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AN ATLAS OF DEMERSAL FISH AND INVERTEBRATE COMMUNITY STRUCTURE IN THE EASTERN BERING SEA: PART 1, 1978-81

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ABSTRACT

This report presents the results of using numerical classification, i.e., "cluster analysis," techniques to investigate some of the qualitative characteristics of demersal fish and invertebrate community structure in the eastern Bering Sea. Summer trawl survey data from the 4 years, 1978-81, were used to examine relationships between species, describe apparent habitat areas, and measure the extent of interannual variability.

Following a description of general analytical steps and their sequence, the manner of their implementation on the computer system of the Northwest and Alaska Fisheries Center is described. A package of four computer programs written in FORTRAN has been developed to prepare data for cluster analysis, to perform the clustering, to produce geographic maps, and to draw summary dendrograms.

The results-that are presented for each of the four trawl surveys include a dendrogram summarizing the grouping relationships between all sampling locations (i.e., sites); maps of these site groups at three levels of dissimilarity; lists of the assemblages of species occurring within these various site groups (i.e., habitat areas) and their relative abundance; and a dendrogram summarizing the relationships between species, based on similarity of distribution patterns.

The resultant site groups reveal highly contiguous distributions with considerable temporal stability.

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INTRODUCTION

The need for better understanding of the structure and dynamics of ecosystems becomes increasingly apparent as we attempt to' facilitate the goals of multispecies management. Although communities of fishes and their associated organisms are complex, they can be described in terms of certain dimensions or characteristics. These include the species list of the community, the relative abundance and co-occurrence of species in space and time; the distributional statistics of the species populations; the behavior and physiology of the component species; and the feeding relationships, trophic levels and efficiencies,, and -energy flow (Fager 1963; May 1979).

Most conventional fisheries statistics and analyses provide only suggestions of community organization. For example, specieswhich may have important roles within a system, due to competitive or predator-prey interactions, may not appear in commercial catch statistics. Similarly, species lists from research surveys indicate which species were present but provide little information on associations.

Even after defining the dimensions and characteristics listed above, it can be quite difficult to distinguish the different geographical boundaries of system structure from the complex overlaps of the individual species distributions: what are the important biological habitats, where are the boundaries that indicate system structure, and how do the locations of these vary over time?

Temporal variability is a particularly important aspect of community structure, though often ignored (Wiens 1981), and is a critical consideration for multispecies management due to the different time scales for many population processes (May et al. 1979). For example, a potentially important source of seasonal variation is environmentally-induced population migration.

The eastern Bering Sea supports large multispecies fisheries, both foreign and domestic (Bakkala et al. 1981; Otto 1981). In recent years, 1970-78, foreigntrawl fisheries have harvested approximately 1,713,00 metric tons (t) of groundfish per year, taking about 24 marketable species. In addition, domestic fisheries now harvest 150,000-200,000 t/yr of crab. Because of the mixed-species catches that occur in these fisheries and growing awareness of interactions between different fisheries and species, it has become increasingly important to study and describe the multispecies system upon which these large fisheries are based.

There have been only a few previous studies of the organization of demersal fish and invertebrate communities in the eastern Bering Sea. Descriptions of the major infaunal and epifaunal invertebrate communities have included those of Semenov (1964), Stoker (1981), Haflinger (19811, and Jewett and Feder (1981). Previous descriptions of Bering Sea demersal fish and macroinvertebrate communities have included Kihara (1976), Pereyra et al. (1976), and Smith and Bakkala (1982).

The hydrography of the eastern Bering Sea shelf plays a major role in the biological organization of the system (Favorite and Laevastu 1981). The shelf is marked by highly variable ice cover over a considerable portion of the year. Frontal systems, with variability in position and strength, are the result of distinct water mass domains across the shelf (Kinder and Schumacher 1981). These domains may have different environmental conditions for the fauna within-them and almost certainly affect the geographic boundaries of community distributions (Haflinger 1981; Cooney 1981).

Since 1971, the Northwest and Alaska Fisheries Center (NWAFC) has conducted annual resource assessment trawl surveys in the eastern Bering Sea. These standard research surveys, usually conducted from June to August of each

year, are now a valuable time series that can be used to study the Bering Sea demersal fish and invertebrate system, and the variations from year to year.

The objectives of the present study are, using the four most recent sets of NWAFC trawl survey data from the years 1978-81, to describe the Bering Sea demersal fish and invertebrate system in terms of 1) the major communities, their component species and associations; 2) the large-scale geographic patterns of community organization; and 3) the variations in these characteristics over successive years.

This report also provides an opportunity to describe the numerical classification techniques and computer programs that were used to conduct these multispecies analyses.

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METHODS

The data and computer programs used for these analyses were obtained from the fishery resource survey data-base system of the NWAFC as described by Mintel and Smith (1981). In brief, the system consists of data, software, and documentation that have been implemented on the Burroughs 7800 computer[1/] at the NWAFC for handling the requirements of multiple, large-scale, groundfish trawl surveys. Data available for the Bering Sea region includes the results of annual resource surveys conducted by the NWAFC since 1971. This preliminary report covers only the four most recent years, 1978-81. The data-base information used in the analyses includes haul position, sampling gear, trawling distance, and catch data consisting of biological identifications, weights, and counts.

Cluster Analyses

General Methods

In recent analyses of trawl survey data from the Pacific coast and northeastern Gulf of Alaska regions, Gabriel and Tyler (1980, 1981) used numerical classification (i.e., "cluster analysis") techniques to describe the distributions of demersal fishes in terms of their associations and organization into different species assemblages; Advantages of these techniques were that they: 1) could be used to reduce large sets of data to simpler summaries using objective criteria; 2) were based upon quantitative catch data, i.e., apparent faunal densities, instead of only presence or absence; 3) enabled evaluations of results at different levels of statistical relationship; and 4) seemed to provide valuable insights into biological associations, both between the different organisms and with their environment, that contribute to the organization of the fauna.

1/ Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

General methods of cluster analysis, in their application to analyses of ecological survey or capture data, are now fairly well described in the literature (Clifford and Stephenson 1975; Boesch 1977). Cluster analysis is used to classify a set of entities based on the resemblance of their attributes according to mathematical criteria. Principal steps and 'their sequence are shown in Figure 1.

Data preparation involves establishing a data matrix consisting of the catch data (counts, weights, or densities) for a set of taxonomic categories (species) among a set of samples or collection sites. A transformation may be applied to the data matrix to reduce the effects of large data values that may be unduly emphasized in the results. A standardization may also be applied to correct for unequal sampling effort, such as two different sampling gears or unequal gear selectivity between species.

After the data matrix has been transformed and/or standardized, resemblance measures are determined between sites or species, resulting in a matrix of resemblance values. By convention, a "normal" numerical classification is an analysis based upon measures of resemblance between samples or collection sites., An "inverse" numerical classification is based upon the resemblance between species in terms of their distributions among samples.

Although various clustering methods are available, the most commonly used procedures are agglomerative and hierarchical (Boesch 1977). With these methods, each entity begins as a separate element. The elements are then combined in hierarchical steps based on the similarity (or dissimilarity) of their attributes. The resultant groupings, indicative of the relationships, are usually summarized in the form of a dendrogram.

It should be noted that numerical classification is not an end in itself, but a means of gaining insight into the organization of complex data and guiding subsequent research.

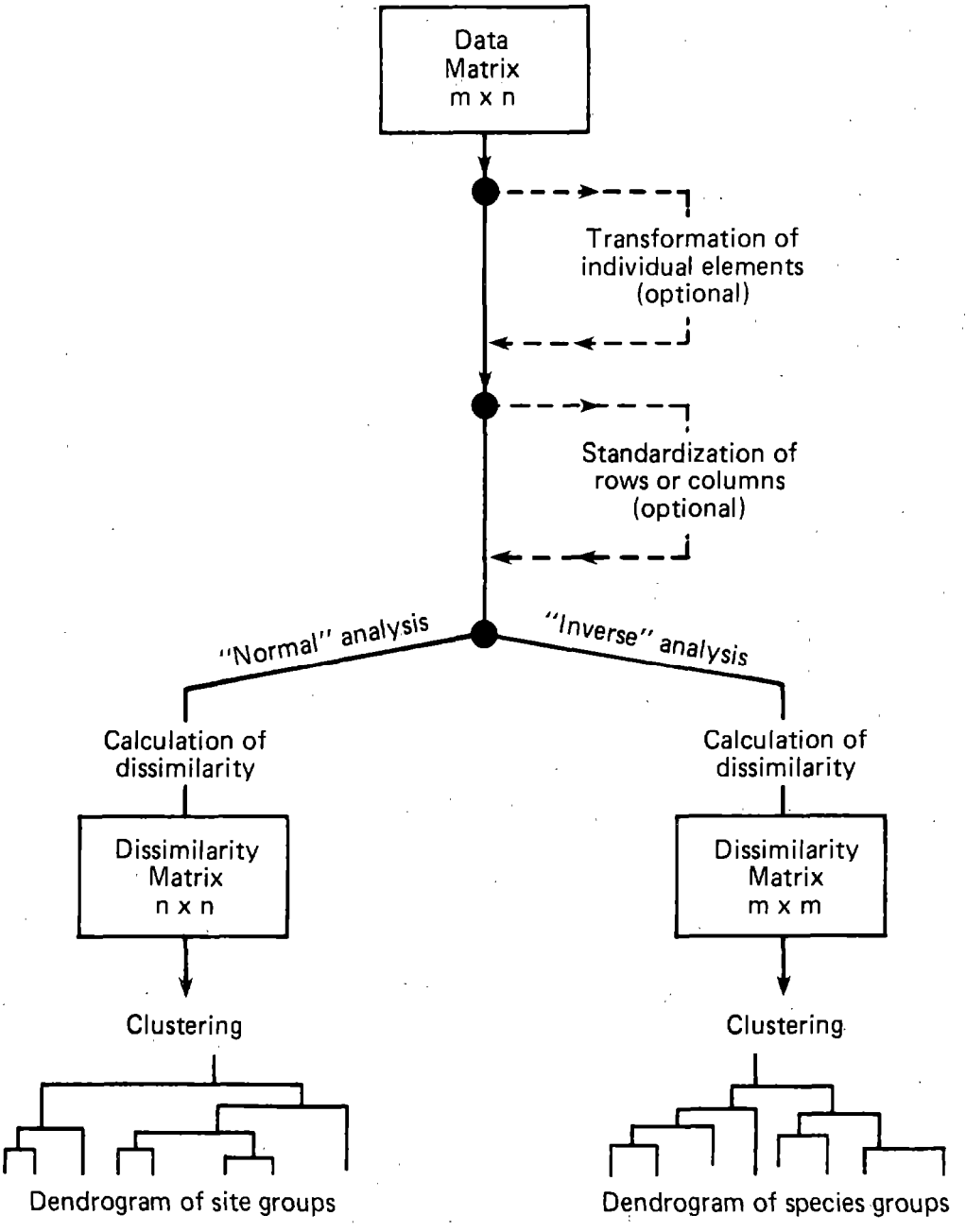

Figure 1. Diagram of the principal steps, and their sequence, for cluster analysis of a survey data matrix composed of catch data for m species at n sampling sites.

Computer Implementation

A package of four computer programs, written in FORTRAN, was developed by the junior author (M. M.) to perform a sequence of steps associated with cluster analyses on the NWAFC computer system. The main program, named CLUSTER, was adapted from a computer program originally written by James Keniston of Oregon State University, Newport, Oregon. The four programs, in approximate' order of use, are

1. CLUSTER/START,
2. CLUSTER,
3. CLUSTER/MAP, and
4. CLUSTER/DRAW.

Documentation for the package of four NWAFC programs is maintained on a disk file. Copies may be obtained from the authors, or NWAFC computer users can list a copy on a terminal at any time with the command

LIST (RACE0360) DOC/CLUSTER.

Program CLUSTER/START.--The first program in the package, CLUSTER/START, interfaces data in the NWAFC survey data-base with the main analytical program. Information that is input to CLUSTER/START includes a haul file (i.e., list of trawl samples); a catch file (i.e., the corresponding capture data); a list of species code numbers to use in the analysis; and measurement standards. Program CLUSTER/START then uses these files to create a data matrix of samples and catch per unit of effort (CPUE) values for the list of species. CPUE values can be calculated in units of either weight or number.

Program CLUSTER.--Program CLUSTER computes resemblance measures, performs the clustering, and reports the results of the classification in a summary table and dendrogram. An output data file which contains the clustering results can

also be saved for subsequent uses with the other two programs in the cluster analysis package, CLUSTER/MAP and CLUSTER/DRAW. Program CLUSTER normally operates in an interactive mode where the user responds to program cues, entering the desired program directions. The program can also be run in "batch" mode with preset instructions. There are no limits on the number of hauls or species which may be analyzed by program CLUSTER, other than processing time and cost constraints.

Program CLUSTER takes the data matrix (generated and stored by the computer as a sequential file) from CLUSTER/START, and then allows the following steps:

1. transformation,
2. standardization,
3. selection of normal or inverse classification,
4. computation of resemblance matrix,
5. clustering of entities,
6. drawing the dendrogram of results, and
7. output of a dendrogram data file.

Data elements can be transformed in one of four different ways: log(x+l), ln(x+l), square root, or exponential, where x refers to the CPUE of each species in each haul.

After any transformation, the data matrix can be standardized on the basis of either row or column values. For example, if two different sampling gears were used, the CPUE of each species in each sample can be divided by the total CPUE of each sample, thereby creating a proportional CPUE. Mean or maximum value divisors may also be used as a basis for standardization.

The next step is to select either a normal or inverse classification. In a normal classification, site clustering, each haul is an entity and its

attributes are the CPUE values of each species in that sample; whereas in species clustering, each species is an entity and its attributes are the CPUE values among all hauls.

Once the desired data matrix has been developed and the selection of classification method made, the entities are compared to each other and a dissimilarity matrix is formed. Two possible algorithms are provided, the Bray-Curtis and Canberra metric coefficients, both of which can range from zero (no dissimilarity) to 1 (complete dissimilarity).

For the Bray-Curtis coefficient (Clifford and Stephenson 1975), the dissimilarity between two entities j and k, with N attributes (i), is given by

$$D_{jk} = \sum_{i=1}^{N} \frac{|X_{ij} - X_{ik}|}{(X_{ij} + X_{ik})}$$

where Djk can range from zero (no dissimilarity) to 1 (total dissimilarity). For site clustering (normal classification), x_{ij} and x_{ik} are the transformed CPUE values for the ith species (of N total) at the jth and kth stations. For species clustering (inverse classification), x_{ij} and x_{ik} represent the ith station (of N total) for the jth and kth species. It should be noted that a few very large data values may heavily influence the result unless previous transformation and/or standardization was used to minimize biasing. The Bray-Curtis coefficient is widely used in marine ecological studies (Boesch 1977).

The Canberra metric coefficient (Lance and Williams 1966) for these entities is given by

$$D_{jk} = \frac{1}{N} \frac{\sum_{i=1}^{N} |X_{ij} - X_{ik}|}{\sum_{i=1}^{N} (X_{ij} + X_{ik})} .$$

A detailed comparison of both coefficients is given by Clifford and Stephenson (1975).

After the dissimilarity values between entities have been established, the actual combining of entities into discrete assemblages can begin. Program CLUSTER has five possible strategies available-to determine clustering: single linkage, complete linkage, group average, simple average, and flexible linkage (see Boesch (1977) for further explanation of these procedures). All of these strategies are hierarchical and agglomerative. Each entity begins as an individual element and the most similar pair are joined first. After that, either another pair is formed, or a single entity is added to a pair that has already been formed. The way that the dissimilarity between groups is calculated is determined by the clustering strategy chosen. This process continues with larger groups being fused at increasingly higher values of dissimilarity until the entire population of entities is joined in one cluster. Differences between the various techniques and the consequences of each strategy are described by Boesch (1977) and Clifford and Stephenson (1975).

After completing the classification, program CLUSTER prints the results in a table and also as a printer-plotted dendrogram showing the entities, their grouping relationships, and levels of dissimilarity.

Program CLUSTER/MAP.--Program CLUSTER/MAP creates a plot work file of the hauls included in a cluster selected by the user. This program can be used to produce computer-drawn geographic maps showing the locations and distribution patterns of different site or species clusters. For site clusters, all the hauls for a given cluster are plotted. In the case of species clusters, those hauls are plotted in which any user defined proportion of the species in the cluster was captured.

Program CLUSTER/DRAW.--Program CLUSTER/DRAW uses dendrogram data files saved from program CLUSTER to draw dendrograms on the NWAFC's offline CalComp plotter. This program is used when high-quality line drawings are needed.

Data Used for Analyses

Survey Coverage and Characteristics

The data used for this study were collected by fisheries resource assessment surveys performed each summer, primarily during June to August, by personnel of the NWAFC's Resource Assessment and Conservation Engineering (RACE) Division. Vessels that were used included research vessels of the National Oceanic and Atmospheric Administration (NOAA) and chartered fishing vessels.

The results of each year's survey were scanned, and successful tows were selected to give as complete coverage of the area surveyed as possible. In cases where replicate tows were made at the same site, one tow was selected using a random number table. Tows were rejected if the trawl had snagged the bottom or been damaged.

For 1978, data from 245 trawl samples were used out of 316 total samples. The geographic area of the survey covered about 342,000 km^2 and ranged from Unimak Pass (lat. 54°20'N) to north of St. Matthew Island (lat. 61°00'N) and from Bristol Bay (long. 159°02'W) to the edge of the continental shelf. Bottom depths varied from 18-276 m. All tows were made with a 400-mesh Eastern trawl (Wathne 1977) using a 32 mm mesh cod end liner.

In 1979, 566 trawl samples were selected from 682 total samples. The survey ranged from Unimak Pass to St. Lawrence Island (lat. 63°30'N) and from inner Bristol Bay (long. 158°00'W) to the continental slope. The area covered was about 649,000 km^2 over a depth range of 11-732 m. A 400-mesh Eastern trawl was used for 472 hauls on the continental shelf and a Nor'eastern trawl

with roller gear (Gunderson and Sample's (1980): figures 2-4) was used for 94 hauls on the slope. Both nets used 32 mm mesh cod end liners.

The 1980 analysis used data from 345 trawl samples out of 383 total hauls. The area covered was about 467,000 km^2 and ranged from Unimak Pass to north of St. Matthew Island (lat. 61°40'N) and from inner Bristol Bay to the shelf edge. Depths sampled ranged from 15-243 m. The 400-mesh Eastern trawl was used for all the hauls.

In 1981, 312 trawl samples were used from 409 total samples., The survey covered about 425,000 km^2 over a depth range of 13-177 m. The area surveyed ranged from Unimak Pass to north of St. Matthew Island (lat. 61°38'N) and from inner Bristol Bay to the shelf edge. The 400-mesh Eastern trawl was used for 127 hauls and an 83/112 Eastern trawl (Wathne's (1977): figure 10) was used for 185 hauls. Both nets had 32 mm cod end liners.

In all 4 yr, 1978-81, the field methods described by Smith and Bakkala (1982) were used for trawl sampling and collecting biological data.

Biological Species

After the selection of hauls, the complete catch data were used to prepare a species list. Taxonomic categories were included in each year's analysis (as entities or attributes) on the basis of frequency of occurrence and the likelihood that they were identified accurately and consistently over all years (Table 1). Some species had to be grouped into higher-level poly-specific categories, i.e., taxonomic genera or families, to assure consistent classification. Taxonomic categories which appeared in less than 1% of the hauls selected for a given year (2% for 1979 due to the unusually large survey) were excluded as being too rare.

Table 1.--List of fish and invertebrates used in the cluster analyses, 1978-81 Bering Sea surveys.

Taxon [1/]	Year [2/] 1978	1979	1980	1981
Fish				
Agonidae				
Agonus acipenserinus	x	x	x	x
Anoplagonus inermis	x			
Aspidophoroides bartoni	x	x	x	x
Bathyagonus infraspinatus				x
B. nigripinnis	x			
Occella dodecaedron		x	x	x
O. verrucosa	x	x	x	
Pallasina barbata			x	
Sarritor frenatus	x	x	x	x
S. leptorhynchus			x	
Unid. agonids	x	x	x	
Ammodytidae				
Ammodytes hexapterus	x	x	x	x
Anoplopomatidae				
Anoplopoma fimbria	x	x	x	x
Bathymasteridae				
Bathymaster signatus	x	x	x	x
Unid. bathymasterids (2)	x			
Clupeidae				
Clupea harengus pallasi	x	x	x	x
Cottidae				
Artediellus spp. (7)	x	x		
Dasycottus setiger	x	x	x	x
Gymnocanthus spp. (4)	x	x	x	x
Hemilepidotus spp. (3)	x	x	x	x
H. jordani	x	x	x	x
H. papilio		x	x	x
Hemitripterus bolini	x	x	x	x
Icelinus borealis	x			
Icelus spp. (6)	x	x	x	x
Leptocottus armatus			x	
Malacocottus kincaidi	x	x	x	x
Myoxocephalus spp. (10)	x	x	x	x
Triglops spp. (6)	x	x	x	x
Unid. cottids	x	x	x	x

Table 1--(continued).

Taxon	Year			
	1978	1979	1980	1981
Cyclopteridae				
Careproctus spp. (13)				x
C. melanurus		x		
C. rastrinus	x	x	x	
Eumicrotremus orbis	x			
Liparis spp. (13)		x	x	
L. dennyi	x		x	
Unid. cyclopterids	x	x	x	x
Gadidae				
Boreogadus saida			x	x
Eleginus gracilis		x	x	x
Gadus macrocephalus	x	x	x	x
Theragra chalcogramma	x	x	x	x
Hexagrammidae				
Hexagrammos spp. (2)		x	x	
H. lagocephalus		x		
H. stelleri	x	x	x	x
Pleurogrammus monopterygius	x	x	x	
Macrouridae				
Coryphaenoides pectoralis		x		
Myctophidae				
Diaphus theta		x		
Unid. myctophids		x		
Osmeridae				
Mallotus villosus	x	x	x	x
Osmerus mordax		x	x	x
Thaleichthys pacificus	x	x	x	x
Pleuronectidae				
Atheresthes spp. (2)	x	x	x	x
Glyptocephalus zachirus	x	x	x	x
Hippoglossoides elassodon	x	x	x	x
Hippoglossus stenolepis	x	x	x	x
Isopsetta isolepis				x
Lepidopsetta bilineata	x	x	x	x
Limanda aspera	x	x	x	x
L. proboscidea	x	x	x	x
Platichthys stellatus	x	x	x	x
Pleuronectes auadritubercula tus	x	x	x	x
Reinhardtius hippoglossoides	x	x	x	x
Rajidae				
Raja spp. (11)	x	x	x	x
Scorpaenidae				
Sebastes alutus		x		
Sebastolobus alascanus	x	x		

Table l--(continued).

Taxon	Year 1978	1979	1980	1981
Stichaeidae				
Lumpenella longirostris			x	
Lumpenus maculatus		x	x	x
L. sagitta	x	x	x	x
Unid. stichaeids	x	x	x	
Trichodontidae				
Trichodon trichodon	x	x	x	x
Zaproridae				
Zaprora silenus	x	x		
Zoarcidae				
Bothrocara brunneum		x		
Lycodes spp. (10)				x
L. brevipes	x	x	x	x
L. concolor		x	x	
L. palearis	x	x	x	x
L. raridens			x	
L. turneri	x		x	
Unid. zoarcids	x	x	x	x
Invertebrates				
Caridean shrimp				
Argis spp. (5)	x	x	x	x
Crangonidae	x	x	x	x
Eualus spp.			x	
Pandalus spp. (4)	x	x	x	x
Sclerocrangon spp.		x		
Unid. carideans	x		x	
Anomuran crabs				
Lithodes aequispina		x		
Paralithodes camtschatica	x	x	x	x
P. platypus	x	x	x	x
Brachyuran crabs				
Cancer oregonensis				x
Chionoecetes (hybrid)	x	x	x	x
C. angulatus		x		
C. bairdi	x	x	x	x
C. opilio	x	x	x	x
Erimacrus isenbeckii	x	x	x	x
Hyas spp. (2)	x	x	x	x
Oregonia gracilis	x	x		x
Telmessus cheiragonus	x	x	x	x
Echinoderms				
Echinarachnius parma	x	x	x	x
Gorgonocephalus caryi	x	x	x	x
Strongylocentrotus droebachiensis	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".

The total number of biological taxa included in each year's analysis were 1978, 70 (54 fish taxa, 16 major invertebrate taxa); 1979, 80 (62, 18); 1980, 76 (60, 16); and 1981, 65 (49, 16).

Analytical Procedures

Following the selection of hauls (sampling "sites") and taxonomic categories ("species"), program CLUSTER/START was used to prepare the data matrix. Since CPUE values were computed in units of kg/hectare-trawled at this step, no further standardization was required.

Using program CLUSTER, a log(x+l) transformation was applied to the data matrix to reduce the influence of high CPUE values from 2-3 exceptionally abundant species. The Bray-Curtis dissimilarity coefficient was chosen because of its wide usage in marine ecology.

The different clustering strategies that were available ranged from those that tend to cluster early and tightly (termed space contraction) to those that cluster conservatively and maintain separation (termed space dilation). The clustering strategy chosen was the group average method, which has little tendency toward either extreme (Boesch 1977).

After each run of program CLUSTER, the site group dendrogram was analyzed for structure. The difficulty of defining what actually constituted a clustered group led to a certain degree of subjectivity, however. Our method of interpretation was to begin at a high level of dissimilarity (level 1, usually near 0.70) where the total population of sites was divided into a few major groups. Program CLUSTER/MAP was then used to plot the geographic locations of these station groups. If the sites within a -group showed contiguous distributions, a lower level of dissimilarity (level 2) was chosen that divided the major areas into smaller groups. If sites included in these smaller groups were

still contiguous, then a lower level of dissimilarity (level 3) was used to examine pattern at a smaller scale. It is, of course, possible to continue to compare clustering relationships at progressively lower values of dissimilarity until sites either lose their within-group homogeneity or become so small as to be ecologically meaningless except on a very small scale.

As the clusters were formed, small groups of l-5 hauls (usually showing as individual stations or pairs) occasionally appeared at intermediate levels of dissimilarity between a large major grouping and the next lower set of groups. In the presentation of results, these are included with the large group but not included at the next lower level of dissimilarity. The number of sites shown at the lowest level of dissimilarity, then, can be smaller than the number of samples used in the analysis, but in all years was at least 90% of the original total.

The emphasis in this study was on site group classification in order to describe the geographic patterns of community organization. The results of species group classification, showing species relationships based on the similarity of their distribution patterns, are presented as dendrograms without further analysis.

Statistics describing bottom depth, species composition, and faunal densities were computed for each site group.

RESULTS

The results are presented in chronological order. For each year (1978-1981), 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. 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 are given in Appendices A-D.

Bering Sea Survey, 1978

At level 1 (D=0.70), the highest level of dissimilarity, the major components-of the 1978 site groupings (see Figures 2-6, Table 2, and Appendix A) were a central shelf group (Group 2) dominated by yellowfin sole (Limanda aspera); an outer shelf group (Group 3) dominated by walleye pollock (Theragra chalcogramma); and a St. Matthew Island group (Group 1) dominated by snow (Tanner) crab (Chionoecetes opilio) and the polar eelpout (Lycodes turneri). A Pribilof Islands group (Group 2B) was formed at the intermediate level of dissimilarity, level 2 (D=0.60), and the outer shelf group divided into north and south components (Groups 3A, 3B). Further divisions of the central shelf group and northern outer shelf group occurred at the lowest level of dissimi-Parity, level 3 (D=0.50).

Bering Sea Survey, 1979

The 1979 survey covered the largest geographical area of the four years, 1978-81, and this was reflected in the results (see Figures 7-11, Table 3, and Appendix B). At the highest level of dissimilarity, level 1 (D=0.75), the major site groups were a mainland inshore group (Group 1) dominated by yellowfin sole and asteroids; a broad continental shelf group (Group 2) dominated

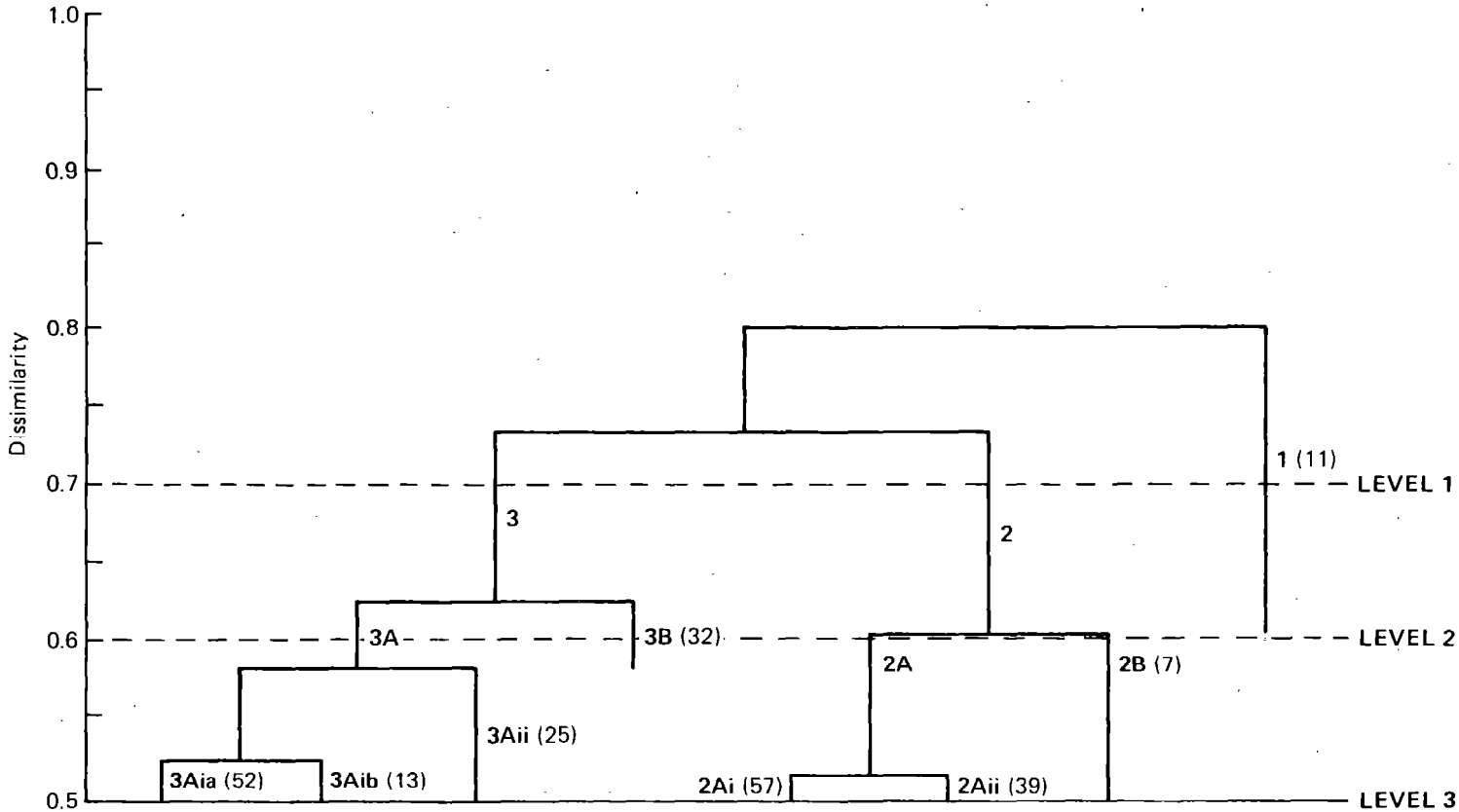

Figure 2. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, 1978 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.

