

Comparison of the Stomach Contents of Fish  
and Squid Collected in Waters off Cape Ann,  
Cape Cod, and Nantucket, Massachusetts, with  
Special Emphasis on Atlantic Mackerel<sup>1</sup>

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<input checked="" type="checkbox"/>	Approved for Distribution
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November 1981

<sup>1</sup>This is MARMAP contribution MED/NEFC 81-12.

## ABSTRACT

Stomach contents of fish and squid caught while bottom trawling off Cape Ann, Cape Cod, and Nantucket, Massachusetts, in November of 1976 are examined. Special emphasis is given to the feeding intensity and catchability of Atlantic mackerel. Fish prey identified in the Cape Ann and Cape Cod region is consistent with previous reports on fish food in those areas. Food was generally made up of benthic invertebrates, planktonic organisms, and fish and squid depending on the particular predator. Percentage similarity values (which indicate dietary overlap) were generally low between most predators. In waters off Nantucket the gammarid amphipod, Gammarus annulatus, was the principal prey and all species sampled preyed upon them to some extent. High dietary overlap was noted between many species because of predation on G. annulatus. Silver hake and spiny dogfish ate mostly Atlantic mackerel in the Nantucket area. Data on mackerel provides some evidence they are caught mainly during daylight hours when bottom trawling, and initiate feeding sometime before dawn.

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## INTRODUCTION

The multispecies approach to fishery management was generally accepted in the late 1970's (Edwards 1976; Gulland 1977, 1978; Grosslein et al. 1980). Management of whole ecosystems requires a better understanding of species interactions within fish communities. Studies of the feeding of fish and fish assemblages indicate resource partitioning and segregation of species in fish communities is an intricate web of species interrelationships (Tyler 1972; Schoener 1974; Ross 1977; Grosslein et al. 1980; Gabriel and Tyler 1980; Langton and Bowman 1980; Bowman 1981A, 1981B). Information on the coexistence of species within offshore communities is especially necessary for modeling species interactions. Such information is scarce from Northwest Atlantic waters (Grosslein et al. 1980). Studies on the food of fishes within fish communities gives some indication of how resources are partitioned. Fish feeding studies also provide information helpful for understanding the ecology of cohabiting species.

The purpose of this study is to examine trophic feeding interactions between various Northwest Atlantic fishes and squids. Particular emphasis is given to Atlantic mackerel because little is known about their feeding behavior or vulnerability to bottom trawls when fishing in areas of known mackerel concentrations. This work is consistent with the overall objectives of NOAA's MARMAP (Marine Resources Monitoring, Assessment, and Prediction) program in the northeast (U.S.A.).

## METHODS

A fish feeding study was conducted in November 1976 by American and Polish scientists aboard the Polish research vessel WIECZNO. The ship fished a modified No. 41 Yankee trawl for the first 27 stations and a Polish No. 28/32 trawl at subsequent stations. Fishing activities commenced at 0700 and ended at 2400 (EST) daily in waters off Cape Ann, Cape Cod, and Nantucket, Massachusetts (Figure 1). A 30-min trawl haul was made at a speed of 4.0 kn at each station. Data on time, depth, location, etc. for each station are listed in Table 1. Standard bottom trawl survey techniques used by personnel at the Northeast Fisheries Center (NEFC) located in Woods Hole, Massachusetts, 02543, were used to process the catch of all species at each station. All fish were measured to the nearest centimeter (fork length when applicable) and the total catch of each species weighed. After the catch was processed, stomachs were excised from as many fish or squid of selected species as time permitted before the next set of the trawl.

A total of 599 stomachs from 31 species was collected. Stomachs were individually wrapped in gauze, labeled, and preserved in 3.7 percent formaldehyde. In the laboratory each stomach was opened and its contents emptied over a fine mesh screen sieve. The contents were then flushed with water to remove the formaldehyde and transferred to a dish. Prey items were sorted, identified, counted, damp dried on bibulous paper and weighed. Parasites in the stomachs were included as part of the stomach contents.

Prey categories for each species are presented as the percentage they made up of the total weight of stomach contents (percentage weight) and as the percentage of the total number of fish whose stomachs contained a particular item (percentage occurrence). A table listing percentage weight and occurrence of dietary items in taxonomic detail is given in the appendix for each predator. In the appendix tables, data for each area are presented separately and subtotals (offset and underlined) are given for broad taxonomic groupings (percentage weight only). On the right-hand side of the appendix tables the stomach content data for the three areas are combined and given as a percentage weight. Percentage occurrence information is not mentioned in the text.

A summary of the stomach contents of all species sampled for each area is presented in Tables 2-4. In these tables, stomach content categories are given in less taxonomic detail than those found in the appendix, and only as a percentage weight. Subtotals are offset for broad taxonomic groupings. In the text the percentage weight is included in parentheses after the first mention of a prey group to quantify that prey's importance in the diet.

Dietary overlap was calculated as a percentage similarity according to the formula of Shorygin (Ivlev 1961) as follows:

$$P.S. = 100 - 0.5 \sum |a-b|$$

or, more simply, by summing the smaller value, in this case the percentage weight, for all prey shared by two predators. That is:

$$P.S. = \sum (a,b)$$

where:

P.S. = percentage similarity

a = percentage weight of a given prey  
group for predator A.

b = percentage weight of the same prey  
group for predator B.

If a +, indicating <0.1% weight, was the smallest value for any prey group in the table it was arbitrarily assigned a value equal to 0.05% for the calculations. In Figures 2-4 similarity values have been grouped into the following three categories to more readily illustrate dietary overlap: low, 0 to <30%; intermediate, 30 to <60%; and high, 60 to 100%.

Data on feeding intensity of Atlantic mackerel at different times of day was determined by calculating the percentage body weight (% BW) made up by the stomach contents of each fish and then obtaining the average for all fish sampled within each 3 hr time period. Body weights were determined by using the following length-weight equation from Anderson et al. (1976):

$$W = a L^b$$

where:

W = weight of fish

a =  $0.4136 \times 10^{-5}$

L = fork length of fish

b = 3.1541

The average number of fish caught per tow within 3-hr time intervals was calculated to determine diurnal variation in catchability. Additional catch data (from Bowman 1980) obtained during a feeding chronology study

conducted by scientists aboard the R/V BELOGORSK in September 1978 on the southern part of Georges Bank is included here to document mackerel catchability during time periods for which no data were gathered during the present study. The information is presented as the average catch per tow (in kilograms) for 3-hr time periods throughout the day.

## RESULTS

In most instances fish prey can be broadly classified into three general categories; the benthos (consisting principally of polychaetes, benthic crustaceans, benthic mollusks, and echinoderms), plankton (mostly euphausiids, mysids, copepods, chaetognaths, and some amphipod species), and fish and squid (Cephalopoda). Generally, the food of fishes and squids tends to be rather constant within one of the three prey groups noted above, being somewhat dependent on the age (length) of a particular predator (Edwards and Bowman 1979). Below, the predators sampled in each area are separated by the kind of food they consumed (usually >50% of their prey falls into one of the three categories) and more important prey groups (those making up >10% of their diet by weight) are noted.

Area A - In the waters off Cape Ann food data on ten species were gathered (Table 2). Predators which ate primarily benthic organisms, and the percentage weights of the prey in their diet, were: fourbeard rockling, 100% Polychaeta (73.0% Nephtys); white hake, 100% Pandalidae; witch flounder, 98.8%; Polychaeta (44.7% Ampharetidae and 21.0% Onuphis); American plaice, 92.7% Echinodermata (14.8% Ophiuroidea); and winter flounder, 100% Echinodermata (100% Ophiuroidea).

The only species which preyed on plankton was the alewife, and its diet included solely hyperiid amphipods (100% Parathemisto).

Four species ate mostly fish and squid. Short-finned squid stomachs contained 100% squid; barndoor skate ate fish which were identified as Atlantic herring (100%); Atlantic cod consumed squid (91.8%), most of which was short-finned squid (91.1%); and silver hake whose stomach contents were made up of 99.6% fish (97.4% herring).

Percentage similarity values were calculated from the data in Table 2 and range from 0 to a maximum of 97 (Figure 2). It is readily seen in Figure 2 that the diets with the most similarity are those of short-finned squid and Atlantic cod (79%), and barndoor skate and silver hake (97%). Squid (73%) accounts for most of the similarity between the short-finned squid and Atlantic cod, while herring (97%) is the principal prey common to barndoor skate and silver hake. Fourbeard rockling and witch flounder diets have intermediate similarity. Unidentified polychaete worms make up most of the dietary overlap noted for these two species (27%).

