

FISH EGGS AND LARVAE NEAR DEEPWATER DUMPSITE 106 (DWD-106)

by

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Report No. SHL 82-21 (August 1982)

Spawning Patterns of Coastal Fishes: Larval fishes representing more than 200 taxa are collected annually on coastal surveys between Cape Hatteras, North Carolina and Cape Sable, Nova Scotia (see Figure 1 and Table 1). Most of the young fish originate from pelagic eggs which drift in the water column until hatching takes place. The incubation period requires anywhere from a few days to a few weeks, depending on the species in question. Thereafter the developing larvae are dependent on favorable circulation patterns, water quality and food supply for a time period measured in months. It is these free-floating eggs and larvae that are the most vulnerable stages of development in the life history of marine fishes.

Although spawning goes on year-round, spawning cycles of most coastal species are seasonal and climatic changes are followed closely by changes in the species composition of the ichthyoplankton community. The role of environmental stimuli in the breeding cycles of most marine fishes is poorly understood, but deVlaming (1974) presented evidence that changing temperatures and photoperiod trigger active spawning in several temperate species and it is widely held that both influence the onset of spawning in coastal fishes off northeastern United States. The significance of temperature and photoperiod in spawning is evident for fishes that spawn in coastal waters between capes Cod and Hatteras, the Middle Atlantic Bight. Here the fish community is comprised of many species that immigrate from the south with spring warming and emigrate as coastal waters cool in autumn. Eggs and larvae of transient species that spawn during seasonal migrations are geographically limited at the outset but their distributions expand as the adult migrations advance. For example, young stages of Atlantic mackerel, Scomber scombrus, first occur off North Carolina and/or Virginia in April,

then continue to spread northward to waters off southern New England and beyond in June (Berrien 1978; Berrien et al. 1981). Conversely, the young of Atlantic menhaden, Brevoortia tyrannus, occur off southern New England in summer and progressively farther south during the autumn months (Kendall and Reintjes 1975). Smith et al. (1975) found similar geographic progressions in the distribution of flatfish larvae, the young of non-migratory fishes, in the Middle Atlantic Bight.

Temporal Trends in Abundance: Species diversity, or the number of taxa contributing to larval fish populations between North Carolina and Nova Scotia, is inversely proportional to increasing latitude. In the Middle Atlantic Bight, where diversity is greatest, the number of taxa increases from a low in winter to a high in summer, then declines during the autumn months. The annual spawning cycle follows a similar pattern. Eggs are most abundant during the warm months, least abundant during the cold months (Figure 2). Despite this disparity in the magnitude of seasonal egg abundance, several economically important species spawn during the late autumn and winter months (Figure 3).

Survey results for the 4-year period between 1977-80 show remarkably similar between-year patterns in relative magnitude of seasonal spawning cycles as measured by the abundance of fish eggs throughout the Bight, and in that part of the Bight potentially influenced by dumping at DWD-106. For most cruises the abundance of eggs in the potential impact area is proportional to the abundance of eggs in the Bight (Figure 4).

Larvae also exhibit seasonal pulses of high and low abundance from year to year but, because of a population explosion in the mid-1970's of sand lance, Ammodytes sp., a taxon that spawns demersal eggs in winter, the annual

abundance curve for larvae does not follow the spawning curve for eggs. Whereas the abundance of eggs has a single annual peak in summer, the standing crop of larvae in the Middle Atlantic Bight peaks in winter, declines in early spring, increases in late spring to a second annual peak in summer, then declines again in autumn (Figure 2).

Within the realm of influence of dumping at DWD-106, the larval fish community is a mix of shelf and slope water species, that continually changes, largely because of the seasonal spawning habits of the fishes, the dynamics of coastal circulation and the inshore-offshore movements of the shelf-slope front. During the course of a year, more than 150 of the 200+ taxa of larvae that occur annually in coastal waters off northeastern United States are found in that part of the Bight that could be influenced by dumping at DWD-106. As with eggs, the proportion of larvae that occurs within the potential impact area at a given time is directly related to the overall abundance of larvae in the Bight (Figure 4).

Despite the dynamic and diverse nature of the larval fish populations in shelf waters adjacent to DWD-106, numerical dominance is shared by a limited number of taxa which maintain their numerical advantage from year to year until they are directly or indirectly reduced through natural or man-induced changes such as: 1) a decline in the size of spawning stocks to a level below that required to produce enough young to maintain a competitive advantage over the developing young stages of other species; 2) shifts in spawning time and/or location which cause shifts in the distribution patterns of eggs and larvae, and have the potential to result in temporal or spatial mismatches between newly hatched larvae and optimal densities of their predators and/or prey; 3) changes in environmental and climatic events which cause mass mortality

by transporting young planktonic stages away from their traditional nursery area; and 4) increased embryonic and larval mortality imposed by the release of pollutants over principal spawning areas. In large part, it is the deviation from average conditions that influence the size of a year class.

During the 4-year period that forms the basis of this report, nine taxa occupied the top five positions of numerical dominance. Three of the top five, Atlantic mackerel, hakes of the genus Urophycis and silver hake, Merluccius bilinearis, are economically important taxa that contribute to the 1.1 billion dollar fishing industry off northeastern United States. Another, sand lance, is an important forage species that provides a principal part of the diet for important piscivorous species such as summer flounder, Paralichthys dentatus, bluefish, Pomatomus saltatrix, weakfish, Cynoscion regalis, striped bass, Morone saxatilis, Atlantic cod, Gadus morhua, bluefin tuna, Thunnus thynnus, etc.

Sand lance, which accounted for 90 to 99.5% of the winter larval population, was the most dominant taxon within that part of the potential impact area lying over the continental shelf. The estimated abundance of sand lance larvae within the 34,336 km<sup>2</sup> shelf area potentially influenced by dumping at DWD-106 exceeded 1.8 trillion at the time of the 1979 winter survey. This extraordinary biomass is equivalent to 52 million larvae/km<sup>2</sup> and represents the peak abundance level for a taxon during the 4-year period, although the abundance estimates of hake, Urophycis sp., and Atlantic mackerel were nearly as great in the summer of 1977 and spring of 1980, respectively. Young sand lance remained at or near the forefront of dominance during winters of the other three years when abundance estimates exceeded 470 billion larvae (Table 2).

A slope water myctophid, Benthoosema glaciale, was a perennial early spring dominant, although larvae were considerably less abundant than those of the other dominants. Benthoosema was succeeded by Atlantic mackerel in late spring of 1977 and 1980 but young mackerel were not abundant in the potential impact area during the intervening years. In summer hakes of the genus Urophycis dominated in 1977 and 1980 and ranked near the top in 1978 and 1979. Silver hake, Merluccius bilinearis, and flatfishes of the genus Citharichthys or Etropus were dominant during late summer and early autumn months of 1977, 1978 and 1979 (Table 2).

Late autumn survey coverage of the potential impact area was adequate only in 1979. Silver hake larvae dominated, although the spawning season of silver hake normally peaks in summer and tapers off to insignificant levels by late autumn. The abundance of silver hake larvae in late autumn of 1979 was only a fraction of that for the dominant taxa during winter, spring and summer (Table 2).

Fish Larvae in Slope Waters: Most of the 112,657 km<sup>2</sup> area that falls within the realm of influence from ocean dumping at DWD-106 lies east of the continental shelf, beyond the geographic scope of most United States fisheries and, therefore, in an area where fisheries research is seldom done (Figure 1). Because of the paucity of ichthyoplankton research in this area and the lack of standardization in collecting gears and techniques used, results cannot be meaningfully quantified. Larval fishes collected in slope and oceanic waters at and surrounding DWD-106 are, therefore, summarized on the basis of monthly occurrence in Table 3. This listing contains 209 taxa which represent 73 families. Most of the taxa are slope water and/or oceanic fishes but representatives of shelf species occur during all seasons of the year. Some

of these shelf taxa originate in the Middle Atlantic Bight and are subsequently transported off the shelf by currents, others originate south of Cape Hatteras and are transported northward by the Gulf Stream. The likelihood of these wayward larvae finding their way back on the shelf is remote and they eventually succumb to the intolerable environment. But one important species, the bluefish, does occur naturally at early stages of development in slope waters adjacent to the Middle Atlantic Bight (Austin 1975; Kendall and Walford 1979). According to the latter authors, these fish ultimately move shoreward into coastal estuaries and in subsequent years contribute to the popular summer sport fishery for bluefish off northeastern United States.

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Table 1. Listing of MARMAP surveys in the Middle Atlantic Bight, 1977-80. Stations are those falling within area potentially affected by dumping at DWD-106.

Year	Season	Date	Vessel	Cruise	No. Sta.
1977	Late winter	9 Mar-7 Apr	DELAWARE II	77-03	23
	Early spring	14 Apr-28 Apr	DELAWARE II	77-04	24
	Spring	4 May-13 May	DELAWARE II	77-05 I	27
	Spring	18 May-24 May	DELAWARE II	77-05 II	20
	Summer	19 Aug-29 Aug	YUBILEINLY	77-02	20
	Early autumn	19 Oct-29 Oct	ARGUS	77-01	22
	Late autumn	2 Dec-9 Dec	KELEZ	77-11	3
1978	Late winter	16 Feb-14 Mar	DELAWARE II	78-02	28
	Early spring	19 Apr-12 May	ARGUS	78-04	29
	Late spring	24 Jun-12 Jul	ALBATROSS IV	78-07	29
	Summer	12 Aug-3 Sep	BELOGORSK	78-01	30
	Early autumn	19 Oct-27 Oct	BELOGORSK	78-03	19
	Autumn	16 Nov	BELOGORSK	78-04	2
1979	Late winter	25 Feb-4 Mar	DELAWARE II	79-03	17
	Early spring	13 Apr-14 Apr	DELAWARE II	79-04	4
	Spring	6 May-18 May	DELAWARE II	79-05	23
	Late spring	17 June-8 Jul	ALBATROSS IV	79-06	23
	Summer	12 Aug-22 Aug	BELOGORSK	79-01	20
	Early autumn	4 Oct-18 Oct	ALBATROSS IV	79-11	18
	Autumn	12 Dec-19 Dec	ALBATROSS IV	79-13	6
1980	Late winter	29 Feb-19 Mar	ALBATROSS IV	80-02	20
	Early spring	7 Apr-27 Apr	EVRIKA	80-01	22
	Late spring		DELAWARE II	80-03	20
	Summer	17 Jul-26 Jul	EVRIKA	80-06	22
	Early autumn	27 Sep-9 Oct	ALBATROSS IV	80-10	19
	Autumn	20 Nov-7 Dec	ALBATROSS IV	80-12	19

Table 2. Summary of fish larvae collected on MARMAP surveys (1977-80) at shelf and slope water stations (depths 55 to 2200 m) within the potential area of impact from ocean dumping at DWD-106. Dominance represents the number of stations where taxon accounted for  $\geq 50\%$  of the larvae. Abundance is expansion of K mean to reflect the size of the area (see Berrien et al, 1981 for methodology).

LARVAL ASSEMBLAGES NEAR DWD-106											
CRUISES=MM7701 & DL7703											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1977	LATE WINTER	23	AMMODYTES	13	56.5	14	60.9	137.0	62.0	470,510,126,923	96.1
			HYGOPHUM BENDITI	3	13.0	5	21.7	3.5	1.9	11,924,947,157	2.4
			UROPHYCIS	0	0.0	2	8.7	0.6	0.4	1,910,873,043	0.4
			PARALEPIDIDAE	0	0.0	2	8.7	0.5	0.3	1,603,341,913	0.3
			CYCLOTHONE	0	0.0	1	4.3	0.3	1.4	994,251,130	0.2
			ETROPUS MICROSTOMUS	1	4.3	1	4.3	0.2	1.1	788,235,130	0.1
			CONGRIDAE	1	4.3	1	4.3	0.2	1.1	759,870,609	0.1
			BENTHOSEMA GLACIALE	0	0.0	1	4.3	0.2	1.0	707,620,174	0.1
			CERATOSCOPELUS MADERENSIS	0	0.0	1	4.3	0.1	0.5	353,810,087	<0.1
			BENTHOSEMA SIMILE	0	0.0	1	4.3	0.1	0.5	353,810,087	<0.1
			UNKNOWN	0	0.0	0	0.0	0.0	0.0	0	0.0
CRUISES=GO7701 & DL7704 (STA 1-94)											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1977	EARLY SPRING	24	AMMODYTES	9	37.5	13	54.2	43.1	20.9	147,966,841,065	48.5
			BENTHOSEMA GLACIALE	3	12.5	8	33.3	15.0	6.8	51,514,747,595	16.9
			HYGOPHUM BENDITI	3	12.5	5	20.8	8.4	5.2	28,739,830,287	9.4
			PARALEPIDIDAE	1	4.2	5	20.8	2.1	0.9	7,126,598,698	2.3
			OPHIDIIDAE	0	0.0	2	8.3	2.1	1.7	7,061,770,667	2.3
			PEPRILUS TRIACANTHUS	0	0.0	2	8.3	1.8	1.4	6,137,560,000	2.0
			TRIGLIDAE	0	0.0	2	8.3	1.7	1.2	5,971,602,667	1.9
			MELANOGRAMMUS AEGLEFINUS	0	0.0	1	4.2	1.6	7.8	5,493,760,000	1.8
			ETRUMEUS TERES	0	0.0	2	8.3	1.4	1.1	4,645,374,667	1.5
			CENTROPRISTIS STRIATUS	0	0.0	1	4.2	1.3	6.6	4,621,053,333	1.5
			SYNOdontIDAE	0	0.0	2	8.3	1.2	0.9	4,289,138,667	1.4
			LOPHIUS AMERICANUS	0	0.0	3	12.5	1.1	0.6	3,617,581,654	1.2
			GOBIIDAE	0	0.0	2	8.3	1.0	0.8	3,530,885,333	1.1
			DIOGENICHTHYS ATLANTICUS	1	4.2	2	8.3	0.9	0.7	3,217,569,333	1.1
			EPINEPHELUS	0	0.0	1	4.2	0.9	4.3	3,033,013,333	1.0
			LIMANDA FERRUGINEA	0	0.0	1	4.2	0.5	2.6	1,828,392,000	0.6
			MYCTOPHIDAE	0	0.0	2	8.3	0.5	0.4	1,764,012,000	0.6
			MYCTOPHUM NITIDULUM	0	0.0	1	4.2	0.4	2.2	1,516,506,667	0.5
			SCORPAENIDAE	0	0.0	1	4.2	0.4	2.2	1,516,506,667	0.5
			BATHYLAGIDAE	0	0.0	2	8.3	0.4	0.3	1,460,710,667	0.5
			ETROPUS MICROSTOMUS	0	0.0	1	4.2	0.3	1.4	948,532,000	0.3
			SYMPHURUS	0	0.0	1	4.2	0.3	1.4	948,532,000	0.3
			DISINTEGRATED	0	0.0	1	4.2	0.3	1.3	944,240,000	0.3
			PARALICHTHYS DENTATUS	0	0.0	1	4.2	0.3	1.3	924,210,667	0.3
			PHOLIS BUNNELLUS	0	0.0	1	4.2	0.3	1.3	914,196,000	0.3
			ENCHELYOPUS CIMBRIUS	0	0.0	1	4.2	0.3	1.3	897,028,000	0.3
			UROPHYCIS	0	0.0	1	4.2	0.2	1.2	851,246,667	0.3
			GADIDAE	0	0.0	1	4.2	0.2	1.2	819,772,000	0.3
			CLUPEIFORMES	0	0.0	1	4.2	0.2	1.1	758,253,333	0.2
			GONOSTOMATIDAE	0	0.0	1	4.2	0.2	1.1	758,253,333	0.2
			HYGOPHUM	0	0.0	1	4.2	0.2	1.1	758,253,333	0.2
			CARAPIDAE	0	0.0	1	4.2	0.2	1.1	758,253,333	0.2
			CITHARICHTHYS ARCTIFRONS	0	0.0	1	4.2	0.2	1.1	758,253,333	0.2
			GADUS MORHUA	0	0.0	1	4.2	0.2	1.0	705,318,667	0.2
			SYNGNATHIDAE	0	0.0	1	4.2	0.2	1.0	705,318,667	0.2
			UNKNOWN	0	0.0	0	0.0	0.0	0.0	0	0.0

Table 2. (continued)

