

RESULTS OF MARMAP OTTER TRAWL INVESTIGATIONS IN
THE SOUTH ATLANTIC BIGHT. V. SUMMER, 1975

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INTRODUCTION

This report is fifth in a series summarizing the MARMAP otter trawl surveys from Cape Fear to Cape Canaveral in depths from 9 to 366 m. Readers are referred to Wenner et al. (1979a) for an introduction to the literature.

MATERIALS and METHODS

The survey lasted from 31 August to 19 September 1975. We towed a 3/4 scale version of a Yankee No. 36 trawl (Wilk and Silverman 1976) from the R/V Dolphin (a 32.6 m converted tug) at 6.5 km/hr. A stratified random sampling design (Grosslein 1969) was employed to allocate trawl tows within strata which were southward projections of MARMAP strata utilized by the Northeast Center of the National Marine Fisheries Service. The strata were subdivisions of six depth zones in which the total effort of 64 trawl tows was allocated as follows: (1) 9-18 m zone, 12 tows; (2) 19-27 m, 12 tows; (3) 28-55 m, 16 tows; (4) 56-110 m, 9 tows; (5) 111-183 m, 9 tows; (6) 184-366 m, 6 tows. Only successful tows on sand bottom habitats were analyzed. Trawl tows on live bottom having large amounts of sponges and/or corals and fish species associated with coral reefs (Wenner et al. 1979a, Table 1) were eliminated from the analysis. Fishes were sorted by species, measured and weighed. Hydrographic observations were taken after each trawl with Niskin bottles and reversing thermometers.

Data handling techniques were essentially the same as described in Wenner et al. (1979a). Individual stratum boundaries were collapsed within depth

zones, resulting in six previously described zones. These were each treated as a large stratum for the biomass estimates. The stratified mean catch/tow was calculated according to Cochran (1977) and the estimated variance of the mean catch/tow after Clarke and Brown (1977). Because of the negative binomial distribution of the trawl catches, calculations were made on both untransformed and $\ln(x + 1)$ transformed data (Taylor 1953; Elliott 1973). The Bliss (1967) approximation was used in retransforming the data from logarithmic to original units.

Much of the variability of South Atlantic Bight trawl collections results from occasional catches of large elasmobranchs such as Dasyatis spp. and large catches of pelagic species such as Decapterus punctatus (Wenner et al. 1979a). Analyses were performed both on total biomass and demersal bony fishes (total biomass - [elasmobranchs + pelagics + squids]). Biomass estimates were expanded by the area swept method (Rohr and Gutherz 1977) with the sweep of the net being 8.748 m (T. Azarovitz, N.M.F.S., Woods Hole, Mass., personal communication) and 3.241 km the distance covered during a standard tow. All estimates are minimum estimates and have not been adjusted by availability or vulnerability factors for our trawl since they are unknown.

After removal of the squids and pelagic fishes, diversity indices (H' [Pielous 1975] and species richness [Margalef 1968]) were calculated for demersal fishes. The data were then subjected to cluster analysis to compare the similarity between assemblages of organisms (normal analysis) and to compare the similarity in the distribution patterns of species (inverse analysis) (Boesch 1977). The Canberra metric coefficient was used in the analysis. In the previous report (Wenner et al. 1979) data were subjected to a log transformation. Possibly, the log transformation of the data was too severe (Clifford and Stephenson 1975). The data were subjected to a square root transformation. The sorting strategy was flexible with $\beta = -0.25$ (Boesch 1977; Clifford and Stephenson 1975).

Only benthic fish species which were collected at three or more trawl stations were included in the analysis. Examination of species and site groups to determine suitability of the groups and misclassifications was done by nodal analysis (Boesch 1977). Constancy (the number of stations in a site-group in which a given species occurs) and fidelity (the comparison of the frequency of occurrence of a species within a site-group to the overall frequency of occurrence in the whole study area) were examined. A species-group is rated high in constancy if found in all stations in a site-group, and high in fidelity if found in only one site-group.

An index of relative abundance (Musick and McEachran 1972) for each depth zone was calculated for the most abundant and widely distributed species as:

$$\text{Index of Relative Abundance} = \frac{1}{n} \sum \ln(x + 1)$$

where n = number of trawls in a depth zone

x = number of individuals or weight of a given species for each tow in a depth zone.

RESULTS and DISCUSSION

Hydrography

As in the summer of 1974 (Wenner et al. 1979b), highest bottom water temperatures (29°C) were in the coastal area off Savannah, Georgia (Fig. 1). The predominant bottom temperature range in the open shelf habitat was between 25–27°C. Temperatures were relatively homogenous throughout the study area. Beyond the shelf break, there was a decrease in bottom temperature with increasing depth that resulted in compaction of the isotherms in offshore areas.

Bottom salinities were lowest in the area between Savannah, Ga. and Charleston, S.C. (Fig. 2) where the input of the numerous estuaries resulted in decreased coastal salinities. During the survey, most of the survey area had bottom salinities ranging from 30–35‰.

Biomass

Mean catch/tow (\bar{y}_n) values by depth zone for total groundfish and demersal bony fish weight are in Tables 1 and 2. Individual collection weights are in Appendix V. Statistically significant differences in the transformed mean catch/tow values were found between depth zones during the summer of 1975 (Table 3). Scheffe's linear contrast (Guenther 1964) separated these zones into two groups; highest catch/tow values were in the three inshore zones, whereas lowest values were in depths greater than 56 m (Table 4). This was the same pattern as was found for the summer of 1974 (Wenner et al. 1979b).

The stratified mean catch/tow based on untransformed data was 35.074 kg (lower and upper 90% confidence limits [CL]: 24.484; 41.875) for total groundfish and 8.704 kg (90% CL: 7.051; 10.357) for demersal bony fishes. Bliss' (1967) approximation of the transformed data gave a stratified mean of 32.055 kg/tow (90% CL: 24.484; 41.875) for total groundfish and 9.359 kg/tow (90% CL: 7.571; 11.519) for demersal teleosts. Removal of elasmobranchs, pelagic species and squids from the analysis of the untransformed data reduced the estimated variance from 5289 to 66, whereas the same procedure reduced the estimated variance of the transformed analysis by 47%.

Density estimates in kg/ha for non-live bottom South Atlantic Bight groundfish from the 3/4 Yankee otter trawl survey are shown below.

Because of the lack of information on the effectiveness of the 3/4 Yankee trawl in sampling the South Atlantic Bight groundfish community, the density and standing stock estimates of Table 5 should be considered minimum values.

Demersal Bony Fishes

A total of 13027 individuals representing 147 species in fifty-two families of demersal teleosts were taken during the summer of 1975 (Table 6). Sparids were dominant in the catches comprising 53% of the total number and 28% of the weight. The ten most numerous families accounted for 92% of the catch by numbers and 83% by weight. The most speciose families were the Bothidae (17 species), Triglidae (11 species) and the Ophidiidae (8 species).

The most abundant demersal bony fish species was the southern porgy, *Stenotomus aculeatus*. The 6887 individuals of this species comprised 52.7% of the number and 27.7% of the weight of demersal teleosts (Table 7). This species ranked first in numerical abundance in the 9–18 and 19–27 m depth zones (Table 8), whereas sand perch, *Diplectrum formosum* and offshore lizardfish, *Synodus poeyi*, dominated the catches in the 28–55 and 56–110 m depth zones. The small argentinid, *Glossanodon pygmaeus*, was more numerous than other species in

	\bar{x}	Lower 90% CL	Upper 90% CL
total groundfish - untransformed	12.372	7.169	17.574
total groundfish - transformed	11.307	8.636	14.771
demersal bony fish - untransformed	3.070	2.487	3.653
demersal bony fish - transformed	3.301	2.671	4.063

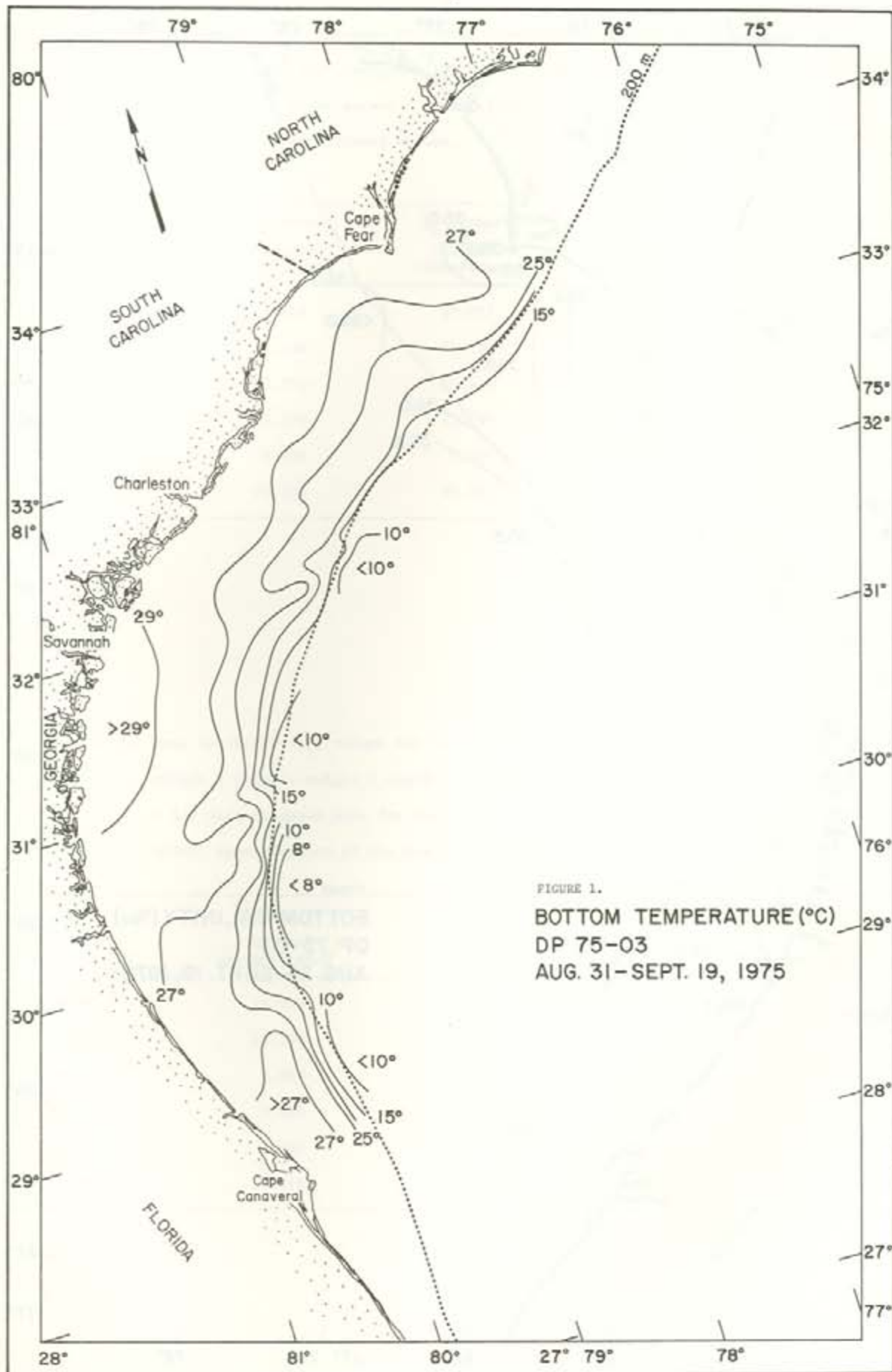


FIGURE 1.
 BOTTOM TEMPERATURE (°C)
 DP 75-03
 AUG. 31-SEPT. 19, 1975

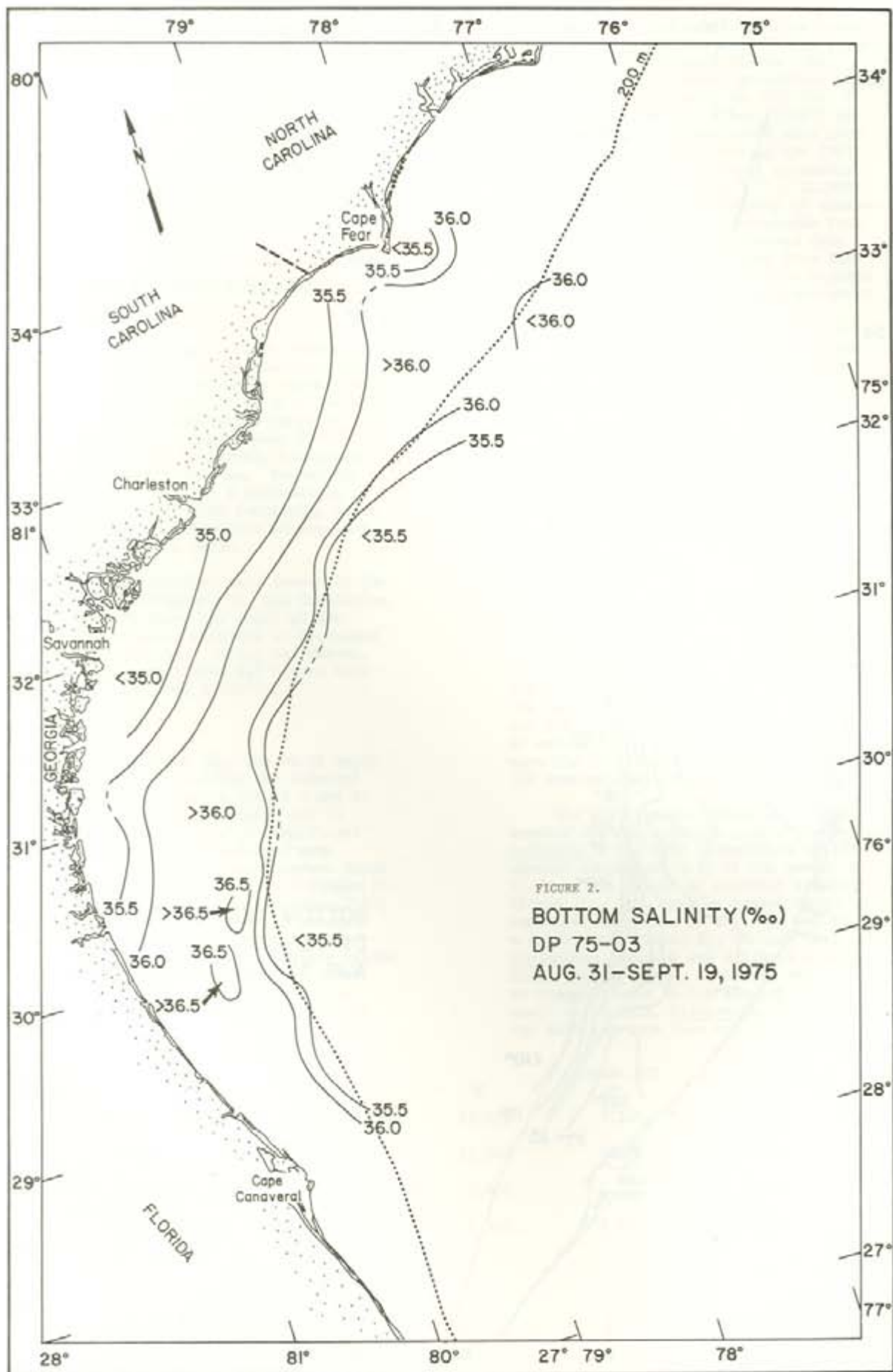


FIGURE 2.
BOTTOM SALINITY (‰)
DP 75-03
AUG. 31-SEPT. 19, 1975

Table 1. Mean catch/tow (\bar{y}_h) values for total trawl caught groundfish on untransformed and transformed (\ln [weight + 1]) data by depth zone for the summer 1975 South Atlantic Bight survey. Bliss' (1967) approximation of the mean was applied to the transformed values.

Depth Zone (m)	\bar{y}_h biomass (kg/tow) untransformed	\bar{y}_h biomass (kg/tow) transformed	Area of ₂ zone (km ²)	Number of tows
9-18	20.248	22.055	18083	12
19-27	73.350	71.494	16100	12
28-55	32.191	21.418	22367	16
56-110	19.296	15.794	4775	9
111-183	9.056	9.309	3615	9
184-366	23.322	36.997	9724	6

Table 2. Mean catch/tow (\bar{y}_h) values for demersal bony fish (total weight - [elasmobranch weight + pelagic weight + squid weight]) on untransformed and transformed (\ln (weight + 1)) data by depth zone for the summer 1975 South Atlantic Bight survey. Bliss' (1967) approximation of the mean was applied to the transformed values.

Depth Zone (m)	\bar{y}_h biomass (kg/tow) untransformed	\bar{y}_h biomass (kg/tow) transformed	Area of ₂ zone (km ²)	Number of tows
9-18	10.929	11.311	18083	12
19-27	12.209	12.168	16100	12
28-55	9.843	9.972	22367	16
56-110	3.454	3.785	4775	9
111-183	3.602	3.147	3615	9
184-366	0.618	0.627	9724	6

Table 3. Analysis of variance of the mean catch/tow in kg of demersal bony fishes between depth zones.

Source of Variation	d.f.	Sums of Squares	Mean Square	F
Between Zones	5	31.755	6.351	12.46*
Among Zones	58	29.573	0.509	
Total	63	61.328		

*Significant at the 90% level.

Table 4. Scheffe's multiple range comparison of the transformed catch/tow of demersal bony fishes in the six depth zones. Underscored treatment groups are those that are not significantly different at the 90% level.

Depth Zone (m)	9-18	19-27	28-55	56-110	111-183	184-366
\bar{x} (ln [kg + 1])	2.169	<u>2.377</u>	<u>2.294</u>	<u>1.285</u>	0.834	<u>0.415</u>
Number of tows	12	12	16	9	9	6

Table 5. Minimum standing stock estimates of sand bottom groundfish in the South Atlantic Bight during summer 1975. All values should be expanded by 10^4 ; units are metric ton. LCL and UCL = lower and upper 90% confidence limits respectively.

	Mean	LCL	UCL
total groundfish-untransformed	9.24	5.35	13.12
total groundfish-transformed	8.44	6.45	11.03
demersal bony fish-untransformed	2.29	1.86	2.73
demersal bony fish-transformed	2.46	1.99	3.03

Table 6. Ranking of families of demersal bony fishes by numerical abundance during the summer of 1975.

Family	Number of Individuals	Weight (kg)	Number of Species
Sparidae	6887	141.9	5
Synodontidae	1386	59.5	7
Serranidae	1112	58.7	7
Bothidae	610	42.5	17
Argentinidae	452	0.7	2
Ophidiidae	437	12.8	8
Triglidae	430	22.1	11
Balistidae	291	69.7	6
Carapidae	219	0.5	1
Gadidae	198	8.6	2
Percichthyidae*	132	0.4	2
Scorpaenidae	120	6.0	5
Sciaenidae	118	15.0	7
Caproidae	91	5.6	1
Gerridae	67	0.9	2
Ariidae	66	21.0	1
Ogcocephalidae	48	0.7	4
Congridae	47	0.5	2
Haemulidae	38	2.5	3
Tetraodontidae	28	2.5	6
Muraenidae	24	2.0	1
Lutjanidae	22	1.6	2
Uranoscopidae	22	1.5	1
Moridae	19	0.5	1
Labridae	18	0.8	2
Cynoglossidae	17	0.4	4
Batrachoididae	14	0.2	1
Anthiidae	13	0.1	3
Ophichthidae	13	1.1	4
Branchiostegidae	10	0.6	2
Diodontidae	10	3.9	3
Ostraciidae	9	2.8	1
Zeidae	9	0.1	1
Ephippidae	7	2.1	1
Chlorophthalmidae	6	-	1
Syngnathidae	6	0.1	3
Centriscidae	4	-	1
Priacanthidae	4	0.4	1
Apogonidae	3	-	1
Merluccidae	3	0.6	2
Muraenescoidea	3	-	1
Emmelichthyidae	2	-	1
Lophiidae	2	0.4	1
Soleidae	2	0.1	1
Antennaridae	1	-	1
Callionymidae	1	-	1
Dactylopteridae	1	1.0	1
Dactyloscopidae	1	-	1
Mullidae	1	-	1
Percophidae	1	-	1
Polymixiidae	1	0.1	1
Rachycentridae	1	10.1	1
	13027	502.6	147

*The family Percichthyidae is an assemblage of unrelated groups. Although *Synagrops* is probably not referable to this family, it is herein placed in this group until a published revision of this assemblage is available (G.D. Johnson, personal communication).

Table 7. Ranking by total number and total weight for demersal bony fishes for 64 trawls during the summer 1975 groundfish survey in the South Atlantic Bight.

Species	Total Number	Percent of Total Catch	Cumulative Percent	Number of Occurrences
<u>Stenotomus aculeatus</u>	6864	52.7	--	25
<u>Synodus poeyi</u>	798	6.1	58.8	18
<u>Diplectrum formosum</u>	790	6.1	64.9	38
<u>Glossanodon pygmaeus</u>	417	3.2	68.1	8
<u>Synodus foetens</u>	377	2.9	71.0	40
<u>Syacium papillosum</u>	232	1.8	72.8	29
<u>Carapus bermudensis</u>	219	1.7	74.5	7
<u>Ophidion beani</u>	209	1.6	76.1	16
<u>Stephanolepis hispidus</u>	208	1.6	77.7	29
<u>Urophycis regius</u>	197	1.5	79.2	8

Species	Total Weight (kg)	Percent of Total Catch	Cumulative Percent	Number of Occurrences
<u>Stenotomus aculeatus</u>	139.134	27.7	--	25
<u>Aluterus schoepfi</u>	55.400	11.0	38.7	19
<u>Diplectrum formosum</u>	43.246	8.6	47.3	38
<u>Synodus foetens</u>	42.315	8.4	55.7	40
<u>Syacium papillosum</u>	23.021	4.6	60.3	29
<u>Arius felis</u>	21.000	4.2	64.5	5
<u>Trachinocephalus myops</u>	10.571	2.1	66.6	26
<u>Rachycentron canadum</u>	10.100	2.0	68.6	1
<u>Prionotus carolinus</u>	9.956	2.0	70.6	14
<u>Epinephelus niveatus</u>	9.600	1.9	72.5	1

Table 8. Numerically dominant demersal bony fish species by depth for summer 1975 groundfish survey in the South Atlantic Bight. N_1 = number of occurrences; N = total trawls in zone.