Area B - In the waters off Cape Cod, food data on 25 predators were gathered (Table 3). Predators which fed on the benthos were: barndoor skate, whose diet was principally pandalid shrimp (81.5% Dichelopandalus leptocerus); thorny skate, which consumed mostly benthic crustaceans (87.6%) consisting mainly of Crangon septemspinosa (27.2%) and several species of lysianassid amphipods (15.4%); Atlantic cod, who preyed on benthic crustaceans (various taxa listed in Appendix Table 14 sum to 21.9%) and mollusks (Pectinidae 32.5%); black sea bass, whose stomachs contained unidentified Mollusca (63.0%), Cancer irroratus (25.2%), and the pandalid shrimp, Dichelopandalus

leptocerus (10.9%). Also, longhorn sculpin stomach contents included Corophiidae (44.7%), which was made up of Unciola irrorata (31.0%) and Erichthonius rubicornis (10.3%), and a large percentage of sand and rock (24.1%); alligatorfish preyed only on Corophiidae (100%) which were identified as Erichthonius rubicornis; witch flounder food was mainly polychaetes (97.4%), with Lumbrineris fragilis (57.7%) being the dominant species; the American plaice diet was principally ophiuroids (66.8%), most of which were identified as Ophiura sarsi (64.1%), along with sabellid worms (24.3%) identified as Potamethus; yellowtail flounder preyed mainly upon Corophiidae (39.3%) mostly identified as Unciola inermis (27.7%) and Erichthonius rubicornis (10.6%), along with some unidentified ampharetid worms (12.2%); and winter flounder whose diet was principally unidentified worms (78.1%) and corophiid amphipods (13.7%).

Six predators were classified as plankton feeders. The only prey identified in the diet of blueback herring was copepods (46.5%), of which 41.7% were Calanoida. Alewife also ate copepods (51.0%) identified as Calanoida (46.3%) along with the hyperiid amphipod Parathemisto (36.7%). American shad and Atlantic herring preyed principally on calanoid copepods (74.9% and 100.0%, respectively). Atlantic mackerel stomachs contained fish scales (58.3%) and copepods (36.5%) of which 31.0% were Calanoida. Nothing was identified in the stomachs of butterfish taken from this area; they are only included here because they are known to feed primarily on planktonic organisms such as salps (see data for Area C).

Fish and squid were eaten by the following nine species: short-finned squid ate mostly squid (44.1%); almost all the food of long-finned

squid was unidentified (animal remains, 91.4%) but they did eat some fish (2.7%); spiny dogfish preyed on fish (81.4%), (66.4% of the fish were herring and 15% were unidentified), and squid (18.6%); the diet of goosefish was principally Pisces (94.1%) including skates (79.5%) and flatfish (10.1%); haddock (although haddock is a known benthic feeder, e.g., see Edwards and Bowman 1979, it is included here based on the stomach contents identified during this study) stomachs contained mostly fish (48.3%) and benthic organisms such as Ophiuroidea (23.5%), (12.6% Ophiura sarsi and 10.7% Ophiopholis aculeata), and corophiid amphipods (11.6%) identified as mostly Unciola inermis (11.3%); silver hake preyed for the most part upon fish (89.6%), (67.0% were unidentified and 20.0% were found to be the sand lance, Ammodytes americanus); pollock ate large amounts of squid (83.9%) which were mostly Illex (72.5%) and Loligo pealei (10.1%); red hake stomachs contained 57.6% fish (all unidentified) and some benthic animals (the largest percentage was the photid amphipod, Leptocheirus pinguis, 10.3%); white hake fed almost exclusively on fish (99.2%), (81.8% were identified as gadids and 17.3% were unclassified).

Percentage similarity values based on the diets of fish sampled in Area B are presented in Figure 3 (calculations were made on data given in Table 3). High dietary overlap can be seen (looking at the rows of non-numerical boxes at the top of the figure, from left to right, for each species listed in the left-hand column and noting overlap with species directly above) between long-finned squid and butterfish (91%), blueback herring and American shad (62%), American shad and Atlantic herring (75%),

haddock and red hake (62%), and silver hake and red hake (65%). The percentage similarity between long-finned squid and butterfish is accounted for totally by animal remains and therefore is of little consequence. The similarity value obtained for blueback herring and American shad was mostly copepods (47%), while the value for American shad and Atlantic herring was totally copepods (75%). Percentage similarity values for haddock and red hake, and silver and red hake are mainly accounted for by unidentified fish in their diet (48% and 58%, respectively).

Intermediate similarity values obtained for various species pairs can be summarized as follows: those of no importance; values accounted for mostly by copepod prey; and overlap principally caused by fish and squid prey. Values obtained for short-finned squid and blueback herring, short-finned squid and butterfish, long-finned squid and blueback herring, and blueback herring and butterfish are made up for the most part (or totally) by animal remains and are therefore of no importance. Also of little significance is the similarity noted for thorny skate and longhorn sculpin (mainly unidentified crustaceans), and haddock and Atlantic mackerel, silver hake and Atlantic mackerel, and red hake and Atlantic mackerel, all of which can be principally accounted for by fish scales found in the Atlantic mackerel stomachs (versus whole fish found in the stomachs of other species). Copepod prey was responsible for the overlap in the diets of blueback herring and alewife (47%), Atlantic herring (47%), and Atlantic mackerel (37%); also for the similarity between alewife and American shad (51%), Atlantic herring (51%), and Atlantic mackerel (37%); and for the values obtained for American shad and Atlantic mackerel (37%), and Atlantic herring and

Atlantic mackerel (37%). Fish and squid were dominant items in the diet of short-finned squid and pollock (44% squid), and haddock and silver hake (48% fish).

Area C - Data on the dietary of 16 species of fish and squid sampled from the waters off Nantucket are summarized in Table 4. None of the species examined fed heavily on benthic organisms. Predators which fed chiefly on planktonic organisms (unless otherwise noted all percentages mentioned represent Gammarus annulatus, or unidentified Gammaridae assumed to be Gammarus annulatus, which is an essentially pelagic species according to Bousfield, 1973) were long-finned squid (47.6%), little skate (52.8%; their diet also included 36.2% scallop viscera which were likely discards from scallop fishermen as they have been previously reported to be eaten by fish in this area by Bowman and Langton 1978), blueback herring (79.4%; another dietary item was fish, 20.6%), alewife (96.9%), American shad (87.2% Neomysis americana), red hake (86.4%), white hake (76.5%), Atlantic mackerel (99.5%), butterfish (90.2% Salpida), windowpane (69.0%), and yellow-tail flounder (90.8%). Fish and squid were eaten by the following predators: short-finned squid (82.4% fish), spiny dogfish (36.6% Atlantic mackerel; 33.5% unidentified fish; and 25.0% squid), Atlantic cod (71.9% summer flounder, and 12.9% Nassarius triuttatus, a benthic gastropod), silver hake (74.7% Atlantic mackerel and 18.5% unidentified fish), and pollock (87.6% Loligo pealei).

High dietary overlap was found for 16 predator pairs in Area C (Figure 4). In every instance gammarid amphipods identified as Gammarus annulatus were the prevalent prey (percentages indicated below) the

predators shared (Table 4). High similarity was noted in the diet of blueback herring and white hake (46% G. annulatus and 21% unidentified fish); alewife and red hake (86%), white hake (77%), Atlantic mackerel (94%), windowpane (69%), and yellowtail flounder (91%); red hake and white hake (77%), Atlantic mackerel (86%), windowpane (69%), and yellowtail flounder (86%); white hake and Atlantic mackerel (77%), windowpane (69%), and yellowtail flounder (77%); Atlantic mackerel and windowpane (69%), and yellowtail flounder (91%); and windowpane and yellowtail flounder (69%).

Similarly, the percentage similarity of 13 of the 16 species pairs with intermediate dietary overlap was made up of mostly gammarid amphipods. Gammarideans were the single most important dietary item to the following predator pairs (all values are strictly G. annulatus unless otherwise noted): squid and blueback herring (34% unidentified Gammaridea, probably G. annulatus); little skate and blueback herring (46%), alewife (53%), red hake (53%), white hake (53%), Atlantic mackerel (53%), windowpane (53%), and yellowtail flounder (53%); and blueback herring and alewife (46%), red hake (46%), Atlantic mackerel (46%), windowpane (46%), and yellowtail flounder (46%). The three remaining species pairs with intermediate values were short-finned squid and spiny dogfish (34% unidentified fish), spiny dogfish and silver hake (37% Atlantic mackerel and 19% unidentified fish), and windowpane and American shad (30% Neomysis americana).

Atlantic mackerel - Information on the diurnal variation in the feeding intensity and catchability of Atlantic mackerel is shown in Figure 5. Stomach samples were taken from fish caught in the waters off Nantucket during three time periods, i.e. 0600-0900, 1200-1500, and 1800-2100. The

average percentage body weight made up by the stomach contents in each period were as follows: 0600-0900, 1.41% BW; 1200-1500, 1.64% BW; and 1800-2100, 1.03% BW (Figure 5A). Nearly all food eaten was Gammarus annulatus (see Appendix Table 22). Mackerel were principally caught during hours of daylight when trawling from the WIECZNO e.g., an average of 1772 fish per tow from 0600 to 0900, and 928 fish per tow between 1200 and 1500 (Figure 5B). However, note that only one tow was made at night (towing began at 1905) during the 1800 to 2100 period. Because of this, catchability information obtained during a study conducted by scientists aboard the R/V BELOGORSK in September of 1978 on the southern part of Georges Bank is included (Figure 5C). Data from that study shows the largest quantities of mackerel are caught during daylight hours when bottom trawling.