YEAR	SEASON	# STA	TXNAME	CRUISES=AL7702 & DL7705 (STA 1-91)				KMEAN	KSTDERR	TOTABUND	PCTABUND
				DOM	PCTDOM	OCCUR	PCTOCCUR				
1977	SPRING	27	BENTHOSEMA GLACIALE	10	37.0	15	55.6	40.6	14.0	139,280,346,837	47.0
			AMMOBTES	1	3.7	5	18.5	4.0	2.4	13,856,223,761	4.7
			SYNOBONTIDAE	0	0.0	7	25.9	3.2	1.3	10,858,411,680	3.6
			OPHIDIIDAE	0	0.0	5	18.5	3.0	1.6	10,272,238,630	3.4
			MYCTOPHIDAE	1	3.7	1	3.7	2.6	13.3	8,790,016,000	2.9
			PEPRILUS TRIACANTHUS	0	0.0	3	11.1	2.5	1.8	8,741,868,289	2.9
			BOTHUS	0	0.0	3	11.1	2.5	1.4	8,456,857,277	2.8
			PARALEPIDIDAE	0	0.0	5	18.5	2.3	1.2	7,854,523,386	2.6
			LIPARIS	1	3.7	2	7.4	1.9	1.6	6,358,518,519	2.1
			UROPHYCIS	0	0.0	5	18.5	1.8	0.8	6,057,523,101	2.0
			LIMANDA FERRUGINEA	1	3.7	3	11.1	1.5	0.9	5,056,344,891	1.7
			SCOMBER SCOMBRUS	1	3.7	3	11.1	1.4	0.9	4,850,639,003	1.6
			BOTHUS	0	0.0	2	7.4	1.4	1.0	4,690,043,259	1.6
			TRIGLIDAE	0	0.0	2	7.4	1.1	0.9	3,841,816,889	1.3
			HYGOPHUM BENOITI	0	0.0	1	3.7	1.1	5.7	3,745,167,407	1.2
			ETROPUS/CITHARICHTHYS	0	0.0	1	3.7	0.9	4.7	3,092,783,407	1.0
			CENTROPRISTIS STRIATUS	0	0.0	1	3.7	0.9	4.7	3,092,783,407	1.0
			CARAPIDAE	0	0.0	1	3.7	0.9	4.7	3,092,783,407	1.0
			SYMPHURUS	0	0.0	2	7.4	0.9	0.7	3,091,511,704	1.0
			SERRANIDAE	0	0.0	3	11.1	0.9	0.5	3,036,655,232	1.0
			MELANOGRAMMUS AEGLEFINUS	2	7.4	3	11.1	0.8	0.5	2,735,965,018	0.9
			GADUS MORHUA	0	0.0	3	11.1	0.7	0.4	2,510,810,869	0.8
			PERCIFORMES	0	0.0	2	7.4	0.7	0.5	2,332,304,593	0.8
			BALISTIDAE	0	0.0	1	3.7	0.7	3.5	2,319,587,556	0.8
			SCOMBERESOX SAURUS	0	0.0	1	3.7	0.5	2.5	1,635,410,963	0.5
			CITHARICHTHYS ARCTIFRONS	0	0.0	1	3.7	0.5	2.5	1,635,410,963	0.5
			VINCIGUERRIA	0	0.0	2	7.4	0.5	0.3	1,634,139,259	0.5
			MYCTOPHUM NITIDULUM	0	0.0	2	7.4	0.5	0.3	1,603,618,370	0.5
			DIAGENICHTHYS ATLANTICUS	0	0.0	1	3.7	0.5	2.3	1,546,391,704	0.5
			DECAPTERUS	0	0.0	1	3.7	0.5	2.3	1,546,391,704	0.5
			BLENNIIDAE	0	0.0	1	3.7	0.5	2.3	1,546,391,704	0.5
			SCORPAENIDAE	0	0.0	1	3.7	0.5	2.3	1,546,391,704	0.5
			SYACIUM	0	0.0	1	3.7	0.5	2.3	1,546,391,704	0.5
			LOPHIUS AMERICANUS	0	0.0	2	7.4	0.4	0.3	1,523,501,037	0.5
			CERATOSCOPELUS MADERENSIS	0	0.0	2	7.4	0.4	0.3	1,518,414,222	0.5
			AGONIDAE	0	0.0	1	3.7	0.3	1.4	946,147,656	0.3
			MAUROLICUS MUELLERI	0	0.0	1	3.7	0.2	1.2	817,705,481	0.3
			DIAPHUS DUMERILI	0	0.0	1	3.7	0.2	1.2	785,912,889	0.2
			GADIFORMES	0	0.0	1	3.7	0.2	1.2	785,912,889	0.2
			STOMIAS FEROX	0	0.0	1	3.7	0.2	1.2	774,467,556	0.2
			MYCTOPHUM	0	0.0	1	3.7	0.2	1.2	774,467,556	0.2
			ARIOMMA	0	0.0	1	3.7	0.2	1.2	773,195,852	0.2
			CONGRIDAE	0	0.0	1	3.7	0.2	1.2	771,924,148	0.2
			UNKNOWN	0	0.0	1	3.7	0.2	1.2	770,652,444	0.2
			MURAENIDAE	0	0.0	1	3.7	0.2	1.2	770,652,444	0.2
			PISODONOPHIS CRUENTIFER	0	0.0	1	3.7	0.2	1.1	750,305,185	0.2
			GLYPTOCEPHALUS CYNOGLOSSUS	0	0.0	1	3.7	0.2	1.1	750,305,185	0.2
			MERLUCCIOUS BILINEARIS	0	0.0	1	3.7	0.2	1.1	749,033,481	0.2
			PSENES CYANOPHRYS	0	0.0	1	3.7	0.2	1.1	749,033,481	0.2
			POLLACHIUS VIRENS	0	0.0	1	3.7	0.2	1.1	731,229,630	0.2
			CALLIONYMIDAE	0	0.0	1	3.7	0.2	1.0	656,199,111	0.2
			CAULOPHRYNIDAE	0	0.0	1	3.7	0.2	1.0	656,199,111	0.2
			DISINTEGRATED	0	0.0	1	3.7	0.1	0.7	473,073,778	0.1
			ANGUILLA ROSTRATA	0	0.0	1	3.7	0.1	0.7	473,073,778	0.1
			ENCHELYOPUS CIMBRIUS	1	3.7	1	3.7	0.1	0.5	319,197,630	0.1

Table 2. (continued)

YEAR	SEASON	#STA	TXNAME	CRUISE=DL7705 (STA 92-180)				KMEAN	KSTDERR	TOTABUND	PCTABUND
				DOM	PCTDOM	OCCUR	PCTOCCUR				
1977	SPRING	20	SCOMBER SCOMBRUS	4	20.0	7	35.0	27.7	18.2	95,081,795,420	31.3
			BENTHOSEMA GLACIALE	3	15.0	7	35.0	10.1	4.3	34,832,234,628	11.5
			CERATOSCOPELUS MADERENSIS	0	0.0	5	25.0	10.0	7.4	34,460,100,408	11.3
			LIPARIS	1	5.0	1	5.0	5.2	23.3	17,923,392,000	5.9
			BENTHOSEMA SUBORBITALE	2	10.0	2	10.0	5.1	3.5	17,401,484,800	5.7
			HYGOPHUM HYGOMII	0	0.0	1	5.0	3.0	13.4	10,305,950,400	3.4
			UROPHYCIS	0	0.0	3	15.0	2.9	2.2	10,042,248,306	3.3
			LIMANDA FERRUGINEA	0	0.0	4	20.0	2.6	1.5	8,777,974,162	2.9
			VINCIGUERRIA	0	0.0	3	15.0	2.5	1.8	8,430,740,028	2.8
			SYACIUM PAPILLOSUM	0	0.0	1	5.0	1.7	7.5	5,725,528,000	1.9
			ENCHELYOPUS CIMBRIUS	0	0.0	3	15.0	1.4	0.9	4,788,439,260	1.5
			BOTHUS	0	0.0	2	10.0	1.3	1.0	4,441,361,600	1.4
			PARALEPIDIDAE	0	0.0	3	15.0	1.3	0.7	4,307,381,169	1.4
			COTTIDAE	0	0.0	2	10.0	1.2	1.0	4,178,691,200	1.4
			GLYPTOCEPHALUS CYNOBLOSSUS	0	0.0	3	15.0	1.2	0.7	4,039,665,690	1.3
			LAMPANYCTUS ALATUS	0	0.0	1	5.0	1.0	4.5	3,435,316,800	1.1
			POMATOMUS SALTATRIX	1	5.0	1	5.0	1.0	4.5	3,425,016,000	1.1
			AMHODYTES	0	0.0	2	10.0	0.9	0.6	2,935,728,000	1.0
			ARGYROPELECUS	0	0.0	1	5.0	0.7	3.0	2,290,211,200	0.7
			GOBIIDAE	0	0.0	2	10.0	0.6	0.4	2,231,840,000	0.7
			OPHICHTHIDAE	0	0.0	2	10.0	0.6	0.4	2,214,672,000	0.7
			SYNODONTIDAE	0	0.0	2	10.0	0.6	0.4	2,118,531,200	0.7
			MELANOGRAMMUS AEGLEFINUS	1	5.0	1	5.0	0.6	2.6	1,991,488,000	0.6
			LOPHIUS AMERICANUS	0	0.0	2	10.0	0.5	0.4	1,749,419,200	0.6
			DIAPHUS	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			DIAPHUS PROBLEMATICUS	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			LAMPANYCTUS	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			LOBIANCHIA DOFLEINI	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			DIAGENICHTHYS ATLANTICUS	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			CENTROPRISTIS STRIATUS	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			RHOMBOPLETES AURORUBENS	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			OPHIDIIDAE	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			THUNNUS	0	0.0	1	5.0	0.3	1.5	1,145,105,600	0.4
			LEIOSTOMUS XANTHURUS	0	0.0	1	5.0	0.3	1.4	1,086,734,400	0.3
			STERNOPTYCHIDAE	0	0.0	1	5.0	0.3	1.4	1,069,566,400	0.3
			PSEUDOPLEURONECTES AMERICANUS	0	0.0	1	5.0	0.3	1.3	1,006,044,800	0.3
			MYCTOPHIDAE	0	0.0	1	5.0	0.3	1.3	985,443,200	0.3
			MERLUCCIIUS ALBIDUS	0	0.0	1	5.0	0.3	1.3	985,443,200	0.3
			CYCLOTHONE	0	0.0	1	5.0	0.3	1.3	973,425,600	0.3
			PEPRILUS TRIACANTHUS	0	0.0	1	5.0	0.3	1.3	973,425,600	0.3
			GADUS MORHUA	0	0.0	1	5.0	0.3	1.3	969,992,000	0.3
			UNKNOWN	0	0.0	0	0.0	0.0	0.0	0	0

Table 2. (continued)

YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCUR	PCTOCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1977	SUMMER	20									
			UROPHYCIS	6	30.0	17	85.0	314.2	152.2	1,078,938,525,099	46.0
			CITHARICHTHYS ARCTIFRONS	0	0.0	15	75.0	95.2	38.5	326,987,023,090	13.9
			ETROPUS MICROSTOMUS	0	0.0	3	15.0	41.5	28.4	142,570,439,458	6.1
			AUXIS	0	0.0	15	75.0	26.5	8.5	91,068,530,705	3.9
			CERATOSCOPELUS MADERENSIS	0	0.0	6	30.0	26.2	19.0	90,077,535,468	3.8
			OPHIDIIDAE	0	0.0	15	75.0	26.1	7.7	89,632,675,880	3.8
			ENGRAULIS EURYSTOLE	0	0.0	8	40.0	17.5	8.4	59,992,613,295	2.6
			LABRIDAE/SCARIDAE	0	0.0	14	70.0	15.4	6.1	52,896,215,439	2.2
			HIPPOGLOSSINA OBLONGA	0	0.0	12	60.0	14.7	4.7	50,530,984,875	2.2
			SYMPHURUS	0	0.0	3	15.0	14.5	13.3	49,839,425,201	2.1
			ETROPUS/CITHARICHTHYS	0	0.0	3	15.0	13.1	10.7	45,125,966,134	1.9
			MERLUCCIOUS BILINEARIS	0	0.0	10	50.0	11.1	3.8	38,153,128,479	1.6
			POMATOMUS SALTATRIX	0	0.0	4	20.0	10.0	7.7	34,259,110,237	1.5
			BOTHUS	0	0.0	8	40.0	9.3	3.5	31,930,114,077	1.4
			SYACIUM PAPILLOSUM	0	0.0	5	25.0	4.7	2.8	16,107,063,811	0.7
			PEPRILUS TRIACANTHUS	0	0.0	7	35.0	4.1	1.7	13,962,101,355	0.6
			TRIGLIDAE	0	0.0	3	15.0	3.9	2.8	13,361,784,985	0.6
			CALLIONYMIDAE	0	0.0	4	20.0	3.6	2.3	12,263,900,307	0.5
			ENGRAULIDAE	0	0.0	2	10.0	3.0	2.8	10,458,745,600	0.4
			CENTROPRISTIS STRIATA	0	0.0	2	10.0	2.7	2.5	9,320,507,200	0.4
			SYNODONTIDAE	0	0.0	1	5.0	2.1	9.4	7,227,728,000	0.3
			UNKNOWN	0	0.0	3	15.0	2.0	1.3	6,777,985,838	0.3
			DISINTEGRATED	0	0.0	4	20.0	1.9	1.0	6,528,249,994	0.3
			CYCLOTHONE	0	0.0	2	10.0	1.7	1.5	5,763,297,600	0.2
			MERLUCCIOUS ALBIDUS	0	0.0	2	10.0	1.7	1.2	5,761,580,800	0.2
			CLUPEIFORMES	0	0.0	1	5.0	1.7	7.4	5,670,590,400	0.2
			GOBIIDAE	0	0.0	5	25.0	1.5	0.6	5,217,852,640	0.2
			EUTHYNNUS ALLETTERATUS	0	0.0	1	5.0	1.5	6.7	5,177,868,800	0.2
			SERRANIDAE	0	0.0	1	5.0	1.3	5.7	4,410,459,200	0.2
			OPHICHTHIDAE	0	0.0	3	15.0	1.1	0.7	3,937,212,791	0.2
			TAUTOGOLABRUS ADSPERSUS	0	0.0	1	5.0	1.1	4.7	3,625,881,600	0.2
			ANGUILLIFORMES	0	0.0	2	10.0	0.9	0.7	3,146,894,400	0.1
			PARALEPIDIDAE	0	0.0	3	15.0	0.9	0.5	2,995,736,380	0.1
			LOPHOLATILUS CHAMAELEONTICEPS	0	0.0	3	15.0	0.9	0.5	2,930,516,363	0.1
			BOTHIDAE	0	0.0	2	10.0	0.8	0.6	2,911,692,800	0.1
			ANCHOA HEPSETUS	0	0.0	1	5.0	0.7	3.0	2,312,529,600	0.1
			GLYPTOCEPHALUS CYNOGLOSSUS	0	0.0	1	5.0	0.5	2.4	1,878,179,200	0.1
			OGCOCEPHALIDAE	0	0.0	1	5.0	0.5	2.2	1,661,862,400	0.1
			SCORPAENIDAE	0	0.0	2	10.0	0.4	0.3	1,481,598,400	0.1
			BALISTIDAE	0	0.0	1	5.0	0.4	1.7	1,294,467,200	0.1
			TETRAGONURIDAE	0	0.0	1	5.0	0.3	1.4	1,067,849,600	<0.1
			PISODONOPHIS CRUENTIFER	0	0.0	1	5.0	0.3	1.2	956,257,600	<0.1
			LOPHIUS AMERICANUS	0	0.0	1	5.0	0.3	1.2	935,656,000	<0.1
			NOTOLYCHNUS	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
			TETRAGONURUS ATLANTICUS	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
			VINCIGUERRIA	0	0.0	1	5.0	0.2	1.1	834,364,800	<0.1
			MURAENIDAE	0	0.0	1	5.0	0.2	1.1	834,364,800	<0.1
			ARGENTINIDAE	0	0.0	1	5.0	0.2	1.1	830,931,200	<0.1
			MYCTOPHIDAE	0	0.0	1	5.0	0.2	1.0	770,843,200	<0.1
			SARDINELLA AURITA	0	0.0	1	5.0	0.2	0.9	722,772,800	<0.1
			CARANX	0	0.0	1	5.0	0.2	0.9	722,772,800	<0.1
			LARIUS FASCIATUS	0	0.0	1	5.0	0.2	0.9	722,772,800	<0.1
			SCOPELIFORMES	0	0.0	1	5.0	0.2	0.8	648,950,400	<0.1
			DIOGENICHTHYS ATLANTICUS	0	0.0	1	5.0	0.2	0.8	647,233,600	<0.1
			LESTIBIUM ATLANTICUM	0	0.0	1	5.0	0.2	0.8	630,065,600	<0.1
			DIAPHUS	0	0.0	1	5.0	0.2	0.8	614,614,400	<0.1

Table 2. (continued)

YEAR	SEASON	#STA	TXNAME	CRUISE=AR7701						TOTABUND	PCTABUND
				DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR		
1977	EARLY	22	CITHARICHTHYS ARCTIFRONS	2	9.1	15	68.2	17.2	5.7	59,091,894,367	21.6
	AUTUMN		UROPHYCIS	2	9.1	18	81.8	15.7	4.2	53,792,714,486	19.7
			MERLUCCIOUS BILINEARIS	2	9.1	9	40.9	13.8	5.7	47,352,220,357	17.4
			CERATOSCOPELUS MADERENSIS	2	9.1	7	31.8	12.9	7.7	44,239,316,063	16.2
			PARALEPIDIDAE	1	4.5	9	40.9	6.4	2.3	22,122,074,961	8.1
			MERLUCCIOUS ALBIDUS	0	0.0	5	22.7	3.2	1.7	10,868,870,334	3.9
			OPHIDIIDAE	0	0.0	7	31.8	2.0	0.7	6,709,995,408	2.5
			BOTHUS	0	0.0	4	18.2	1.2	0.6	4,213,268,444	1.5
			PARALICHTHYS DENTATUS	0	0.0	2	9.1	0.9	0.7	3,093,361,455	1.1
			BENTHOSENA GLACIALE	0	0.0	1	4.5	0.9	4.1	2,991,914,182	1.1
			GOBIIDAE	0	0.0	3	13.6	0.7	0.4	2,362,227,186	0.8
			MYCTOPHIDAE	0	0.0	2	9.1	0.6	0.4	1,949,348,364	0.7
			GONOSTOMATIDAE	0	0.0	2	9.1	0.4	0.3	1,445,233,455	0.5
			LAMPANYCTUS	0	0.0	1	4.5	0.4	1.7	1,208,002,909	0.4
			LOBIANCHIA DOFLEINI	0	0.0	1	4.5	0.4	1.7	1,208,002,909	0.4
			SYACIUM PAPILLOSUM	0	0.0	1	4.5	0.3	1.4	997,304,727	0.3
			CYCLOTHONE	0	0.0	1	4.5	0.3	1.3	970,772,364	0.3
			MICROPOGONIAS UNBULATUS	1	4.5	1	4.5	0.3	1.3	927,072,000	0.3
			DIODONTIDAE	0	0.0	1	4.5	0.3	1.3	919,268,364	0.3
			VINCIGUERRIA	0	0.0	1	4.5	0.2	1.0	741,345,455	0.3
			SYMBOLOPHORUS VERANYI	0	0.0	1	4.5	0.2	1.0	741,345,455	0.3
			CARAPIDAE	0	0.0	1	4.5	0.2	1.0	741,345,455	0.3
			CALLIONYCHIDAE	0	0.0	1	4.5	0.2	1.0	741,345,455	0.3
			GEMPYLIDAE	0	0.0	1	4.5	0.2	1.0	741,345,455	0.3
			UNKNOWN FISH/EGGS	0	0.0	1	4.5	0.2	1.0	703,888,000	0.3
			ENGRAULIS EURYSTOLE	0	0.0	1	4.5	0.2	1.0	697,645,091	0.2
			SCOPHTHALMUS AQUOSUS	0	0.0	1	4.5	0.2	0.9	692,962,909	0.2
			AMMODYTES	0	0.0	1	4.5	0.2	0.9	650,823,273	0.2
			LABRIDAE/SCARIDAE	0	0.0	1	4.5	0.2	0.8	602,440,727	0.2

Table 2. (continued)

