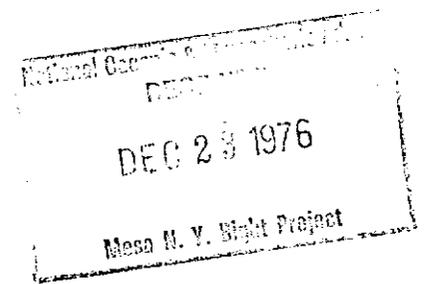


MACROBENTHIC INVERTEBRATE FAUNA  
OF THE  
MIDDLE ATLANTIC BIGHT REGION:  
PART II. FAUNAL COMPOSITION AND QUANTITATIVE DISTRIBUTION

by  
Roland L. Wigley and Roger B. Theroux



U.S. Department of Commerce  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Northeast Fisheries Center  
Woods Hole, Massachusetts

September 30, 1976

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	4
LIST OF FIGURES	12
ABSTRACT	29
INTRODUCTION	31
Reconnaissance Survey	31
Middle Atlantic Bight Region	32
Previous Studies	33
MATERIALS AND METHODS	41
Macrofauna Samples	41
Benthos Sampling Gear	44
Sample Processing	48
Data Reduction	50
Bathymetry	51
Temperature	51
Geological Samples	52
FAUNAL COMPOSITION	53
Entire Middle Atlantic Bight Region	53
Subarea Differences in Composition	71
GEOGRAPHIC DISTRIBUTION	77
Total Macrobenthic Fauna -- All Taxonomic Groups Combined	78
Major Taxonomic Components	81
Selected Genera and Species	161

	<u>Page</u>
BATHYMETRIC DISTRIBUTION	172
Total Macrobenthic Fauna -- All Taxonomic Groups Combined	172
Entire Middle Atlantic Bight Region	172
Subareas	179
Southern New England	179
New York Bight	180
Chesapeake Bight	182
Taxonomic Groups	183
Entire Middle Atlantic Bight Region	183
Subarea Differences in Distribution of Taxonomic Groups	202
RELATION WITH BOTTOM SEDIMENTS	220
Distribution of Sediment Types	220
Total Macrobenthic Fauna -- All Taxonomic Groups Combined	229
Entire Middle Atlantic Bight Region	229
Subareas	229
Southern New England	229
New York Bight	234
Chesapeake Bight	236
Taxonomic Groups	236
Entire Middle Atlantic Bight Region	236
Subareas	255
Southern New England	255
New York Bight	267
Chesapeake Bight	280

	<u>Page</u>
RELATION WITH SEDIMENT ORGANIC CARBON	294
Distribution of Sediment Organic Carbon	295
Total Macrobenthic Fauna -- All Taxonomic Groups Combined	295
Taxonomic Groups	300
Entire Middle Atlantic Bight Region	300
Southern New England	309
RELATION WITH RANGE IN BOTTOM WATER TEMPERATURE	312
Total Macrobenthic Fauna -- All Taxonomic Groups Combined	314
Entire Middle Atlantic Bight Region	314
Subareas	314
Southern New England	314
New York Bight	318
Chesapeake Bight	319
Taxonomic Groups	320
Entire Middle Atlantic Bight Region	320
Subarea Differences in Distribution of Taxonomic Groups	339
DOMINANT FAUNAL COMPONENTS	371
Bays and Sounds	372
Continental Shelf	372
Continental Slope	375
Continental Rise	376
ACKNOWLEDGMENTS	377
LITERATURE CITED	379
APPENDIX	391