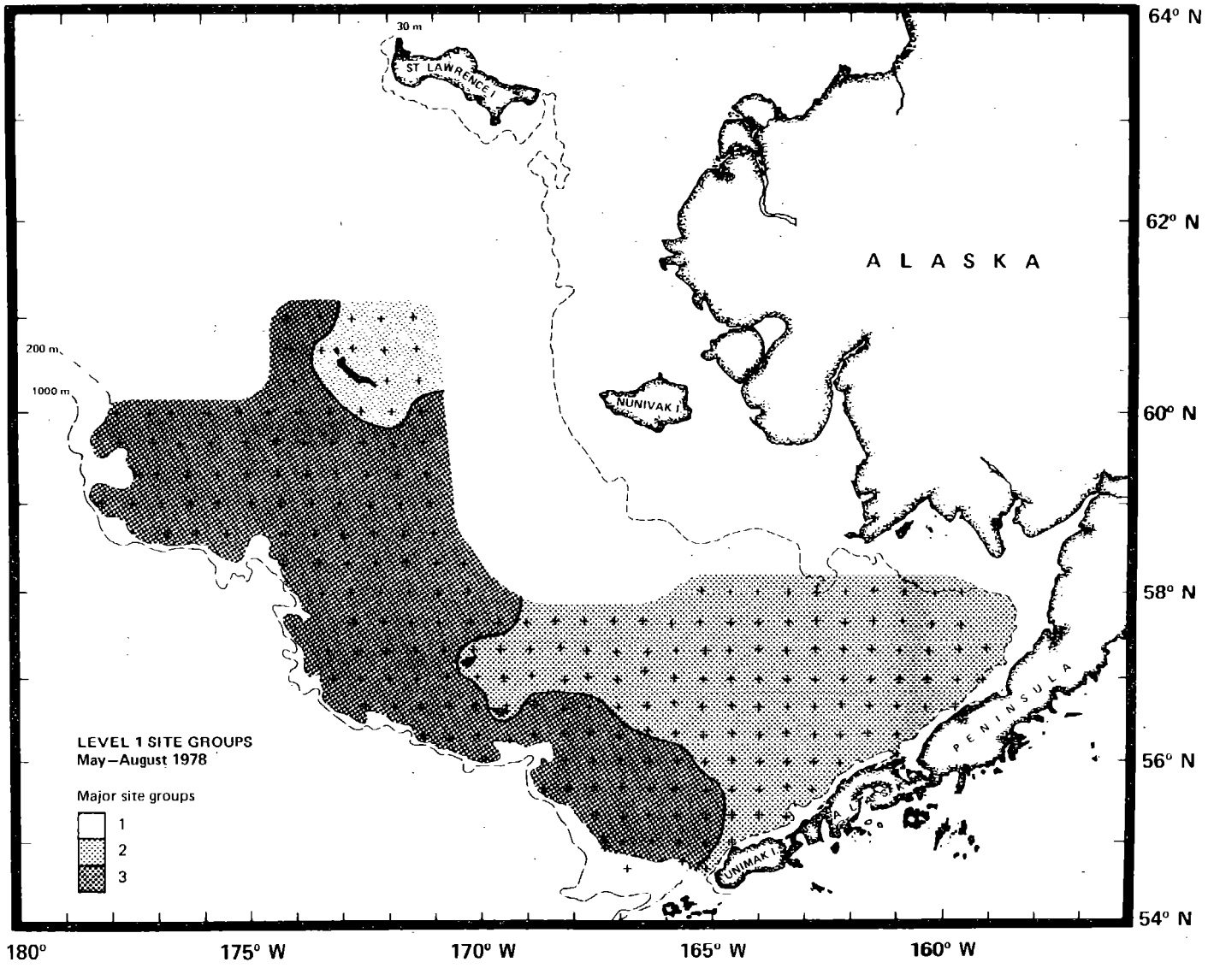

Figure 3. Map of level 1 site groups, 1978 Bering Sea trawl survey. Plus signs indicate sampling locations.

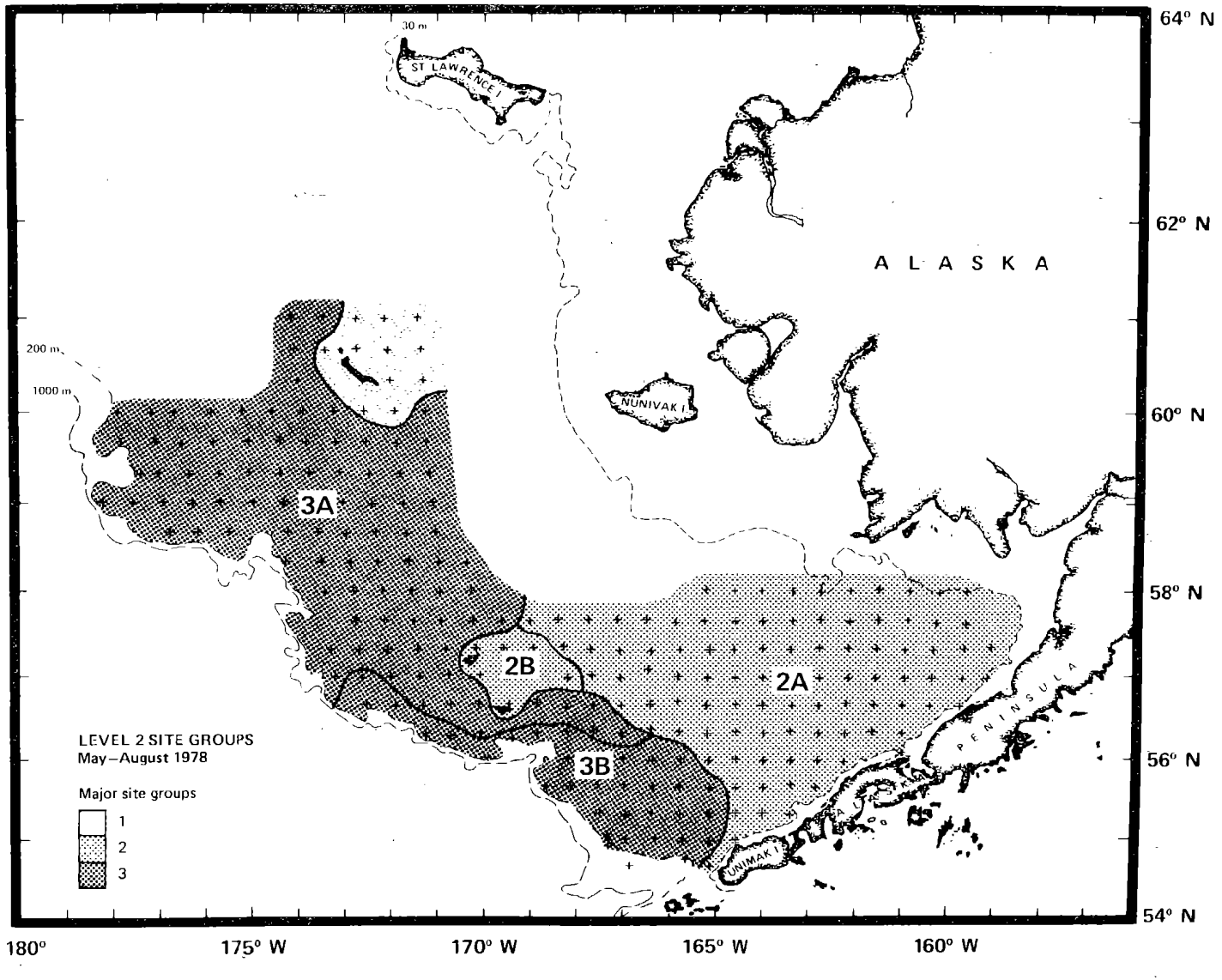

Figure 4. Map of level 2 site groups, 1978 Bering Sea trawl survey. Plus signs indicate sampling locations.

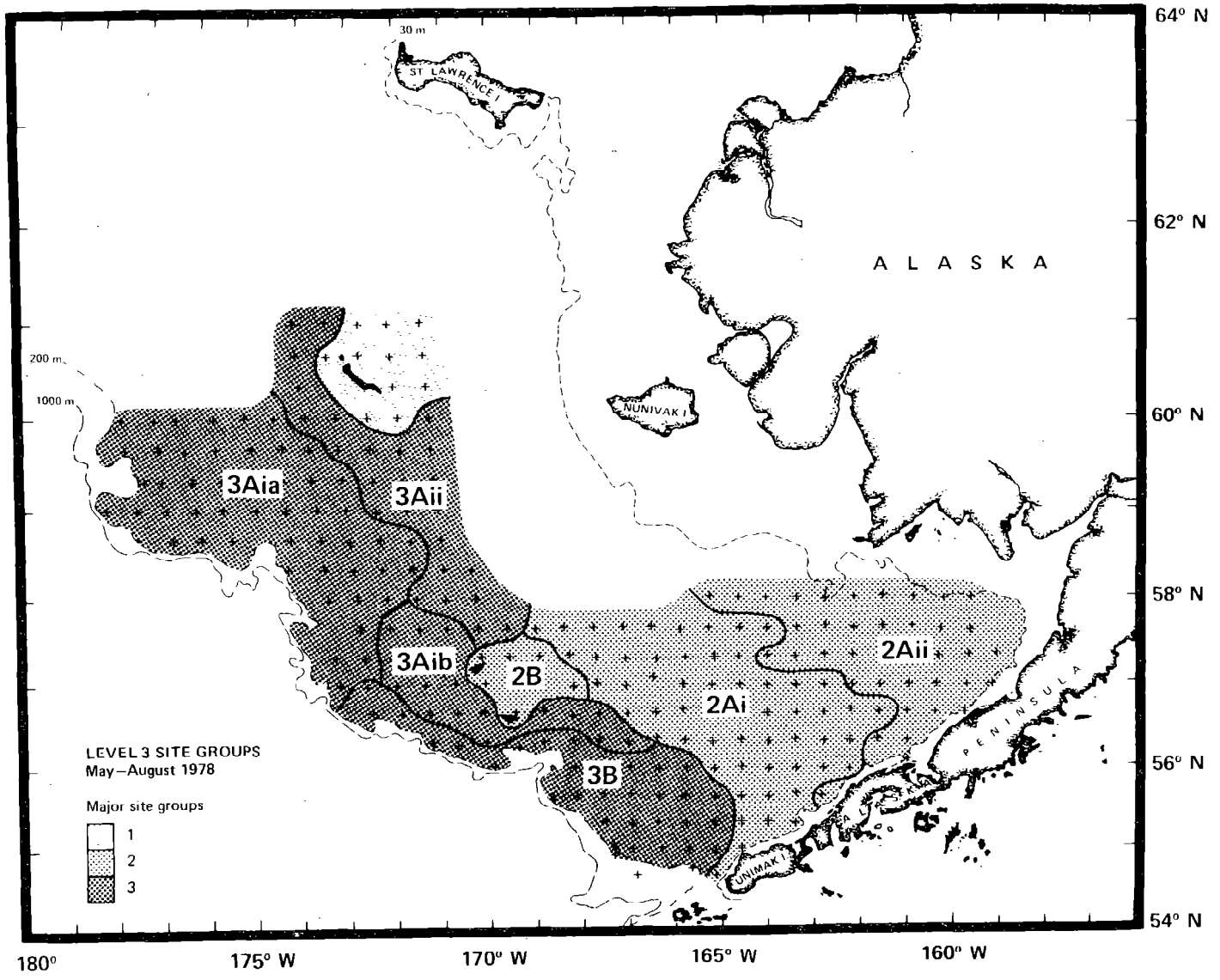

Figure 5. Map of level 3 site groups, 1978 Bering Sea trawl survey. Plus signs indicate sampling locations.

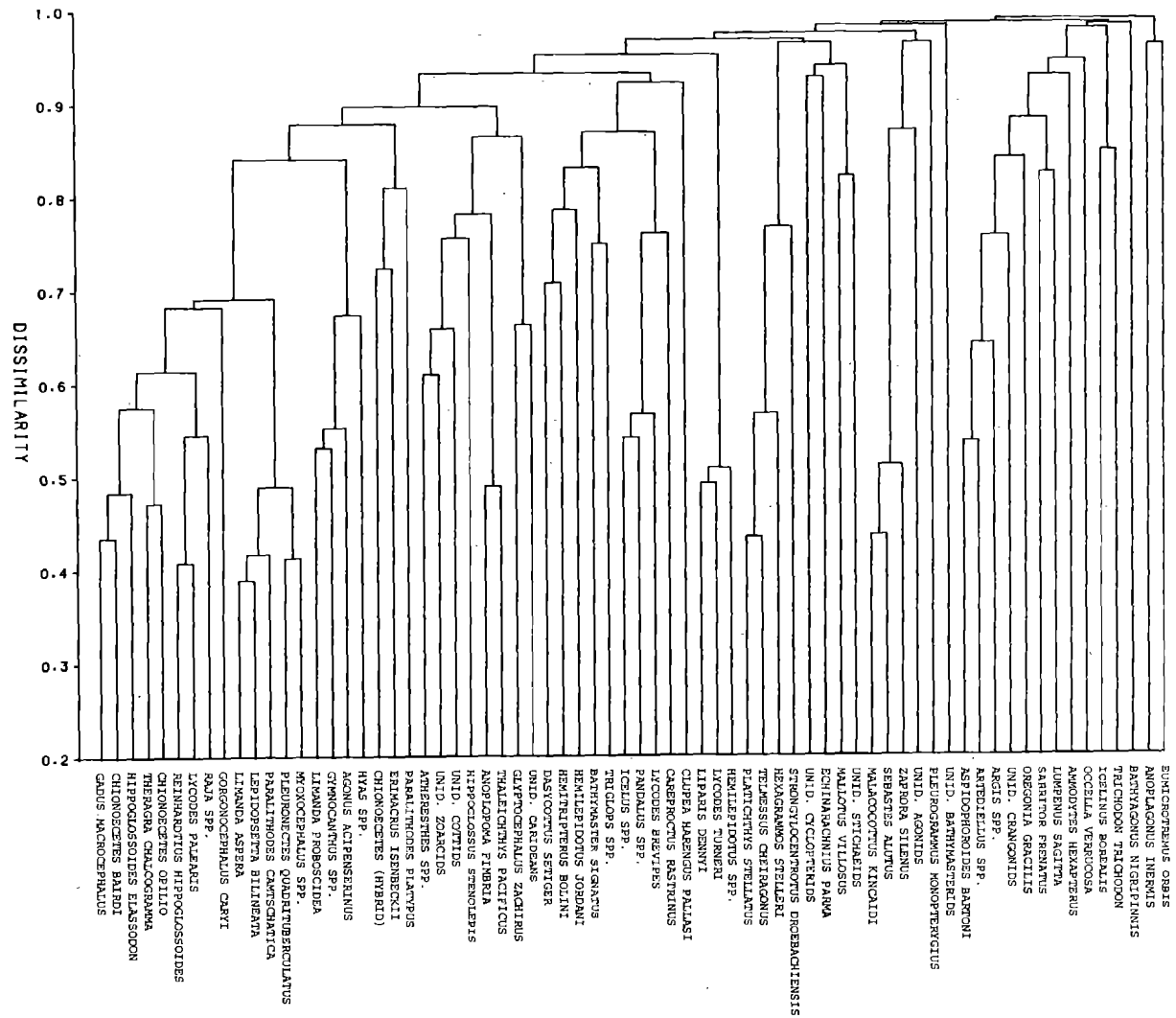

Figure 6. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1978 Bering Sea trawl survey.

Table 2.--Summary of site group characteristics, 1978 Bering Sea survey.

Site group 1/	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		Mean	SD	Range	
1	11	60.0	6.0	44-64	39.2
2	104	63.9	16.6	18-101	278.0
2A	97	63.4	17.0	18-101	288.2
2Ai	57	73.8	11.7	49-101	261.7
2Aii	39	49.3	10.2	26-70	325.5
2B	7	70.5	8.4	60-80	198.9
3	126	118.8	35.3	66-276	168.0
3A	94	110.5	26.9	66-188	198.3
3Ai	69	121.4	22.5	80-188	209.9
3Aia	52	127.7	21.8	91-188	163.0
3Aib	13	102.1	10.8	80-117	270.1
3Aii	25	80.3	9.7	66-97	110.8
3B	32	143.1	45.4	104-276	120.2

1/ See Figure 2.

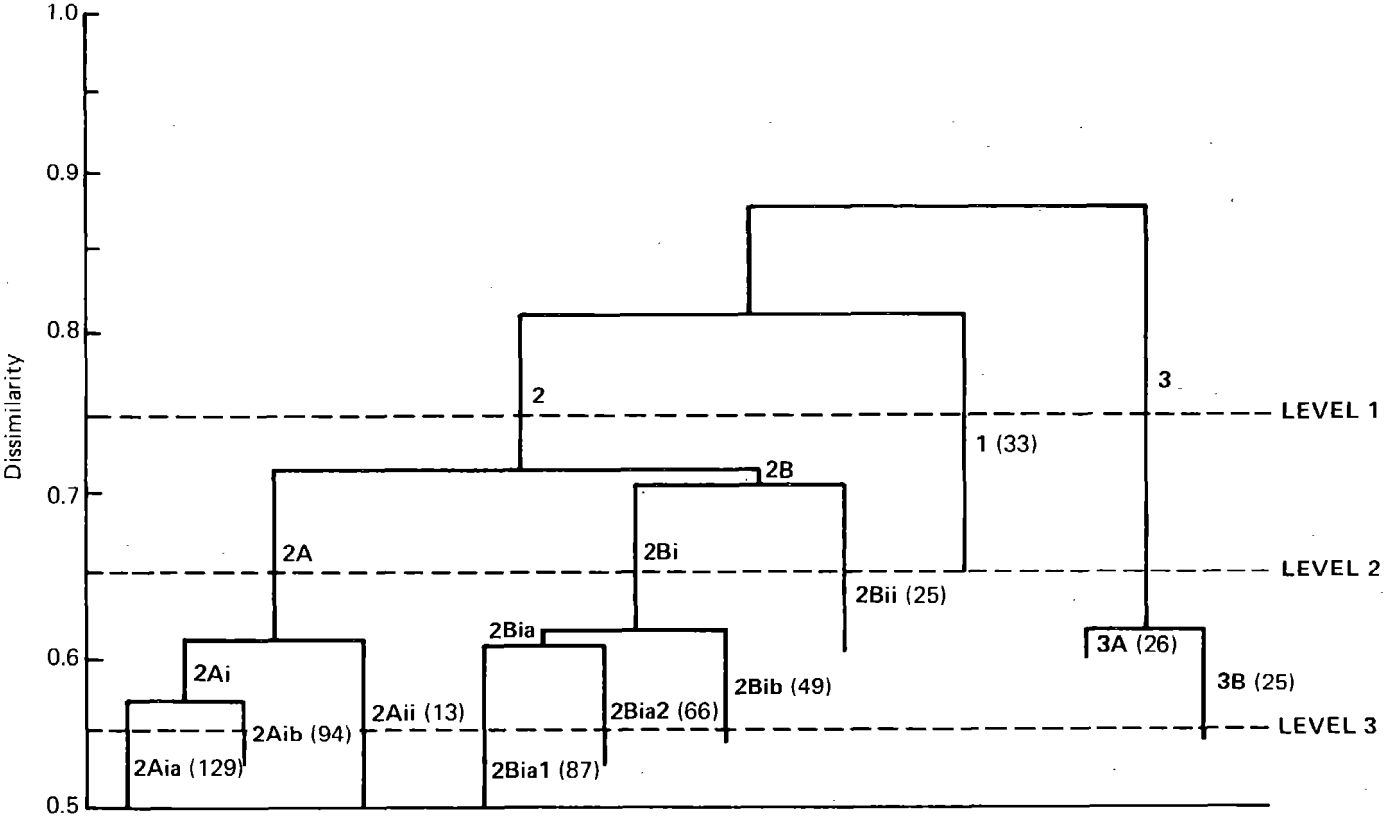

Figure 7. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, 1979 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.

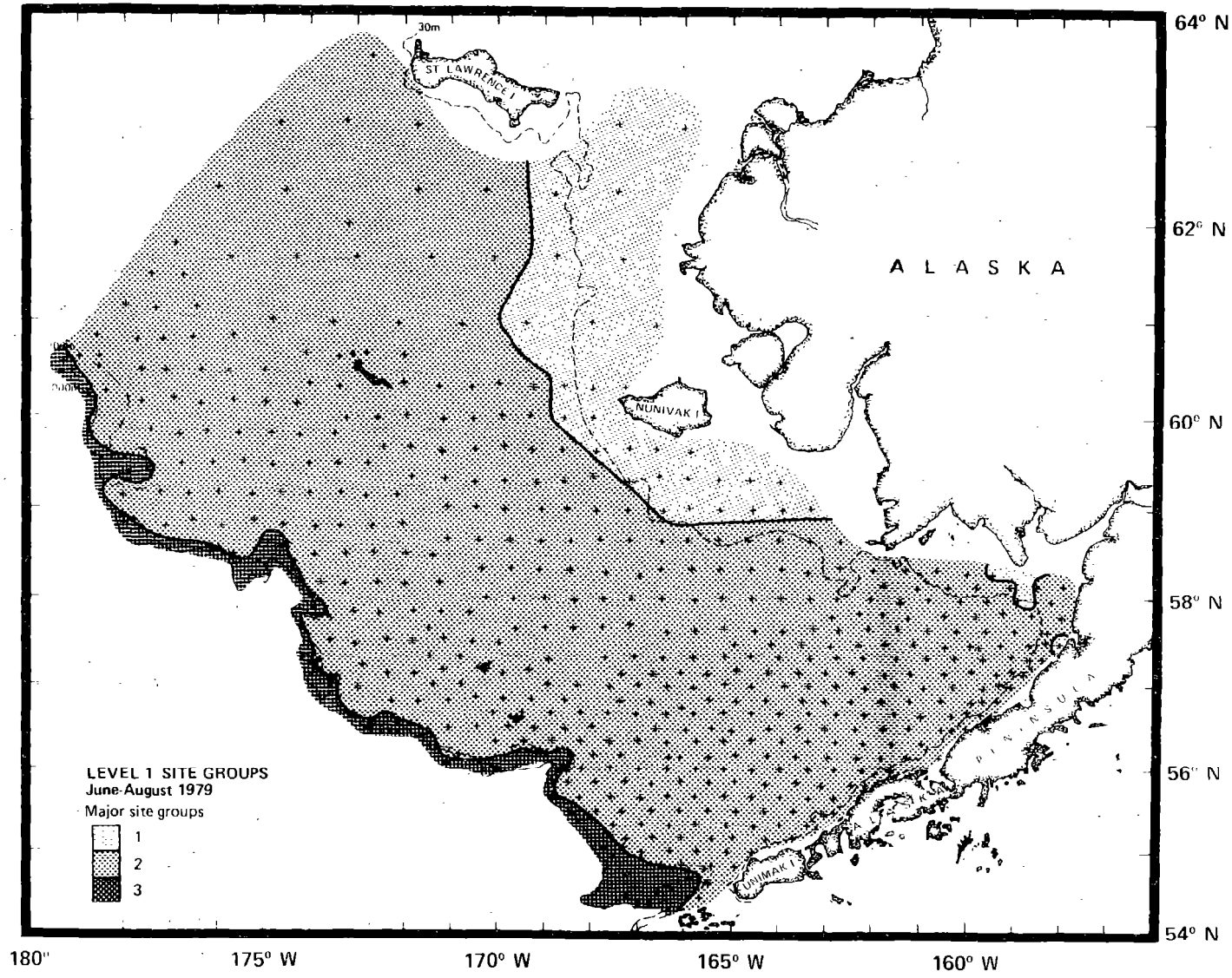

Figure 8. Map of level 1 site groups, 1979 Bering-Sea trawl survey. Plus signs indicate sampling locations.

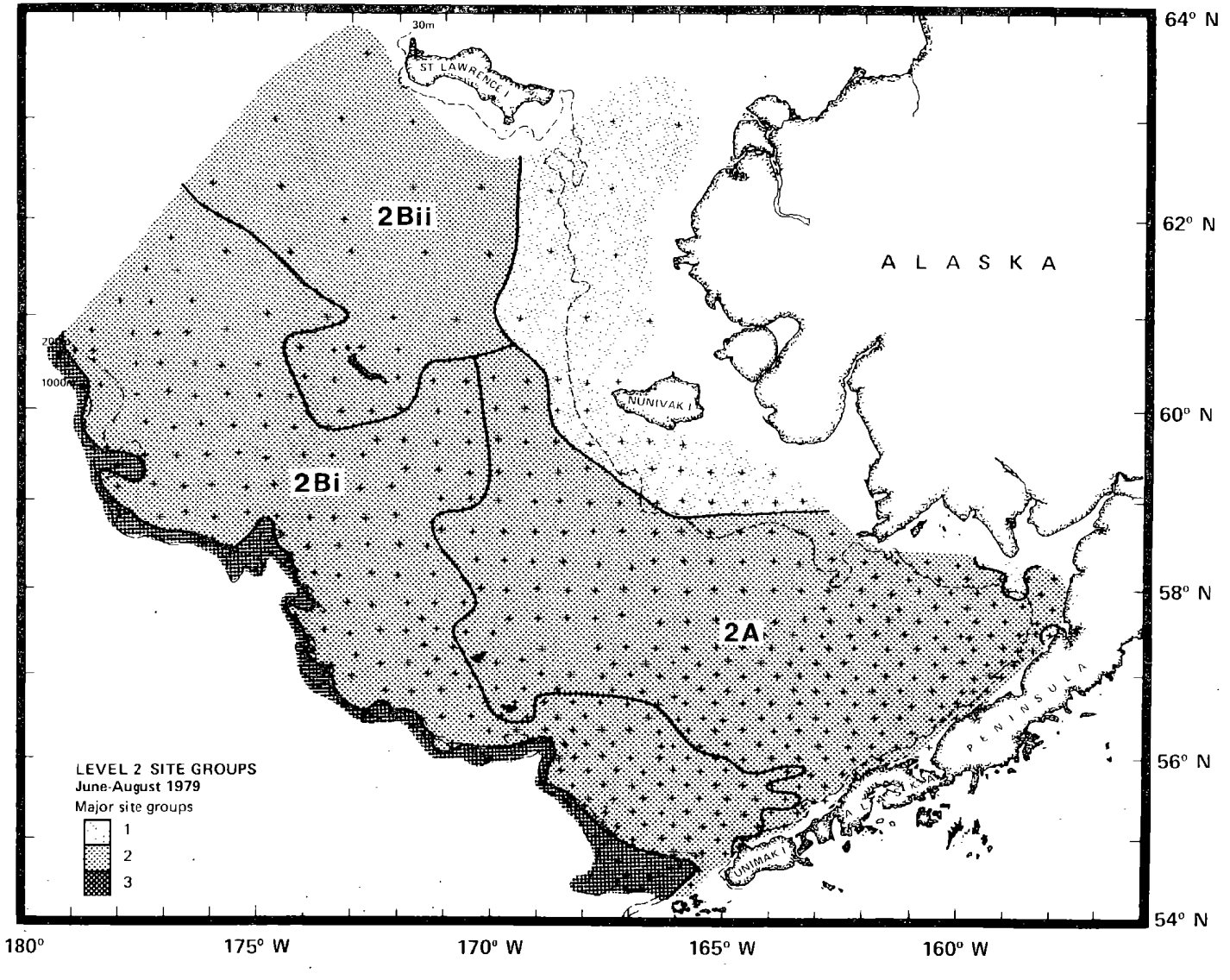

Figure 9. Map of level 2 site groups, 1979 Bering Sea trawl survey. Plus signs indicate sampling locations.

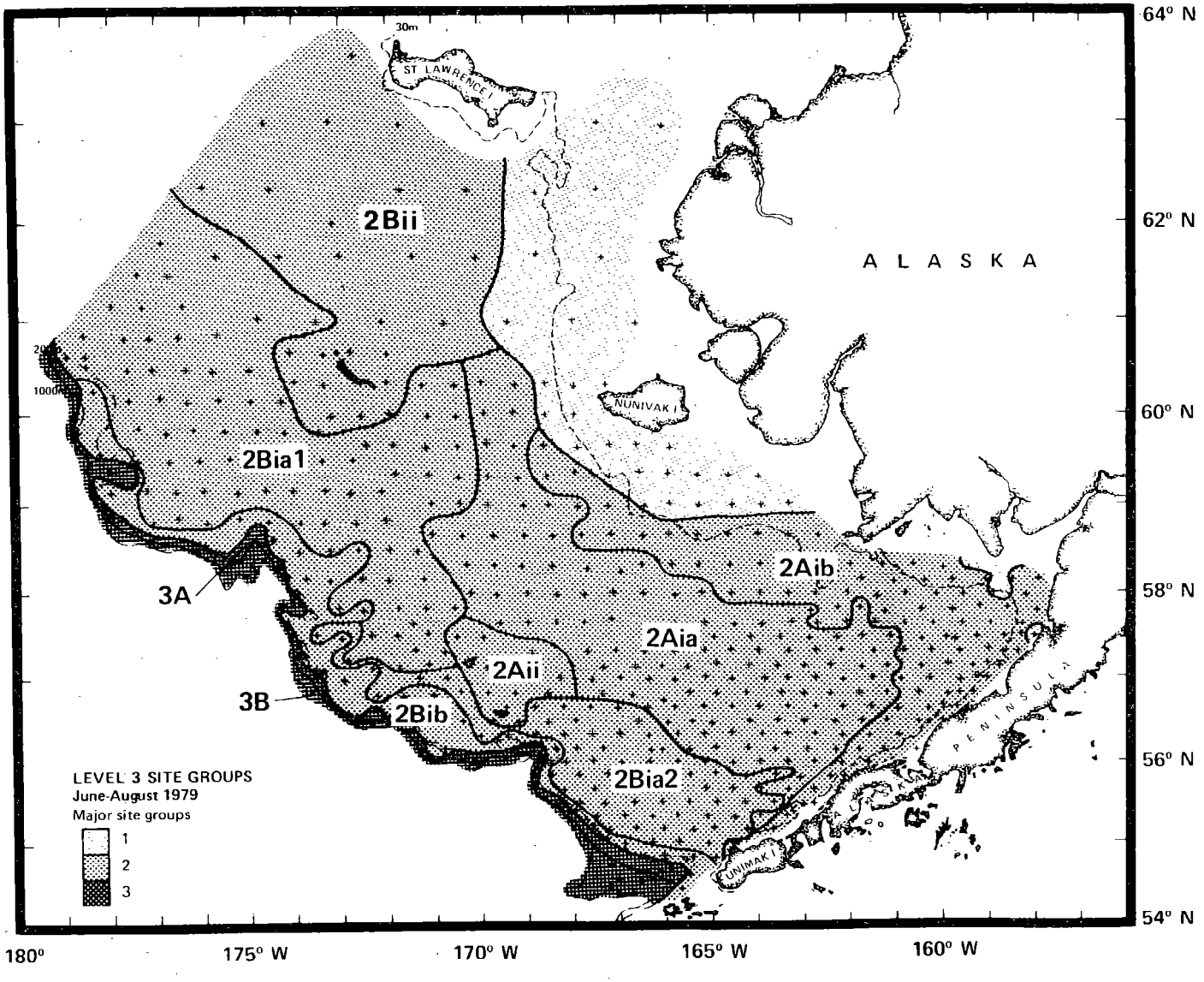

Figure 10. Map of level 3 site groups, 1979 Bering Sea trawl survey. plus signs indicate sampling locations.