CRUISES=HM7711 & KE7711											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1977	EARLY	3	GOBIIDAE	1	33.3	2	66.7	10.0	7.3	34,221,546,667	37.7
	WINTER		PARALEPIDIDAE	0	0.0	1	33.3	4.8	8.2	16,321,045,333	18.0
			LABRIDAE/SCARIDAE	0	0.0	1	33.3	2.4	4.1	8,160,522,667	8.9
			STOMIAS	0	0.0	1	33.3	2.4	4.1	8,160,522,667	8.9
			MYCTOPHIDAE	0	0.0	1	33.3	1.9	3.3	6,638,293,333	7.3
			MERLUCCIUS ALBIDUS	0	0.0	1	33.3	1.9	3.3	6,638,293,333	7.3
			VINCIGUERRIA	0	0.0	1	33.3	1.6	2.8	5,516,650,667	6.1
			CALLIONYMIDAE	0	0.0	1	33.3	1.6	2.8	5,516,650,667	6.1
CRUISE=DL7802											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1978	LATE	28	AMHODYTES	11	39.3	12	42.9	222.1	128.7	762,512,494,902	89.2
	WINTER		PARALEPIDIDAE	4	14.3	9	32.1	11.1	5.1	37,983,661,892	4.4
			DISINTEGRATED	1	3.6	2	7.1	3.7	3.2	12,692,057,143	1.5
			UNKNOWN:FISH/EGGS	0	0.0	4	14.3	2.4	1.2	8,184,541,049	0.9
			BREVOORTIA TYRANNUS	0	0.0	3	10.7	2.1	1.5	7,167,399,176	0.8
			MYCTOPHIDAE	0	0.0	3	10.7	0.9	0.5	3,020,001,697	0.4
			GOBIIDAE	0	0.0	2	7.1	0.8	0.6	2,711,317,714	0.3
			UROPHYCIS	0	0.0	3	10.7	0.7	0.4	2,335,980,029	0.3
			HYGOPHUM	0	0.0	2	7.1	0.5	0.4	1,807,545,143	0.2
			CERATOSCOPELUS MADERENSIS	0	0.0	1	3.6	0.5	2.7	1,721,705,143	0.2
			CITHARICHTHYS ARCTIFRONS	0	0.0	1	3.6	0.5	2.7	1,721,705,143	0.2
			SCOPHTHALMUS AQUOSUS	0	0.0	1	3.6	0.5	2.7	1,721,705,143	0.2
			SCIAENIDAE	0	0.0	1	3.6	0.4	2.2	1,449,469,714	0.2
			OPHICHTHIDAE	0	0.0	2	7.1	0.4	0.3	1,386,929,143	0.2
			ENCHELYOPUS CIMBRIUS	0	0.0	2	7.1	0.4	0.3	1,386,929,143	0.2
			CARAPIDAE	0	0.0	1	3.6	0.3	1.5	946,692,571	0.1
			CYNOGLOSSIDAE	0	0.0	1	3.6	0.3	1.3	860,852,571	0.1
			PARALICHTHYS DENTATUS	1	3.6	1	3.6	0.2	1.2	767,654,857	<0.1
			SYMPHURUS	0	0.0	1	3.6	0.2	1.1	724,734,857	<0.1
			TETRAODONTIDAE	0	0.0	1	3.6	0.2	1.1	724,734,857	<0.1
			LABRIDAE/SCARIDAE	0	0.0	1	3.6	0.2	1.0	662,194,286	<0.1
			CYCLOTHONE	0	0.0	1	3.6	0.2	1.0	662,194,286	<0.1
			DIAPHUS	0	0.0	1	3.6	0.2	1.0	662,194,286	<0.1
			BREGNACEROTIDAE	0	0.0	1	3.6	0.2	1.0	662,194,286	<0.1
			DECAPTERUS FUNCTATUS	0	0.0	1	3.6	0.2	1.0	662,194,286	<0.1
			PEPRILUS TRIACANTHUS	0	0.0	1	3.6	0.2	1.0	662,194,286	<0.1



Table 2. (continued)

YEAR	SEASON	#STA	TXNAME	DOM	CRUISES=AR7804 & AL7804				KMEAN	KSTDERR	TOTABUND	PCTABUND
					PCTDOM	OCCUR	PCTOCCUR					
1978	EARLY SPRING	29	BENTHOSEMA GLACIALE	15	51.7	16	55.2	61.1	17.8	209,776,921,462	84.2	
			AMMODYTES	5	17.2	10	34.5	5.1	2.2	17,577,903,593	7.0	
			MYCTOPHIDAE	3	10.3	3	10.3	3.9	3.2	13,482,161,482	5.4	
			PARALEPIDIDAE	0	0.0	3	10.3	0.5	0.3	1,876,293,029	0.7	
			CERATOSCOPELUS MADERENSIS	0	0.0	2	6.9	0.5	0.3	1,562,880,000	0.6	
			PEPRILUS TRIACANTHUS	0	0.0	1	3.4	0.3	1.6	1,046,656,000	0.4	
			ENCHELYOPUS CIMBRIUS	0	0.0	1	3.4	0.2	1.2	755,392,000	0.3	
			HYGOPHUM	0	0.0	1	3.4	0.2	1.2	738,816,000	0.3	
			DISINTEGRATED	0	0.0	1	3.4	0.2	1.0	636,992,000	0.2	
			CITHARICHTHYS ARCTIFRONS	0	0.0	1	3.4	0.2	0.9	555,296,000	0.2	
			UNKNOWN	0	0.0	1	3.4	0.2	0.8	523,328,000	0.2	
			GONOSTOMATIDAE	0	0.0	1	3.4	0.2	0.8	523,328,000	0.2	
			CARAPIDAE	0	0.0	1	3.4	0.2	0.8	523,328,000	0.2	

YEAR	SEASON	#STA	TXNAME	DOM	CRUISE=AL7807				KMEAN	KSTDERR	TOTABUND	PCTABUND
					PCTDOM	OCCUR	PCTOCCUR					
1978	LATE SPRING	29	MERLUCCIIUS BILINEARIS	3	10.3	11	37.9	15.8	7.8	54,187,605,719	17.5	
			UROPHYCIS	2	6.9	14	48.3	15.4	5.5	52,797,641,503	17.0	
			PEPRILUS TRIACANTHUS	1	3.4	8	27.6	12.3	6.8	42,379,410,780	13.7	
			CERATOSCOPELUS MADERENSIS	2	6.9	5	17.2	10.0	7.1	34,470,531,174	11.1	
			HIPPUGLOSSINA OBLONGA	1	3.4	10	34.5	6.6	2.4	22,601,964,431	7.3	
			BENTHOSEMA GLACIALE	3	10.3	11	37.9	6.3	1.9	21,585,339,573	6.9	
			SCOMBER SCOMBRUS	0	0.0	5	17.2	4.2	2.5	14,346,749,887	4.6	
			POMATOMUS SALTATRIX	1	3.4	1	3.4	3.1	16.9	10,755,456,000	3.5	
			LINANDA FERRUGINEA	1	3.4	4	13.8	2.2	1.4	7,652,909,817	2.5	
			ENGRAULIDAE	0	0.0	2	6.9	1.7	1.5	5,708,064,000	1.8	
			UNKNOWN	0	0.0	5	17.2	1.5	0.7	5,237,758,906	1.7	
			LOPHIUS AMERICANUS	2	6.9	5	17.2	1.5	0.7	5,074,048,001	1.6	
			MYCTOPHIDAE	0	0.0	4	13.8	1.1	0.5	3,744,854,443	1.2	
			BOTHUS	0	0.0	3	10.3	1.0	0.6	3,413,720,692	1.1	
			DPHIDIIDAE	0	0.0	3	10.3	0.9	0.4	3,105,949,320	1.0	
			LABRIDAE/SCARIDAE	0	0.0	3	10.3	0.8	0.5	2,697,247,310	0.8	
			SARDA SARDA	0	0.0	2	6.9	0.8	0.6	2,643,872,000	0.8	
			GLYPTOCEPHALUS CYNOGLOSSUS	0	0.0	3	10.3	0.7	0.4	2,389,137,176	0.7	
			SYNOBONTIDAE	0	0.0	2	6.9	0.6	0.4	2,132,384,000	0.7	
			MERLUCCIIUS	0	0.0	1	3.4	0.4	2.3	1,477,632,000	0.5	
			DISINTEGRATED	0	0.0	2	6.9	0.4	0.3	1,466,976,000	0.5	
			ETROPUS MICROSTOMUS	0	0.0	2	6.9	0.4	0.3	1,451,584,000	0.5	
			PARALEPIDIDAE	0	0.0	1	3.4	0.4	2.1	1,321,344,000	0.4	
			DIAPHUS	0	0.0	2	6.9	0.4	0.3	1,278,720,000	0.4	
			LAMPANCTUS	0	0.0	1	3.4	0.4	1.9	1,236,096,000	0.4	
			CARAPIDAE	0	0.0	1	3.4	0.2	1.1	726,976,000	0.2	
			SCOMBRIDAE	0	0.0	1	3.4	0.2	1.0	660,672,000	0.2	
			GONICHTHYS COCCOI	0	0.0	1	3.4	0.2	1.0	652,384,000	0.2	
			HYGOPHUM	0	0.0	1	3.4	0.2	1.0	638,176,000	0.2	
			GONOSTOMA ELONGATUM	0	0.0	1	3.4	0.2	1.0	618,048,000	0.2	
			CYCLOPSETTA	0	0.0	1	3.4	0.2	1.0	618,048,000	0.2	
			SYACIUM	0	0.0	1	3.4	0.2	1.0	618,048,000	0.2	

Table 2. (continued)

YEAR	SEASON	#STA	TXNAME	DDM	PCTDDM	CRUISE=BE7801		KMEAN	KSTDERR	TOTALBUND	PCTABUND
						OCCUR	PCTOCCUR				
1978	SUMMER	30	ETROPUS MICROSTOMUS	1	3.3	9	30.0	164.8	125.7	565,832,361,762	36.2
			CITHARICHTHYS ARCTIFRONS	1	3.3	16	53.3	65.2	31.0	223,970,984,356	14.4
			LABRIDAE/SCARIDAE	0	0.0	6	20.0	27.8	18.9	95,610,206,123	6.1
			UROPHYCIS	2	6.7	20	66.7	24.9	7.0	85,515,500,716	5.5
			AUXIS	2	6.7	15	50.0	18.4	6.3	63,292,418,840	4.1
			HIPPOGLOSSINA OBLONGA	1	3.3	16	53.3	17.9	5.2	61,521,913,098	3.9
			OPHIDIIDAE	1	3.3	15	50.0	16.9	5.8	57,872,321,603	3.7
			PEPRILUS TRIACANTHUS	0	0.0	14	46.7	14.8	4.7	50,816,628,732	3.3
			ENGRAULIDAE	0	0.0	7	23.3	14.6	9.1	50,190,858,806	3.2
			TRIGLIDAE	0	0.0	5	16.7	7.9	4.9	27,066,593,267	1.7
			CENTROPRISTIS STRIATUS	0	0.0	5	16.7	7.6	4.9	26,150,241,825	1.7
			SYACIUM	0	0.0	3	10.0	7.3	4.4	25,062,792,928	1.6
			GOBIIDAE	0	0.0	5	16.7	5.8	3.4	20,009,609,794	1.3
			ROTHUS	0	0.0	7	23.3	4.4	2.2	15,091,859,761	1.0
			POMATOMUS SALTATRIX	0	0.0	7	23.3	4.4	1.9	14,960,155,684	1.0
			CALLIONYMIDAE	0	0.0	4	13.3	4.0	2.5	13,783,862,077	0.9
			SYMPHURUS	0	0.0	5	16.7	3.9	2.3	13,248,229,841	0.8
			CERATOSCOPELUS MADERENSIS	1	3.3	3	10.0	3.0	2.1	10,338,543,287	0.7
			PISODONOPHIS CRUENTIFER	0	0.0	4	13.3	3.0	1.9	10,269,830,989	0.7
			SYNOdontIDAE	0	0.0	5	16.7	2.9	1.6	9,809,585,104	0.6
			ANGUILLIFORMES	0	0.0	3	10.0	2.8	2.1	9,768,041,774	0.6
			MERLUCCIOUS	0	0.0	2	6.7	2.1	1.6	7,276,942,933	0.5
			BENTHOSEMA BLACIALE	0	0.0	3	10.0	2.0	1.2	6,900,300,125	0.4
			SCORPAENIDAE	0	0.0	4	13.3	2.0	1.2	6,752,026,405	0.4
			OPHICHTHIDAE	0	0.0	6	20.0	1.8	0.7	6,257,782,295	0.4
			SERRANIDAE	0	0.0	4	13.3	1.7	1.1	5,919,483,645	0.4
			DISINTEGRATED	0	0.0	3	10.0	1.7	1.0	5,916,189,982	0.4
			MERLUCCIOUS BILINEARIS	0	0.0	7	23.3	1.6	0.6	5,352,829,651	0.4
			SARDINELLA	0	0.0	1	3.3	1.5	8.2	5,136,665,600	0.4
			DECAPTERUS PUNCTATUS	0	0.0	2	6.7	1.4	1.2	4,910,048,000	0.3
			MERLUCCIOUS ALBIDUS	0	0.0	3	10.0	1.3	0.8	4,402,501,808	0.3
			DIAPHUS SUBTILIS	1	3.3	1	3.3	1.2	6.7	4,217,605,333	0.3
			PARALEPIDIDAE	0	0.0	2	6.7	1.2	1.0	4,192,425,600	0.3
			EUTHYNNUS ALLETTERATUS	0	0.0	3	10.0	1.1	0.6	3,813,331,872	0.2
			MICROPOGONIAS UNDULATUS	0	0.0	1	3.3	1.0	5.5	3,424,443,733	0.2
			UNKNOWN/FISH/EGGS	0	0.0	3	10.0	0.9	0.6	3,194,664,469	0.2
			OGCOEPHALIDAE	0	0.0	2	6.7	0.8	0.6	2,788,083,200	0.2
			MAUROLICUS MUELLERI	0	0.0	1	3.3	0.8	4.3	2,669,051,733	0.2
			CYCLOTHONE	0	0.0	2	6.7	0.7	0.5	2,379,484,800	0.1
			NYCTOPHIDAE	0	0.0	2	6.7	0.6	0.5	2,140,277,333	0.1
			LOPHIUS AMERICANUS	0	0.0	3	10.0	0.6	0.3	2,057,027,234	0.1
			SCIAENIDAE	0	0.0	1	3.3	0.5	2.9	1,812,940,800	0.1
			CERATOSCOPELUS	0	0.0	1	3.3	0.5	2.7	1,682,464,000	0.1
			MURAENIDAE	0	0.0	2	6.7	0.4	0.3	1,523,373,867	0.1
			CARAPIDAE	0	0.0	2	6.7	0.4	0.3	1,499,338,667	0.1
			MELANOCETIDAE	0	0.0	2	6.7	0.4	0.3	1,436,389,333	0.1
			DIAPHUS	0	0.0	1	3.3	0.4	2.1	1,334,525,867	0.1
			CARANGIDAE	0	0.0	2	6.7	0.3	0.2	1,184,592,000	0.1
			ARGYROPELECUS HEMIGYMNUS	0	0.0	1	3.3	0.3	1.5	965,986,133	0.1
			HENTICIRRHUS	0	0.0	1	3.3	0.3	1.5	965,986,133	0.1
			CYNOSCION REGALIS	0	0.0	1	3.3	0.3	1.4	885,868,800	0.1
			ANTHIAE	0	0.0	1	3.3	0.2	1.4	856,110,933	0.1
			NANSENIA GROENLANDICA	0	0.0	1	3.3	0.2	1.4	856,110,933	0.1

Table 2. (continued)

CRUISE=BE7801											
		TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND	
		SCOPELARCHIDAE	0	0.0	1	3.3	0.2	1.4	856,110,933	0.1	
		MYCTOPHUM NITIDULUM	0	0.0	1	3.3	0.2	1.4	856,110,933	0.1	
		TETRAODONTIDAE	0	0.0	1	3.3	0.2	1.4	856,110,933	0.1	
		CUBICEPS PAUCIRADIATUS	0	0.0	1	3.3	0.2	1.3	841,232,000	0.1	
		BRANCHIOSTEGIDAE	0	0.0	1	3.3	0.2	1.2	743,946,667	<0.1	
		MYCTOPHUM	0	0.0	1	3.3	0.2	1.1	667,262,933	<0.1	
		HYGOPHUM REINHARDT	0	0.0	1	3.3	0.2	1.1	667,262,933	<0.1	
		HOWELLA	0	0.0	1	3.3	0.2	1.1	667,262,933	<0.1	
		STOMIAS FEROX	0	0.0	1	3.3	0.1	0.8	505,883,733	<0.1	
		PSENES MACULATUS	0	0.0	1	3.3	0.1	0.8	505,883,733	<0.1	
		APOGONIDAE	0	0.0	1	3.3	0.1	0.5	302,156,800	<0.1	
CRUISES=W17804 & BE7803											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1978	EARLY	19	CERATOSCOPELUS MADERENSIS	7	36.8	15	78.9	55.6	22.5	190,993,995,969	53.1
	AUTUMN		UROPHYCIS	2	10.5	10	52.6	11.8	4.1	40,414,965,224	11.2
			PARALEPIDIDAE	1	5.3	7	36.8	6.2	2.8	21,129,985,665	5.9
			MERLUCCIOUS BILINEARIS	0	0.0	6	31.6	5.9	3.0	20,375,290,595	5.6
			BOTHUS	0	0.0	12	63.2	5.3	1.3	18,077,343,219	5.0
			GOBIIDAE	0	0.0	7	36.8	3.3	1.2	11,278,943,148	3.1
			SYACIUM	0	0.0	9	47.4	2.8	0.8	9,658,547,446	2.7
			CARAPIDAE	0	0.0	4	31.6	1.9	0.7	6,443,135,186	1.8
			MYCTOPHIDAE	0	0.0	2	10.5	1.8	1.5	6,306,981,053	1.8
			LABRIDAE/SCARIDAE	0	0.0	7	36.8	1.7	0.5	5,798,932,711	1.6
			CITHARICHTHYS ARCTIFRONS	0	0.0	4	21.1	1.2	0.6	3,981,860,928	1.0
			OPHIDIIDAE	0	0.0	4	21.1	1.1	0.6	3,766,003,573	1.0
			CERATOSCOPELUS WARMINGI	0	0.0	2	10.5	0.8	0.6	2,665,557,895	0.7
			CYCLOTHONE	0	0.0	2	10.5	0.6	0.4	2,125,217,684	0.6
			MERLUCCIOUS ALBIDUS	0	0.0	2	10.5	0.6	0.5	2,063,774,316	0.6
			SYMBOLOPHORUS VERANYI	0	0.0	1	5.3	0.6	2.5	1,958,959,158	0.5
			SCORPAENIDAE	0	0.0	2	10.5	0.6	0.4	1,890,287,158	0.5
			CALLIONYMHIDAE	0	0.0	2	10.5	0.5	0.3	1,711,378,526	0.5
			ICHTHYOCOCCUS OVATUS	0	0.0	1	5.3	0.3	1.3	1,051,765,895	0.3
			OGCOEPHALIDAE	0	0.0	1	5.3	0.3	1.3	1,051,765,895	0.3
			ENGRAULIDAE	0	0.0	1	5.3	0.3	1.3	1,019,237,053	0.3
			ETROPUS/CITHARICHTHYS	0	0.0	1	5.3	0.3	1.2	954,179,368	0.3
			HAUROLICUS MUELLERI	0	0.0	1	5.3	0.3	1.2	954,179,368	0.3
			PEPRILUS TRIACANTHUS	0	0.0	1	5.3	0.3	1.2	939,722,105	0.3
			SYNOBONTIDAE	0	0.0	1	5.3	0.2	1.0	751,777,684	0.2
			MURAENIDAE	0	0.0	1	5.3	0.2	1.0	751,777,684	0.2
			MICROPOGONIAS UNDULATUS	0	0.0	1	5.3	0.2	1.0	751,777,684	0.2
			SERRANIDAE	0	0.0	1	5.3	0.2	0.7	562,026,105	0.1
			SYMPHURUS	0	0.0	1	5.3	0.2	0.7	562,026,105	0.1
			CERATIIDEA	0	0.0	1	5.3	0.2	0.7	560,218,947	0.1
			OPHICHTHIDAE	0	0.0	1	5.3	0.2	0.7	560,218,947	0.1
			UNKNOWN	0	0.0	0	0.0	0.0	0.0		