LIST OF TABLES

Table		<u>page</u>
1.	Research vessels, cruise identification and dates, and number of stations sampled.	43
2.	Areas, in square kilometers, of several bathymetric zones within each subarea and for the entire Middle Atlantic Bight Region.	45
3.	Quantitative taxonomic composition of the macrobenthic invertebrate fauna, in terms of both number of individuals and biomass, representing the entire Middle Atlantic Bight Region.	54
4.	List of invertebrate species contained in quantitative samples taken within the Middle Atlantic Bight Region.	57
5.	Quantitative taxonomic composition of the macrobenthic invertebrate fauna, in terms of both number of individuals and biomass, representing the Southern New England subarea.	73
6.	Quantitative taxonomic composition of the macrobenthic invertebrate fauna, in terms of both number of individuals and biomass, representing the New York Bight subarea.	74

TABLES (continued)

Table		<u>page</u>
7.	Quantitative taxonomic composition of the macrobenthic invertebrate fauna, in terms of both number of individuals and biomass, representing the Chesapeake Bight subarea.	75
8.	Mean number of individuals and biomass of the macrobenthic invertebrate fauna in relation to water depth. Values are listed separately for each subarea and for the entire Middle Atlantic Bight Region.	176
9.	Change and rate of change in density of invertebrates in relation to water depth.	177
10.	Change and rate of change in biomass of invertebrates in relation to water depth.	178
11.	Mean number of individuals listed by major taxonomic groups for each bathymetric class, representing the entire Middle Atlantic Bight Region.	184
12.	Mean biomass listed by major taxonomic groups for each bathymetric class, representing the entire Middle Atlantic Bight Region.	185

TABLES (continued)

Table		<u>page</u>
13.	Mean number of individuals listed by major taxonomic groups for each bathymetric class, representing the Southern New England subarea.	204
14.	Mean biomass listed by major taxonomic groups for each bathymetric class, representing the Southern New England subarea.	205
15.	Mean number of individuals listed by major taxonomic groups for each bathymetric class, representing the New York Bight subarea.	206
16.	Mean biomass listed by major taxonomic groups for each bathymetric class, representing the New York Bight subarea.	207
17.	Mean number of individuals listed by major taxonomic groups for each bathymetric class, representing the Chesapeake Bight subarea.	210
18.	Mean biomass listed by major taxonomic groups for each bathymetric class, representing the Chesapeake Bight subarea.	211

TABLES (continued)

Table		<u>page</u>
19.	Mean number of individuals and biomass of the macrobenthic invertebrate fauna in relation to bottom sediments. Values are listed separately for each subarea and for the entire Middle Atlantic Bight Region.	230
20.	Mean number of individuals listed by taxonomic groups in each bottom sediment type for the entire Middle Atlantic Bight Region.	237
21.	Mean biomass of each taxonomic group listed by bottom sediment type for the entire Middle Atlantic Bight Region.	238
22.	Mean number of individuals listed by taxonomic group in each bottom sediment type for the Southern New England subarea.	256
23.	Mean biomass of each taxonomic group listed by bottom sediment type for the Southern New England subarea.	257
24.	Mean number of individuals listed by taxonomic group in each bottom sediment type for the New York Bight subarea.	268

TABLES (continued)

Table		<u>page</u>
25.	Mean biomass of each taxonomic group listed by bottom sediment type for the New York Bight subarea.	269
26.	Mean number of individuals listed by taxonomic group in each bottom sediment type for the Chesapeake Bight subarea.	281
27.	Mean biomass of each taxonomic group listed by bottom sediment type in the Chesapeake Bight subarea.	282
28.	Mean number of individuals and biomass of the macrobenthic invertebrate fauna in relation to percent organic carbon in bottom sediments. Values are listed separately for each subarea and for the entire Middle Atlantic Bight Region.	297
29.	Mean number of individuals of each taxonomic group listed by sediment organic carbon content class, representing the entire Middle Atlantic Bight Region.	301
30.	Mean biomass of each taxonomic group listed by sediment organic carbon content class, representing the entire Middle Atlantic Bight Region.	302

TABLES (continued)