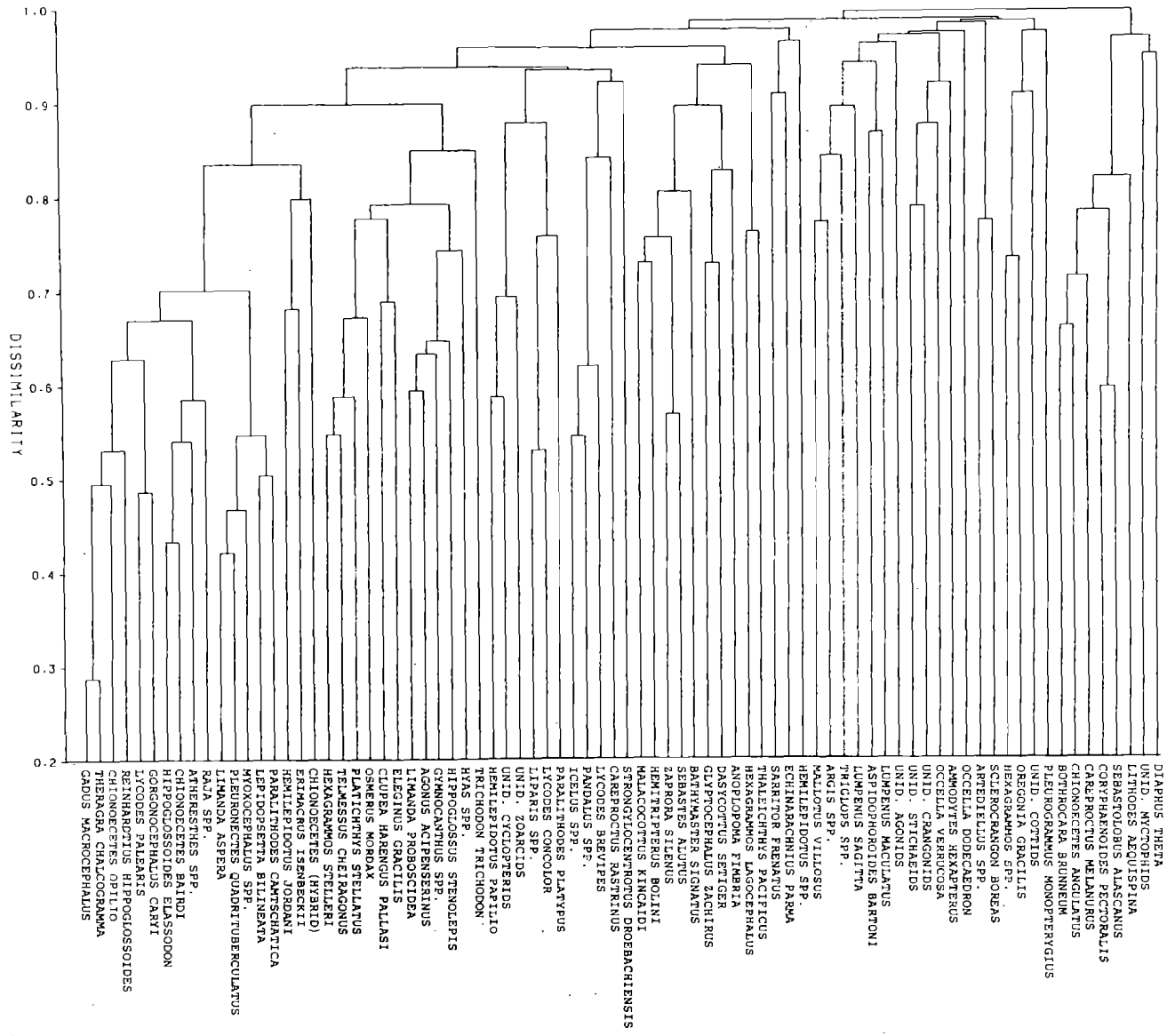

Figure 11. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1979 Bering Sea trawl survey.

Table 3.--Summary of site group characteristics, 1979 Bering Sea survey.

Site group 1/	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		Mean	SD	Range	
1	33	25.7	6.0	15-38	90.5
2	468	87.4	44.3	11-274	195.8
2A	236	56.6	17.4	11-93	274.7
2Ai	223	55.6	17.1	11-91	287.5
2Aia	129	65.5	12.6	40-91	307.1
2Aib	94	42.0	12.3	11-68	225.3
2Aii	13	73.7	12.4	48-93	246.5
2B	227	120.2	40.4	38-274	184.3
2Bi	202	127.3	36.8	59-274	197.0
2Bia	153	115.0	27.6	59-274	200.3
2Bial	87	113.3	32.7	59-274	187.7
2Bia2	66	117.2	19.0	68-152	200.9
2Bib	49	165.9	35.1	99-241	118.3
2Bii	25	62.7	14.4	38-93	103.6
3	51	507.1	134.6	187-732	40.4
3A	26	417.0	80.7	187-563	41.9
3B	25	600.7	114.5	439-732	43.0

1/ See Figure 7.

by walleye pollock, yellowfin sole, the snow crab C. opilio, and Pacific cod (Gadus macrocephalus); and a continental slope group (Group 3) dominated by Greenland turbot (Reinhardtius hippoglossoides). At level 2 (D=0.65), the shelf group divided into an outer shelf group (Group 2Bi), and north and south central shelf groups (Groups 2Bii, 2A) including St. Matthew Island. At level 3 (D=0.55), a Pribilof Islands group (Group 2Aii) separated from the central shelf group, and the continental slope group divided into two depth zones (Groups 3A, 3B). Other divisions also occurred in the central and outer shelf areas.

Bering Sea Survey, 1980

The 1980 results (see Figures 12-16, Table 4, Appendix C) were similar to those of 1978, although more of the central shelf area was surveyed. At level 1 (D=0.70), the highest level of dissimilarity, the major site groups were St. Matthew Island (Group l), the central shelf (Group 2), and the outer shelf (Group 3). Although snow crab (C. opilio) dominated the St. Matthew Island group, as in 1978, a different eelpout, Lycodes raridens, was also abundant. The central shelf group had a larger proportion of walleye pollock in addition to yellowfin sole. At dissimilarity level 2 (D=0.60), the central shelf group split to form an inshore group (Group 2B). Subdivisions that formed at dissimilarity level 3 (D=0.50) were a Pribilof Islands group (Group 2Aii) and further divisions of central and outer shelf groups.

Bering Sea Survey, 1981

Three site groups were formed at the highest level of dissimilarity, level 1 (D=0.60), in 1981 (see Figures 17-21, Table 5, and Appendix D). These were a shallow, inner Bristol Bay group (Group 1) dominated by yellowfin sole and asteroids; a central shelf group (Group 2) dominated by yellowfin sole and walleye pollock; and an outer shelf group (Group 3) dominated by walleye

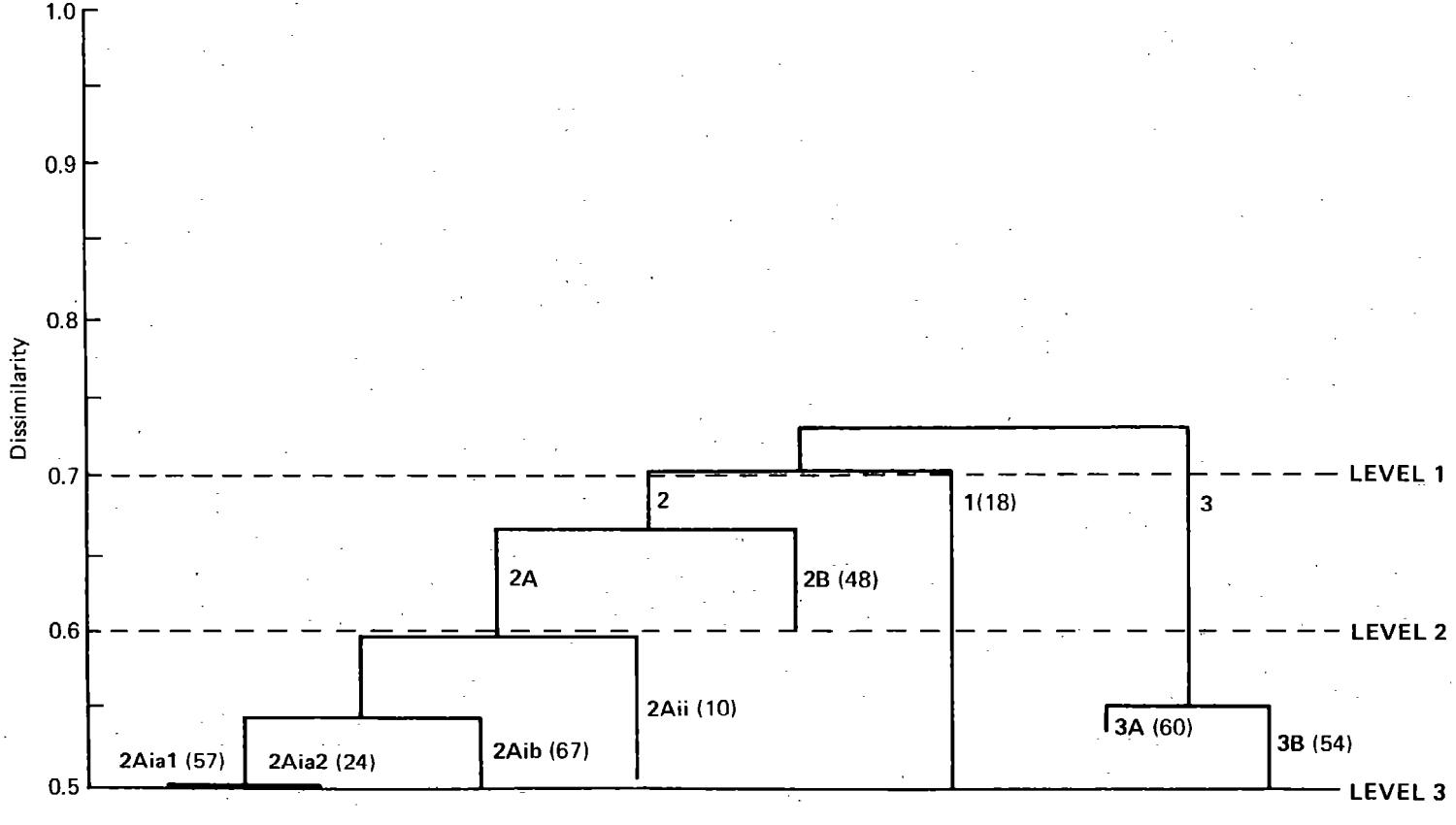

Figure 12. Schematic dendrogram showing the major site groups (areas of similar species composition) and their relationships at different levels of dissimilarity, 1980 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses indicate the number of stations.

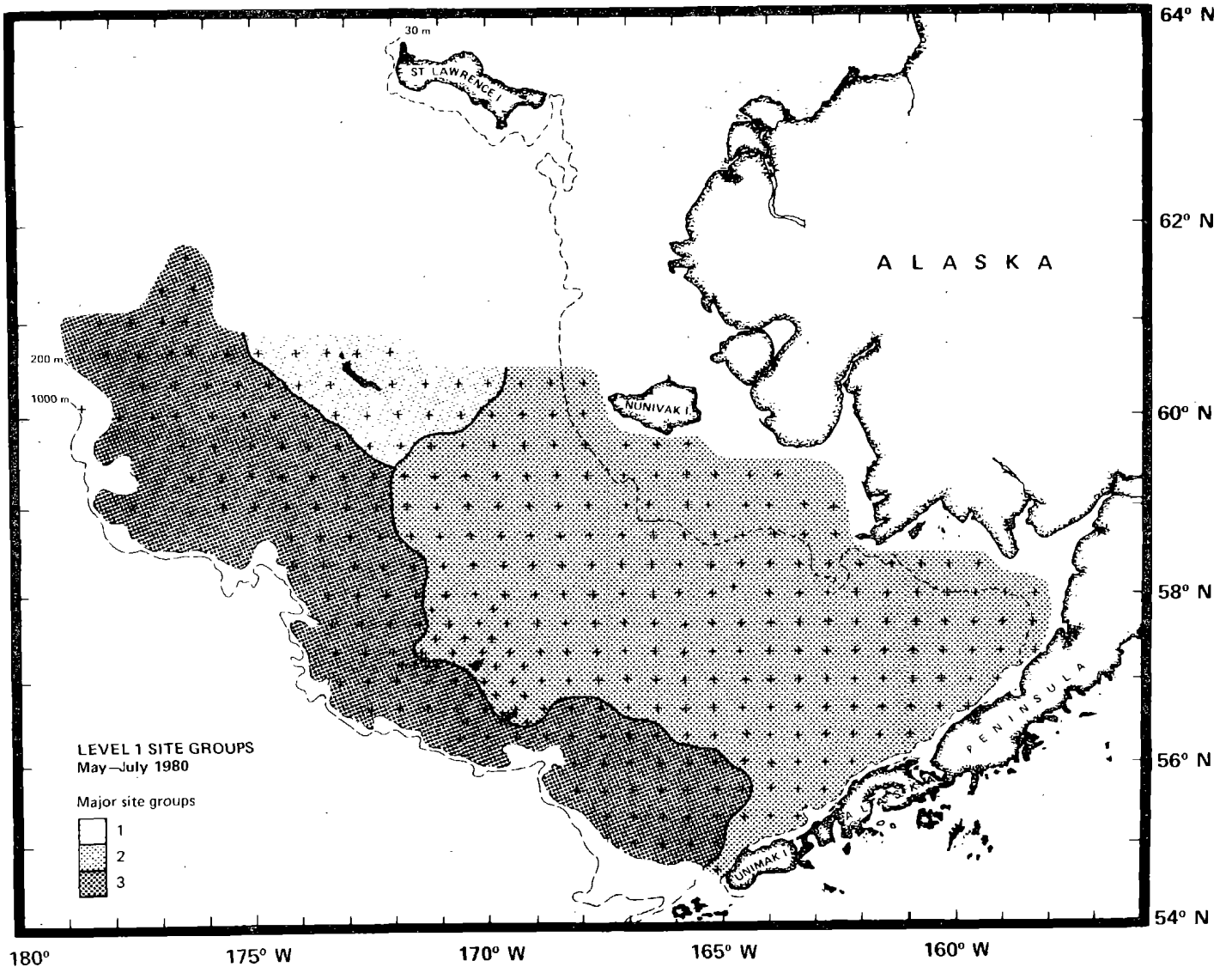

Figure 13. Map of level 1 site groups, 1980 Bering Sea trawl survey. Plus signs indicate sampling locations.

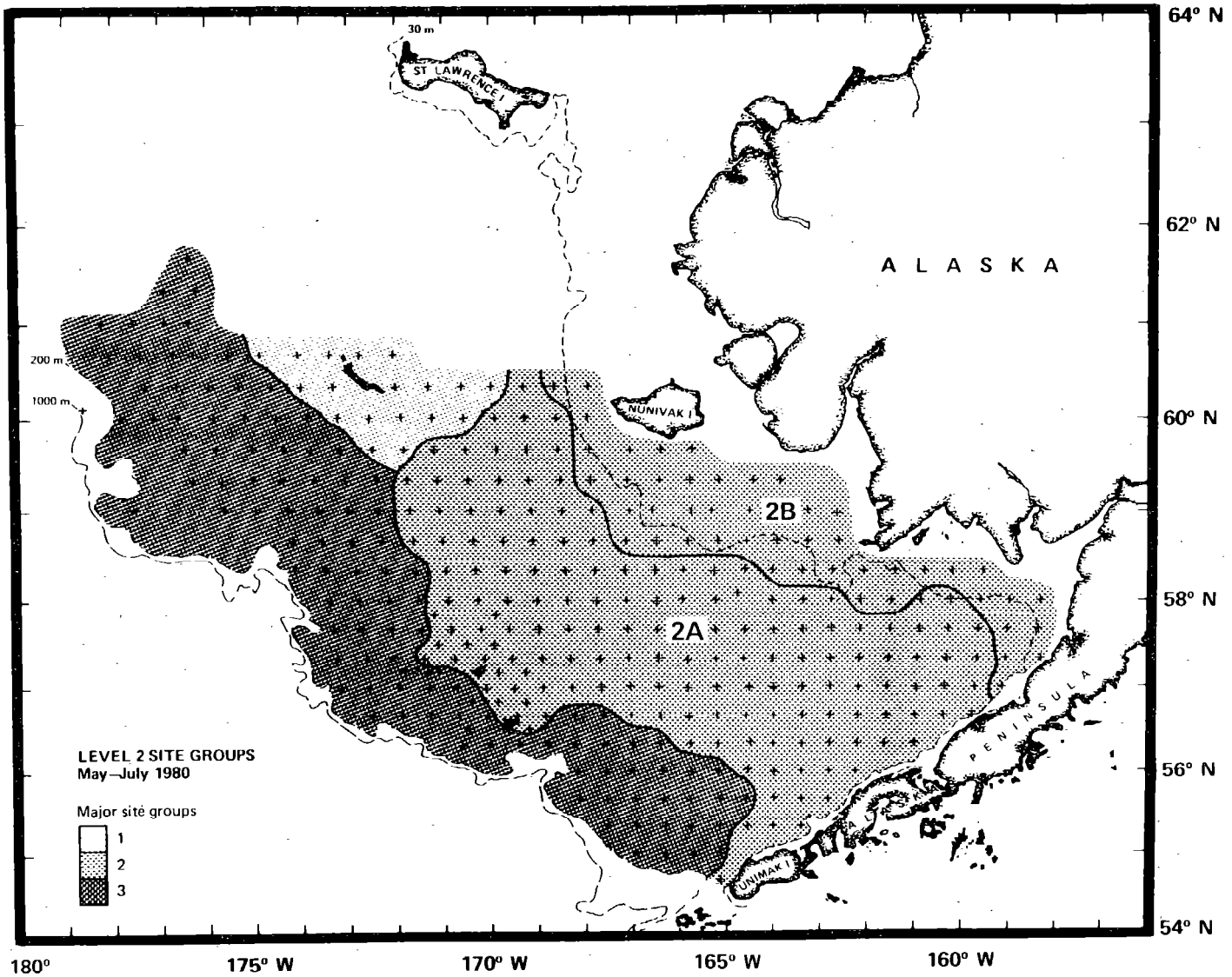

Figure 14. Map of level 2 site groups, 1980 Bering Sea trawl survey. Plus signs indicate sampling locations.

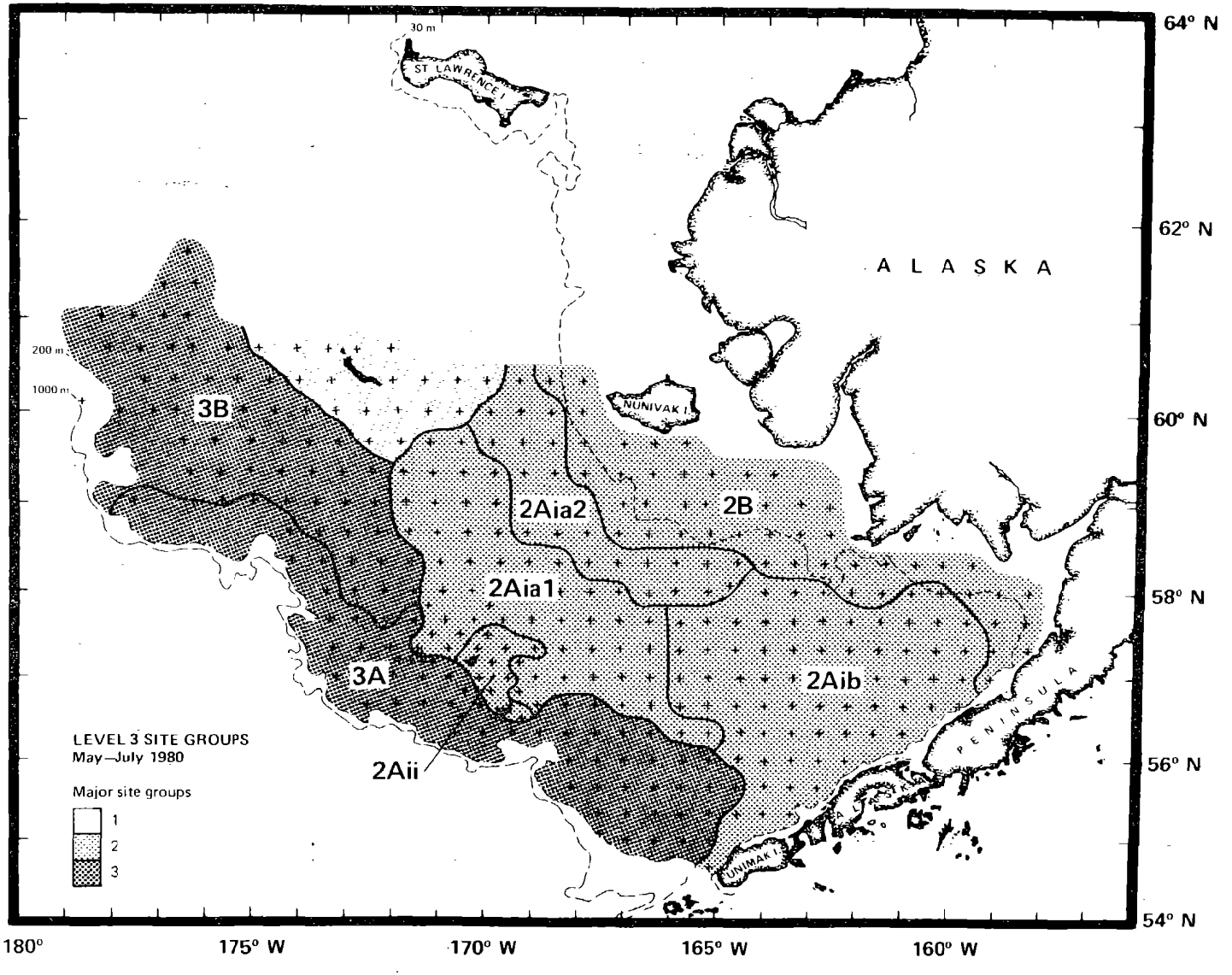

Figure 15. Map of level 3 site groups, 1980 Bering Sea trawl survey. Plus signs indicate sampling locations.

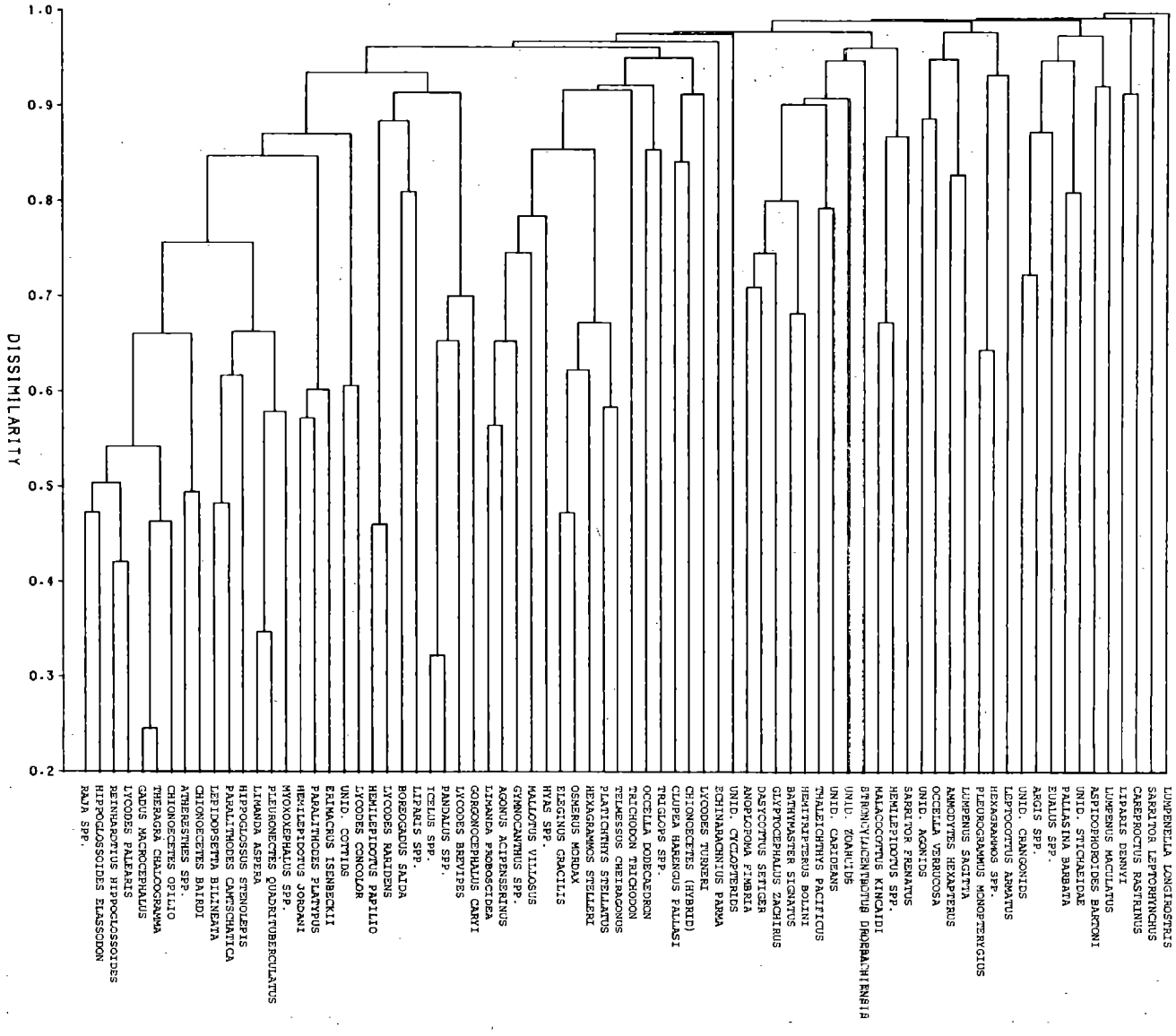

Figure 16. Dendrogram showing relationships between fish and invertebrate species based on similarity of destribution patterns, 1980 Bering Sea trawl survey.

Table 4.--Summary of site group characteristics, 1980 Bering Sea survey.

Site group 1/	Number of stations	Bottom depth (m)			Mean faunal density (kg/ha)
		Mean	SD	Range	
1	18	69.1	13.7	44-97	95.4
2	207	58.1	20.3	15-102	268.6
2A	159	66.2	15.2	35-102	272.4
2Ai	149	66.1	15.4	35-102	248.0
2Aia	81	67.6	15.7	37-102	258.9
2Aia1	57	75.8	10.1	60-102	260.4
2Aia2	24	48.2	7.3	37-62	201.2
2Aib	67	64.2	14.8	35-101	186.4
2Aii	10	68.0	13.5	46-95	360.7
2B	48	31.2	8.8	15-55	193.6
3	115	120.5	20.9	84-243	161.2
3A	60	121.5	23.8	84-243	157.3
3B	54	120.1	16.8	95-163	159.0

1/ See Figure 12.

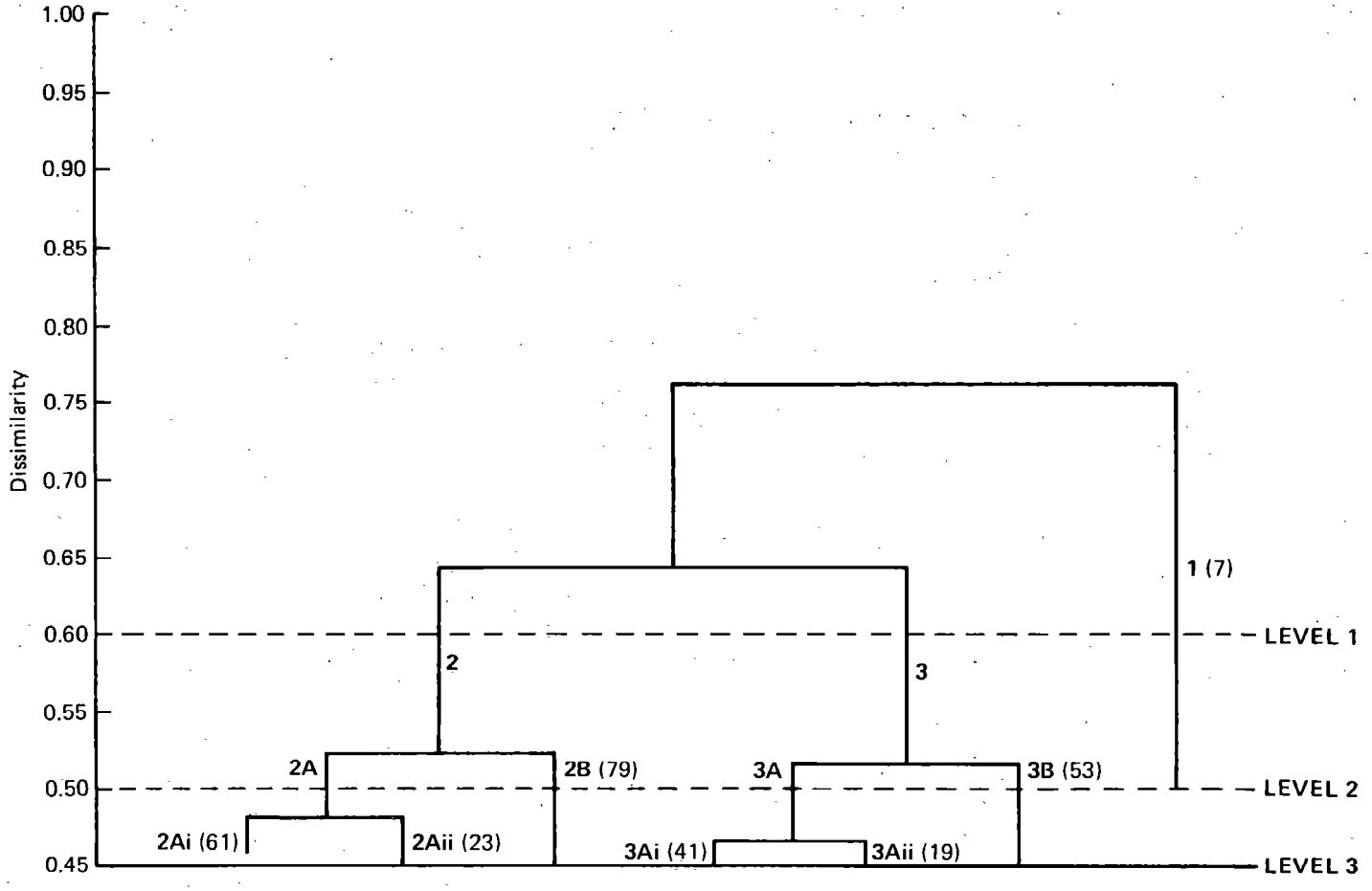

Figure 17. Schematic dendrogram showing the major site groups (areas of similar species co&position) and their relationships at different levels of dissimilarity, 1981 Bering Sea trawl survey. Index numbers identify the different site groups. Values in parentheses-indicate the number of stations.

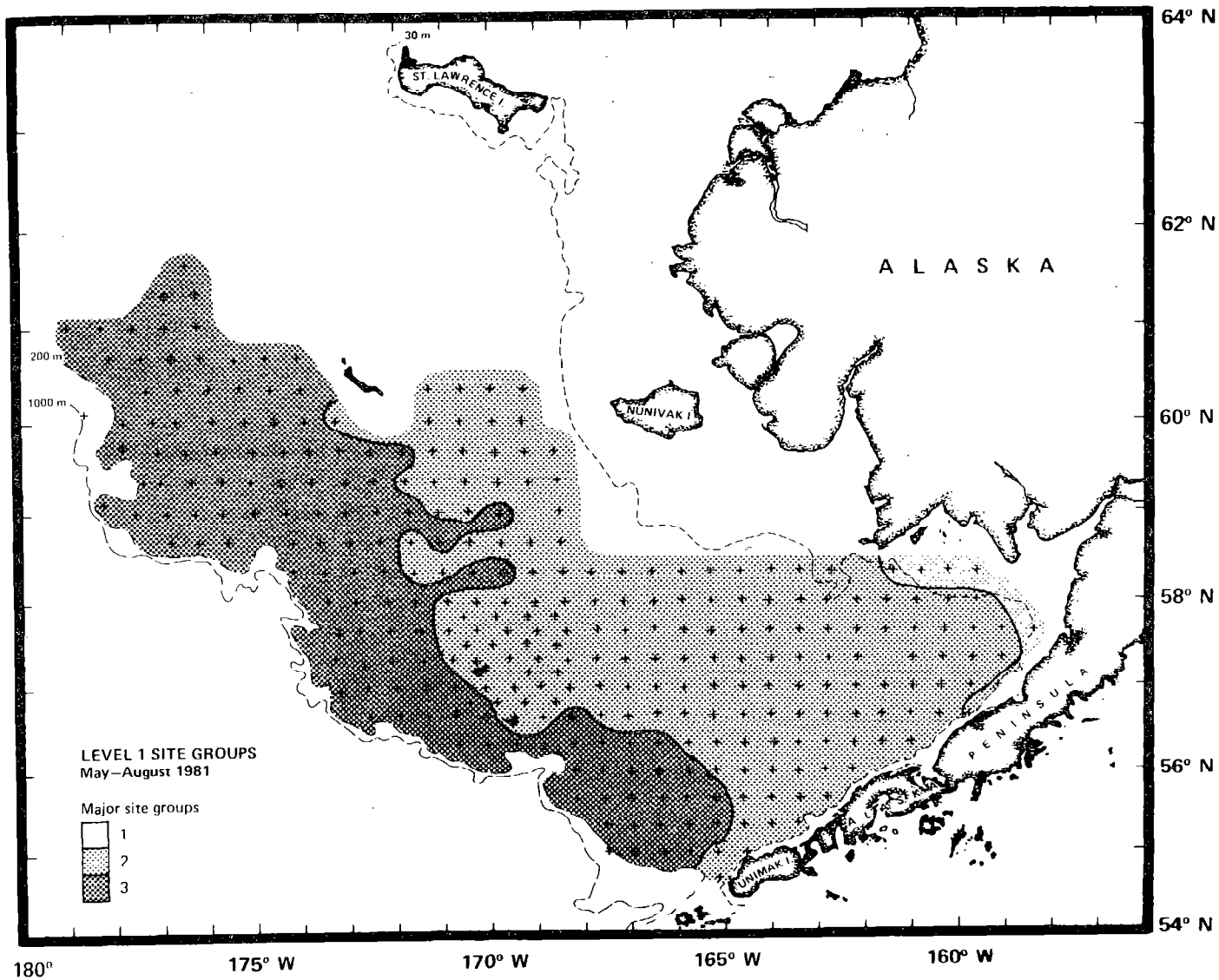

Figure 18. Map of level 1 site groups, 1981 Bering Sea trawl survey. Plus signs indicate sampling locations.