Table 2. (continued)

YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	CRUISE=BE7804		KMEAN	KSTDERR	TOTABUND	PCTABUND
						OCCUR	PCTOCCUR				
1978	AUTUMN	2	PARALEPIDIDAE	1	50.0	1	50.0	7.6	10.7	26,095,360,000	38.2
			LABRIDAE/SCARIDAE	0	0.0	1	50.0	4.1	5.8	14,026,256,000	20.6
			CARAFIDAE	0	0.0	1	50.0	4.1	5.8	14,026,256,000	20.6
			BOTHUS	0	0.0	1	50.0	4.1	5.8	14,026,256,000	20.6
CRUISE=DL7903											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
			PARALEPIDIDAE	2	11.8	3	17.6	1.0	0.6	3,479,138,476	0.2
			BENTHOSEMA GLACIALE	1	5.9	1	5.9	0.8	3.3	2,726,682,353	0.1
			DISINTEGRATED	0	0.0	2	11.8	0.7	0.5	2,393,421,176	0.1
			CRYPTACANTHODES MACULATUS	1	5.9	1	5.9	0.3	1.3	1,112,890,353	0.1
			MERLUCCIOUS BILINEARIS	0	0.0	1	5.9	0.3	1.1	929,091,765	<0.1
			PARALICHTHYS DENTATUS	0	0.0	1	5.9	0.2	0.9	777,609,412	<0.1
			UNKNOWN	0	0.0	0	0.0	0.0	0.0	0	0
CRUISES=AL7903 & DL7904											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
			BENTHOSEMA GLACIALE	1	25.0	2	50.0	13.6	8.3	46,636,872,000	29.3
			MERLUCCIOUS BILINEARIS	0	0.0	1	25.0	1.4	2.8	4,849,960,000	3.0
CRUISE=DL7905											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
			LIMANDA FERRUGINEA	3	13.0	4	17.4	4.6	2.8	15,918,929,828	5.1
			SCOMBER SCOMBRUS	0	0.0	3	13.0	2.5	1.8	8,541,344,760	2.8
			MICROPOGONIAS UNDULATUS	0	0.0	1	4.3	2.2	10.8	7,715,149,913	2.5
			OPHIDIIDAE	0	0.0	1	4.3	1.7	8.1	5,786,362,435	1.8
			SYNOBONTIDAE	0	0.0	1	4.3	1.4	6.7	4,821,968,696	1.6
			MERLUCCIOUS BILINEARIS	0	0.0	2	8.7	1.2	0.9	4,248,706,783	1.4
			GLYPTOCEPHALUS CYNGBLOSSUS	0	0.0	3	13.0	1.1	0.7	3,923,937,645	1.3
			CITHARICHTHYS ARCTIFRONS	0	0.0	1	4.3	1.1	5.4	3,857,574,957	1.2
			MERLUCCIOUS ALBIDUS	0	0.0	3	13.0	0.8	0.4	2,737,933,781	0.9
			PARALEPIDIDAE	0	0.0	2	8.7	0.8	0.6	2,715,529,739	0.9
			MELANOGRAMMUS AEGLEFINUS	0	0.0	1	4.3	0.7	3.5	2,516,978,087	0.8
			PEPRILUS TRIACANTHUS	0	0.0	1	4.3	0.6	2.7	1,928,787,478	0.6
			SCOPHTHALMUS AQUOSUS	0	0.0	1	4.3	0.6	2.7	1,928,787,478	0.6
			UNKNOWN	0	0.0	2	8.7	0.5	0.4	1,803,386,435	0.6
			AMMODYTES	1	4.3	2	8.7	0.5	0.3	1,585,427,478	0.5
			ENCHELYOPUS CIMBRIUS	0	0.0	1	4.3	0.4	2.0	1,398,818,783	0.4
			PROTOMYCTOPHUM	0	0.0	1	4.3	0.3	1.5	1,089,794,783	0.3
			DISINTEGRATED	0	0.0	1	4.3	0.3	1.3	964,393,739	0.3
			PARALICHTHYS DENTATUS	0	0.0	1	4.3	0.3	1.3	964,393,739	0.3
			SYMPHURUS	0	0.0	1	4.3	0.3	1.3	964,393,739	0.3
			BROSME BROSME	0	0.0	1	4.3	0.3	1.3	962,900,870	0.3
			LOPHIUS AMERICANUS	0	0.0	1	4.3	0.3	1.3	900,200,348	0.3
			SEBASTES	0	0.0	1	4.3	0.2	1.2	856,907,130	0.3
			ETROPUS MICROSTOMUS	1	4.3	1	4.3	0.2	1.2	853,921,391	0.3
			CYCLOPTERIDAE	0	0.0	1	4.3	0.2	1.2	836,006,957	0.3

Table 2. (continued)

		CRUISE=AL7906									
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1979	LATE SPRING	23	MERLUCCIOUS BILINEARIS	3	13.0	12	52.2	33.5	15.3	115,193,166,937	23.6
			PEPRILUS TRIACANTHUS	1	4.3	11	47.8	24.3	11.3	83,336,338,302	17.1
			UROPHYCIS	0	0.0	11	47.8	23.0	8.5	79,058,147,911	16.2
			CERATOSCOFELUS MADERENSIS	2	8.7	6	26.1	16.4	12.0	56,168,031,893	11.5
			ETROPUS/CITHARICHTHYS	0	0.0	6	26.1	6.2	3.6	21,124,107,815	4.3
			POMATOMUS SALTATRIX	0	0.0	7	30.4	5.9	2.6	20,110,221,657	4.1
			HIPPOGLOSSINA OBLONGA	0	0.0	10	43.5	5.5	1.9	18,827,709,818	3.9
			LIMANDA FERRUGINEA	0	0.0	5	21.7	5.5	2.8	18,749,875,615	3.8
			GLYPTOCEPHALUS CYNOGLOSSUS	0	0.0	6	26.1	2.9	1.2	9,938,166,678	2.0
			OPHIDIIDAE	1	4.3	4	17.4	2.4	1.4	8,131,244,543	1.7
			EUTHYNNUS ALLETTERATUS	0	0.0	3	13.0	2.4	1.6	8,079,196,738	1.6
			SCOMBRIDAE	0	0.0	4	17.4	2.3	1.3	7,904,966,802	1.6
			TAUTOGOLABRUS ADSPERSUS	0	0.0	4	17.4	2.1	1.1	7,188,656,025	1.5
			BENTHOSEMA GLACIALE	1	4.3	3	13.0	2.0	1.1	6,787,132,576	1.4
			DISINTEGRATED	0	0.0	3	13.0	1.8	1.1	6,204,205,804	1.3
			LOPHIUS AMERICANUS	0	0.0	4	17.4	1.6	0.8	5,501,297,083	1.1
			SCOMBER SCOMBRUS	0	0.0	3	13.0	1.0	0.6	3,298,305,079	0.7
			AUXIS	0	0.0	2	8.7	0.6	0.4	1,904,901,565	0.4
			MERLUCCIOUS ALBIDUS	0	0.0	2	8.7	0.5	0.4	1,769,050,435	0.3
			ANGUILLIFORMES	0	0.0	2	8.7	0.5	0.4	1,763,078,957	0.3
			ENGRAULIDAE	0	0.0	2	8.7	0.5	0.3	1,627,227,826	0.3
			OPHICHTHIDAE	1	4.3	1	4.3	0.4	2.1	1,477,940,870	0.3
			ENGRAULIS EURYSTOLE	0	0.0	1	4.3	0.3	1.4	1,022,615,652	0.2
			LAMPANYCTUS	0	0.0	1	4.3	0.3	1.4	1,001,715,478	0.2
			BROSME BROSME	0	0.0	1	4.3	0.3	1.2	882,285,913	0.2
			MYCTOPHIDAE	0	0.0	1	4.3	0.2	1.1	821,078,261	0.2
			LAMPANYCTUS ALATUS	0	0.0	1	4.3	0.2	1.1	821,078,261	0.2
			CONGRIDAE	0	0.0	1	4.3	0.2	1.1	821,078,261	0.2
			UNKNOWN	0	0.0	0	0.0	0.0	0.0	0	0

		CRUISE=BE7901									
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1979	SUMMER	20	ETROPUS/CITHARICHTHYS	8	40.0	18	90.0	296.5	127.3	1,017,900,975,165	53.1
			POMATOMUS SALTATRIX	0	0.0	7	35.0	47.2	30.9	161,917,985,737	8.5
			UROPHYCIS	0	0.0	14	70.0	37.0	13.8	127,042,401,100	6.6
			TRIGLIDAE	0	0.0	2	10.0	29.1	26.7	99,780,416,000	5.2
			OPHIDIIDAE	0	0.0	12	60.0	24.0	11.9	82,383,726,410	4.3
			HIPPOGLOSSINA OBLONGA	0	0.0	15	75.0	23.2	6.5	79,793,829,920	4.2
			AUXIS	0	0.0	12	60.0	20.7	8.1	70,962,214,825	3.7
			PEPRILUS TRIACANTHUS	0	0.0	17	85.0	14.9	3.8	51,326,668,080	2.7
			SCOMBRIDAE	0	0.0	4	20.0	8.0	5.1	27,447,239,887	1.4
			OPHICHTHIDAE	0	0.0	8	40.0	6.6	3.2	22,792,224,054	1.2
			TAUTOGOLABRUS ADSPERSUS	0	0.0	2	10.0	6.3	6.2	21,758,723,200	1.1
			MERLUCCIOUS ALBIDUS	0	0.0	5	25.0	6.1	3.2	20,908,192,763	1.1
			ENGRAULIDAE	0	0.0	4	20.0	5.4	3.6	18,539,875,606	1.0
			LABRIDAE/SCARIDAE	1	5.0	4	20.0	4.9	3.5	16,839,092,520	0.9
			ANGUILLIFORMES	0	0.0	5	25.0	3.9	2.1	13,470,865,109	0.7
			PISODONOPHIS CRUENTIFER	0	0.0	3	15.0	3.7	2.1	12,652,800,847	0.7
			BENTHOSEMA GLACIALE	0	0.0	2	10.0	3.4	2.4	11,722,310,400	0.6
			MERLUCCIOUS BILINEARIS	0	0.0	8	40.0	2.1	0.6	7,067,788,758	0.4
			DISINTEGRATED	0	0.0	6	30.0	2.0	0.9	7,028,039,667	0.4

Table 2. (continued)

		CRUISE=BE7901							
		DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
	TXNAME								
	CENTROPRISTIS STRIATUS	0	0.0	2	10.0	1.6	1.4	5,366,716,800	0.3
	UNKNOWN	0	0.0	4	20.0	1.3	0.6	4,603,975,771	0.2
	PEPRILUS	0	0.0	1	5.0	1.3	5.8	4,420,760,000	0.2
	BOTHUS	0	0.0	3	15.0	1.1	0.6	3,899,195,319	0.2
	ENCHELYOPUS CIMBRIUS	0	0.0	2	10.0	0.9	0.6	3,038,736,000	0.2
	ENGRAULIS EURYSTOLE	0	0.0	1	5.0	0.8	3.4	2,642,155,200	0.1
	CUBICEPS	0	0.0	1	5.0	0.8	3.4	2,642,155,200	0.1
	GOBIIDAE	0	0.0	1	5.0	0.8	3.4	2,642,155,200	0.1
	ETROPUS MICROSTOMUS	0	0.0	1	5.0	0.6	2.7	2,091,062,400	0.1
	CARANGIDAE	0	0.0	1	5.0	0.5	2.3	1,741,436,800	0.1
	URANOSCOPIIDAE	0	0.0	1	5.0	0.5	2.2	1,716,800,000	0.1
	BRANCHIOSTEGIDAE	0	0.0	2	10.0	0.4	0.3	1,541,686,400	0.1
	SYMPHURUS	0	0.0	2	10.0	0.4	0.3	1,370,006,400	0.1
	COTTIDAE	0	0.0	1	5.0	0.3	1.4	1,050,681,600	0.1
	SYNOBONTIDAE	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
	LAMFANYCTUS	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
	SERRANIDAE	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
	HIMANTOLOPHIDAE	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
	SCORPAENIDAE	0	0.0	1	5.0	0.2	1.1	849,816,000	<0.1
	LOPHIUS AMERICANUS	0	0.0	1	5.0	0.2	0.8	645,516,800	<0.1
	TAUTOGA ONITIS	0	0.0	1	5.0	0.2	0.7	528,774,400	<0.1
	BLENNIIDAE	0	0.0	1	5.0	0.1	0.6	489,288,000	<0.1
	CARAPIDAE	0	0.0	1	5.0	0.1	0.6	489,288,000	<0.1
	SYACIUM	0	0.0	1	5.0	0.1	0.6	489,288,000	<0.1
	LIMANDA FERRUGINEA	0	0.0	1	5.0	0.1	0.6	482,420,800	<0.1
	HIPPOCAMPUS	0	0.0	1	5.0	0.1	0.3	264,387,200	<0.1

		CRUISE=AL7911									
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1979	EARLY	18	ETROPUS/CITHARICHTHYS	3	16.7	13	72.2	18.9	7.4	64,811,970,936	27.1
	AUTUMN		UROPHYCIS	7	38.9	15	83.3	15.1	3.8	51,971,521,151	21.7
			TRIGLIDAE	0	0.0	2	11.1	11.7	10.6	40,104,448,000	16.8
			OPHIDIIDAE	0	0.0	5	27.8	4.1	2.1	14,148,549,401	5.9
			ENGRAULIS EURYSTOLE	0	0.0	2	11.1	3.2	3.0	11,090,528,000	4.6
			ENGRAULIDAE	0	0.0	1	5.6	3.0	12.7	10,255,018,667	4.3
			MICROPOGONIAS UNDULATUS	0	0.0	2	11.1	1.5	1.1	5,207,626,667	2.2
			GOBIIDAE	0	0.0	5	27.8	1.4	0.6	4,782,719,916	2.0
			BOTHUS	0	0.0	4	22.2	1.4	0.7	4,678,731,526	1.9
			UNKNOWN	0	0.0	1	5.6	1.1	4.8	3,845,632,000	1.6
			SERRANIDAE	0	0.0	2	11.1	1.0	0.8	3,544,238,222	1.5
			CERATOSCOPELUS MADERENSIS	0	0.0	1	5.6	0.7	2.8	2,266,176,000	0.9
			OPHICHTHIDAE	0	0.0	2	11.1	0.6	0.4	2,031,546,667	0.8
			MYCTOPHIDAE	0	0.0	2	11.1	0.6	0.4	1,945,706,667	0.8
			SYNOBONTIDAE	0	0.0	2	11.1	0.5	0.4	1,806,455,111	0.8
			LABRIDAE/SCARIDAE	0	0.0	2	11.1	0.5	0.3	1,644,312,889	0.7
			URANOSCOPIIDAE	0	0.0	1	5.6	0.4	1.9	1,510,784,000	0.6
			HIPPOGLOSSINA OBLONGA	0	0.0	1	5.6	0.4	1.9	1,510,784,000	0.6
			PEPRILUS TRIACANTHUS	0	0.0	1	5.6	0.4	1.6	1,281,877,333	0.5
			SCOPHTHALMUS AQUOSUS	0	0.0	1	5.6	0.4	1.6	1,281,877,333	0.5
			BENTHOSEMA GLACIALE	0	0.0	1	5.6	0.3	1.4	1,155,978,667	0.5
			MURAENIDAE	0	0.0	1	5.6	0.3	1.3	1,051,063,111	0.4
			MYLIOBATIDAE	0	0.0	1	5.6	0.3	1.2	980,483,556	0.4
			DIAGENICHTHYS ATLANTICUS	0	0.0	1	5.6	0.3	1.2	980,483,556	0.4
			SCIAENIDAE	0	0.0	1	5.6	0.3	1.2	980,483,556	0.4

Table 2. (continued)

CRUISE=BE7901								
TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
CENTROPRISTIS STRIATUS	0	0.0	2	10.0	1.6	1.4	5,366,716,800	0.3
UNKNOWN	0	0.0	4	20.0	1.3	0.6	4,603,975,771	0.2
PEPRILUS	0	0.0	1	5.0	1.3	5.8	4,420,760,000	0.2
BOTHUS	0	0.0	3	15.0	-1.1	0.6	3,899,195,319	0.2
ENCHELYOPUS CIMBRIUS	0	0.0	2	10.0	0.9	0.6	3,038,736,000	0.2
ENGRAULIS EURYSTOLE	0	0.0	1	5.0	0.8	3.4	2,642,155,200	0.1
CUBICEPS	0	0.0	1	5.0	0.8	3.4	2,642,155,200	0.1
GOBIIDAE	0	0.0	1	5.0	0.8	3.4	2,642,155,200	0.1
ETROPUS MICROSTOMUS	0	0.0	1	5.0	0.6	2.7	2,091,062,400	0.1
CARANGIDAE	0	0.0	1	5.0	0.5	2.3	1,761,436,800	0.1
URANOSCOPIIDAE	0	0.0	1	5.0	0.5	2.2	1,716,800,000	0.1
BRANCHIOSTEGIDAE	0	0.0	2	10.0	0.4	0.3	1,541,686,400	0.1
SYMPHURUS	0	0.0	2	10.0	0.4	0.3	1,370,006,400	0.1
COTTIDAE	0	0.0	1	5.0	0.3	1.4	1,050,681,600	0.1
SYNOdontIDAE	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
LAMPANYCTUS	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
SERRANIDAE	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
HIMANTOLOPHIDAE	0	0.0	1	5.0	0.3	1.1	880,718,400	<0.1
SCORPAENIDAE	0	0.0	1	5.0	0.2	1.1	849,816,000	<0.1
LOPHIUS AMERICANUS	0	0.0	1	5.0	0.2	0.8	645,516,800	<0.1
TAUTOBA ONITIS	0	0.0	1	5.0	0.2	0.7	528,774,400	<0.1
BLENNIIDAE	0	0.0	1	5.0	0.1	0.6	489,288,000	<0.1
CARAPIDAE	0	0.0	1	5.0	0.1	0.6	489,288,000	<0.1
SYACIUM	0	0.0	1	5.0	0.1	0.6	489,288,000	<0.1
LIMANDA FERRUGINEA	0	0.0	1	5.0	0.1	0.6	482,420,800	<0.1
HIPPOCAMPUS	0	0.0	1	5.0	0.1	0.3	264,387,200	<0.1

