIPES
14	1.77	.009	.944	1.00	GASTROPOD UNIDENT
15	1.64	.009	.953	0.88	REINHARDTIUS HIPPOGLOSSOIDES
16	1.45	.008	.960	0.88	CHIONOECETES HYBRID
17	1.13	.006	.966	0.53	BATHYMASTER SIGNATUS
18	0.96	.005	.971	1.00	DASYCOTTUS SETIGER
19	0.94	.005	.976	0.59	PAGURIDAE
20	0.84	.004	.980	0.88	HEMITRIPTERUS BOLINI
21	0.82	.004	.985	0.24	SCYPHOZOA
22	0.79	.004	.989	0.65	OSMERIDAE
23	0.57	.003	.992	0.18	STARFISH UNIDENT

TOTAL 191.22

\* NUMBER OF HAULS- 17, MEAN DEPTH=122.5M (RANGE=104-143M)

Table E-13. Site Group 2Aii

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	60.84	.207	.207	1.00	THERAGRA CHALCOGRAMMA
2	50.66	.172	.379	1.00	CHIONOECETES BAIRDI
3	45.91	.156	.535	0.94	LIMANDA ASPERA
4	27.79	.094	.629	0.88	PARALITHODES CAMTSCHATICA
5	20.72	.070	.700	0.94	LEPIDOSETTA BILINEATA
6	13.73	.047	.746	1.00	CHIONOECETES OPILIO
7	9.97	.034	.780	1.00	HIPPOGLOSSOIDES ELASSODON
8	9.93	.034	.814	0.81	PLEURONECTES QUADRITUBERCULATUS
9	9.73	.033	.847	0.50	GASTROPOD UNIDENT
10	9.51	.032	.879	0.81	LYCODES PALEARIS
11	8.05	.027	.907	0.94	GADUS MACROCEPHALUS
12	7.76	.026	.933	0.25	STARFISH UNIDENT
13	4.29	.015	.948	0.06	EVASTERIAS ECHINODON
14	3.57	.012	.960	0.50	ATHERESTHES SP
15	1.51	.005	.965	0.44	PAGURIDAE
16	1.31	.004	.969	0.75	CHIONOECETES HYBRID
17	1.28	.004	.974	0.13	GYMNOCANTHUS SP
18	1.26	.004	.978	0.06	PORIFERA
19	1.22	.004	.982	0.69	REINHARDTIUS HIPPOGLOSSOIDES
20	0.70	.002	.984	0.59	RAJA SP
21	0.69	.002	.987	0.38	MYOXOCEPHALUS SP
22	0.58	.002	.989	0.19	ERIMACRUS ISENBECKII
23	0.57	.002	.991	0.13	COTTIDAE

TOTAL 294.33

\* NUMBER OF HAULS- 16, MEAN DEPTH= 86.6M (RANGE= 48-106M)

Table E-14. Site Group 2B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	43.10	.275	.275	1.00	CHIONDECETES OPILIO
2	39.92	.255	.530	1.00	THERAGRA CHALCOGRAMMA
3	13.01	.083	.613	0.29	GORGONCEPHALUS CARYI
4	12.55	.080	.693	1.00	CHIONDECETES BAIRDI
5	11.27	.072	.765	0.72	CHIONDECETES HYBRID
6	5.88	.038	.803	0.58	GADUS MACROCEPHALUS
7	4.89	.031	.834	0.92	LEPIDOPSETTA BILINEATA
8	3.94	.025	.859	0.46	LIMANDA ASPERA
9	3.17	.020	.879	0.88	LYCODES PALEARIS
10	3.13	.020	.899	0.92	REINHARDTIUS HIPPOGLOSSOIDES
11	2.96	.019	.918	0.96	HIPPOGLOSSOIDES ELASSODON
12	2.73	.017	.935	3.54	STARFISH UNIDENT
13	2.34	.015	.950	1.00	GASTROPOD UNIDENT
14	1.71	.011	.961	0.92	PAGURIDAE
15	1.66	.011	.972	0.17	PARALITHODES PLATYPUS
16	0.99	.006	.978	0.53	RAJA SP
17	0.81	.005	.983	0.42	ATHERESTÆES SP
18	0.53	.003	.987	0.13	ICELUS SP
19	0.40	.003	.989	0.42	HEMITRIPTERUS BOLINI
20	0.24	.002	.991	0.53	DASYCOTTUS SETIGER

TOTAL 156.66

\* NUMBER OF HAULS- 24, MEAN DEPTH=102.9M (RANGE= 73-146M)

Table E-15. Site Group 2Bi

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PRDP.	OF	
	(KG/HA)	CPUE	OF	CPUE	OCURR. TAXA
*****					
1	60.65	.406	.406	1.00	THERAGRA CHALCOGRAMMA
2	22.16	.148	.554	0.29	GORGONCEPHALUS CARYI
3	21.83	.146	.700	1.00	CHIONDECETES OPILO
4	14.25	.095	.796	1.00	CHIONDECETES HYBRID
5	9.98	.067	.862	0.71	GADUS MACROCEPHALUS
6	4.77	.032	.894	1.00	CHIONDECETES BAIRDI
7	3.66	.025	.919	1.00	HIPPOGLOSSOIDES ELASSODON
8	2.78	.019	.937	0.86	REINHARDTIUS HIPPOGLOSSOIDES
9	1.36	.009	.947	0.43	STARFISH UNIDENT
10	1.28	.009	.955	0.50	ATHERESTHES SP
11	1.13	.008	.963	0.86	LEPIDOPSETTA BILINEATA
12	0.93	.006	.969	1.00	GASTROPOD UNIDENT
13	0.90	.006	.975	0.37	ICELUS SP
14	0.90	.006	.981	0.43	RAJA SP
15	0.69	.005	.986	0.79	LYCODES PALEARIS
16	0.66	.004	.990	0.57	HEMITRIPTERUS BOLINI
17	0.36	.002	.992	0.14	OCTOPUS UNIDENT

TOTAL 149.43

\* NUMBER OF HAULS- 14, MEAN DEPTH=114.2M (RANGE= 91-146M)

Table E-16. Site Group 2Bii

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	72.88	.437	.437	1.00	CHIONOECETES OPILO
2	23.43	.140	.577	1.00	CHIONOECETES BAIRDI
3	10.88	.065	.643	1.00	THERAGRA CHALCOGRAMMA
4	10.15	.061	.704	1.00	LEPIDOSETTA BILINEATA
5	9.46	.057	.760	1.00	LIMANDA ASPERA
6	7.10	.043	.803	0.80	CHIONOECETES HYBRID
7	6.63	.040	.843	1.00	LYCODES PALEARIS
8	4.65	.028	.870	0.70	STARFISH UNIDENT
9	4.33	.026	.896	1.00	GASTROPOD UNIDENT
10	3.97	.024	.920	0.40	PARALITHODES PLATYPUS
11	3.85	.023	.943	0.90	PAGURIDAE
12	3.63	.022	.965	1.00	REINHARDTIUS HIPPOGLOSSOIDES
13	1.98	.012	.977	0.90	HIPPOGLOSSOIDES ELASSODON
14	1.11	.007	.984	0.90	RAJA SP
15	0.53	.003	.987	0.80	MYOXOCEPHALUS SP
16	0.33	.002	.989	0.50	DASYCOTTUS SETIGER
17	0.29	.002	.990	0.60	AGONUS ACIPENSERINUS