Table		<u>page</u>
31.	Mean number of individuals of each taxonomic group listed by sediment organic carbon content class, representing the Southern New England subarea.	310
32.	Mean biomass of each taxonomic group listed by sediment organic carbon content class, representing the Southern New England subarea.	311
33.	Mean number of individuals and biomass of the macrobenthic invertebrate fauna, all taxonomic groups combined, in relation to range in bottom water temperature. Values are listed separately for each subarea and for the entire Middle Atlantic Bight Region.	315
34.	Mean number of individuals of each taxonomic group listed by temperature range class, representing the entire Middle Atlantic Bight Region.	321
35.	Mean biomass of each taxonomic group listed by temperature range class, representing the entire Middle Atlantic Bight Region.	322
36.	Mean number of individuals of each taxonomic group listed by temperature range class, representing the Southern New England subarea.	340

TABLES (continued)

Table		<u>page</u>
37.	Mean number of individuals of each taxonomic group listed by temperature range class, representing the New York Bight subarea.	341
38.	Mean number of individuals of each taxonomic group listed by temperature range class, representing the Chesapeake Bight subarea.	342
39.	Mean biomass of each taxonomic group listed by temperature range class, representing the Southern New England subarea.	343
40.	Mean biomass of each taxonomic group listed by temperature range class, representing the New York Bight subarea.	344
41.	Mean biomass of each taxonomic group listed by temperature range class, representing the Chesapeake Bight subarea.	345

APPENDIX

A-1.	Number of samples within each depth range class in each subarea and for the entire Middle Atlantic Bight Region.	392
A-2.	Number of samples for each bottom sediment type in each subarea and for the entire Middle Atlantic Bight Region.	393

TABLES (continued)

Table		<u>page</u>
A-3.	Number of samples for each class of sediment organic carbon in each subarea and for the entire Middle Atlantic Bight Region.	394
A-4.	Number of samples within each temperature range class in each subarea and for the entire Middle Atlantic Bight Region.	395

LIST OF FIGURES

Figure		<u>Page</u>
1	Chart of the Middle Atlantic Bight Region showing the location of geographical features and the three subarea divisions: Southern New England, New York Bight, and Chesapeake Bight.	34
2	Chart of station locations where quantitative samples of macrobenthic invertebrates were obtained.	42
3	Side view of the Smith-McIntyre spring-loaded bottom sampler in the closed position. Lead weights on each side are set vertically to impede rotation of the sampler during descent and ascent.	46
4	Bottom view of Campbell grab sampler. Camera is installed in right-hand bucket and strobe light is in the left-hand bucket. Width of the buckets (vertical dimension in photograph) is 57 cm.	47
5	Pie chart illustrating the taxonomic composition of the total macrobenthic fauna in the entire Middle Atlantic Bight Region: upper chart--percentage number of individuals; lower chart--percentage biomass.	55
6	Pie chart illustrating the taxonomic composition of the total macrobenthic fauna for each subarea in the Middle Atlantic Bight Region. Numbers of individuals are shown on the left-hand side, and biomasses are shown on the right-hand side. The area of each circle is proportional to the mean density or mean biomass.	76

FIGURES (continued)

Figure		<u>Page</u>
7	Geographic distribution of the density of all taxonomic groups combined, expressed as number of individuals per square meter of bottom.	79
8	Geographic distribution of the biomass of all taxonomic groups combined, expressed as damp weight per square meter of bottom.	80
9	Geographic distribution of the density of Porifera, expressed as number of individuals per square meter of bottom.	82
10	Geographic distribution of the biomass of Porifera, expressed as damp weight per square meter of bottom.	83
11	Geographic distribution of the density of Coelenterata, expressed as number of individuals per square meter of bottom.	85
12	Geographic distribution of the biomass of Coelenterata, expressed as damp weight per square meter of bottom.	86
13	Geographic distribution of the density of Hydrozoa, expressed as number of individuals per square meter of bottom.	87
14	Geographic distribution of the biomass of Hydrozoa, expressed as damp weight per square meter of bottom.	88
15	Geographic distribution of the density of Alcyonaria, expressed as number of individuals per square meter of bottom.	89