CRUISE=AL7911											
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1979	EARLY	18	ETROPUS/CITHARICHTHYS	3	16.7	13	72.2	18.9	7.4	64,811,970,936	27.1
	AUTUMN		UROPHYCIS	7	38.9	15	83.3	15.1	3.8	51,971,521,151	21.7
			TRIGLIDAE	0	0.0	2	11.1	11.7	10.6	40,104,448,000	16.8
			OPHIDIIDAE	0	0.0	5	27.8	4.1	2.1	14,148,549,401	5.9
			ENGRAULIS EURYSTOLE	0	0.0	2	11.1	3.2	3.0	11,090,528,000	4.6
			ENGRAULIDAE	0	0.0	1	5.6	3.0	12.7	10,255,018,667	4.3
			MICROPOGONIAS UNDULATUS	0	0.0	2	11.1	1.5	1.1	5,207,626,667	2.2
			GOBIIDAE	0	0.0	5	27.8	1.4	0.6	4,782,719,916	2.0
			BOTHUS	0	0.0	4	22.2	1.4	0.7	4,678,731,526	1.9
			UNKNOWN	0	0.0	1	5.6	1.1	4.8	3,845,632,000	1.6
			SERRANIDAE	0	0.0	2	11.1	1.0	0.8	3,544,238,222	1.5
			CERATOSCOPELUS MADERENSIS	0	0.0	1	5.6	0.7	2.8	2,266,176,000	0.9
			OPHICHTHIDAE	0	0.0	2	11.1	0.6	0.4	2,031,546,667	0.8
			MYCTOPHIDAE	0	0.0	2	11.1	0.6	0.4	1,945,706,667	0.8
			SYNOdontIDAE	0	0.0	2	11.1	0.5	0.4	1,806,455,111	0.8
			LABRIDAE/SCARIDAE	0	0.0	2	11.1	0.5	0.3	1,644,312,889	0.7
			URANOSCOPIIDAE	0	0.0	1	5.6	0.4	1.9	1,510,784,000	0.6
			HIPPOGLOSSINA OBLONGA	0	0.0	1	5.6	0.4	1.9	1,510,784,000	0.6
			PEPRILUS TRIACANTHUS	0	0.0	1	5.6	0.4	1.6	1,281,877,333	0.5
			SCOPHTHALMUS AQUOSUS	0	0.0	1	5.6	0.4	1.6	1,281,877,333	0.5
			BENTHOSEMA GLACIALE	0	0.0	1	5.6	0.3	1.4	1,155,978,667	0.5
			MURAENIDAE	0	0.0	1	5.6	0.3	1.3	1,051,063,111	0.4
			MYLIOBATIDAE	0	0.0	1	5.6	0.3	1.2	980,483,556	0.4
			DIOGENICHTHYS ATLANTICUS	0	0.0	1	5.6	0.3	1.2	980,483,556	0.4
			SCIAENIDAE	0	0.0	1	5.6	0.3	1.2	980,483,556	0.4

Table 2. (continued)

			CRUISES=EK8001 & ALB003 & DLB002								
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1980	EARLY SPRING	22	BENTHOSEMA GLACIALE	9	40.9	11	50.0	46.4	23.6	159,340,522,772	76.7
			AMMODYTES	5	22.7	5	22.7	4.7	2.6	16,283,312,021	7.8
			LOPHIUS AMERICANUS	0	0.0	4	18.2	3.5	2.1	11,995,050,273	5.7
			CERATOSCOPELUS WARMINGI	1	4.5	1	4.5	1.1	5.3	3,909,621,818	1.9
			PARALEPIDIDAE	0	0.0	4	18.2	1.0	0.5	3,562,099,671	1.7
			UROPHYCIS	0	0.0	3	13.6	0.9	0.5	2,964,664,903	1.3
			CYCLOPTERIDAE	0	0.0	1	4.5	0.5	2.2	1,582,577,455	0.7
			MYCTOPHIDAE	0	0.0	1	4.5	0.3	1.6	1,162,741,818	0.5
			TRIGLIDAE	0	0.0	1	4.5	0.3	1.6	1,162,741,818	0.5
			UNKNOWN	0	0.0	1	4.5	0.3	1.4	1,019,154,909	0.5
			STOMIATIDAE	0	0.0	1	4.5	0.3	1.4	1,019,154,909	0.5
			COTTIDAE	0	0.0	1	4.5	0.3	1.3	953,604,364	0.4
			PARALEPIS ATLANTICA	0	0.0	1	4.5	0.2	1.1	777,242,182	0.3
			PARALICHTHYS DENTATUS	1	4.5	1	4.5	0.2	1.0	763,195,636	0.3
			GONOSTOMATIDAE	0	0.0	1	4.5	0.2	1.0	758,513,455	0.3
			MACROURIDAE	0	0.0	1	4.5	0.2	1.0	758,513,455	0.3
			GADUS MORHUA	1	4.5	1	4.5	0.2	0.9	653,944,727	0.3

			CRUISES=DLB003 & EK8004								
YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	OCCUR	PCTOCCUR	KMEAN	KSTDERR	TOTABUND	PCTABUND
1980	SPRING	20	SCOMBER SCOMBRUS	10	50.0	17	85.0	302.7	140.5	1,039,504,478,930	82.5
			LIMANDA FERRUGINEA	0	0.0	8	40.0	15.7	8.1	53,993,385,426	4.2
			BENTHOSEMA GLACIALE	2	10.0	7	35.0	13.6	6.3	46,707,264,745	3.7
			MERLUCCIOUS BILINEARIS	0	0.0	10	50.0	11.6	5.0	39,683,144,972	3.1
			BENTHOSEMA	1	5.0	1	5.0	3.9	17.6	13,514,649,600	1.1
			MYCTOPHUM	0	0.0	1	5.0	2.6	11.7	8,968,563,200	0.7
			ENCHELYOPUS CIMBRIUS	0	0.0	6	30.0	2.5	1.0	8,467,731,190	0.6
			GLYPTOCEPHALUS CYNGBLOSSUS	0	0.0	8	40.0	2.3	0.7	8,066,716,072	0.6
			LOPHIUS AMERICANUS	0	0.0	5	25.0	2.1	1.0	7,361,929,204	0.5
			UROPHYCIS	0	0.0	4	20.0	2.0	1.0	6,815,451,926	0.5
			MERLUCCIOUS ALBIDUS	0	0.0	3	15.0	2.0	1.2	6,790,527,052	0.2
			SYNOdontIDAE	0	0.0	3	15.0	0.9	0.5	2,994,135,166	0.2
			GADUS MORHUA	0	0.0	1	5.0	0.8	3.6	2,765,764,800	0.2
			PEPRILUS TRIACANTHUS	0	0.0	2	10.0	0.7	0.5	2,329,697,600	0.2
			CYCLOPTERIDAE	0	0.0	1	5.0	0.6	2.6	1,977,753,600	0.1
			PARALEPIDIDAE	0	0.0	1	5.0	0.4	1.8	1,345,971,200	0.1
			NETTASTOMATIDAE	0	0.0	1	5.0	0.4	1.8	1,345,971,200	0.1
			DISINTEGRATED	0	0.0	1	5.0	0.4	1.6	1,203,476,800	0.1
			CERATOSCOPELUS MADERENSIS	0	0.0	1	5.0	0.3	1.5	1,126,220,800	0.1
			UNKNOWN	0	0.0	1	5.0	0.3	1.5	1,121,070,400	0.1
			CONGRIDAE	0	0.0	1	5.0	0.3	1.5	1,121,070,400	0.1
			SYMPHURUS	0	0.0	1	5.0	0.3	1.3	1,014,628,800	0.1
			SYMBOLOPHORUS VERANYI	0	0.0	1	5.0	0.3	1.3	1,011,195,200	0.1
			CITHARICHTHYS ARCTIFRONS	0	0.0	1	5.0	0.3	1.3	1,011,195,200	0.1
			CONGER OCEANICUS	0	0.0	1	5.0	0.3	1.3	1,007,761,600	0.1



Table 2. (continued)

YEAR 1980	SEASON SUMMER	#STA 22	TXNAME	DOM	CRUISES=EKB006 & DL8005			KMEAN	ESTDERR	TOTALUND	PCTABUND
					PCTDOM	OCCUR	PCTOCCUR				
			UROPHYCIS	3	13.6	14	63.6	111.7	57.6	383,650,423,581	26.2
			POMATOMUS SALTATRIX	2	9.1	16	72.7	91.5	38.1	314,118,759,314	21.4
			PEPRILUS TRIACANTHUS	2	9.1	16	72.7	91.1	35.7	312,745,061,858	21.3
			HIPPOGLOSSINA OBLONGA	0	0.0	15	68.2	33.7	12.7	115,870,963,777	7.9
			CITHARICHTHYS ARCTIFRONS	0	0.0	14	63.6	21.0	7.7	72,037,929,627	4.9
			MERLUCCIUS BILINEARIS	0	0.0	12	54.5	16.9	5.9	58,177,433,965	3.9
			LABRIDAE/SCARIDAE	1	4.5	9	40.9	8.2	3.3	28,027,632,591	1.9
			SCOMBRIDAE	0	0.0	10	45.5	6.8	2.3	23,455,990,619	1.6
			ETROPUS MICROSTOMUS	0	0.0	5	22.7	6.3	3.6	21,703,514,783	1.5
			TAUTOGOLABRUS ADSPERSUS	0	0.0	6	27.3	5.6	3.1	19,201,270,596	1.3
			OPHICHTHIDAE	0	0.0	5	22.7	4.4	2.3	15,263,371,300	1.0
			AUXIS	0	0.0	2	9.1	4.2	3.0	14,481,988,364	1.0
			OPHIDIIDAE	0	0.0	8	36.4	2.7	0.9	9,344,196,882	0.6
			BOTHUS	0	0.0	7	31.8	2.3	0.8	7,813,670,286	0.5
			LOPHIUS AMERICANUS	0	0.0	6	27.3	2.2	0.9	7,427,483,070	0.5
			BISINTEGRATED	0	0.0	4	18.2	1.8	1.0	6,155,952,252	0.4
			BENTHOSEMA	0	0.0	1	4.5	1.4	6.4	4,719,639,273	0.3
			GLYPTOCEPHALUS CYNOGLOSSUS	0	0.0	4	18.2	1.3	0.6	4,471,168,355	0.3
			ENGRAULIDAE	0	0.0	5	22.7	1.2	0.5	3,983,160,122	0.3
			CONGRIDAE	0	0.0	3	13.6	0.9	0.5	2,994,430,874	0.2
			STERNOPTYCHIDAE	0	0.0	2	9.1	0.8	0.6	2,737,515,636	0.2
			SYACIUM	0	0.0	1	4.5	0.8	3.7	2,696,936,727	0.2
			SYNOdontIDAE	0	0.0	3	13.6	0.7	0.4	2,397,400,799	0.2
			GOBIIDAE	0	0.0	3	13.6	0.7	0.4	2,397,383,331	0.2
			UNKNOWN	0	0.0	3	13.6	0.7	0.4	2,269,342,263	0.2
			MYCTOPHIDAE	0	0.0	2	9.1	0.7	0.5	2,258,372,364	0.2
			MERLUCCIUS ALBIDUS	0	0.0	3	13.6	0.7	0.4	2,238,555,589	0.2
			LINANDA FERRUGINEA	0	0.0	2	9.1	0.6	0.5	2,208,429,091	0.2
			SCIAENIDAE	0	0.0	2	9.1	0.5	0.4	1,724,603,636	0.1
			SCOPHTHALMUS AQUOSUS	0	0.0	1	4.5	0.4	2.1	1,513,905,455	0.1
			SERRANIDAE	0	0.0	2	9.1	0.4	0.3	1,389,047,273	0.1
			SYMBOLOPHORUS VERANYI	0	0.0	1	4.5	0.4	1.8	1,348,468,364	0.1
			TAUTOGA ONITIS	0	0.0	1	4.5	0.3	1.4	1,009,790,545	0.1
			CALLECHELYS MURAENA	0	0.0	1	4.5	0.2	1.2	849,035,636	0.1
			CENTROPRISTIS STRIATUS	0	0.0	1	4.5	0.2	1.2	849,035,636	0.1
			CYCLOTHONE	0	0.0	1	4.5	0.2	1.1	828,746,182	0.1
			HOWELLA	0	0.0	1	4.5	0.2	1.1	828,746,182	0.1
			MERLUCCIUS	0	0.0	1	4.5	0.2	1.1	817,821,091	<0.1
			PERCIFORMES	0	0.0	1	4.5	0.2	1.1	817,821,091	<0.1
			URANOSCOPIIDAE	0	0.0	1	4.5	0.2	1.1	785,045,818	<0.1
			TRIGLIDAE	0	0.0	1	4.5	0.2	1.0	756,952,727	<0.1
			CERATOSCOPELUS MADERENSIS	0	0.0	1	4.5	0.2	1.0	714,813,091	<0.1
			Holocentridae	0	0.0	1	4.5	0.2	1.0	714,813,091	<0.1
			ARGENTINIDAE	0	0.0	1	4.5	0.2	0.9	674,234,182	<0.1
			CARANGIDAE	0	0.0	1	4.5	0.2	0.9	674,234,182	<0.1
			CALLIONYMIIDAE	0	0.0	1	4.5	0.2	0.9	674,234,182	<0.1
			CYCLOPSETTA	0	0.0	1	4.5	0.2	0.9	674,234,182	<0.1
			SYMPHURUS	0	0.0	1	4.5	0.2	0.9	674,234,182	<0.1

Table 2. (continued)

YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	CRUISE=ALB010		KMEAN	KSTDERR	TOTABUND	PCTABUND
						OCCUR	PCTOCCUR				
1980	EARLY	19	UROPHYCIS	7	36.8	17	89.5	147.2	64.0	505,434,083,488	60.8
	AUTUMN		CITHARICHTHYS ARCTIFRONS	4	21.1	12	63.2	52.8	21.7	181,363,368,512	21.7
			OPHIDIIDAE	0	0.0	9	47.4	12.0	4.6	41,098,778,261	4.9
			HIPPOGLOSSINA OBLONGA	0	0.0	7	36.8	5.8	2.4	19,909,699,292	2.4
			MERLUCCIUS ALBIDUS	1	5.3	9	47.4	4.5	1.3	15,386,193,592	1.8
			CERATOSCOPELUS HABERENSIS	0	0.0	3	15.8	4.1	2.4	14,224,354,336	1.7
			MERLUCCIUS BILINEARIS	0	0.0	5	26.3	3.9	2.2	13,360,158,056	1.6
			BOTHUS	0	0.0	6	31.6	2.7	1.1	9,276,461,962	1.1
			LOPHIUS AMERICANUS	0	0.0	4	31.6	1.6	0.6	5,591,167,643	0.6
			ETROPUS MICROSTOMUS	0	0.0	3	15.8	1.3	0.8	4,353,207,575	0.5
			DISINTEGRATED	0	0.0	2	10.5	1.2	0.9	4,073,333,895	0.5
			GOBIIDAE	0	0.0	2	10.5	0.7	0.4	2,239,068,632	0.3
			BENTHOSEMA GLACIALE	0	0.0	1	5.3	0.6	2.8	2,226,418,526	0.3
			GADUS	0	0.0	1	5.3	0.6	2.5	1,969,802,105	0.2
			MERLUCCIUS	0	0.0	1	5.3	0.6	2.5	1,969,802,105	0.2
			PISODONOPHIS CRUENTIFER	0	0.0	1	5.3	0.5	2.2	1,734,871,579	0.2
			DIAPHUS	0	0.0	1	5.3	0.3	1.5	1,181,881,263	0.1
			CYNOSCION REGALIS	0	0.0	1	5.3	0.3	1.5	1,181,881,263	0.1
			POLLACHIUS VIRENS	0	0.0	1	5.3	0.3	1.5	1,154,773,895	0.1
			SYACIUM PAPILLOSUM	0	0.0	1	5.3	0.3	1.5	1,154,773,895	0.1
			CONGRIDAE	0	0.0	1	5.3	0.3	1.4	1,125,859,368	0.1
			SYACIUM	0	0.0	1	5.3	0.3	1.4	1,125,859,368	0.1
			LABRIDAE/SCARIDAE	0	0.0	1	5.3	0.3	1.3	1,013,815,579	0.1
			SYNGNATHIDAE	0	0.0	1	5.3	0.3	1.3	1,008,394,105	0.1
			PEPRILUS TRIACANTHUS	0	0.0	1	5.3	0.3	1.2	961,408,000	0.1
			BRANCHIOSTEGIDAE	0	0.0	1	5.3	0.2	0.9	713,827,368	<0.1
			ENGRAULIDAE	0	0.0	1	5.3	0.2	0.9	688,527,158	<0.1