Depth zone (m)	Species	Total Number	Percent of Total in Depth Zone	N_1/N
9-18	<u>Stenotomus aculeatus</u>	4055	86.8	11/12
	<u>Diplectrum formosum</u>	131	2.8	12/12
	<u>Synodus foetens</u>	80	1.7	10/12
	<u>Eucinostomus argenteus</u>	60	1.3	2/12
	<u>Prionotus carolinus</u>	58	1.2	6/12
	<u>Leiostomus xanthurus</u>	45	1.0	1/12
	<u>Arius felis</u>	37	0.8	3/12
	<u>Cynoscion nothus</u>	26	0.6	1/12
	<u>Micropogonias undulatus</u>	26	0.6	1/12
	<u>Larimus fasciatus</u>	14	0.3	1/12
19-27	<u>Stenotomus aculeatus</u>	2638	66.8	8/12
	<u>Diplectrum formosum</u>	248	6.3	11/12
	<u>Carapus bermudensis</u>	218	5.5	6/12
	<u>Ophidion beani</u>	157	4.0	6/12
	<u>Synodus foetens</u>	110	2.8	11/12
	<u>Ophidion selenops</u>	93	2.4	6/12
	<u>Stephanolepis hispidus</u>	81	2.1	9/12
	<u>Prionotus carolinus</u>	60	1.5	3/12
	<u>Syacium papillosum</u>	39	1.0	4/12
	<u>Arius felis</u>	29	0.7	2/12
28-55	<u>Diplectrum formosum</u>	411	22.8	15/16
	<u>Synodus foetens</u>	180	10.0	16/16
	<u>Stenotomus aculeatus</u>	171	9.5	6/16
	<u>Synodus poeyi</u>	154	8.5	8/16
	<u>Stephanolepis hispidus</u>	111	6.2	11/16
	<u>Syacium papillosum</u>	77	4.3	13/16
	<u>Bothus robinsi</u>	76	4.2	8/16
	<u>Orophidium omostigmum</u>	76	4.2	5/16
	<u>Trachinocephalus myops</u>	76	4.2	13/16
	<u>Prionotus carolinus</u>	68	3.8	5/16
56-110	<u>Synodus poeyi</u>	640	49.2	7/9
	<u>Syacium papillosum</u>	109	8.4	7/9
	<u>Serranus phoebe</u>	105	8.1	5/9
	<u>Serranus notospilus</u>	74	5.7	5/9
	<u>Trachinocephalus myops</u>	54	4.2	6/9
	<u>Centropristis ocyurus</u>	28	2.2	4/9
	<u>Bellator egretta</u>	27	2.1	3/9
	<u>Synodus intermedius</u>	21	1.6	5/9
	<u>Scorpaena calcarata</u>	20	1.5	3/9
	<u>Citharichthys cornutus</u>	18	1.4	2/9
111-183	<u>Glossanodon pygmaeus</u>	399	34.5	5/9
	<u>Urophycis regius</u>	180	15.5	5/9
	<u>Antigonia capros</u>	91	7.9	2/9
	<u>Synagrops spinosa</u>	63	5.4	1/9
	<u>Peristedion gracile</u>	60	5.2	3/9
	<u>Synagrops bella</u>	54	4.7	4/9
	<u>Serranus notospilus</u>	50	4.3	4/9
	<u>Citharichthys arctifrons</u>	49	4.2	3/9
	<u>Citharichthys cornutus</u>	39	3.4	3/9
	<u>Argentina striata</u>	34	2.9	2/9
184-366	<u>Peristedion gracile</u>	27	19.3	1/6
	<u>Laemonema barbatulum</u>	19	13.6	1/6
	<u>Glossanodon pygmaeus</u>	18	12.9	3/6
	<u>Urophycis regius</u>	17	12.1	3/6
	<u>Citharichthys arctifrons</u>	16	11.4	4/6
	<u>Synagrops bella</u>	9	6.4	3/6
	<u>Lopholatilus chamaeleonticeps</u>	8	5.7	1/6
	<u>Chloropthalmus agassizi</u>	6	4.3	1/6
	<u>Synagrops spinosa</u>	6	4.3	2/6
	<u>Helicolenus dactylopterus</u>	2	1.4	2/6

the 111-183 m zone. The deepest trawl tows caught small numbers of several species. Southern porgy contributed the most to the total trawl weight of demersal teleosts in the two shallow water zones (Table 9) and was replaced by orange filefish, *Aluterus schoepfi* and dusky flounder *Syacium papillosum*, in mid-depth zones.

Southern Porgy: *Stenotomus aculeatus*

The southern porgy, the most abundant demersal teleost, was widely distributed during the 1975 summer survey from Cape Fear (32.8°N) to Cape Canaveral (29°N) (Fig. 3) in depths from 14 to 44 m (22.5-29.1°C). Maximum catch rates occurred in 11 of 12 trawl tows made in the 9-18 m depth zone. These tows accounted for 59% of the total number and 52% of the total weight of *S. aculeatus*. The index of relative abundance (Fig. 4A) showed a decline with increasing trawl depth for the three shallowest zones. Although comparisons of length frequency distributions showed overlap between depth zones, fishes had their greatest mean size (14 cm FL) in the 28-56 m zone. The overall mean size was 9.3 cm FL (range: 6-17 cm FL) (Fig. 4B). Abundance statistics for southern porgy are in Table 10.

Offshore lizardfish: *Synodus poeyi*

Synodus poeyi was the second most abundant demersal teleost comprising 6.1% of the catch. However, because of this species' small size (mean weight for 798 individuals = 4g) it ranked 22nd by weight. Offshore lizardfish were collected from southeast of Cape Fear (33.3°N) to Cape Canaveral (29°N) (Fig. 5) in depths from 17 to 198 m (13.0-28.2°C). Although *S. poeyi* was eurybathic, 80% of the total number and 86.8% of the total weight of this species was taken in the 56-110 m zone where it occurred in 7 of 9 trawls (Fig. 4C). The average catch/tows for this zone was 71 individuals (range: 0-211) with a mean weight of 0.3 kg (range: 0-1.1 kg). *Synodus poeyi* were slightly larger in depths greater than 55 m (Fig. 4D); its overall mean size was 7.3 cm FL (range: 4-17 cm FL).

Sand Perch: *Diplectrum formosum*

Diplectrum formosum was one of the

most widespread and ubiquitous species of the shallow water open shelf habitat in the South Atlantic Bight during the summer of 1975. Sand perch were taken in all but two trawls made in depths shoaler than 56 m from Cape Canaveral to Cape Fear (Fig. 6). Catch rates as indicated by the index of relative abundance were consistent in the three inshore zones (Fig. 4E). However, trawl tows in the 28-55 m zone accounted for 52% of the number and 42% of the weight of this species. The mean size was 12.2 cm FL (range: 4-23 cm FL) (Fig. 4F). Abundance statistics for sand perch are in Table 10.

Glossanodon pygmaeus

Although the argentinid fish, *Glossanodon pygmaeus*, was numerically the fourth most abundant demersal teleost, its small size contributed less than 1 kg to the catch. This species was taken in trawl tows on the upper portion of the continental slope in depths from 139 to 158 m (13.9-25.8°C) from northern Florida (30°N) to southeast of Cape Fear (33.2°N). Highest catches were in the 111-184 m depth zone where 96% of the total number of *G. pygmaeus* were taken in 5 of 9 trawls. The mean size was 5.7 cm TL.

Inshore lizardfish: *Synodus foetens*

Synodus foetens occurred from Cape Fear (33.8°N) to Cape Canaveral (28.7°N) in depths from 14 to 77 m (17.1-29.1°C) (Fig. 7). This ubiquitous species was encountered in 90% of the 40 trawls made in depths less than 56 m. Maximum catches occurred in the 28-55 m depth zone (Fig. 8A) where 47% of the total number and 51% of the total weight of *S. foetens* were taken. The mean size was 23 cm FL (range: 5-40 cm FL). (Fig. 8B). Abundance statistics for inshore lizardfish are in Table 10.

Dusky flounder: *Syacium papillosum*

Dusky flounder ranked sixth in total number (1.8%) and fifth by weight (4.6%) in the demersal teleost catch. This species was found from Cape Fear (33.8°N) to Cape Canaveral (28.7°N) (Fig. 9) in depths from 16 to 101 m (15.9-29.0°C). Maximum catches were in the 56-110 m zone (Fig. 8C) where 47% of the number and 39% of the weight of *S. papillosum* occurred. The catch data for each depth zone were:

Depth Zone	Number	Weight (kg)	Occurrences	Trawls
9-18	7	0.620	5	12
19-27	39	3.160	4	12
28-55	76	10.150	12	16
56-110	109	9.090	7	9
111-183	0	0	0	9
184-366	0	0	0	6

Table 9. Dominant demersal bony fish species by weight for summer 1975 groundfish survey in the South Atlantic Bight by depth zone. N_1 = number of occurrences; N = total trawls in zone.

Depth zone (m)	Species	Total Weight (kg)	Percent of Total in Depth Zone	N_1/N
9-18	<u>Stenotomus aculeatus</u>	72.720	55.4	11/12
	<u>Arius felis</u>	14.200	10.8	3/12
	<u>Diplectrum formosum</u>	10.030	7.6	12/12
	<u>Synodus foetens</u>	6.290	4.8	10/12
	<u>Leiostomus xanthurus</u>	6.100	4.6	1/12
	<u>Micropogonias undulatus</u>	3.900	3.0	1/12
	<u>Aluterus schoepfi</u>	2.300	1.8	2/12
	<u>Prionotus carolinus</u>	2.206	1.7	6/12
	<u>Larimus fasciatus</u>	2.000	1.5	1/12
	<u>Cynoscion nothus</u>	1.900	1.4	1/12
19-27	<u>Stenotomus aculeatus</u>	54.816	37.4	8/12
	<u>Aluterus schoepfi</u>	21.650	14.8	7/12
	<u>Diplectrum formosum</u>	14.860	10.1	11/12
	<u>Synodus foetens</u>	12.470	8.5	11/12
	<u>Arius felis</u>	6.800	4.6	2/12
	<u>Ophidion beani</u>	5.870	4.0	6/12
	<u>Syacium papillosum</u>	3.165	2.2	4/12
	<u>Prionotus salmonicolor</u>	3.044	2.1	4/12
	<u>Stephanolepis hispidus</u>	2.651	1.8	9/12
	<u>Ancylopsetta quadrocellata</u>	2.640	1.8	7/12
28-55	<u>Aluterus schoepfi</u>	31.450	20.0	10/16
	<u>Synodus foetens</u>	21.957	13.9	16/16
	<u>Diplectrum formosum</u>	18.356	11.6	15/16
	<u>Stenotomus aculeatus</u>	11.598	7.4	6/16
	<u>Syacium papillosum</u>	10.152	6.4	13/16
	<u>Rachycentron canadum</u>	10.100	6.4	1/16
	<u>Bothus robinsi</u>	7.906	5.0	8/16
	<u>Stephanolepis hispidus</u>	5.645	3.6	11/16
	<u>Prionotus carolinus</u>	5.330	3.4	5/16
	<u>Trachinocephalus myops</u>	5.081	3.2	13/16
56-110	<u>Syacium papillosum</u>	9.088	29.2	7/9
	<u>Trachinocephalus myops</u>	3.958	12.7	6/9
	<u>Synodus poeyi</u>	2.714	8.7	7/9
	<u>Balistes capriscus</u>	2.500	8.0	1/9
	<u>Synodus intermedius</u>	2.339	7.5	5/9
	<u>Synodus foetens</u>	1.598	5.1	3/9
	<u>Centropristis ocyurus</u>	1.281	4.1	4/9
	<u>Kathetostoma albigutta</u>	1.035	3.3	2/9
	<u>Dactylopterus volitans</u>	1.000	3.2	1/9
	<u>Scorpaena calcarata</u>	0.846	2.7	3/9
111-183	<u>Epinephelus niveatus</u>	9.600	29.6	1/9
	<u>Urophycis regius</u>	7.193	22.2	5/9
	<u>Antigonia capros</u>	5.610	17.3	2/9
	<u>Neomerinthe hemingwayi</u>	2.600	8.0	1/9
	<u>Sphoeroides pachygaster</u>	1.300	4.0	2/9
	<u>Peristedion gracile</u>	1.044	3.2	3/9
	<u>Glossanodon pygmaeus</u>	0.533	1.6	5/9
	<u>Paralichthys lethostigma</u>	0.500	1.5	1/9
	<u>Gastropsetta frontalis</u>	0.490	1.5	2/9
	<u>Serranus notospilus</u>	0.487	1.5	4/9
184-366	<u>Urophycis regius</u>	1.340	36.1	3/6
	<u>Merluccius albidus</u>	0.504	13.6	2/6
	<u>Saurida normani</u>	0.500	13.5	1/6
	<u>Laemonema barbatulum</u>	0.460	12.4	1/6
	<u>Lopholatilus chamaeleonticeps</u>	0.350	9.4	1/6
	<u>Peristedion gracile</u>	0.150	4.0	1/6
	<u>Merluccius bilinearis</u>	0.090	2.4	1/6
	<u>Citharichthys arctifrons</u>	0.082	2.2	4/6
	<u>Polymixia lowei</u>	0.056	1.5	1/6
	<u>Helicolenus dactylopterus</u>	0.046	1.2	2/6

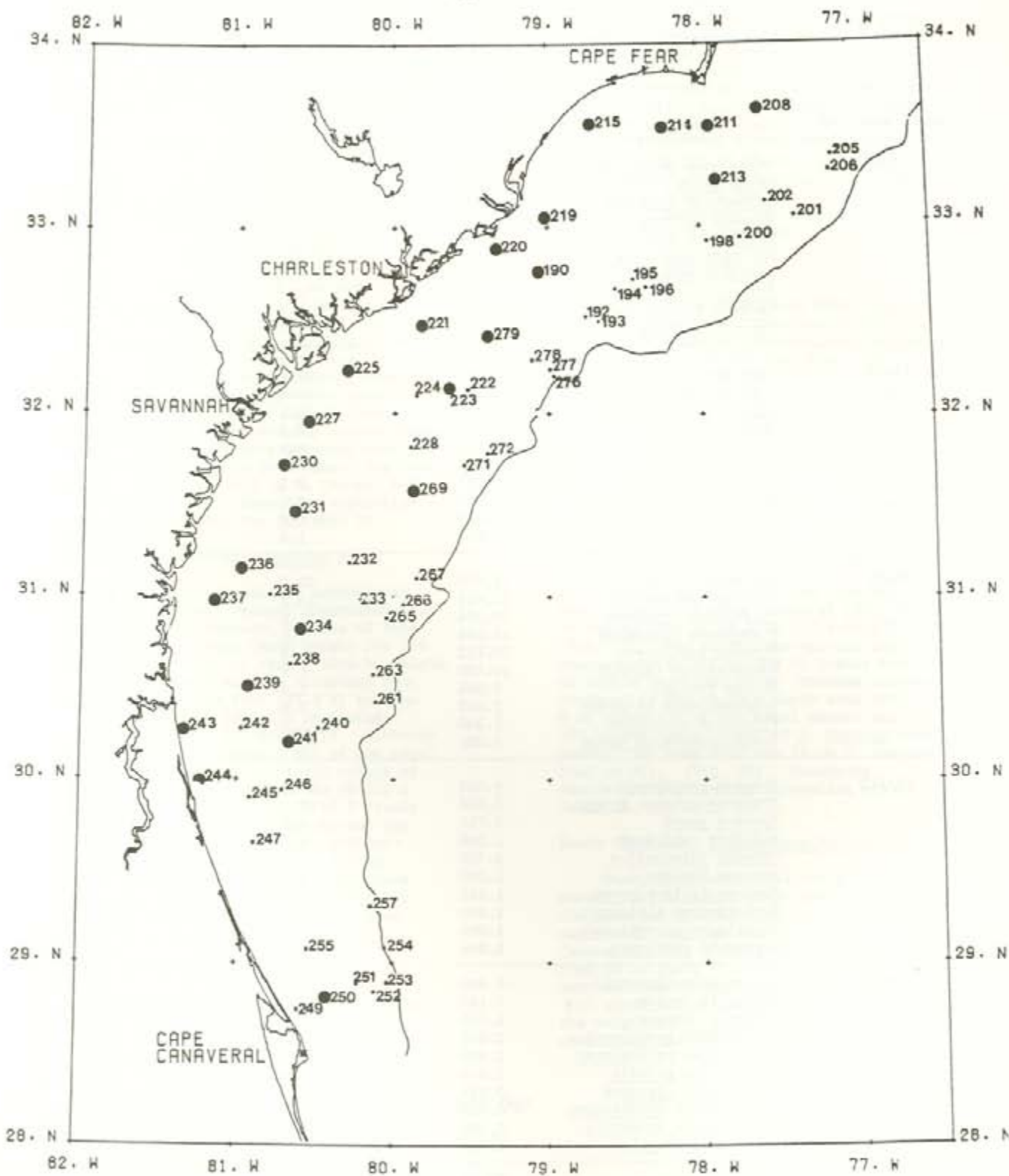


FIGURE 3. DISTRIBUTION OF SOUTHERN PORGY, *STENOTOMUS ACULEATUS*, DURING SUMMER 1975. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT. NUMBERS REFER TO STATION.

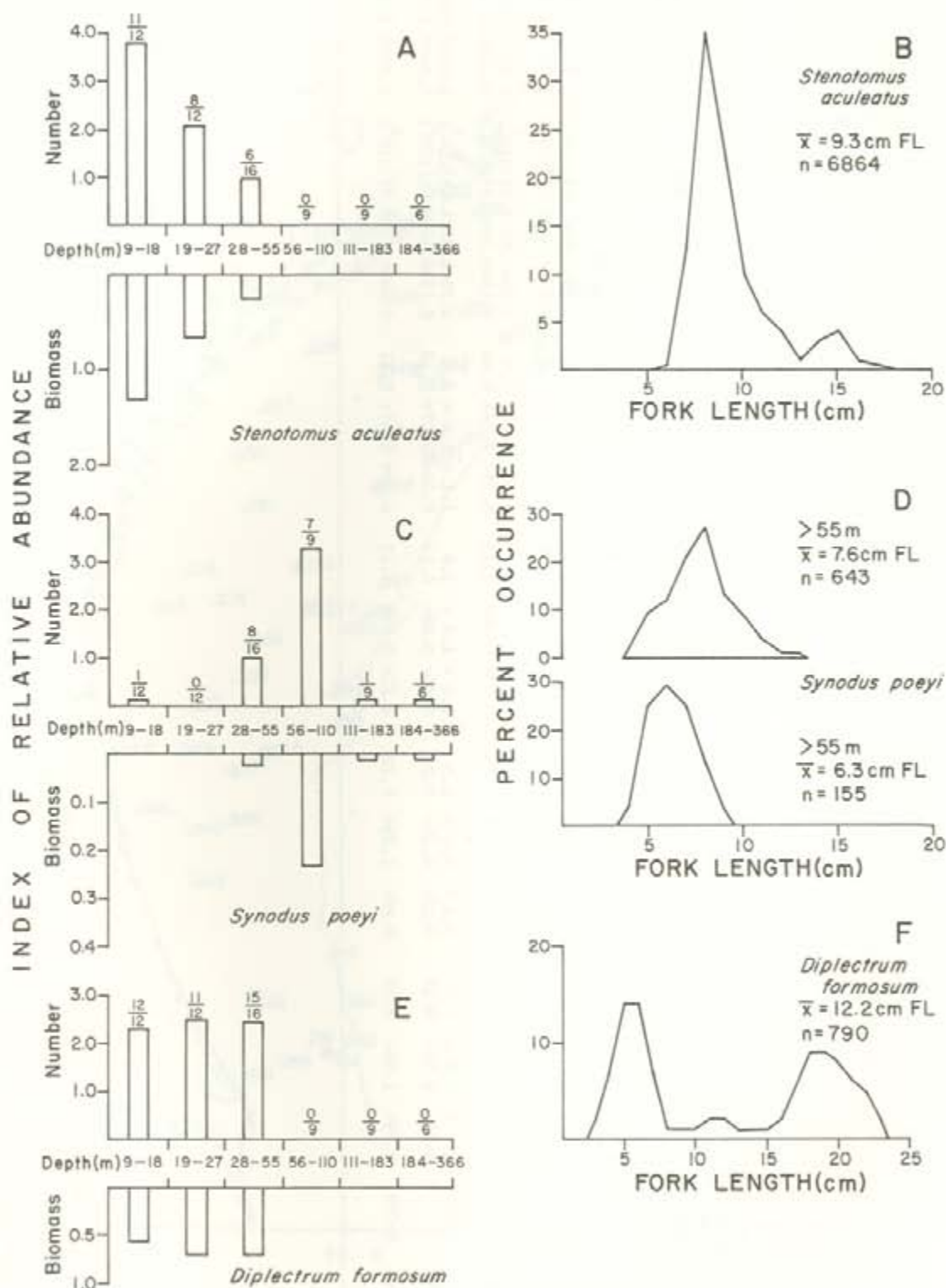


FIGURE 4. INDEX OF RELATIVE ABUNDANCE OF SOUTHERN PORGY, *STENOTOMUS ACULEATUS* (A), OFF-SHORE LIZARDFISH, *SYNODUS POEYI* (C) AND SAND PERCH, *DIPLECTRUM FORMOSUM* (E), DURING THE SUMMER 1975 GROUND FISH SURVEYS IN THE SOUTH ATLANTIC BIGHT. NUMERATOR = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN ZONE. LENGTH FREQUENCY DISTRIBUTION OF *S. ACULEATUS* (B), *S. POEYI* (D) AND *D. FORMOSUM* (F) DURING THE SURVEY.