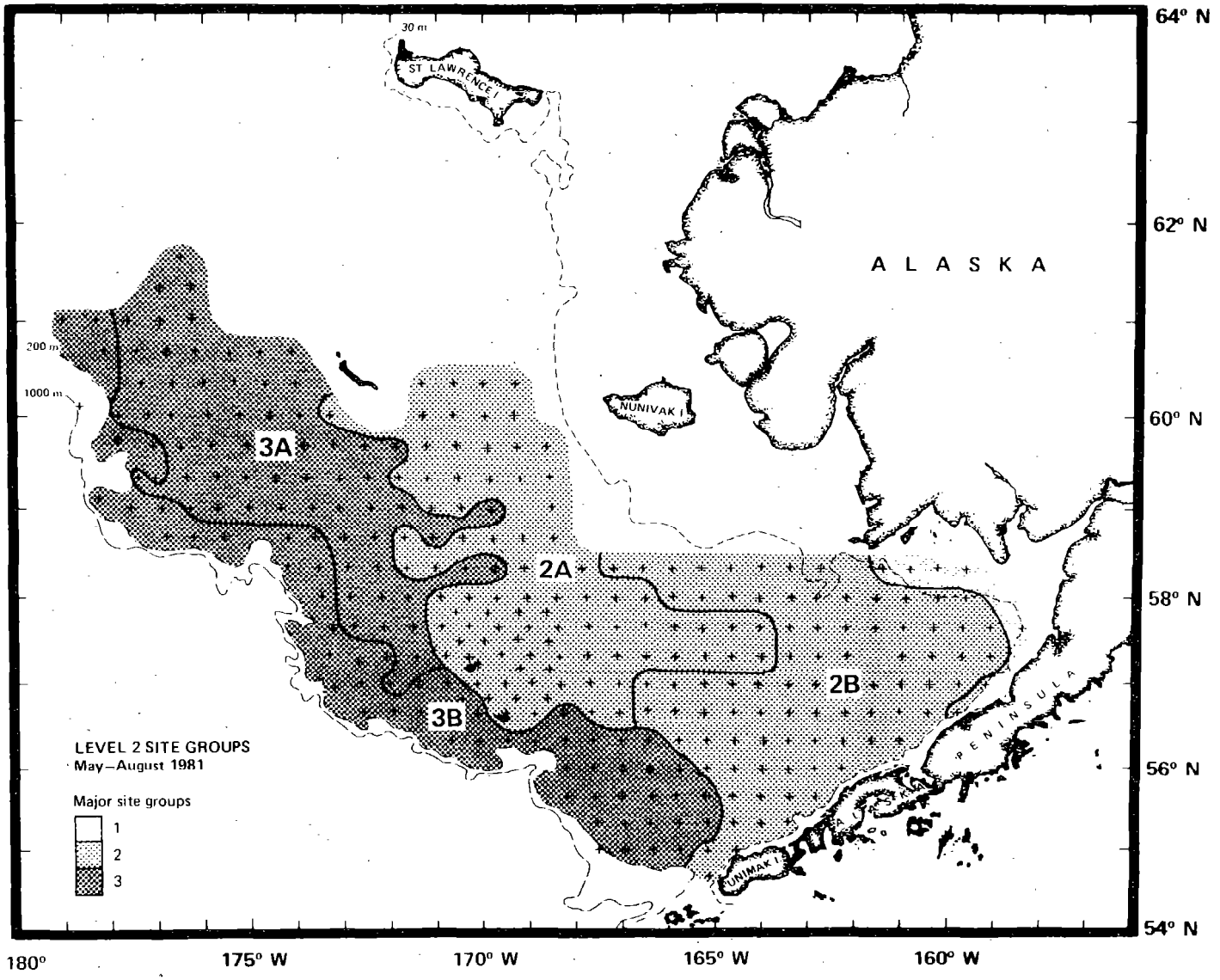

Figure 19. Map of level 2 site groups, 1981 Bering Sea trawl survey. Plus signs indicate sampling locations.

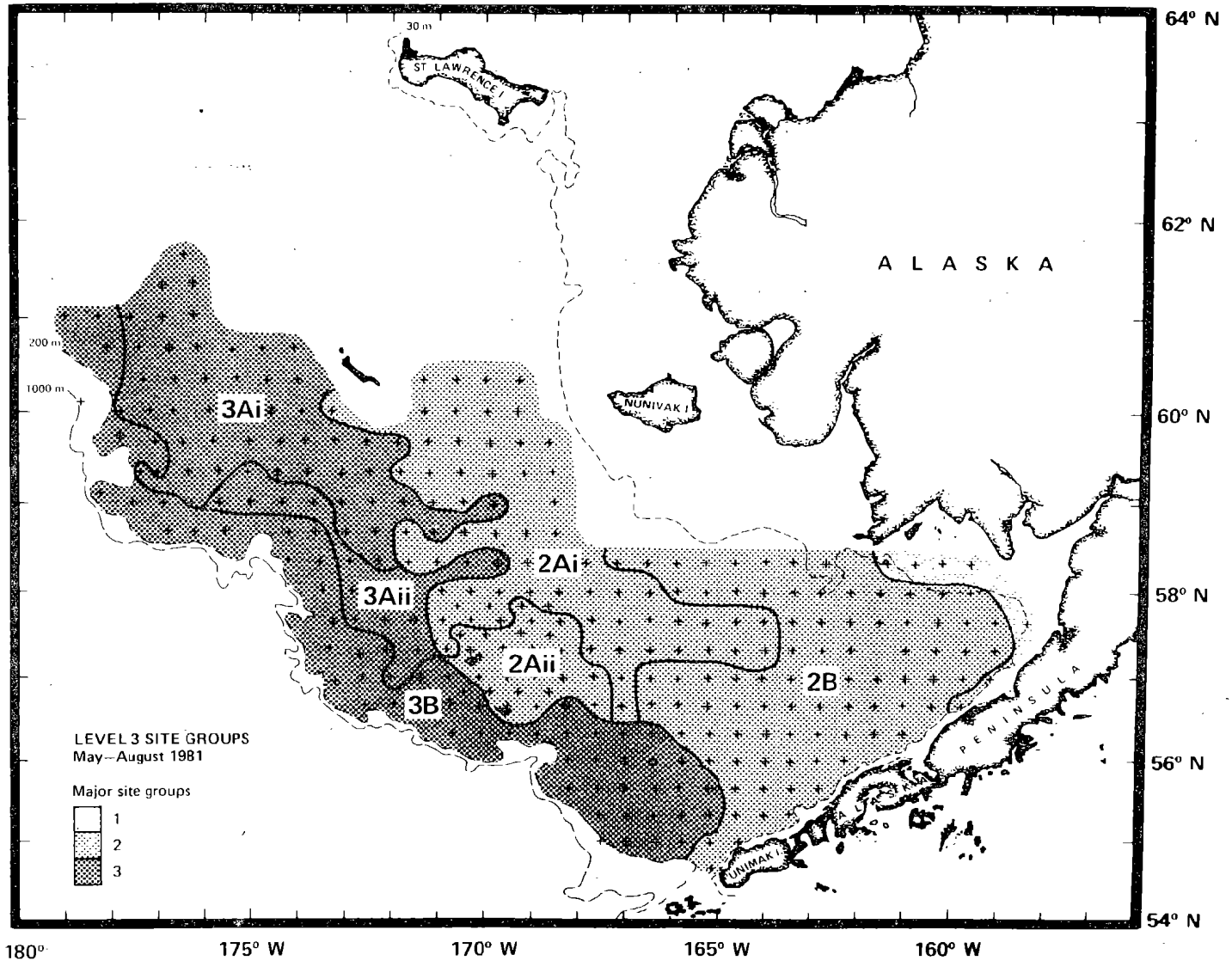

Figure 20. Map of level 3 site groups, 1981 Bering Sea trawl survey. Plus signs indicate sampling locations.

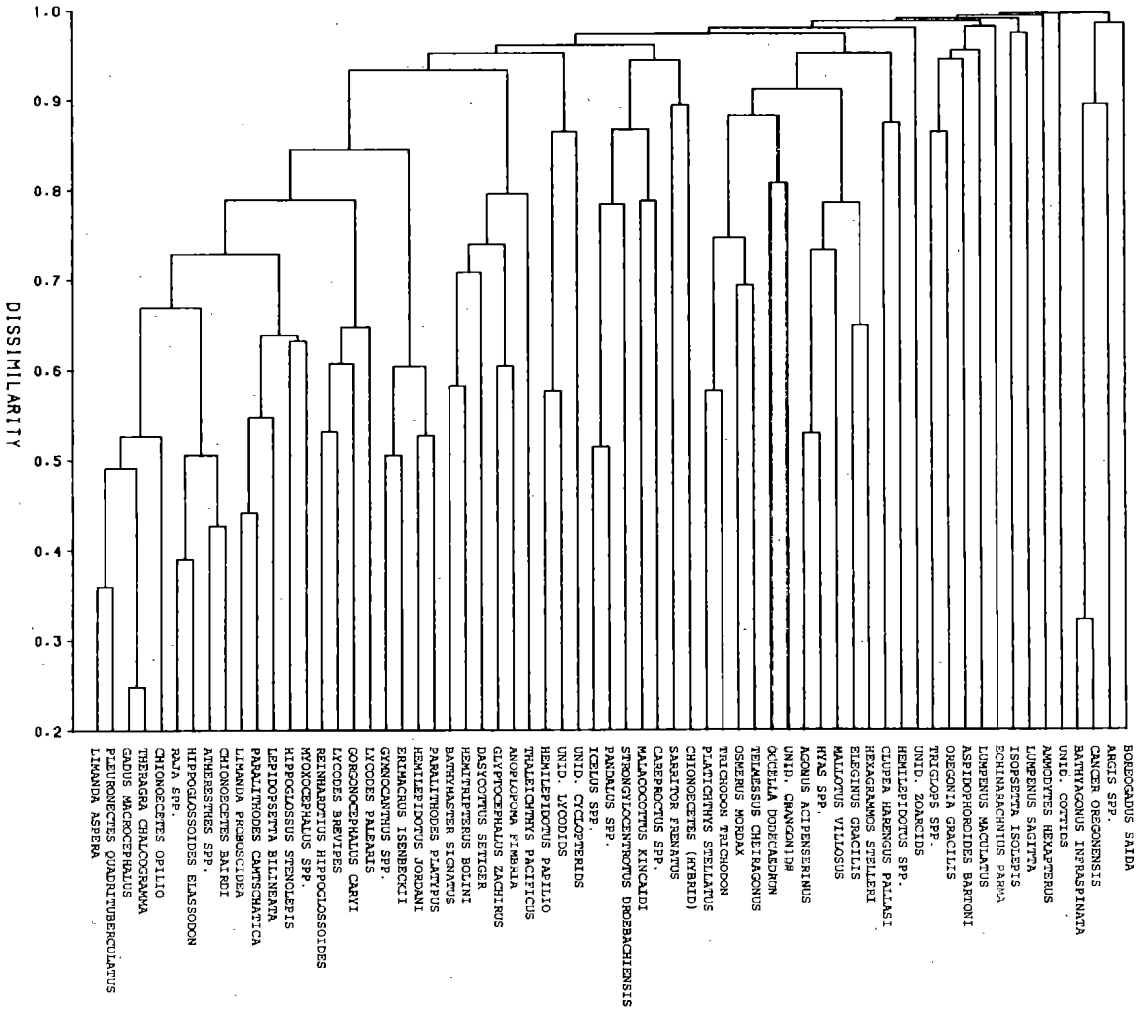

Figure 21. Dendrogram showing relationships between fish and invertebrate species based on similarity of distribution patterns, 1981 Bering Sea trawl survey.

Table 5.--Summary of site group characteristics, 1981 Bering Sea survey.

Site group 1/	Number of stations	Bottom depth (m) Mean	SD	Range	Mean faunal density (kg/ha)
1	7	28.0	8.8	13-37	99.7
2	165	68.0	15.7	31-110	270.0
2A	84	71.3	12.3	40-102	211.2
2Ai	61	69.2	12.1	40-99	190.9
2Aii	23	77.0	11.0	64-102	265.0
2B	79	63.9	17.7	31-102	325.6
3	122	122.6	21.9	66-177	132.3
3A	60	116.0	21.6	66-174	126.1
3Ai	41	118.4	18.5	86-152	154.6
3Aii	19	110.7	26.9	66-174	64.5
3B	53	131.8	17.7	97-177	151.8

1/ See Figure 17.

pollock, Pacific cod, and snow crabs C. opilio and C. bairdi. At the intermediate level of dissimilarity, level 2 (D=0.50), the central shelf group divided into two groups (2A, 2B) and a shelf edge component (Group 3B) was differentiated from the outer shelf group. A Pribilof Islands group (Group 2Aii) was formed at the lowest level of dissimilarity, level 3 (D=0.45).

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DISCUSSION

One would expect that in a limited geographical area, the species composition of a group of trawl samples would exhibit some degree of similarity. It is also reasonable to expect that in a larger area, a group of samples may exhibit more within-group homogeneity than similarity to an adjoining group. The difficulty in an analysis of a biological system is to define the boundaries of these groups in a repeatable, reasonably objective manner. Herein lies one of the advantages of numerical classification techniques.

The evidence presented here is indicative of large-scale patterns of. community organization in the eastern Bering Sea. Over the 4 years studied, 1978-81, the geographical distributions of the major site groups were highly contiguous with minimal scattering. Additionally, at least several of the site group boundaries remained consistent over the years analyzed.

Generally for each year, the first differentiation of the survey area, on the basis of similarity of species composition, was to form inner, central, and outer continental shelf groups. The extent of the survey and types of sampling gear used in a given year seemed to influence how these separations occurred. For example, in 1979 the continental slope area was extensively surveyed using a trawl equipped with roller gear; these samples, for one reason or another, were distinctly different from the shelf and nearshore groups (Figure 8). In 1978, the continental slope and nearshore areas were not surveyed and the first differentiation occurred between the St. Matthew Island and shelf groups (Figure 3). The shelf group then divided into central and outer shelf subgroups.

Certain boundaries and areas were repeated with few differences over the 4 year time period. For example, the faunas in the Pribilof Islands and St.

Matthew Island areas (during the years in which surveys extended that far north) invariably showed as distinct community groups (see Figures 4, 10, 15, and 20). The locations of the southern boundaries between central and outer shelf groups (Groups 2 and 3) were also similar between all 4 years (Figures 3, 9, 13, 18).

A further interesting aspect of the analysis was the opportunity to distinguish species of the various site groups which were important to their differentiation. For example, in 1978 the middle shelf group, site group 2 (Figure 3), was differentiated from the outer shelf and St. Matthew Island groups (site groups 1 and 3) by the dominance of yellowfin sole on the middle shelf (Appendix A: Tables A-l, A-2, and A-7). Further division of the middle shelf group separated the Pribilof Islands, site group 2B, from the rest of the shelf (Figure 4). The species assemblage in the Pribilof Islands area was marked by higher densities of snow crab and cottids (Appendix A: Table A-6). The remainder of the shelf was divided into two groups (Figure 5): the central shelf, site group 2Ai, and Bristol Bay, site group 2Aii. Although both areas were dominated by yellowfin sole, the Bristol Bay group showed a significantly lower density of snow crab and walleye pollock (Appendix A: Tables A-4, A-5).

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APPENDIX A

Species Assemblages, 1978 Bering Sea Survey

Table A-l. Site Group 1

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	10.28	.262	.262	1.00	CHIONOECETES OPILIO
2	9.15	.234	.496	0.82	LYCODES TURNERI
3	2.94	.075	.571	0.36	PARALITHODES PLATYPUS
4	2.70	.069	.640	0.91	PAGURIDAE
5	2.49	.063	.703	0.64	GORGONOCEPHALUS CARYI
6	2.06	.053	.756	0.55	MYOXOCEPHALUS SP
7	1.71	.044	.799	0.64	INVERTEBRATE UNIDENT
8	1.05	.027	.826	0.45	HYAS SP
9	0.96	.024	.850	0.73	NEPTUNEA HEROS
10	0.91	.023	.874	1.00	REINHARDTIUS HIPPOGLOSSOIDES
11	0.76	.019	.893	1.00	LIPARIS DENNYI
12	0.67	.017	.910	0.45	STARFISH UNIDENT
13	0.65	.016	.927	0.64	PLEURONECTES QUADRITUBERCULATUS
14	0.50	.013	.939	0.36	LEPTASTERIAS SP
15	0.43	.011	.950	1.00	THERAGRA CHALCOGRAMMA
16	0.41	.011	.961	0.45	NEPTUNEA VENTRICOSA
17	0.27	.007	.968	0.73	HEMILEPIDOTUS SP
18	0.21	.005	.973	1.00	GADUS MACROCEPHALUS
19	0.16	.005	.978	0.36	MARGARITES SP
20	0.16	.004	.982	0.09	BOLTENIA OVIFERA
21	0.12	.003	.985	0.91	HIPPOGLOSSOIDES ELASSODON
22	0.09	.002	.987	0.45	PLICIFUSUS KROYERI
23	0.08	.002	.989	0.27	ZOARCIDAE
24	0.05	.001	.990	0.18	HIPPOGLOSSUS STENOLEPIS
TOTAL	39.20				

* NUMBER OF HAULS- 11, MEAN DEPTH= 60.0M (RANGE= 44- 64M)

Table A-2. Site Group 2

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	111.30	.400	.400	1.00	LIMANDA ASPERA
2	18.02	.065	.465	0.78	CHIONOECETES OPILIO
3	16.78	.060	.525	0.70	STARFISH UNIDENT
4	16.68	.060	.585	0.77	PARALITHODES CAMTSCHATICA
5	15.74	.057	.642	0.90	THERAGRA CHALCOGRAMMA
6	11.95	.043	.685	0.85	PLEURONECTES QUADRITUBERCULATUS
7	10.76	.039	.724	0.87	MYOXOCEPHALUS SP
8	10.37	.037	.761	0.98	LEPIDOPSETTA BILINEATA
9	10.08	.036	.797	0.99	GADUS MACROCEPHALUS
10	6.16	.022	.819	0.25	PORIFERA
11	6.15	.022	.842	0.62	PAGURIDAE
12	5.07	.018	.860	0.92	CHIONOECETES BAIRDI
13	4.29	.015	.875	0.08	INVERTEBRATE UNIDENT
14	3.90	.014	.889	0.40	NEPTUNEA HEROS
15	2.52	.009	.898	0.07	HALOCYNTHIA AURANTIUM
16	1.60	.006	.904	0.63	REINHARDTIUS HIPPOGLOSSOIDES
17	1.59	.006	.910	0.33	HEMILEPIDOTUS JORDANI
18	1.59	.006	.916	0.80	HIPPOGLOSSOIDES ELASSODON
19	1.53	.006	.921	0.07	PARALITHODES PLATYPUS
20	1.50	.005	.926	0.37	GORGONOCEPHALUS CARYI
21	1.46	.005	.932	0.47	LIMANDA PROBOSCIDEA
22	1.35	.005	.937	0.45	LYCODES PALEARIS
23	1.12	.004	.941	0.19	COTTIDAE
24	1.11	.004	.945	0.37	GYMNOCANTHUS SP
25	1.09	.004	.949	0.38	ERIMACRUS ISENBECKII
26	1.05	.004	.952	0.81	AGONUS ACIPENSERINUS
27	0.83	.003	.955	0.03	LEPTASTERIAS SP
28	0.82	.003	.958	0.13	BOLTENIA OVIFERA
29	0.78	.003	.961	0.54	NEPTUNEA VENTRICOSA
30	0.73	.003	.964	0.43	NEPTUNEA LYRATA
31	0.70	.003	.966	0.03	ICELINUS BOREALIS
32	0.68	.002	.969	0.24	CUCUMARIA SP
33	0.65	.002	.971	0.52	HIPPOGLOSSUS STENOLEPIS
34	0.64	.002	.973	0.41	RAJA SP
35	0.59	.002	.975	0.10	ASCIDIAN UNIDENT
36	0.55	.002	.977	0.13	SEA ANEMONE UNIDENT
37	0.49	.002	.979	0.41	CHIONOECETES HYBRID
38	0.46	.002	.981	0.12	ECHINARACHNIUS PARMA
39	0.45	.002	.982	0.67	HYAS SP
40	0.43	.002	.984	0.31	ATHERESTHES SP
41	0.42	.002	.985	0.09	NEPTUNEA SP
42	0.37	.001	.987	0.31	GASTROPOD UNIDENT
43	0.33	.001	.988	0.20	EUNEPHTHYA (GERSEMIA) RUBIFORMIS

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Table A-2. Site Group 2 (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.27	.001	.989	0.16	NEPTUNEA PRIBILOFFENSIS
45	0.26	.001	.990	0.05	ASTERIAS AMURENSIS
46	0.23	.001	.991	0.20	PAGURUS OCHOTENSIS
TOTAL	278.04				

* NUMBER OF HAULS-104, MEAN DEPTH= 63.9M (RANGE= 18-101M)

Table A-3. Site Group 2A

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	120.57	.418	.418	1.00	LIMANDA ASPERA
2	18.10	.063	.481	0.69	STARFISH UNIDENT
3	17.43	.060	.542	0.81	PARALITHODES CAMTSCHATICA
4	16.82	.058	.600	0.90	THERAGRA CHALCOGRAMMA
5	16.40	.057	.657	0.76	CHIONOECETES OPILIO
6	13.23	.046	.703	0.86	PLEURONECTES QUADRITUBERCULATUS
7	11.05	.038	.741	0.92	MYOXOCEPHALUS SP
8	10.51	.036	.778	0.99	GADUS MACROCEPHALUS
9	10.38	.036	.814	0.98	LEPIDOPSETTA BILINEATA
10	6.26	.022	.835	0.59	PAGURIDAE
11	6.14	.021	.857	0.25	PORIFERA
12	4.95	.017	.874	0.92	CHIONOECETES BAIRDI
13	4.65	.016	.890	0.06	INVERTEBRATE UNIDENT
14	4.38	.015	.905	0.42	NEPTUNEA HEROS
15	2.38	.008	.913	0.06	HALOCYNTHIA AURANTIUM
16	1.71	.006	.919	0.82	HIPPOGLOSSOIDES ELASSODON
17	1.70	.006	.925	0.62	REINHARDTIUS HIPPOGLOSSOIDES
18	1.67	.006	.931	0.39	GORGONOCEPHALUS CARYI
19	1.55	.005	.937	0.51	LIMANDA PROBOSCIDEA
20	1.50	.005	.942	0.46	LYCODES PALEARIS
21	1.15	.004	.946	0.38	GYMNOCANTHUS SP
22	1.02	.004	.949	0.80	AGONUS ACIPENSERINUS
23	1.02	.004	.953	0.16	COTTIDAE
24	0.87	.003	.956	0.03	LEPTASTERIAS SP
25	0.86	.003	.959	0.13	BOLTENIA OVIFERA
26	0.79	.003	.962	0.53	NEPTUNEA VENTRICOSA
27	0.74	.003	.964	0.40	NEPTUNEA LYRATA
28	0.72	.002	.967	0.26	CUCUMARIA SP
29	0.68	.002	.969	0.42	RAJA SP
30	0.68	.002	.971	0.54	HIPPOGLOSSUS STENOLEPIS
31	0.65	.002	.974	0.10	ASCIDIAN UNIDENT
32	0.55	.002	.975	0.12	SEA ANEMONE UNIDENT
33	0.48	.002	.977	0.39	CHIONOECETES HYBRID
34	0.48	.002	.979	0.12	ECHINARACHNIUS PARMA
35	0.47	.002	.980	0.09	NEPTUNEA SP
36	0.44	.002	.982	0.69	HYAS SP
37	0.44	.002	.983	0.31	ATHERESTHES SP
38	0.40	.001	.985	0.30	GASTROPOD UNIDENT
39	0.37	.001	.986	0.22	EUNEPHTHYA (GERSEMIA) RUBIFORMIS
40	0.31	.001	.987	0.34	ERIMACRUS ISENBECKII
41	0.28	.001	.988	0.18	NEPTUNEA PRIBILOFFENSIS
42	0.27	.001	.989	0.05	ASTERIAS AMURENSIS
43	0.25	.001	.990	0.22	PAGURUS OCHOTENSIS

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Table A-3. Site Group 2A (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.23	.001	.991	0.31	HENILEPIDOTUS JORDANI
TOTAL	288.20				

* NUMBER OF HAULS= 97, MEAN DEPTH= 63.4M (RANGE= 18-101M)

Table A-4. Site Group 2Ai

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	95.54	.365	.365	1.00	LIMANDA ASPERA
2	27.80	.106	.471	0.98	THERAGRA CHALCOGRAMMA
3	21.68	.083	.554	0.70	PARALITHODES CAMTSCHATICA
4	21.62	.083	.637	1.00	CHIONOECETES OPILIO
5	14.84	.057	.694	0.95	PLEURONECTES QUADRITUBERCULATUS
6	7.54	.029	.722	0.14	PORIFERA
7	7.25	.028	.750	0.86	MYOXOCEPHALUS SP
8	6.98	.027	.777	0.68	PAGURIDAE
9	6.35	.024	.801	0.11	INVERTEBRATE UNIDENT
10	6.01	.023	.824	0.98	CHIONOECETES BAIRDI
11	5.65	.022	.846	0.67	STARFISH UNIDENT
12	5.61	.021	.867	1.00	GADUS MACROCEPHALUS
13	4.52	.017	.884	0.39	NEPTUNEA HEROS
14	3.28	.013	.897	0.96	LEPIDOPSETTA BILINEATA
15	3.24	.012	.909	0.11	HALOCYNTHIA AURANTIUM
16	2.50	.010	.919	0.95	HIPPOGLOSSOIDES ELASSODON
17	2.38	.009	.928	0.79	REINHARDTIUS HIPPOGLOSSOIDES
18	2.27	.009	.936	0.51	GORGONOCEPHALUS CARYI
19	2.23	.009	.945	0.72	LYCODES PALEARIS
20	1.41	.005	.950	0.23	COTTIDAE
21	1.29	.005	.955	0.58	NEPTUNEA LYRATA
22	0.93	.004	.959	0.67	RAJA SP
23	0.83	.003	.962	0.37	ATHERESTHES SP
24	0.82	.003	.965	0.54	NEPTUNEA VENTRICOSA
25	0.76	.003	.968	0.18	SEA ANEMONE UNIDENT
26	0.74	.003	.971	0.67	AGONUS ACIPENSERINUS
27	0.69	.003	.974	0.16	NEPTUNEA SP
28	0.66	.003	.976	0.58	CHIONOECETES HYBRID
29	0.65	.003	.979	0.54	HIPPOGLOSSUS STENOLEPIS
30	0.57	.002	.981	0.46	GASTROPOD UNIDENT
31	0.57	.002	.983	0.12	GYMNOCANTHUS SP
32	0.50	.002	.985	0.26	NEPTUNEA PRIBILOFFENSIS
33	0.42	.002	.986	0.37	ERIMACRUS ISENBECKII
34	0.37	.001	.988	0.44	HEMILEPIDOTUS JORDANI
35	0.32	.001	.989	0.14	PAGURUS ALEUTICUS
36	0.30	.001	.990	0.18	PAGURUS TRIGONOCHEIRUS

TOTAL 261.69

* NUMBER OF HAULS= 57. MEAN DEPTH= 73.8M (RANGE= 49-101M)

Table A-5. Site Group 2Aii

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	137.89	.424	.424	1.00	LIMANDA ASPERA
2	49.04	.151	.574	0.72	STARFISH UNIDENT
3	25.88	.080	.654	0.97	GADUS MACROCEPHALUS
4	23.83	.073	.727	1.00	LEPIDOPSETTA BILINEATA
5	15.09	.046	.773	1.00	MYOXOCEPHALUS SP
6	13.76	.042	.816	0.97	PARALITHODES CAMTSCHATICA
7	8.03	.025	.840	0.72	PLEURONECTES QUADRITUBERCULATUS
8	5.60	.017	.858	0.44	PAGURIDAE
9	4.74	.015	.872	0.85	CHIONOECETES BAIRDI
10	4.69	.014	.887	0.44	CHIONOECETES OPILIO
11	4.60	.014	.901	0.38	PORIFERA
12	4.11	.013	.913	0.49	NEPTUNEA HEROS
13	3.77	.012	.925	0.97	LIMANDA PROBOSCIDEA
14	2.53	.008	.933	0.74	GYMNOCANTHUS SP
15	2.39	.007	.940	0.18	ASCIDIAN UNIDENT
16	2.08	.006	.946	0.79	THERAGRA CHALCOGRAMMA
17	1.80	.006	.952	0.31	BOLTENIA OVIFERA
18	1.73	.005	.957	0.05	LEPTASTERIAS SP
19	1.49	.005	.962	0.28	CUCUMARIA SP
20	1.26	.004	.966	0.31	EUNEPHTHYA (GERSEMIA) RUBIFORMIS
21	1.26	.004	.970	1.00	AGONUS ACIPENSERINUS
22	1.00	.003	.973	0.23	ECHINARACHNIUS PARMA
23	0.99	.003	.976	0.51	NEPTUNEA VENTRICOSA
24	0.82	.003	.978	0.77	HYAS SP
25	0.78	.002	.981	0.51	HIPPOGLOSSUS STENOLEPIS
26	0.70	.002	.983	0.46	PAGURUS OCHOTENSIS
27	0.56	.002	.984	0.10	ASTERIAS AMURENSIS
28	0.50	.002	.986	0.77	HEXAGRAMMOS STELLERI
29	0.47	.001	.987	0.13	TELMESSUS CHEIRAGONUS
30	0.46	.001	.989	0.67	HIPPOGLOSSOIDES ELASSODON
31	0.43	.001	.990	0.23	GORGONOCEPHALUS CARYI
TOTAL	325.48				

* NUMBER OF HAULS= 39. MEAN DEPTH= 49.3M (RANGE= 26- 70M)

Table A-6. Site Group 2B

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	33.96	.171	.171	1.00	CHIONOECETES OPILIO
2	27.09	.136	.307	0.57	HEMILEPIDOTUS JORDANI
3	26.42	.133	.440	1.00	PARALITHODES PLATYPUS
4	15.91	.080	.520	0.14	ICELINUS BOREALIS
5	15.79	.079	.599	1.00	LIMANDA ASPERA
6	13.57	.068	.667	1.00	LEPIDOPSETTA BILINEATA
7	9.72	.049	.716	1.00	ERIMACRUS ISENBECKII
8	8.12	.041	.757	1.00	GADUS MACROCEPHALUS
9	6.77	.034	.791	0.86	STARFISH UNIDENT
10	5.99	.030	.821	1.00	PAGURIDAE
11	5.92	.030	.851	0.29	PORIFERA
12	5.10	.026	.877	1.00	CHIONOECETES BAIRDI
13	5.04	.025	.902	0.14	MYOXOCEPHALUS SP
14	3.56	.018	.920	0.14	HALOCYNTHIA AURANTIUM
15	3.02	.015	.935	0.57	COTTIDAE
16	1.57	.008	.943	0.14	PARALITHODES CAMTSCHATICA
17	1.52	.008	.951	0.29	INVERTEBRATE UNIDENT
18	1.31	.007	.957	0.71	NEPTUNEA VENTRICOSA
19	1.30	.007	.964	0.86	AGONUS ACIPENSERINUS
20	0.88	.004	.968	0.71	CHIONOECETES HYBRID
21	0.71	.004	.972	0.86	REINHARDTIUS HIPPOGLOSSOIDES
22	0.66	.003	.975	1.00	THERAGRA CHALCOGRAMMA
23	0.55	.003	.978	0.71	PLEURONECTES QUADRITUBERCULATUS
24	0.52	.003	.980	0.29	RAJA SP
25	0.50	.003	.983	0.43	HYAS SP
26	0.49	.002	.985	0.14	SEA ANEMONE UNIDENT
27	0.48	.002	.988	0.43	EUNICROTREMUS ORBIS
28	0.47	.002	.990	0.86	NEPTUNEA LYRATA
TOTAL	198.90				