YEAR	SEASON	#STA	TXNAME	DOM	PCTDOM	CRUISE=ALB012		KMEAN	KSTDERR	TOTABUND	PCTABUND
						OCCUR	PCTOCCUR				
1980	LATE	19	MERLUCCIUS BILINEARIS	7	36.8	11	57.9	21.8	9.0	75,008,244,396	45.8
	AUTUMN		PARALICHTHYS DENTATUS	1	5.3	4	21.1	12.1	8.4	41,696,288,245	25.4
			UROPHYCIS	0	0.0	8	42.1	4.1	1.5	13,942,727,830	8.5
			SCOPHTHALMUS AQUOSUS	0	0.0	3	15.8	2.0	1.4	6,905,564,674	4.2
			CITHARICHTHYS ARCTIFRONS	0	0.0	3	15.8	1.3	0.8	4,530,293,787	2.8
			DISINTEGRATED	0	0.0	2	10.5	0.7	0.5	2,394,484,211	1.4
			GOBIIDAE	0	0.0	2	10.5	0.7	0.4	2,242,682,947	1.3
			PARALEPIDIDAE	1	5.3	2	10.5	0.6	0.4	2,177,625,263	1.2
			CLUPEIDAE	0	0.0	2	10.5	0.6	0.4	2,119,796,211	1.2
			ETROPUS MICROSTOMUS	0	0.0	2	10.5	0.6	0.4	2,094,496,000	1.2
			CONGRIDAE	0	0.0	2	10.5	0.6	0.4	2,074,617,263	1.2
			BOTHUS	0	0.0	2	10.5	0.6	0.4	1,935,466,105	1.2
			MERLUCCIUS ALBIDUS	0	0.0	1	5.3	0.5	2.2	1,709,571,368	1.0
			CENTROPRISTIS STRIATUS	0	0.0	1	5.3	0.3	1.4	1,140,316,632	0.7
			OPHIDIIDAE	0	0.0	1	5.3	0.3	1.4	1,084,294,737	0.6
			MYCTOPHUM	0	0.0	1	5.3	0.3	1.1	896,350,316	0.5
			HYGOPHUM	0	0.0	1	5.3	0.3	1.1	896,350,316	0.5
			DIAPHUS	0	0.0	1	5.3	0.2	1.0	820,449,684	0.5
			OPHICHTHIDAE	0	0.0	1	5.3	0.2	1.0	820,449,684	0.5
			UNKNOWN	0	0.0	0	0.0	0.0	0.0	0	0



Table 3. (continued)

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
<b>STOMIATIDAE</b>																									
<i>Stomias ferox</i>		✓	✓		✓			✓	✓							✓				✓	✓		✓	✓	
<i>Stomias</i> sp.																									
Unidentified			✓	✓																					
<b>MYCTOPHIFORMES</b>																									
<b>SYNODONTIDAE</b>																									
<i>Saurida</i> sp.				✓											✓	✓									
<i>Trachinocephalus myops</i>					✓			✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unidentified					✓			✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>MYCTOPHIDAE</b>																									
<i>Benthosema glaciale</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓														
<i>Benthosema suborbitale</i>			✓	✓	✓	✓	✓	✓	✓	✓	✓														
<i>Centrobranchus nigro-ocellatus</i>			✓	✓	✓	✓	✓	✓	✓	✓	✓														
<i>Centrobranchus</i> sp.					✓																				
<i>Ceratoscopelus maderensis</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓													
<i>Ceratoscopelus warmingi</i>																									
<i>Ceratoscopelus</i> sp.																									
<i>Diaphus dumerili</i>		✓		✓																					
<i>Diaphus holti</i>											✓	✓													
<i>Diaphus mollis</i>		✓	✓																						
<i>Diaphus problematicus</i>					✓																				
<i>Diaphus rafinesquei</i>		✓	✓						✓	✓															
<i>Diaphus subtilis</i>									✓	✓															
<i>Diaphus taaningi</i>																									
<i>Diaphus</i> sp.		✓	✓		✓	✓	✓	✓	✓	✓															
<i>Diogenichthys atlanticus</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓															
<i>Gonichthys cocco</i>						✓	✓	✓	✓	✓															
<i>Hygophum benoiti</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓															
<i>Hygophum hygomi</i>					✓																				
<i>Hygophum reinhardtii</i>					✓			✓																	
<i>Hygophum</i> sp.		✓	✓		✓	✓	✓	✓	✓	✓															
<i>Lampanyctus alatus</i>					✓	✓	✓	✓	✓	✓															
<i>Lampanyctus</i> sp.		✓	✓	✓	✓	✓	✓	✓	✓	✓															
<i>Lepidophanes guenteri</i>					✓	✓	✓	✓	✓	✓															
<i>Lobianchia dolfieini</i>					✓	✓	✓	✓	✓	✓															
<i>Myctophum affine</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓															
<i>Myctophum asperum</i>																✓									
<i>Myctophum humboldti</i>																				✓	✓		✓	✓	
<i>Myctophum nitidulum</i>																									
<i>Myctophum punctatum</i>																									
<i>Myctophum</i> sp.																									
<i>Protomyctophum</i> sp.																									
<i>Symbolophorus veranyi</i>																									
Unidentified		✓	✓																						
<b>PARALEPIDIDAE</b>																									
<i>Lestidium atlanticum</i>																									
<i>Notolepis rissoi</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓														
<i>Paralepis coregonoides</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓														
<i>Sudis hyalina</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓														
Unidentified																									
<b>PHOTICHTHYIDAE</b>																									
<i>Vinoiguerria nimbaria</i>																									
<i>Vinoiguerria powerai</i>																									
<i>Vinoiguerria</i> sp.		✓																							
<b>EVERMANNELLIDAE</b>																									
Unidentified																									
<b>SCOPELARCHIDAE</b>																									
Unidentified																									
<b>GADIFORMES</b>																									
Unidentified																									
<b>MORIDAE</b>																									
Unidentified																✓	✓	✓							
<b>BREGMACEROTIDAE</b>																									
<i>Bregmaceros</i> sp.																									
Unidentified		✓	✓																						

Table 3. (continued)

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D
<b>GADIDAE</b>																									
<i>Brosmo brosmo</i>							✓																		
<i>Enchelyopus cimbrius</i>	✓	✓	✓	✓																		✓	✓		
<i>Gadus morhua</i>				✓	✓																				
<i>Melanogrammus aeglefinus</i>				✓	✓																				
<i>Urophycis</i> sp.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓													
Unidentified	✓	✓																✓							
<b>MERLUCCIIDAE</b>																									
<i>Merluccius albidus</i>				✓		✓		✓	✓	✓	✓	✓						✓	✓						
<i>Merluccius bilinearis</i>				✓		✓		✓	✓	✓	✓	✓													
<i>Merluccius</i> sp.				✓		✓		✓	✓	✓	✓	✓													
<b>MACROURIDAE</b>																									
Unidentified				✓	✓														✓						
<b>OPHIDIIDAE</b>																									
Unidentified				✓	✓	✓	✓	✓	✓	✓	✓	✓							✓						
<b>CARAPODIDAE</b>																									
<i>Carapus bermudensis</i>				✓				✓	✓	✓	✓	✓													
Unidentified	✓	✓						✓	✓	✓	✓	✓													
<b>LOPHIIFORMES</b>																									
<b>LOPHIDAE</b>																									
<i>Lophius americanus</i>				✓	✓	✓	✓	✓	✓																
<b>ANTENNARIDAE</b>																									
<i>Histrio histrio</i>				✓	✓																				
Unidentified				✓																					
<b>OGCOEPHALIDAE</b>																									
Unidentified								✓	✓	✓	✓														
<b>CAULOPHRYNIDAE</b>																									
<i>Caulophryne jordani</i>					✓			✓				✓	✓												
Unidentified					✓							✓	✓												
<b>MELANOCETIDAE</b>																									
Unidentified																						✓	✓		
<b>ATHERINIFORMES</b>																									
<b>EXOCEIIDAE</b>																									
Unidentified																			✓						
<b>SCOMBERESOCIDAE</b>																									
<i>Scomberesox saurus</i>																									
<b>BERYCIFORMES</b>																									
<b>MELAMPHAEIDAE</b>																									
Unidentified																									
<b>Holocentridae</b>																									
Unidentified																									
<b>CAPROIDAE</b>																									
<i>Antogonia</i> sp.																									
Unidentified																									
<b>SYNGNATHIFORMES</b>																									
<b>SYNGNATHIDAE</b>																									
<i>Syngnathus elucens</i>																									
<i>Syngnathus fuscus</i>																									
<b>SCORPAENIFORMES</b>																									
<b>SCORPAENIDAE</b>																									
<i>Pontinia</i> sp.																									
<i>Scorpaena</i> sp.																									
Unidentified																									
<b>TRIGLIDAE</b>																									
<i>Prionotus</i> sp.																									
Unidentified																									
<b>COTTIDAE</b>																									
Unidentified																									

Table 3. (continued)

	J	F	M	A	M	J	J	A	S	O	N	D		J	F	M	A	M	J	J	A	S	O	N	D	
<b>AGONIDAE</b>														<b>GERRIDAE</b>												
Unidentified					✓									<i>Euoinotomus gula</i>											✓	
<b>CYCLOPTERIDAE</b>														<b>SPARIDAE</b>												
Unidentified							✓	✓						<i>Stenotomus chrysops</i>				✓								
<b>PERCIFORMES</b>														<b>SCIAENIDAE</b>												
Unidentified					✓	✓								<i>Cynoscion regalis</i>							✓	✓				
<b>SERRANIDAE</b>														<i>Larimus fasciatus</i>							✓	✓				
Anthiinae														<i>Leiostomus xanthurus</i>				✓								
<i>Anthias</i> sp.					✓	✓			✓	✓				<i>Mentidorrhus saxatilis</i>							✓	✓				
<i>Centropristis striata</i>				✓	✓				✓	✓				<i>Micropogonias undulatus</i>							✓	✓		✓	✓	
<i>Centropristis</i> sp.				✓	✓				✓	✓				Unidentified							✓	✓				
<i>Diplectrum</i> sp.				✓	✓				✓	✓				<b>MULLIDAE</b>												
<i>Mycteroperca</i> sp.				✓	✓				✓	✓				<i>Mullus auratus</i>											✓	
<i>Sebastes</i> sp.			✓	✓	✓				✓	✓				<b>POMACENTRIDAE</b>												
Unidentified			✓	✓	✓				✓	✓				Unidentified							✓	✓				
<b>APOGONIDAE</b>														<b>MUGILIDAE</b>												
Unidentified					✓						✓	✓		<i>Mugil curema</i>											✓	
<b>POMATOMIDAE</b>														<b>LABRIDAE</b>												
<i>Pomatomus saltatrix</i>					✓	✓	✓	✓						<i>Tautoga adspersus</i>				✓		✓	✓	✓	✓	✓	✓	
<b>CARANGIDAE</b>														Unidentified	✓	✓		✓		✓	✓	✓	✓	✓	✓	
<i>Caranx</i> sp.														<b>SCARIDAE</b>												
<i>Decapterus punctatus</i>		✓	✓						✓	✓				Unidentified						✓	✓	✓	✓			
<i>Decapterus</i> sp.						✓			✓	✓				<b>URANOSCOPIDAE</b>												
<i>Seriola</i> sp.														Unidentified										✓	✓	
Unidentified														<b>CRYPTOCANTHODIDAE</b>												
<b>CORYPHAENIDAE</b>														<i>Cryptocanthoides maculatus</i>	✓	✓										
<i>Coryphaena hippurus</i>						✓																				
<b>LUTJANIDAE</b>																										
<i>Rhomboplites aurorubens</i>					✓																					



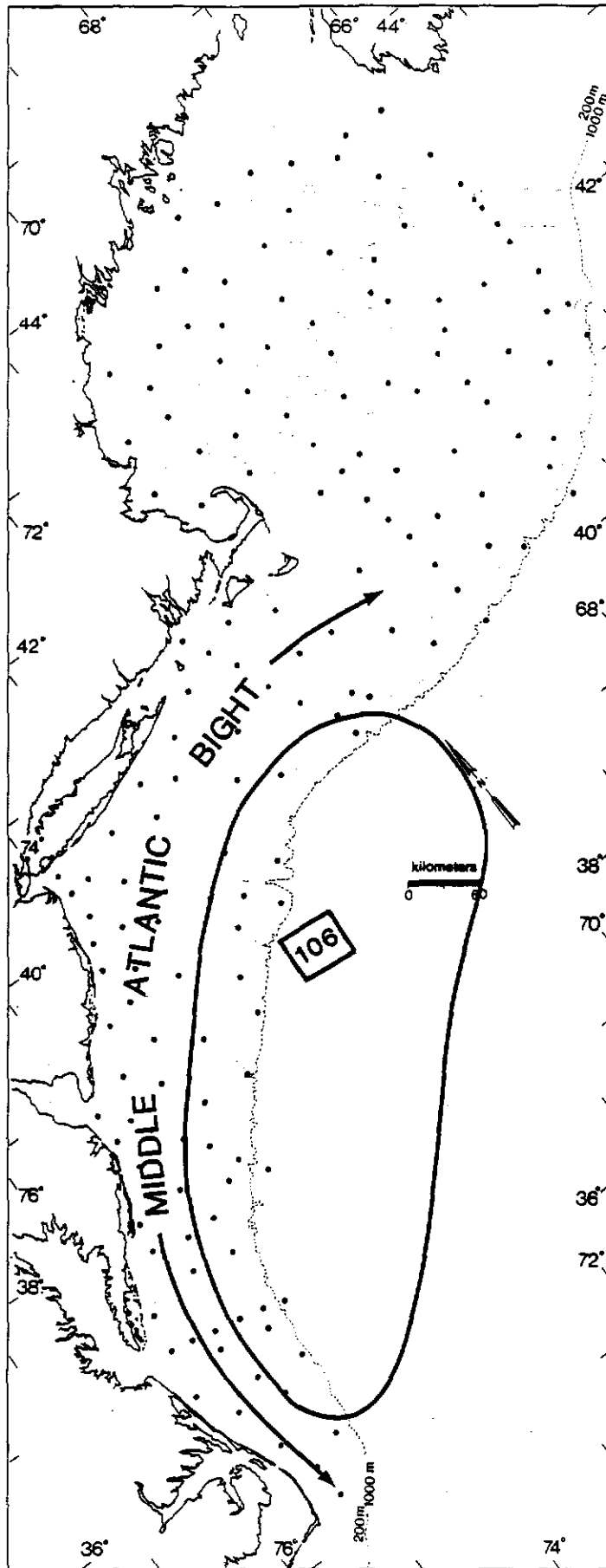


Figure 1. MARMAP (Marine Resources Monitoring Assessment and Prediction) plankton stations off northeastern United States during 1980 (see Sherman 1980 for description of MARMAP Program). DWD-106 and potential impact area from dumping at DWD-106 are shown off Middle Atlantic states.



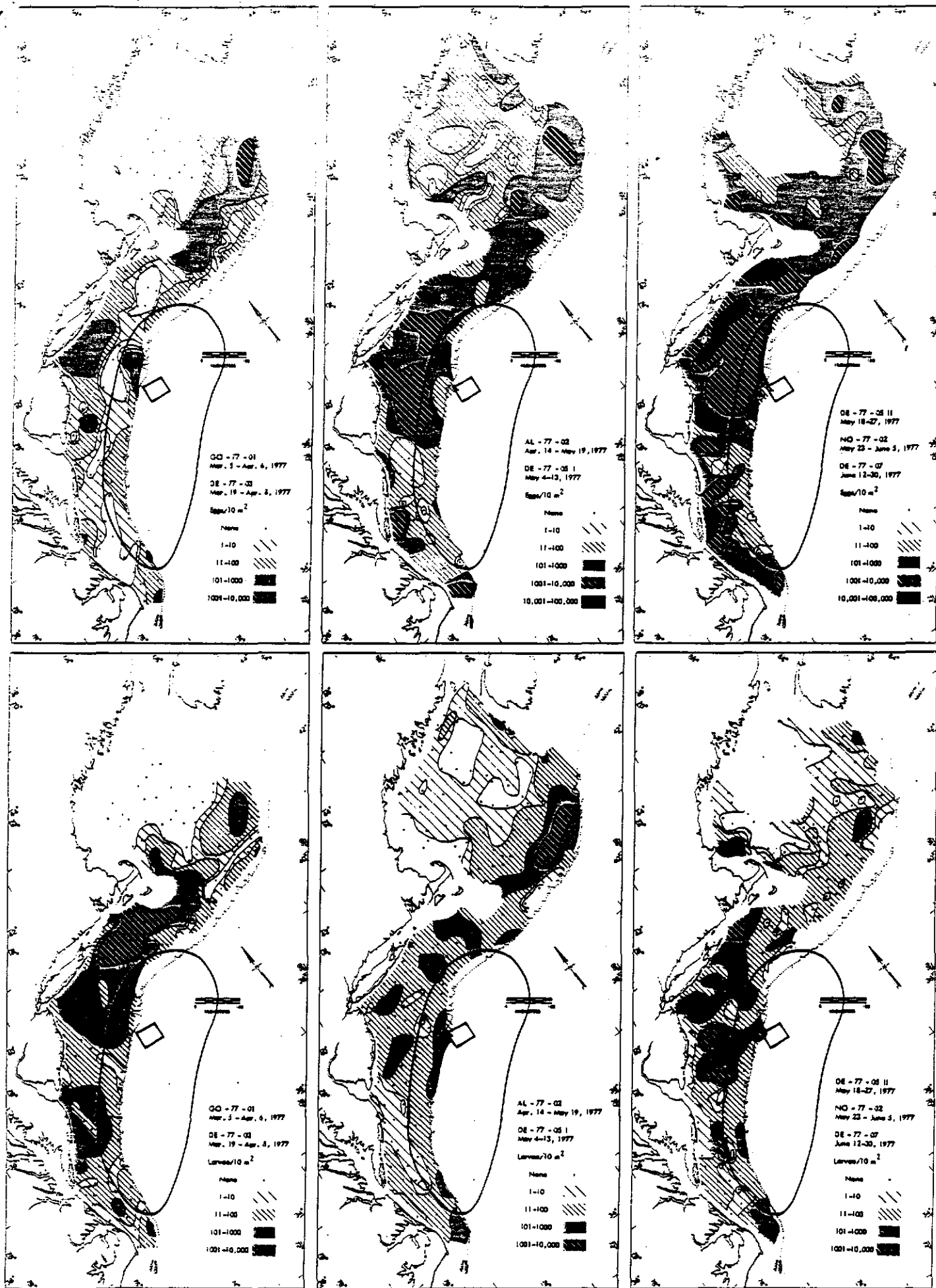


Figure 2. Distribution and abundance of fish eggs (top) and fish larvae (bottom) off northeastern United States as determined from MARMAP surveys, 1977-80.