TOTAL 166.79

\* NUMBER OF HAULS- 10, MEAN DEPTH= 87.1M (RANGE= 73-102M)

## APPENDIX F

## Species Assemblages, 1976 Bering Sea Survey

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Table F-1. Site Group 1

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	86.06	.298	.298	0.99	LIMANDA ASPERA
2	22.03	.076	.374	0.75	THERAGRA CHALCOGRAMMA
3	18.86	.065	.440	0.86	LEPIDOPSETTA BILINEATA
4	18.79	.065	.505	0.77	PARALITHODES CAMTSCHATICA
5	18.75	.065	.569	0.33	PTERASTER SP
6	18.13	.063	.632	0.53	CHIONOECETES OPILO
7	17.65	.061	.693	0.85	PLEURONECTES QUADRITUBERCULATUS
8	11.97	.041	.735	0.84	CHIONOECETES BAIRDI
9	10.71	.037	.772	0.24	SEA ANEMONE UNIDENT
10	8.06	.028	.800	0.72	MYOXOCEPHALUS SP
11	7.95	.028	.827	0.47	STARFISH UNIDENT
12	5.64	.020	.847	0.18	PAGURIDAE
13	4.98	.017	.864	0.39	GASTROPOD UNIDENT
14	4.07	.014	.878	0.44	ERIMACRUS ISENBECKII
15	3.87	.013	.892	0.49	HIPPOGLOSSOIDES ELASSODON
16	3.67	.013	.904	0.06	PARALITHODES PLATYPUS
17	3.57	.012	.917	0.34	ASCIDIAN UNIDENT
18	3.40	.012	.928	0.39	PORIFERA
19	2.57	.009	.937	0.53	LIMANDA PROBOSCIDEA
20	2.37	.008	.945	0.97	AGONUS ACIPENSERINUS
21	1.94	.007	.952	0.72	GADUS MACROCEPHALUS
22	1.44	.005	.957	0.23	BOLTENIA OVIFERA
23	1.40	.005	.962	0.55	GYMNOCANTHUS SP
24	1.34	.005	.967	0.14	COTTIDAE
25	1.18	.004	.971	0.10	LYCODES PALEARIS
26	1.16	.004	.975	0.75	MYAS SP
27	1.16	.004	.979	0.25	HEMILEPIDOTUS JORDANI
28	0.88	.003	.982	0.49	REINHARDTIUS HIPPOGLOSSOIDES
29	0.56	.002	.984	0.14	ATHERESTHES SP
30	0.55	.002	.986	0.47	CHIONOECETES HYBRID
31	0.53	.002	.987	0.46	HIPPOGLOSSUS STENOLEPIS
32	0.34	.001	.989	0.35	SCYPHOZOA
33	0.34	.001	.990	0.24	HOLOTHURIDEA UNIDENT
34	0.33	.001	.991	0.14	ZOARCIDAE

TOTAL 288.85

\* NUMBER OF HAULS= 79, MEAN DEPTH= 62.8M (RANGE= 27-104M)

Table F-2. Site Group 1A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	116.89	.336	.336	1.90	LIMANDA ASPERA
2	38.32	.110	.446	0.71	THERAGRA CHALCOGRAMMA
3	30.99	.089	.536	0.84	PARALITHODES CANTSCHATICA
4	24.55	.071	.606	0.89	PLEURONECTES QUADRITUBERCULATUS
5	22.31	.064	.670	0.84	LEPIDOPSETTA BILINEATA
6	19.20	.055	.726	0.34	PTERASTER SP
7	15.38	.044	.770	0.50	CHIONOECETES OPILIO
8	14.18	.041	.811	0.84	CHIONOECETES BAIRDI
9	10.84	.031	.842	0.93	MYOXOCEPHALUS SP
10	8.41	.024	.866	0.44	STARFISH UNIDENT
11	6.71	.019	.885	0.50	HIPPOGLOSSOIDES ELASSODON
12	6.20	.018	.903	0.87	GASTROPOD UNIDENT
13	4.21	.012	.915	0.41	PORIFERA
14	3.61	.010	.926	0.70	LIMANDA PROBOSCIDEA
15	3.24	.009	.935	0.71	GADUS MACROCEPHALUS
16	2.64	.008	.942	0.77	PAGURIDAE
17	2.42	.007	.949	0.11	COTTIDAE
18	1.70	.005	.954	0.24	BOLTENIA OVIFERA
19	1.64	.005	.959	0.19	LYCODES PALEARIS
20	1.48	.004	.963	0.74	MYAS SP
21	1.46	.004	.967	0.97	AGONUS ACIPENSERINUS
22	1.32	.004	.971	0.51	REINHARDTIUS HIPPOGLOSSOIDES
23	1.09	.003	.974	0.13	ERIMACRUS ISENBECKII
24	0.99	.003	.977	0.13	ATHERESTHES SP
25	0.86	.002	.980	0.33	ASCIDIAN UNIDENT
26	0.78	.002	.982	0.47	HIPPOGLOSSUS STENDLEPIS
27	0.72	.002	.984	0.51	GYMNOCANTHUS SP
28	0.56	.002	.986	0.16	ZOARCIDAE
29	0.48	.001	.987	0.37	SCYPHOZOA
30	0.45	.001	.988	0.29	GORGONOCEPHALUS CARYI
31	0.41	.001	.989	0.24	HOLOTHUROIDEA UNIDENT
32	0.40	.001	.991	0.46	CHIONOECETES HYBRID

TOTAL 347.68

\* NUMBER OF HAULS= 70, MEAN DEPTH= 61.5M (RANGE= 27-101M)

Table F-3. Site Group 1Ai

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	131.65	.408	.408	1.00	LIMANDA ASPERA
2	39.96	.124	.531	0.91	PARALITHODES CAMTSCHATICA
3	27.79	.086	.617	0.81	LEPIDOSETTA BELINEATA
4	21.35	.066	.684	0.40	PTERASTER SP
5	19.74	.061	.745	0.98	MYOXOCEPHALUS SP
6	17.98	.056	.800	0.88	PLEURONECTES QUADRITUBERCULATUS
7	15.42	.048	.848	0.53	CHIONDECETES OPILIO
8	9.66	.030	.878	0.40	STARFISH UNIDENT
9	5.69	.018	.896	0.81	CHIONDECETES BAIRDI
10	5.27	.016	.912	0.81	LIMANDA PROBJSCIDEA
11	4.63	.014	.926	0.86	GASTROPOD UNIDENT
12	1.89	.006	.932	0.30	BOLTENIA OVIFERA
13	1.77	.005	.938	0.96	AGONUS ACIPENSERINUS
14	1.72	.005	.943	0.62	PORIFERA
15	1.56	.005	.948	0.39	HIPPOGLOSSOIDES ELASSODON
16	1.51	.005	.952	0.77	HYAS SP
17	1.49	.005	.957	0.75	PAGURIDAE
18	1.43	.004	.961	0.44	ERIMACRUS ISENBECKII
19	1.36	.004	.966	0.07	ATHERESTHES SP
20	1.13	.004	.969	0.11	COTTIDAE
21	1.12	.003	.973	0.47	HIPPOGLOSSUS STENDLEPIS
22	0.90	.003	.975	0.60	ASCIDIAN UNIDENT
23	0.87	.003	.978	0.18	CYCLOPTERIDAE
24	0.83	.003	.981	0.33	GORGONOCEPHALUS CARYI
25	0.75	.002	.983	0.70	GYMNOCANTHUS SP
26	0.73	.002	.985	0.62	REINHARDTIUS HIPPOGLOSSOIDES
27	0.63	.002	.987	0.55	TERAGRA CHALCOGRAMMA
28	0.55	.002	.989	0.29	TRICHODON TRICHODON
29	0.49	.002	.990	0.35	SCYPHOZOA