FIGURES (continued)

Figure		<u>Page</u>
16	Geographic distribution of the biomass of Alcyonaria, expressed as damp weight per square meter of bottom.	90
17	Geographic distribution of the density of Zoantharia, expressed as number of individuals per square meter of bottom.	92
18	Geographic distribution of the biomass of Zoantharia, expressed as damp weight per square meter of bottom.	93
19	Geographic distribution of the density of Platyhelminthes, expressed as number of individuals per square meter of bottom.	94
20	Geographic distribution of the biomass of Platyhelminthes, expressed as damp weight per square meter of bottom.	95
21	Geographic distribution of the density of Nemertea, expressed as number of individuals per square meter of bottom.	96
22	Geographic distribution of the biomass of Nemertea, expressed as damp weight per square meter of bottom.	97
23	Geographic distribution of the density of Nematoda, expressed as number of individuals per square meter of bottom.	99
24	Geographic distribution of the biomass of Nematoda, expressed as damp weight per square meter of bottom.	100
25	Geographic distribution of the density of Annelida, expressed as number of individuals per square meter of bottom.	101

FIGURES (continued)

Figure		<u>Page</u>
26	Geographic distribution of the biomass of Annelida, expressed as damp weight per square meter of bottom.	102
27	Geographic distribution of the density of Pogonophora, expressed as number of individuals per square meter of bottom.	104
28	Geographic distribution of the biomass of Pogonophora, expressed as damp weight per square meter of bottom.	105
29	Geographic distribution of the density of Sipuncula, expressed as number of individuals per square meter of bottom.	106
30	Geographic distribution of the biomass of Sipuncula, expressed as damp weight per square meter of bottom.	107
31	Geographic distribution of the density of Echiura and Priapulida, expressed as number of individuals per square meter of bottom.	109
32	Geographic distribution of the biomass of Echiura and Priapulida, expressed as damp weight per square meter of bottom.	110
33	Geographic distribution of the density of Mollusca, expressed as number of individuals per square meter of bottom.	111
34	Geographic distribution of the biomass of Mollusca, expressed as damp weight per square meter of bottom.	112
35	Geographic distribution of the density of Cephalopoda and Polyplacophora, expressed as number of individuals per square meter of bottom.	114

FIGURES (continued)

Figure		<u>Page</u>
36	Geographic distribution of the biomass of Cephalopoda and Polyplacophora, expressed as damp weight per square meter of bottom.	115
37	Geographic distribution of the density of Gastropoda, expressed as number of individuals per square meter of bottom.	116
38	Geographic distribution of the biomass of Gastropoda, expressed as damp weight per square meter of bottom.	117
39	Geographic distribution of the density of Bivalvia, expressed as number of individuals per square meter of bottom.	118
40	Geographic distribution of the biomass of Bivalvia, expressed as damp weight per square meter of bottom.	119
41	Geographic distribution of the density of Scaphopoda, expressed as number of individuals per square meter of bottom.	121
42	Geographic distribution of the biomass of Scaphopoda, expressed as damp weight per square meter of bottom.	122
43	Geographic distribution of the density of Arthropoda, expressed as number of individuals per square meter of bottom.	123
44	Geographic distribution of the biomass of Arthropoda, expressed as damp weight per square meter of bottom.	124

FIGURES (continued)

Figure		<u>Page</u>
45	Geographic distribution of the density of Arachnida, Copepoda, Nebaliacea, Ostracoda, and Pycnogonida, expressed as number of individuals per square meter of bottom.	126
46	Geographic distribution of the density of Cirripedia, expressed as number of individuals per square meter of bottom.	127
47	Geographic distribution of the biomass of Cirripedia, expressed as damp weight per square meter of bottom.	128
48	Geographic distribution of the density of Cumacea, expressed as number of individuals per square meter of bottom.	129
49	Geographic distribution of the biomass of Cumacea, expressed as damp weight per square meter of bottom.	130
50	Geographic distribution of the density of Tanaidacea, expressed as number of individuals per square meter of bottom.	132
51	Geographic distribution of the biomass of Tanaidacea, expressed as damp weight per square meter of bottom.	133
52	Geographic distribution of the density of Isopoda, expressed as number of individuals per square meter of bottom.	134
53	Geographic distribution of the biomass of Isopoda, expressed as damp weight per square meter of bottom.	135