Table 10. Abundance statistics for the most commonly occurring groundfish during the summer 1975 survey in the South Atlantic Bight. LCL and UCL = lower and upper 90% confidence limits respectively. Values in parentheses following standing stock values are expansion factors for \bar{x} , LCL and UCL. Standing stock weight estimates are in metric tons; stratified weights/tow are in kg.

Species	Depth Zone (m)	Stratified Mean Catch/Tow			Density (# or kg/hectare)			Standing Stock Estimate	
		Untransformed	Transformed		Untransformed	Transformed	Untransformed	Transformed	
		LCL< \bar{x} <UCL	LCL< \bar{x} <UCL		LCL< \bar{x} <UCL	LCL< \bar{x} <UCL	LCL< \bar{x} <UCL	LCL< \bar{x} <UCL	
<u>Stenotomus aculeatus</u>	number	9-55	51.8 < 174.9 < 297.9	76.4 < 174.9 < 270.2	18.3 < 61.7 < 105.1	26.9 < 50.8 < 95.3	1.03<3.49<5.94(x10 ⁸)	1.52<2.87<5.39(x10 ⁸)	
	weight		1.56< 2.19< 2.82	1.73< 2.64< 3.87	0.52< 1.24< 1.96	0.61< 0.93< 1.36	0.30<0.70<1.11(x10 ⁴)	0.34<0.53<0.77(x10 ⁴)	
<u>Diplectrum formosum</u>	number	9-55	9.8 < 19.5 < 29.3	13.7 < 18.6 < 25.0	3.4 < 6.9 < 10.3	4.8 < 6.6 < 8.8	1.94<3.90<5.84(x10 ⁷)	2.74<3.71<5.00(x10 ⁷)	
	weight		0.84< 1.07< 1.30	0.86< 1.07< 1.30	0.30< 0.38< 0.46	0.30< 0.38< 0.46	1.67<2.14<2.61(x10 ³)	1.72<2.14<2.60(x10 ³)	
<u>Synodus foetens</u>	number	9-55	6.3 < 9.2 < 12.1	7.1 < 9.7 < 13.1	2.2 < 3.2 < 4.3	2.5 < 3.4 < 4.6	1.26<1.83<2.41(x10 ⁷)	1.41<1.93<2.61(x10 ⁷)	
	weight		0.66< 1.01< 1.35	0.73< 0.97< 1.25	0.23< 0.36< 0.48	0.26< 0.34< 0.44	0.13<0.20<0.27(x10 ³)	0.15<0.19<0.25(x10 ³)	
<u>Stephanolepis hispidus</u>	number	9-55	2.7 < 5.0 < 7.3	3.2 < 4.6 < 6.5	1.0 < 1.8 < 2.6	1.1 < 1.6 < 2.3	0.55<1.01<1.46(x10 ⁷)	0.64<0.93<1.30(x10 ⁷)	
	weight		0.09< 0.21< 0.33	0.12< 0.20< 0.29	0.03< 0.08< 0.12	0.04< 0.07< 0.10	0.19<0.42<0.66(x10 ³)	0.24<0.41<0.58(x10 ³)	
Total Squid	weight	9-364	0.59< 1.96< 3.32	0.99< 1.33< 1.72	0.21< 0.69< 1.17	0.35< 0.47< 0.61	0.16<0.52<0.87(x10 ⁴)	0.26<0.35<0.45(x10 ⁴)	

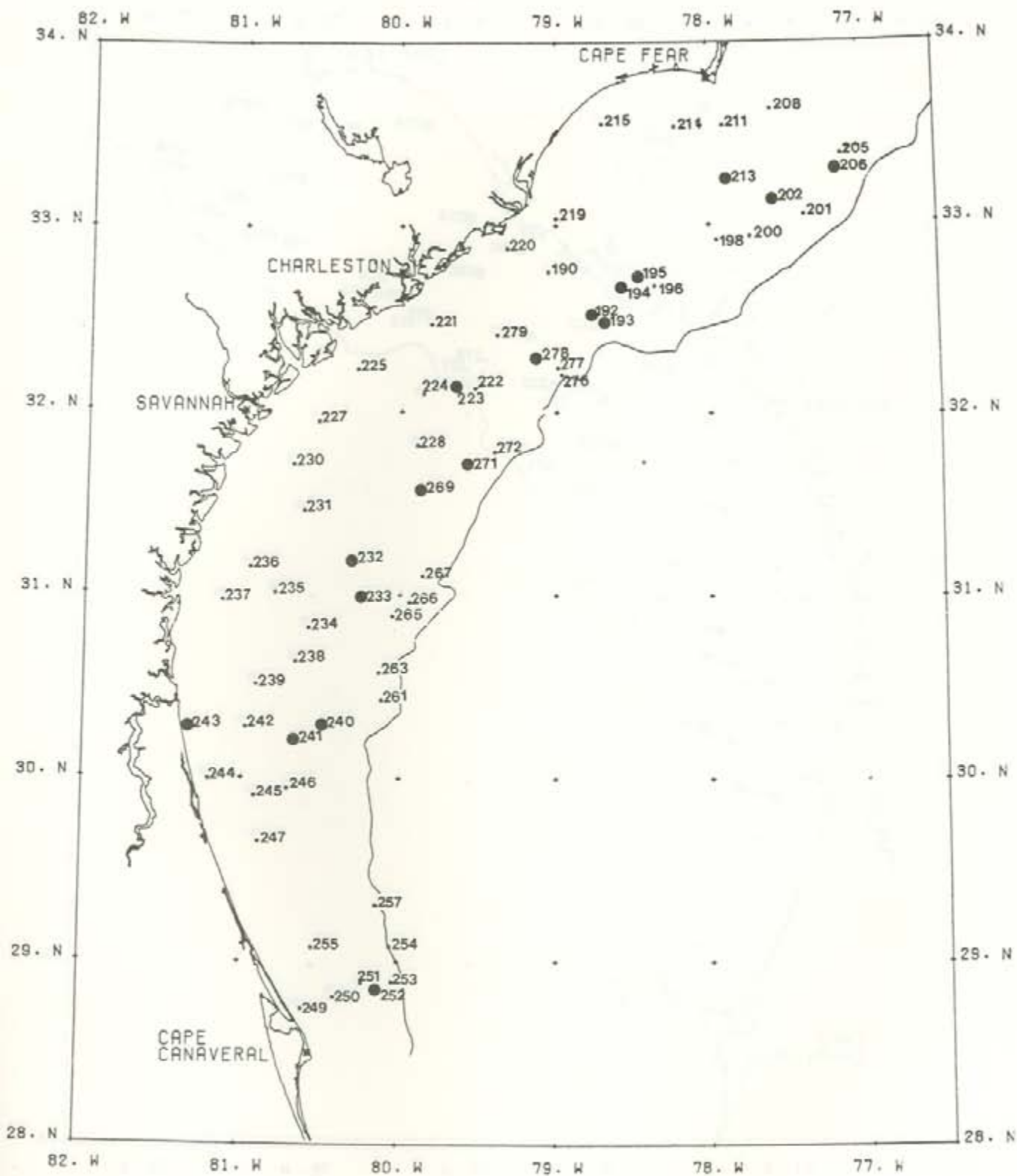


FIGURE 5. DISTRIBUTION OF OFF-SHORE LIZARDFISH, *SYNODUS POEYI*, DURING SUMMER 1975. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

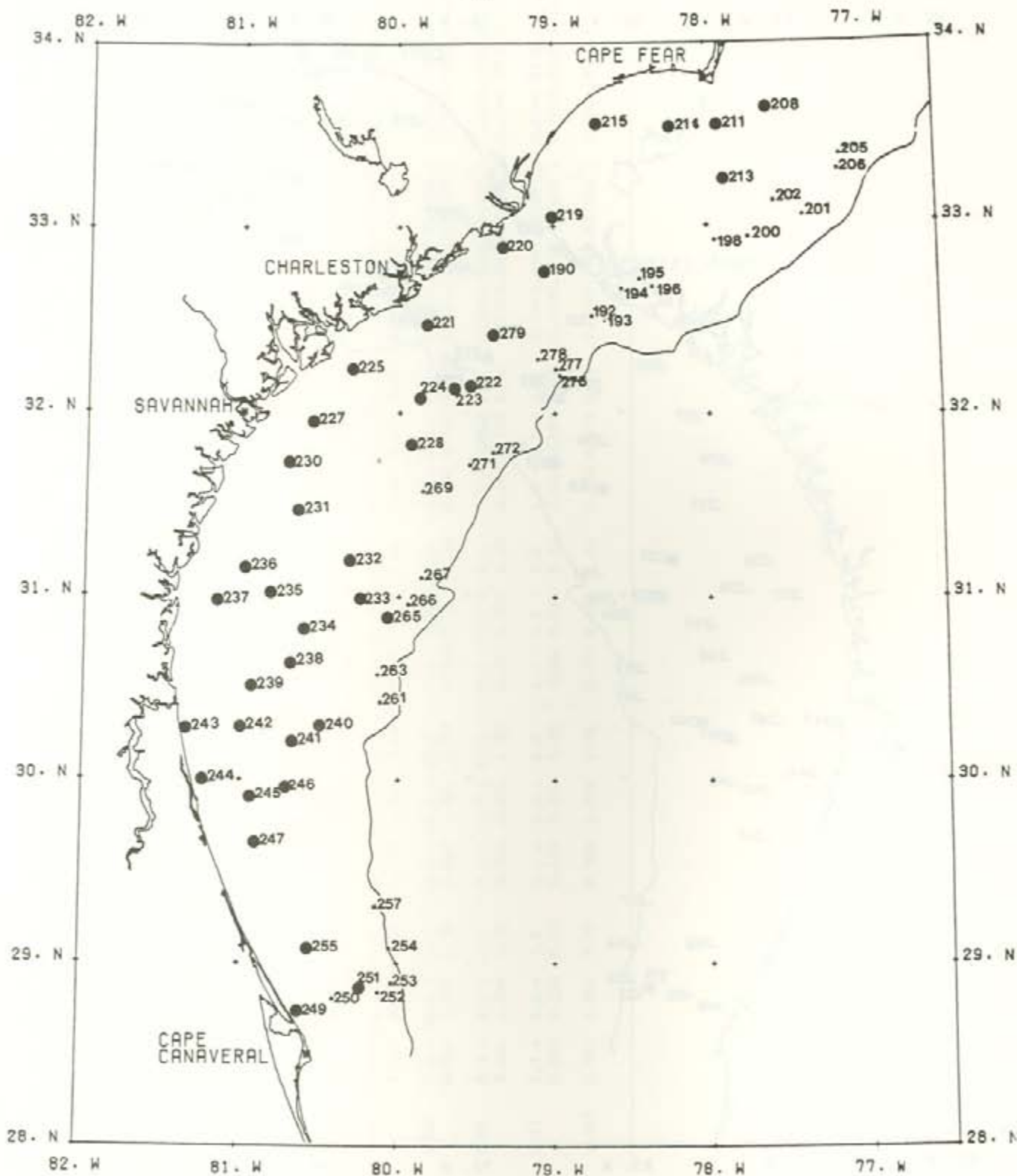


FIGURE 6. DISTRIBUTION OF SAND PERCH, *DIPLECTRUM FORMOSUM*, DURING THE SUMMER 1975. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

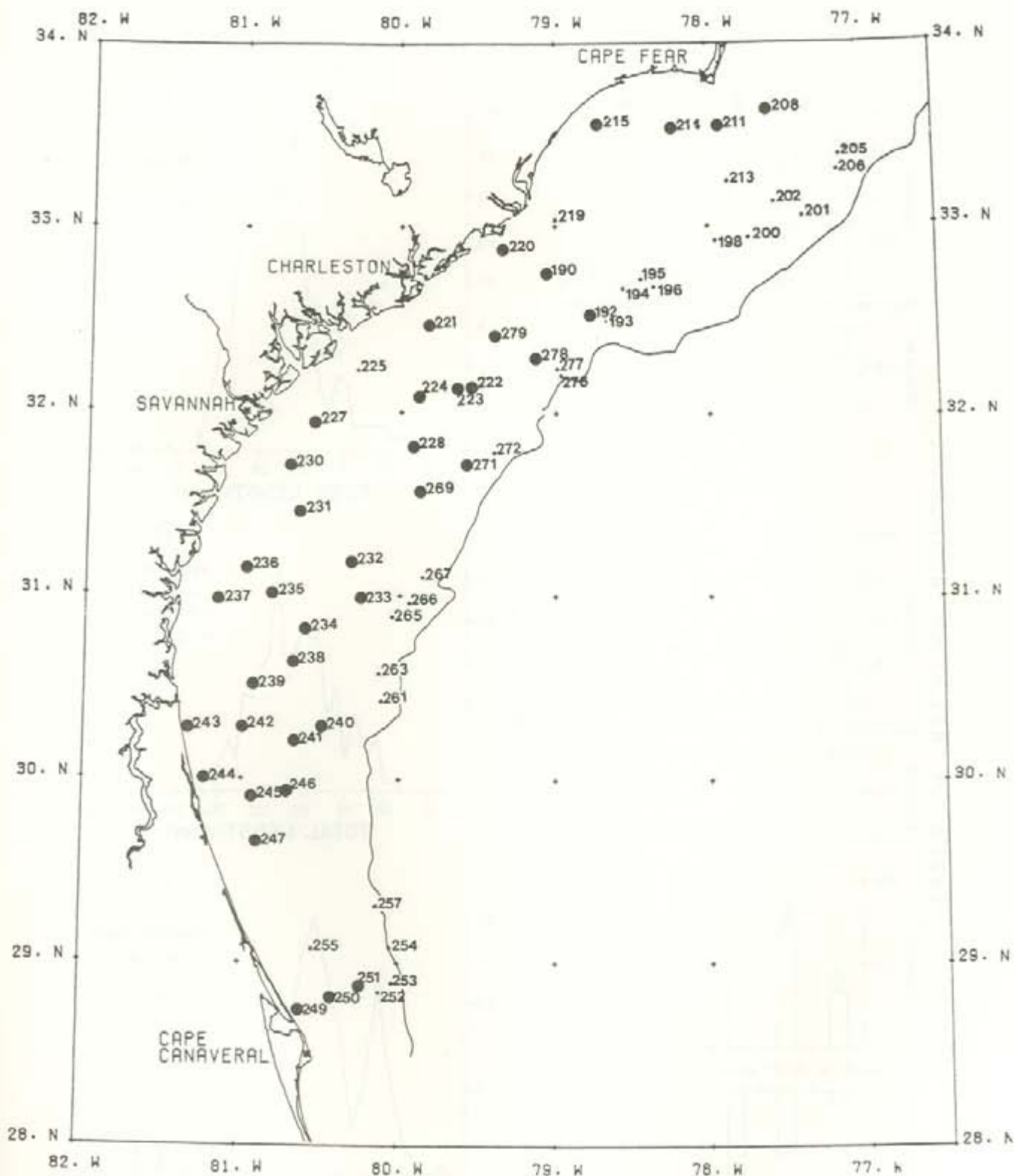


FIGURE 7. DISTRIBUTION OF INSHORE LIZARDFISH *SYNODUS FOETENS*, DURING THE SUMMER 1975. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

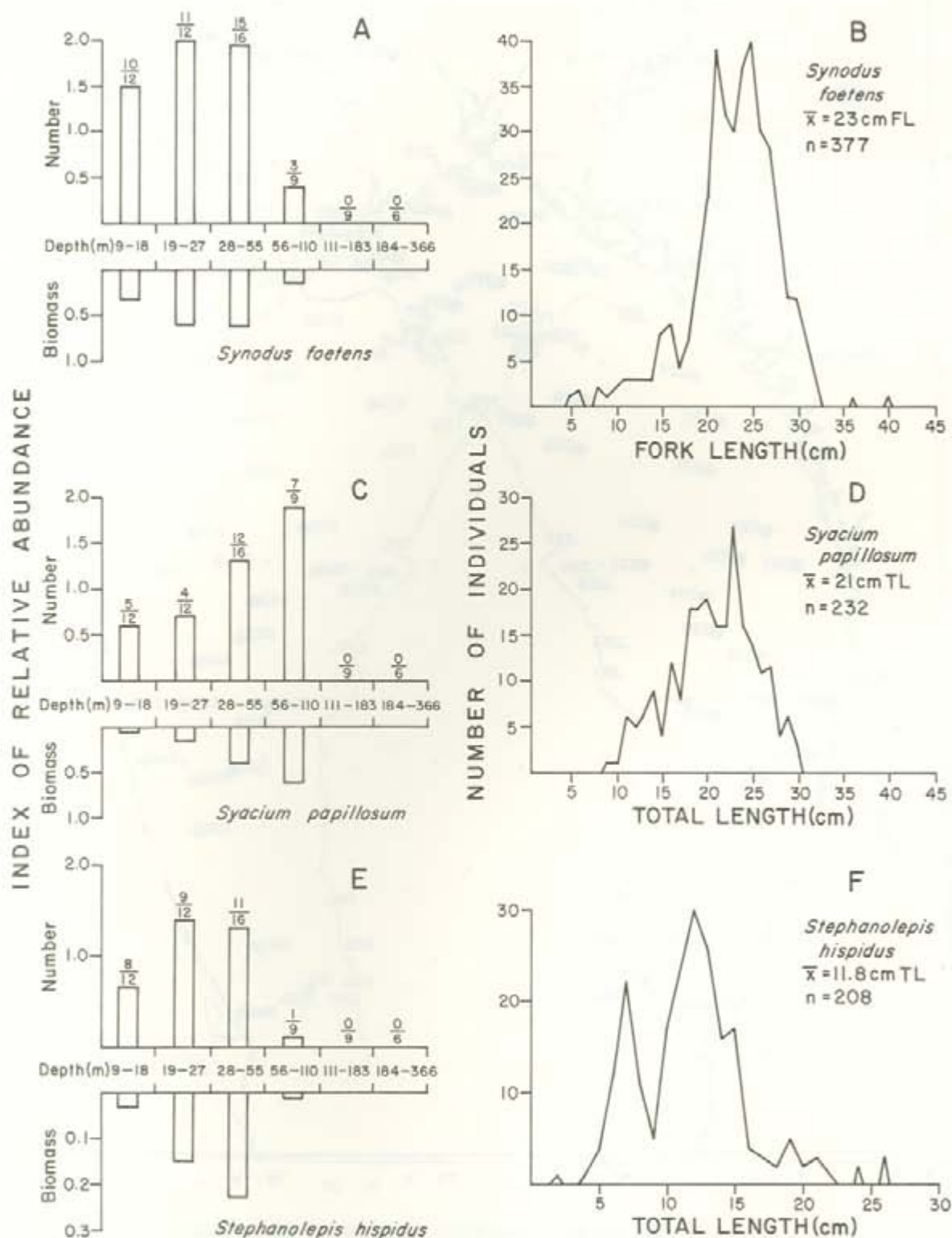


FIGURE 8. INDEX OF RELATIVE ABUNDANCE OF INSHORE LIZARDFISH *SYNODUS FOETENS*, (A) DUSKY FLOUNDER, *SYACIUM PAPILLOSUM* (C), PLANEHEAD FILEFISH, *STEPHANOLEPIS HISPIDUS* (E), DURING THE SUMMER 1975 GROUND FISH SURVEY IN THE SOUTH ATLANTIC BIGHT. NUMERATOR = NUMBER OF TRAWLS WITH SPECIES; DENOMINATOR = TOTAL TRAWLS IN ZONE. LENGTH FREQUENCY DISTRIBUTION OF *S. FOETENS* (B), *S. PAPILLOSUM* (D) AND *S. HISPIDUS* (F) DURING THE SURVEY.