#### DISCUSSION

Cape Ann and Cape Cod - the food of predators sampled from the waters off Cape Ann and Cape Cod, Massachusetts, was generally similar to dietary information previously reported for these species (Maurer and Bowman 1975; Edwards and Bowman 1979; Langton and Bowman 1980, 1981; and Bowman 1981B). Overall, the small percentage similarity values obtained between most predators in both areas indicate there is little dietary overlap except for species which feed predominantly on copepods (e.g., blueback herring, alewife, American shad, Atlantic herring, and Atlantic mackerel). Some dietary overlap was noted for fish and squid predators (e.g., barndoor skate and silver hake fed on herring) in the area off Cape Ann (Table 2), but much of this overlap is accounted for by the prey group "Other Pisces," most of which was unidentified (Table 3).

Obviously a prey category consisting of large amounts of unidentified fish results in elevated percentage similarity values between fish eating predators. Moyle (1977) also noticed that greater overlap occurs when prey are broadly classified during his study on the diet of sculpins and salmonids. Of interest to us here is that although predators were gathered in localized areas, and in fairly small numbers, their diets illustrate how effectively resources are partitioned. Foraging tactics, habitat separation, and spatial and temporal distribution (of predators and prey) apparently influence the food taken by fishes in local areas almost as much as they do over broad areas. If this was not true the results obtained here would not be so similar to the results obtained by Edwards and Bowman 1979; and Langton and Bowman 1980, 1981, who studied the diet of many of the same species over a much broader geographic range. It is worth noting however, that in some areas or during certain years (or seasons) the abundance of a particular prey may, to a large extent, influence the diet of predators (Bowman and Langton 1978, Edwards and Bowman 1979).

Nantucket - Profound dietary differences were noted between the predators taken off Nantucket and the other two areas. Virtually every species sampled in the Nantucket region ate some Gammarus annulatus, and many of the predators consumed large quantities. Because of this, high percentage similarity values were obtained between many species. Relatively high abundance of G. annulatus in this particular area has been implicated in at least two previous studies (Langton and Bowman 1977, and Bowman 1977) and documented in another (Dickinson et al. 1980). In the studies by Langton and Bowman, and Bowman (loc. cit.), which were conducted in response to the

ARGO MERCHANT oil spill, it was observed that the food of many fishes sampled in the same area was G. annulatus (the present study took place in November 1976 just prior to the oil spillage which occurred in December 1976 in the same region). In December 1976 the food of (all below data in terms of percentage of the total stomach contents weight) the following species contained G. annulatus (percentages indicated): little skate (63.8%), Atlantic cod (47.8%), and windowpane (90.2%). During January 1977 alewife ate large quantities (96.4%), and in August 1977 large amounts were eaten by silver hake (83.8%), red hake (13.4%), longhorn sculpin (17.2%), yellow-tail flounder (36.0%), and winter flounder (51.0%). Dickinson et al. (loc. cit.) noted that G. annulatus is relatively abundant in the same region during late spring and early summer based on the results of macroinvertebrate surveys conducted in the Middle Atlantic Bight region. G. annulatus may be considered somewhat endemic to the Nantucket Shoals area since few were obtained during other surveys conducted in the Northwest Atlantic (Dickinson and Wigley 1981). The above information establishes that G. annulatus may likely be found in the Nantucket Shoals region throughout the year and further, that this species is a predominant food for fish and squid inhabiting the area. The only other major prey contributing to the food of predators in the Nantucket area during the present study were Atlantic mackerel [eaten by spiny dogfish (36.6%) and silver hake (74.7%)], and the mysid, Neomysis americana, which accounted for 87.2% of the diet of American shad and 30.3% of the diet of windowpane.

Atlantic mackerel - Mackerel were principally caught during daylight hours when bottom trawling in the waters off Nantucket. Stations where the plankton composition was dominated by G. annulatus coincided with high catches

of mackerel (personal observation). Mackerel were intensively feeding on G. annulatus (99.5% of all food). Copepods (mostly Calanoida) were the main food (36.5%) found in the stomachs of mackerel (13 specimens) examined from waters off Cape Cod (Appendix Table 22).

Information on Atlantic mackerel presented below gives some insight into their feeding behavior and availability to bottom trawls. Unpublished hydroacoustical data gathered during January of 1981 in the vicinity of Hudson Canyon indicates mackerel tend to form tight schools located close to bottom during daylight hours and are dispersed and somewhat off bottom at night (James Crossen, NEFC, Woods Hole, MA, 02543, November 6, 1981 personal communication). Laboratory studies on the swimming behavior of Atlantic mackerel by Olla (1971) show that mackerel swim at higher more variable speeds during the day than at night. Mackerel feed by filtering small pelagic organisms from the water with their gill rakers, or by active pursuit of larger individual prey by sight (Bigelow and Schroeder 1953; MacKay 1967). Generally, the habits of mackerel appear similar to the habits reported for other "pelagic" species. Herring, for instance, are also filter feeders and tend to be associated with bottom during daylight and are off bottom at night (Blaxter and Holliday 1958). Butterfish and short-finned squid, two other typical pelagics, are caught more often during periods of daylight when bottom trawling (Arnold 1979; Bowman 1980). Most of these species reportedly feed near dawn or dusk and seldom feed in total darkness (Blaxter and Holliday 1958; Bradbury and Aldrich 1969; Arnold 1979, Bowman 1980). Mackerel, falling into the "pelagic" category, also likely feed near dawn or dusk and seldom at night. Data from

the present study, although certainly not conclusive, shows that mackerel are caught with bottom trawls during daylight and not at night, and that they begin feeding sometime just before dawn (since their stomachs contained some food during the 0600-0900 period, reached peak fullness near noon and contained the least amount of food at dusk).

Predation on Atlantic mackerel by two species, namely spiny dogfish (36.6%) and silver hake (74.7%) occurred in Nantucket waters. Spiny dogfish and silver hake are known to be the two major fish predators in the Northwest Atlantic (Noskov and Vinogradov 1977; Edwards and Bowman 1979). Because mackerel congregate in the Nantucket Shoals region at certain times of the year (Sette 1950) when silver hake and spiny dogfish are also in the vicinity (Fritz 1965) it comes as no surprise to find them serving as food for these two species.

#### ACKNOWLEDGMENTS

We thank Dr. M. Grosslein for his critical review of the manuscript; the captain and crew of the R/V WIECZNO for their assistance and cooperation; and G. Kelley, the laboratory typist, for her patience.

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Table 1. Station data for the fish feeding study conducted by American and Polish scientists aboard the R/V WIECZNO in November of 1976. Data listed indicate the conditions at the beginning of each tow.

Station	Time (EST)	Depth (m)	Cloud cover (%)	Wave height (ft)	Bottom temperature (°C)	Surface temperature (°C)	Latitude	Longitude
<u>(AREA A)</u>								
1	1325	118	100	3	7.6	10.7	42° 37'	70° 07'
2	0755	154	70	2	8.0	10.2	43° 15'	70° 04'
3	1140	164	75	2	7.3	10.1	43° 10'	70° 07'
4	1930	84	30	5	8.2	10.4	42° 39'	70° 14'
5	0725	80	10	5	9.0	10.0	42° 38'	70° 14'
6	1040	74	10	5	8.5	10.0	42° 35'	70° 10'
7	1620	76	10	3	9.4	10.0	42° 31'	70° 11'
<u>(AREA B)</u>								
8	0000	152	50	4	9.2	10.5	41° 39'	69° 24'
9	0715	76	90	5	9.6	10.3	41° 31'	69° 23'
10	1055	60	90	2	9.9	10.0	41° 37'	69° 41'
11	1300	60	100	2	10.2	10.4	41° 36'	69° 38'
12	1510	52	70	3	10.0	10.0	41° 35'	69° 36'
13	NONE	--	--	-	----	----	-----	-----
14	2040	66	50	5	9.7	10.0	41° 37'	69° 34'
15	2330	78	10	4	7.9	10.0	41° 37'	69° 33'
16	0735	76	60	4	8.0	10.3	41° 37'	69° 32'
17	0945	129	80	4	7.7	10.2	41° 40'	69° 34'
18	1220	120	95	5	8.3	10.3	41° 42'	69° 33'
19	1615	108	30	5	7.7	10.4	41° 24'	69° 17'
20	1825	92	50	5	7.9	10.3	41° 27'	69° 18'
21	2050	127	50	6	9.6	----	41° 26'	69° 16'
22	0730	78	100	2	----	----	41° 37'	69° 33'
23	1250	99	90	3	7.3	10.5	41° 22'	69° 18'
24	1625	136	75	2	7.3	10.5	41° 12'	69° 06'
25	1850	112	50	3	---	----	41° 15'	69° 07'
<u>(AREA C)</u>								
26	0735	58	50	5	9.5	10.3	40° 37'	69° 50'
27	0935	51	65	6	10.0	10.0	40° 40'	69° 50'
28	1430	40	NA	NA	9.6	9.7	40° 45'	69° 48'
29	1645	40	75	6	9.0	8.9	40° 47'	69° 47'
30	0800	42	10	5	9.0	9.0	40° 44'	69° 52'
31	1057	41	5	5	8.8	8.9	40° 44'	69° 53'
32	1335	39	10	5	8.8	8.9	40° 47'	69° 50'
33	1905	46	50	6	8.5	8.6	40° 44'	69° 52'
34	0742	44	5	2	---	---	40° 46'	69° 53'

Table 2. Summary of the stomach contents of fish and squid gathered off Cape Ann, Massachusetts (Area A) during November of 1976. Data expressed as a percentage of the total stomach contents weight. A "+" signifies <0.1% in the diet.