FIGURES (continued)

Figure		<u>Page</u>
54	Geographic distribution of the density of Amphipoda, expressed as number of individuals per square meter of bottom.	136
55	Geographic distribution of the biomass of Amphipoda, expressed as damp weight per square meter of bottom.	137
56	Geographic distribution of the density of Mysidacea, expressed as number of individuals per square meter of bottom.	139
57	Geographic distribution of the biomass of Mysidacea, expressed as damp weight per square meter of bottom.	140
58	Geographic distribution of the density of Decapoda, expressed as number of individuals per square meter of bottom.	141
59	Geographic distribution of the biomass of Decapoda, expressed as damp weight per square meter of bottom.	142
60	Geographic distribution of the density of Bryozoa and Brachiopoda, expressed as number of individuals per square meter of bottom.	144
61	Geographic distribution of the biomass of Bryozoa and Brachiopoda, expressed as damp weight per square meter of bottom.	145
62	Geographic distribution of the density of Echinodermata, expressed as number of individuals per square meter of bottom.	146
63	Geographic distribution of the biomass of Echinodermata, expressed as damp weight per square meter of bottom.	147

FIGURES (continued)

Figure		<u>Page</u>
64	Geographic distribution of the density of Holothuroidea, expressed as number of individuals per square meter of bottom.	148
65	Geographic distribution of the biomass of Holothuroidea, expressed as damp weight per square meter of bottom.	149
66	Geographic distribution of the density of Echinoidea, expressed as number of individuals per square meter of bottom.	151
67	Geographic distribution of the biomass of Echinoidea, expressed as damp weight per square meter of bottom.	152
68	Geographic distribution of the density of Ophiuroidea, expressed as number of individuals per square meter of bottom.	153
69	Geographic distribution of the biomass of Ophiuroidea, expressed as damp weight per square meter of bottom.	154
70	Geographic distribution of the density of Asteroidea, expressed as number of individuals per square meter of bottom.	157
71	Geographic distribution of the biomass of Asteroidea, expressed as damp weight per square meter of bottom.	158
72	Geographic distribution of the density of Ascidiacea and Hemichordata, expressed as number of individuals per square meter of bottom.	159

FIGURES (continued)

Figure		<u>Page</u>
73	Geographic distribution of the biomass of Ascidacea and Hemichordata, expressed as damp weight per square meter of bottom.	160
74	Geographic distribution of three selected species of Annelida and of one Pogonophora (lower right).	162
75	Geographic distribution of selected bivalves, phylum Mollusca.	164
76	Geographic distribution of selected bivalves (top) and gastropods (bottom), phylum Mollusca.	166
77	Geographic distribution of selected amphipods, phylum Arthropoda.	167
78	Geographic distribution of a selected isopod (upper left) and decapods, phylum Arthropoda.	170
79	Geographic distribution of selected echinoids (top), asteroids (lower left), and ophiuroids (lower right), phylum Echinodermata.	171
80	Relation between number of individuals and water depth. Values represent all taxonomic groups combined for each subarea and for the entire Middle Atlantic Bight Region.	173
81	Relation between biomass (wet weight) and water depth. Values represent all taxonomic groups combined for each subarea and for the entire Middle Atlantic Bight Region.	174

FIGURES (continued)