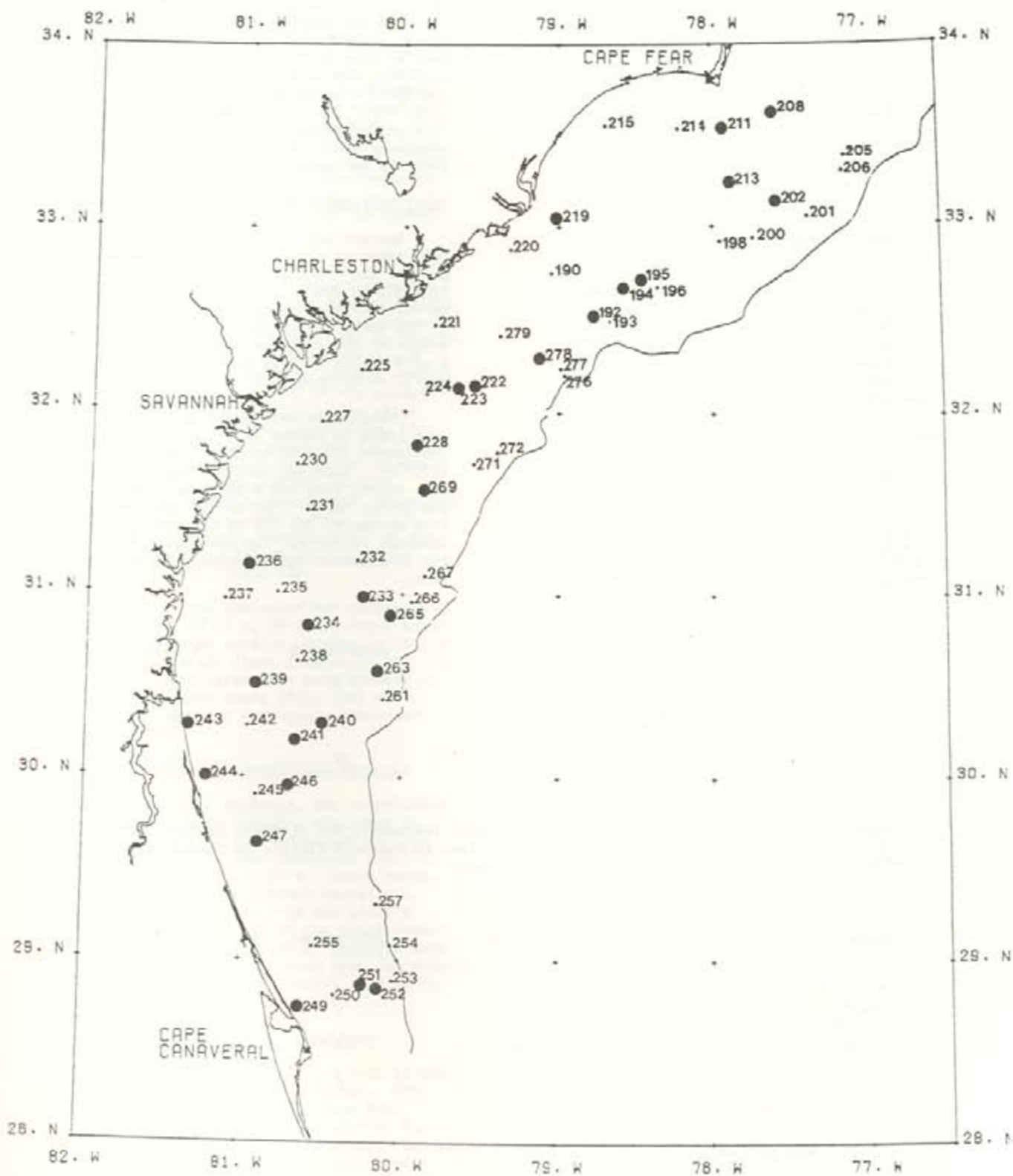


FIGURE 9. DISTRIBUTION OF DUSKY FLOUNDER, *SYACIUM PAPILLOSUM*, DURING THE SUMMER 1975. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

The mean size was 21 cm TL (range: 9-30 cm TL) (Fig. 8D).

Pearlfish: *Carapus bermudensis*

A total of 219 pearlfish, *Carapus bermudensis*, were taken in depths from 24 to 101 m (25.8-28.4°C) from northern Florida (29.8°N) to southeast of Cape Fear (33.5°N). All but one individual were taken in six of the twelve trawls made in the 19-28 m depth zone. The mean size was 13 cm TL (range: 8-18 cm TL).

Long-nose cusk-eel: *Ophidion beani*

Ophidion beani was collected in depths of 17 to 70 m (25.8-29.1°C) from southeast of Cape Fear (33.5°N) to Cape Canaveral (28.6°N). Catches were highest in the 19-27 m depth zone where 157 of the 209 (75%) individuals were taken. *Ophidion beani* also had its greatest frequency of occurrence in that zone, being found in 50% of that zone's stations. The mean size was 18.3 cm TL (range: 7-24 cm TL).

Planehead filefish: *Stephanolepis hispidus*

Although relatively low numbers of *Stephanolepis hispidus* were encountered during the summer 1975 survey, this species was widely distributed throughout the area from Cape Fear to Cape Canaveral. It

occurred in depths from 14 to 70 m (15.5-29.1°C) with maximum catches by number found in the 19-27 m depth zone. Individuals in this zone, however, were of a smaller size (\bar{x} TL = 10 cm) and therefore accounted for less of the weight than in the 28-55 m depth zone (\bar{x} TL = 13 cm) (Fig. 8E). The overall mean size was 11.8 cm TL (range: 2-26 cm TL) (Fig. 8F). Abundance statistics for planehead filefish are in Table 10.

Other Demersal Bony Fishes

Spotted hake, *Urophycis regius*, were only taken in trawl tows made on the upper part of the continental slope in depths from 132 to 258 m (7.8-17.6°C). Catches in the 111-183 m depth zone comprised 91% of the total number and 84% of the total weight of spotted hake. It occurred in 5 of 9 trawls in this zone. The mean size was 17 cm TL (range: 12-34 cm TL).

Orange filefish, *Aluterus schoepfi*, were taken in depths of 17 to 40 m from Charleston (32.8°N) to Cape Canaveral (28.7°N). Although only 57 individuals were taken, they had a large mean size (46 cm TL; range: 8-55 cm TL) and therefore accounted for 11% of the weight of demersal teleosts. The catch data for the zones where this species occurred were:

Depth Zone	Number	Weight (kg)	Occurrences	Trawls
9-18	3	2.300	2	12
19-27	24	21.650	7	12
28-55	30	31.450	10	16

Sand divers, *Trachinocephalus myops*, also occurred frequently but in small numbers during the survey. This species was encountered from Cape Fear to northern Florida in depths from 16 to 101 m (16.0-28.5°C). Catch data by depth zone were:

Depth Zone	Number	Weight (kg)	Occurrences	Trawls
9-18	2	0.130	2	12
19-27	18	1.400	5	12
28-55	76	5.080	13	16
56-110	54	3.960	6	9

The mean size was 16.7 cm FL (range: 6-24 cm FL).

Elasmobranchs

Sixty-four elasmobranchs representing 6 species (5 families) and weighing 1104.369 kg were taken in 19 of 64 summer 1975 otter trawl tows. Three species (*Rhinoptera bonasus*, *Raja eglanteria* and *Breviraja plutonia*) accounted for 86% of the total number caught. Four *Dasyatis centroura*, averaging 175.5 kg per fish, made up 64% of the total elasmobranch weight (Table 11). Elasmobranchs contributed 54.3% of the 2033.3 kg of total groundfish taken during the survey.

Pelagic Fishes

Benthic otter trawl tows during the summer of 1975 in the South Atlantic Bight collected 18165 pelagic fishes representing 28 species and 11 families. The Carangidae was the most speciose (10 species) and abundant (51% of the total pelagic number) while contributing to 79% of the pelagic catch by weight (Table 12). The three most abundant families (Carangidae, Clupeidae, Engraulidae) accounted for 99% of the number and 98% of the weight of the pelagic catch. The Spanish sardine, *Sardinella anchovia*, round scad, *Decapterus punctatus*, and Atlantic bumper, *Chloroscombrus chrysurus*, comprised 89% of the total number and 94% of the weight of pelagic fishes (Table 13).

Round scad dominated the catches in the 9-18 m, 28-55 m, 56-110 m depth zones, whereas Spanish sardine catches in the 19-27 m zone ranked first (Tables 14 and 15). Pelagic catch rates were much greater in the two inshore zones (Fig. 10A) where the Clupeidae and Carangidae dominated the catches.

Spanish sardine: *Sardinella anchovia*

Sardinella anchovia, the numerically dominant pelagic species, was taken in collections made from southeast of Cape Fear (33.5°N) to Cape Canaveral (28.8°N) in depths from 14 to 66 m. Catch rates, incidental to bottom trawl operations, were greatest in the 9-18 and 19-27 m depth zones where 99% of the total number and 96% of the weight of *S. anchovia* were taken (Fig. 10B). The mean size for Spanish sardine was 8.3 cm FL (range: 4-17 cm FL) (Fig. 10C).

Round scad: *Decapterus punctatus*

Round scad ranked second both in number and weight of pelagic fishes. This species was collected from Cape Fear (33.8°N) to Cape Canaveral (28.7°N) in depths from 14 to 167 m (Fig. 11). Catches were highest in the 9-18 m depth zone (Fig. 10D) where 58% of the total number and 61% of the total weight were found. The mean size was 10.2 cm FL (range: 2-20 cm FL) (Fig. 10E). A total of 53 *D. punctatus* collected in the 111-183 m depth zone were juveniles with a mean length of 4.6 cm FL (range: 3-6 cm FL).

Atlantic bumper: *Chloroscombrus chrysurus*

Atlantic bumper were found in five trawl tows from northern Florida (30.4°N) to Cape Canaveral (29.3°N) in depths from 17 to 25 m. Although *C. chrysurus* was infrequently encountered, it ranked third in numerical abundance and first by weight of pelagic fishes. Atlantic bumper in the 9-18 m depth zone showed a bimodal size frequency distribution with modes at 7 and 14 cm FL (Fig. 12 A) and a mean size of 12.4 cm FL. In the 19-27 m depth zone the distribution was unimodal (13 cm FL). The overall mean size was 13 cm FL (range: 7-19 cm FL).

Other Pelagic Species

The flat anchovy, *Anchoviella per fasciata*, ranked fourth in numerical abundance among pelagic fishes during the survey. Ninety-nine percent of the 911 specimens were taken in a single tow off northern Florida (29.8°N) in 25 m. The mean size was 8.5 cm FL (range: 7-10 cm FL).

A total of 427 dusky anchovy, *Anchoa lyolepis*, were taken in a single trawl haul off Cape Canaveral (28.7°N) in 17 m. All specimens were 5 cm FL. This same trawl was also the only tow in which the Cuban anchovy, *A. cubana*, was taken. A total of 289 *A. cubana* had a mean size of 4.7 cm FL (range: 4-5 cm FL). Round herring *Etrumeus teres*, occurred at 5 stations in depths from 24 to 152 m from off Savannah (32°N) to southwest of Cape Fear (33.6°N). Two tows in the 111-183 m depth zone accounted for 92% of the number and 95% of the weight of round herring collected. The mean size was 15.8 cm FL (range: 11-18 cm FL) (Fig. 12B).

Butterfish, *Peprilus triacanthus*, were taken in small numbers in three tows in the area between Charleston and Savannah. Most (95%) were in a trawl made in 152 m (16.1°C) due east of Savannah. The mean size was 12.8 cm FL (range: 9-14 cm FL) (Fig. 12C).

Cephalopods

A total of 11276 squid weighing 130.667 kg were taken during the survey. Squid occurred in 53 of 64 tows and had greatest catches in the 111-183 m depth zone (Fig. 13A). The shortfin squid, *Illex illecebrosus*, accounted for less than 1% of the total number and weight of the squid catch. These few individuals were taken in depths from 97 to 258 m (7.8-26.7°C). The mean size shortfin squid was 14 cm mantle length (range: 7-26 cm).

Since field separation of the two loliginid species was inconsistent, both species were pooled for analysis. Thus, the Loliginidae is comprised of *Loligo pealei* and *L. plei*. Loliginids were distributed throughout all depth zones during the summer of 1975 in depths from 14 to 205 m. Maximum catches occurred in the

Table 11. Rankings of elasmobranch species by total number and total weight for the 1975 summer groundfish survey in the South Atlantic Bight. N_1 = number of occurrences in the 64 successful trawls.

Species	Total Number	Percent of Total Elasmobranchs	N_1
<u>Rhinoptera bonasus</u>	20	31.2	1
<u>Raja eglanteria</u>	19	29.7	11
<u>Breviraja plutonia</u>	16	25.0	2
<u>Dasyatis centroura</u>	15	7.8	4
<u>Sphyrna tiburo</u>	3	4.7	1
<u>Rhizoprionodon terraenovae</u>	1	1.6	1

Species	Total Weight (kg)	Percent of Total Elasmobranchs	N_1
<u>Dasyatis centroura</u>	702.150	63.6	4
<u>Rhinoptera bonasus</u>	385.600	34.9	1
<u>Raja eglanteria</u>	9.625	0.9	11
<u>Sphyrna tiburo</u>	4.000	0.4	1
<u>Rhizoprionodon terraenovae</u>	2.300	0.2	1
<u>Breviraja plutonia</u>	0.694	0.1	2

Table 12. Ranking by total number for families of pelagic fishes taken during the summer 1975 groundfish survey in the South Atlantic Bight.

Family	Total Number	Total Weight (kg)	Number of Species
Carangidae	9275	235.2	10
Clupeidae	6997	49.7	3
Engraulidae	1732	5.3	4
Stromateidae	56	2.2	2
Sphyraenidae	42	2.0	1
Myctophidae	37	0.9	1
Scombridae	19	0.3	3
Echeneidae	3	0.2	1
Trichiuridae	2	0.1	1
Fistulariidae	1	0.1	1
Gempylidae	1	-	1

Table 13. Dominant pelagic species by number and weight for the summer 1975 groundfish survey in the South Atlantic Bight. Total number of trawls = 64.

Rank	Species	Total Number	Percent of Total Pelagics	Number of Occurrences
1	<u>Sardinella anchovia</u>	6861	37.8	17
2	<u>Decapterus punctatus</u>	4805	26.4	27
3	<u>Chloroscombrus chrysurus</u>	4431	24.4	5
4	<u>Anchoviella perfasciata</u>	911	5.0	3
5	<u>Anchoa lyolepis</u>	427	2.4	1
6	<u>Anchoa cubana</u>	389	2.1	1
7	<u>Etrumeus teres</u>	112	0.6	5
8	<u>Peprilus triacanthus</u>	55	0.3	3
9	<u>Sphyræna guachancho</u>	42	0.2	1
10	<u>Diaphus dumerilli</u>	37	0.2	1
Total Number		18,165		

Rank	Species	Total Weight (kg)	Percent of Total Pelagics	Number of Occurrences
1	<u>Chloroscombrus chrysurus</u>	161.300	54.5	5
2	<u>Decapterus punctatus</u>	72.287	24.4	27
3	<u>Sardinella anchovia</u>	45.027	15.2	17
4	<u>Anchoviella perfasciata</u>	4.600	1.6	3
5	<u>Etrumeus teres</u>	4.166	1.4	5
6	<u>Peprilus triacanthus</u>	2.179	0.7	3
7	<u>Scomber japonicus</u>	0.960	0.3	2
8	<u>Echeneis sp.</u>	0.910	0.3	3
9	<u>Caranx crysos</u>	0.848	0.3	9
10	<u>Scomberomorus maculatus</u>	0.600	0.2	1
Total Weight		295.932		

Table 14. Numerically dominant pelagic fish species for the summer 1975 groundfish survey by depth zone. N_1 = number of occurrences; N = total number of trawls in zone.

Depth Zone (m)	Species	Total Number	Percent of Total in Depth Zone	N_1/N
9-18	<u>Decapterus punctatus</u>	2801	45.8	7/12
	<u>Sardinella anchovia</u>	1418	23.2	7/12
	<u>Chloroscombrus chrysurus</u>	964	15.8	3/12
	<u>Anchoa lyolepis</u>	427	7.0	1/12
	<u>Anchoa cubana</u>	389	6.4	1/12
19-27	<u>Sardinella anchovia</u>	5392	48.5	3/12
	<u>Chloroscombrus chrysurus</u>	3467	31.2	2/12
	<u>Decapterus punctatus</u>	1333	12.0	8/12
	<u>Anchoviella perfasciata</u>	905	8.2	2/12
	<u>Opisthonema oglinum</u>	3	---	1/12
28-55	<u>Decapterus punctatus</u>	391	87.7	8/16
	<u>Sardinella anchovia</u>	50	11.2	6/16
	<u>Caranx crysos</u>	1	0.2	1/16
	<u>Caranx hippos</u>	1	0.2	1/16
	<u>Echeneis sp.</u>	1	0.2	1/16
56-110	<u>Decapterus punctatus</u>	229	91.2	2/9
	<u>Scomber japonicus</u>	10	4.0	1/9
	<u>Etrumeus teres</u>	8	3.2	2/9
	<u>Caranx hippos</u>	1	0.4	1/9
	<u>Caranx bartholomaei</u>	1	0.4	1/9
111-183	<u>Etrumeus teres</u>	103	49.8	2/9
	<u>Peprilus triacanthus</u>	53	25.6	2/9
	<u>Decapterus punctatus</u>	51	24.6	2/9
184-366	<u>Diaphus dumerili</u>	37	97.4	1/6
	<u>Caranx crysos</u>	1	2.6	1/6

Table 15. Dominant pelagic fish species by weight for the summer 1975 groundfish survey by depth zone N_1 = number of occurrences; N = total number of trawls in stratum.

Depth Zone (m)	Species	Total Weight (kg)	Percent of Total in Depth Zone	N_1/N
9-18	<u>Decapterus punctatus</u>	44.318	49.0	7/12
	<u>Chloroscombrus chrysurus</u>	31.700	35.1	3/12
	<u>Sardinella anchovia</u>	10.694	11.8	7/12
	<u>Scomberomorus maculatus</u>	0.600	0.7	1/12
	<u>Caranx crysos</u>	0.504	0.6	5/12
19-27	<u>Chloroscombrus chrysurus</u>	129.600	73.2	2/12
	<u>Sardinella anchovia</u>	32.888	18.6	3/12
	<u>Decapterus punctatus</u>	8.494	4.8	8/12
	<u>Anchoviella perfasciata</u>	4.578	2.6	2/12
	<u>Echeneis sp.</u>	0.700	0.4	1/12
28-55	<u>Decapterus punctatus</u>	8.764	85.0	8/16
	<u>Sardinella anchovia</u>	1.411	13.7	6/16
	<u>Fistularia villosa</u>	0.080	0.8	1/16
	<u>Trachurus lathami</u>	0.038	0.4	1/16
	<u>Echeneis sp.</u>	0.010	0.1	1/16
56-110	<u>Decapterus punctatus</u>	10.650	90.3	2/9
	<u>Scomber japonicus</u>	0.900	7.6	1/9
	<u>Etrumeus teres</u>	0.208	1.8	2/9
	<u>Sardinella anchovia</u>	0.034	0.3	1/9
	<u>Caranx hippos</u>	0.001	----	1/9
111-183	<u>Etrumeus teres</u>	3.950	64.3	2/9
	<u>Peprilus triacanthus</u>	2.135	34.7	2/9
	<u>Decapterus punctatus</u>	0.061	1.0	2/9
184-366	<u>Diaphus dumerili</u>	0.160	95.2	1/6
	<u>Caranx crysos</u>	0.008	4.8	1/6

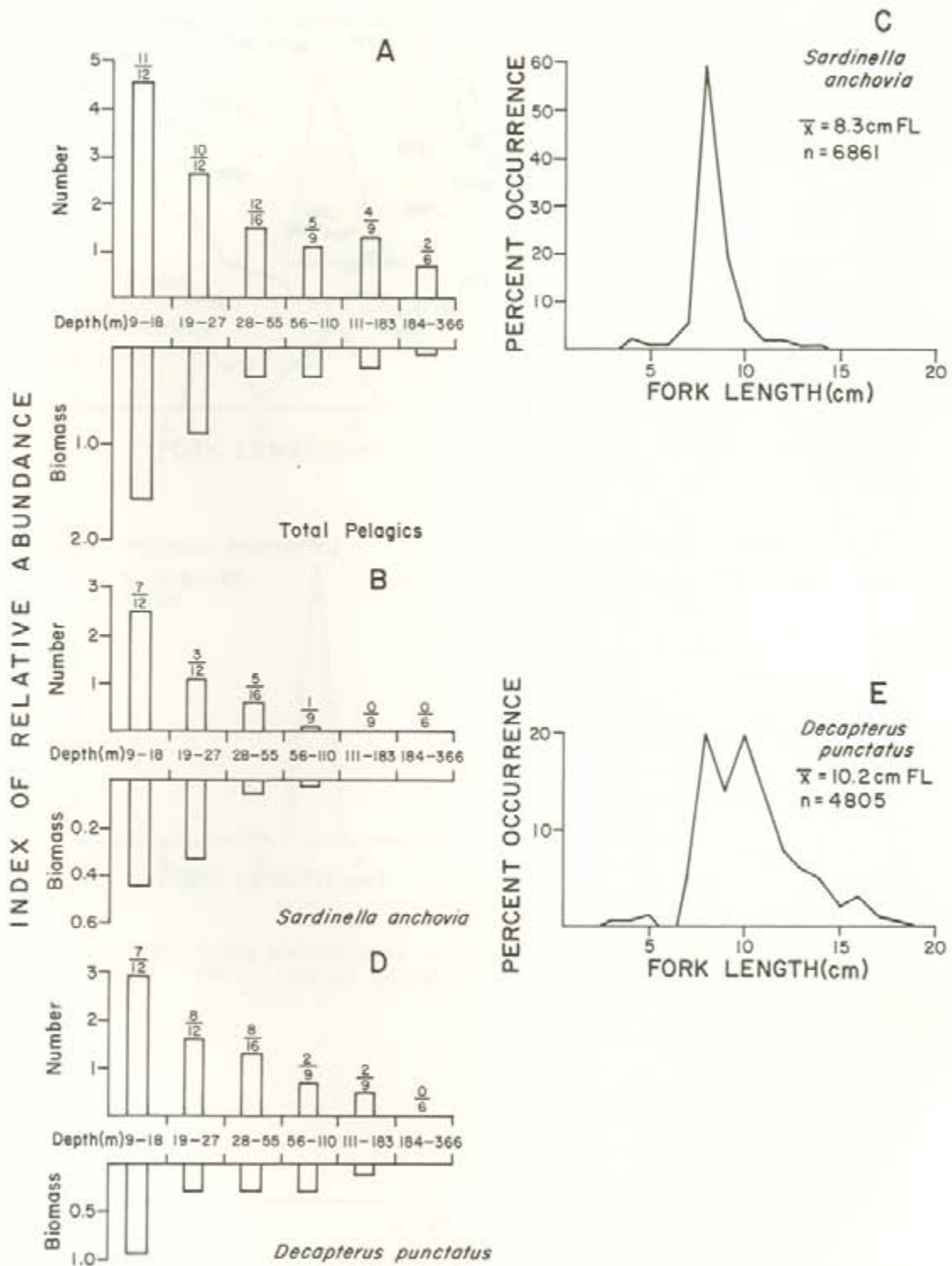


FIGURE 10. INDEX OF RELATIVE ABUNDANCE OF (A) TOTAL PELAGICS, (B) SARDINELLA ANCHOVIA AND (D) DECAPTERUS PUNCTATUS FOR THE SUMMER 1975 IN THE SOUTH ATLANTIC BIGHT. NUMERATOR = NUMBER OF TRAWLS IN ZONE. LENGTH FREQUENCY OF *S. ANCHOVIA* (C) AND *D. PUNCTATUS* (E).