Stomach contents	Short-finned squid (% wt)	Barndoor skate (% wt)	Alewife (% wt)	Fourbeard rockling (% wt)	Atlantic cod (% wt)	Silver hake (% wt)	White hake (% wt)	Witch flounder (% wt)	American plaice (% wt)	Winter flounder (% wt)
PORIFERA	-	-	-	-	-	-	-	-	3.3	-
POLYCHAETA	-	-	-	100.0	-	-	-	98.8	2.7	-
Maldanidae	-	-	-	-	-	-	-	2.8	-	-
Onuphidae	-	-	-	-	-	-	-	21.0	-	-
Nephtyidae	-	-	-	73.0	-	-	-	2.5	1.2	-
Ampharetidae	-	-	-	-	-	-	-	44.7	-	-
Other Polychaeta	-	-	-	27.0	-	-	-	27.8	1.5	-
CRUSTACEA	+	-	100.0	-	1.0	0.4	100.0	1.2	1.0	-
Gammaridae	-	-	-	-	-	-	-	0.7	-	-
Hyperidea	-	-	100.0	-	-	+	-	-	-	-
Gammaridea	-	-	-	-	-	-	-	-	+	-
Pandalidae	-	-	-	-	-	-	100.0	-	-	-
Decapoda	-	-	-	-	0.1	-	-	0.5	-	-
Cumacea	-	-	-	-	-	-	-	-	+	-
Euphausiacea	-	-	-	-	0.9	0.3	-	-	1.0	-
Other Crustacea	+	-	-	-	-	0.1	-	-	-	-
MOLLUSCA	73.3	-	-	-	91.8	-	-	-	0.3	-
Pelecypoda	-	-	-	-	-	-	-	-	0.3	-
Cephalopoda	73.3	-	-	-	91.8	-	-	-	-	-
ECHINODERMATA	-	-	-	-	-	-	-	-	92.7	100.0
Ophiuroidea	-	-	-	-	-	-	-	-	14.8	100.0
Other Echinodermata	-	-	-	-	-	-	-	-	77.9	-
PISCES	5.3	100.0	-	-	7.2	99.6	-	-	-	-
Herrings	-	100.0	-	-	-	97.4	-	-	-	-
Silver hake	-	-	-	-	-	1.7	-	-	-	-
Other Pisces	5.3	-	-	-	7.2	0.5	-	-	-	-
ANIMAL REMAINS	20.0	-	-	-	-	-	-	-	-	-
CESTODA	1.4	-	-	-	-	-	-	-	+	-
TREMATODA	-	-	-	-	-	-	-	-	+	+
Number of specimens examined	7	1	2	1	6	7	1	3	13	4
Number of empty stomachs	0	0	1	0	0	1	0	0	3	1
Mean stomach content weight	6.957	26.055	0.032	0.200	30.182	15.056	6.271	1.122	0.401	0.008
Mean fish length(cm)	26.9	112.0	24.5	24.0	75.7	30.1	48.0	47.3	28.6	21.0
Length range (cm)	26-28	112	24-25	24	49-95	16-49	48	41-51	12-46	18-24

Table 3. Summary of the stomach contents of fish and squid gathered off Cape Cod, Massachusetts (Area 8) during November of 1976.<sup>1</sup> Data expressed as a percentage of the total stomach contents weight. A "+" signifies <0.1% in the diet.

Stomach contents	Short-finned squid (% wt)	Long-finned squid (% wt)	Spiny dogfish (% wt)	Barndoor skate (% wt)	Thorny skate (% wt)	Blueback herring (% wt)	Alewife (% wt)	American shad (% wt)	Atlantic herring (% wt)	Goosefish (% wt)	Atlantic cod (% wt)	Haddock (% wt)	Silver hake (% wt)
POLYCHAETA	0.2	-	-	-	2.2	-	-	-	-	-	0.5	3.7	-
Maldanidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Eunicidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbrineridae	-	-	-	-	-	-	-	-	-	-	-	-	-
Aphroditidae	-	-	-	-	-	-	-	-	-	-	-	1.0	-
Goniadidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Nephtyidae	-	-	-	-	-	-	-	-	-	-	0.1	-	-
Nereidae	-	-	-	-	0.1	-	-	-	-	-	-	-	-
Phyllococidae	-	-	-	-	-	-	-	-	-	-	-	0.1	-
Polynoidae	-	-	-	-	-	-	-	-	-	-	-	0.1	-
Sabellidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Spionidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Ampharetidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Terebellidae	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Polychaeta	0.2	-	-	-	2.1	-	-	-	-	-	0.4	2.5	-
CRUSTACEA	4.5	5.9	-	100.0	87.6	47.0	93.1	74.9	100.0	-	21.9	18.0	10.2
Caprellidae	-	-	-	-	-	-	-	-	-	-	0.1	-	-
Gammaridae	-	-	-	-	7.0	-	-	-	-	-	0.1	1.0	+
Ampeliscaidae	-	-	-	-	2.1	-	-	-	-	-	-	-	-
Corophiidae	-	-	-	-	4.6	-	0.2	-	-	-	0.2	11.6	-
Eusiridae	-	-	-	-	0.2	-	-	-	-	-	-	-	-
Gammaridae	-	-	-	-	-	-	-	-	-	-	0.1	-	-
Hyperidae	-	-	-	-	-	0.5	36.7	-	-	-	-	-	+
Lysianassidae	-	-	-	-	15.4	-	-	-	-	-	-	-	+
Oedicerotidae	-	-	-	-	7.8	-	-	-	-	-	-	-	+
Photidae	-	-	-	-	4.1	-	-	-	-	-	0.1	0.2	-
Phoxocephalidae	-	-	-	-	0.4	-	-	-	-	-	-	-	-
Decapoda	-	-	-	-	-	-	5.2	-	-	-	0.1	0.1	-
Canceridae	-	-	-	-	-	-	-	-	-	-	4.2	-	-
Crangonidae	-	-	-	18.5	29.0	-	-	-	-	-	0.2	0.1	0.2
Hippolytidae	-	-	-	-	-	-	-	-	-	-	0.5	-	-
Majidae	-	-	-	-	-	-	-	-	-	-	1.3	-	-
Paguridae	-	-	-	-	-	-	-	-	-	-	4.9	1.2	0.3
Pandalidae	-	-	-	81.5	-	-	-	-	-	-	9.5	3.5	6.2
Isopoda	-	-	-	-	-	-	-	-	-	-	-	-	-
Euphausiacea	-	-	-	-	-	-	-	-	-	-	-	-	3.0
Copepoda	-	-	-	-	-	46.5	51.0	74.9	100.0	-	-	-	0.3
Other Crustacea	4.5	5.9	-	-	17.0	-	-	-	-	-	0.6	0.3	0.2
MOLLUSCA	44.1	-	18.6	-	-	-	-	-	-	5.9	38.0	0.3	-
Pelecypoda	-	-	-	-	-	-	-	-	-	-	-	-	-
Pectinidae <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	32.5	-	-
Gastropoda	-	-	-	-	-	-	-	-	-	-	0.4	0.1	-
Pteropoda	-	-	-	-	-	-	-	-	-	-	-	-	-
Cephalopoda	44.1	-	18.6	-	-	+	-	-	-	5.9	5.1	-	-
Other Mollusca	-	-	-	-	-	-	-	-	-	-	-	-	-
CHAETOGNATHA	-	-	-	-	-	-	-	1.2	-	-	-	0.2	-
ECHINODERMATA	-	-	-	-	-	-	-	-	-	-	9.6	24.7	-
Echinoidea	-	-	-	-	-	-	-	-	-	-	-	0.7	-
Ophiuroidea	-	-	-	-	-	-	-	-	-	-	9.5	23.5	-
Other Echinodermata	-	-	-	-	-	-	-	-	-	-	-	0.5	-
PISCES	8.4	2.7	81.4	+	-	1.2	0.9	9.2	-	94.1	23.3	48.3	89.6
Skates	-	-	-	-	-	-	-	-	-	-	-	-	-
Herrings	-	-	66.4	-	-	-	-	-	-	79.5	-	-	-
Hakes	-	-	-	-	-	-	-	-	-	-	14.5	-	-
Silver hake	-	-	-	-	-	-	-	-	-	-	-	-	1.0
Amer. sand lance	-	-	-	-	-	-	-	-	-	-	-	-	20.9
Flatfishes	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Pisces	8.4	2.7	15.0	+	-	1.2	0.9	9.2	-	10.1	9.3	48.3	57.0
ANIMAL REMAINS	41.3	91.4	-	-	3.0	51.8	5.0	14.7	-	-	1.7	2.8	0.2
SAND AND ROCK	-	-	-	-	7.2	-	1.0	-	-	-	4.5	1.8	-
CESTODA	1.5	-	-	-	-	-	-	-	-	-	-	-	-
TREMATODA	-	-	-	-	-	+	+	-	-	-	+	-	-
NEMATODA	+	-	-	-	-	-	+	-	-	-	+	-	+
Number of specimens examined	34	29	16	1	5	6	20	12	1	4	25	29	68
Number of empty stomachs	5	3	10	0	0	0	6	1	0	1	2	0	24
Mean stomach content weight(g)	1.292	1.045	36.731	0.540	0.180	0.135	0.131	0.296	0.105	660.033	5.517	3.858	1.390
Mean fish length(cm)	25.3	10.9	76.8	88.0	19.4	24.2	25.3	33.2	29.0	72.3	49.3	34.3	25.3
Length range (cm)	13-29	6-16	64-101	88	14-25	22-25	22-28	27-43	29	49-97	20-83	9-68	5-59