Figure		<u>Page</u>
82	Density and biomass in relation to water depth in the entire Middle Atlantic Bight Region for: Porifera, Hydrozoa, Alcyonaria, Zoantharia, Platyhelminthes, and Nemertea.	187
83	Density and biomass in relation to water depth in the entire Middle Atlantic Bight Region for: Nematoda, Annelida, Pogonophora, Sipuncula, Echiura, and Priapulida.	190
84	Density and biomass in relation to water depth in the entire Middle Atlantic Bight Region for: Polyplacophora, Gastropoda, Bivalvia, Scaphopoda, Cephalopoda, and Pycnogonida.	193
85	Density and biomass in relation to water depth in the entire Middle Atlantic Bight Region for: Ostracoda, Cirripedia, Copepoda, Nebaliacea, Cumacea, and Tanaidacea.	196
86	Density and biomass in relation to water depth in the entire Middle Atlantic Bight Region for: Isopoda, Amphipoda, Mysidacea, Decapoda, Bryozoa, and Brachiopoda.	198
87	Density and biomass in relation to water depth in the entire Middle Atlantic Bight Region for: Holothuroidea, Echinoidea, Ophiuroidea, Asteroidea, Hemichordata, and Ascidiacea.	201
88	Geographic distribution of bottom sediment types in the Middle Atlantic Bight Region.	222

FIGURES (continued)

- | Figure |   | <u>Page</u> |
|--------|---|-------------|
| 89     | Gravel bottom at a depth of 23 m in the Nantucket Shoals region, south of Cape Cod, Massachusetts. The most common gravels range in diameter from 5 to 15 cm. Camera tripping-weight is visible in the upper right-hand corner. Photograph was taken at Station 1103, located at 41 <sup>0</sup> 11' N. lat., 69 <sup>0</sup> 40' W. long. Scale bar is 10 cm.  | 223         |
| 90     | Sand bottom with a small proportion of shell, located on the continental shelf northeast of Cape Charles, Virginia, at a depth of 48 m. Shell remains are mainly bivalve mollusks with a small proportion of echinoid tests and spines. Photograph was taken at Station 1421, located at 37 <sup>0</sup> 30' N. lat., 74 <sup>0</sup> 44' W. long. Scale bar is 10 cm.  | 224         |
| 91     | Silty sand bottom at a depth of 406 m on the continental slope east of New Jersey. In the upper left is a sodastraw worm tube ( <u>Hyalinoecia tubicola</u> ); in the lower left is the camera tripping-weight; and the tips of brittlestar arms and numerous animal tracks are evident in other sections. Photograph was taken at Station 1335, located at 39 <sup>0</sup> 10' N. lat., 72 <sup>0</sup> 30' W. long. Scale bar is 10 cm. | 225         |
| 92     | Sand bottom inhabited by a dense assemblage of sand dollars ( <u>Echinarachnius parma</u> ) at a depth of 48 m near mid-shelf east of Delaware. Size of the sand dollars is 2 to 3 cm in diameter. Photograph was taken at Station 1418, located at 37 <sup>0</sup> 59' N. lat., 74 <sup>0</sup> 29' W. long. Scale bar is 10 cm.   | 226         |

FIGURES (continued)

Figure		Page
93	Sand-shell bottom at a depth of 69 m near the outer continental shelf northeast of Cape May, New Jersey. The starfish is <u>Astropecten</u> ; the shell remains are <u>Placopecten</u> , <u>Arctica</u> , and <u>Astarte</u> . Photograph was taken at Station 1360, located at 38°40' N. lat., 73°30' W. long. Scale bar is 10 cm.	227
94	Silty sand bottom at a depth of 178 m on the outer continental shelf near Hudson Canyon, southeast of New York City. Dominant animals are sea anemones (Zoantharia). Bivalve shells and polychaete tubes are moderately common. Photograph was taken at Station 1324, located at 39°20' N. lat., 72°18' W. long. Scale bar is 10 cm.	228
95	Relation between number of individuals and bottom sediment types. Values represent all taxonomic groups combined for the entire Middle Atlantic Bight Region.	231
96	Relation between biomass and bottom sediment types. Values represent all taxonomic groups combined for the entire Middle Atlantic Bight Region.	232
97	Relation between number of individuals and bottom sediment types. Values represent all taxonomic groups combined for each subarea.	233