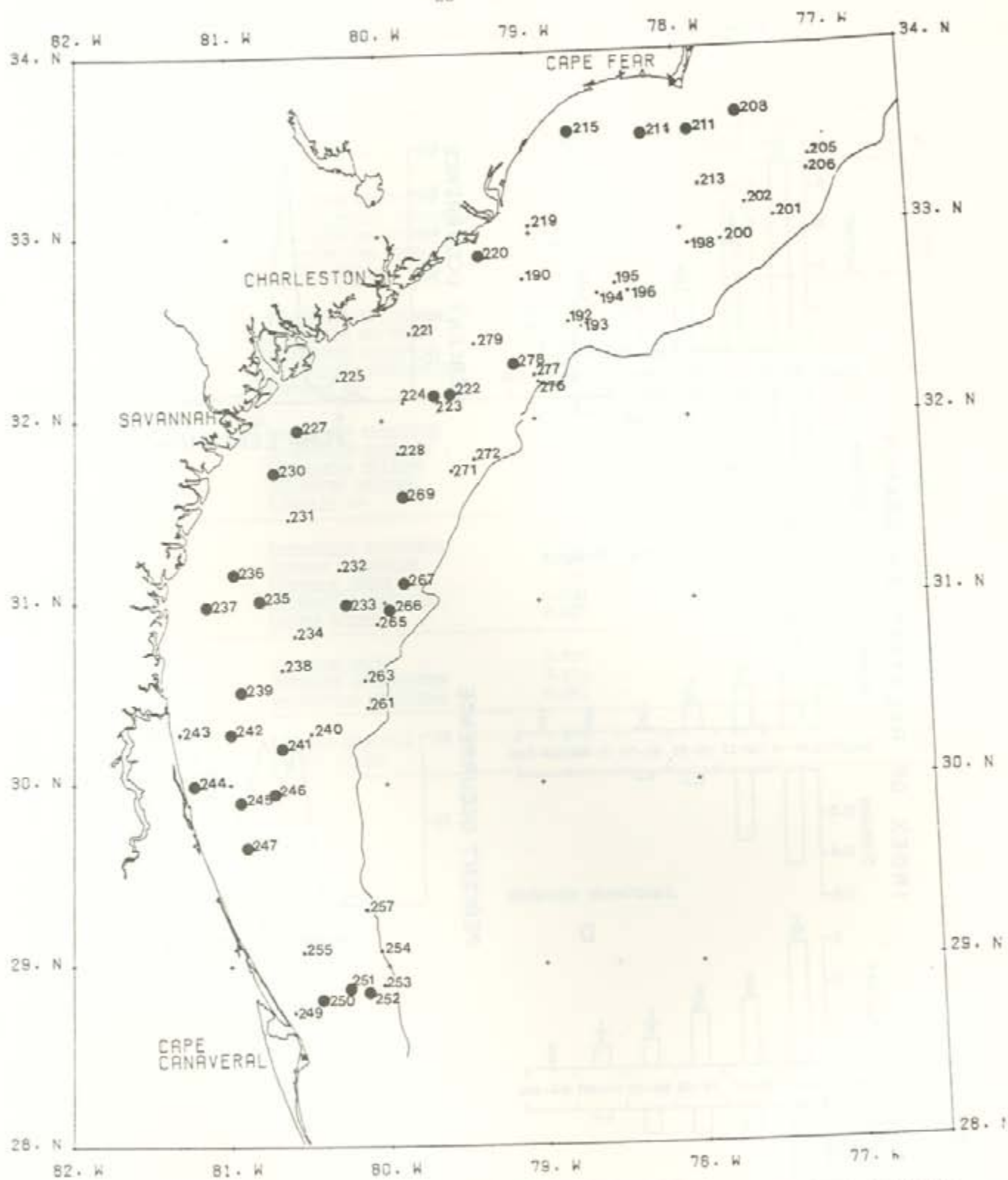


FIGURE 11. DISTRIBUTION OF ROUND SCAD, *DECAPTERUS PUNCTATUS*, IN THE SOUTH ATLANTIC BIGHT DURING SUMMER 1975. LARGE DOTS = SPECIES PRESENT; SMALL DOTS = SPECIES ABSENT.

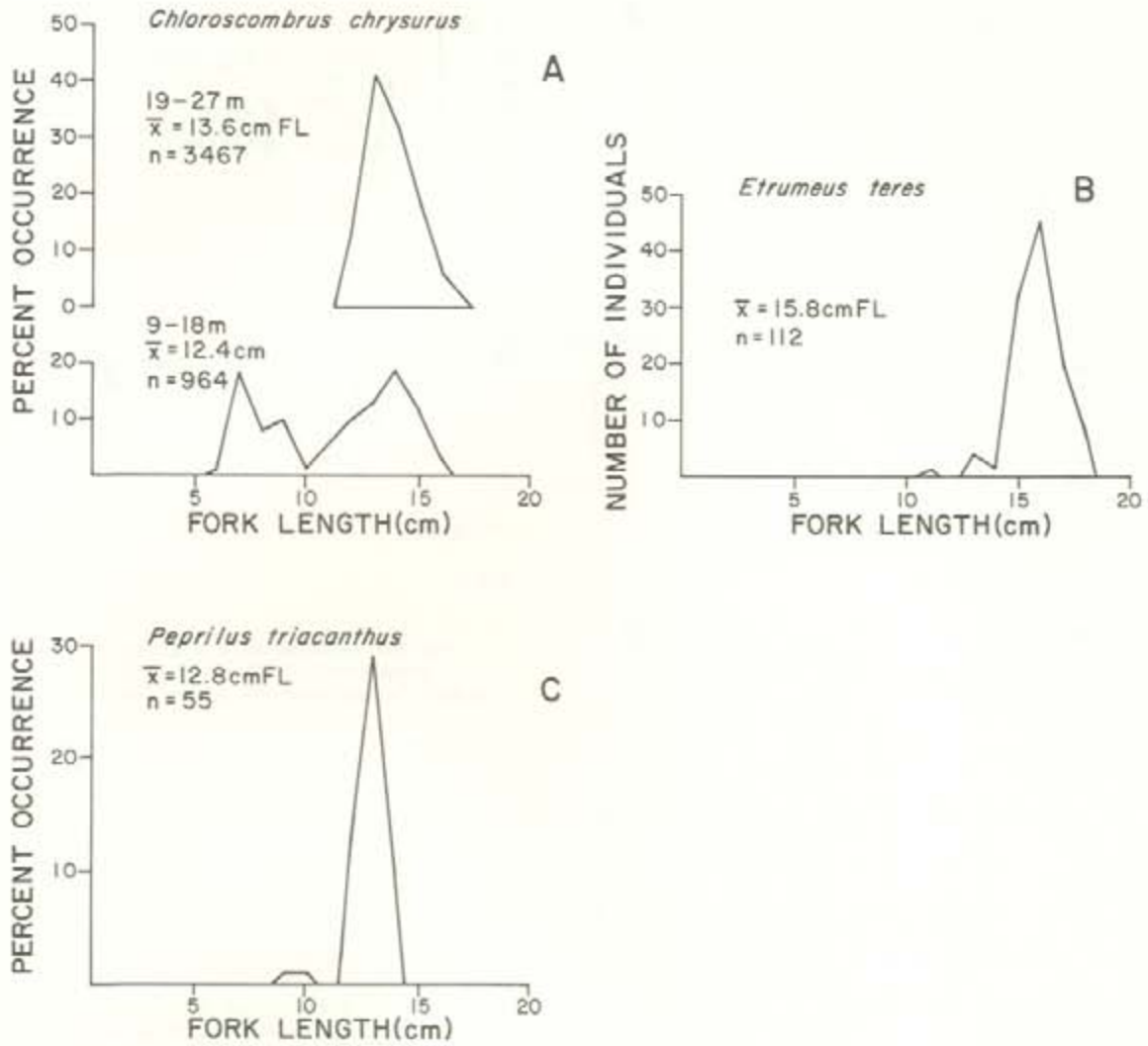


FIGURE 12. LENGTH FREQUENCIES OF (A) *CHLOROSCOMBRUS CHRYSURUS*, (B) *ETRUMEUS TERES* AND (C) *PEPRILUS TRIACANTHUS* DURING SUMMER 1975.

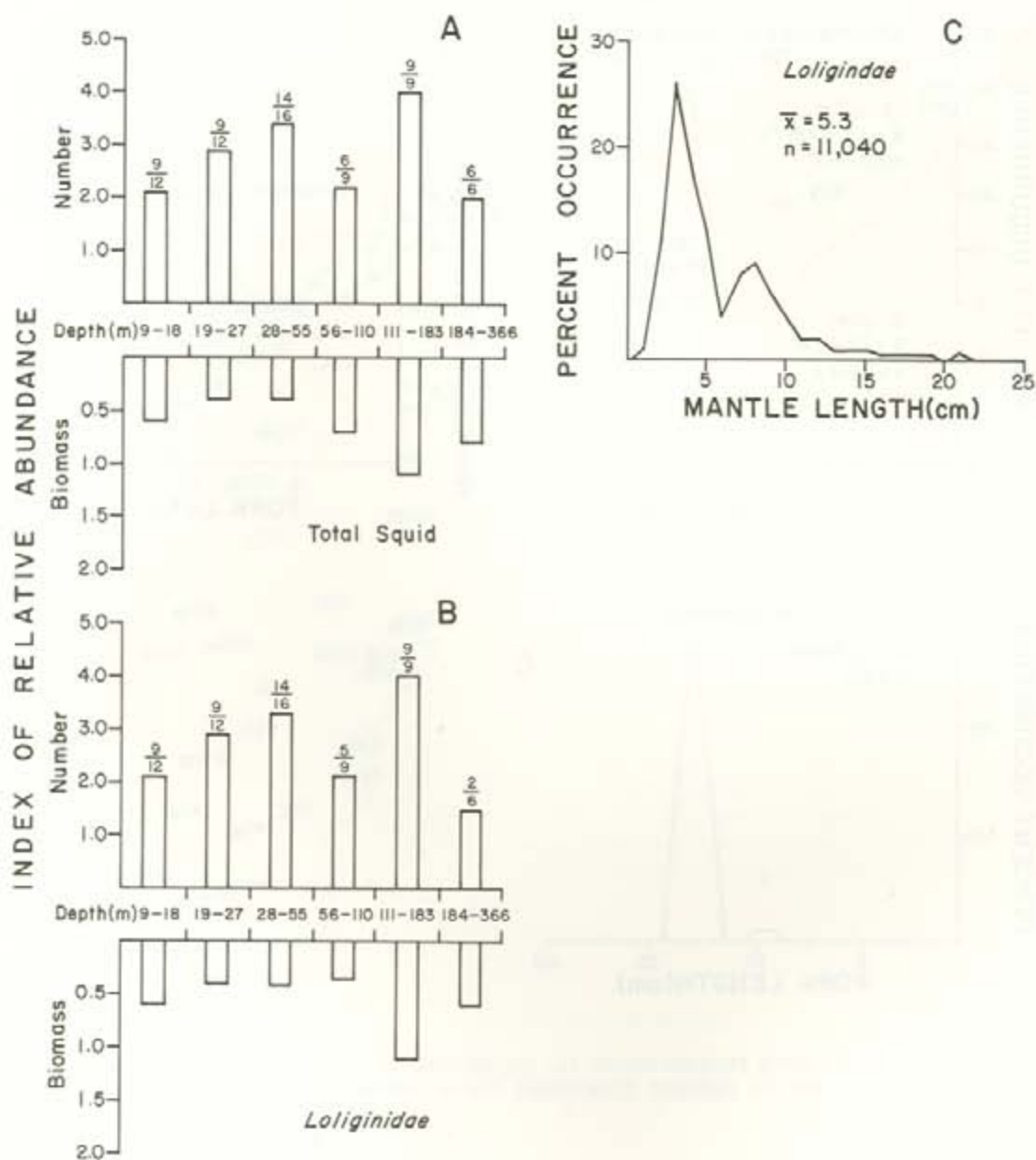


FIGURE 13. INDEX OF RELATIVE ABUNDANCE OF TOTAL SQUID NUMBERS (A) LOLIGINIDAE (B) IN THE SOUTH ATLANTIC BIGHT DURING THE SUMMER 1975 SURVEY. NUMBER IN NUMERATOR = TRAWLS IN DEPTH ZONE WITH TAXON; DENOMINATOR = TOTAL TRAWLS IN ZONE. LENGTH FREQUENCY DISTRIBUTION OF LOLIGINIDAE (C) DURING THE SURVEY.

111-183 m depth zone where this group was represented in all nine trawls (Fig. 13B). The mean size was 5.3 cm mantle length (range: 1-34 cm) (Fig. 13C). Squid abundance statistics are in Table 10.

Demersal Fish Diversity

The 1975 summer survey collected 152 species of demersal fishes (teleosts and elasmobranchs) in the open shelf and upper continental slope habitats of the South Atlantic Bight. The total number of species was highest in the 28-55 m depth zone and

lowest in the deepest area (184-366 m). The mean number of species/tow was highest in the 19-27 m zone and then showed a gradual decrease with depth (Table 16). Plots of the number of species/tow, species diversity and species richness showed a trend for high inshore variability followed by a gradual decrease with increasing trawl depth (Fig. 14 A,B,C). Low diversity values in shallow water trawl tows were caused by low evenness, whereas most low values in the deeper samples could be attributed to low richness (Appendix IV). Ranges for diversity and richness for each zone are:

<u>Depth Zone (m)</u>	<u>H'(bits/individual)</u>	<u>Species Richness</u>
9-18	0.134 - 3.266	0.553 - 3.559
19-27	0.030 - 3.610	0.261 - 4.478
28-55	0.994 - 4.223	1.338 - 5.018
56-110	0 - 3.321	0 - 4.472
111-183	0.353 - 3.015	0.369 - 3.566
184-366	1.500 - 2.407	1.302 - 2.232

When the 28 pelagic fish species are included in the total number, the summer 1975 survey collected 180 species of fishes.

Comparison of assemblages of demersal fishes by numerical classification resulted in seven site groups (Fig. 15). The major faunal division occurred between stations on the open shelf and shelf break (site groups 1 through 5) and those on the upper continental slope (site groups 6 and 7). The analysis showed depth related station groups, however, each showed depth overlap and a wide latitudinal range (Table 17). Previously we indicated that the overlap in depth could be attributed to the wide depth distribution of dominant species and the homogeneity of habitat and hydrography throughout the region. This interpretation was short-sighted, though plausible.

Site group 1 is composed of 15 trawl tows in depths from 14 to 38 m. All these tows were made during the day. Site group 2 contains 8 stations with all being made at night or dusk in 16 to 27 m. Site group 3 with one exception (75221; depth = 17 m) has stations made near or at the shelf break during day, dusk or dawn, in 17-40 m. Site group 4 is in the same approximate depth range with all but one tow occurring at night. Group 5 collections were, for the most part, beyond the shelf break (> 100m) at variable periods of the day. Thus, our previous interpretations of the cluster analysis of open-shelf groundfish collections in the South Atlantic Bight are in error, in that, time of trawl, as well as trawl depth, must be examined to provide some rational basis for site groups as shown by numerical classification.

Inverse analysis gave eight species groups, one of which (Group VIII) was a composite of three misclassified species (Fig. 16). Species group I (11 species) was made up of the ubiquitous open shelf species. The broad latitudinal and depth distributions of these species was indicated in the patterns of low fidelity (Fig. 17) and moderate to high constancy (Fig. 18). Thus, this assemblage of fish can be expected to occur regularly in otter trawl tows in depths shallower than the shelf break (< 100 m) during both day and night throughout the region.

Species group II showed high constancy and fidelity to site group 2 and moderate constancy and fidelity to site group 4. As previously indicated, site groups 2 and 4 were comprised of trawl tows made mostly at times other than during daylight periods. Comparisons of presence-absence of species group II with 2x2 contingency tables using the correction for continuity (Siegel 1956) for daylight and other (dusk, night, dawn) trawl tows for site groups 1 through 4 showed that most of the members of this species group occurred in significantly fewer day tows (Table 18).

Thus, during the summer of 1975, otter trawl tows in the shallower regions of the South Atlantic Bight were grouped basically by two factors: depth and time of day. It appeared that the ubiquitous sand bottom species (Species Group I) were represented in both day and night collections as evidenced by moderate and high constancy and low and moderate fidelity to both day site groups (1 & 3) and site groups with trawl tows made during other times (2 & 4). Collections at dawn,

Table 16. Total number of species, mean number of species/tow and mean number of individuals/tow for demersal fishes (elasmobranchs + demersal teleosts) in the South Atlantic Bight during the summer 1975 survey.

Depth zone (m)	Total Number of Demersal Species	Mean Number of Demersal Species/tow	Mean Number of Individuals/tow
9-18	46	10.4	389.8
19-27	60	15.2	331.3
28-55	71	13.3	95.6
56-110	56	13.1	145.3
111-183	41	8.0	132.1
184-366	22	5.6	26.0

Table 17. Characteristics of seven site groups as defined by cluster analysis for the sand bottom habitat during summer 1975.

Site Group	Number of Stations	\bar{x} Depth (m)	Depth Range (m)	Latitudinal Range of Stations
1	15	22.4	14-38	28.7° - 33.5°
2	8	22.5	16-27	30.5° - 33.5°
3	6	30.3	17-40	30.2° - 33.6°
4	8	34.0	22-44	28.8° - 31.5°
5	11	67.1	24-101	28.8° - 33.1°
6	6	159.8	139-198	31.8° - 33.3°
7	9	192.5	132-258	28.9° - 33.1°

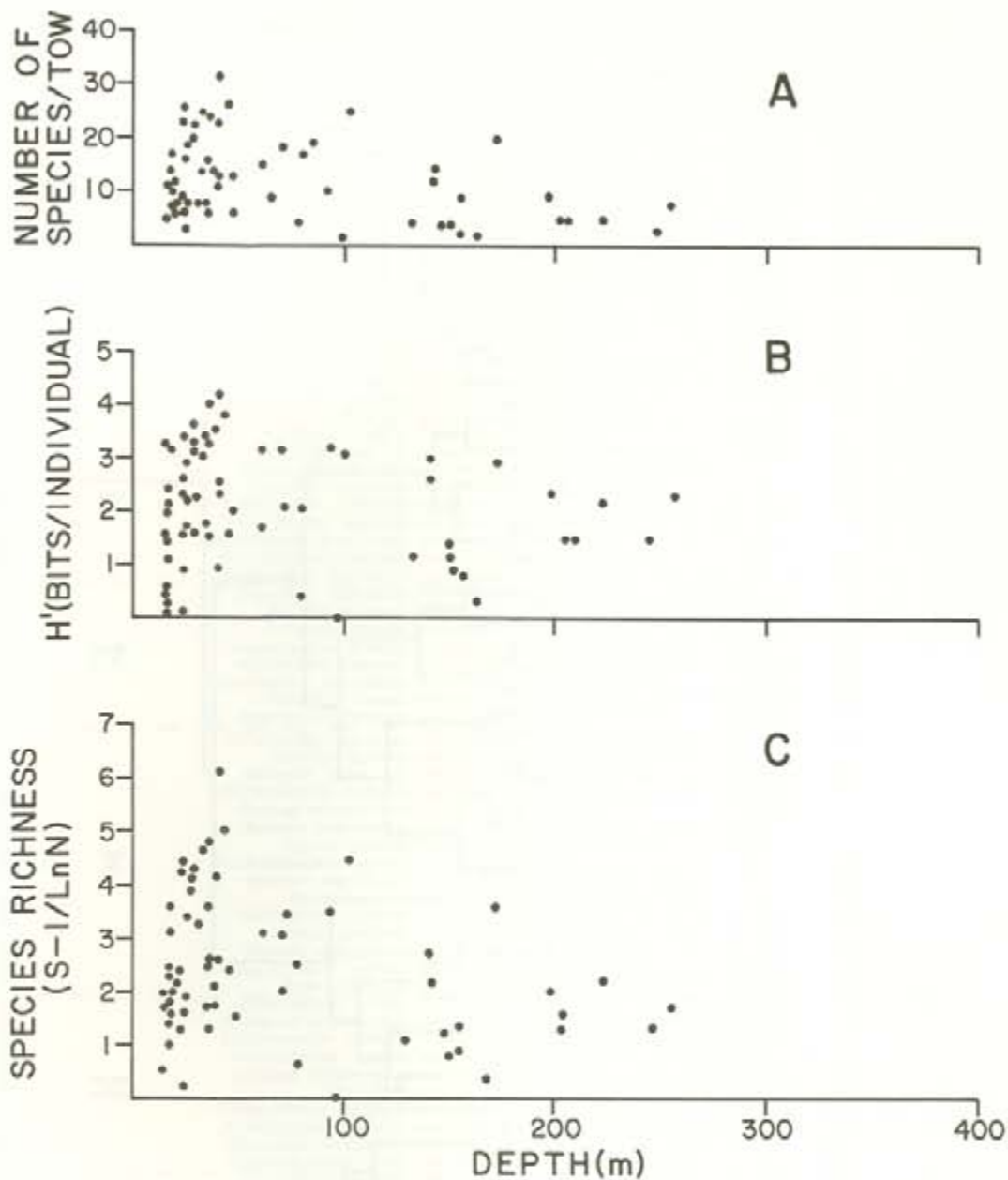


FIGURE 14. PLOTS OF THE NUMBER OF SPECIES PER TOW (A) SHANNON-WEAVER DIVERSITY (H' BITS/INDIVIDUAL) (B) AND SPECIES RICHNESS ($S-1/\ln N$ WHERE S = NUMBER OF SPECIES AND N = NUMBER OF INDIVIDUALS IN A TRAWL SAMPLE (C) AGAINST TRAWL DEPTH FOR THE SUMMER 1975 GROUND FISH SURVEY IN THE SOUTH ATLANTIC BIGHT.