<sup>1</sup>Species collected which only had empty stomachs include: winter skate and Atlantic wolffish.

<sup>2</sup>Viscera only.

Table 3. Continued.

Stomach contents	Pollock (% wt)	Red hake (% wt)	White hake (% wt)	Black sea bass (% wt)	Atlantic mackerel (% wt)	Butterfish (% wt)	Longhorn sculpin (% wt)	Alligatorfish (% wt)	Witch flounder (% wt)	American plaice (% wt)	Yellow-tail flounder (% wt)	Winter flounder (% wt)
POLYCHAETA	0.3	11.9	0.1	-	-	-	3.4	-	97.4	24.2	37.2	86.3
Maldanidae	-	-	-	-	-	-	-	-	-	-	0.7	-
Eunicidae	-	1.4	-	-	-	-	-	-	-	-	-	-
Lumbrineridae	-	-	-	-	-	-	-	-	57.7	-	-	-
Aphroditidae	-	-	-	-	-	-	-	-	-	-	-	-
Goniadidae	-	0.1	-	-	-	-	-	-	7.0	-	-	-
Nephtyidae	-	-	-	-	-	-	-	-	1.2	-	-	-
Nereidae	-	-	-	-	-	-	-	-	-	-	-	-
Phyllococidae	-	5.7	0.1	-	-	-	-	-	-	-	2.3	4.8
Polynoidae	0.3	-	-	-	-	-	-	-	-	-	-	-
Sabellidae	-	-	-	-	-	-	-	-	-	24.2	8.3	3.4
Spionidae	-	-	-	-	-	-	-	-	0.5	-	-	-
Ampharetidae	-	-	-	-	-	-	-	-	-	-	15.2	-
Terebellidae	-	1.0	-	-	-	-	-	-	-	-	-	-
Other Polychaeta	-	3.7	-	-	-	-	3.4	-	31.0	-	10.7	78.1
CRUSTACEA	5.1	26.7	0.5	37.0	36.5	-	72.5	100.0	2.6	3.8	42.6	13.1
Caprellidea	-	0.3	-	-	-	-	-	-	-	-	0.4	-
Gammaridea	-	0.5	-	-	-	-	-	-	-	-	0.6	-
Ampeliscidae	-	-	-	-	-	-	-	-	-	-	-	-
Corophiidae	-	2.3	-	0.9	-	-	44.7	100.0	-	-	39.3	13.7
Eusiridae	-	-	-	-	-	-	-	-	-	-	-	-
Gammaridae	-	-	-	-	-	-	-	-	-	-	-	-
Hyperidae	0.3	-	-	-	-	-	-	-	-	-	-	-
Lysianassidae	-	0.1	-	-	-	-	-	-	-	-	0.8	-
Oedicerotidae	-	-	-	-	-	-	-	-	-	-	-	-
Photidae	-	10.3	-	-	-	-	-	-	-	-	0.3	-
Phoxocephalidae	-	-	-	-	-	-	-	-	-	-	-	-
Decapoda	-	0.9	-	-	-	-	-	-	-	-	-	-
Canceridae	-	0.4	-	25.2	-	-	-	-	-	-	-	-
Crangonidae	0.2	0.3	0.1	-	-	-	-	-	-	0.7	-	-
Hippolytidae	-	-	-	-	-	-	-	-	-	-	-	-
Majidae	-	-	-	-	-	-	-	-	-	-	-	-
Paguridae	-	3.0	-	-	-	-	-	-	-	3.1	0.8	-
Pandalidae	4.1	7.8	0.3	10.9	-	-	-	-	-	-	-	-
Isopoda	-	-	-	-	-	-	-	-	-	-	0.4	-
Euphausiacea	0.3	-	-	-	-	-	-	-	-	-	-	-
Copepoda	-	-	-	-	36.5	-	-	-	-	-	-	-
Other Crustacea	0.2	1.7	0.1	-	-	-	27.8	-	2.6	-	-	-
MOLLUSCA	83.9	-	-	63.0	-	-	-	-	-	3.2	2.8	-
Pelecypoda	-	-	-	-	-	-	-	-	-	3.2	0.5	-
Pectinidae <sup>2</sup>	-	-	-	-	-	-	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-	-	-	-	-	2.3	-
Pteropoda	0.5	-	-	-	-	-	-	-	-	-	-	-
Cephalopoda	83.4	-	-	-	-	-	-	-	-	-	-	-
Other Mollusca	-	-	-	63.0	-	-	-	-	-	-	-	-
CHAETOGNATHA	-	-	-	-	4.1	-	-	-	-	-	-	-
ECHINODERMATA	-	-	-	-	-	-	-	-	-	66.8	-	-
Echinoidea	-	-	-	-	-	-	-	-	-	-	-	-
Ophiuroidea	-	-	-	-	-	-	-	-	-	66.8	-	-
Other Echinodermata	-	-	-	-	-	-	-	-	-	-	-	-
PISCES	2.6	57.6	99.2	-	58.3	-	-	-	-	2.0	-	-
Skates	-	-	-	-	-	-	-	-	-	-	-	-
Herrings	-	-	-	-	-	-	-	-	-	-	-	-
Hakes	-	-	81.8	-	-	-	-	-	-	-	-	-
Silver hake	0.4	-	0.1	-	-	-	-	-	-	2.0	-	-
Amer. sand lance	-	-	-	-	-	-	-	-	-	-	-	-
Flatfishes	-	-	-	-	-	-	-	-	-	-	-	-
Other Pisces	2.2	57.6	17.3	-	58.3	-	-	-	-	-	-	-
ANIMAL REMAINS	1.2	1.8	-	-	1.1	100.0	-	-	-	-	3.0	-
SAND AND ROCK	5.6	0.9	0.2	-	-	-	24.1	-	-	-	14.3	-
CESTODA	-	-	-	-	-	-	-	-	-	-	-	-
TREMATODA	-	0.2	-	-	-	-	-	-	-	-	-	-
NEMATODA	1.3	-	-	-	-	-	-	-	-	-	0.1	-
Number of specimens examined	18	13	11	1	13	14	3	1	1	7	10	2
Number of empty stomachs	1	0	3	0	0	10	0	0	0	1	0	0
Mean stomach content weight(g)	13.823	1.529	40.472	1.509	0.860	0.030	0.010	0.003	1.033	1.324	0.543	0.073
Mean fish length(cm)	80.2	35.1	52.1	33.0	36.2	15.9	16.7	8.0	58.0	40.4	35.5	21.5
Length range (cm)	60-105	11-45	28-67	33	32-38	6-20	8-29	8	58	32-47	13-43	21-22

Table 4. Summary of the stomach contents of fish and squid gathered off Nantucket, Massachusetts (Area C) during November of 1976.<sup>1</sup> Data expressed as a percentage of the total stomach contents weight. A "+" signifies <0.1% in the diet.