TOTAL 322.96

\* NUMBER OF HAULS= 57, MEAN DEPTH= 55.6M (RANGE= 27- 86M)

Table F-4. Site Group 1A1a

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	153.39	.423	.423	1.00	LIMANDA ASPERA
2	57.99	.160	.583	0.89	PARALITHODES CAMTSCHATICA
3	40.49	.112	.695	0.97	LEPIDOPSETTA BILINEATA
4	25.71	.071	.766	0.98	MYOXOCEPHALUS SP
5	20.65	.057	.823	0.92	PTERASTER SP
6	12.20	.034	.857	0.98	STARFISH UNIDENT
7	12.13	.033	.890	0.84	PLEURONECTES QUADRITUBERCULATUS
8	6.85	.019	.909	0.93	LIMANDA PROBOSCIDEA
9	5.05	.014	.923	0.76	CHIONOECETES BAIRDI
10	2.37	.007	.930	0.98	BOLTENIA OVIFERA
11	2.32	.006	.936	0.98	AGONUS ACIPENSERINUS
12	2.30	.006	.942	0.82	GASTROPOD UNIDENT
13	2.25	.006	.949	0.40	HIPPOGLOSSIDES ELASSODON
14	2.22	.006	.955	0.51	PORIFERA
15	2.09	.006	.961	0.69	ERINACRUS ISENBECKII
16	2.03	.006	.966	0.09	ATHERESTHES SP
17	1.70	.005	.971	0.11	COTTIDAE
18	1.58	.004	.975	0.49	HIPPOGLOSSUS STENOLEPIS
19	1.26	.003	.979	0.78	MYAS SP
20	0.93	.003	.981	0.87	GYMNOCANTHUS SP
21	0.88	.002	.984	0.36	ASCIDIAN UNIDENT
22	0.83	.002	.986	0.11	TRICHODON TRICHODON
23	0.75	.002	.988	0.60	CHIONOECETES OPILIO
24	0.62	.002	.990	0.82	PAGURIDAE
25	0.60	.002	.991	0.64	THERAGRA CHALCOGRAMMA

TOTAL 362.28

\* NUMBER OF HAULS- 45, MEAN DEPTH= 51.8M (RANGE= 27- 84M)

Table F-5. Site Group 1Aib

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	78.40	.331	.331	1.00	LIMANDA ASPERA
2	54.36	.230	.561	1.00	CHIONOECETES OPILIO
3	38.20	.161	.722	1.00	PLEURONECTES QUADRITUBERCULATUS
4	17.55	.074	.796	0.33	PTERASTER SP
5	9.76	.041	.837	1.00	GASTROPOD UNIDENT
6	7.24	.031	.868	1.00	CHIONOECETES BAIRDI
7	5.86	.025	.893	1.00	MYOXOCEPHALUS SP
8	4.67	.020	.912	0.50	PAGURIDAE
9	2.67	.011	.924	0.50	CYCLOPTERIDAE
10	2.66	.011	.935	0.75	GORGONJCEPHALUS CARYI
11	2.41	.010	.945	0.75	HYAS SP
12	2.28	.010	.955	1.00	REINHARDTIUS HIPPOGLOSSOIDES
13	1.59	.007	.961	0.17	ECHINARACHNIUS PARMA
14	1.10	.005	.966	0.92	CHIONOECETES HYBRID
15	0.96	.004	.970	0.33	LIMANDA PROBJSCIDEA
16	0.93	.004	.974	0.58	ASCIDIAN UNIDENT
17	0.85	.004	.978	0.33	LYCODES PALEARIS
18	0.83	.004	.981	0.50	PARALITHODES CAMTSCHATICA
19	0.77	.003	.984	0.58	LEPIDOPSETTA BILINEATA
20	0.74	.003	.988	0.57	THERAGRA CHALCOGRAMMA
21	0.69	.003	.990	0.50	STARFISH UNIDENT

TOTAL 236.79

\* NUMBER OF HAULS= 12, MEAN DEPTH= 70.1M (RANGE= 51- 86M)

Table F-6. Site Group 1Aii

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	101.63	.228	.228	1.00	THERAGRA CHALCOGRAMMA
2	82.38	.185	.413	1.00	LIMANDA ASPERA
3	64.88	.146	.559	1.00	PARALITHODES CAMTSCHATICA
4	38.79	.087	.646	1.00	LEPIDOPSETTA BILINEATA
5	38.26	.086	.732	1.00	CHIONOECETES BAIRDI
6	25.91	.058	.790	0.92	PLEURONECTES QUADRITUBERCULATUS
7	16.82	.038	.828	0.92	CHIONOECETES OPILO
8	16.07	.036	.864	1.00	HIPPOGLOSSOIDES ELASSODON
9	8.60	.019	.884	1.00	GADUS MACROCEPHALUS
10	7.25	.016	.900	0.92	GASTROPOD UNIDENT
11	6.50	.015	.915	0.38	PORIFERA
12	4.36	.010	.924	0.15	COTTIDAE
13	3.98	.009	.933	0.66	HIPPOGLOSSUS STENDLEPIS
14	3.79	.009	.942	0.62	STARFISH UNIDENT
15	3.28	.007	.949	0.85	PAGURIDAE
16	3.20	.007	.956	0.15	LYCODES PALEARIS
17	2.60	.006	.962	0.92	REINHARDTIUS HIPPOGLOSSOIDES
18	2.50	.006	.968	0.69	MYOXOCEPHALUS SP
19	2.14	.005	.973	0.08	PTERASTER SP
20	1.99	.004	.977	0.69	ZOARCIDAE
21	1.60	.004	.981	0.38	ERIMACRUS ISENBECKII
22	1.56	.004	.984	0.38	ATHERESTHES SP
23	1.48	.003	.988	0.66	RAJA SP
24	0.67	.002	.989	0.85	HEMILEPIDOTUS JORDANI
25	0.66	.001	.991	0.08	ISOPSETTA ISOLEPIS

TOTAL 445.11

\* NUMBER OF HAULS- 13, MEAN DEPTH= 87.1M (RANGE= 70-101M)