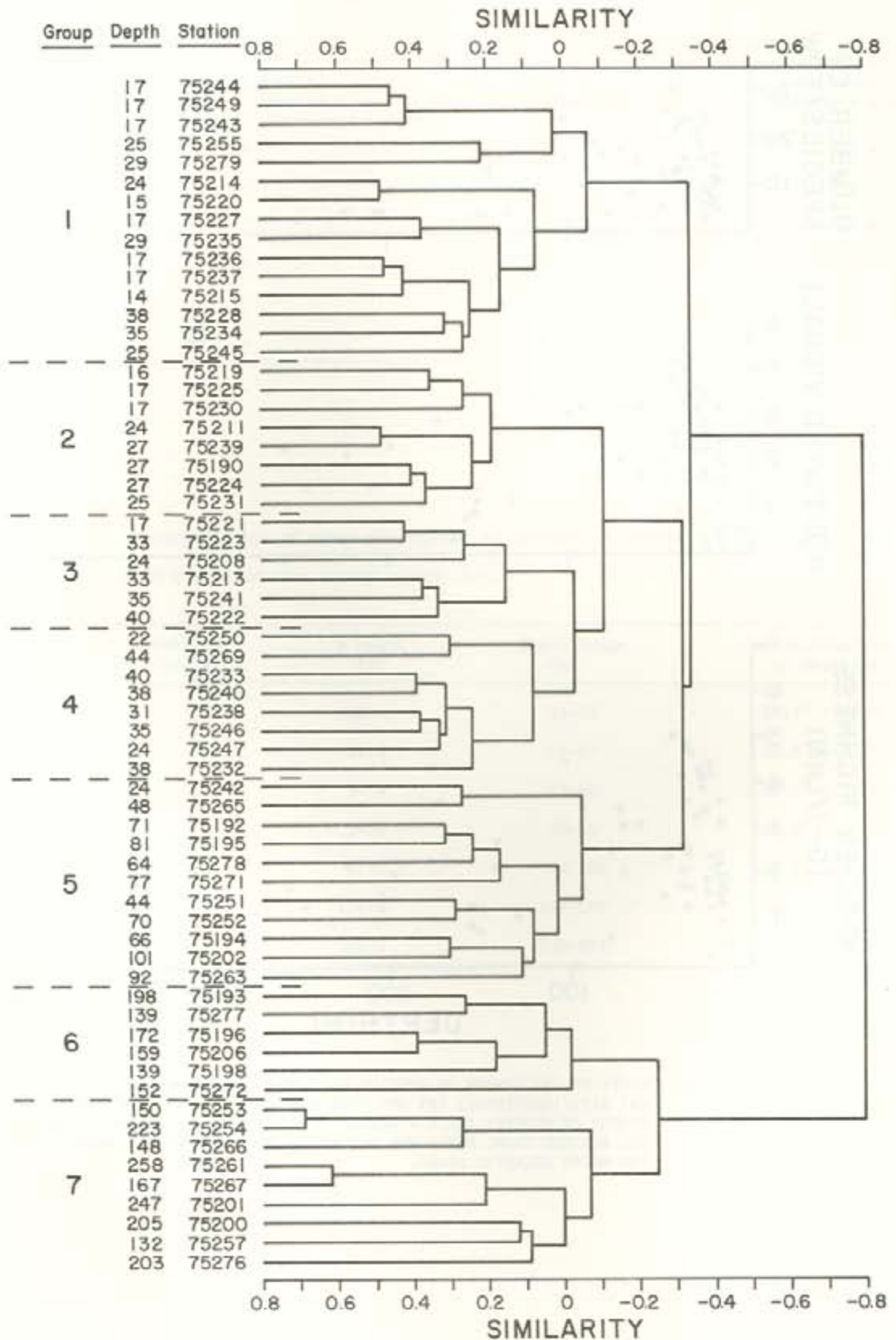


FIGURE 15. STATION CLUSTER (NORMAL ANALYSIS) FOR SUMMER 1975 SAND BOTTOM STATIONS. CANBERRA-METRIC CORRELATION, SQUARE ROOT TRANSFORMED DATA. FLEXIBLE SORTING, $\lambda = -0.25$.

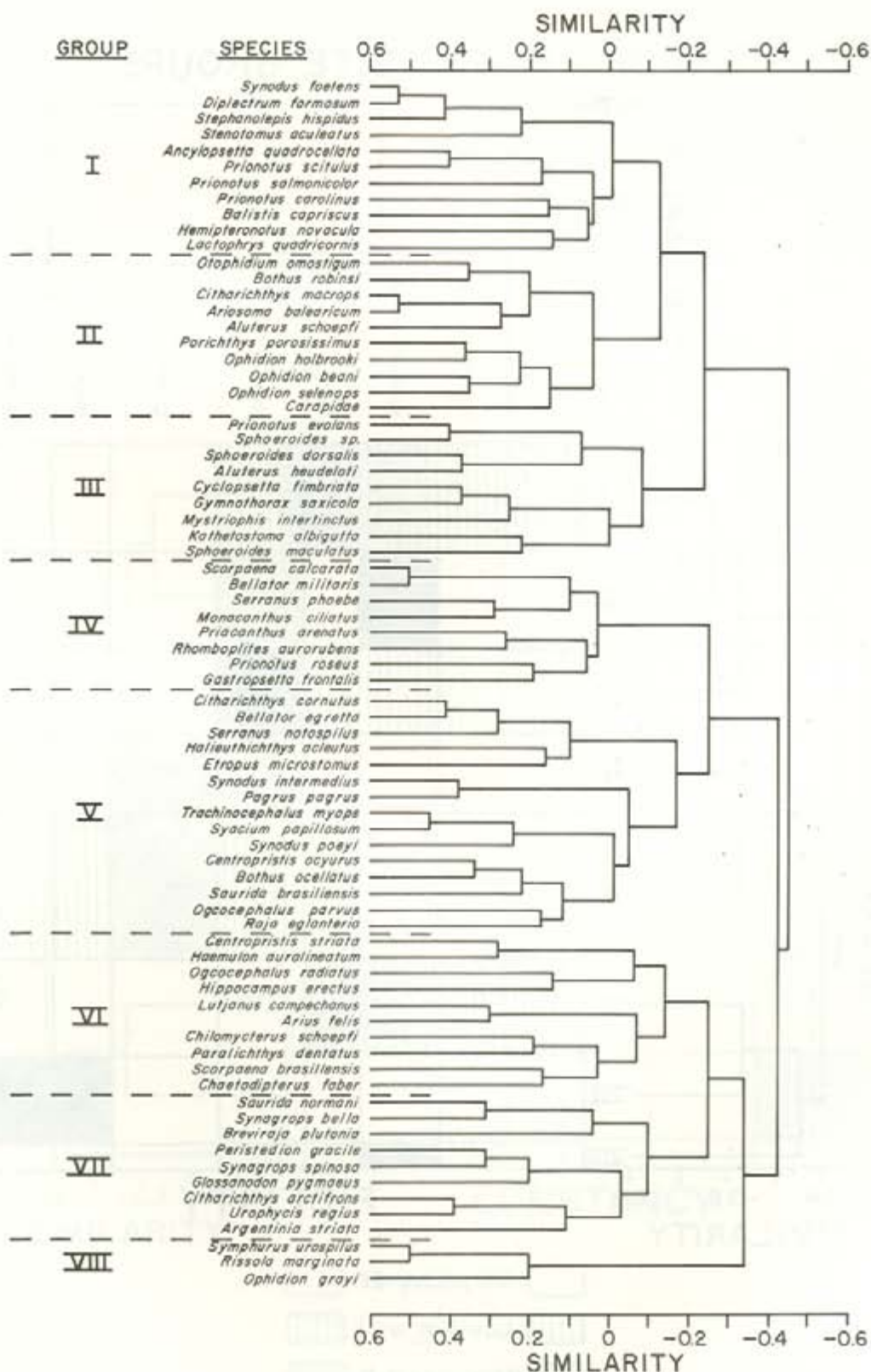


FIGURE 16. SPECIES CLUSTER (INVERSE ANALYSIS) FOR SUMMER 1975 SAND BOTTOM STATIONS. METHODOLOGY SAME AS FIGURE 15.

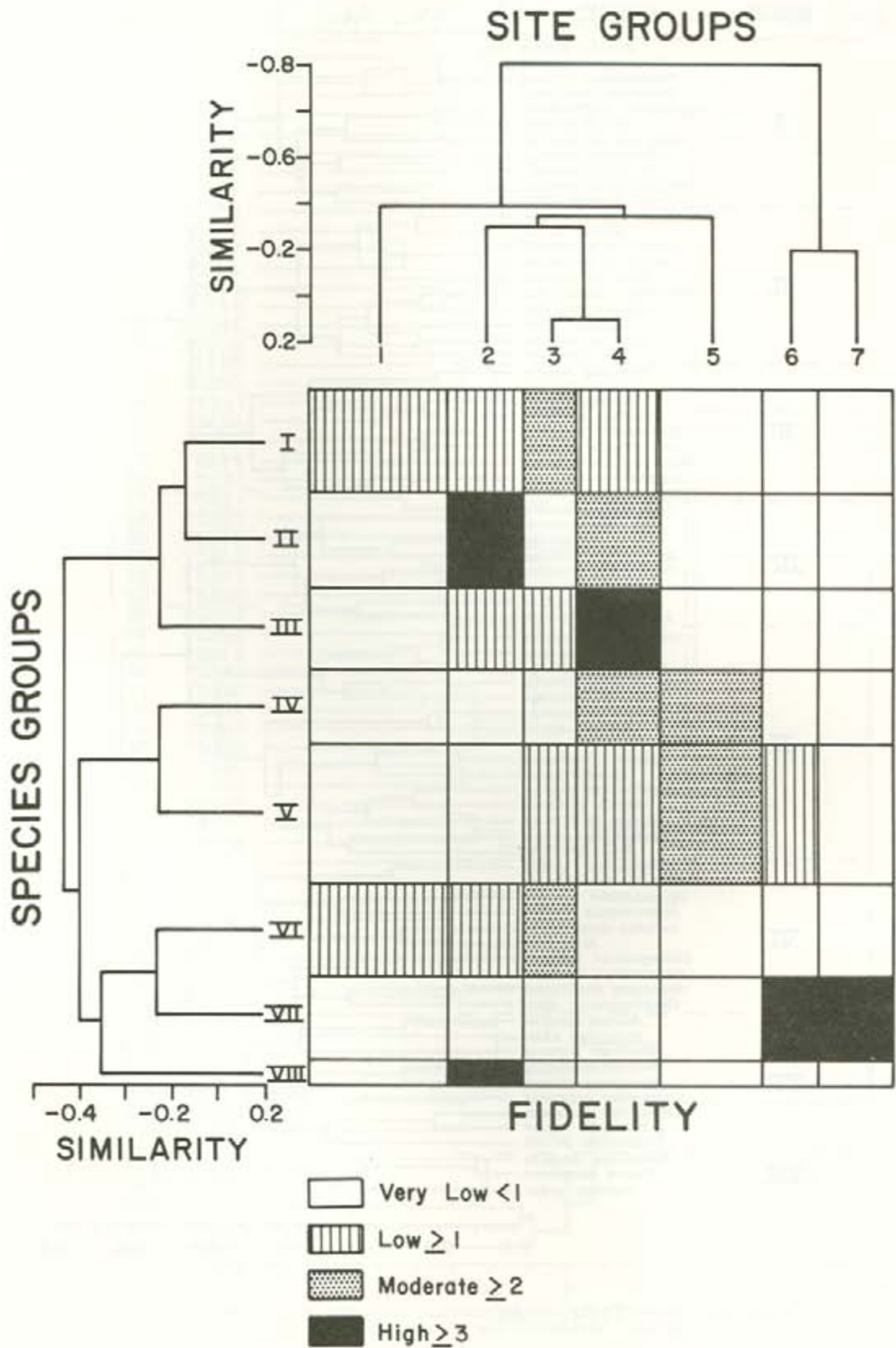


FIGURE 17. NODAL FIDELITY IN A TWO-WAY TABLE OF SPECIES GROUPS AND SITE GROUPS FOR SAND BOTTOM STATIONS DURING SUMMER 1975.

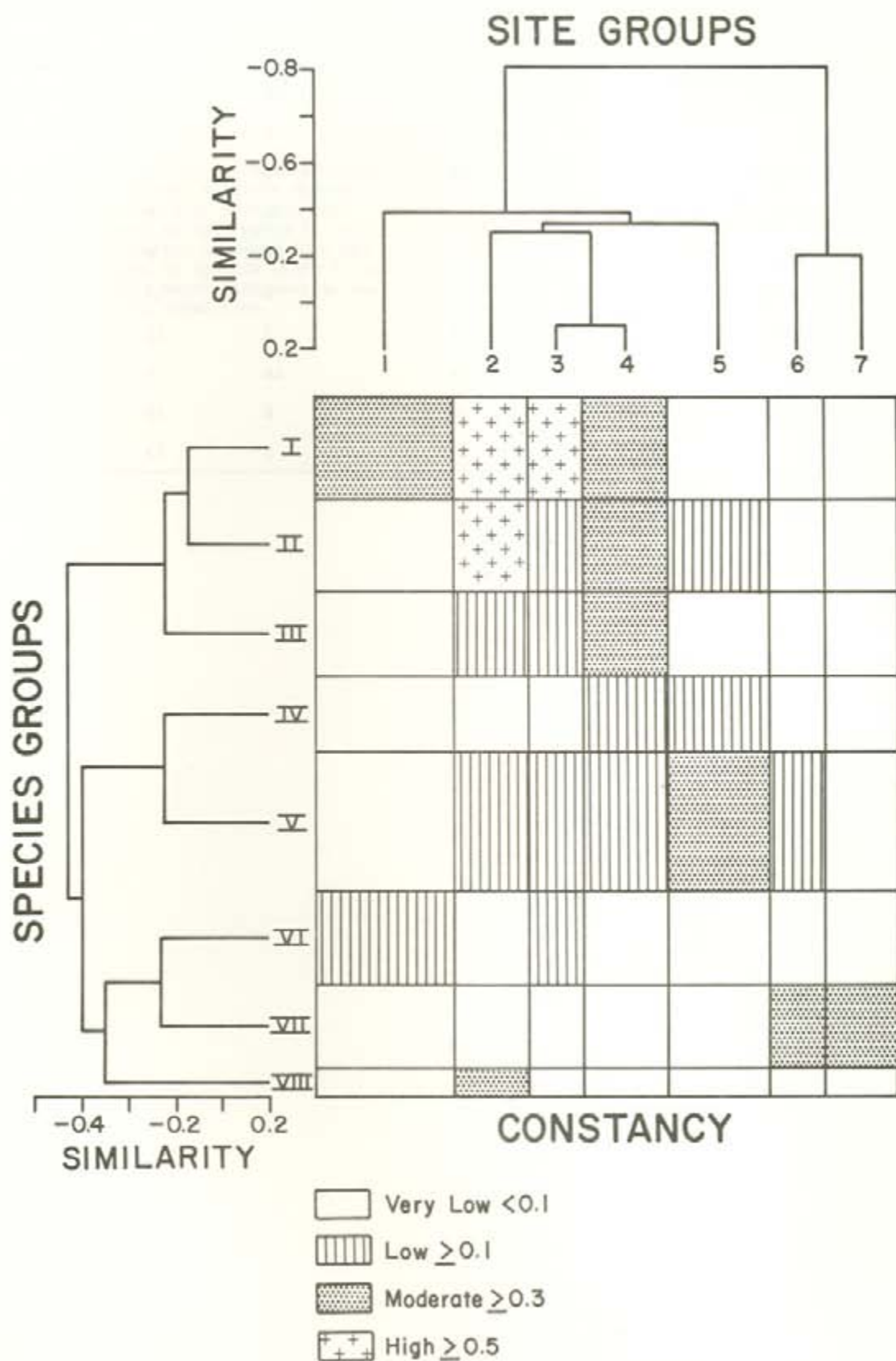


FIGURE 18. NODAL CONSTANCY IN A TWO-WAY TABLE OF SPECIES GROUPS AND SITE GROUPS FOR SAND BOTTOM STATIONS DURING SUMMER 1975.

Table 18. Comparisons of species in Group II for presence-absence in trawls made during the day and at dusk, night and dawn for site Groups 1 through 4.

Species	Day Tows		Other Tows		χ^2
	Present	Absent	Present	Absent	
<u>Ariosoma balearicum</u>	0	19	12	6	15.827*
<u>Bothus robinsi</u>	2	17	9	9	5.134*
<u>Citharichthys macrops</u>	1	18	9	9	7.249*
<u>Otophidium omostigmmum</u>	0	19	10	8	11.785*
<u>Aluterus schoepfi</u>	7	12	12	6	2.205 ^{ns}
<u>Porichthys porosissimus</u>	0	19	6	12	5.304*
<u>Ophidion holbrookii</u>	0	19	7	11	6.754*
<u>Ophidion beani</u>	0	19	14	4	20.581*
<u>Ophidion selenops</u>	1	18	8	10	5.727*
Carapidae	1	18	5	13	1.991 ^{ns}

*significant at the 95% level.

dusk or night at the shallowest trawl stations had another assemblage added which were available or vulnerable only during these times.

Site groups 6 and 7 contained otter trawl stations from the upper continental slope (132-258 m). Species group VII showed high fidelity and moderate constancy to both these site groups thus indicating that this assemblage of nine species resided on the upper continental slope during the summer of 1975.

Species group VIII was misclassified by the cluster. Nodal analysis showed that this group had high fidelity and moderate constancy to site group 2. All three species occurred in night tows and should be assigned to species group II on the basis of their depth distribution and time of capture in trawl tows.

LITERATURE CITED

- Bliss, C.I. 1967. Statistics in biology. Vol. I. McGraw-Hill, Inc., N.Y. 558 p.
- Boesch, D.F. 1977. Application of numerical classification in ecological investigations of water pollution. EPA-600/3-77-033 Ecological Research Series. 114 p.
- Clarke, S.H. and B.E. Brown. 1977. Changes in biomass of finfishes and squids from the Gulf of Maine to Cape Hatteras, 1963-74, as determined from research vessel survey data. Fish. Bull. 75: 1-21.
- Clifford, H.T. and W. Stephenson. 1975. An introduction to numerical classification. Academic Press, N.Y. 229 p.
- Cochran, W.C. 1977. Sampling techniques. John Wiley and Sons, N.Y. 428 p.
- Elliott, J.M. 1973. Some methods for the statistical analysis of samples of benthic invertebrates. Freshwater Biol. Assoc. U.K. Sci. Publ. No. 25. 148 p.
- Grosslein, M.D. 1969. Groundfish survey of BCF Woods Hole. Comm. Fish. Rev. 31: 22-35.
- Guenther, W.C. 1964. Analysis of variance. Prentice Hall, Englewood Cliffs, N.J. 199 p.
- Margalef, R. 1968. Perspectives in ecological theory. Univ. of Chicago Press, Chicago, Ill. 111 p.
- Musick, J.A. and J.D. McEachran. 1972. Autumn and winter occurrence of decapod crustaceans in the Chesapeake Bight, U.S.A. Crustaceans 22: 190-200.
- Pielou, E.C. 1975. Ecological diversity. Wiley-Interscience, N.Y. 165 p.
- Rohr, B.H. and E.J. Gutherz. 1977. Biology of the offshore hake, Merluccius albidus. Fish. Bull. 75: 147-158.
- Siegel, S. 1956. Nonparametric statistics for the behavioral sciences. McGraw-Hill, N.Y. 312 p.
- Taylor, C.C. 1953. Nature of variability in trawl catches. Fish. Bull. 54: 145-166.
- Wenner, C., C. Barans, B. Stender and F. Berry. 1979a. Results of MARMAP otter trawl investigations in the South Atlantic Bight. I. Fall, 1973. South Carolina Marine Resources Center. Tech. Report No. 33. 79 p.
- Wenner, C., C. Barans, B. Stender and F. Berry. 1979b. Results of MARMAP otter trawl investigations in the South Atlantic Bight. III. Summer, 1974. South Carolina Marine Resources Center. Tech. Report No. 41. 62 p.
- Wilk, S.J. and M.J. Silverman. 1976. Fish and hydrographic collections made by the research vessels Dolphin and Delaware II during 1968-72 from New York to Florida. NMFS-SSRF-697. 159 p.