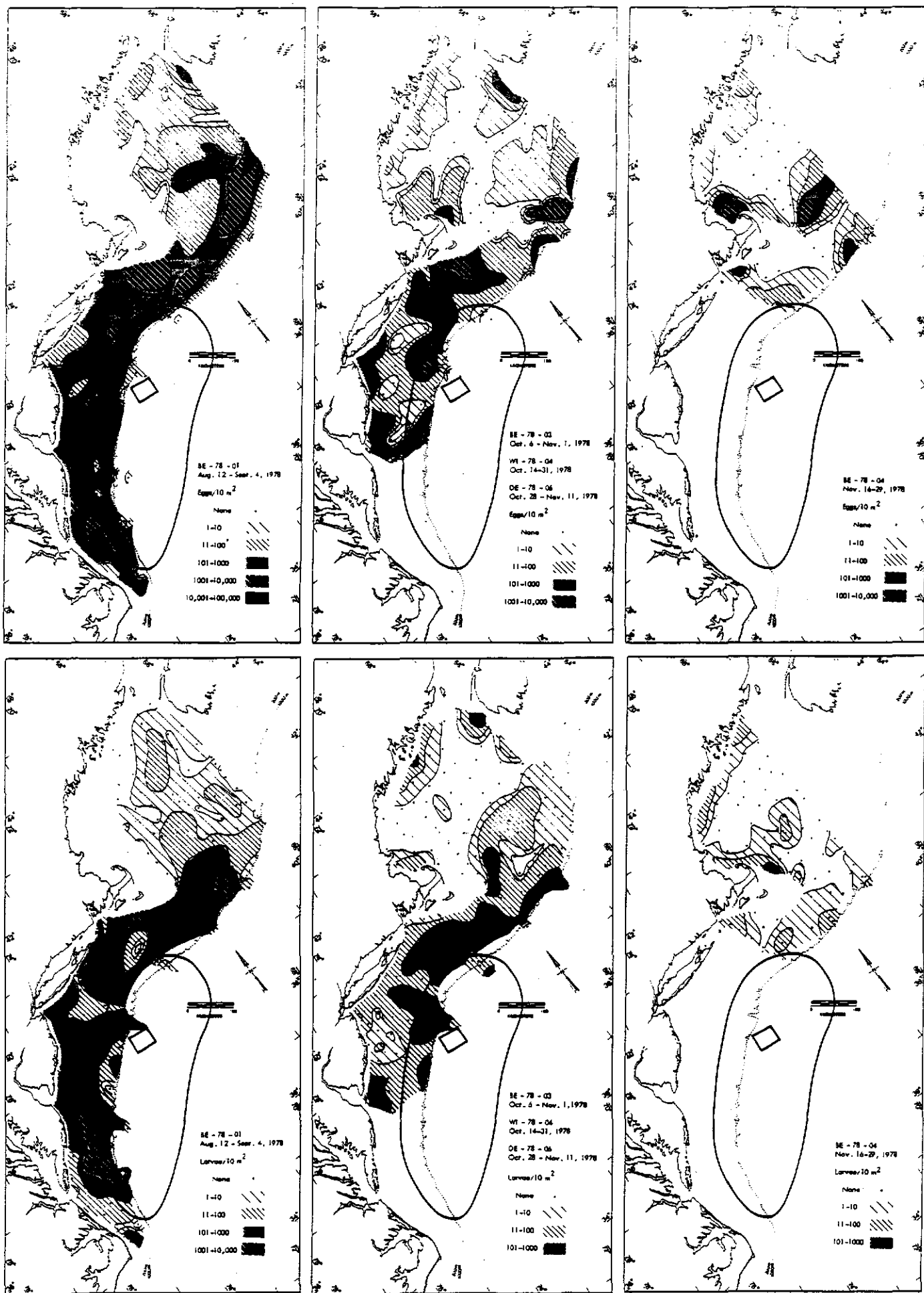


Figure 2. (continued)

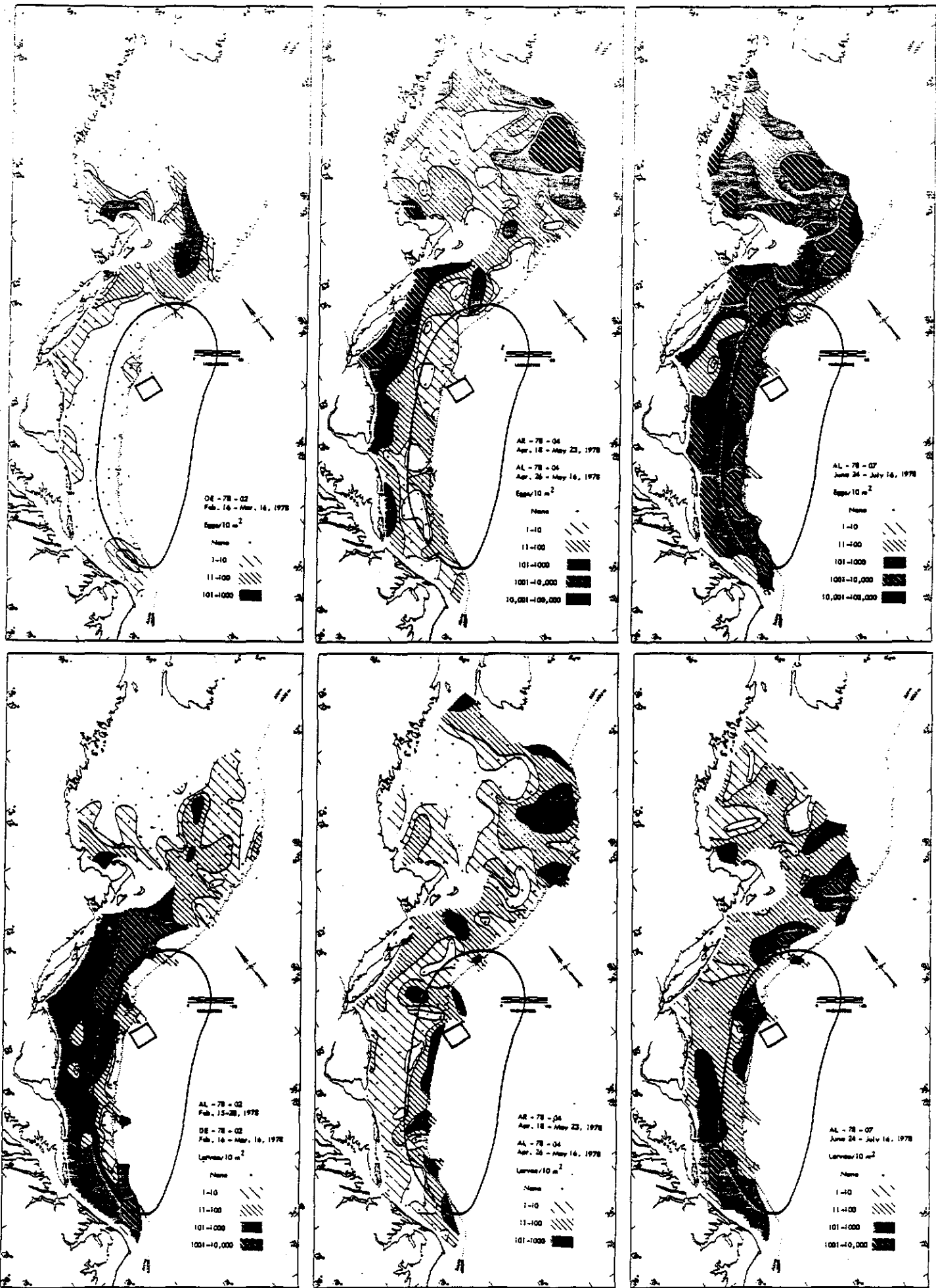


Figure 2. (continued)

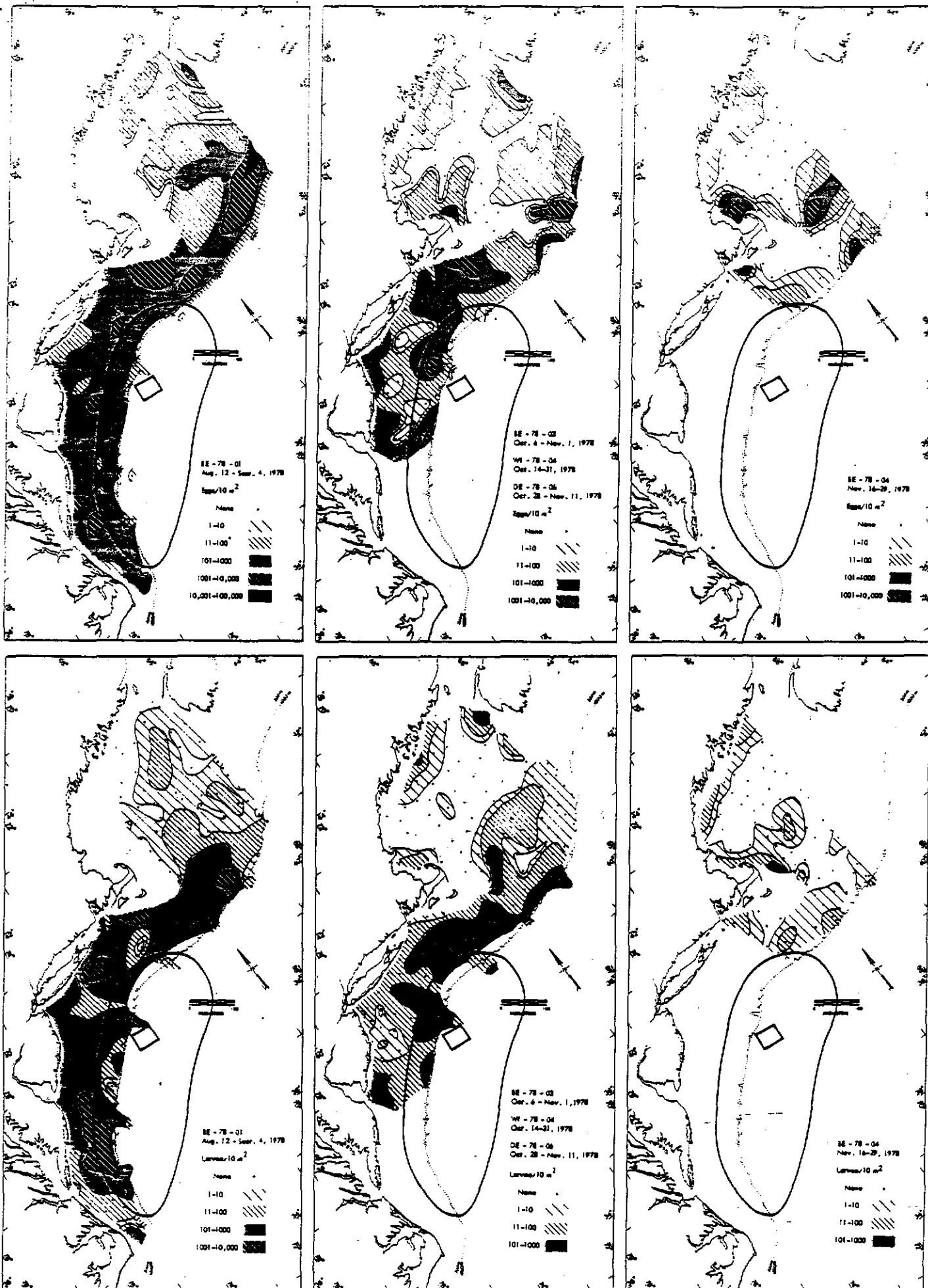


Figure 2. (continued)

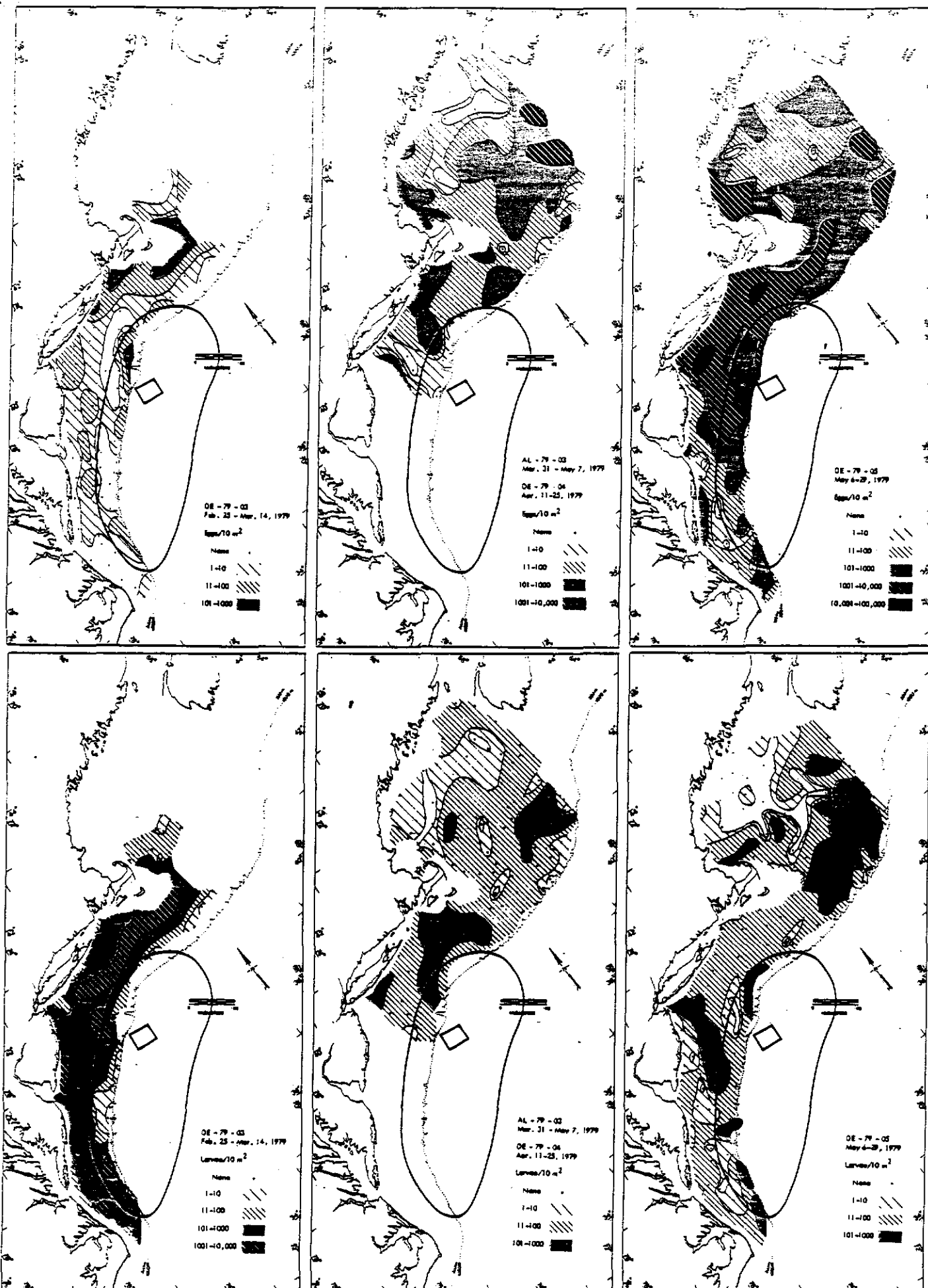


Figure 2. (continued)

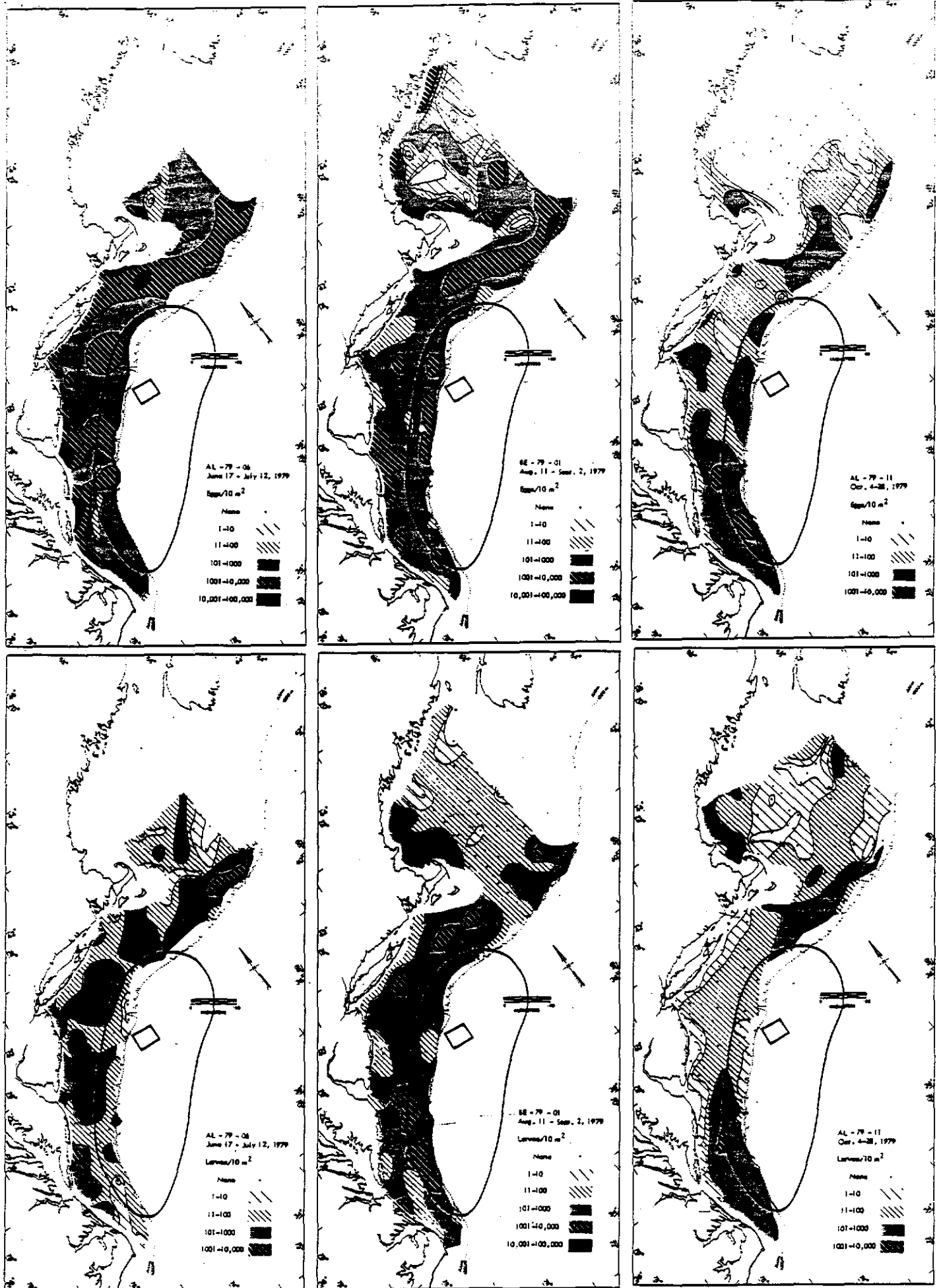


Figure 2. (continued)