* NUMBER OF HAULS= 7, MEAN DEPTH= 70.5M (RANGE= 60- 80M)

Table A-7. Site Group 3

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	97.89	.583	.583	1.00	THERAGRA CHALCOGRAMMA
2	14.87	.088	.671	0.83	GADUS MACROCEPHALUS
3	11.22	.067	.738	0.89	CHIONOECETES OPILIO
4	4.64	.028	.766	0.94	HIPPOGLOSSOIDES ELASSODON
5	4.41	.026	.792	0.92	REINHARDTIUS HIPPOGLOSSOIDES
6	3.33	.020	.812	0.27	ZOARCIDAE
7	3.02	.018	.830	0.59	ATHERESTHES SP
8	2.82	.017	.846	0.47	LYCODES BREVIPES
9	2.73	.016	.863	0.47	GORGONOCEPHALUS CARYI
10	2.41	.014	.877	0.74	RAJA SP
11	2.13	.013	.890	0.57	CHIONOECETES BAIRDI
12	1.65	.010	.899	0.64	LYCODES PALEARIS
13	1.34	.008	.907	0.18	LYCODES TURNERI
14	1.34	.008	.915	0.80	PAGURIDAE
15	0.99	.006	.921	0.56	PANDALUS SP
16	0.93	.006	.927	0.30	STARFISH UNIDENT
17	0.84	.005	.932	0.21	COTTIDAE
18	0.81	.005	.937	0.14	PARALITHODES PLATYPUS
19	0.65	.004	.941	0.24	OCTOPUS UNIDENT
20	0.55	.003	.944	0.17	CTENODISCUS CRISPATUS
21	0.55	.003	.947	0.32	NEPTUNEA SP
22	0.54	.003	.950	0.21	PLEURONECTES QUADRITUBERCULATUS
23	0.51	.003	.953	0.18	HIPPOGLOSSUS STENOLEPIS
24	0.47	.003	.956	0.44	NEPTUNEA PRIBILOFFENSIS
25	0.47	.003	.959	0.34	HEMILEPIDOTUS JORDANI
26	0.44	.003	.962	0.37	MYOXOCEPHALUS SP
27	0.41	.002	.964	0.06	PARALITHODES CAMTSCHATICA
28	0.41	.002	.966	0.33	BATHYMASTER SIGNATUS
29	0.33	.002	.968	0.24	HEMITRIPTERUS BOLINI
30	0.33	.002	.970	0.05	SEBASTES ALUTUS
31	0.32	.002	.972	0.39	DASYCOTTUS SETIGER
32	0.32	.002	.974	0.21	LIMANDA ASPERA
33	0.30	.002	.976	0.38	LEPIDOPSETTA BILINEATA
34	0.28	.002	.978	0.16	THALEICHTHYS PACIFICUS
35	0.27	.002	.979	0.25	HEMILEPIDOTUS SP
36	0.26	.002	.981	0.47	ICELUS SPINIGER
37	0.24	.001	.982	0.15	ERIMACRUS ISENBECKII
38	0.23	.001	.984	0.18	NEPTUNEA HEROS
39	0.20	.001	.985	0.14	MALACOCOTTUS KINCAIDI
40	0.19	.001	.986	0.27	CHIONOECETES HYBRID
41	0.18	.001	.987	0.15	ANOPLOPOMA FIMBRIA
42	0.18	.001	.988	0.16	LIPARIS DENNYI
43	0.15	.001	.989	0.33	LEPTASTERIAS SP

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Table A-7 Site Group 3 (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.14	.001	.990	0.10	SEA ANEMONE UNIDENT
45	0.11	.001	.990	0.09	OPHIUROID UNIDENT
TOTAL	168.02				

* NUMBER OF HAULS-126, MEAN DEPTH=118.8M (RANGE= 66-276M)

Table A-8. Site Group 3A

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	140.11	.707	.707	1.00	THERAGRA CHALCOGRAMMA
2	18.61	.094	.801	0.95	CHIONOECETES OPILIO
3	5.41	.027	.828	0.97	REINHARDTIUS HIPPOGLOSSOIDES
4	2.67	.013	.841	0.53	LYCODES BREVIPES
5	2.50	.013	.854	0.17	ZOARCIDAE
6	2.07	.010	.864	0.87	PAGURIDAE
7	2.07	.010	.875	0.94	HIPPOGLOSSOIDES ELASSODON
8	2.03	.010	.885	0.80	GADUS MACROCEPHALUS
9	1.92	.010	.895	0.19	PARALITHODES PLATYPUS
10	1.84	.009	.904	0.79	LYCODES PALEARIS
11	1.77	.009	.913	0.33	STARFISH UNIDENT
12	1.43	.007	.920	0.24	LYCODES TURNERI
13	1.33	.007	.927	0.55	GORGONOCEPHALUS CARYI
14	1.30	.007	.933	0.45	CHIONOECETES BAIRDI
15	1.13	.006	.939	0.69	RAJA SP
16	1.11	.006	.945	0.37	NEPTUNEA SP
17	1.09	.006	.950	0.68	PANDALUS SP
18	1.01	.005	.955	0.45	ATHERESTHES SP
19	0.79	.004	.959	0.36	HEMILEPIDOTUS JORDANI
20	0.73	.004	.963	0.10	COTTIDAE
21	0.65	.003	.966	0.28	HEMITRIPTERUS BOLINI
22	0.63	.003	.969	0.28	PLEURONECTES QUADRITUBERCULATUS
23	0.62	.003	.973	0.26	LIMANDA ASPERA
24	0.58	.003	.975	0.21	CTENODISCUS CRISPATUS
25	0.49	.002	.978	0.48	NEPTUNEA PRIBILOFFENSIS
26	0.47	.002	.980	0.39	MYOXOCEPHALUS SP
27	0.31	.002	.982	0.38	DASYCOTTUS SETIGER
28	0.29	.001	.983	0.33	HEMILEPIDOTUS SP
29	0.28	.001	.985	0.57	ICELUS SPINIGER
30	0.24	.001	.986	0.22	OCTOPUS UNIDENT
31	0.24	.001	.987	0.24	NEPTUNEA HEROS
32	0.22	.001	.988	0.38	LEPIDOPSETTA BILINEATA
33	0.21	.001	.989	0.19	CHIONOECETES HYBRID
34	0.19	.001	.990	0.21	LIPARIS DENNYI
TOTAL	198.26				

* NUMBER OF HAULS= 94, MEAN DEPTH=110.5M (RANGE= 66-188M)

Table A-9. Site Group 3Ai

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	156.12	.744	.744	1.00	THERAGRA CHALCOGRAMMA
2	15.36	.073	.817	0.93	CHIONOECETES OPILIO
3	4.97	.024	.841	0.96	REINHARDTIUS HIPPOGLOSSOIDES
4	3.80	.018	.859	0.70	LYCODES BREVIPES
5	2.57	.012	.871	0.22	ZOARCIDAE
6	2.12	.010	.881	0.74	GADUS MACROCEPHALUS
7	2.01	.010	.891	0.91	HIPPOGLOSSOIDES ELASSODON
8	1.84	.009	.899	0.71	LYCODES PALEARIS
9	1.83	.009	.908	0.13	PARALITHODES PLATYPUS
10	1.81	.009	.917	0.87	PAGURIDAE
11	1.54	.007	.924	0.59	CHIONOECETES BAIRDI
12	1.52	.007	.931	0.77	RAJA SP
13	1.39	.007	.938	0.29	STARFISH UNIDENT
14	1.30	.006	.944	0.58	GORGONOCEPHALUS CARYI
15	1.20	.006	.950	0.48	NEPTUNEA SP
16	1.17	.006	.955	0.71	PANDALUS SP
17	1.15	.005	.961	0.61	ATHERESTHES SP
18	0.86	.004	.965	0.29	CTENODISCUS CRISPATUS
19	0.81	.004	.969	0.45	HEMILEPIDOTUS JORDANI
20	0.73	.003	.972	0.06	COTTIDAE
21	0.70	.003	.976	0.38	HEMITRIPTERUS BOLINI
22	0.69	.003	.979	0.58	NEPTUNEA PRIBILOFFENSIS
23	0.46	.002	.981	0.13	LIMANDA ASPERA
24	0.40	.002	.983	0.70	ICELUS SPINIGER
25	0.38	.002	.985	0.32	MYOXOCEPHALUS SP
26	0.34	.002	.986	0.52	DASYCOTTUS SETIGER
27	0.32	.002	.988	0.26	OCTOPUS UNIDENT
28	0.21	.001	.989	0.19	CHIONOECETES HYBRID
29	0.21	.001	.990	0.38	LEPIDOPSETTA BILINEATA
30	0.17	.001	.991	0.09	THALEICHTHYS PACIFICUS
TOTAL	209.91				

* NUMBER OF HAULS= 69, MEAN DEPTH=121.4M (RANGE= 80-188M)

Table A-10. Site Group 3Aia

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	121.25	.744	.744	1.00	THERAGRA CHALCOGRAMMA
2	5.35	.033	.777	0.88	LYCODES BREVIPES
3	4.35	.027	.804	0.42	HEMITRIPTERUS BOLINI
4	3.87	.024	.827	0.90	HIPPOGLOSSOIDES ELASSODON
5	3.72	.023	.850	0.58	ATHERESTHES SP
6	3.70	.023	.873	0.96	REINHARDTIUS HIPPOGLOSSOIDES
7	3.18	.020	.892	0.92	CHIONOECETES OPILIO
8	2.60	.016	.908	0.77	GADUS MACROCEPHALUS
9	2.06	.013	.921	0.81	PANDALUS SP
10	1.73	.011	.932	0.66	LYCODES PALEARIS
11	1.72	.011	.942	0.87	RAJA SP
12	1.36	.008	.950	0.52	CHIONOECETES BAIRDI
13	1.28	.008	.958	0.58	GORGONOCEPHALUS CARYI
14	0.91	.006	.964	0.38	CTENODISCUS CRISPATUS
15	0.83	.005	.969	0.50	DASYCOTTUS SETIGER
16	0.67	.004	.973	0.73	NEPTUNEA PRIBILOFFENSIS
17	0.63	.004	.977	0.87	PAGURIDAE
18	0.43	.003	.980	0.92	ICELUS SPINIGER
19	0.40	.002	.982	0.15	STARFISH UNIDENT
20	0.35	.002	.984	0.40	NEPTUNEA SP
21	0.29	.002	.986	0.33	OCTOPUS UNIDENT
22	0.16	.001	.987	0.25	MYOXOCEPHALUS SP
23	0.15	.001	.988	0.85	BUCCINUM SP
24	0.15	.001	.989	0.02	THALEICHTHYS PACIFICUS
25	0.13	.001	.990	0.17	OPHIUROID UNIDENT
26	0.13	.001	.990	0.13	TRIGLOPS SP
TOTAL	162.95				

* NUMBER OF HAULS= 52. MEAN DEPTH=127.7M (RANGE= 91-188M)

Table A-11. Site Group 3Aib

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	196.83	.729	.729	1.00	THERAGRA CHALCOGRAMMA
2	35.15	.130	.859	1.00	CHIONOECETES OPILIO
3	7.75	.029	.888	0.92	ZOARCIDAE
4	6.12	.023	.910	1.00	REINHARDTIUS HIPPOGLOSSOIDES
5	3.20	.012	.922	0.92	PAGURIDAE
6	2.65	.010	.932	0.15	PARALITHODES PLATYPUS
7	2.27	.008	.940	0.85	NEPTUNEA SP
8	2.03	.008	.948	0.77	CHIONOECETES BAIRDI
9	1.82	.007	.955	0.77	GADUS MACROCEPHALUS
10	1.72	.006	.961	0.77	STARFISH UNIDENT
11	1.52	.006	.967	0.85	HEMILEPIDOTUS JORDANI
12	1.28	.005	.971	0.92	HIPPOGLOSSOIDES ELASSODON
13	1.18	.004	.976	0.62	GORGONOCEPHALUS CARYI
14	1.15	.004	.980	0.08	COTTIDAE
15	0.80	.003	.983	0.62	MYOXOCEPHALUS SP
16	0.73	.003	.986	0.46	LIMANDA ASPERA
17	0.69	.003	.988	0.69	ATHERESTHES SP
18	0.48	.002	.990	0.46	CHIONOECETES HYBRID
19	0.33	.001	.991	0.08	LYCODES PALEARIS

TOTAL 270.10

* NUMBER OF HAULS- 13, MEAN DEPTH=102.1M (RANGE= 80-117M)

Table A-12. Site Group 3Aii

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	40.12	.362	.362	1.00	THERAGRA CHALCOGRAMMA
2	26.27	.237	.599	1.00	CHIONOECETES OPILIO
3	8.88	.080	.680	0.76	LYCODES TURNERI
4	8.66	.078	.758	1.00	REINHARDTIUS HIPPOGLOSSOIDES
5	3.27	.030	.787	0.68	PLEURONECTES QUADRITUBERCULATUS
6	3.25	.029	.817	1.00	LYCODES PALEARIS
7	2.82	.025	.842	0.88	PAGURIDAE
8	2.50	.023	.865	0.44	STARFISH UNIDENT
9	1.68	.015	.880	0.88	HEMILEPIDOTUS SP
10	1.54	.014	.894	0.60	PANDALUS SP
11	1.40	.013	.906	0.72	NEPTUNEA HEROS
12	1.32	.012	.918	1.00	HIPPOGLOSSOIDES ELASSODON
13	1.21	.011	.929	0.96	GADUS MACROCEPHALUS
14	1.10	.010	.939	0.68	LIPARIS DENNYI
15	0.94	.009	.948	0.60	LIMANDA ASPERA
16	0.93	.008	.956	0.48	GORGONOCEPHALUS CARYI
17	0.91	.008	.964	0.60	MYOXOCEPHALUS SP
18	0.75	.007	.971	0.36	PARALITHODES PLATYPUS
19	0.49	.004	.976	0.36	LEPTASTERIAS SP
20	0.47	.004	.980	0.48	RAJA SP
21	0.34	.003	.983	0.16	PISASTER SP
22	0.22	.002	.985	0.40	LEPIDOPSETTA BILINEATA
23	0.21	.002	.987	0.32	NEPTUNEA VENTRICOSA
24	0.20	.002	.989	0.16	ECHINARACHNIUS PARMA
25	0.20	.002	.990	0.24	INVERTEBRATE UNIDENT
TOTAL	110.75				

* NUMBER OF HAULS= 25, MEAN DEPTH= 80.3M (RANGE= 66- 97M)

Table A-13. Site Group 3B

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	40.12	.334	.334	1.00	THERAGRA CHALCOGRAMMA
2	26.69	.222	.556	0.94	GADUS MACROCEPHALUS
3	11.40	.095	.651	0.22	GORGONOCEPHALUS CARYI
4	6.88	.057	.708	1.00	ATHERESTHES SP
5	6.87	.057	.765	0.97	HIPPOGLOSSOIDES ELASSODON
6	4.43	.037	.802	0.88	RAJA SP
7	4.28	.036	.838	0.94	CHIONOECETES BAIRDI
8	4.14	.034	.872	0.56	ZOARCIDAE
9	2.02	.017	.889	0.72	CHIONOECETES OPILIO
10	1.32	.011	.900	0.56	COTTIDAE
11	0.88	.007	.907	0.28	OCTOPUS UNIDENT
12	0.87	.007	.915	0.50	HIPPOGLOSSUS STENOLEPIS
13	0.85	.007	.922	0.78	REINHARDTIUS HIPPOGLOSSOIDES
14	0.84	.007	.929	0.28	LYCODES BREVIPES
15	0.63	.005	.934	0.31	BATHYMASTER SIGNATUS
16	0.58	.005	.939	0.22	SQUID UNIDENT
17	0.57	.005	.944	0.16	PARALITHODES CAMTSCHATICA
18	0.57	.005	.948	0.16	SEBASTES ALUTUS
19	0.36	.003	.951	0.59	PAGURIDAE
20	0.35	.003	.954	0.25	ERIMACRUS ISENBECKII
21	0.34	.003	.957	0.44	THALEICHTHYS PACIFICUS
22	0.34	.003	.960	0.31	MYOXOCEPHALUS SP
23	0.33	.003	.963	0.41	ANOPLOPOMA FIMBRIA
24	0.33	.003	.965	0.38	LEPIDOPSETTA BILINEATA
25	0.33	.003	.968	0.22	LYCODES PALEARIS
26	0.32	.003	.971	0.41	DASYCOTTUS SETIGER
27	0.30	.003	.973	0.19	MALACOCOTTUS KINCAIDI
28	0.24	.002	.975	0.28	HEMILEPIDOTUS JORDANI
29	0.22	.002	.977	0.13	HEMITRIPTERUS BOLINI
30	0.21	.002	.979	0.25	SEA ANEMONE UNIDENT
31	0.20	.002	.981	0.03	AGONUS ACIPENSERINUS
32	0.19	.002	.982	0.50	CHIONOECETES HYBRID
33	0.18	.001	.984	0.59	GLYPTOCEPHALUS ZACHIRUS
34	0.17	.001	.985	0.06	CYCLOPTERIDAE
35	0.17	.001	.986	0.19	SHRIMP UNIDENT
36	0.17	.001	.988	0.34	FUSITRITON OREGONENSIS
37	0.16	.001	.989	0.47	GASTROPOD UNIDENT
38	0.13	.001	.990	0.16	NEPTUNEA SP
TOTAL	120.15				

* NUMBER OF HAULS= 32, MEAN DEPTH=143.1M (RANGE=104-276M)

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APPENDIX B

Species Assemblages, 1979 Bering Sea Survey

Table B-1. Site Group 1

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	41.62	.460	.460	1.00	LIMANDA ASPERA
2	22.16	.245	.704	0.94	STARFISH UNIDENT
3	3.97	.044	.748	0.88	ELEGINUS GRACILIS
4	2.92	.032	.781	0.06	ASTERIAS AMURENSIS
5	2.52	.028	.808	0.91	LIMANDA PROBOSCIDEA
6	1.97	.022	.830	0.42	ASCIDIAN UNIDENT
7	1.50	.017	.847	0.94	PLEURONECTES QUADRITUBERCULATUS
8	1.41	.016	.862	0.97	MYOXOCEPHALUS SP
9	1.34	.015	.877	0.48	NEPTUNEA HEROS
10	1.30	.014	.891	0.58	THERAGRA CHALCOGRAMMA
11	1.12	.012	.904	0.21	PAGURUS TRIGONOCHEIRUS
12	1.00	.011	.915	0.70	OSMERUS MORDAX
13	0.98	.011	.926	0.79	PLATICHTHYS STELLATUS
14	0.92	.010	.936	0.64	CLUPEA HARENGUS PALLASI
15	0.69	.008	.943	0.58	PAGURUS SP
16	0.63	.007	.950	0.67	HIPPOGLOSSUS STENOLEPIS
17	0.47	.005	.956	0.55	TELMESSUS CHEIRAGONUS
18	0.39	.004	.960	0.64	GYMNOCANTHUS SP
19	0.36	.004	.964	0.73	AGONUS ACIPENSERINUS
20	0.36	.004	.968	0.61	PAGURUS ALEUTICUS
21	0.31	.003	.971	0.39	CHIONOECETES OPILIO
22	0.30	.003	.975	0.33	LEPIDOPSETTA BILINEATA
23	0.24	.003	.977	0.67	NEPTUNEA VENTRICOSA
24	0.22	.002	.980	0.03	LUMPENUS MACKAYI
25	0.19	.002	.982	0.03	OCCELLA DODECAEDRON
26	0.19	.002	.984	0.82	HEXAGRAMMOS STELLERI
27	0.16	.002	.986	0.09	THALEICHTHYS PACIFICUS
28	0.16	.002	.987	0.12	SCYPHOZOA
29	0.15	.002	.989	0.21	GORGONOCEPHALUS CARYI
30	0.10	.001	.990	0.39	ALCYONARIA
TOTAL	90.53				

* NUMBER OF HAULS= 33, MEAN DEPTH= 25.7M (RANGE= 15- 38M)

Table B-2. Site Group 2

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	48.58	.248	.248	0.97	THERAGRA CHALCOGRAMMA
2	32.68	.167	.415	0.64	LIMANDA ASPERA
3	24.97	.128	.543	0.68	CHIONOECETES OPILIO
4	19.14	.098	.640	0.96	GADUS MACROCEPHALUS
5	6.84	.035	.675	0.36	STARFISH UNIDENT
6	5.05	.026	.701	0.53	PLEURONECTES QUADRITUBERCULATUS
7	4.07	.021	.722	0.38	PARALITHODES CAMTSCHATICA
8	3.67	.019	.741	0.18	ZOARCIDAE
9	3.33	.017	.758	0.15	HEMILEPIDOTUS PAPILIO
10	3.17	.016	.774	0.72	REINHARDTIUS HIPPOGLOSSOIDES
11	2.97	.015	.789	0.59	MYOXOCEPHALUS SP
12	2.94	.015	.804	0.61	PAGURIDAE
13	2.61	.013	.817	0.60	LEPIDOPSETTA BILINEATA
14	2.49	.013	.830	0.16	ASTERIAS AMURENSIS
15	1.92	.010	.840	0.80	HIPPOGLOSSOIDES ELASSODON
16	1.70	.009	.848	0.40	ATHERESTHES SP
17	1.69	.009	.857	0.23	NEPTUNEA HEROS
18	1.69	.009	.866	0.19	LYCODES BREVIPES
19	1.66	.008	.874	0.44	LYCODES PALEARIS
20	1.42	.007	.881	0.11	CTENODISCUS CRISPATUS
21	1.42	.007	.889	0.44	GASTROPOD UNIDENT
22	1.40	.007	.896	0.06	LYCODES CONCOLOR
23	1.36	.007	.903	0.60	CHIONOECETES BAIRDI
24	1.24	.006	.909	0.37	GORGONOCEPHALUS CARYI
25	1.02	.005	.914	0.43	RAJA SP
26	0.97	.005	.919	0.09	PARALITHODES PLATYPUS
27	0.87	.004	.924	0.04	SEBASTES ALUTUS
28	0.84	.004	.928	0.29	HEMILEPIDOTUS JORDANI
29	0.78	.004	.932	0.19	OCTOPUS UNIDENT
30	0.75	.004	.936	0.35	HIPPOGLOSSUS STENOLEPIS
31	0.68	.003	.939	0.04	HALOCYNTHIA AURANTIUM
32	0.64	.003	.943	0.11	ANOPLOPOMA FIMBRIA
33	0.57	.003	.946	0.11	PAGURUS TRIGONOCHEIRUS
34	0.54	.003	.948	0.09	ASCIDIAN UNIDENT
35	0.48	.002	.951	0.13	HEMITRIPTERUS BOLINI
36	0.47	.002	.953	0.16	LEPTASTERIAS SP
37	0.46	.002	.955	0.19	NEPTUNEA PRIBILOFFENSIS
38	0.44	.002	.958	0.26	LIMANDA PROBOSCIDEA
39	0.42	.002	.960	0.07	LIPARIS SP
40	0.40	.002	.962	0.08	ELEGINUS GRACILIS
41	0.36	.002	.964	0.13	PORIFERA
42	0.35	.002	.965	0.19	NEPTUNEA VENTRICOSA
43	0.32	.002	.967	0.48	AGONUS ACIPENSERINUS

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Table B-2. Site Group 2 (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.29	.001	.969	0.34	PANDALUS SP
45	0.29	.001	.970	0.22	BUCCINUM SP
46	0.28	.001	.972	0.09	CYCLOPTERIDAE
47	0.26	.001	.973	0.28	SEA ANEMONE UNIDENT
48	0.25	.001	.974	0.29	GYMNOCANTHUS SP
49	0.24	.001	.975	0.23	CHIONOECETES HYBRID
50	0.24	.001	.977	0.41	HYAS SP
51	0.23	.001	.978	0.27	ERIMACRUS ISENBECKII
52	0.23	.001	.979	0.04	ZAPRORA SILENUS
53	0.19	.001	.980	0.02	INVERTEBRATE UNIDENT
54	0.18	.001	.981	0.09	PAGURUS SP
55	0.17	.001	.982	0.15	SCYPHOZOA
56	0.17	.001	.983	0.03	OPHIUROID UNIDENT
57	0.16	.001	.983	0.10	HOLOTHUROIDEA UNIDENT
58	0.16	.001	.984	0.12	STRONGYLOCENTROTUS DROEBACHIENSIS
59	0.15	.001	.985	0.16	THALEICHTHYS PACIFICUS
60	0.15	.001	.986	0.19	NEPTUNEA LYRATA
61	0.14	.001	.987	0.23	CLUPEA HARENGUS PALLASI
62	0.14	.001	.987	0.02	HALOCYNTHIA SP
63	0.13	.001	.988	0.01	INVERTEBRATE EGGS UNIDENT
64	0.12	.001	.989	0.25	ICELUS SP
65	0.11	.001	.989	0.05	BOLTENIA SP
66	0.10	.001	.990	0.08	PLATICHTHYS STELLATUS
67	0.10	.000	.990	0.14	BATHYMASTER SIGNATUS

TOTAL 195.77

* NUMBER OF HAULS-468, MEAN DEPTH= 87.4M (RANGE= 11-274M)

Table B-3. Site Group 2A

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	70.73	.257	.257	1.00	LIMANDA ASPERA
2	45.47	.166	.423	0.94	THERAGRA CHALCOGRAMMA
3	24.63	.090	.513	0.96	GADUS MACROCEPHALUS
4	23.57	.086	.598	0.59	CHIONOECETES OPILIO
5	14.41	.052	.651	0.50	STARFISH UNIDENT
6	10.27	.037	.688	0.78	PLEURONECTES QUADRITUBERCULATUS
7	9.95	.036	.725	0.21	ASTERIAS AMURENSIS
8	9.83	.036	.760	0.64	PARALITHODES CAMTSCHATICA
9	7.57	.028	.788	0.89	LEPIDOPSETTA BILINEATA
10	7.36	.027	.815	0.65	PAGURIDAE
11	6.34	.023	.838	0.82	MYOXOCEPHALUS SP
12	3.94	.014	.852	0.06	PARALITHODES PLATYPUS
13	2.57	.009	.861	0.31	NEPTUNEA HEROS
14	2.55	.009	.871	0.41	GASTROPOD UNIDENT
15	2.37	.009	.879	0.05	STRONGYLOCENTROTUS DROEBACHIENSIS
16	2.15	.008	.887	0.62	CHIONOECETES BAIRDI
17	2.13	.008	.895	0.25	HEMILEPIDOTUS JORDANI
18	1.80	.007	.901	0.17	SEA ANEMONE UNIDENT
19	1.65	.006	.907	0.08	HALOCYNTHIA AURANTIUM
20	1.63	.006	.913	0.74	HIPPOGLOSSOIDES ELASSODON
21	1.56	.006	.919	0.39	LYCODES PALEARIS
22	1.45	.005	.924	0.59	REINHARDTIUS HIPPOGLOSSOIDES
23	1.37	.005	.929	0.45	HIPPOGLOSSUS STENOLEPIS
24	1.35	.005	.934	0.43	ERIMACRUS ISENBECKII
25	1.20	.004	.939	0.51	LIMANDA PROBOSCIDEA
26	1.12	.004	.943	0.13	ASCIDIAN UNIDENT
27	0.99	.004	.946	0.31	GORGONOCEPHALUS CARYI
28	0.92	.003	.950	0.12	PAGURUS TRIGONOCHEIRUS
29	0.92	.003	.953	0.04	MYTILIDAE
30	0.88	.003	.956	0.43	GYMNOCANTHUS SP
31	0.83	.003	.959	0.62	HYAS SP
32	0.82	.003	.962	0.86	AGONUS ACIPENSERINUS
33	0.81	.003	.965	0.14	ELEGINUS GRACILIS
34	0.54	.002	.967	0.17	HOLOTHUROIDEA UNIDENT
35	0.53	.002	.969	0.12	PORIFERA
36	0.51	.002	.971	0.06	LEPTASTERIAS SP
37	0.49	.002	.973	0.25	CHIONOECETES HYBRID
38	0.45	.002	.974	0.25	RAJA SP
39	0.44	.002	.976	0.19	SCYPHOZOA
40	0.42	.002	.977	0.25	NEPTUNEA VENTRICOSA
41	0.41	.001	.979	0.30	ATHERESTHES SP
42	0.41	.001	.980	0.17	NEPTUNEA LYRATA
43	0.38	.001	.982	0.04	INVERTEBRATE UNIDENT

Table B-3. Site Group 2A (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.35	.001	.983	0.07	PAGURUS SP
45	0.32	.001	.984	0.07	NEPTUNEA PRIBILOFFENSIS
46	0.28	.001	.985	0.03	HALOCYNTHIA SP
47	0.28	.001	.986	0.33	CLUPEA HARENGUS PALLASI
48	0.26	.001	.987	0.06	ZOARCIDAE
49	0.24	.001	.988	0.08	HEMILEPIDOTUS PAPILIO
50	0.24	.001	.989	0.04	OCTOPUS UNIDENT
51	0.23	.001	.990	0.15	PLATICHTHYS STELLATUS
52	0.22	.001	.991	0.09	BOLTENIA SP

TOTAL 274.69

* NUMBER OF HAULS=236, MEAN DEPTH= 56.6M (RANGE= 11- 93M)

Table B-4. Site Group 2Ai

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	86.62	.301	.301	1.00	LIMANDA ASPERA
2	52.92	.184	.485	0.95	THERAGRA CHALCOGRAMMA
3	30.93	.108	.593	0.96	GADUS MACROCEPHALUS
4	18.07	.063	.656	0.50	STARFISH UNIDENT
5	15.40	.054	.709	0.57	CHIONOECETES OPILIO
6	13.47	.047	.756	0.65	PARALITHODES CAMTSCHATICA
7	12.54	.044	.800	0.79	PLEURONECTES QUADRITUBERCULATUS
8	7.08	.025	.825	0.89	LEPIDOPSETTA BILINEATA
9	5.56	.019	.844	0.64	PAGURIDAE
10	5.21	.018	.862	0.20	ASTERIAS AMURENSIS
11	5.21	.018	.880	0.84	MYOXOCEPHALUS SP
12	3.27	.011	.892	0.42	GASTROPOD UNIDENT
13	3.03	.011	.902	0.31	NEPTUNEA HEROS
14	2.05	.007	.909	0.74	HIPPOGLOSSOIDES ELASSODON
15	1.81	.006	.915	0.38	LYCODES PALEARIS
16	1.73	.006	.921	0.54	LIMANDA PROBOSCIDEA
17	1.57	.005	.927	0.60	CHIONOECETES BAIRDI
18	1.56	.005	.932	0.08	HALOCYNTHIA AURANTIUM
19	1.48	.005	.938	0.45	HIPPOGLOSSUS STENOLEPIS
20	1.37	.005	.942	0.13	ASCIDIAN UNIDENT
21	1.20	.004	.946	0.33	GORGONOCEPHALUS CARYI
22	1.14	.004	.950	0.13	PAGURUS TRIGONOCHEIRUS
23	1.13	.004	.954	0.58	REINHARDTIUS HIPPOGLOSSOIDES
24	0.99	.003	.958	0.14	ELEGINUS GRACILIS
25	0.76	.003	.960	0.87	AGONUS ACIPENSERINUS
26	0.68	.002	.963	0.19	SCYPHOZOA
27	0.63	.002	.965	0.12	PORIFERA
28	0.59	.002	.967	0.27	ATHERESTHES SP
29	0.52	.002	.969	0.22	CHIONOECETES HYBRID
30	0.52	.002	.971	0.25	RAJA SP
31	0.47	.002	.972	0.04	INVERTEBRATE UNIDENT
32	0.46	.002	.974	0.40	GYMNOCANTHUS SP
33	0.44	.002	.975	0.07	PAGURUS SP
34	0.44	.002	.977	0.21	HEMILEPIDOTUS JORDANI
35	0.42	.001	.978	0.05	ZOARCIDAE
36	0.40	.001	.980	0.14	NEPTUNEA LYRATA
37	0.35	.001	.981	0.07	NEPTUNEA PRIBILOFFENSIS
38	0.34	.001	.982	0.17	HOLOTHUROIDEA UNIDENT
39	0.34	.001	.983	0.35	CLUPEA HARENGUS PALLASI
40	0.34	.001	.985	0.04	HALOCYNTHIA SP
41	0.33	.001	.986	0.24	NEPTUNEA VENTRICOSA
42	0.33	.001	.987	0.40	ERIMACRUS ISENBECKII
43	0.31	.001	.988	0.16	PLATICHTHYS STELLATUS