Table F-7. Site Group IB

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	34.13	.172	.172	0.89	LIMANDA ASPERA
2	33.17	.167	.338	0.89	CHIONOECETES OPILIO
3	19.84	.100	.438	1.00	LEPIDOPSETTA BILINEATA
4	14.16	.071	.509	0.44	SEA ANEMONE UNIDENT
5	12.44	.063	.572	0.11	BOLTENIA OVIFERA
6	11.76	.059	.631	0.56	PARALITHODES PLATYPUS
7	7.79	.039	.670	0.78	CHIONOECETES BAIRDI
8	7.15	.036	.706	0.22	PORIFERA
9	6.76	.034	.740	0.89	PAGURIDAE
10	6.46	.032	.773	0.67	STARFISH UNIDENT
11	6.44	.032	.805	0.22	PTERASTER SP
12	5.45	.027	.832	0.56	ERIMACRUS ISENBECKII
13	4.84	.024	.857	0.67	HEMILEPIDOTUS JORDANI
14	3.91	.020	.876	0.44	ASCIDIAN UNIDENT
15	3.63	.018	.895	1.00	AGONUS ACIPENSERINUS
16	3.19	.016	.911	1.00	THERAGRA CHALCOGRAMMA
17	2.84	.014	.925	0.89	MYOXOCEPHALUS SP
18	2.71	.014	.938	0.89	GYMNOCANTHUS SP
19	2.64	.013	.952	0.22	HOLOTHYROIDEA UNIDENT
20	1.74	.009	.961	1.00	GASTROPOD UNIDENT
21	1.46	.007	.968	0.56	CHIONOECETES HYBRID
22	1.33	.007	.975	0.22	LYCODES PALEARIS
23	1.01	.005	.980	0.78	GADUS MACROCEPHALUS
24	0.83	.004	.984	0.56	PLEURONECTES QUADRITUBERCULATUS
25	0.52	.003	.986	0.33	REINHARDTIUS HIPPOGLOSSOIDES
26	0.49	.002	.989	0.78	MYAS SP
27	0.48	.002	.991	0.44	HIPPOGLOSSOIDES ELASSODON

TOTAL 198.92

\* NUMBER OF HAULS= 9, MEAN DEPTH= 72.8M (RANGE= 53-104M)

Table F-8. Site Group 2

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	104.39	.433	.433	1.00	THERAGRA CHALCOGRAMMA
2	18.13	.075	.508	0.47	GORGONJCEPHALUS CARYI
3	17.53	.073	.580	0.93	CHIONDECETES OPILIO
4	11.82	.049	.629	0.44	LYCODES PALEARIS
5	11.68	.048	.678	0.62	SEA ANEMONE UNIDENT
6	11.07	.046	.724	0.98	CHIONDECETES BAIRDI
7	10.22	.042	.766	0.99	HIPPOGLOSSOIDES ELASSODON
8	7.47	.031	.797	0.80	PAGURIDAE
9	6.10	.025	.822	0.98	GASTROPOD UNIDENT
10	5.72	.024	.846	0.44	ZOARCIDAE
11	5.33	.022	.868	0.80	GADUS MACROCEPHALUS
12	4.00	.017	.885	0.78	ATHERESTHES SP
13	3.87	.016	.901	0.11	PTERASTER SP
14	3.40	.014	.915	0.80	RAJA SP
15	2.81	.012	.926	0.82	REINHARDTIUS HIPPOGLOSSOIDES
16	2.59	.011	.937	0.24	PARALITHODES CAMTSCHATICA
17	2.00	.008	.945	0.54	LEPIDOPSETTA BILINEATA
18	1.11	.005	.950	0.73	CHIONDECETES HYBRID
19	1.10	.005	.955	0.16	STARFISH UNIDENT
20	1.07	.004	.959	0.50	BATHYMASTER SIGNATUS
21	0.92	.004	.963	0.17	DELDLEPIS GIGANTEA
22	0.89	.004	.967	0.59	DASYCOTTUS SETIGER
23	0.72	.003	.970	0.33	HIPPOGLOSSUS STENOLEPIS
24	0.60	.002	.972	0.33	MYOXOCEPHALUS SP
25	0.54	.002	.974	0.49	HEMITRIPTERUS BOLINI
26	0.52	.002	.976	0.11	STRONGYLOCENTROTUS DROEBACHIENSIS
27	0.52	.002	.979	0.53	HEMILEPIDOTUS JORDANI
28	0.50	.002	.981	0.20	SCYPHOZOA
29	0.50	.002	.983	0.13	SEBASTES ALUTUS
30	0.48	.002	.985	0.09	PARALITHODES PLATYPUS
31	0.44	.002	.986	0.42	PANDALUS SP
32	0.43	.002	.988	0.22	LIHANDA ASPERA
33	0.40	.002	.990	0.12	EUNEPHTHYA (GERSEMA) SP
34	0.40	.002	.992	0.18	OCTOPUS UNIDENT

TOTAL 241.30

\* NUMBER OF HAULS= 45, MEAN DEPTH=123.2M (RANGE= 71-305M)



Table F-9. Site Group 2A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	138.73	.511	.511	1.00	THERAGRA CHALCOGRAMMA
2	25.53	.094	.605	0.44	GORGONOCEPHALUS CARYI
3	17.76	.065	.670	0.92	CHIONDECETES OPILIO
4	12.47	.046	.716	1.00	CHIONDECETES BAIRDI
5	12.20	.045	.761	0.36	LYCODES PALEARIS
6	11.53	.042	.804	0.44	SEA ANEMONE UNIDENT
7	10.95	.040	.844	0.92	HIPPOGLOSSOIDES ELASSODON
8	5.81	.021	.865	0.51	ZOARCIDAE
9	5.42	.020	.885	0.87	GADUS MACROCEPHALUS
10	4.32	.016	.901	0.90	ATHERESTHES SP
11	3.46	.013	.914	0.85	RAJA SP
12	2.77	.010	.924	0.79	REINHARDTIUS HIPPOGLOSSOIDES
13	2.70	.010	.934	0.97	GASTROPOD UNIDENT
14	2.59	.010	.944	0.28	PARALITHODES CAMTSCHATICA
15	2.31	.009	.952	0.77	PAGURIDAE
16	1.92	.007	.959	0.59	LEPIDOPSETTA BILINEATA
17	1.31	.005	.964	0.77	CHIONDECETES HYBRID
18	1.15	.004	.968	0.59	BATHYMASTER SIGNATUS
19	0.94	.003	.972	0.79	DASYCOTTUS SETIGER
20	0.83	.003	.975	0.33	HIPPOGLOSSUS STENDLEPIS
21	0.71	.003	.977	0.51	HEMILEPIDOTUS JORDANI
22	0.59	.002	.979	0.56	HEMITRIPTERUS BOLINI
23	0.52	.002	.981	0.13	STRONGYLOCENTROTUS DROEBACHIENSIS
24	0.50	.002	.983	0.15	SEBASTES ALUTUS
25	0.49	.002	.985	0.21	SCYPHOZOA
26	0.46	.002	.987	0.33	PARALITHODES PLATYPUS
27	0.40	.001	.988	0.93	EUNEPHTHYA (GERSEMIA) SP
28	0.38	.001	.990	0.18	OCTOPUS UNIDENT
29	0.35	.001	.991	0.15	STARFISH UNIDENT

TOTAL 271.56

\* NUMBER OF HAULS- 39, MEAN DEPTH=128.9M (RANGE= 93-305M)