Stomach contents	Short-finned squid (% wt)	Long-finned squid (% wt)	Spiny dogfish (% wt)	Little skate (% wt)	Blueback herring (% wt)	Alewife (% wt)	American shad (% wt)	Atlantic cod (% wt)	Silver hake (% wt)	Pollock (% wt)	Red hake (% wt)	White hake (% wt)	Atlantic mackerel (% wt)	Butterfish (% wt)	Windowpane (% wt)	Yellowtail flounder (% wt)
POLYCHAETA	0.6	-	-	1.6	-	0.4	-	6.8	-	-	-	-	-	-	-	4.6
Haldanidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9
Flabelligeridae	-	-	-	-	-	0.4	-	-	-	-	-	-	-	-	-	-
Aphroditidae	-	-	-	-	-	-	-	6.7	-	-	-	-	-	-	-	-
Nephtyidae	-	-	-	1.6	-	-	-	-	-	-	-	-	-	-	-	-
Nereidae	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyllococidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2
Sigalionidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.5
Other Polychaeta	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-
CRUSTACEA	2.9	100.0	4.9	54.6	79.4	99.5	100.0	6.0	6.8	2.3	93.0	76.5	99.6	4.6	99.3	90.8
Gammaridea	-	47.6	-	-	33.5	2.8	-	1.3	-	-	-	-	-	-	-	-
Gammaridae	2.0	-	+	52.8	45.9	94.1	0.2	3.5	6.5	1.8	86.4	76.5	99.5	4.6	69.0	90.8
Hyperidea	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-
Decapoda	-	-	-	0.3	-	-	-	-	-	-	-	-	+	-	-	-
Cancridae	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Crangonidae	-	-	-	0.7	-	1.9	-	-	0.1	-	1.9	-	+	-	-	-
Paguridae	-	-	4.9	-	-	-	-	-	-	-	-	-	-	-	-	-
Pandalidae	-	-	-	-	-	-	-	-	-	-	4.7	-	-	-	-	-
Isopoda	-	-	-	-	-	-	-	-	-	0.4	-	-	-	-	-	-
Mysidacea	-	-	-	-	-	-	87.2	-	-	-	-	-	+	-	30.3	-
Copepoda	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
Other Crustacea	0.9	54.4	-	0.8	+	0.7	12.0	-	0.2	0.1	-	-	0.1	-	-	-
MOLLUSCA	1.1	-	25.0	43.5	-	-	-	14.6	+	87.6	-	-	-	-	-	-
Pelecypoda	-	-	-	7.3	-	-	-	-	-	-	-	-	-	-	-	-
Pectinidae	-	-	-	36.2	-	-	-	-	-	-	-	-	-	-	-	-
Gastropoda	-	-	-	-	-	-	-	12.9	-	-	-	-	-	-	-	-
Cephalopoda	1.1	-	25.0	-	-	-	-	1.7	+	87.6	-	-	-	-	-	-
SALPIDA	-	-	-	-	-	-	-	-	-	-	-	-	-	90.2	-	-
PISCES	82.4	-	70.1	-	20.6	-	0	71.9	93.2	-	-	23.5	0.1	-	0.7	-
Atlantic mackerel	-	-	36.6	-	-	-	-	-	74.7	-	-	-	-	-	-	-
Summer flounder	-	-	-	-	-	-	-	71.9	-	-	-	-	-	-	-	-
Windowpane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-
Other Pisces	82.4	-	33.5	-	-	-	-	-	18.5	-	-	23.5	0.1	-	+	-
MISCELLANEOUS	-	-	-	0.3	20.6	-	-	0.1	-	0.2	-	-	+	-	-	-
ANIMAL REMAINS	12.2	-	-	-	+	0.1	-	0.5	-	9.9	7.0	-	0.3	5.2	-	4.6
SAND AND ROCK	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-
CESTODA	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEMATODA	-	-	-	-	-	-	-	+	-	-	-	-	+	+	-	-
Number of specimens examined	17	5	10	6	3	20	3	5	17	1	3	1	98	8	4	4
Number of empty stomachs	2	0	5	0	0	2	0	1	2	0	0	0	2	6	0	0
Mean stomach content weight(g)	4.836	0.690	15.808	1.217	0.162	0.609	2.017	36.814	18.421	18.236	4.128	0.812	5.642	0.073	5.409	1.123
Mean fish length(cm)	26.5	19.4	79.3	50.3	28.0	26.2	36.0	84.6	41.9	106.0	39.3	50.0	33.0	21.1	26.8	33.0
Length range (cm)	23-29	15-24	77-83	48-52	26-30	24-28	31-39	64-104	28-57	106	37-43	50	26-39	14-24	25-28	30-37

<sup>1</sup>Species collected which only had empty stomachs include: sea raven and winter flounder.

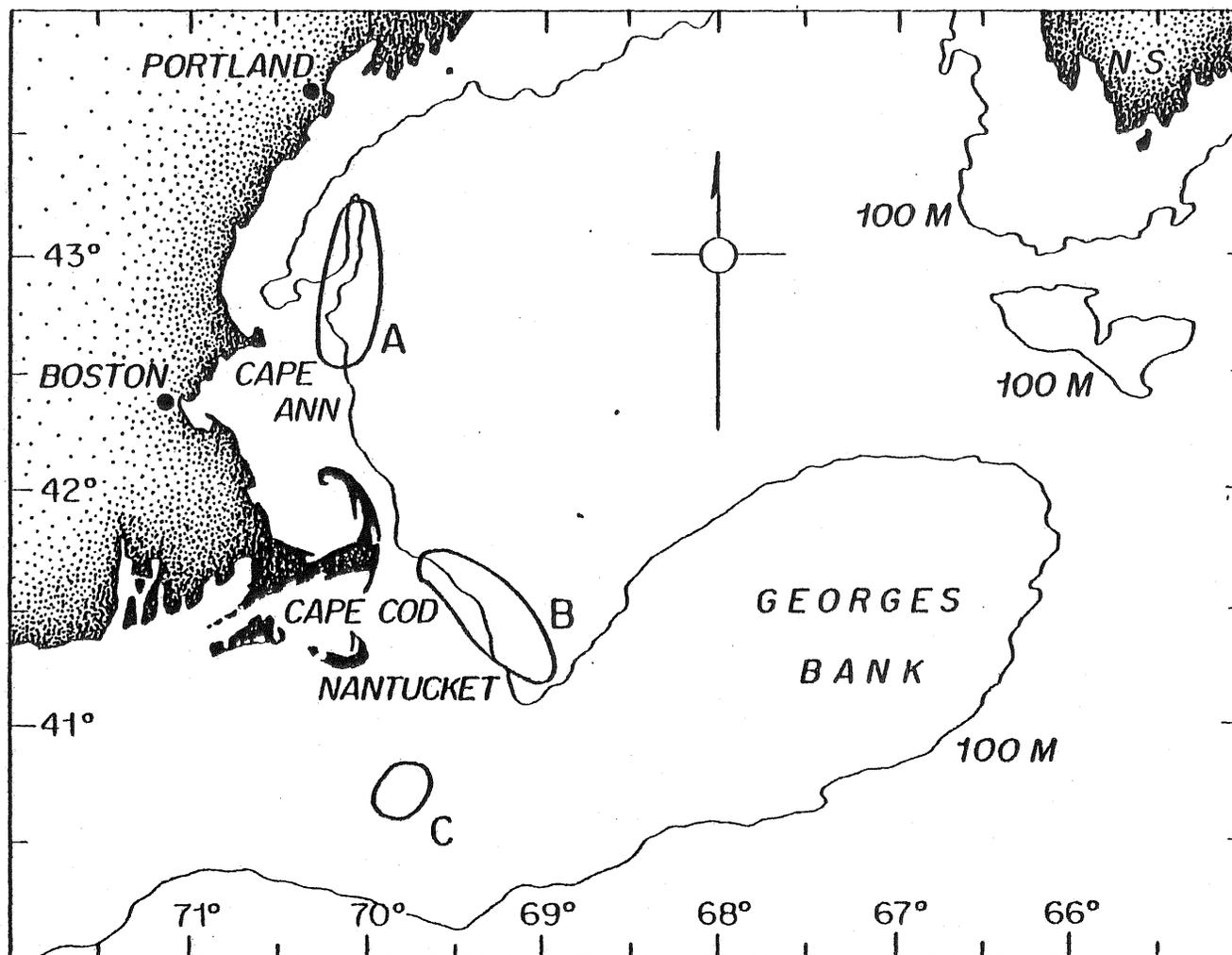


Figure 1. Locations (A, B, C) where fish and squid were collected for stomach contents analysis in November of 1976. Large quantities of the gammarid amphipod, Gammarus annulatus were eaten by predators sampled at Area C.