APPENDIX I. Collection data for otter trawl stations during the 1975 summer groundfish survey in the South Atlantic Bight.

Collection Number	Latitude(°N)	Longitude(°W)	Depth (m)	Temperature (°C)	Salinity (PPT)	Time
75190	32°44.7'	75°03.0'	27	26.0	35.61	Night
75192	32°30.5'	78°45.3'	71	21.6	36.14	Dawn
75193	32°29.0'	75°40.0'	198	13.0	35.64	Day
75194	32°39.5'	78°33.6'	66	21.6	36.19	Day
75195	32°42.5'	78°26.5'	81	22.1	36.16	Day
75196	32°40.0'	78°21.5'	172	14.1	35.78	Dusk
75198	32°55.0'	77°57.0'	139	17.8	36.15	Night
75200	32°56.0'	77°44.0'	205	15.4	36.03	Day
75201	33°03.0'	77°22.5'	247	15.4	36.00	Day
75202	33°07.7'	77°33.7'	101	25.9	36.27	Night
75205	33°22.9'	77°07.5'	97	26.7	36.22	Day
75206	33°18.0'	77°08.5'	159	15.1	35.97	Day
75208	33°37.7'	77°35.0'	24	27.9	36.04	Day
75211	33°32.5'	77°54.0'	24	27.0	36.12	Night
75213	33°14.5'	77°52.0'	33	25.1	36.21	Dawn
75214	33°32.0'	78°13.0'	24	26.9	36.16	Day
75215	33°33.0'	78°41.7'	14	27.8	35.29	Day
75219	33°2.2'	79°00.0'	16	27.9	35.14	Night
75220	32°52.5'	79°19.0'	15	27.9	35.12	Day
75221	32°27.7'	79°48.5'	17	28.5	35.00	Day
75222	32°07.0'	79°31.7'	40	24.6	36.16	Day
75223	32°06.0'	79°38.0'	33	25.1	36.05	Dusk
75224	32°05.0'	79°51.5'	27	26.2	35.84	Night
75225	32°13.0'	80°17.0'	17	28.6	34.72	Night
75227	31°56.5'	80°32.0'	17	29.0	34.67	Day
75228	31°49.0'	79°53.8'	38	26.5	36.19	Day
75230	31°42.5'	80°19.6'	17	29.1	34.81	Dusk
75231	31°27.5'	80°37.2'	25	28.4	35.72	Night
75232	31°11.0'	80°17.5'	38	27.7	36.14	Night
75233	30°59.2'	80°13.3'	40	26.7	36.22	Night
75234	30°49.0'	80°35.0'	35	26.5	36.13	Day
75235	31°00.5'	80°48.0'	29	28.1	36.08	Day
75236	31°09.0'	80°57.5'	17	29.0	35.51	Day
75237	30°58.0'	81°08.0'	17	28.9	35.10	Day
75238	30°38.0'	80°40.0'	31	28.9	36.29	Night
75239	30°30.5'	80°54.8'	27	27.3	36.46	Night
75240	30°16.7'	80°29.0'	38	24.9	36.51	Night
75241	30°12.0'	80°39.0'	35	26.7	36.43	Dawn
75242	30°16.5'	80°58.6'	24	26.1	36.31	Day
75243	30°16.4'	81°19.5'	17	28.2	35.94	Day
75244	29°59.5'	81°12.5'	17	27.8	36.17	Day
75245	29°54.0'	80°55.0'	25	25.9	36.25	Day
75246	29°56.5'	80°42.7'	35	25.9	36.62	Night
75247	29°39.2'	80°53.3'	24	25.8	36.23	Night
75249	28°44.5'	80°36.0'	17	27.6	36.07	Day
75250	28°48.4'	80°24.0'	22	27.5	36.22	Day
75251	28°53.0'	80°13.5'	44	26.1	36.22	Dusk
75252	28°50.3'	80°07.0'	70	15.5	35.86	Night
75253	28°53.4'	80°02.1'	150	10.3	35.28	Night
75254	29°05.0'	80°03.0'	223	9.9	35.22	Night
75255	29°04.5'	80°32.5'	25	27.2	36.23	Day
75257	29°18.5'	80°08.6'	132	10.4	35.29	Day
75261	30°25.5'	80°07.0'	258	7.8	34.99	Night
75263	30°34.5'	80°08.0'	92	16.0	35.91	Dawn
75265	30°53.0'	80°03.0'	48	23.6	36.20	Day
75266	30°57.5'	79°56.5'	148	9.7	35.22	Day
75267	31°06.2'	79°51.5'	167	9.8	35.21	Day
75269	31°34.4'	79°51.0'	44	22.5	36.14	Night
75271	31°43.0'	79°33.0'	77	17.1	36.22	Day
75272	31°47.0'	79°24.0'	152	16.1	36.14	Day
75276	32°11.0'	79°58.0'	203	10.4	35.35	Night
75277	32°13.2'	78°59.5'	139	17.6	35.18	Night
75278	32°16.5'	79°06.5'	64	21.2	36.16	Day
75279	32°24.0'	79°23.0'	29	25.7	35.54	Day

APPENDIX II. Catches of demersal fish by number and weight (kg) for individual depth zones for the summer 1975 groundfish survey in the South Atlantic Bight.

DEPTH ZONES		9-18		19-27		28-55		56-110		111-183		184-366 m	
FAMILY	SPECIES	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Carcharhinidae	<u>Rhizoprionodon terraenovae</u>					1	2.3						
Sphyrinidae	<u>Sphyrna tiburo</u>	3	4.0										
Rajidae	<u>Raja eglanteria</u>	1	0.4	4	1.5	8	4.4	6	3.4				
	<u>Breviraja plutonia</u>									1	0.1	15	0.6
Dasyatidae	<u>Dasyatis centroura</u>			1	161.2	2	328.9	1	121.4			1	90.7
Myliobatidae	<u>Rhinoptera bonasus</u>			20	385.6								
Muraenidae	<u>Cymnothorax saxicola</u>			3	0.3	18	1.5	3	0.3				
Muraenesocidae	<u>Hoplunnis sp.</u>									2	0.1	1	0.1
Congridae	<u>Ariosoma balearicum</u>	3	0.1	23	0.8	14	0.2						
	<u>Gnathophis sp.</u>							2	0.1				
Ophichthidae	<u>Myxtriophis intertinctus</u>			1	0.1	3	0.3	1	0.1				
	<u>Ophichthus gomesi</u>			1	0.1			2	0.1				
	<u>Ophichthus melanoporus</u>					1	0.1						
	<u>Ophichthus ocellatus</u>					3	0.1			1	0.2		
Argentinidae	<u>Argentina striata</u>									34	0.1	1	0.1
	<u>Glossanodon pygmaeus</u>									399	0.5	18	0.1
Synodontidae	<u>Saurida brasiliensis</u>					2	0.1	17	0.1	5	0.1		
	<u>Saurida caribbaea</u>									1	0.1		
	<u>Saurida normani</u>									9	0.3	2	0.5
	<u>Synodus foetens</u>	80	6.3	110	12.5	180	22.0	7	1.6				
	<u>Synodus intermedius</u>					4	0.4	21	2.3				
	<u>Synodus poeyi</u>	1	0.1			154	0.4	640	2.7	2	0.1	1	0.1
	<u>Trachinocephalus myops</u>	2	0.1	18	1.4	76	5.1	54	4.0				
Chlorophthalmidae	<u>Chlorophthalmus agassizi</u>											6	0.1
Ariidae	<u>Arius felis</u>	37	14.2	29	6.8								
Batrachoididae	<u>Porichthys porosissimus</u>	1	0.1	8	0.1	4	0.1	1	0.1				
Lophiidae	<u>Lophius americanus</u>									2	0.4		
Antennariidae	<u>Antennarius multiocellatus</u>									1	0.1		
Ogcocephalidae	<u>Halieutichthys aculeatus</u>					7	0.1	4	0.1	2	0.1		
	<u>Ogcocephalus parvus</u>					2	0.1	8	0.1				
	<u>Ogcocephalus radiatus</u>			1	0.2			1	0.1	2	0.1		
	<u>Zalieutes mcgintyi</u>									21	0.2		
Gadidae	<u>Urophycis earlII</u>							1	0.1				
	<u>Urophycis regius</u>									180	7.2	17	1.3
Merlucciidae	<u>Merluccius albidus</u>											2	0.5
	<u>Merluccius bilineatus</u>											1	0.1
Moridae	<u>Laemonema barbatulum</u>											19	0.5
Ophidiidae	<u>Lepophidium cervinum</u>									2	0.1		
	<u>Lepophidium jeannae</u>							1	0.1				
	<u>Ophidion beani</u>	11	0.2	157	5.9	31	1.7	10	0.1				
	<u>Ophidion grayi</u>	1	0.1	2	0.1								
	<u>Ophidion holbrookii</u>	1	0.1	16	1.3	7	1.2	3	0.3				
	<u>Ophidion selenops</u>	3	0.1	93	0.8	1	0.1	2	0.1				
	<u>Otophidium omostigmum</u>			17	0.2	76	0.6						
	<u>Rissola marginata</u>	2	0.1	1	0.1								
Carapidae	<u>Carapus bermudensis</u>			218	0.5			1	0.1				
Polymixidae	<u>Polymixia lowei</u>											1	0.1

DEPTH ZONES	9-18		19-27		28-55		56-110		111-183		184-366 m	
	FAMILY	SPECIES	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Zeidae	<u>Zenopsis ocellata</u>								9	0.1		
Caproidae	<u>Antigonia capros</u>								91	5.6		
Centriscidae	<u>Macrorhamposus scolopax</u>								4	0.1		
Syngnathidae	<u>Hippocampus erectus</u>	1	0.1					2	0.1			
	<u>Hippocampus sp.</u>					1	0.1					
	<u>Syngnathus springeri</u>					1	0.1					
Percichthyidae	<u>Synagrops bella</u>								54	0.2	9	0.1
	<u>Synagrops spinosa</u>								63	0.2	6	0.1
Serranidae	<u>Centropristis ocyurus</u>			1	0.1	34	1.9	28	1.3			
	<u>Centropristis striata</u>	2	0.2	9	1.0							
	<u>Diplectrum formosum</u>	131	10.0	248	14.9	411	18.4					
	<u>Epinephelus niveatus</u>								2	9.6		
	<u>Serranus phoebe</u>					1	0.1	105	0.6			
	<u>Serranus notospilus</u>					2	0.1	74	0.3	50	0.5	
	<u>Schultzea beta</u>							14	0.1			
	<u>Anthias nicholsi</u>								1	0.1		
	<u>Hemanthias vivanus</u>							9	0.1	1	0.1	
	<u>Hemanthias sp.</u>					1	0.1	1	0.1			
Priacanthidae	<u>Priacanthus arenatus</u>			1	0.1	3	0.2					
Apogonidae	<u>Apogon pseudomaculatus</u>					3	0.1					
Branchiostegidae	<u>Caulolatilus microps</u>								2	0.3		
	<u>Lopholatilus chamaeleonticeps</u>										8	0.4
Rachycentridae	<u>Rachycentron canadum</u>					1	10.1					
Emmelichthyidae	<u>Emmelichthyidae</u>							2	0.1			
Lutjanidae	<u>Lutjanus campechanus</u>	9	0.2									
	<u>Rhomboplites aurorubens</u>	1	0.1	1	0.2	10	1.0	1	0.3			
Gerridae	<u>Eucinostomus argenteus</u>	60	0.8									
	<u>Eucinostomus gula</u>	7	0.1									
Haemulidae	<u>Haemulon aurolineatum</u>			17	1.0	2	0.2					
	<u>Haemulon striatum</u>							10	0.3			
	<u>Orthopristis chrysoptera</u>	9	1.1									
Sparidae	<u>Calamus leucosteus</u>			2	0.1	1	0.6					
	<u>Calamus nodosus</u>					1	1.0					
	<u>Lagodon rhomboides</u>	5	0.4									
	<u>Pagrus pagrus</u>					5	0.3	9	0.4			
	<u>Stenotomus aculeatus</u>	4055	72.7	2638	54.8	171	11.6					
Sciaenidae	<u>Cynoscion nothus</u>	26	1.9									
	<u>Cynoscion regalis</u>	2	0.5									
	<u>Equetus lanceolatus</u>					4	0.6					
	<u>Equetus sp.</u>											
	<u>Larimus fasciatus</u>	14	2.0					1	0.1			
	<u>Leiostomus xanthurus</u>	45	6.1									
	<u>Micropogonias undulatus</u>	26	3.9									
Mullidae	<u>Mullus auratus</u>							1	0.1			
Ephippidae	<u>Chaetodipterus faber</u>	1	0.2	6	1.9							
Labridae	<u>Decodon puellaris</u>								1	0.1		
	<u>Hemipteronotus novacula</u>	11	0.6	2	0.1	4	0.1					
Percophidae	<u>Bembrops gobioides</u>								1	0.1		
Dactyloscopidae	<u>Dactyloscopidae</u>					1	0.1					
Uranoscopidae	<u>Kathetostoma albigutta</u>			2	0.1	2	0.1	11	1.0	7	0.3	

DEPTH ZONES		9-18		19-27		28-55		56-110		111-183		184-366 m	
FAMILY	SPECIES	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Callionymidae	<u>Callionymus agassizi</u>									1	0.1		
Scorpaenidae	<u>Helicolenus dactylopterus</u>											2	0.1
	<u>Neomerinthe hemingwayi</u>									24	2.6		
	<u>Scorpaena brachyptera</u>							3	0.1				
	<u>Scorpaena brasiliensis</u>	2	0.1			2	0.2						
	<u>Scorpaena calcarata</u>	1	0.1	4	0.1	62	2.2	20	0.8				
Triglidae	<u>Bellator egretta</u>							27	0.1	10	0.2		
	<u>Bellator militaris</u>			1	0.1	14	0.1	12	0.1				
	<u>Prionotus alatus</u>							3	0.1				
	<u>Prionotus carolinus</u>	58	2.2	60	2.4	68	5.3						
	<u>Prionotus evolans</u>			1	0.2	5	1.2						
	<u>Prionotus ophyras</u>					1	0.1						
	<u>Prionotus roseus</u>	1	0.1	2	0.1	5	0.3	5	0.1				
	<u>Prionotus salmonicolor</u>	9	1.4	18	3.0	12	2.7						
	<u>Prionotus scitulus</u>	14	0.7	5	0.2	4	0.1						
	<u>Prionotus stearnsi</u>									7	0.1		
	<u>Peristedion gracile</u>									60	1.0	27	0.2
Dactylopteridae	<u>Dactylopterus volitans</u>							1	1.0				
Bothidae	<u>Ancylosetta quadrocellata</u>	3	0.4	12	2.6	4	1.1						
	<u>Bothus ocellatus</u>			4	0.1	34	1.1	13	0.3				
	<u>Bothus robinsi</u>			19	0.4	76	7.9						
	<u>Bothus sp.</u>					2	0.1						
	<u>Citharichthys arctifrons</u>									49	0.1	16	0.1
	<u>Citharichthys cornutus</u>							18	0.1	39	0.2		
	<u>Citharichthys dinoceros</u>									1	0.1		
	<u>Citharichthys gymnorhinus</u>							15	0.1				
	<u>Citharichthys macrops</u>	3	0.1	13	0.6	3	0.1	1	0.1				
	<u>Cyclosetta fimbriata</u>			2	0.2	17	1.2					1	0.1
	<u>Etropus crossotus</u>	1	0.1										
	<u>Etropus microstomus</u>							6	0.1	1	0.1		
	<u>Etropus rimosus</u>							7	0.1				
	<u>Gastropsetta frontalis</u>					2	0.3			7	0.5		
	<u>Paralichthys dentatus</u>	1	0.2	4	1.0	2	0.4						
	<u>Paralichthys lethostigma</u>									2	0.5		
	<u>Syacium papillosum</u>	7	0.6	39	3.2	77	10.2	109	9.1				
Soleidae	<u>Gymnachirus melas</u>			1	0.1	1	0.1						
Cynoglossidae	<u>Symphurus diomedianus</u>			1	0.1	3	0.1						
	<u>Symphurus minor</u>			1	0.1								
	<u>Symphurus urospilus</u>	5	0.1	3	0.1								
	<u>Symphurus parvus</u>							4	0.1				
Balistidae	<u>Aluterus heudeloti</u>			6	0.5	8	1.9						
	<u>Aluterus schoepfi</u>	3	2.3	24	21.7	30	31.5						
	<u>Balistes capriscus</u>	2	0.2	1	0.1	4	0.5	1	2.5				
	<u>Monacanthus ciliatus</u>			1	0.1	1	0.1	1	0.1				
	<u>Stephanolepis hispidus</u>	14	0.4	81	2.7	111	5.6	2	0.1				
Ostraciidae	<u>Lactophrys quadricornis</u>	2	0.6	4	1.2	3	1.0						
Tetraodontidae	<u>Sphoeroides dorsalis</u>			4	0.1	5	0.3						
	<u>Sphoeroides maculatus</u>			2	0.2	1	0.3						
	<u>Sphoeroides pachygaster</u>									8	1.3		
	<u>Sphoeroides spengleri</u>			1	0.1								
	<u>Sphoeroides testudineus</u>					4	0.2						
	<u>Sphoeroides sp.</u>					2	0.1						

DEPTH ZONES		9-18		19-27		28-55		56-110		111-183		184-366 m	
FAMILY	SPECIES	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
Diodontidae	<u>Chilomycterus antillarum</u>			1	0.1			1	0.2				
	<u>Chilomycterus atinga</u>					2	2.0						
	<u>Chilomycterus schoepfi</u>			4	1.1	2	0.3	1	0.3				

APPENDIX III. Collection numbers for fishes taken during summer 1975 groundfish survey in the South Atlantic Bight.

<u>Family</u>	<u>Species</u>	<u>Collection Numbers For Each Occurrence</u>		
Carcharhinidae	<u>Rhizoprionodon terraenovae</u>	75228		
Sphyrnidae	<u>Sphyrna tiburo</u>	75249		
Rajiidae	<u>Raja eglanteria</u>	75195	75202	75211
		75213	75222	75224
		75225	75240	75241
		75251	75278	
	<u>Breviraja plutonia</u>	75196	75261	
Dasyatidae	<u>Dasyatis centroura</u>	75200	75242	75265
		75278		
Myliobatidae	<u>Rhinoptera bonasus</u>	75255		
Muraenidae	<u>Gymnothorax saxicola</u>	75194	75202	75232
		75233	75238	75240
		75241	75246	75247
		75251		
Muraenesocidae	<u>Hoplunnis sp.</u>	75253	75254	
Congridae	<u>Ariosoma balearicum</u>	75190	75211	75224
		75225	75230	75231
		75232	75233	75238
		75239	75240	75247
	<u>Gnathophis sp.</u>	75202		
Ophichthidae	<u>Mystriophis intertinctus</u>	75190	75194	75238
		75240	75246	
	<u>Ophichthus gomesi</u>	75202	75224	
	<u>Ophichthus melanoporus</u>	75251		
	<u>Ophichthus ocellatus</u>	75251	75277	
Clupeidae	<u>Etrumeus teres</u>	75214	75271	75272
		75277	75278	
	<u>Opisthonema oglinum</u>	75243	75250	
	<u>Sardinella anchovia</u>	75194	75211	75215
		75220	75222	75223
		75227	75230	75235
		75236	75237	75240
		75241	75242	75245
		75249	75251	
Engraulidae	<u>Anchoa cubana</u>	75249		
	<u>Anchoa hepsetus</u>	75249		
	<u>Anchoa lyolepis</u>	75249		
	<u>Anchoviella perfasciata</u>	75220	75242	75245
Argentinidae	<u>Argentina striata</u>	75253	75254	75257
	<u>Glossanodon pygmaeus</u>	75193	75196	75198
		75201	75206	75261
		75267	75277	
Synodontidae	<u>Saurida brasiliensis</u>	75192	75194	75195
		75206	75251	75263
		75278	75279	

<u>Family</u>	<u>Species</u>	<u>Collection Numbers For Each Occurrence</u>		
Synodontidae (cont.)	<u>Saurida caribbaea</u>	75266		
	<u>Saurida normanf</u>	75196	75200	75206
	<u>Synodus foetens</u>	75190	75192	75208
		75211	75213	75214
		75215	75220	75221
		75222	75223	75224
		75227	75228	75230
		75231	75232	75233
		75234	75235	75236
		75237	75238	75239
		75240	75241	75242
		75243	75244	75245
		75246	75247	75249
		75250	75251	75269
		75271	75278	75279
		<u>Synodus intermedius</u>	75192	75194
	75202		75222	75223
	75271			
	<u>Synodus poeyi</u>	75192	75193	75194
		75195	75202	75206
		75213	75223	75232
		75233	75240	75241
		75243	75246	75252
75269		75271	75278	
<u>Trachinocephalus myops</u>	75190	75192	75194	
	75195	75202	75211	
	75213	75219	75221	
	75222	75223	75228	
	75232	75233	75235	
	75238	75239	75240	
	75241	75242	75246	
	75247	75263	75265	
	75269	75278		
Myctophidae	<u>Diaphus dumerili</u>	75276		
Chlorophthalmidae	<u>Chlorophthalmus agassizi</u>	75261		
Ariidae	<u>Arius felis</u>	75243	75244	75249
		75250	75255	
Batrachoididae	<u>Perichthys porosissimus</u>	75190	75202	75211
		75219	75239	75246
		75251	75269	
Lophiidae	<u>Lophius americanus</u>	75196	75198	
Antennariidae	<u>Antennarius multiocellatus</u>	75277		
Ogcocephalidae	<u>Halieutichthys aculeatus</u>	75194	75195	75198
		75202	75232	75233
		75246	75257	75263
	<u>Ogcocephalus parvus</u>	75192	75195	75222
		75233	75252	75271
		75278		
	<u>Ogcocephalus radiatus</u>	75192	75255	75257
		75266		
	<u>Zalieutes mcgintyi</u>	75277		
Gadidae	<u>Urophycis earlII</u>	75252		
	<u>Urophycis regius</u>	75198	75253	75254
		75261	75266	75267
		75276	75277	
Merluccidae	<u>Merluccius bilinearis</u>	75276		
	<u>Merluccius albidus</u>	75254	75261	