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Table B-4. Site Group 2Ai (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.30	.001	.989	0.05	LEPTASTERIAS SP
45	0.26	.001	.990	0.10	BOLTENIA SP
46	0.23	.001	.991	0.13	THALEICHTHYS PACIFICUS
TOTAL	287.48				

* NUMBER OF HAULS=223, MEAN DEPTH= 55.6M (RANGE= 11- 91M)

Table B-5. Site Group 2Aia

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	84.72	.276	.276	1.00	LIMANDA ASPERA
2	73.96	.241	.517	1.00	THERAGRA CHALCOGRAMMA
3	20.13	.066	.582	0.89	CHIONOECETES OPILIO
4	20.02	.065	.648	0.61	PARALITHODES CAMTSCHATICA
5	19.83	.065	.712	0.99	GADUS MACROCEPHALUS
6	17.97	.059	.771	0.95	PLEURONECTES QUADRITUBERCULATUS
7	11.54	.038	.808	0.39	STARFISH UNIDENT
8	8.58	.028	.836	0.64	PAGURIDAE
9	7.43	.024	.860	0.81	MYOXOCEPHALUS SP
10	4.91	.016	.876	0.49	GASTROPOD UNIDENT
11	4.17	.014	.890	0.40	NEPTUNEA HEROS
12	2.54	.008	.898	0.22	ASTERIAS AMURENSIS
13	2.42	.008	.906	0.65	LYCODES PALEARIS
14	2.26	.007	.913	0.83	LEPIDOPSETTA BILINEATA
15	2.24	.007	.921	0.71	CHIONOECETES BAIRDI
16	2.16	.007	.928	0.13	HALOCYNTHIA AURANTIUM
17	2.15	.007	.935	0.90	HIPPOGLOSSOIDES ELASSODON
18	1.71	.006	.940	0.53	GORGONOCEPHALUS CARYI
19	1.60	.005	.945	0.13	ASCIDIAN UNIDENT
20	1.56	.005	.951	0.89	REINHARDTIUS HIPPOGLOSSOIDES
21	1.39	.005	.955	0.19	PAGURUS TRIGONOCHEIRUS
22	0.81	.003	.958	0.21	SCYPHOZOA
23	0.79	.003	.960	0.09	LEPTASTERIAS SP
24	0.77	.003	.963	0.84	AGONUS ACIPENSERINUS
25	0.75	.002	.965	0.02	INVERTEBRATE UNIDENT
26	0.72	.002	.968	0.42	RAJA SP
27	0.72	.002	.970	0.38	CHIONOECETES HYBRID
28	0.70	.002	.972	0.09	ZOARCIDAE
29	0.64	.002	.974	0.19	NEPTUNEA LYRATA
30	0.58	.002	.976	0.10	NEPTUNEA PRIBILOFFENSIS
31	0.48	.002	.978	0.09	PAGURUS SP
32	0.47	.002	.979	0.24	LIMANDA PROBOSCIDEA
33	0.42	.001	.981	0.34	ATHERESTHES SP
34	0.41	.001	.982	0.09	ELEGINUS GRACILIS
35	0.39	.001	.983	0.48	ERIMACRUS ISENBECKII
36	0.38	.001	.984	0.28	HEMILEPIDOTUS JORDANI
37	0.38	.001	.986	0.35	NEPTUNEA VENTRICOSA
38	0.36	.001	.987	0.01	OPHIURA SARSI
39	0.34	.001	.988	0.05	HALOCYNTHIA SP
40	0.34	.001	.989	0.05	PORIFERA
41	0.29	.001	.990	0.03	ECHINARACHNIUS PARMA

TOTAL 307.06

* NUMBER OF HAULS-129, MEAN DEPTH= 65.5M (RANGE= 40- 91M)

Table B-6. Site Group 2Aib

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	91.08	.404	.404	1.00	LIMANDA ASPERA
2	57.21	.254	.658	0.91	GADUS MACROCEPHALUS
3	18.24	.081	.739	0.65	STARFISH UNIDENT
4	15.10	.067	.806	0.97	LEPIDOPSETTA BILINEATA
5	8.10	.036	.842	0.17	ASTERIAS AMURENSIS
6	4.88	.022	.864	0.69	PARALITHODES CAMTSCHATICA
7	4.75	.021	.885	0.95	LIMANDA PROBOSCIDEA
8	3.56	.016	.901	0.87	THERAGRA CHALCOGRAMMA
9	3.38	.015	.916	0.85	HIPPOGLOSSUS STENOLEPIS
10	2.63	.012	.927	0.57	PLEURONECTES QUADRITUBERCULATUS
11	2.43	.011	.938	0.52	HIPPOGLOSSOIDES ELASSODON
12	1.88	.008	.946	0.88	MYOXOCEPHALUS SP
13	1.22	.005	.952	0.22	ELEGINUS GRACILIS
14	1.09	.005	.957	0.72	GYMNOCANTHUS SP
15	1.04	.005	.961	0.18	ATHERESTHES SP
16	0.81	.004	.965	0.20	PORIFERA
17	0.67	.003	.968	0.36	PLATICHTHYS STELLATUS
18	0.66	.003	.971	0.90	AGONUS ACIPENSERINUS
19	0.64	.003	.974	0.19	NEPTUNEA HEROS
20	0.48	.002	.976	0.27	HOLOTHUROIDEA UNIDENT
21	0.47	.002	.978	0.17	SCYPHOZOA
22	0.41	.002	.980	0.46	CHIONOECETES BAIRDI
23	0.36	.002	.981	0.21	THALEICHTHYS PACIFICUS
24	0.35	.002	.983	0.65	PAGURIDAE
25	0.34	.002	.984	0.30	ERIMACRUS ISENBECKII
26	0.29	.001	.986	0.06	INVERTEBRATE UNIDENT
27	0.29	.001	.987	0.12	HEMILEPIDOTUS JORDANI
28	0.27	.001	.988	0.05	PAGURUS SP
29	0.26	.001	.989	0.09	NEPTUNEA VENTRICOSA
30	0.24	.001	.990	0.48	CLUPEA HARENGUS PALLASI
TOTAL	225.31				

* NUMBER OF HAULS= 94, MEAN DEPTH= 42.0M (RANGE= 11- 68M)

Table B-7. Site Group 2Aii

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	37.94	.154	.154	1.00	GADUS MACROCEPHALUS
2	36.71	.149	.303	1.00	CHIONOECETES OPILIO
3	22.47	.091	.394	0.08	HALOCYNTHIA AURANTIUM
4	22.36	.091	.485	1.00	HEMILEPIDOTUS JORDANI
5	15.86	.064	.549	0.54	MYOXOCEPHALUS SP
6	12.06	.049	.598	0.08	METRIDIUM SENILE
7	11.09	.045	.643	0.85	THERAGRA CHALCOGRAMMA
8	10.78	.044	.687	0.77	PARALITHODES PLATYPUS
9	8.96	.036	.723	1.00	LIMANDA ASPERA
10	8.90	.036	.759	0.31	ASTERIAS AMURENSIS
11	8.82	.036	.795	0.85	PAGURIDAE
12	7.95	.032	.827	1.00	LEPIDOPSETTA BILINEATA
13	6.33	.026	.853	0.85	ERIMACRUS ISENBECKII
14	4.91	.020	.873	1.00	CHIONOECETES BAIRDI
15	4.24	.017	.890	0.54	SEA ANEMONE UNIDENT
16	3.52	.014	.904	0.62	HYAS SP
17	3.51	.014	.918	0.15	STRONGYLOCENTROTUS DROEBACHIENSIS
18	2.52	.010	.929	0.92	GYMNOCANTHUS SP
19	2.43	.010	.938	0.38	BERINGIUS BERINGII
20	1.67	.007	.945	0.77	AGONUS ACIPENSERINUS
21	1.33	.005	.951	0.23	MYTILIDAE
22	1.19	.005	.955	0.15	LEPTASTERIAS SP
23	1.04	.004	.960	0.77	REINHARDTIUS HIPPOGLOSSOIDES
24	0.98	.004	.964	0.08	TEALIA SP
25	0.90	.004	.967	0.15	CHLAMYS SP
26	0.77	.003	.970	0.54	STARFISH UNIDENT
27	0.77	.003	.974	0.54	PLEURONECTES QUADRITUBERCULATUS
28	0.64	.003	.976	0.54	PARALITHODES CAMTSCHATICA
29	0.60	.002	.979	0.69	HIPPOGLOSSOIDES ELASSODON
30	0.59	.002	.981	0.69	NEPTUNEA LYRATA
31	0.50	.002	.983	0.54	HIPPOGLOSSUS STENOLEPIS
32	0.46	.002	.985	0.15	OCTOPUS UNIDENT
33	0.39	.002	.986	0.15	HOLOTHUROIDEA UNIDENT
34	0.31	.001	.988	0.31	HEMILEPIDOTUS PAPILIO
35	0.28	.001	.989	0.77	ATHERESTHES SP
36	0.27	.001	.990	0.69	CHIONOECETES HYBRID
37	0.26	.001	.991	0.31	TRIGLOPS SP
TOTAL	246.51				

* NUMBER OF HAULS= 13, MEAN DEPTH= 73.7M (RANGE= 48- 93M)

Table B-8. Site Group 2B

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	63.41	.344	.344	1.00	THERAGRA CHALCOGRAMMA
2	29.40	.160	.504	0.79	CHIONOECETES OPILIO
3	16.93	.092	.596	0.95	GADUS MACROCEPHALUS
4	12.12	.066	.661	0.10	PARALITHODES CAMTSCHATICA
5	5.21	.028	.690	0.32	ZOARCIDAE
6	4.33	.024	.713	0.86	REINHARDTIUS HIPPOGLOSSOIDES
7	4.14	.022	.736	0.26	LIPARIS ASPERA
8	4.02	.022	.757	0.21	HEMILEPIDOTUS PAPILIO
9	3.19	.017	.775	0.13	PORIFERA
10	2.99	.016	.791	0.57	CHIONOECETES BAIRDI
11	2.65	.014	.805	0.87	HIPPOGLOSSOIDES ELASSODON
12	2.40	.013	.818	0.51	ATHERESTHES SP
13	2.21	.012	.830	0.49	LYCODES PALEARIS
14	1.94	.011	.841	0.38	LYCODES BREVIPES
15	1.92	.010	.851	0.28	LEPIDOPSETTA BILINEATA
16	1.86	.010	.861	0.27	PLEURONECTES QUADRITUBERCULATUS
17	1.68	.009	.870	0.58	PAGURIDAE
18	1.60	.009	.879	0.11	LYCODES CONCOLOR
19	1.57	.008	.888	0.22	CTENODISCUS CRISPATUS
20	1.51	.008	.896	0.61	RAJA SP
21	1.46	.008	.904	0.34	MYOXOCEPHALUS SP
22	1.27	.007	.911	0.23	HIPPOGLOSSUS STENOLEPIS
23	1.13	.006	.917	0.16	NEPTUNEA HEROS
24	1.09	.006	.923	0.43	GORGONOCEPHALUS CARYI
25	1.03	.006	.928	0.49	GASTROPOD UNIDENT
26	0.99	.005	.934	0.22	STARFISH UNIDENT
27	0.98	.005	.939	0.07	SEBASTES ALUTUS
28	0.91	.005	.944	0.20	ANOPLOPOMA FIMBRIA
29	0.87	.005	.949	0.35	OCTOPUS UNIDENT
30	0.72	.004	.952	0.12	PARALITHODES PLATYPUS
31	0.69	.004	.956	0.33	HEMILEPIDOTUS JORDANI
32	0.64	.003	.960	0.26	HEMITRIPTERUS BOLINI
33	0.55	.003	.963	0.31	NEPTUNEA PRIBILOFFENSIS
34	0.49	.003	.965	0.11	CYCLOPTERIDAE
35	0.45	.002	.968	0.11	LIPARIS SP
36	0.42	.002	.970	0.26	LEPTASTERIAS SP
37	0.38	.002	.972	0.21	NEPTUNEA LYRATA
38	0.36	.002	.974	0.63	PANDALUS SP
39	0.35	.002	.976	0.11	SCYPHOZOA
40	0.33	.002	.978	0.33	BUCCINUM SP
41	0.28	.002	.979	0.12	ASTERIAS AMURENSIS
42	0.28	.002	.981	0.10	PAGURUS TRIGONOCHEIRUS
43	0.26	.001	.982	0.14	NEPTUNEA VENTRICOSA

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Table B-8. Site Group 2B (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.26	.001	.984	0.06	ZAPRORA SILENUS
45	0.23	.001	.985	0.26	FUSITRITON OREGONENSIS
46	0.17	.001	.986	0.07	OPHIUROID UNIDENT
47	0.16	.001	.987	0.40	SEA ANEMONE UNIDENT
48	0.15	.001	.988	0.01	INVERTEBRATE EGGS UNIDENT
49	0.13	.001	.988	0.50	ICELUS SP
50	0.13	.001	.989	0.28	BATHYMASTER SIGNATUS
51	0.12	.001	.990	0.20	HYAS SP
52	0.11	.001	.990	0.19	THALEICHTHYS PACIFICUS
TOTAL	184.25				

* NUMBER OF HAULS=227, MEAN DEPTH=120.2M (RANGE= 38-274M)

Table B-9. Site Group 2Bi

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	74.60	.379	.379	1.00	THERAGRA CHALCOGRAMMA
2	31.88	.162	.541	0.76	CHIONOECETES OPILIO
3	19.08	.097	.638	0.96	GADUS MACROCEPHALUS
4	13.46	.068	.706	0.11	PARALITHODES CAMTSCHATICA
5	5.37	.027	.733	0.85	REINHARDTIUS HIPPOGLOSSOIDES
6	4.54	.023	.756	0.24	LIMANDA ASPERA
7	3.75	.019	.775	0.26	ZOARCIDAE
8	3.47	.018	.793	0.12	PORIFERA
9	3.32	.017	.810	0.63	CHIONOECETES BAIRDI
10	3.13	.016	.826	0.88	HIPPOGLOSSOIDES ELASSODON
11	3.02	.015	.841	0.49	LYCODES PALEARIS
12	2.67	.014	.854	0.57	ATHERESTHES SP
13	2.16	.011	.865	0.42	LYCODES BREVIPES
14	2.12	.011	.876	0.28	LEPIDOPSETTA BILINEATA
15	1.74	.009	.885	0.25	CTENODISCUS CRISPATUS
16	1.70	.009	.894	0.22	PLEURONECTES QUADRITUBERCULATUS
17	1.68	.009	.902	0.67	RAJA SP
18	1.44	.007	.910	0.60	PAGURIDAE
19	1.41	.007	.917	0.26	HIPPOGLOSSUS STENOLEPIS
20	1.13	.006	.922	0.46	GASTROPOD UNIDENT
21	1.12	.006	.928	0.39	GORGONOCEPHALUS CARYI
22	1.09	.006	.934	0.08	SEBASTES ALUTUS
23	1.03	.005	.939	0.30	MYOXOCEPHALUS SP
24	1.01	.005	.944	0.19	STARFISH UNIDENT
25	1.01	.005	.949	0.22	ANOPLOPOMA FIMBRIA
26	0.93	.005	.954	0.37	OCTOPUS UNIDENT
27	0.77	.004	.958	0.37	HEMILEPIDOTUS JORDANI
28	0.71	.004	.961	0.29	HEMITRIPTERUS BOLINI
29	0.69	.004	.965	0.09	NEPTUNEA HEROS
30	0.62	.003	.968	0.34	NEPTUNEA PRIBILOFFENSIS
31	0.62	.003	.971	0.06	CYCLOPTERIDAE
32	0.60	.003	.974	0.11	HEMILEPIDOTUS PAPILIO
33	0.43	.002	.976	0.23	NEPTUNEA LYRATA
34	0.39	.002	.978	0.12	SCYPHOZOA
35	0.35	.002	.980	0.60	PANDALUS SP
36	0.34	.002	.982	0.27	BUCCINUM SP
37	0.32	.002	.983	0.14	ASTERIAS AMURENSIS
38	0.31	.002	.985	0.21	LEPTASTERIAS SP
39	0.29	.001	.986	0.06	ZAPRORA SILENUS
40	0.26	.001	.988	0.30	FUSITRITON OREGONENSIS
41	0.17	.001	.989	0.40	SEA ANEMONE UNIDENT
42	0.16	.001	.989	0.05	OPHIUROID UNIDENT
43	0.15	.001	.990	0.55	ICELUS SP

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Table B-9. Site Group 2Bi (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.14	.001	.991	0.32	BATHYMASTER SIGNATUS
TOTAL	196.97				

* NUMBER OF HAULS-202. MEAN DEPTH=127.3M (RANGE= 59-274M)

Table B-10. Site Group 2Bia

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	75.51	.377	.377	1.00	THERAGRA CHALCOGRAMMA
2	36.57	.183	.560	0.87	CHIONOECETES OPILIO
3	15.17	.076	.635	0.14	PARALITHODES CAMTSCHATICA
4	10.01	.050	.685	0.97	GADUS MACROCEPHALUS
5	6.71	.033	.719	0.92	REINHARDTIUS HIPPOGLOSSOIDES
6	5.15	.026	.744	0.31	LIMANDA ASPERA
7	4.32	.022	.766	0.34	ZOARCIDAE
8	3.94	.020	.786	0.63	CHIONOECETES BAIRDI
9	3.89	.019	.805	0.11	PORIFERA
10	3.86	.019	.824	0.96	HIPPOGLOSSOIDES ELASSODON
11	3.56	.018	.842	0.58	LYCODES PALEARIS
12	2.65	.013	.855	0.50	LYCODES BREVIPES
13	2.23	.011	.867	0.28	LEPIDOPSETTA BILINEATA
14	1.96	.010	.876	0.29	CTENODISCUS CRISPATUS
15	1.93	.010	.886	0.29	PLEURONECTES QUADRITUBERCULATUS
16	1.86	.009	.895	0.75	RAJA SP
17	1.77	.009	.904	0.62	PAGURIDAE
18	1.55	.008	.912	0.31	HIPPOGLOSSUS STENOLEPIS
19	1.48	.007	.919	0.52	ATHERESTHES SP
20	1.30	.007	.926	0.47	GORGONOCEPHALUS CARYI
21	1.28	.006	.932	0.54	GASTROPOD UNIDENT
22	1.21	.006	.938	0.27	ANOPLOPOMA FIMBRIA
23	1.15	.006	.944	0.16	STARFISH UNIDENT
24	0.92	.005	.948	0.33	MYOXOCEPHALUS SP
25	0.90	.004	.953	0.41	OCTOPUS UNIDENT
26	0.81	.004	.957	0.41	NEPTUNEA PRIBILOFFENSIS
27	0.80	.004	.961	0.11	NEPTUNEA HEROS
28	0.69	.003	.964	0.08	CYCLOPTERIDAE
29	0.68	.003	.968	0.14	HEMILEPIDOTUS PAPILIO
30	0.65	.003	.971	0.31	HEMILEPIDOTUS JORDANI
31	0.53	.003	.974	0.66	PANDALUS SP
32	0.52	.003	.976	0.16	ASTERIAS AMURENSIS
33	0.52	.003	.979	0.29	NEPTUNEA LYRATA
34	0.40	.002	.981	0.33	BUCCINUM SP
35	0.38	.002	.983	0.10	SCYPHOZOA
36	0.36	.002	.985	0.27	LEPTASTERIAS SP
37	0.25	.001	.986	0.29	FUSITRITON OREGONENSIS
38	0.25	.001	.987	0.23	HEMITRIPTERUS BOLINI
39	0.19	.001	.988	0.41	SEA ANEMONE UNIDENT
40	0.18	.001	.989	0.61	ICELUS SP
41	0.18	.001	.990	0.05	OPHIUROID UNIDENT
42	0.15	.001	.991	0.27	THALEICHTHYS PACIFICUS

TOTAL 200.30

* NUMBER OF HAULS=153, MEAN DEPTH=115.0M (RANGE= 59-274M)

Table B-11. Site Group 2Bial

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	100.24	.534	.534	1.00	THERAGRA CHALCOGRAMMA
2	38.29	.204	.738	0.93	CHIONOECETES OPILIO
3	8.84	.047	.785	0.95	GADUS MACROCEPHALUS
4	8.70	.046	.831	1.00	REINHARDTIUS HIPPOGLOSSOIDES
5	4.08	.022	.853	0.85	LYCODES PALEARIS
6	3.57	.019	.872	0.20	ZOARCIDAE
7	3.05	.016	.888	0.68	LYCODES BREVIPES
8	2.68	.014	.903	0.43	CTENODISCUS CRISPATUS
9	2.36	.013	.915	0.94	HIPPOGLOSSOIDES ELASSODON
10	1.08	.006	.921	0.20	NEPTUNEA HEROS
11	0.98	.005	.926	0.53	OCTOPUS UNIDENT
12	0.94	.005	.931	0.67	GORGONOCEPHALUS CARYI
13	0.94	.005	.936	0.45	NEPTUNEA PRIBILOFFENSIS
14	0.92	.005	.941	0.40	CHIONOECETES BAIRDI
15	0.92	.005	.946	0.14	CYCLOPTERIDAE
16	0.90	.005	.951	0.25	HEMILEPIDOTUS PAPILIO
17	0.81	.004	.955	0.70	RAJA SP
18	0.77	.004	.959	0.26	LIMANDA ASPERA
19	0.76	.004	.963	0.62	PAGURIDAE
20	0.69	.004	.967	0.16	ASTERIAS AMURENSIS
21	0.66	.003	.970	0.91	PANDALUS SP
22	0.55	.003	.973	0.57	BUCCINUM SP
23	0.53	.003	.976	0.31	PLEURONECTES QUADRITUBERCULATUS
24	0.49	.003	.979	0.48	LEPTASTERIAS SP
25	0.46	.002	.981	0.26	MYOXOCEPHALUS SP
26	0.46	.002	.984	0.18	STARFISH UNIDENT
27	0.25	.001	.985	0.80	ICELUS SP
28	0.24	.001	.986	0.08	OPHIUROID UNIDENT
29	0.24	.001	.988	0.67	GASTROPOD UNIDENT
30	0.19	.001	.989	0.16	ATHERESTHES SP
31	0.16	.001	.989	0.17	PAGURUS SP
32	0.15	.001	.990	0.15	PAGURUS TRIGONOCHEIRUS

TOTAL 187.72

* NUMBER OF HAULS- 87, MEAN DEPTH=113.3M (RANGE= 59-274M)

Table B-12. Site Group 2Bia2

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	86.85	.432	.432	1.00	THERAGRA CHALCOGRAMMA
2	24.29	.121	.553	0.33	PARALITHODES CAMTSCHATICA
3	13.91	.069	.622	0.79	CHIONOECETES OPILIO
4	8.79	.044	.666	0.94	CHIONOECETES BAIRDI
5	7.89	.039	.705	1.00	GADUS MACROCEPHALUS
6	7.33	.036	.742	0.36	LIMANDA ASPERA
7	6.23	.031	.773	0.08	PORIFERA
8	4.87	.024	.797	0.98	HIPPOGLOSSOIDES ELASSODON
9	3.77	.019	.816	0.45	LEPIDOPSETTA BILINEATA
10	3.11	.015	.831	0.82	RAJA SP
11	3.07	.015	.846	1.00	ATHERESTHES SP
12	2.87	.014	.861	0.62	PAGURIDAE
13	2.82	.014	.875	0.42	HEMILEPIDOTUS JORDANI
14	2.66	.013	.888	0.53	ZOARCIDAE
15	2.56	.013	.901	0.68	HIPPOGLOSSUS STENOLEPIS
16	2.51	.012	.913	0.27	PLEURONECTES QUADRITUBERCULATUS
17	2.00	.010	.923	0.62	ANOPLOPOMA FIMBRIA
18	1.96	.010	.933	0.38	GASTROPOD UNIDENT
19	1.56	.008	.941	0.24	OCTOPUS UNIDENT
20	1.29	.006	.947	0.14	STARFISH UNIDENT
21	1.26	.006	.953	0.21	GORGONOCEPHALUS CARYI
22	1.20	.006	.959	0.21	LYCODES PALEARIS
23	1.08	.005	.965	0.42	MYOXOCEPHALUS SP
24	1.07	.005	.970	0.80	REINHARDTIUS HIPPOGLOSSOIDES
25	1.04	.005	.975	0.29	NEPTUNEA LYRATA
26	0.87	.004	.980	0.27	LYCODES BREVIPES
27	0.59	.003	.983	0.12	SCYPHOZOA
28	0.54	.003	.985	0.45	HEMITRIPTERUS BOLINI
29	0.39	.002	.987	0.35	FUSITRITON OREGONENSIS
30	0.34	.002	.989	0.36	NEPTUNEA PRIBILOFFENSIS
31	0.26	.001	.990	0.52	SEA ANEMONE UNIDENT
TOTAL	200.94				

* NUMBER OF HAULS= 66, MEAN DEPTH=117.2M (RANGE= 68-152M)

Table B-13. Site Group 2Bib

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	60.02	.507	.507	1.00	THERAGRA CHALCOGRAMMA
2	30.49	.258	.765	0.92	GADUS MACROCEPHALUS
3	7.17	.061	.825	0.73	ATHERESTHES SP
4	3.43	.029	.854	0.33	SEBASTES ALUTUS
5	1.76	.015	.869	0.49	HEMITRIPTERUS BOLINI
6	1.71	.014	.884	0.31	BATHYMASTER SIGNATUS
7	1.56	.013	.897	0.55	HEMILEPIDOTUS JORDANI
8	1.33	.011	.908	0.22	ZAPRORA SILENUS
9	1.10	.009	.917	0.27	OCTOPUS UNIDENT
10	1.07	.009	.927	0.33	FUSITRITON OREGONENSIS
11	0.94	.008	.934	0.41	RAJA SP
12	0.72	.006	.941	0.63	CHIONOECETES BAIRDI
13	0.70	.006	.946	0.27	LEPIDOPSETTA BILINEATA
14	0.59	.005	.951	0.47	MALACOCOTTUS KINCAIDI
15	0.55	.005	.956	0.18	MYOXOCEPHALUS SP
16	0.53	.004	.961	0.63	REINHARDTIUS HIPPOGLOSSOIDES
17	0.48	.004	.965	0.61	HIPPOGLOSSOIDES ELASSODON
18	0.40	.003	.968	0.53	PAGURIDAE
19	0.32	.003	.971	0.14	TRIGLOPS SP
20	0.29	.002	.973	0.16	SKATE EGG CASE UNIDENT
21	0.28	.002	.976	0.43	PANDALUS SP
22	0.26	.002	.978	0.08	ANOPLOPOMA FIMBRIA
23	0.23	.002	.980	0.14	PORIFERA
24	0.23	.002	.982	0.12	HIPPOGLOSSUS STENOLEPIS
25	0.20	.002	.983	0.14	GORGONOCEPHALUS CARYI
26	0.20	.002	.985	0.04	DIPLOPTERASTER MULTIPES
27	0.18	.002	.987	0.37	SEA ANEMONE UNIDENT
28	0.14	.001	.988	0.08	GLYPTOCEPHALUS ZACHIRUS
29	0.13	.001	.989	0.20	SCYPHOZOA
30	0.08	.001	.990	0.43	CHIONOECETES OPILIO
31	0.07	.001	.990	0.02	EVASTERIAS SP
TOTAL	118.34				

* NUMBER OF HAULS- 49, MEAN DEPTH=165.9M (RANGE= 99-241M)

Table B-14. Site Group 2Bii

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	36.64	.354	.354	1.00	CHIONOECETES OPILIO
2	12.48	.120	.474	1.00	HEMILEPIDOTUS PAPILIO
3	8.42	.081	.556	0.80	ZOARCIDAE
4	6.99	.068	.623	0.44	LYCODES CONCOLOR
5	4.84	.047	.670	1.00	THERAGRA CHALCOGRAMMA
6	3.47	.034	.703	0.20	OCTOPUS UNIDENT
7	3.38	.033	.736	1.00	REINHARDTIUS HIPPOGLOSSOIDES
8	3.09	.030	.766	0.72	MYOXOCEPHALUS SP
9	2.67	.026	.792	0.68	PLEURONECTES QUADRITUBERCULATUS
10	2.53	.024	.816	0.72	NEPTUNEA HEROS
11	2.03	.020	.836	0.60	PARALITHODES PLATYPUS
12	1.96	.019	.854	0.84	GADUS MACROCEPHALUS
13	1.96	.019	.873	0.44	LIPARIS SP
14	1.64	.016	.889	0.40	PAGURIDAE
15	1.24	.012	.901	0.84	HIPPOGLOSSOIDES ELASSODON
16	1.06	.010	.911	0.52	NEPTUNEA VENTRICOSA
17	0.97	.009	.921	0.68	LEPTASTERIAS SP
18	0.72	.007	.928	0.80	PANDALUS SP
19	0.65	.006	.934	0.52	LYCODES PALEARIS
20	0.60	.006	.940	0.40	PAGURUS TRIGONOCHEIRUS
21	0.55	.005	.945	0.40	LIMANDA ASPERA
22	0.55	.005	.951	0.48	CYCLOPTERIDAE
23	0.40	.004	.954	0.72	GORGONOCEPHALUS CARYI
24	0.39	.004	.958	0.88	BUCCINUM SP
25	0.39	.004	.962	0.76	HYAS SP
26	0.37	.004	.965	0.04	INVERTEBRATE EGGS UNIDENT
27	0.30	.003	.968	0.44	STARFISH UNIDENT
28	0.28	.003	.971	0.12	RAJA SP
29	0.25	.002	.973	0.56	GYMNOCANTHUS SP
30	0.19	.002	.975	0.32	ASCIDIAN UNIDENT
31	0.18	.002	.977	0.04	CLINOPEGMA (ANCISTROLEPIS) MAGNA
32	0.17	.002	.979	0.32	TEALIA SP
33	0.16	.002	.980	0.24	PORIFERA
34	0.15	.001	.982	0.56	NUDIBRANCH UNIDENT
35	0.14	.001	.983	0.88	ARGIS SP
36	0.13	.001	.984	0.28	LEPIDOPSETTA BILINEATA
37	0.11	.001	.985	0.12	BALANUS SP
38	0.11	.001	.986	0.48	SNAIL (GASTROPOD) EGGS
39	0.10	.001	.987	0.16	OPHIUROID UNIDENT
40	0.09	.001	.988	0.36	CAREPROCTUS RASTRINUS
41	0.09	.001	.989	0.24	BOLTENIA OVIFERA
42	0.08	.001	.990	0.08	HEMILEPIDOTUS SP
43	0.08	.001	.991	0.20	PLICIFUSUS KROYERI

(CONTINUED ON NEXT PAGE)

Table B-14. Site Group 2Bii (continued)

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
44	0.07	.001	.991	0.08	SUBERITES DOMUNCULA
TOTAL	103.57				

* NUMBER OF HAULS= 25, MEAN DEPTH= 62.7M (RANGE= 38- 93M)