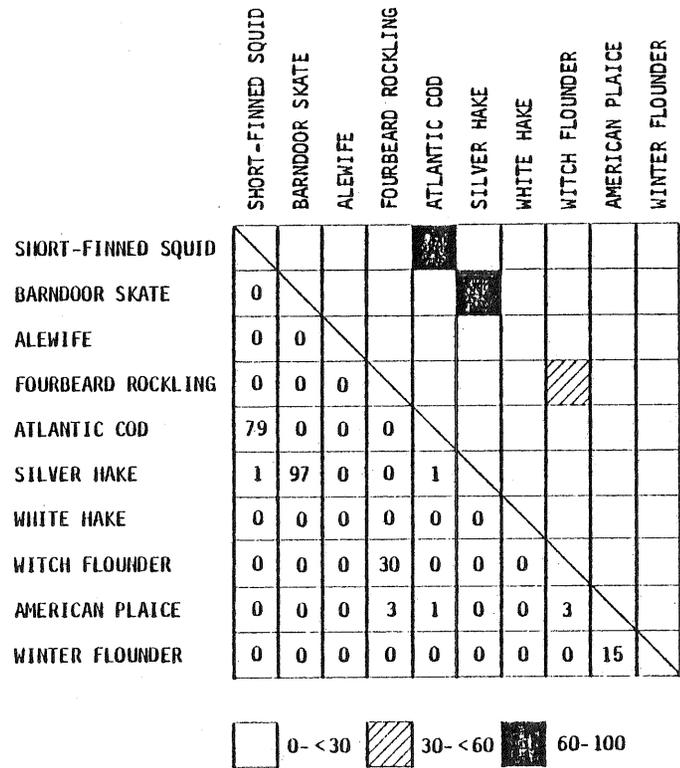
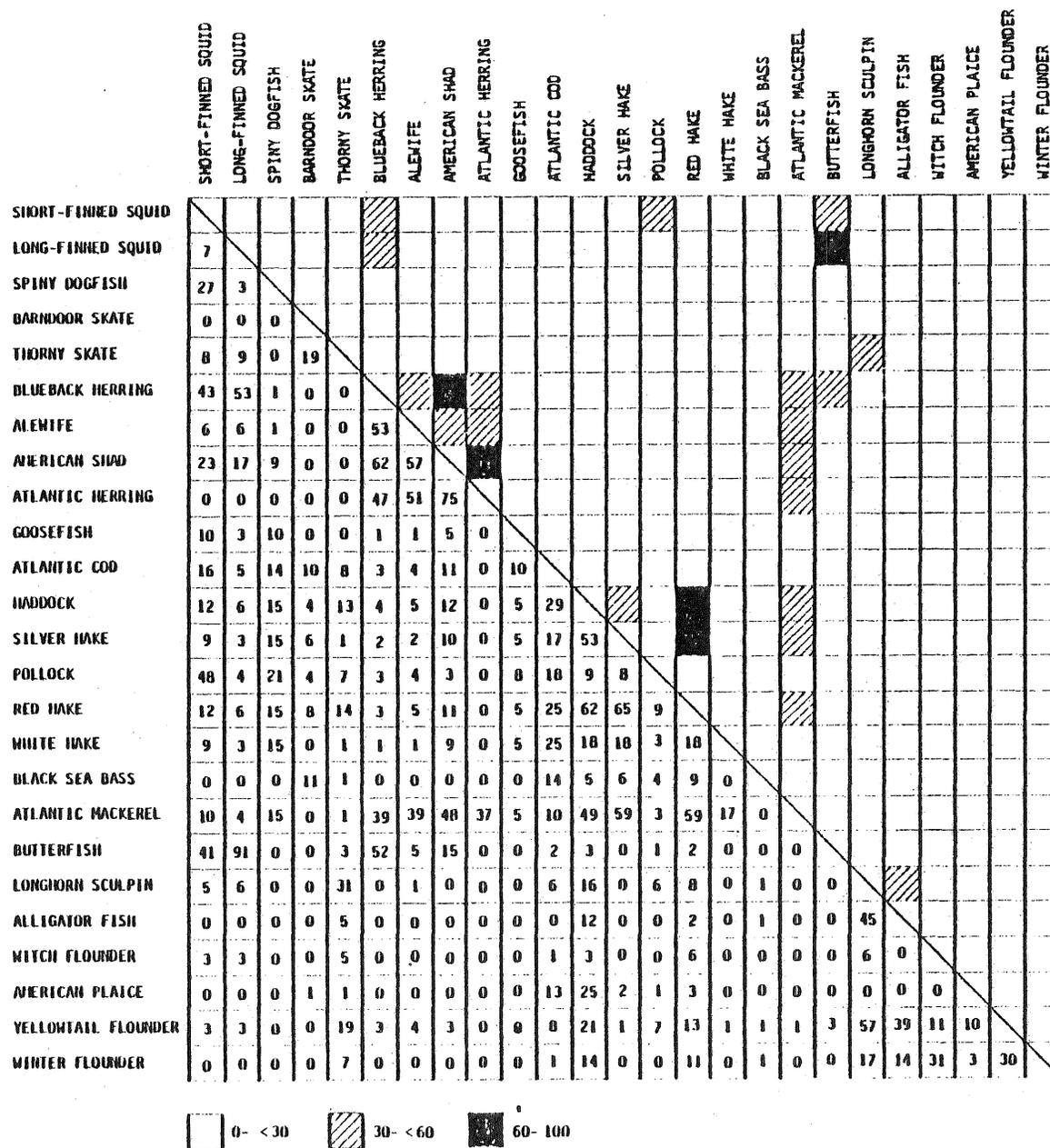


Figure 2. Percentage similarity between the diet of 10 predators gathered off Cape Ann, Massachusetts (Area A) in November 1976. For calculation see text. Open boxes = 0 to 30%; ruled boxes = 30 to 60%; solid boxes = 60 to 100%.



0- <30    
 30- <60    
 60- 100

Figure 3. Percentage similarity between the diet of 25 predators sampled from the waters off Cape Cod, Massachusetts (Area B) in November 1976. For calculation methods see text. Open boxes = 0 to 30%; ruled boxes = 30 to 60%; solid boxes = 60 to 100%.

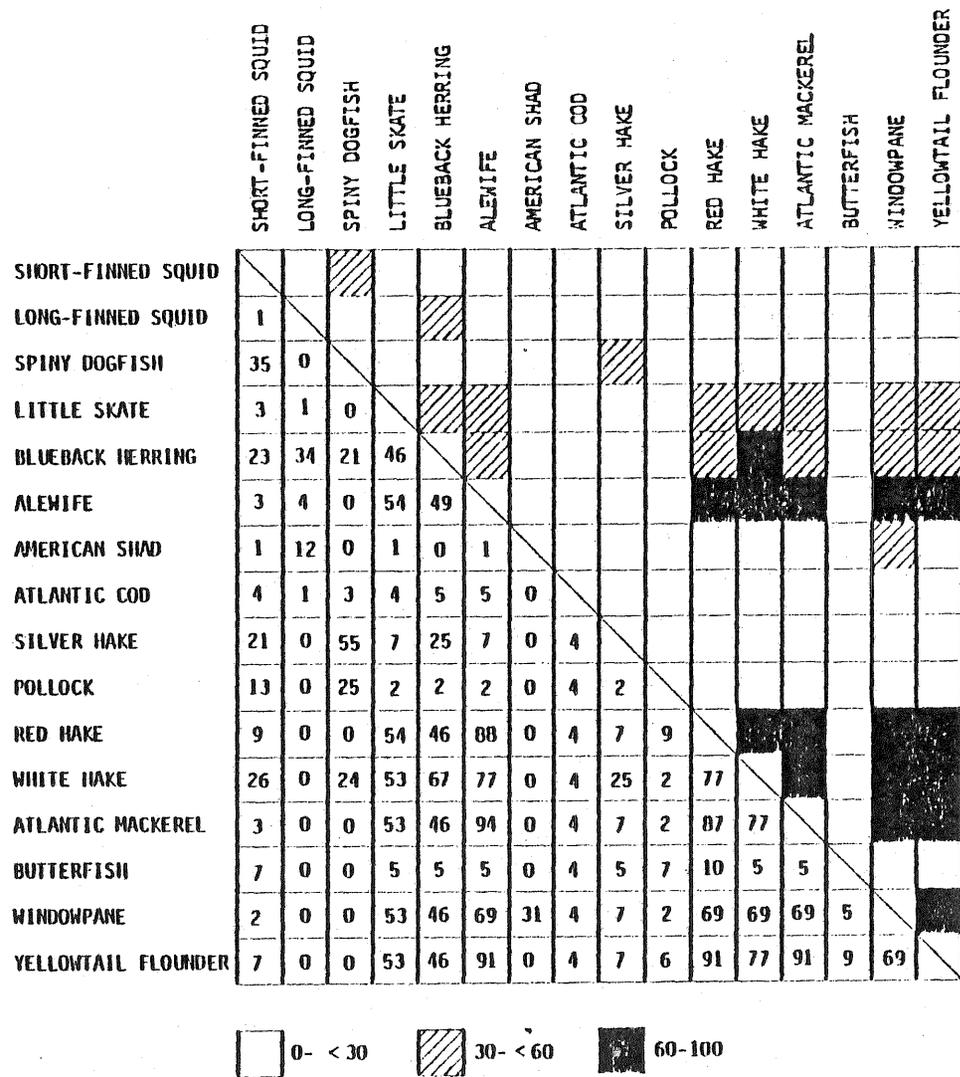


Figure 4. Diet overlap expressed as a percentage similarity for 16 predators sampled from waters off Nantucket, Massachusetts (Area C) in November 1976. For calculation methods see text. Open boxes = 0 to 30%; ruled boxes = 30 to 60%; solid boxes = 60 to 100%.