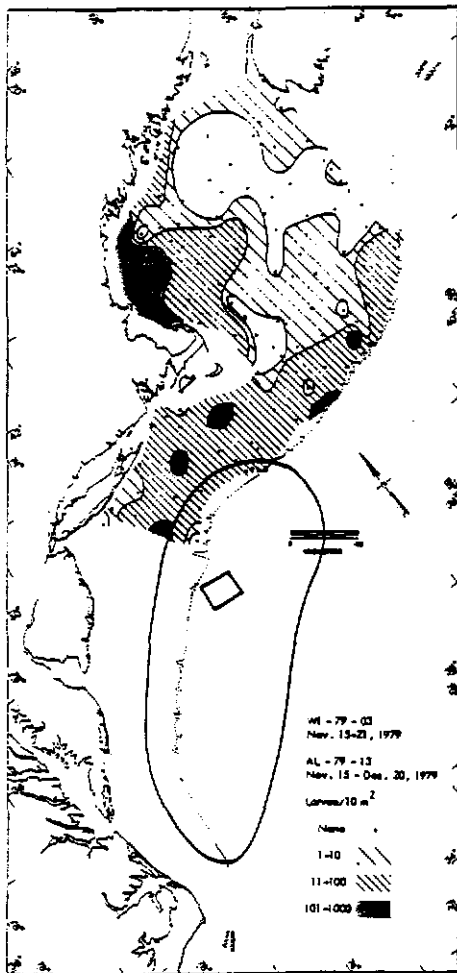
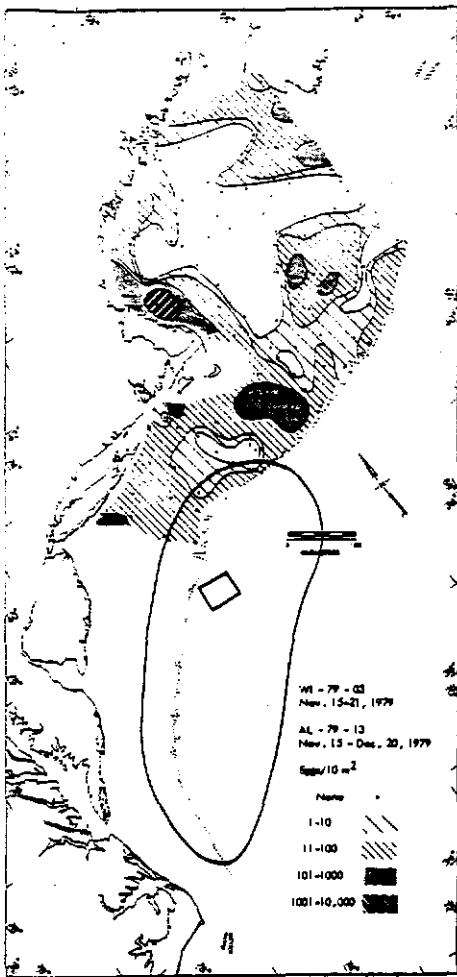


Figure 2. (continued)

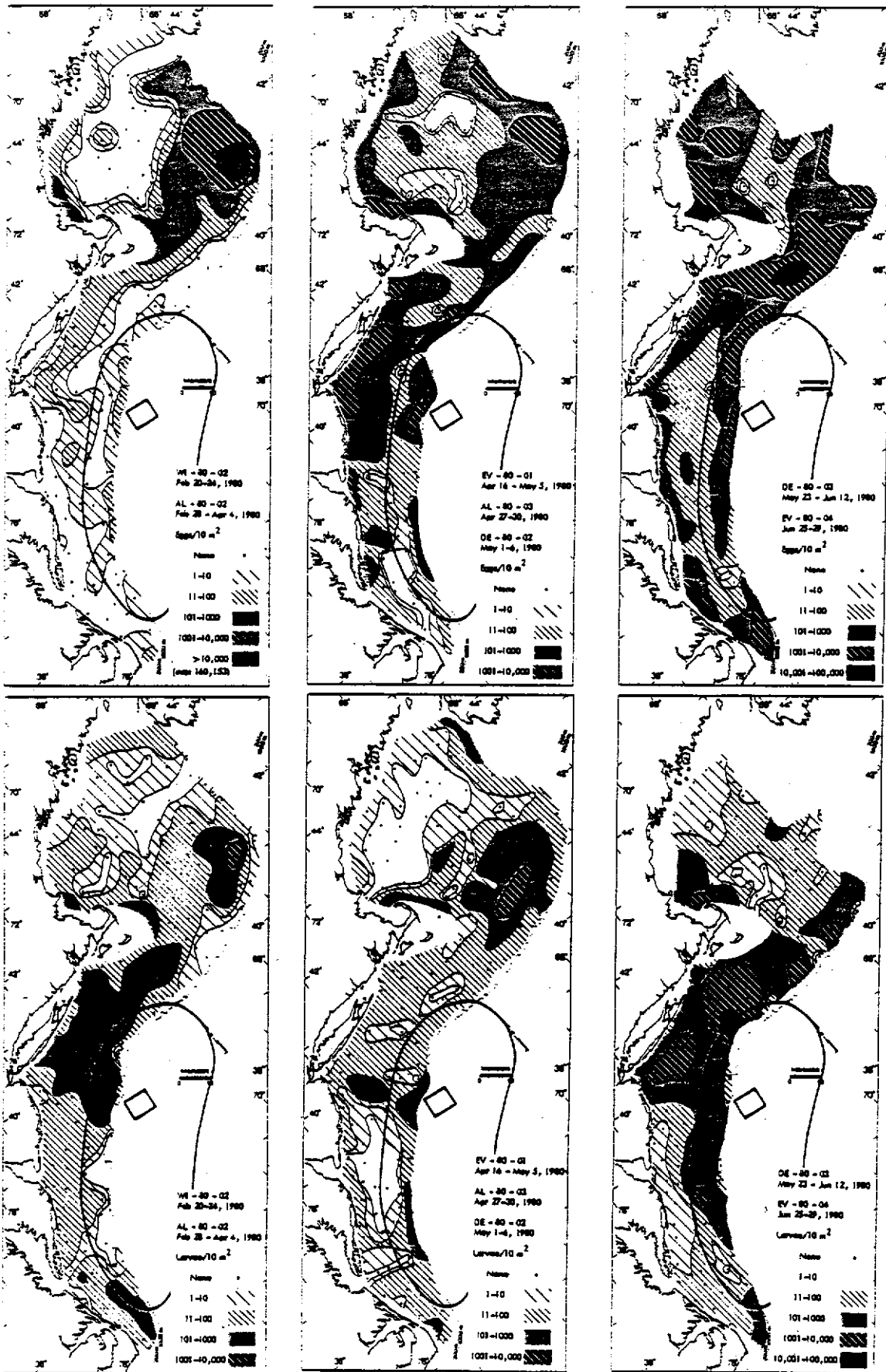


Figure 2. (continued)



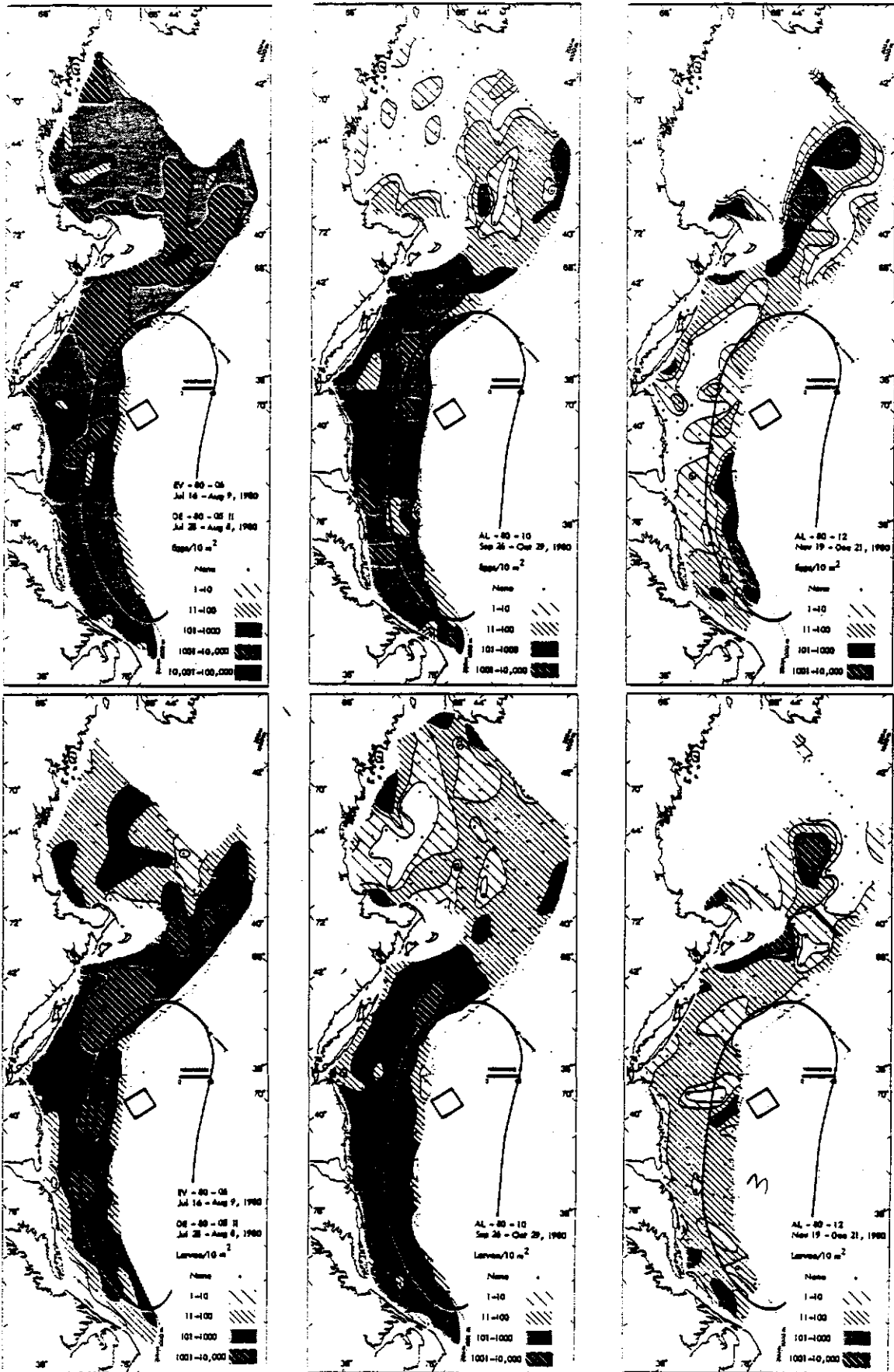
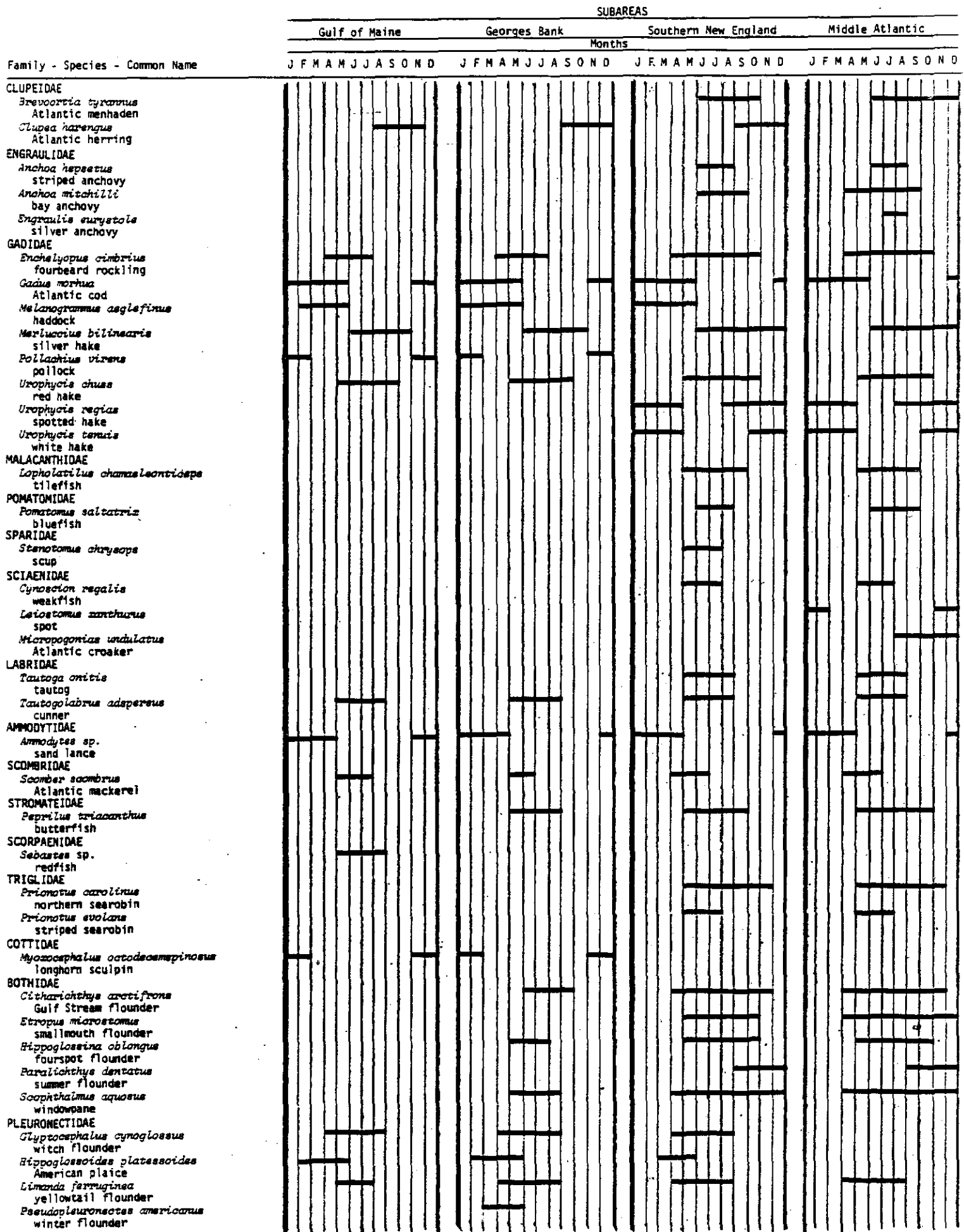


Figure 2. (continued)

Figure 3. Spawning seasons of principal species, based on larval occurrences, in four analytical subareas of northeastern United States (after Colton et al. 1979).



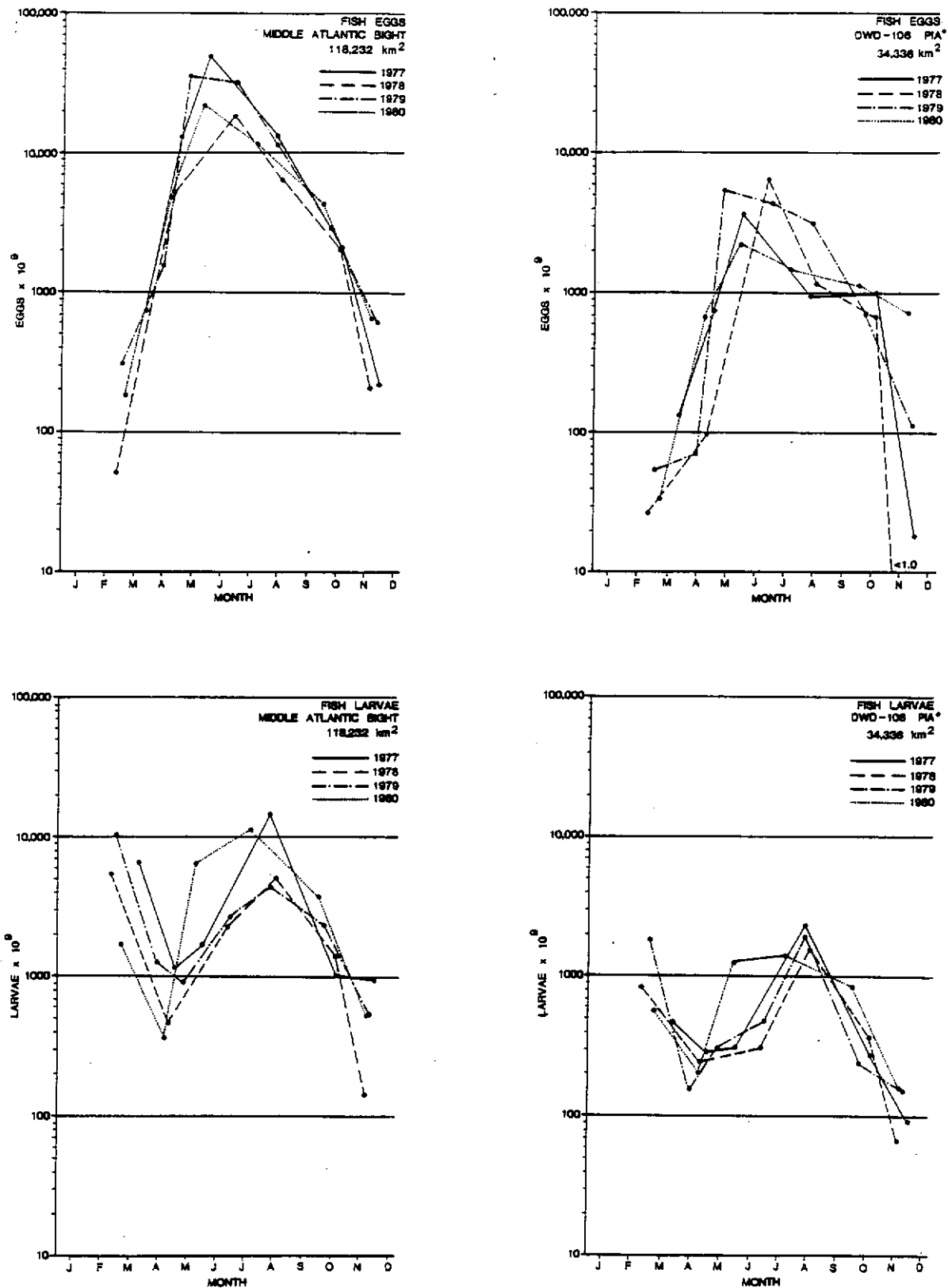


Figure 4. Seasonal changes in abundance of fish eggs in the Middle Atlantic Bight (1977-80) and in the potential impact area \* of ocean dumping at DWD-106 (top). Seasonal changes in abundance of fish larvae in the Bight (1977-80) and in the potential impact area of dumping at DWD-106 (bottom).