Table F-10. Site Group 2B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	32.59	.230	.230	1.00	PAGURIDAE
2	26.50	.187	.418	1.00	CHIONOECETES OPILIO
3	23.17	.164	.581	1.00	GASTROPOD UNIDENT
4	21.40	.151	.733	0.57	PTERASTER SP
5	5.58	.039	.772	0.83	CHIONOECETES BAIRDI
6	5.23	.037	.809	0.50	DELOLEPIS GIGANTEA
7	4.46	.032	.841	0.17	STARFISH UNIDENT
8	3.85	.027	.868	1.00	REINHARDTIUS HIPPOGLOSSOIDES
9	3.05	.022	.889	1.00	LYCODES PALEARIS
10	2.32	.016	.906	1.00	MYOXOCEPHALUS SP
11	2.19	.016	.921	1.00	THERAGRA CHALCOGRAMMA
12	2.18	.015	.937	0.83	LIMANDA ASPERA
13	1.14	.008	.945	0.50	RAJA SP
14	1.05	.007	.952	0.50	PARALITHODES PLATYPUS
15	0.87	.006	.958	0.33	SEA ANEMONE UNIDENT
16	0.85	.006	.964	0.57	PANDALUS SP
17	0.82	.006	.970	1.00	LEPIDOPSETTA BILINEATA
18	0.72	.005	.975	0.57	HIPPOGLOSSOIDES ELASSODON
19	0.61	.004	.980	0.57	GORGONOCEPHALUS CARYI
20	0.45	.003	.983	0.50	HEMILEPIDOTUS SP
21	0.45	.003	.986	1.00	PLEURONECTES QUADRITUBERCULATUS
22	0.31	.002	.988	0.50	ERINACRUS ISENBECKII
23	0.28	.002	.990	0.50	CHIONOECETES HYBRID

TOTAL 141.48

\* NUMBER OF HAULS= 6, MEAN DEPTH= 86.3M (RANGE= 71- 99M)

## APPENDIX G

## Species Assemblages, 1977 Bering Sea Survey

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Table G-1. Site Group 1

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	74.70	.297	.297	1.00	LIMANDA ASPERA
2	43.64	.173	.470	0.71	CHIONOECETES OPILO
3	25.45	.101	.571	0.71	STARFISH UNIDENT
4	17.30	.069	.640	0.62	PARALITHODES CAMTSCHATICA
5	11.18	.044	.684	0.76	PLEURONECTES QUADRITUBERCULATUS
6	10.83	.043	.727	0.95	LEPIDOPSETTA BILINEATA
7	8.57	.034	.761	0.62	GASTROPOD UNIDENT
8	6.82	.027	.788	0.79	HERAGRA CHALCOGRAMMA
9	6.60	.026	.815	0.58	GADUS MACROCEPHALUS
10	5.07	.020	.835	0.71	CHIONOECETES BAIRDI
11	4.91	.020	.854	0.72	MYOXOCEPHALUS SP
12	4.23	.017	.871	0.16	PORIFERA
13	4.05	.016	.887	0.39	PARALITHODES PLATYPUS
14	3.07	.012	.899	0.20	BOLTENIA SP
15	2.60	.010	.910	0.21	COMPOUND ASCIDIAN UNIDENT
16	2.47	.010	.920	0.47	GORGONOCEPHALUS CARYI
17	2.40	.010	.929	0.53	LIMANDA PROBOSCIDEA
18	2.25	.009	.938	0.42	PAGURIDAE
19	1.30	.005	.943	0.52	ERIMACRUS ISENBECKII
20	1.29	.005	.948	0.08	ASCIDIAN UNIDENT
21	1.26	.005	.953	0.58	REINHARDTIUS HIPPOGLOSSOIDES
22	1.11	.004	.958	0.56	CHIONOECETES HYBRID
23	1.02	.004	.962	0.88	AGONUS ACIPENSERINUS
24	0.85	.003	.965	0.20	LYCODES PALEARIS
25	0.80	.003	.968	0.71	HIPPOGLOSSOIDES ELASSODON
26	0.77	.003	.972	0.73	HYAS SP
27	0.76	.003	.975	0.18	HOLOTHUROIDEA UNIDENT
28	0.70	.003	.977	0.35	HEMILEPIDOTUS JORDANI
29	0.61	.002	.980	0.28	SEA ANEMONE UNIDENT
30	0.60	.002	.982	0.11	HALOCYNTHIA SP
31	0.59	.002	.984	0.27	ZOARCIDAE
32	0.57	.002	.987	0.42	HIPPOGLOSSUS STENOLEPIS
33	0.48	.002	.989	0.47	GYMNOCANTHUS SP
34	0.46	.002	.990	0.13	LYCODES BREVIPES

TOTAL 251.75

\* NUMBER OF HAULS- 85, MEAN DEPTH= 60.3M (RANGE= 31- 86M)

Table G-2. Site Group 1A

\*\*\*\*\*  
 MEAN PROP. CUMUL. FREQ.  
 CPUE OF PROP. OF  
 (KG/HA) CPUE OF CPUE OCCURR. TAXA  
 \*\*\*\*\*

1	69.95	.261	.261	1.00	CHIONOECETES OPILIO
2	57.30	.214	.474	1.00	LIMANDA ASPERA
3	19.87	.074	.548	0.73	STARFISH UNIDENT
4	17.43	.065	.613	0.71	THERAGRA CHALCOGRAMMA
5	15.38	.057	.671	0.71	PLEURONECTES QUADRITUBERCULATUS
6	13.62	.051	.721	0.88	GASTROPOD UNIDENT
7	12.27	.046	.767	0.19	PARALITHODES PLATYPUS
8	8.49	.032	.799	0.57	GADUS MACROCEPHALUS
9	8.44	.031	.830	0.28	PARALITHODES CAMTSCHATICA
10	6.52	.024	.855	0.65	CHIONOECETES BAIRDI
11	5.31	.020	.874	0.73	LEPIDOPSETTA BILINEATA
12	3.51	.013	.887	0.31	GORGONOCEPHALUS CARYI
13	3.30	.012	.900	0.88	MYOXOCEPHALUS SP
14	3.28	.012	.912	0.56	PAGURIDAE
15	3.13	.012	.924	0.21	COMPOUND ASCIDIAN UNIDENT
16	2.05	.008	.931	0.40	LYCODES PALEARIS
17	2.04	.008	.939	0.95	REINHARDTIUS HIPPOGLOSSOIDES
18	2.01	.008	.946	0.79	CHIONOECETES HYBRID
19	1.66	.006	.953	0.51	ERIMACRUS ISENBECKII
20	1.58	.006	.959	0.16	ASCIDIAN UNIDENT
21	1.36	.005	.964	0.12	LIMANDA PROBOJSCIDEA
22	1.17	.004	.968	0.56	HEMILEPIDOTUS JORDANI
23	1.10	.004	.972	0.51	ZOARCIDAE
24	1.09	.004	.976	0.77	HIPPOGLOSSOIDES ELASSODON
25	1.00	.004	.980	0.70	HYAS SP
26	0.74	.003	.983	0.42	SEA ANEMONE UNIDENT
27	0.74	.003	.985	0.53	RAJA SP
28	0.60	.002	.988	0.26	LYCODES BREVIPIES
29	0.57	.002	.990	0.42	GYMNOCANTHUS SP
30	0.55	.002	.992	0.16	OPHIUROID UNIDENT