FIGURES (continued)

Figure		<u>Page</u>
98	Relation between biomass (wet weight) and bottom sediment types. Values represent all taxonomic groups combined for each subarea.	235
99	Density (solid bar) and biomass (striped bar) in relation to bottom sediments in the entire Middle Atlantic Bight Region for: Porifera, Hydrozoa, Alcyonaria, Zoantharia, Platyhelminthes, and Nemertea.	241
100	Density (solid bar) and biomass (striped bar) in relation to bottom sediments in the entire Middle Atlantic Bight Region for: Nematoda, Annelida, Pogonophora, Sipuncula, Echiura, and Priapulida.	245
101	Density (solid bar) and biomass (striped bar) in relation to bottom sediments in the entire Middle Atlantic Bight Region for: Polyplacophora, Gastropoda, Bivalvia, Scaphopoda, Cephalopoda, and Pycnogonida.	247
102	Density (solid bar) and biomass (striped bar) in relation to bottom sediments in the entire Middle Atlantic Bight Region for: Ostracoda, Cirripedia, Copepoda, Nebaliacea, Cumacea, and Tanaidacea.	248
103	Density (solid bar) and biomass (striped bar) in relation to bottom sediments in the entire Middle Atlantic Bight Region for: Isopoda, Amphipoda, Mysidacea, Decapoda, Bryozoa, and Brachiopoda.	251

FIGURES (continued)

Figure		<u>Page</u>
104	Density (solid bar) and biomass (striped bar) in relation to bottom sediments in the entire Middle Atlantic Bight Region for: Holothuroidea, Echinoidea, Ophiuroidea, Asteroidea, Hemichordata, and Ascidiacea.	254
105	Geographic distribution of sediment organic carbon in the Middle Atlantic Bight Region.	296
106	Relation between number of individuals and sediment organic carbon. Values represent all taxonomic groups combined for each subarea and for the entire Middle Atlantic Bight Region.	298
107	Relation between biomass and sediment organic carbon. Values represent all taxonomic groups combined for each subarea and for the entire Middle Atlantic Bight Region.	299
108	Density and biomass in relation to sediment organic carbon in the entire Middle Atlantic Bight Region for: Porifera, Hydrozoa, Alcyonaria, Zoantharia, Platyhelminthes, and Nemertea.	303
109	Density and biomass in relation to sediment organic carbon in the entire Middle Atlantic Bight Region for: Nematoda, Annelida, Pogonophora, Sipuncula, Echiura, and Priapulida.	304
110	Density and biomass in relation to sediment organic carbon in the entire Middle Atlantic Bight Region for: Polyplacophora, Gastropoda, Bivalvia, Scaphopoda, Cephalopoda, and Pycnogonida.	305

FIGURES (continued)

Figure		<u>Page</u>
111	Density and biomass in relation to sediment organic carbon in the entire Middle Atlantic Bight Region for: Ostracoda, Cirripedia, Copepoda, Nebaliacea, Cumacea, and Tanaidacea.	306
112	Density and biomass in relation to sediment organic carbon in the entire Middle Atlantic Bight Region for: Isopoda, Amphipoda, Mysidacea, Decapoda, Bryozoa, and Brachiopoda.	307
113	Density and biomass in relation to sediment organic carbon in the entire Middle Atlantic Bight Region for: Holothuroidea, Echinoidea, Ophiuroidea, Asteroidea, Hemichordata, and Ascidiacea.	308
114	Distribution of the range in bottom-water temperature for the Middle Atlantic Bight Region. Lines delimit areas of comparable temperature range; they are not isotherms.	313
115	Relation between number of individuals and range in bottom-water temperature. Values represent all taxonomic groups combined for each subarea and for the entire Middle Atlantic Bight Region.	316
116	Relation between biomass and range of bottom-water temperature. Values represent all taxonomic groups combined for each subarea and for the entire Middle Atlantic Bight Region.	317