Table B-15. Site Group 3

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	18.76	.465	.465	1.00	REINHARDTIUS HIPPOGLOSSOIDES
2	5.99	.148	.613	0.41	CORYPHAENOIDES PECTORALIS
3	4.14	.102	.716	0.69	ATHERESTHES SP
4	2.48	.061	.777	0.16	SEBASTES BOREALIS
5	1.20	.030	.807	0.33	ANOPLOPOMA FIMBRIA
6	1.06	.026	.833	0.22	CORYPHAENOIDES CINEREUS
7	1.00	.025	.858	0.39	SEBASTOLOBUS ALASCANUS
8	0.63	.015	.873	0.27	RAJA SP
9	0.59	.015	.888	0.53	THERAGRA CHALCOGRAMMA
10	0.47	.012	.899	0.24	HIPPOGLOSSOIDES ELASSODON
11	0.47	.012	.911	0.80	MALACOCOTTUS KINCAIDI
12	0.44	.011	.922	0.24	LITHODES AEQUISPINA
13	0.30	.007	.929	0.14	GADUS MACROCEPHALUS
14	0.29	.007	.936	0.08	SEBASTES ALUTUS
15	0.28	.007	.943	0.27	BOTHROCARA BRUNNEUM
16	0.25	.006	.949	0.57	GONATUS SP
17	0.24	.006	.955	0.41	CHIONOECETES ANGULATUS
18	0.22	.006	.961	0.24	HEMITRIPTERUS BOLINI
19	0.19	.005	.966	0.02	ICOSTEUS AENIGMATICUS
20	0.16	.004	.970	0.31	PANDALUS SP
21	0.14	.003	.973	0.20	HOLOTHUROIDEA UNIDENT
22	0.10	.003	.976	0.31	SCYPHOZOA
23	0.10	.002	.978	0.35	OCTOPUS UNIDENT
24	0.10	.002	.980	0.39	CAREPROCTUS MELANURUS
25	0.09	.002	.983	0.24	SEA ANEMONE UNIDENT
26	0.06	.002	.984	0.41	CHIONOECETES OPILIO
27	0.06	.002	.986	0.08	SHRIMP UNIDENT
28	0.05	.001	.987	0.18	ZOARCIDAE
29	0.05	.001	.988	0.43	CHIONOECETES BAIRDI
30	0.05	.001	.989	0.29	GLYPTOCEPHALUS ZACHIRUS
31	0.04	.001	.990	0.12	PORIFERA
TOTAL	40.37				

* NUMBER OF HAULS= 51, MEAN DEPTH=507.1M (RANGE=187-732M)

Table B-16. Site Group 3A

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	19.36	.462	.462	1.00	REINHARDTIUS HIPPOGLOSSOIDES
2	8.46	.202	.665	0.88	ATHERESTHES SP
3	5.35	.128	.792	0.23	SEBASTES BOREALIS
4	1.08	.026	.818	0.38	HIPPOGLOSSOIDES ELASSODON
5	1.01	.024	.842	0.42	RAJA SP
6	1.00	.024	.866	0.62	THERAGRA CHALCOGRAMMA
7	0.71	.017	.883	0.88	MALACOCOTTUS KINCAIDI
8	0.62	.015	.898	0.23	GADUS MACROCEPHALUS
9	0.54	.013	.911	0.15	ANOPLOPOMA FIMBRIA
10	0.52	.012	.923	0.15	SEBASTES ALUTUS
11	0.42	.010	.933	0.15	SEBASTOLOBUS ALASCANUS
12	0.36	.009	.942	0.35	HEMITRIPTERUS BOLINI
13	0.30	.007	.949	0.50	PANDALUS SP
14	0.30	.007	.957	0.23	LITHODES AEQUISPINA
15	0.22	.005	.962	0.54	GONATUS SP
16	0.20	.005	.966	0.54	OCTOPUS UNIDENT
17	0.19	.004	.971	0.38	SCYPHOZOA
18	0.16	.004	.975	0.04	CORYPHAENOIDES PECTORALIS
19	0.14	.003	.978	0.08	SHRIMP UNIDENT
20	0.14	.003	.981	0.23	SEA ANEMONE UNIDENT
21	0.08	.002	.983	0.54	CHIONOECETES BAIRDI
22	0.07	.002	.985	0.12	SEBASTES SP
23	0.07	.002	.987	0.38	CAREPROCTUS MELANURUS
24	0.07	.002	.988	0.50	CHIONOECETES OPILIO
25	0.06	.001	.990	0.12	PORIFERA
26	0.05	.001	.991	0.31	GLYPTOCEPHALUS ZACHIRUS
TOTAL	41.85				

* NUMBER OF HAULS= 26. MEAN DEPTH=417.0M (RANGE=187-563M)

Table B-17. Site Group 3B

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	18.89	.440	.440	1.00	REINHARDTIUS HIPPOGLOSSOIDES
2	13.35	.311	.750	0.80	CORYPHAENOIDES PECTORALIS
3	2.44	.057	.807	0.40	CORYPHAENOIDES CINEREUS
4	1.95	.045	.852	0.52	ANOPLOPOMA FIMBRIA
5	1.57	.036	.889	0.64	SEBASTOLOBUS ALASCANUS
6	0.55	.013	.901	0.24	LITHODES AEQUISPINA
7	0.53	.012	.914	0.48	ATHERESTHES SP
8	0.50	.012	.925	0.52	BOTHROCARA BRUNNEUM
9	0.44	.010	.936	0.68	CHIONOECETES ANGULATUS
10	0.33	.008	.943	0.04	ICOSTEUS AENIGMATICUS
11	0.31	.007	.951	0.12	RAJA SP
12	0.30	.007	.957	0.08	SEBASTES BOREALIS
13	0.27	.006	.964	0.60	GONATUS SP
14	0.23	.005	.969	0.24	HOLOTHUROIDEA UNIDENT
15	0.20	.005	.974	0.44	THERAGRA CHALCOGRAMMA
16	0.20	.005	.978	0.72	MALACOCOTTUS KINCAIDI
17	0.11	.003	.981	0.40	CAREPROCTUS MELANURUS
18	0.08	.002	.983	0.28	ZOARCIDAE
19	0.08	.002	.985	0.12	HEMITRIPTERUS BOLINI
20	0.06	.001	.986	0.32	CHIONOECETES OPILIO
21	0.05	.001	.987	0.24	SEA ANEMONE UNIDENT
22	0.04	.001	.988	0.48	STARFISH UNIDENT
23	0.04	.001	.989	0.28	GLYPTOCEPHALUS ZACHIRUS
24	0.03	.001	.990	0.20	APTOCYCLUS VENTRICOSUS
TOTAL	42.98				

* NUMBER OF HAULS= 25, MEAN DEPTH=600.7M (RANGE=439-732M)

APPENDIX C

Species Assemblages, 1980 Bering Sea Survey

Table C-l. Site Group 1

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	26.66	.279	.279	1.00	CHIONOECETES OPILIO
2	12.43	.130	.410	0.89	LYCODES RARIDENS
3	12.25	.128	.538	1.00	HEMILEPIDOTUS PAPILIO
4	6.52	.068	.606	1.00	MYOXOCEPHALUS SP
5	6.51	.068	.675	0.94	GADUS MACROCEPHALUS
6	6.07	.064	.738	0.83	PLEURONECTES QUADRITUBERCULATUS
7	3.26	.034	.772	0.89	LIMANDA ASPERA
8	2.98	.031	.804	0.94	REINHARDTIUS HIPPOGLOSSOIDES
9	2.97	.031	.835	0.78	PAGURIDAE
10	2.70	.028	.863	0.56	PARALITHODES PLATYPUS
11	1.70	.018	.881	0.61	NEPTUNEA HERDS
12	1.64	.017	.898	1.00	THERAGRA CHALCOGRAMMA
13	1.13	.012	.910	0.94	HIPPOGLOSSOIDES ELASSODON
14	1.08	.011	.921	0.06	BOLTENIA SP
15	0.86	.009	.930	0.22	ASTERIAS AMURENSIS
16	0.77	.008	.938	0.50	NEPTUNEA VENTRICOSA
17	0.76	.008	.946	0.11	LYCODES CONCOLOR
18	0.75	.008	.954	0.11	INVERTEBRATE UNIDENT
19	0.75	.008	.962	0.39	STARFISH UNIDENT
20	0.64	.007	.969	0.22	GORGONOCEPHALUS CARYI
21	0.49	.005	.974	0.39	LEPTASTERIAS POLARIS
22	0.42	.004	.978	0.44	HYAS SP
23	0.24	.003	.981	0.50	LIPARIS SP
24	0.20	.002	.983	0.56	LYCODES PALEARIS
25	0.17	.002	.985	0.22	LYCODES TURNERI
26	0.13	.001	.986	0.11	LIPARIS DENNYI
27	0.12	.001	.987	0.67	BOREOGADUS SAIDA
28	0.10	.001	.988	0.11	GASTROPOD UNIDENT
29	0.10	.001	.989	0.06	CHITON UNIDENT
30	0.08	.001	.990	0.11	ASCIDIAN UNIDENT
TOTAL	95.42				

* NUMBER OF HAULS- 18. MEAN DEPTH= 69.1M (RANGE= 44- 97M)

Table C-2. Site Group 2

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	59.97	.223	.223	0.88	THERAGRA CHALCOGRAMMA
2	46.01	.171	.395	1.00	LIMANDA ASPERA
3	28.03	.104	.499	0.69	CHIONOECETES OPILIO
4	23.66	.088	.587	0.89	GADUS MACROCEPHALUS
5	19.71	.073	.660	0.16	PARALITHODES PLATYPUS
6	10.92	.041	.701	0.89	LEPIDOPSETTA BILINEATA
7	10.13	.038	.739	0.58	STARFISH UNIDENT
8	8.38	.031	.770	0.92	PLEURONECTES QUADRITUBERCULATUS
9	6.08	.023	.793	0.28	INVERTEBRATE UNIDENT
10	5.20	.019	.812	0.46	PARALITHODES CAMTSCHATICA
11	4.82	.018	.830	0.17	ASTERIAS AMURENSIS
12	4.04	.015	.845	0.32	HEMILEPIDOTUS JORDANI
13	4.02	.015	.860	0.07	LETHASTERIAS NANIMENSIS
14	3.79	.014	.874	0.61	MYOXOCEPHALUS SP
15	3.22	.012	.886	0.55	CHIONOECETES BAIRDI
16	2.79	.010	.896	0.42	LYCODES PALEARIS
17	1.99	.007	.904	0.30	GASTROPOD UNIDENT
18	1.95	.007	.911	0.46	PAGURIDAE
19	1.83	.007	.918	0.15	HIPPOGLOSSOIDES ELASSODON
20	1.71	.006	.924	0.52	REINHARDTIUS HIPPOGLOSSOIDES
21	1.62	.006	.930	0.43	GYMNOCANTHUS SP
22	1.38	.005	.935	0.13	HIPPOGLOSSUS STENOLEPIS
23	1.37	.005	.940	0.39	ERIMACRUS ISENBECKII
24	1.35	.005	.945	0.09	PORIFERA
25	1.28	.005	.950	0.22	NEPTUNEA HEROS
26	1.27	.005	.955	0.06	NEPTUNEA PRIBILOFFENSIS
27	1.26	.005	.960	0.41	RAJA SP
28	1.20	.004	.964	0.02	SEA ANEMONE UNIDENT
29	1.01	.004	.968	0.15	NEPTUNEA LYRATA
30	0.98	.004	.972	0.49	LIMANDA PROBOSCIDEA
31	0.94	.004	.975	0.15	COTTIDAE
32	0.73	.003	.978	0.22	ATHERESTHES SP
33	0.70	.003	.980	0.18	LYCODES CONCOLOR
34	0.64	.002	.983	0.06	ECHINARACHNIUS PARMA
35	0.51	.002	.985	0.04	HALOCYNTHIA AURANTIUM
36	0.41	.002	.986	0.55	AGONUS ACIPENSERINUS
37	0.39	.001	.988	0.18	ELEGINUS GRACILIS
38	0.30	.001	.989	0.22	NEPTUNEA VENTRICOSA
39	0.24	.001	.990	0.01	CUCUMARIA SP
40	0.20	.001	.990	0.04	HALOCYNTHIA SP
TOTAL	268.61				

* NUMBER OF HAULS-207, MEAN DEPTH= 58.1M (RANGE= 15-102M)

Table C-3. Site Group 2A

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	64.99	.239	.239	0.97	THERAGRA CHALCOGRAMMA
2	39.47	.145	.384	1.00	LINANDA ASPERA
3	29.50	.108	.492	0.84	CHIONOECETES OPILIO
4	26.92	.099	.591	0.97	GADUS MACROCEPHALUS
5	19.80	.073	.663	0.21	PARALITHODES PLATYPUS
6	11.16	.041	.704	0.93	LEPIDOPSETTA BILINEATA
7	9.18	.034	.738	0.94	PLEURONECTES QUADRITUBERCULATUS
8	7.30	.027	.765	0.58	STARFISH UNIDENT
9	7.12	.026	.791	0.33	INVERTEBRATE UNIDENT
10	6.71	.025	.816	0.51	PARALITHODES CAMTSCHATICA
11	4.12	.015	.831	0.41	HEMILEPIDOTUS JORDANI
12	4.12	.015	.846	0.09	LETHASTERIAS NANIMENSIS
13	3.51	.013	.859	0.69	CHIONOECETES BAIRDI
14	3.49	.013	.872	0.11	ASTERIAS AMURENSIS
15	3.15	.012	.883	0.55	LYCODES PALEARIS
16	3.08	.011	.894	0.53	MYOXOCEPHALUS SP
17	2.28	.008	.903	0.42	PAGURIDAE
18	2.10	.008	.911	0.34	GASTROPOD UNIDENT
19	2.05	.008	.918	0.92	HIPPOGLOSSOIDES ELASSODON
20	1.81	.007	.925	0.67	REINHARDTIUS HIPPOGLOSSOIDES
21	1.45	.005	.930	0.31	GYMNOCANTHUS SP
22	1.43	.005	.935	0.48	ERIMACRUS ISENBECKII
23	1.42	.005	.941	0.23	NEPTUNEA HEROS
24	1.42	.005	.946	0.72	HIPPOGLOSSUS STENOLEPIS
25	1.41	.005	.951	0.09	PORIFERA
26	1.37	.005	.956	0.52	RAJA SP
27	1.28	.005	.961	0.08	NEPTUNEA PRIBILOFFENSIS
28	1.20	.004	.965	0.03	SEA ANEMONE UNIDENT
29	1.10	.004	.969	0.20	COTTIDAE
30	1.05	.004	.973	0.19	NEPTUNEA LYRATA
31	0.96	.004	.976	0.22	LYCODES CONCOLOR
32	0.82	.003	.980	0.34	LIMANDA PROBOSCIDEA
33	0.81	.003	.983	0.07	ECHINARACHNIUS PARMA
34	0.75	.003	.985	0.29	ATHERESTHES SP
35	0.71	.003	.988	0.06	HALOCYNTHIA AURANTIUM
36	0.31	.001	.989	0.21	NEPTUNEA VENTRICOSA
37	0.28	.001	.990	0.05	HALOCYNTHIA SP
TOTAL	272.36				

* NUMBER OF HAULS=159, MEAN DEPTH= 66.2M (RANGE= 35-102M)

Table C-4. Site Group 2Ai

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	66.42	.268	.268	0.99	THERAGRA CHALCOGRAMMA
2	38.90	.157	.425	1.00	LIMANDA ASPERA
3	37.87	.153	.577	0.84	CHIONOECETES OPILIO
4	26.18	.106	.683	0.98	GADUS MACROCEPHALUS
5	9.46	.038	.721	0.97	PLEURONECTES QUADRITUBERCULATUS
6	7.50	.030	.751	0.62	STARFISH UNIDENT
7	6.51	.026	.778	0.50	PARALITHODES CAMTSCHATICA
8	5.88	.024	.801	0.93	LEPIDOPSETTA BILINEATA
9	5.28	.021	.823	0.33	INVERTEBRATE UNIDENT
10	4.96	.020	.843	0.06	LETHASTERIAS NANIMENSIS
11	3.48	.014	.857	0.56	MYOXOCEPHALUS SP
12	3.44	.014	.870	0.58	LYCODES PALEARIS
13	2.56	.010	.881	0.68	CHIONOECETES BAIRDI
14	2.36	.010	.890	0.45	PAGURIDAE
15	2.23	.009	.899	0.36	GASTROPOD UNIDENT
16	2.05	.008	.908	0.93	HIPPOGLOSSOIDES ELASSODON
17	1.94	.008	.915	0.07	NEPTUNEA PRIBILOFFENSIS
18	1.91	.008	.923	0.70	REINHARDTIUS HIPPOGLOSSOIDES
19	1.74	.007	.930	0.23	NEPTUNEA HEROS
20	1.65	.007	.937	0.52	RAJA SP
21	1.41	.006	.942	0.17	PARALITHODES PLATYPUS
22	1.35	.005	.948	0.37	HEMILEPIDOTUS JORDANI
23	1.25	.005	.953	0.70	HIPPOGLOSSUS STENOLEPIS
24	1.21	.005	.958	0.19	NEPTUNEA LYRATA
25	1.14	.005	.962	0.21	COTTIDAE
26	0.98	.004	.966	0.23	LYCODES CONCOLOR
27	0.97	.004	.970	0.01	SEA ANEMONE UNIDENT
28	0.83	.003	.974	0.09	ASTERIAS AMURENSIS
29	0.83	.003	.977	0.36	LIMANDA PROBOSCIDEA
30	0.81	.003	.980	0.07	ECHINARACHNIUS PARMA
31	0.72	.003	.983	0.06	HALOCYNTHIA AURANTIUM
32	0.61	.002	.986	0.27	ATHERESTHES SP
33	0.33	.001	.987	0.20	NEPTUNEA VENTRICOSA
34	0.29	.001	.988	0.05	HALOCYNTHIA SP
35	0.28	.001	.989	0.13	HEMILEPIDOTUS PAPILIO
36	0.26	.001	.990	0.09	PORIFERA
TOTAL	248.02				

* NUMBER OF HAULS=149, MEAN DEPTH= 66.1M (RANGE= 35-102M)

Table C-5. Site Group 2Ai a

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	77.45	.299	.299	1.00	THERAGRA CHALCOGRAMMA
2	50.72	.196	.495	0.99	CHIONOECETES OPILIO
3	26.23	.101	.596	0.99	GADUS MACROCEPHALUS
4	25.57	.099	.695	1.00	LIMANDA ASPERA
5	11.04	.043	.738	0.99	PLEURONECTES QUADRITUBERCULATUS
6	7.64	.030	.767	0.60	INVERTEBRATE UNIDENT
7	6.78	.026	.793	0.68	STARFISH UNIDENT
8	5.96	.023	.816	0.11	LETHASTERIAS NANIMENSIS
9	4.49	.017	.834	0.84	LYCODES PALEARIS
10	4.33	.017	.851	0.59	MYOXOCEPHALUS SP
11	3.04	.012	.862	0.07	NEPTUNEA PRIBILOFFENSIS
12	3.02	.012	.874	0.21	GASTROPOD UNIDENT
13	2.97	.011	.885	0.14	NEPTUNEA LYRATA
14	2.52	.010	.895	0.32	HEMILEPIDOTUS JORDANI
15	2.45	.009	.905	0.22	PAGURIDAE
16	2.33	.009	.914	0.94	REINHARDTIUS HIPPOGLOSSOIDES
17	2.08	.008	.922	0.58	RAJA SP
18	2.06	.008	.930	0.22	NEPTUNEA HEROS
19	2.06	.008	.938	0.31	PARALITHODES PLATYPUS
20	1.77	.007	.944	0.93	HIPPOGLOSSOIDES ELASSODON
21	1.67	.006	.951	0.38	COTTIDAE
22	1.61	.006	.957	0.90	LEPIDOPSETTA BILINEATA
23	1.23	.005	.962	0.43	LYCODES CONCOLOR
24	1.17	.005	.966	0.11	HALOCYNTHIA AURANTIUM
25	1.16	.004	.971	0.02	SEA ANEMONE UNIDENT
26	1.07	.004	.975	0.67	HIPPOGLOSSUS STENOLEPIS
27	1.04	.004	.979	0.16	ASTERIAS AMURENSIS
28	0.87	.003	.982	0.42	CHIONOECETES BAIRDI
29	0.66	.003	.985	0.19	NEPTUNEA VENTRICOSA
30	0.47	.002	.987	0.30	ATHERESTHES SP
31	0.40	.002	.988	0.06	ASCIDIAN UNIDENT
32	0.33	.001	.990	0.23	HEMILEPIDOTUS PAPILIO
33	0.27	.001	.991	0.14	PARALITHODES CAMTSCHATICA

TOTAL 258.91

* NUMBER OF HAULS= 81, MEAN DEPTH= 67.6M (RANGE= 37-102M)

Table C-6. Site Group 2Aial

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	85.85	.330	.330	1.00	THERAGRA CHALCOGRAMMA
2	48.71	.187	.517	0.98	CHIONOECETES OPILIO
3	29.53	.113	.630	1.00	GADUS MACROCEPHALUS
4	22.68	.087	.717	1.00	LIMANDA ASPERA
5	8.17	.031	.749	0.61	INVERTEBRATE UNIDENT
6	7.65	.029	.778	0.98	PLEURONECTES QUADRITUBERCULATUS
7	6.61	.025	.804	0.70	STARFISH UNIDENT
8	6.23	.024	.828	0.16	LETHASTERIAS NANIMENSIS
9	5.21	.020	.848	0.98	LYCODES PALEARIS
10	3.18	.012	.860	0.53	MYOXOCEPHALUS SP
11	3.08	.012	.872	0.14	NEPTUNEA LYRATA
12	3.04	.012	.883	0.11	NEPTUNEA PRIBILOFFENSIS
13	2.89	.011	.894	0.18	GASTROPOD UNIDENT
14	2.63	.010	.904	0.40	HEMILEPIDOTUS JORDANI
15	2.43	.009	.914	0.98	REINHARDTIUS HIPPOGLOSSOIDES
16	2.40	.009	.923	0.75	RAJA SP
17	2.22	.009	.932	0.44	PARALITHODES PLATYPUS
18	1.97	.008	.939	1.00	HIPPOGLOSSOIDES ELASSODON
19	1.86	.007	.946	0.16	HALOCYNTHIA AURANTIUM
20	1.70	.007	.953	0.19	NEPTUNEA HEROS
21	1.61	.006	.959	0.16	PAGURIDAE
22	1.57	.006	.965	0.91	LEPIDOPSETTA BILINEATA
23	1.36	.005	.970	0.35	COTTIDAE
24	1.16	.004	.975	0.04	SEA ANEMONE UNIDENT
25	1.14	.004	.979	0.72	HIPPOGLOSSUS STENOLEPIS
26	0.91	.004	.982	0.53	CHIONOECETES BAIRDI
27	0.84	.003	.986	0.30	LYCODES CONCOLOR
28	0.68	.003	.988	0.14	NEPTUNEA VENTRICOSA
29	0.50	.002	.990	0.42	ATHERESTHES SP
TOTAL	260.35				

* NUMBER OF HAULS= 57, MEAN DEPTH= 75.8M (RANGE= 60-102M)

Table C-7. Site Group 2Aia2

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	56.86	.283	.283	1.00	LIMANDA ASPERA
2	35.45	.176	.459	1.00	PLEURONECTES QUADRITUBERCULATUS
3	27.19	.135	.594	1.00	CHIONOECETES OPILIO
4	11.41	.057	.651	0.58	INVERTEBRATE UNIDENT
5	11.35	.056	.707	0.96	GADUS MACROCEPHALUS
6	8.65	.043	.750	0.75	MYOXOCEPHALUS SP
7	7.67	.038	.788	0.63	STARFISH UNIDENT
8	6.43	.032	.820	0.38	PAGURIDAE
9	5.02	.025	.845	0.29	ASTERIAS AMURENSIS
10	4.55	.023	.868	0.75	LYCODES CONCOLOR
11	3.46	.017	.885	0.29	NEPTUNEA HEROS
12	2.97	.015	.900	0.46	COTTIDAE
13	2.51	.012	.912	1.00	THERAGRA CHALCOGRAMMA
14	1.99	.010	.922	0.13	ASCIDIAN UNIDENT
15	1.88	.009	.932	0.88	LEPIDOPSETTA BILINEATA
16	1.75	.009	.940	0.50	HYAS SP
17	1.69	.008	.949	0.79	LIMANDA PROBOSCIDEA
18	1.58	.008	.957	0.04	EVASTERIAS SP
19	1.50	.007	.964	0.25	HALOCYNTHIA SP
20	1.43	.007	.971	0.50	LYCODES PALEARIS
21	1.31	.006	.978	0.29	GASTROPOD UNIDENT
22	0.75	.004	.981	0.83	REINHARDTIUS HIPPOGLOSSOIDES
23	0.65	.003	.985	0.25	HEMILEPIDOTUS PAPILIO
24	0.30	.001	.986	0.21	PARALITHODES CAMTSCHATICA
25	0.25	.001	.987	0.54	HIPPOGLOSSUS STENOLEPIS
26	0.23	.001	.988	0.75	HIPPOGLOSSOIDES ELASSODON
27	0.22	.001	.990	0.33	CHIONOECETES HYBRID
28	0.20	.001	.991	0.17	RAJA SP
TOTAL	201.15				

* NUMBER OF HAULS= 24, MEAN DEPTH= 48.2M (RANGE= 37- 62M)

Table C-8. Site Group 2Aib

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	73.17	.393	.393	1.00	LIMANDA ASPERA
2	21.69	.116	.509	0.97	THERAGRA CHALCOGRAMMA
3	18.27	.098	.607	0.97	GADUS MACROCEPHALUS
4	16.97	.091	.698	0.94	PARALITHODES CAMTSCHATICA
5	11.80	.063	.761	0.96	LEPIDOPSETTA BILINEATA
6	8.60	.046	.808	0.54	STARFISH UNIDENT
7	6.79	.036	.844	0.94	PLEURONECTES QUADRITUBERCULATUS
8	6.10	.033	.877	0.99	CHIONOECETES BAIRDI
9	2.65	.014	.891	0.94	HIPPOGLOSSOIDES ELASSODON
10	2.55	.014	.905	0.72	PAGURIDAE
11	2.28	.012	.917	0.66	CHIONOECETES OPILIO
12	1.93	.010	.927	0.51	LIMANDA PROBOSCIDEA
13	1.55	.008	.936	0.76	HIPPOGLOSSUS STENOLEPIS
14	1.41	.008	.943	0.13	ECHINARACHNIUS PARMA
15	1.27	.007	.950	0.24	ATHERESTHES SP
16	1.18	.006	.956	0.55	GASTROPOD UNIDENT
17	1.05	.006	.962	0.25	NEPTUNEA HEROS
18	0.83	.004	.966	0.45	RAJA SP
19	0.55	.003	.969	0.18	PORIFERA
20	0.51	.003	.972	0.16	SCYPHOZOA
21	0.49	.003	.975	0.52	MYOXOCEPHALUS SP
22	0.45	.002	.977	0.03	LEPTOCOTTUS ARMATUS
23	0.39	.002	.979	0.01	HALOCYNTHIA SP
24	0.39	.002	.981	0.60	HYAS SP
25	0.38	.002	.983	0.21	GORGONOCEPHALUS CARYI
26	0.32	.002	.985	0.33	HOLOTHUROIDEA UNIDENT
27	0.24	.001	.986	0.27	LYCODES PALEARIS
28	0.22	.001	.988	0.27	NEPTUNEA LYRATA
29	0.20	.001	.989	0.40	ERIMACRUS ISENBECKII
30	0.19	.001	.990	0.22	NEPTUNEA VENTRICOSA
31	0.17	.001	.991	0.04	ZOARCIDAE
TOTAL	186.35				

* NUMBER OF HAULS= 67, MEAN DEPTH= 64.2M (RANGE= 35-101M)

Table C-9. Site Group 2Aii

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	96.74	.268	.268	0.80	PARALITHODES PLATYPUS
2	46.56	.129	.397	1.00	LEPIDOPSETTA BILINEATA
3	38.37	.106	.504	1.00	HEMILEPIDOTUS JORDANI
4	20.73	.057	.561	0.90	GADUS MACROCEPHALUS
5	17.24	.048	.609	0.90	CHIONOECETES OPILIO
6	16.52	.046	.655	0.20	PORIFERA
7	15.99	.044	.699	0.90	ERIMACRUS ISENBECKII
8	15.63	.043	.742	0.30	INVERTEBRATE UNIDENT
9	15.62	.043	.786	0.80	THERAGRA CHALCOGRAMMA
10	15.33	.042	.828	1.00	LIMANDA ASPERA
11	12.46	.035	.863	0.40	ASTERIAS AMURENSIS
12	12.01	.033	.896	0.80	GYMNOCANTHUS SP
13	8.10	.022	.919	0.30	SEA ANEMONE UNIDENT
14	5.95	.016	.935	0.90	CHIONOECETES BAIRDI
15	5.68	.016	.951	0.60	LETHASTERIAS NANIMENSIS
16	3.07	.009	.959	0.30	CUCUMARIA SP
17	2.43	.007	.966	0.60	ATHERESTHES SP
18	2.37	.007	.973	0.90	HIPPOGLOSSUS STENOLEPIS
19	2.30	.006	.979	0.70	HIPPOGLOSSOIDES ELASSODON
20	1.62	.005	.983	0.50	PLEURONECTES QUADRITUBERCULATUS
21	1.44	.004	.987	0.60	PARALITHODES CAMTSCHATICA
22	1.39	.004	.991	0.10	STARFISH UNIDENT
TOTAL	360.68				

* NUMBER OF HAULS= 10, MEAN DEPTH= 68.0M (RANGE= 46- 95M)

Table C-10. Site Group 2B

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	110.28	.570	.570	1.00	LIMANDA ASPERA
2	29.90	.154	.724	0.58	STARFISH UNIDENT
3	10.76	.056	.780	0.40	ASTERIAS AMURENSIS
4	9.17	.047	.827	0.85	PLEURONECTES QUADRITUBERCULATUS
5	7.50	.039	.866	0.90	MYOXOCEPHALUS SP
6	7.38	.038	.904	0.75	LEPIDOPSETTA BILINEATA
7	2.87	.015	.919	1.00	LIMANDA PROBOSCIDEA
8	2.73	.014	.933	0.63	ELEGINUS GRACILIS
9	1.84	.010	.942	0.90	AGONUS ACIPENSERINUS
10	1.35	.007	.949	0.81	GYMNOCANTHUS SP
11	1.31	.007	.956	0.60	MALLOTUS VILLOSUS
12	0.97	.005	.961	0.73	TELMESSUS CHEIRAGONUS
13	0.96	.005	.966	0.58	PLATICHTHYS STELLATUS
14	0.94	.005	.971	0.63	GADUS MACROCEPHALUS
15	0.85	.004	.975	0.77	HIPPOGLOSSUS STENOLEPIS
16	0.73	.004	.979	0.10	INVERTEBRATE UNIDENT
17	0.69	.004	.983	0.42	OSMERUS MORDAX
18	0.56	.003	.986	0.60	PAGURIDAE
19	0.44	.002	.988	0.21	NEPTUNEA HEROS
20	0.42	.002	.990	0.31	PARALITHODES CAMTSCHATICA
TOTAL	193.57				

* NUMBER OF HAULS= 48, MEAN DEPTH= 31.2M (RANGE= 15- 55M)

Table C-11. Site Group 3

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	65.99	.409	.409	0.99	THERAGRA CHALCOGRAMMA
2	19.01	.118	.527	1.00	GADUS MACROCEPHALUS
3	10.50	.065	.592	0.87	CHIONOECETES OPILIO
4	9.85	.061	.653	0.74	CHIONOECETES BAIRDI
5	7.67	.048	.701	0.91	RAJA SP
6	6.87	.043	.744	0.61	ATHERESTHES SP
7	6.25	.039	.782	0.88	REINHARDTIUS HIPPOGLOSSOIDES
8	4.84	.030	.812	0.89	LYCODES PALEARIS
9	4.37	.027	.840	0.23	LYCODES BREVIPES
10	4.30	.027	.866	0.95	HIPPOGLOSSOIDES ELASSODON
11	3.89	.024	.890	0.21	ANOPLOPOMA FIMBRIA
12	2.65	.016	.907	0.27	GORGONOCEPHALUS CARYI
13	1.98	.012	.919	0.25	INVERTEBRATE UNIDENT
14	1.30	.008	.927	0.45	STARFISH UNIDENT
15	1.10	.007	.934	0.46	NEPTUNEA PRIBILOFFENSIS
16	0.82	.005	.939	0.44	OCTOPUS UNIDENT
17	0.81	.005	.944	0.43	HIPPOGLOSSUS STENOLEPIS
18	0.70	.004	.948	0.33	PAGURIDAE
19	0.63	.004	.952	0.27	MYOXOCEPHALUS SP
20	0.55	.003	.956	0.23	CHIONOECETES HYBRID
21	0.53	.003	.959	0.30	GASTROPOD UNIDENT
22	0.51	.003	.962	0.30	LINANDA ASPERA
23	0.51	.003	.965	0.11	CTENODISCUS SP
24	0.43	.003	.968	0.38	LEPIDOPSETTA BILINEATA
25	0.41	.003	.970	0.27	HEMITRIPTERUS BOLINI
26	0.38	.002	.973	0.33	SEA ANEMONE UNIDENT
27	0.36	.002	.975	0.64	PANDALUS SP
28	0.36	.002	.977	0.50	ICELUS SP
29	0.33	.002	.979	0.08	MALACOCOTTUS KINCAIDI
30	0.26	.002	.981	0.25	PLEURONECTES QUADRITUBERCULATUS
31	0.25	.002	.983	0.23	COTTIDAE
32	0.25	.002	.984	0.10	ZOARCIDAE
33	0.24	.001	.986	0.42	BATHYMASTER SIGNATUS
34	0.19	.001	.987	0.41	DASYCOTTUS SETIGER
35	0.16	.001	.988	0.23	NEPTUNEA LYRATA
36	0.13	.001	.989	0.23	BUCCINUM SCALARIFORME
37	0.13	.001	.989	0.07	LETHASTERIAS NANIMENSIS
38	0.12	.001	.990	0.37	GLYPTOCEPHALUS ZACHIRUS
TOTAL	161.23				