TOTAL 268.27

\* NUMBER OF HAULS- 43, MEAN DEPTH= 68.9M (RANGE= 48- 82M)

Table G-3. Site Group 1Ai

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	72.15	.274	.274	1.00	LIMANDA ASPERA
2	71.08	.270	.544	1.00	CHIONDECETES OPILIO
3	18.14	.069	.613	0.97	PLEURONECTES QUADRITUBERCULATUS
4	17.43	.066	.679	0.92	THERAGRA CHALCOGRAMMA
5	16.73	.064	.743	0.97	STARFISH UNIDENT
6	15.23	.058	.801	0.95	GASTROPOD UNIDENT
7	11.82	.045	.845	0.30	PARALITHODES CAMTSCHATICA
8	4.78	.018	.864	0.92	LEPIDOPSETTA BILINEATA
9	3.83	.015	.878	0.92	GORGONOCEPHALUS CARYI
10	3.78	.014	.892	0.65	PAGURIDAE
11	3.37	.013	.905	0.59	CHIONDECETES BAIRDI
12	3.37	.013	.918	0.39	MYOXOCEPHALUS SP
13	3.26	.012	.930	0.24	COMPOUND ASCIDIAN UNIDENT
14	2.27	.009	.939	0.52	GADUS MACROCEPHALUS
15	2.02	.008	.947	1.00	REINHARDTIUS HIPPOGLOSSOIDES
16	1.92	.007	.954	0.14	LIMANDA PROBOSCIDEA
17	1.38	.005	.959	0.59	ZOARCIDAE
18	1.33	.005	.964	0.84	HIPPOGLOSSOIDES ELASSODON
19	1.28	.005	.969	0.76	CHIONDECETES HYBRID
20	1.24	.005	.974	0.78	HYAS SP
21	0.78	.003	.977	0.19	OPHIUROID UNIDENT
22	0.73	.003	.980	0.55	RAJA SP
23	0.65	.002	.982	0.30	LYCODES BREVIPES
24	0.60	.002	.984	0.46	SEA ANEMONE UNIDENT
25	0.58	.002	.987	0.46	ERIMACRUS ISENBECKII
26	0.51	.002	.989	0.49	HEMILEPIDOTUS JORDANI
27	0.47	.002	.990	0.16	ASCIDIAN UNIDENT

TOTAL 263.28

\* NUMBER OF HAULS- 37, MEAN DEPTH= 68.7M (RANGE= 48- 82M)

Table G-4. Site Group 1Aii

*****					
	MEAN	PROP.	CUNUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	91.62	.250	.250	1.00	GADUS MACROCEPHALUS
2	50.49	.138	.388	1.00	CHIONOECETES OPILIO
3	43.53	.119	.507	1.00	PARALITHODES PLATYPUS
4	29.47	.081	.588	0.17	ASCIDIAN UNIDENT
5	28.62	.078	.666	1.00	LIMANDA ASPERA
6	20.56	.056	.722	0.67	STARFISH UNIDENT
7	15.72	.043	.765	0.83	THERAGRA CHALCOGRAMMA
8	15.18	.041	.807	1.00	CHIONOECETES BAIRDI
9	15.16	.041	.848	1.00	LEPIDOPSETTA BILINEATA
10	11.50	.031	.880	0.83	ERIMACRUS ISENBECKII
11	11.04	.030	.910	0.83	MYOXOCEPHALUS SP
12	5.67	.016	.925	0.50	LYCODES PALEARIS
13	5.60	.015	.941	1.00	CHIONOECETES HYBRID
14	4.09	.011	.952	0.83	EUMICROTRENUS ORBIS
15	3.24	.009	.961	0.50	GASTROPOD UNIDENT
16	2.90	.008	.969	1.00	HEMILEPIDOTUS JORDANI
17	1.78	.005	.974	0.83	GYMNOCANTHUS SP
18	1.77	.005	.978	0.50	PLEURONECTES QUADRITUBERCULATUS
19	1.58	.004	.983	0.17	MYAS SP
20	1.22	.003	.986	0.50	RAJA SP
21	1.12	.003	.989	0.83	AGONUS ACIPENSERINUS
22	0.96	.003	.992	0.67	REINHARDTIUS HIPPOGLOSSOIDES

TOTAL 365.82

• NUMBER OF HAULS- 6, MEAN DEPTH= 70.7M (RANGE= 59- 80M)



Table G-5. Site Group 1B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	159.83	.530	.530	1.00	LIMANDA ASPERA
2	33.67	.112	.642	0.88	STARFISH UNIDENT
3	27.86	.092	.734	0.98	PARALITHODES CAMTSCHATICA
4	27.17	.090	.824	0.98	LEPIDOPSETTA BILINEATA
5	10.63	.035	.860	0.98	GADUS MACROCEPHALUS
6	6.25	.021	.880	0.29	PORIFERA
7	5.90	.020	.900	0.95	HYDROCEPHALUS SP
8	4.79	.016	.916	0.36	BOLTENIA SP
9	4.75	.016	.932	0.76	CHIONOECETES BAIRDI
10	3.25	.011	.942	0.95	LIMANDA PROBOUSCIDEA
11	2.40	.008	.950	0.62	PLEURONECTES QUADRITUBERCULATUS
12	2.08	.007	.957	0.97	HALOCYNTHIA SP
13	1.71	.006	.963	0.54	HIPPOGLOSSUS STENDLEPS
14	1.40	.005	.968	0.26	HOLOTHUROIDEA UNIDENT
15	1.14	.004	.971	0.95	AGONUS ACIPENSERINUS
16	1.12	.004	.975	0.36	GASTROPOD UNIDENT
17	1.03	.003	.979	0.55	COTTIDAE
18	0.98	.003	.982	0.29	HEXAGRAMMOS SP
19	0.82	.003	.985	0.52	ERIMACRUS ISENBECKII
20	0.52	.002	.986	0.52	GYMNOCANTHUS SP
21	0.52	.002	.988	0.76	MYAS SP
22	0.52	.002	.990	0.40	CHIONOECETES OPILIO
23	0.47	.002	.991	0.54	HIPPOGLOSSOIDES ELASSODON

TOTAL 301.45

\* NUMBER OF HAULS= 42, MEAN DEPTH= 51.4M (RANGE= 31 - 86M)