FIGURES (continued)

Figure		<u>Page</u>
117	Density and biomass in relation to range in bottom-water temperature in the entire Middle Atlantic Bight Region for: Porifera, Hydrozoa, Alcyonaria, Zoantharia, Platyhelminthes, and Nemertea.	325
118	Density and biomass in relation to range in bottom-water temperature in the entire Middle Atlantic Bight Region for: Nematoda, Annelida, Pogonophora, Sipuncula, Echiura, and Priapulida.	328
119	Density and biomass in relation to range in bottom-water temperature in the entire Middle Atlantic Bight Region for: Polyplacophora, Gastropoda, Bivalvia, Scaphopoda, Cephalopoda, and Pycnogonida.	331
120	Density and biomass in relation to range in bottom-water temperature in the entire Middle Atlantic Bight Region for: Ostracoda, Cirripedia, Copepoda, Nebaliacea, Cumacea, and Tanaidacea.	333
121	Density and biomass in relation to range in bottom-water temperature in the entire Middle Atlantic Bight Region for: Isopoda, Amphipoda, Mysidacea, Decapoda, Bryozoa, and Brachiopoda.	336

FIGURES (continued)

Figure		<u>Page</u>
122	Density and biomass in relation to range in bottom-water temperature in the entire Middle Atlantic Bight Region for: Holothuroidea, Echinoidea, Ophiuroidea, Asteroidea, Hemichordata, and Ascidiacea.	338
123	Geographic distribution of the number of individuals for each dominant taxon in the entire Middle Atlantic Bight Region.	373
124	Geographic distribution of the biomass for each dominant taxon in the entire Middle Atlantic Bight Region.	374

ABSTRACT

In the early 1960's a quantitative survey of the macrobenthic invertebrate fauna was conducted in the Middle Atlantic Bight Region. Purposes of this survey were to obtain a preliminary measure of the macrobenthic standing crop, particularly in terms of biomass, and secondarily, to determine the principal taxonomic components of the fauna and learn the general features of their distribution. Sampling was conducted at 563 locations; water depths represented ranged from 4 to 3,080 m. An analysis of faunal composition and quantitative distributions, from the survey, are presented in this report. Quantities are expressed in terms of density and biomass.

Dominant taxonomic components, in numbers of individuals, in decreasing order of importance were: Arthropoda (46%), Mollusca (25%), Annelida (21%), Echinodermata (4%), and Coelenterata (1%). Dominant in biomass, in decreasing order of importance were: Mollusca (71%), Echinodermata (12%), Annelida (7%), Arthropoda (5%), and Ascidiacea (2%). The quantity of fauna, both density and biomass, decreased substantially from shallow to deep water. Another major trend was the marked decrease in quantity from north to south within the Middle Atlantic Bight. Bottom sediment composition strongly influenced both the kind and quantity of macrobenthic animals. Coarse-grained sediments generally supported the largest quantities of animals, including many sessile forms. Fine-

grained sediments usually contained a depauperate fauna; attached organisms were uncommon. No obvious correlations were detected between the amount of organic carbon in bottom sediments and the quantity of benthic animals present. Marked seasonal changes in bottom water temperature were associated with an abundant fauna composed of diverse forms, whereas uniform temperatures throughout the year were associated with a sparse fauna composed of a moderate variety of species. Taxonomic groups that were dominant in a significant number of samples, in terms of number of individuals, were: Bivalvia, Annelida, Echinoidea, Ophiuroidea, Crustacea, and the Bathyal assemblage. Groups dominant in terms of biomass were: Bivalvia, Annelida, Echinoidea, Ophiuroidea, Holothuroidea, and the Bathyal assemblage.