* NUMBER OF HAULS=115, MEAN DEPTH=120.5M (RANGE= 84-243M)

Table C-12. Site Group 3A

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	70.23	.446	.446	0.98	THERAGRA CHALCOGRAMMA
2	17.75	.113	.559	1.00	CHIONOECETES BAIRDI
3	15.28	.097	.656	1.00	GADUS MACROCEPHALUS
4	10.57	.067	.724	0.82	CHIONOECETES OPILIO
5	8.37	.053	.777	0.98	ATHERESTHES SP
6	6.29	.040	.817	0.88	RAJA SP
7	4.55	.029	.846	0.40	ANOPLOPOMA FIMBRIA
8	3.92	.025	.871	1.00	HIPPOGLOSSOIDES ELASSODON
9	2.73	.017	.888	0.17	GORGONOCEPHALUS CARYI
10	2.68	.017	.905	0.82	LYCODES PALEARIS
11	1.75	.011	.916	0.15	INVERTEBRATE UNIDENT
12	1.67	.011	.927	0.25	CHIONOECETES HYBRID
13	1.48	.009	.936	0.77	REINHARDTIUS HIPPOGLOSSOIDES
14	0.87	.006	.942	0.23	OCTOPUS UNIDENT
15	0.86	.005	.947	0.38	HIPPOGLOSSUS STENOLEPIS
16	0.77	.005	.952	0.37	PAGURIDAE
17	0.75	.005	.957	0.50	LEPIDOPSETTA BILINEATA
18	0.65	.004	.961	0.35	NEPTUNEA PRIBILOFFENSIS
19	0.58	.004	.965	0.47	HEMITRIPTERUS BOLINI
20	0.57	.004	.968	0.40	GASTROPOD UNIDENT
21	0.55	.004	.972	0.32	LIMANDA ASPERA
22	0.44	.003	.975	0.32	STARFISH UNIDENT
23	0.44	.003	.977	0.32	SEA ANEMONE UNIDENT
24	0.38	.002	.980	0.17	ZOARCIDAE
25	0.31	.002	.982	0.08	MALACOCOTTUS KINCAIDI
26	0.31	.002	.984	0.58	BATHYMASTER SIGNATUS
27	0.30	.002	.986	0.20	MYOXOCEPHALUS SP
28	0.29	.002	.987	0.68	DASYCOTTUS SETIGER
29	0.25	.002	.989	0.18	PLEURONECTES QUADRITUBERCULATUS
30	0.19	.001	.990	0.13	COTTIDAE
TOTAL	157.30				

* NUMBER OF HAULS= 60, MEAN DEPTH=121.5M (RANGE= 84-243M)

Table C-13. Site Group 3B

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	48.85	.307	.307	1.00	THERAGRA CHALCOGRAMMA
2	22.84	.144	.451	1.00	GADUS MACROCEPHALUS
3	14.47	.091	.542	1.00	REINHARDTIUS HIPPOGLOSSOIDES
4	13.21	.083	.625	0.94	RAJA SP
5	12.93	.081	.706	0.44	LYCODES BREVIPES
6	11.45	.072	.778	0.93	CHIONOECETES OPILIO
7	9.85	.062	.840	0.96	LYCODES PALEARIS
8	4.23	.027	.867	0.89	HIPPOGLOSSOIDES ELASSODON
9	2.53	.016	.883	0.59	STARFISH UNIDENT
10	2.49	.016	.898	0.35	INVERTEBRATE UNIDENT
11	1.67	.010	.909	0.35	MYOXOCEPHALUS SP
12	1.66	.010	.919	0.59	NEPTUNEA PRIBILOFFENSIS
13	1.23	.008	.927	0.39	GORGONOCEPHALUS CARYI
14	1.19	.007	.934	0.24	CTENODISCUS SP
15	1.14	.007	.941	0.46	CHIONOECETES BAIRDI
16	1.01	.006	.948	0.78	PANDALUS SP
17	0.84	.005	.953	0.63	ICELUS SP
18	0.77	.005	.958	0.30	PAGURIDAE
19	0.75	.005	.963	0.31	COTTIDAE
20	0.55	.003	.966	0.24	LEPIDOPSETTA BILINEATA
21	0.47	.003	.969	0.19	GASTROPOD UNIDENT
22	0.44	.003	.972	0.43	BUCCINUM SCALARIFORME
23	0.41	.003	.974	0.67	OCTOPUS UNIDENT
24	0.27	.002	.976	0.48	HIPPOGLOSSUS STENOLEPIS
25	0.26	.002	.978	0.22	NEPTUNEA LYRATA
26	0.25	.002	.979	0.39	PARALITHODES PLATYPUS
27	0.25	.002	.981	0.20	ATHERESTHES SP
28	0.25	.002	.982	0.20	LYCODES CONCOLOR
29	0.24	.001	.984	0.07	MALACOCOTTUS KINCAIDI
30	0.23	.001	.985	0.20	LYCODES RARIDENS
31	0.21	.001	.987	0.02	ZOARCIDAE
32	0.18	.001	.988	0.37	VOLUTOPSIUS MIDDENDORFFII
33	0.17	.001	.989	0.22	CHIONOECETES HYBRID
34	0.16	.001	.990	0.41	BUCCINUM ANGULOSSUM
35	0.16	.001	.991	0.26	LIMANDA ASPERA
TOTAL	159.04				

* NUMBER OF HAULS= 54, MEAN DEPTH=120.1M (RANGE= 95-163M)

APPENDIX D

Species Assemblages, 1981 Bering Sea Survey

Table D-l. Site Group 1

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	51.48	.517	.517	1.00	LIMANDA ASPERA
2	14.60	.147	.663	0.57	ASTERIAS AMURENSIS
3	9.28	.093	.756	0.29	STARFISH UNIDENT
4	6.67	.067	.823	0.86	LEPIDOPSETTA BILINEATA
5	6.04	.061	.884	1.00	HIPPOGLOSSUS STENOLEPIS
6	2.35	.024	.908	0.86	PLATICHTHYS STELLATUS
7	1.56	.016	.923	1.00	LIMANDA PROBOSCIDEA
8	1.20	.012	.935	0.57	PORIFERA
9	1.09	.011	.946	0.86	GADUS MACROCEPHALUS
10	0.75	.007	.954	0.86	TRICHODON TRICHODON
11	0.67	.007	.960	0.71	BOLTENIA OVIFERA
12	0.63	.006	.967	0.71	TELMESSUS CHEIRAGONUS
13	0.62	.006	.973	0.29	PARALITHODES CAMTSCHATICA
14	0.49	.005	.978	0.86	MYOXOCEPHALUS SP
15	0.28	.003	.981	1.00	HEXAGRAMMOS STELLERI
16	0.28	.003	.983	1.00	GYMNOCANTHUS SP
17	0.26	.003	.986	0.43	PAGURIDAE
18	0.22	.002	.988	1.00	OSMERUS MORDAX
19	0.22	.002	.990	0.71	PLEURONECTES QUADRITUBERCULATUS
TOTAL	99.65				

* NUMBER OF HAULS= 7. MEAN DEPTH= 28.0M (RANGE= 13- 37M)

Table D-2. Site Group 2

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	78.61	.291	.291	1.00	LIMANDA ASPERA
2	64.27	.238	.529	0.96	THERAGRA CHALCOGRAMMA
3	22.38	.083	.612	0.99	GADUS MACROCEPHALUS
4	16.17	.060	.672	0.93	PLEURONECTES QUADRITUBERCULATUS
5	11.30	.042	.714	0.76	CHIONOECETES OPILIO
6	10.47	.039	.753	0.28	ASTERIAS AMURENSIS
7	10.19	.038	.790	0.95	LEPIDOPSETTA BILINEATA
8	10.19	.038	.828	0.81	PAGURIDAE
9	6.59	.024	.852	0.58	STARFISH UNIDENT
10	4.00	.015	.867	0.50	PARALITHODES CAMTSCHATICA
11	3.06	.011	.879	0.98	HIPPOGLOSSOIDES ELASSODON
12	3.06	.011	.890	0.68	MYOXOCEPHALUS SP
13	2.18	.008	.898	0.61	NEPTUNEA HEROS
14	2.00	.007	.905	0.33	LIMANDA PROBOSCIDEA
15	2.00	.007	.913	0.25	PORIFERA
16	1.80	.007	.919	0.64	RAJA SP
17	1.43	.005	.925	0.67	HIPPOGLOSSUS STENOLEPIS
18	1.39	.005	.930	0.21	ASCIDIAN UNIDENT
19	1.37	.005	.935	0.21	PARALITHODES PLATYPUS
20	1.36	.005	.940	0.60	CHIONOECETES BAIRDI
21	1.31	.005	.945	0.15	HALOCYNTHIA SP
22	1.23	.005	.949	0.41	HEMILEPIDOTUS JORDANI
23	1.21	.004	.954	0.65	NEPTUNEA VENTRICOSA
24	1.18	.004	.958	0.46	GORGONOCEPHALUS CARYI
25	0.99	.004	.962	0.31	NEPTUNEA LYRATA
26	0.84	.003	.965	0.16	LYCODES SP
27	0.75	.003	.968	0.10	SEA ANEMONE UNIDENT
28	0.70	.003	.970	0.19	NEPTUNEA PRIBILOFFENSIS
29	0.68	.003	.973	0.39	GASTROPOD UNIDENT
30	0.65	.002	.975	0.42	ERIMACRUS ISENBECKII
31	0.64	.002	.978	0.47	LYCODES PALEARIS
32	0.64	.002	.980	0.47	ATHERESTHES SP
33	0.58	.002	.982	0.03	ECHINARACHNIUS PARMA
34	0.46	.002	.984	0.51	HYAS SP
35	0.42	.002	.985	0.55	AGONUS ACIPENSERINUS
36	0.40	.001	.987	0.32	GYMNOCANTHUS SP
37	0.34	.001	.988	0.53	REINHARDTIUS HIPPOGLOSSOIDES
38	0.31	.001	.989	0.04	ECHINARACHNIUS PARMA
39	0.25	.001	.990	0.09	BOLTENIA OVIFERA
TOTAL	270.03				

* NUMBER OF HAULS=165, MEAN DEPTH= 68.0M (RANGE= 31-110M)

Table D-3. Site Group 2A

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	59.89	.284	.284	0.99	THERAGRA CHALCOGRAMMA
2	34.77	.165	.448	1.00	LIMANDA ASPERA
3	21.85	.103	.552	0.99	CHIONOECETES OPILIO
4	19.98	.095	.646	0.99	PLEURONECTES QUADRITUBERCULATUS
5	18.91	.090	.736	1.00	GADUS MACROCEPHALUS
6	12.35	.058	.794	0.86	PAGURIDAE
7	5.87	.028	.822	0.81	STARFISH UNIDENT
8	2.82	.013	.835	0.15	ASTERIAS AMURENSIS
9	2.69	.013	.848	0.42	PARALITHODES PLATYPUS
10	2.50	.012	.860	0.89	LEPIDOPSETTA BILINEATA
11	2.44	.012	.872	0.73	MYOXOCEPHALUS SP
12	2.35	.011	.883	0.25	ASCIDIAN UNIDENT
13	2.32	.011	.894	0.70	NEPTUNEA HEROS
14	2.16	.010	.904	0.52	HEMILEPIDOTUS JORDANI
15	1.71	.008	.912	0.60	GORGONOCEPHALUS CARYI
16	1.65	.008	.920	0.31	LYCODES SP
17	1.44	.007	.927	0.12	SEA ANEMONE UNIDENT
18	1.34	.006	.933	0.70	RAJA SP
19	1.27	.006	.939	0.63	GASTROPOD UNIDENT
20	1.16	.006	.945	0.15	HALOCYNTHIA SP
21	1.12	.005	.950	0.99	HIPPOGLOSSOIDES ELASSODON
22	1.08	.005	.955	0.50	ERIMACRUS ISENBECKII
23	1.05	.005	.960	0.54	NEPTUNEA VENTRICOSA
24	0.97	.005	.964	0.57	HIPPOGLOSSUS STENOLEPIS
25	0.90	.004	.969	0.08	PORIFERA
26	0.79	.004	.972	0.40	CHIONOECETES BAIRDI
27	0.73	.003	.976	0.67	LYCODES PALEARIS
28	0.59	.003	.979	0.36	GYMNOCANTHUS SP
29	0.59	.003	.982	0.82	REINHARDTIUS HIPPOGLOSSOIDES
30	0.42	.002	.984	0.04	ZOARCIDAE
31	0.42	.002	.986	0.18	NEPTUNEA PRIBILOFFENSIS
32	0.38	.002	.987	0.51	ATHERESTHES SP
33	0.37	.002	.989	0.19	HEMILEPIDOTUS PAPILIO
34	0.32	.002	.991	0.04	NEPTUNEA SP
TOTAL	211.19				

* NUMBER OF HAULS= 84, MEAN DEPTH= 71.3M (RANGE= 40-102M)

Table D-4. Site Group 2Ai

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	38.50	.202	.202	1.00	LIMANDA ASPERA
2	37.12	.194	.396	0.98	THERAGRA CHALCOGRAMMA
3	24.99	.131	.527	1.00	PLEURONECTES QUADRITUBERCULATUS
4	22.64	.119	.646	1.00	GADUS MACROCEPHALUS
5	20.02	.105	.750	0.98	CHIONOECETES OPILIO
6	12.25	.064	.815	0.87	PAGURIDAE
7	4.81	.025	.840	0.77	STARFISH UNIDENT
8	3.19	.017	.857	0.85	MYOXOCEPHALUS SP
9	2.91	.015	.872	0.20	ASTERIAS AMURENSIS
10	2.34	.012	.884	0.85	NEPTUNEA HEROS
11	2.28	.012	.896	0.43	LYCODES SP
12	2.06	.011	.907	0.72	GORGONOCEPHALUS CARYI
13	1.86	.010	.917	0.23	ASCIDIAN UNIDENT
14	1.66	.009	.925	0.72	RAJA SP
15	1.61	.008	.934	0.72	GASTROPOD UNIDENT
16	1.60	.008	.942	0.21	HALOCYNTHIA SP
17	1.25	.007	.949	1.00	HIPPOGLOSSOIDES ELASSODON
18	1.08	.006	.954	0.25	PARALITHODES PLATYPUS
19	0.91	.005	.959	0.70	LYCODES PALEARIS
20	0.81	.004	.963	0.85	LEPIDOPSETTA BILINEATA
21	0.80	.004	.968	0.54	NEPTUNEA VENTRICOSA
22	0.75	.004	.971	0.90	REINHARDTIUS HIPPOGLOSSOIDES
23	0.61	.003	.975	0.54	HIPPOGLOSSUS STENOLEPIS
24	0.58	.003	.978	0.05	ZOARCIDAE
25	0.50	.003	.980	0.23	HEMILEPIDOTUS PAPILIO
26	0.47	.002	.983	0.18	NEPTUNEA PRIBILOFFENSIS
27	0.43	.002	.985	0.03	NEPTUNEA SP
28	0.40	.002	.987	0.28	LYCODES BREVIPES
29	0.33	.002	.989	0.51	HYAS SP
30	0.31	.002	.991	0.15	PARALITHODES CAMTSCHATICA

TOTAL 190.90

* NUMBER OF HAULS= 61, MEAN DEPTH= 69.2M (RANGE= 40- 99M)

Table D-5. Site Group 2Aii

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	120.26	.454	.454	1.00	THERAGRA CHALCOGRAMMA
2	26.71	.101	.555	1.00	CHIONOECETES OPILIO
3	24.88	.094	.648	1.00	LIMANDA ASPERA
4	12.61	.048	.696	0.83	PAGURIDAE
5	9.05	.034	.730	1.00	GADUS MACROCEPHALUS
6	8.69	.033	.763	0.91	STARFISH UNIDENT
7	7.10	.027	.790	0.96	HEMILEPIDOTUS JORDANI
8	6.98	.026	.816	1.00	LEPIDOPSETTA BILINEATA
9	6.97	.026	.842	0.87	PARALITHODES PLATYPUS
10	6.68	.025	.868	0.96	PLEURONECTES QUADRITUBERCULATUS
11	4.93	.019	.886	0.26	SEA ANEMONE UNIDENT
12	3.64	.014	.900	0.30	ASCIDIAN UNIDENT
13	3.17	.012	.912	0.74	ERIMACRUS ISENBECKII
14	3.05	.012	.923	0.09	PORIFERA
15	2.66	.010	.934	0.83	CHIONOECETES BAIRDI
16	2.57	.010	.943	0.04	ASTERIAS AMURENSIS
17	2.26	.009	.952	0.30	NEPTUNEA HEROS
18	1.92	.007	.959	0.91	GYMNOCANTHUS SP
19	1.92	.007	.966	0.65	HIPPOGLOSSUS STENOLEPIS
20	1.72	.007	.973	0.52	NEPTUNEA VENTRICOSA
21	1.11	.004	.977	0.91	ATHERESTHES SP
22	0.96	.004	.981	0.09	HALOCYNTHIA AURANTIUM
23	0.78	.003	.984	0.96	HIPPOGLOSSOIDES ELASSODON
24	0.75	.003	.986	0.26	GORGONOCEPHALUS CARYI
25	0.50	.002	.988	0.65	RAJA SP
26	0.44	.002	.990	0.39	MYOXOCEPHALUS SP
27	0.38	.001	.991	0.09	HEMITRIPTERUS BOLINI
TOTAL	265.00				

* NUMBER OF HAULS= 23, MEAN DEPTH= 77.0M (RANGE= 64-102M)

Table D-6. Site Group 2B

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	125.30	.385	.385	1.00	LIMANDA ASPERA
2	61.68	.189	.574	0.92	THERAGRA CHALCOGRAMMA
3	25.50	.078	.653	0.99	GADUS MACROCEPHALUS
4	18.88	.058	.711	0.42	ASTERIAS AMURENSIS
5	18.19	.056	.767	1.00	LEPIDOPSETTA BILINEATA
6	12.53	.038	.805	0.89	PLEURONECTES QUADRITUBERCULATUS
7	8.14	.025	.830	0.76	PAGURIDAE
8	8.07	.025	.855	0.87	PARALITHODES CAMTSCHATICA
9	7.52	.023	.878	0.34	STARFISH UNIDENT
10	5.09	.016	.894	0.96	HIPPOGLOSSOIDES ELASSODON
11	4.15	.013	.906	0.62	LIMANDA PROBOSCIDEA
12	3.76	.012	.918	0.63	MYOXOCEPHALUS SP
13	3.22	.010	.928	0.44	PORIFERA
14	2.13	.007	.934	0.57	RAJA SP
15	2.09	.006	.941	0.52	NEPTUNEA HEROS
16	2.00	.006	.947	0.80	CHIONOECETES BAIRDI
17	1.88	.006	.953	0.39	NEPTUNEA LYRATA
18	1.77	.005	.958	0.77	HIPPOGLOSSUS STENOLEPIS
19	1.51	.005	.963	0.15	HALOCYNTHIA SP
20	1.40	.004	.967	0.78	NEPTUNEA VENTRICOSA
21	1.21	.004	.971	0.06	ECHINARACHNIUS PARMA
22	1.01	.003	.974	0.22	NEPTUNEA PRIBILOFFENSIS
23	0.79	.002	.976	0.65	AGONUS ACIPENSERINUS
24	0.69	.002	.978	0.57	HYAS SP
25	0.66	.002	.980	0.09	ECHINARACHNIUS PARMA
26	0.66	.002	.982	0.33	GORGONOCEPHALUS CARYI
27	0.55	.002	.984	0.25	LYCODES PALEARIS
28	0.51	.002	.986	0.18	BOLTENIA OVIFERA
29	0.49	.001	.987	0.42	ATHERESTHES SP
30	0.41	.001	.988	0.18	ASCIDIAN UNIDENT
31	0.37	.001	.990	0.53	CHIONOECETES OPILIO
32	0.31	.001	.991	0.01	INVERTEBRATE UNIDENT
TOTAL	325.56				

* NUMBER OF HAULS= 79, MEAN DEPTH= 63.9M (RANGE= 31-102M)

Table D-7. Site Group 3

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	71.05	.537	.537	1.00	THERAGRA CHALCOGRAMMA
2	16.14	.122	.659	1.00	GADUS MACROCEPHALUS
3	5.49	.041	.701	0.89	CHIONOECETES OPILIO
4	5.13	.039	.739	0.62	CHIONOECETES BAIRDI
5	4.52	.034	.774	0.23	CTENODISCUS CRISPATUS
6	4.51	.034	.808	0.97	HIPPOGLOSSOIDES ELASSODON
7	3.89	.029	.837	0.87	RAJA SP
8	3.64	.028	.865	0.82	REINHARDTIUS HIPPOGLOSSOIDES
9	2.88	.022	.886	0.55	LYCODES BREVIPES
10	2.20	.017	.903	0.82	NEPTUNEA PRIBILOFFENSIS
11	2.14	.016	.919	0.71	ATHERESTHES SP
12	1.32	.010	.929	0.84	GASTROPOD UNIDENT
13	1.22	.009	.938	0.59	GORGONOCEPHALUS CARYI
14	1.17	.009	.947	0.71	LYCODES PALEARIS
15	0.95	.007	.954	0.62	PAGURIDAE
16	0.54	.004	.959	0.77	STARFISH UNIDENT
17	0.48	.004	.962	0.46	HEMITRIPTERUS BOLINI
18	0.43	.003	.965	0.24	ANOPLOPOMA FIMBRIA
19	0.43	.003	.969	0.34	HIPPOGLOSSUS STENOLEPIS
20	0.39	.003	.972	0.50	SEA ANEMONE UNIDENT
21	0.35	.003	.974	0.24	MYOXOCEPHALUS SP
22	0.31	.002	.977	0.36	PLEURONECTES QUADRITUBERCULATUS
23	0.30	.002	.979	0.33	OCTOPUS UNIDENT
24	0.30	.002	.981	0.41	NEPTUNEA LYRATA
25	0.26	.002	.983	0.64	ICELUS SP
26	0.22	.002	.985	0.24	LYCODES SP
27	0.20	.002	.986	0.43	BATHYMASTER SIGNATUS
28	0.17	.001	.987	0.37	LEPIDOPSETTA BILINEATA
29	0.15	.001	.989	0.37	GLYPTOCEPHALUS ZACHIRUS
30	0.14	.001	.990	0.52	HEMILEPIDOTUS JORDANI
31	0.14	.001	.991	0.22	PARALITHODES PLATYPUS
TOTAL	132.28				

* NUMBER OF HAULS=122, MEAN DEPTH=122.6M (RANGE= 66-177M)

Table D-8. Site Group 3A

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	65.45	.519	.519	1.00	THERAGRA CHALCOGRAMMA
2	20.65	.164	.683	1.00	GADUS MACROCEPHALUS
3	8.32	.066	.749	0.40	CTENODISCUS CRISPATUS
4	6.18	.049	.798	0.98	REINHARDTIUS HIPPOGLOSSOIDES
5	3.91	.031	.829	0.98	CHIONOECETES OPILIO
6	3.29	.026	.855	0.83	NEPTUNEA PRIBILOFFENSIS
7	2.42	.019	.874	0.62	LYCODES BREVIPES
8	2.07	.016	.891	0.93	HIPPOGLOSSOIDES ELASSODON
9	2.01	.016	.907	0.90	GASTROPOD UNIDENT
10	1.96	.016	.922	0.90	LYCODES PALEARIS
11	1.79	.014	.936	0.87	RAJA SP
12	1.45	.012	.948	0.83	GORGONOCEPHALUS CARYI
13	0.82	.007	.954	0.97	STARFISH UNIDENT
14	0.73	.006	.960	0.35	CHIONOECETES BAIRDI
15	0.59	.005	.965	0.52	ATHERESTHES SP
16	0.54	.004	.969	0.52	PAGURIDAE
17	0.52	.004	.973	0.53	PLEURONECTES QUADRITUBERCULATUS
18	0.49	.004	.977	0.75	ICELUS SP
19	0.38	.003	.980	0.40	LYCODES SP
20	0.25	.002	.982	0.52	OCTOPUS UNIDENT
21	0.25	.002	.984	0.37	PARALITHODES PLATYPUS
22	0.20	.002	.986	0.27	LIMANDA ASPERA
23	0.18	.001	.987	0.33	HEMITRIPTERUS BOLINI
24	0.14	.001	.988	0.17	NEPTUNEA HEROS
25	0.14	.001	.989	0.78	PANDALUS SP
26	0.11	.001	.990	0.50	HEMILEPIDOTUS JORDANI

TOTAL 126.08

* NUMBER OF HAULS- 60, MEAN DEPTH=116.0M (RANGE= 66-174M)

Table D-9. Site Group 3Ai

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	83.44	.540	.540	1.00	THERAGRA CHALCOGRAMMA
2	21.37	.138	.678	1.00	GADUS MACROCEPHALUS
3	12.18	.079	.757	0.59	CTENODISCUS CRISPATUS
4	8.78	.057	.814	1.00	REINHARDTIUS HIPPOGLOSSOIDES
5	3.67	.024	.837	0.85	NEPTUNEA PRIBILOFFENSIS
6	3.59	.023	.860	0.98	CHIONOECETES OPILIO
7	3.45	.022	.883	0.73	LYCODES BREVIPES
8	2.76	.018	.901	0.95	LYCODES PALEARIS
9	2.67	.017	.918	0.95	HIPPOGLOSSOIDES ELASSODON
10	2.61	.017	.935	0.88	GASTROPOD UNIDENT
11	2.02	.013	.948	0.88	RAJA SP
12	2.01	.013	.961	0.88	GORGONOCEPHALUS CARYI
13	1.00	.006	.967	0.98	STARFISH UNIDENT
14	0.69	.004	.972	0.88	ICELUS SP
15	0.54	.003	.975	0.54	LYCODES SP
16	0.48	.003	.978	0.46	PLEURONECTES QUADRITUBERCULATUS
17	0.40	.003	.981	0.20	CHIONOECETES BAIRDI
18	0.36	.002	.983	0.73	OCTOPUS UNIDENT
19	0.32	.002	.985	0.37	PAGURIDAE
20	0.30	.002	.987	0.46	PARALITHODES PLATYPUS
21	0.23	.001	.989	0.39	ATHERESTHES SP
22	0.20	.001	.990	0.88	PANDALUS SP
TOTAL	154.60				

* NUMBER OF HAULS= 41, MEAN DEPTH=118.4M (RANGE= 86-152M)

Table D-10. Site Group 3Aii

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	26.64	.413	.413	1.00	THERAGRA CHALCOGRAMMA
2	19.09	.296	.709	1.00	GADUS MACROCEPHALUS
3	4.62	.072	.780	1.00	CHIONOECETES OPILIO
4	2.45	.038	.818	0.79	NEPTUNEA PRIBILOFFENSIS
5	1.46	.023	.841	0.68	CHIONOECETES BAIRDI
6	1.38	.021	.862	0.79	ATHERESTHES SP
7	1.29	.020	.882	0.84	RAJA SP
8	1.00	.016	.898	0.84	PAGURIDAE
9	0.78	.012	.910	0.89	HIPPOGLOSSOIDES ELASSODON
10	0.70	.011	.921	0.95	GASTROPOD UNIDENT
11	0.61	.009	.930	0.68	PLEURONECTES QUADRITUBERCULATUS
12	0.55	.009	.938	0.95	REINHARDTIUS HIPPOGLOSSOIDES
13	0.51	.008	.946	0.42	LIMANDA ASPERA
14	0.43	.007	.953	0.95	STARFISH UNIDENT
15	0.34	.005	.958	0.58	HEMITRIPTERUS BOLINI
16	0.29	.005	.963	0.37	HIPPOGLOSSUS STENOLEPIS
17	0.25	.004	.967	0.74	GORGONOCEPHALUS CARYI
18	0.22	.003	.970	0.79	LYCODES PALEARIS
19	0.21	.003	.974	0.37	LYCODES BREVIPES
20	0.21	.003	.977	0.68	NEPTUNEA LYRATA
21	0.14	.002	.979	0.37	MYOXOCEPHALUS SP
22	0.14	.002	.981	0.16	PARALITHODES PLATYPUS
23	0.14	.002	.984	0.11	ANOPLOPOMA FIMBRIA
24	0.12	.002	.985	0.11	OPHIUROID UNIDENT
25	0.10	.002	.987	0.47	BATHYMASTER SIGNATUS
26	0.09	.001	.988	0.47	DASYCOTTUS SETIGER
27	0.09	.001	.990	0.21	NEPTUNEA HEROS
28	0.08	.001	.991	0.11	PORIFERA
TOTAL	64.53				

* NUMBER OF HAULS= 19, MEAN DEPTH=110.7M (RANGE= 66-174M)

Table D-11. Site Group 3B

	MEAN CPUE (KG/HA)	PROP. OF CPUE	CUMUL. PROP. OF CPUE	FREQ. OF OCCURR.	TAXA
1	88.24	.581	.581	1.00	THERAGRA CHALCOGRAMMA
2	12.53	.083	.664	1.00	GADUS MACROCEPHALUS
3	10.65	.070	.734	0.98	CHIONOECETES BAIRDI
4	7.88	.052	.786	1.00	HIPPOGLOSSOIDES ELASSODON
5	6.38	.042	.828	0.89	RAJA SP
6	4.02	.026	.854	1.00	ATHERESTHES SP
7	3.86	.025	.880	0.51	LYCODES BREVIPES
8	3.39	.022	.902	0.75	CHIONOECETES OPILIO
9	1.50	.010	.912	0.75	PAGURIDAE
10	1.26	.008	.920	0.89	NEPTUNEA PRIBILOFFENSIS
11	1.15	.008	.928	0.36	GORGONOCEPHALUS CARYI
12	1.06	.007	.935	0.62	REINHARDTIUS HIPPOGLOSSOIDES
13	0.94	.006	.941	0.49	ANOPLOPOMA FIMBRIA
14	0.87	.006	.947	0.06	CTENODISCUS CRISPATUS
15	0.86	.006	.953	0.64	HEMITRIPTERUS BOLINI
16	0.83	.005	.958	0.47	HIPPOGLOSSUS STENOLEPIS
17	0.78	.005	.963	0.51	SEA ANEMONE UNIDENT
18	0.69	.005	.968	0.79	GASTROPOD UNIDENT
19	0.61	.004	.972	0.17	MYOXOCEPHALUS SP
20	0.48	.003	.975	0.45	NEPTUNEA LYRATA
21	0.41	.003	.978	0.62	BATHYMASTER SIGNATUS
22	0.35	.002	.980	0.49	LYCODES PALEARIS
23	0.34	.002	.982	0.74	GLYPTOCEPHALUS ZACHIRUS
24	0.32	.002	.984	0.42	LEPIDOPSETTA BILINEATA
25	0.29	.002	.986	0.13	OCTOPUS UNIDENT
26	0.27	.002	.988	0.55	STARFISH UNIDENT
27	0.21	.001	.989	0.02	ZOARCIDAE
28	0.20	.001	.991	0.34	THALEICHTHYS PACIFICUS
TOTAL	151.79				

* NUMBER OF HAULS= 53, MEAN DEPTH=131.8M (RANGE= 97-177M)