Table G-6. Site Group 2

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OC:URR.	TAXA
*****					
1	58.56	.335	.335	0.99	THERAGRA CHALCOGRAMMA
2	26.12	.150	.485	0.93	CHIONDECETES OPILIO
3	8.93	.051	.536	0.91	PARALITHODES CAMTSCHATICA
4	8.79	.050	.586	0.83	ZOARCIDAE
5	7.92	.045	.631	0.86	CHIONDECETES BAIRDI
6	6.91	.040	.671	0.74	GASTROPOD UNIDENT
7	5.89	.034	.705	0.66	STARFISH UNIDENT
8	5.13	.029	.734	0.80	REINHARDTIUS HIPPOGLOSSOIDES
9	5.05	.029	.763	0.92	HIPPOGLOSSOIDES ELASSODON
10	4.36	.025	.788	0.93	RAJA SP
11	4.33	.025	.813	0.86	GADUS MACROCEPHALUS
12	4.27	.024	.837	0.97	PORIFERA
13	4.11	.024	.861	0.65	LIMANDA ASPERA
14	3.88	.022	.883	0.39	LYCODES PALEARIS
15	3.38	.019	.902	0.34	HEMILEPIDOTUS JORDANI
16	2.49	.014	.916	0.34	SEA ANEMONE UNIDENT
17	1.98	.011	.928	0.57	ATHERESTHES SP
18	1.82	.010	.938	0.75	CHIONDECETES HYBRID
19	1.71	.010	.948	0.30	GORGONOCEPHALUS CARYI
20	1.48	.008	.956	0.57	LEPIDOPSETTA BILINEATA
21	0.96	.005	.962	0.34	PANDALUS SP
22	0.86	.005	.967	0.34	PLEURONECTES QUADRITUBERCULATUS
23	0.77	.004	.971	0.66	GYMNOCANTHUS SP
24	0.45	.003	.974	0.45	PAGURIDAE
25	0.43	.002	.976	0.39	BATHYMASTER SIGNATUS
26	0.42	.002	.979	0.25	OCTOPUS UNIDENT
27	0.42	.002	.981	0.30	CYCLOPTERIDAE
28	0.39	.002	.983	0.30	HIPPOGLOSSUS STENDLEPIS
29	0.39	.002	.985	0.62	MYOXOCEPHALUS SP
30	0.35	.002	.988	0.57	DASYCOTTUS SETIGER
31	0.33	.002	.989	0.33	HEMITRIPTERUS BOLINI
32	0.31	.002	.991	0.36	THALEICHTHYS PACIFICUS

TOTAL 174.73

\* NUMBER OF HAULS- 76, MEAN DEPTH=105.3M (RANGE= 59-148M)

Table G-7. Site Group 2A

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	69.74	.283	.283	0.98	THERAGRA CHALCOGRAMMA
2	32.30	.131	.413	0.92	CHIONOECETES OPILIO
3	21.58	.087	.501	0.65	PARALITHODES CAMTSCHATICA
4	18.54	.075	.576	0.85	ZOARCIDAE
5	14.68	.059	.635	0.98	CHIONOECETES BAIRDI
6	11.03	.045	.680	0.98	HIPPOGLOSSOIDES ELASSODON
7	10.29	.042	.722	0.06	PORIFERA
8	9.44	.038	.760	0.56	LINANDA ASPERA
9	8.56	.035	.795	0.94	GADUS MACROCEPHALUS
10	8.15	.033	.828	0.50	HEMILEPIDOTUS JORDANI
11	5.91	.024	.852	0.44	SEA ANEMONE UNIDENT
12	4.57	.019	.870	0.94	RAJA SP
13	4.49	.018	.888	0.40	STARFISH UNIDENT
14	4.22	.017	.905	0.58	GASTROPOD UNIDENT
15	4.06	.016	.922	0.92	ATHERESTHES SP
16	3.43	.014	.936	0.63	LEPIDOPSETTA BILINEATA
17	2.63	.011	.946	0.35	GORGONOCEPHALUS CARYI
18	2.07	.008	.955	0.48	PLEURONECTES QUADRITUBERCULATUS
19	1.71	.007	.962	0.75	REINHARDTIUS HIPPOGLOSSOIDES
20	1.14	.005	.966	0.71	CHIONOECETES HYBRID
21	1.09	.004	.971	0.69	PAGURIDAE
22	0.95	.004	.975	0.48	HIPPOGLOSSUS STENDOLEPIS
23	0.74	.003	.978	0.56	THALEICHTHYS PACIFICUS
24	0.74	.003	.981	0.10	LYCODES PALEARIS
25	0.59	.002	.983	0.38	HEMITRIPTERUS BOLINI
26	0.58	.002	.985	0.25	OCTOPUS UNIDENT
27	0.54	.002	.988	0.63	DASYCOTTUS SETIGER
28	0.51	.002	.990	0.44	MYOXOCEPHALUS SP
29	0.37	.002	.991	0.94	STRONGYLOCENTROTUS DROEBACHIENSIS

TOTAL 246.85

\* NUMBER OF HAULS- 48, MEAN DEPTH=104.1M (RANGE= 59-143M)

Table G-8. Site Group 2Ai

\*\*\*\*\*  
 MEAN PROP. CUMUL. FREQ.  
 CPUE OF PROP. OF  
 (KG/HA) CPUE OF CPUE OCCURR. TAXA  
 \*\*\*\*\*

1	92.83	.304	.304	0.96	THERAGRA CHALCOGRAMMA
2	48.71	.159	.463	1.00	CHIONOECETES OPILIO
3	35.99	.118	.581	0.82	PARALITHODES CAMTSCHATICA
4	18.93	.062	.642	1.00	CHIONOECETES BAIRDI
5	17.63	.058	.700	0.11	PORIFERA
6	16.18	.053	.753	0.89	LIMANDA ASPERA
7	13.91	.045	.798	0.68	HEMILEPIDOTUS JORDANI
8	9.22	.030	.829	0.96	GADUS MACROCEPHALUS
9	7.09	.023	.852	0.50	STARFISH UNIDENT
10	6.65	.022	.874	0.57	GASTROPOD UNIDENT
11	6.40	.021	.894	0.96	HIPPOGLOSSOIDES ELASSODON
12	5.86	.019	.914	0.93	LEPIDOPSETTA BILINEATA
13	5.48	.018	.932	0.75	ZOARCIDAE
14	3.48	.011	.943	0.79	PLEURONECTES QUADRITUBERCULATUS
15	3.38	.011	.954	0.86	ATHERESTHES SP
16	2.77	.009	.963	0.89	RAJA SP
17	1.76	.006	.969	0.51	PAGURIDAE
18	1.38	.005	.973	0.75	CHIONOECETES HYBRID
19	1.20	.004	.977	0.11	LYCODES PALEARIS
20	1.19	.004	.981	0.68	REINHARDTIUS HIPPOGLOSSOIDES
21	0.95	.003	.984	0.57	HIPPOGLOSSUS STENDLEPIS
22	0.90	.003	.987	0.25	GORGONOCEPHALUS CARYI
23	0.62	.002	.989	0.46	MYOXOCEPHALUS SP
24	0.42	.001	.991	0.25	ERIMACRUS ISENBECKII

TOTAL 305.81

\* NUMBER OF HAJLS- 28, MEAN DEPTH= 90.4M (RANGE= 59-124M)