Family	Species	Collection Numbers For Each Occurrence		
Moridae	<u>Laemonema barbatulum</u>	75261		
Ophidiidae	<u>Lepophidium cervinum</u>	75277		
	<u>Lepophidium jeannae</u>	75202		
	<u>Ophidion beani</u>	75190	75211	75213
		75219	75224	75225
		75230	75231	75233
		75238	75239	75241
		75246	75247	75251
		75252		
	<u>Ophidion grayi</u>	75211	75230	75231
	<u>Ophidion holbrookii</u>	75190	75219	75224
		75238	75239	75246
		75247	75251	75252
	<u>Ophidion selenops</u>	75190	75192	75211
		75219	75220	75224
		75230	75231	75239
		75247	75251	
	<u>Otophidium omostigmum</u>	75190	75213	75224
	75231	75233	75239	
	75240	75241	75246	
	75247			
<u>Rissola marginata</u>	75219	75225	75231	
Carapidae	<u>Carapus bermudensis</u>	75190	75202	75211
		75231	75239	75245
		75247		
Polymixidae	<u>Polymixia lowei</u>	75261		
Zeidae	<u>Zenopsis ocellata</u>	75277		
Caproidae	<u>Antigonia capros</u>	75196	75277	
Fistulariidae	<u>Fistularia villosa</u>	75251		
Centriscidae	<u>Macrorhamphosus scolopax</u>	75196		
Syngnathidae	<u>Hippocampus erectus</u>	75192	75221	75276
	<u>Hippocampus sp.</u>	75235		
	<u>Syngnathus springeri</u>	75233		
Percichthyidae	<u>Synagrops bella</u>	75196	75200	75201
		75206	75257	75276
		75277		
	<u>Synagrops spinosa</u>	75193	75276	75277
Serranidae	<u>Centropristis ocyurus</u>	75190	75192	75195
		75213	75240	75241
		75251	75252	75263
		75279		
	<u>Centropristis striata</u>	75208	75221	75239
	<u>Diplectrum formosum</u>	75190	75208	75211
		75213	75214	75215
		75219	75220	75221
		75222	75223	75224
		75225	75227	75228
		75230	75231	75232
		75233	75234	75235
		75236	75237	75238
	75239	75240	75241	
	75242	75243	75244	
	75245	75246	75247	
	75249	75251	75255	
	75265	75279		

<u>Family</u>	<u>Species</u>	<u>Collection Numbers For Each Occurrence</u>			
Serranidae (cont.)	<u>Epinephelus niveatus</u>	75196			
	<u>Serranus phoebe</u>	75194 75251	75195 75252	75202	
	<u>Serranus notospilus</u>	75192 75198 75206 75277	75194 75202 75232	75196 75205 75252	
	<u>Schultzea beta</u>	75202			
	<u>Anthias nicholsi</u>	75196			
	<u>Hemanthias vivanus</u>	75195	75198		
	<u>Hemanthias sp.</u>	75251	75263		
	Priacanthidae	<u>Priacanthus arenatus</u>	75242	75246	75251
	Apogonidae	<u>Apogon pseudomaculatus</u>	75240		
	Branchiostegidae	<u>Caulolatilus microps</u>	75196		
		<u>Lopholatilus chamaeleonticeps</u>	75193		
Rachycentridae	<u>Rachycentron canadum</u>	75265			
Echeneidae	<u>Echeneis sp.</u>	75242	75249	75265	
Carangidae	<u>Caranx bartholomaei</u>	75195			
	<u>Caranx crysos</u>	75201 75225 75244	75214 75232 75249	75215 75243 75250	
	<u>Caranx hippos</u>	75195	75246		
	<u>Chloroscombrus chrysurus</u>	75243 75250	75244 75255	75249	
	<u>Decapterus punctatus</u>	75208 75215 75223 75233 75237 75242 75246 75251 75267	75211 75220 75227 75235 75239 75244 75247 75252 75269	75214 75222 75230 75236 75241 75245 75250 75266 75278	
	<u>Decapterus tabl</u>	75236			
	<u>Selene vomer</u>	75249			
	<u>Trachinotus carolinus</u>	75249			
	<u>Trachurus lathamii</u>	75219	75250	75279	
	<u>Vomer setapinnis</u>	75250			
	Emmelichthyidae	<u>Emmelichthyidae</u>	75202		
	Lutjanidae	<u>Lutjanus campechanus</u>	75236 75249	75243	75244
		<u>Rhomboplites aurorubens</u>	75244 75251	75246 75263	75247 75279
Gerridae	<u>Eucinostomus argenteus</u>	75243	75244		
	<u>Eucinostomus gula</u>	75249			

<u>Family</u>	<u>Species</u>	<u>Collection Numbers For Each Occurrence</u>		
Haemulidae	<u>Haemulon aurolineatum</u>	75208	75211	75232
		75239	75240	
	<u>Haemulon striatum</u>	75202		
	<u>Orthopristis chrysoptera</u>	75249		
Sparidae	<u>Calamus leucosteus</u>	75208	75213	
	<u>Calamus nodosus</u>	75213		
	<u>Lagodon rhomboides</u>	75249		
	<u>Pagrus pagrus</u>	75194	75222	75223
	<u>Stenotomus aculeatus</u>	75190	75208	75211
		75213	75214	75215
		75219	75220	75221
		75223	75225	75227
		75230	75231	75234
		75236	75237	75239
		75241	75243	75244
	75250	75255	75269	
	75279			
Sciaenidae	<u>Cynoscion nothus</u>	75249		
	<u>Cynoscion regalis</u>	75249		
	<u>Equetus lanceolatus</u>	75240	75246	
	<u>Equetus sp.</u>	75202		
	<u>Larimus fasciatus</u>	75249		
	<u>Leiostomus xanthurus</u>	75249		
	<u>Micropogonias undulatus</u>	75249		
Mullidae	<u>Mullus auratus</u>	75192		
Ephippidae	<u>Chaetodipterus faber</u>	75224	75231	75249
		75250		
Labridae	<u>Decodon puellaris</u>	75196		
	<u>Hemipteronotus novacula</u>	75215	75220	75221
		75223	75227	75228
		75234	75235	75236
		75237	75245	
Sphyraenidae	<u>Sphyraena guachancho</u>	75249		
Percophididae	<u>Bembrops gobioides</u>	75196		
Dactyloscopidae	Dactyloscopidae	75233		
Uranoscopidae	<u>Kathetostoma albigutta</u>	75190	75192	75195
		75198	75224	75246
		75269	75277	
Callionymidae	<u>Callionymus agassizi</u>	75196		
Gempylidae	<u>Nesiarchus nasutus</u>	75195		
Trichiuridae	<u>Trichiurus lepturus</u>	75249		
Scombridae	<u>Scomber japonicus</u>	75242	75278	
	<u>Scomberomorus cavalla</u>	75224	75249	
	<u>Scomberomorus maculatus</u>	75249		

<u>Family</u>	<u>Species</u>	<u>Collection Numbers For Each Occurrence</u>		
Stromateidae	<u>Peprilus alepidotus</u>	75249		
	<u>Peprilus triacanthus</u>	75244	75272	75251
Scorpaenidae	<u>Helicolenus dactylopterus</u>	75193	75201	
	<u>Neomerinthe hemingwayi</u>	75196		
	<u>Scorpaena brachyptera</u>	75195		
	<u>Scorpaena brasiliensis</u>	75215	75249	75251
	<u>Scorpaena calcarata</u>	75195	75202	75221
		75233	75240	75246
	75247	75251	75252	
Triglidae	<u>Bellator egretta</u>	75195	75196	75198
		75206	75252	75263
	<u>Bellator militaris</u>	75202	75233	75240
		75246	75247	75251
		75252		
	<u>Prionotus alatus</u>	75252		
	<u>Prionotus carolinus</u>	75208	75211	75213
		75215	75219	75222
		75225	75227	75230
		75233	75236	75238
		75239	75246	
	<u>Prionotus evolans</u>	75211	75213	75233
	<u>Prionotus ophryas</u>	75233		
	<u>Prionotus roseus</u>	75192	75202	75208
		75233	75244	75245
		75251		
	<u>Prionotus salmonicolor</u>	75190	75211	75213
		75215	75222	75235
		75237	75239	75243
		75244	75247	75249
	<u>Prionotus scitulus</u>	75211	75213	75219
		75221	75223	75225
		75227	75238	75239
		75247		
	<u>Prionotus stearnsi</u>	75198		
	<u>Peristedion gracile</u>	75193	75198	75272
		75277		
Dactylopteridae	<u>Dactylopterus volitans</u>	75192		
Bothidae	<u>Ancylopsetta quadrocellata</u>	75190	75208	75211
		75213	75215	75219
		75221	75223	75224
		75231	75239	75247
	<u>Bothus ocellatus</u>	75190	75192	75194
		75211	75213	75228
		75233	75240	75250
		75251	75252	75263
		75265	75269	
	<u>Bothus robinsi</u>	75213	75228	75231
	75233	75238	75239	
	75240	75242	75246	
	75247	75250	75251	
	75269			

Family	Species	Collection Numbers For Each Occurrence		
Bothidae (cont.)	<u>Bothus</u> sp.	75233		
	<u>Citharichthys arctifrons</u>	75193	75200	75253
		75254	75261	75266
		75277		
	<u>Citharichthys cornutus</u>	75192	75195	75196
		75198	75206	
	<u>Citharichthys dinoceros</u>	75198		
	<u>Citharichthys gymnorhinus</u>	75252		
	<u>Citharichthys macrops</u>	75190	75202	75211
		75224	75225	75230
		75231	75233	75239
		75243	75247	
	<u>Cyclopsetta fimbriata</u>	75193	75224	75232
		75233	75238	75240
		75246	75247	75269
	<u>Etropus crossotus</u>	75215		
	<u>Etropus microstomus</u>	75202	75206	75263
	<u>Etropus rimosus</u>	75202		
	<u>Gastropsetta frontalis</u>	75196	75233	75251
		75272		
	<u>Paralichthys dentatus</u>	75208	75215	75228
		75231	75241	
	<u>Paralichthys lethostigma</u>	75196		
	<u>Syacium papillosum</u>	75192	75194	75195
		75202	75208	75211
		75213	75219	75222
		75223	75228	75233
		75234	75236	75239
		75240	75241	75243
		75244	75246	75247
		75249	75251	75252
		75263	75265	75269
		75278		
Soleidae	<u>Gymnachirus melas</u>	75233	75247	
Cynoglossidae	<u>Symphurus diomedianus</u>	75224	75251	
	<u>Symphurus minor</u>	75231		
	<u>Symphurus urospilus</u>	75211	75219	75225
		75231		
	<u>Symphurus parvus</u>	75202	75252	
Balistidae	<u>Aluterus heudeloti</u>	75208	75213	75222
		75224	75232	75233
		75245	75247	75250
		75269		
	<u>Aluterus schoepfi</u>	75190	75222	75224
		75225	75227	75228
		75231	75232	75233
		75235	75238	75239
		75240	75241	75246
		75247	75250	75255
		75279		
	<u>Balistes capriscus</u>	75208	75221	75223
		75230	75233	75246
		75278	75279	

<u>Family</u>	<u>Species</u>	<u>Collection Numbers For Each Occurrence</u>			
Balistidae (cont.)	<u>Monacanthus ciliatus</u>	75211	75251	75252	
	<u>Monacanthus sp.</u>	75190			
	<u>Stephanolepis hispidus</u>	75190	75208	75211	
		75213	75215	75219	
		75221	75222	75223	
		75224	75225	75228	
		75230	75231	75232	
		75236	75237	75238	
		75239	75240	75241	
		75243	75245	75246	
		75247	75250	75251	
		75252	75269		
Ostraciidae	<u>Lactophrys quadricornis</u>	75230	75234	75235	
		75247			
Tetraodontidae	<u>Sphoeroides dorsalis</u>	75190	75208	75213	
		75233	75240	75241	
		75247	75269		
	<u>Sphoeroides maculatus</u>	75190	75213	75224	
	<u>Sphoeroides pachygaster</u>	75196	75198		
	<u>Sphoeroides spengleri</u>	75255			
	<u>Sphoeroides testudineus</u>	75194	75252		
	<u>Sphoeroides sp.</u>	75213	75233	75239	
	Diodontidae	<u>Chilomycterus antillarum</u>	75194		
		<u>Chilomycterus atinga</u>	75213		
<u>Chilomycterus schoepfi</u>		75194	75208	75223	
	75224	75241	75255		

APPENDIX IV. Diversity values by depth zone for successful sand bottom trawls in the South Atlantic Bight during summer 1975.

Depth Zone (m)	Collection Number	Depth (m)	Number Of Species	Number of Individuals	H' Bits/Ind.	J' Evenness	Species Richness	
9-18	75215	14	11	138	1.651	0.477	2.030	
	75219	16	14	1668	0.347	0.091	1.752	
	75220	15	5	1394	0.134	0.058	0.553	
	75221	17	12	22	3.295	0.919	3.559	
	75225	17	12	430	0.601	0.167	1.814	
	75227	17	7	431	0.550	0.196	0.989	
	75230	17	12	128	1.455	0.406	2.267	
	75236	17	8	126	1.096	0.365	1.447	
	75237	17	6	22	2.058	0.796	1.618	
	75243	17	11	55	2.422	0.700	2.495	
	75244	17	10	99	2.092	0.630	1.959	
75249	17	17	164	3.266	0.799	3.137		
19-27	75190	27	23	177	3.333	0.737	4.250	
	75208	24	16	546	0.935	0.234	2.380	
	75211	24	23	136	2.697	0.817	4.478	
	75214	24	3	2130	0.030	0.019	0.261	
	75224	27	20	118	3.132	0.725	3.983	
	75231	25	19	181	2.970	0.699	3.463	
	75239	27	23	183	3.610	0.780	4.223	
	75242	24	6	42	1.559	0.603	1.338	
	75245	25	7	43	1.653	0.589	1.595	
	75247	24	26	334	3.431	0.730	4.302	
	75250	22	9	45	2.334	0.736	2.102	
	75255	25	8	40	2.251	0.750	1.898	
	28-55	75213	33	25	191	3.492	0.752	4.569
		75222	40	13	94	2.582	0.698	2.641
75223		33	14	156	1.767	0.464	2.574	
75228		38	11	46	2.376	0.687	2.612	
75232		38	13	268	0.994	0.269	2.146	
75233		40	32	152	4.223	0.845	6.171	
75234		35	6	42	1.533	0.593	1.338	
75235		29	8	50	1.688	0.563	1.789	
75238		31	14	53	3.069	0.806	3.274	
75240		38	23	201	3.553	0.785	4.148	
75241		35	16	58	3.389	0.847	3.694	
75246		35	24	116	4.043	0.882	4.838	
75251		44	27	178	3.770	0.793	5.018	
75265		48	6	23	2.021	0.782	1.595	
75269		44	13	140	1.612	0.436	2.428	
75279		29	8	49	2.354	0.785	1.799	
56-110	75192	71	18	249	2.160	0.518	3.081	
	75194	66	15	92	3.200	0.819	3.096	
	75195	81	17	389	2.146	0.525	2.683	
	75202	101	25	214	3.115	0.671	4.472	
	75205	97	1	1	0	0	0	
	75252	70	19	196	3.321	0.782	3.410	
	75263	92	10	13	3.239	0.975	3.509	
	75271	77	4	102	0.349	0.175	0.649	
	75278	64	9	52	1.864	0.588	2.025	
	111-183	75196	172	20	206	2.896	0.670	3.566
75198		139	13	79	3.015	0.815	2.746	
75206		159	9	379	0.612	0.193	1.347	
75253		150	4	29	1.173	0.587	0.891	
75257		132	4	17	1.277	0.639	1.059	
75266		148	4	10	1.357	0.678	1.303	
75267		167	2	15	0.353	0.353	0.369	
75272		152	2	3	0.918	0.918	0.910	
75277		139	14	421	2.790	0.733	2.151	

Depth Zone (m)	Collection Number	Depth (m)	Number Of Species	Number of Individuals	H' Bits/Ind.	J' Evenness	Species Richness
184-366	75193	198	9	68	2.382	0.751	1.896
	75200	205	4	10	1.571	0.785	1.302
	75201	247	3	4	1.500	0.946	1.443
	75254	223	5	6	2.252	0.970	2.232
	75261	258	8	56	2.407	0.802	1.739
	75276	203	5	12	1.585	0.683	1.610

APPENDIX V. Groundfish weights for otter trawls in the South Atlantic Bight during summer 1975.

Depth Zone (m)	Collection Number	Depth (m)	Total Weight (kg)	Pelagic Weight (kg)	Elasmobranch Weight (kg)	Squid Weight (kg)	Demersal Bony Fish Weight (kg)
9-18	75215	14	19.480	12.030	0	0.700	7.110
	75219	16	32.723	0.001	0	5.358	27.364
	75220	15	31.006	7.422	0	0.082	23.502
	75221	17	2.005	0	0	0	2.005
	75225	17	14.689	0.022	0.035	1.773	12.544
	75227	17	20.794	9.500	0	0.600	10.694
	75230	17	10.088	0.068	0	5.100	4.920
	75236	17	23.612	19.312	0	0.130	4.170
	75237	17	6.655	5.000	0	0	1.655
	75243	17	30.639	25.346	0	0.098	5.195
	75244	17	14.437	7.020	0	3.200	4.217
	75249	17	36.488	4.708	4.000	0	27.780
	19-27	75190	27	13.299	0	0	1.826
75208		24	38.471	0.132	0	0	38.339
75211		24	6.977	0.030	0.075	0.970	5.902
75214		24	24.087	0.079	0	0.138	23.870
75224		27	12.449	0.001	1.400	2.280	8.768
75231		25	10.322	0	0	1.250	9.072
75239		27	9.553	0.002	0	1.400	8.151
75242		24	168.365	3.162	161.170	0	4.033
75245		25	47.767	43.285	0	0	4.482
75247		24	16.888	0.004	0	0.052	16.832
75250		22	141.369	130.094	0	0.130	11.145
75255		25	390.655	0.300	385.600	0.310	4.445
28-55		75213	33	24.178	0	1.600	1.800
	75222	40	16.843	3.762	1.000	0.300	11.781
	75223	33	17.427	1.004	0	0.200	16.223
	75228	38	14.124	0	2.300	0.048	11.776
	75232	38	7.282	0.002	0	0.210	7.070
	75233	40	11.149	0.001	0	0.700	10.448
	75234	35	4.344	0	0	0.008	4.336
	75235	29	8.099	1.555	0	0	6.544
	75238	31	5.487	0	0	0.008	5.479
	75240	38	9.336	0.010	0.700	0.400	8.226
	75241	35	11.615	0.080	0.600	1.000	9.935
	75246	35	14.238	0.003	0	0.650	13.585
	75251	44	17.509	3.780	0.500	3.100	10.129
	75265	48	340.576	0.010	328.860	0	11.706
	75269	44	5.969	0.062	0	3.200	2.707
75279	29	6.890	0.038	0	0.072	6.780	
56-110	75192	71	6.364	0	0	0	6.364
	75194	66	5.296	0.034	0	0	5.262
	75195	81	8.758	0.003	1.800	0	6.955
	75202	101	7.920	0	1.100	2.400	4.420
	75205	97	0.064	0	0	0.060	0.004
	75252	70	5.615	0.050	0	2.800	2.765
	75263	92	0.905	0	0	0.290	0.615
	75271	77	1.182	0.108	0	0.300	0.774
	75278	64	137.562	11.600	121.900	0.130	3.932
	111-183	75196	172	45.544	0	0.094	24.320
75198		139	10.497	0	0	9.350	1.147
75206		159	1.972	0	0	1.404	0.568
75253		150	0.232	0	0	0.070	0.162
75257		132	4.303	0	0	4.214	0.089
75266		148	0.405	0.001	0	0.155	0.249
75267		167	2.714	0.060	0	2.200	0.454
75272		152	6.164	5.900	0	0.140	0.124
75277		139	9.681	0.185	0	1.000	8.496

Depth Zone (m)	Collection Number	Depth (m)	Total Weight (kg)	Pelagic Weight (kg)	Elasmobranch Weight (Kg)	Squid Weight (kg)	Demersal Bony Fish Weight (kg)
184-366	75193	198	43.594	0	0	43.000	0.594
	75200	205	91.267	0	90.72	0.041	0.506
	75201	247	0.058	0.008	0	0	0.050
	75254	223	0.355	0	0	0.300	0.055
	75261	258	3.978	0	0.600	1.400	1.978
	75276	203	0.685	0.160	0	0	0.525