Table G-9. Site Group 2Aii

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCURR.	TAXA
*****					
1	37.43	.228	.228	1.00	THERAGRA CHALCOGRAMMA
2	36.82	.224	.452	1.00	ZOARCIDAE
3	17.51	.107	.558	1.00	HIPPOGLOSSOIDES ELASSODON
4	14.17	.086	.645	0.75	SEA ANEMONE UNIDENT
5	9.33	.057	.701	0.30	CHIONOECETES OPILIO
6	8.74	.053	.755	0.95	CHIONOECETES BAIRDI
7	7.63	.046	.801	0.90	GADUS MACROCEPHALUS
8	7.10	.043	.844	1.00	RAJA SP
9	5.04	.031	.875	0.50	GORGONOCEPHALUS CARYI
10	5.01	.031	.906	1.00	ATHERESTHES SP
11	2.43	.015	.920	0.85	REINHARDTIUS HIPPOGLOSSOIDES
12	1.48	.009	.929	0.75	THALEICHTHYS PACIFICUS
13	1.40	.009	.938	0.60	PARALITHODES CANTSCHATICA
14	1.37	.008	.946	0.80	HEMITRIPTERUS BOLINI
15	0.99	.006	.952	0.95	DASYCOTTUS SETIGER
16	0.95	.006	.958	0.35	HIPPOGLOSSUS STENDLEPIS
17	0.89	.005	.963	0.10	STRONGYLOCENTROTUS DROEBACHIENSIS
18	0.88	.005	.969	0.25	OCTOPUS UNIDENT
19	0.86	.005	.974	0.25	STARFISH UNIDENT
20	0.81	.005	.979	0.55	CHIONOECETES HYBRID
21	0.80	.005	.984	0.50	GASTROPOD UNIDENT
22	0.55	.003	.987	0.55	BATHYMASTER SIGNATUS
23	0.35	.002	.989	0.40	MYOXOCEPHALUS SP
24	0.32	.002	.991	0.15	NEPTUNEA PRIBILOFFENSIS

TOTAL 164.31

\* NUMBER OF HAULS- 20, MEAN DEPTH=123.2M (RANGE=104-143M)

Table G-10. Site Group 2B

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	40.81	.312	.312	1.00	THERAGRA CHALCOGRAMMA
2	36.14	.277	.589	1.00	CHIONOECETES OPILO
3	7.76	.059	.648	1.00	GASTROPOD UNIDENT
4	7.58	.058	.706	0.96	REINHARDTIUS HIPPOGLOSSOIDES
5	5.28	.040	.747	0.96	LYCODES PALEARIS
6	4.60	.035	.782	0.72	GADUS MACROCEPHALUS
7	4.16	.032	.814	0.56	STARFISH UNIDENT
8	3.77	.029	.843	0.50	CHIONOECETES BAIRDI
9	3.75	.029	.871	0.16	ZOARCIDAE
10	2.98	.023	.894	0.80	CHIONOECETES HYBRID
11	2.66	.020	.915	0.72	RAJA SP
12	1.88	.014	.929	0.84	HIPPOGLOSSOIDES ELASSODON
13	1.82	.014	.943	0.24	GORGONOCEPHALUS CARYI
14	1.71	.013	.956	0.88	GYMNOCANTHUS SP
15	1.05	.006	.964	0.72	PANDALUS SP
16	0.87	.007	.971	0.52	BATHYMASTER SIGNATUS
17	0.50	.004	.975	0.08	ERIMACRUS ISENBECKII
18	0.48	.004	.978	0.48	CYCLOPTERIDAE
19	0.44	.003	.982	0.40	DASYCOTTUS SETIGER
20	0.43	.003	.985	0.40	MYOXOCEPHALUS SP
21	0.33	.003	.987	0.12	EUMICROTREMUS ORBIS
22	0.21	.002	.989	0.16	HEMITRIPTERUS BOLINI
23	0.21	.002	.991	0.28	LIMANDA ASPERA

TOTAL 130.67

\* NUMBER OF HAULS= 25, MEAN DEPTH=103.1M (RANGE= 82-128M)

Table G-11. Site Group 2Bi

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF	CPUE	TAXA
*****					
1	33.14	.357	.357	1.00	TERAGRA CHALCOGRAMMA
2	14.00	.151	.508	1.00	CHIONDECETES OPILO
3	10.92	.118	.625	1.00	REINHARDTIUS HIPPOGLOSSOIDES
4	9.21	.099	.724	1.00	GASTROPOD UNIDENT
5	9.03	.097	.822	1.00	LYCODES PALEARIS
6	5.50	.059	.881	0.54	STARFISH UNIDENT
7	2.91	.031	.912	0.93	RAJA SP
8	2.00	.022	.934	0.86	PANDALUS SP
9	1.12	.012	.946	0.93	GYMNOCANTHUS SP
10	1.06	.011	.957	0.57	ZOARCIDAE
11	0.80	.009	.966	0.71	CYCLOPTERIDAE
12	0.56	.006	.972	0.79	HIPPOGLOSSOIDES ELASSODON
13	0.52	.006	.977	0.71	GADUS MACROCEPHALUS
14	0.28	.003	.980	0.21	LIMANDA ASPERA
15	0.25	.003	.983	0.29	CHIONDECETES BAIRDI
16	0.24	.003	.986	0.57	ICELUS SP
17	0.21	.002	.988	0.21	GORGONOCEPHALUS CARYI
18	0.19	.002	.990	0.50	MYOXOCEPHALUS SP
19	0.19	.002	.992	0.21	LYCODES BREVIPES

TOTAL 92.87

\* NUMBER OF HAULS= 14, MEAN DEPTH= 99.6M (RANGE= 82-113M)

Table G-12. Site Group 2Bii

*****					
	MEAN	PROP.	CUMUL.	FREQ.	
	CPUE	OF	PROP.	OF	
	(KG/HA)	CPUE	OF CPUE	OCCURR.	TAXA
*****					
1	49.66	.368	.368	1.00	THERAGRA CHALCOGRAMMA
2	37.26	.276	.644	1.00	CHIONOECETES OPILO
3	7.55	.056	.700	1.00	CHIONOECETES BAIRDI
4	5.87	.043	.743	0.91	CHIONOECETES HYBRID
5	5.52	.041	.784	0.73	GADUS MACROCEPHALUS
6	4.74	.035	.819	0.91	REINHARDTIUS HIPPOGLOSSOIDES
7	4.70	.035	.854	1.00	ZOARCIDAE
8	4.05	.030	.884	1.00	GASTROPOD UNIDENT
9	2.84	.021	.905	0.91	LYCODES PALEARIS
10	2.67	.020	.925	0.27	GORGONOCEPHALUS CARYI
11	2.45	.018	.943	0.91	HIPPOGLOSSOIDES ELASSODON
12	1.54	.011	.954	0.82	GYMNOCANTHUS SP
13	1.24	.009	.964	0.82	BATHYMASTER SIGNATUS
14	0.78	.006	.969	0.91	RAJA SP
15	0.65	.005	.974	0.64	DASYCOTTUS SETIGER
16	0.59	.004	.979	0.18	ERIMACRUS ISENBECKII
17	0.38	.003	.982	0.36	ATHERESTHES SP
18	0.37	.003	.984	0.73	EUMICROTREMUS ORBIS
19	0.34	.003	.987	0.27	MYOXOCEPHALUS SP
20	0.33	.002	.989	0.99	OCTOPUS UNIDENT
21	0.32	.002	.992	0.45	STARFISH UNIDENT

TOTAL 134.99

\* NUMBER OF HAULS= 11, MEAN DEPTH=107.7M (RANGE= 91-128M)