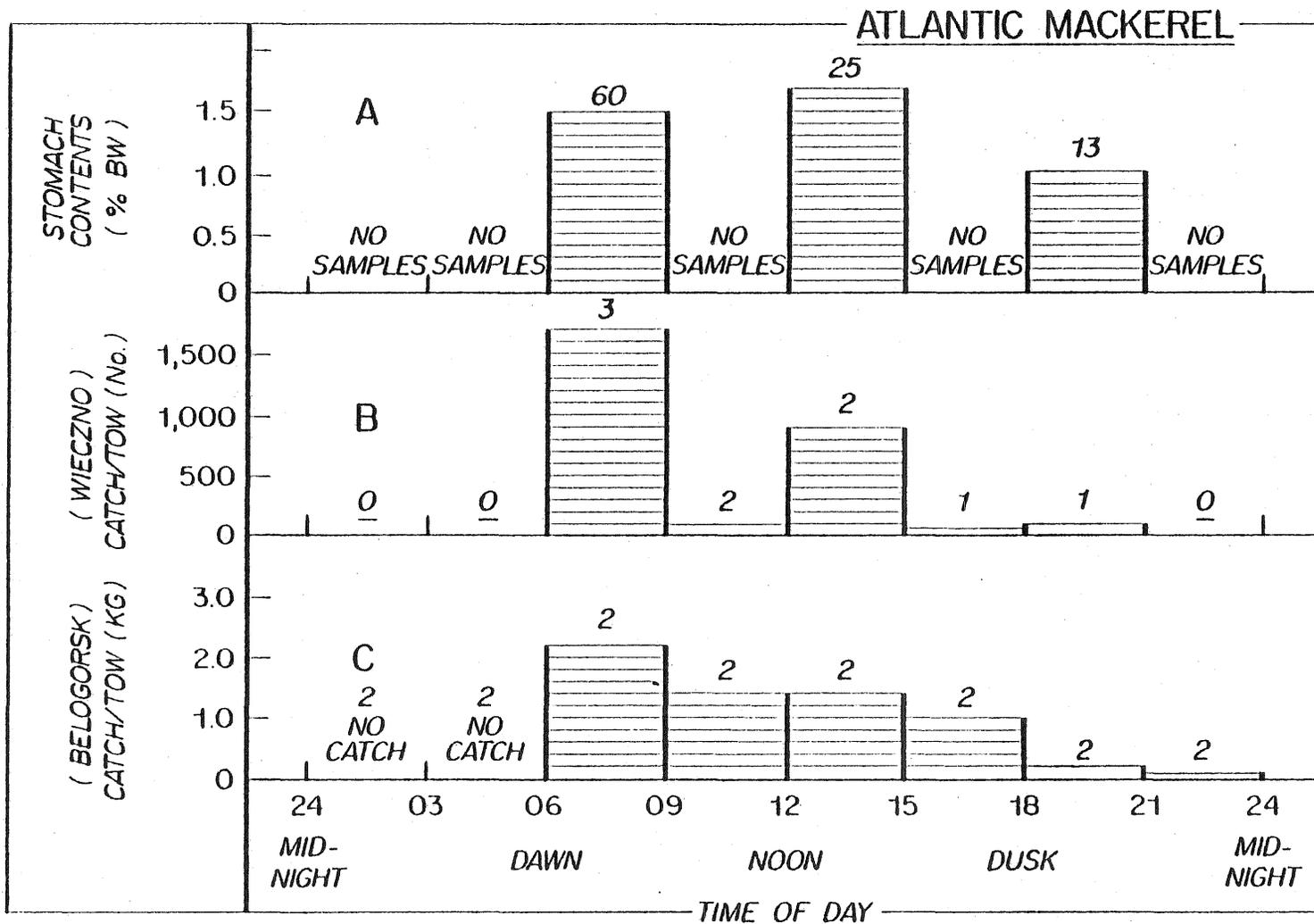


Figure 5. Mean stomach content weight expressed in terms of percentage body weight (A), and mean catch per tow, expressed in terms of number (B) and weight (C) versus time of day for Atlantic mackerel. The number of fish sampled in each time period is given just above the histogram in A; the number of tows in each time period is given above the histograms in B and C. Data presented in C were taken from Bowman (1980).

Appendix Table 1. Stomach contents of short-finned squid, *Illex illecebrosus* (LeSueur).

Stomach contents	AREA A		AREA B		AREA C		Total
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight
Polychaeta	-	-	<u>0.2</u>	-	<u>0.6</u>	-	<u>0.4</u>
Unidentified Nereidae	-	-	-	-	0.6	5.9	0.3
Unidentified Polychaeta	-	-	0.2	2.9	-	-	0.1
Crustacea	<u>&lt;0.1</u>	-	<u>4.5</u>	-	<u>2.9</u>	-	<u>2.3</u>
<i>Gammarus annulatus</i>	-	-	-	-	2.0	11.8	0.9
Unidentified Crustacea	<0.1	14.3	4.5	11.8	0.9	11.8	1.4
Cephalopoda	<u>73.3</u>	-	<u>44.1</u>	-	<u>1.1</u>	-	<u>32.0</u>
Unidentified Teuthidida	-	-	6.9	2.9	-	-	1.7
Unidentified Cephalopoda	73.3	28.6	37.2	20.6	1.1	5.9	30.3
Pisces	<u>5.3</u>	28.6	<u>8.4</u>	11.8	<u>82.4</u>	23.5	<u>42.3</u>
Animal remains	<u>20.0</u>	42.9	<u>41.3</u>	44.1	<u>12.2</u>	41.2	<u>21.9</u>
Cestoda	<u>1.4</u>	71.4	<u>1.5</u>	44.1	<u>0.8</u>	64.7	<u>1.1</u>
Nematoda	-	-	<u>&lt;0.1</u>	2.9	-	-	<u>&lt;0.1</u>

Number of specimens examined	7	34	17	58
Number of empty stomachs	0	5	2	7
Mean stomach content weight(g)	6.957	1.292	4.836	3.014
Mean fish length (cm)	26.9	25.3	26.5	25.8
Length range (cm)	26-28	13-29	23-29	13-29

Appendix Table 2. Stomach contents of long-finned squid, *Loligo pealei* (LeSueur).

Stomach contents	AREA A		AREA B		AREA C		Total
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight
Crustacea	-	-	5.9	-	100.0	-	15.6
Unidentified Gammaridea	-	-	-	-	47.6	60.0	4.9
Other Crustacea	-	-	5.9	17.2	54.4	40.0	10.7
Pisces	-	-	2.7	3.4	-	-	2.4
Animal remains	-	-	<u>91.4</u>	75.9	-	-	<u>82.0</u>
Number of specimens examined	-	-	-	29	-	5	34
Number of empty stomachs	-	-	-	3	-	0	3
Mean stomach content weight(g)	-	-	-	1.045	-	0.690	1.022
Mean fish length (cm)	-	-	-	10.9	-	19.4	12.1
Length range (cm)	-	-	-	6-16	-	15-24	6-24

Appendix Table 3. Stomach contents of spiny dogfish, *Squalus acanthias* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	-	-	4.9	-	1.0
<i>Gammarus annulatus</i>	-	-	-	-	<0.1	10.0	<0.1
Unidentified Paguridae	-	-	-	-	4.9	10.0	1.0
Cephalopoda	-	-	18.6	-	25.0	-	20.0
Unidentified Teuthidida	-	-	18.6	12.5	25.0	10.0	20.0
Pisces	-	-	81.4	-	70.1	-	79.0
Unidentified Clupeiformes	-	-	66.4	12.5	-	-	52.3
<i>Scomber scombrus</i>	-	-	-	-	36.6	10.0	7.8
Unidentified Pisces	-	-	15.0	12.5	33.5	30.0	18.9
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Number of specimens examined	-	-	16	-	10	-	26
Number of empty stomachs	-	-	10	-	5	-	15
Mean stomach content weight(g)	-	-	36.731	-	15.808	-	28.684
Mean fish length (cm)	-	-	76.8	-	79.3	-	77.7
Length range (cm)	-	-	64-101	-	77-83	-	64-101

Appendix Table 4. Stomach contents of little skate, *Raja erinacea* (Mitchill).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	-	-	<u>1.6</u>	-	<u>1.6</u>
<i>Nephtys caeca</i>	-	-	-	-	0.8	16.7	0.8
Unidentified Nephtyidae	-	-	-	-	0.8	16.7	0.8
Crustacea	-	-	-	-	<u>54.6</u>	-	<u>54.6</u>
<i>Gammarus annulatus</i>	-	-	-	-	52.8	100.0	52.8
<i>Crangon septemspinosus</i>	-	-	-	-	0.7	50.0	0.7
Unidentified Decapoda	-	-	-	-	0.3	16.7	0.3
Unidentified Crustacea	-	-	-	-	0.8	16.7	0.8
Mollusca	-	-	-	-	<u>43.5</u>	-	<u>43.5</u>
Unidentified Pectinidae (viscera)	-	-	-	-	36.2	50.0	36.2
Unidentified Pelecypoda	-	-	-	-	7.3	33.3	7.3
Bryozoa	-	-	-	-	<u>&lt;0.1</u>	16.7	<u>&lt;0.1</u>
Hydrozoa	-	-	-	-	<u>0.3</u>	16.7	<u>0.3</u>
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Number of specimens examined	-	-	-	-	-	6	6
Number of empty stomachs	-	-	-	-	-	0	0
Mean stomach content weight(g)	-	-	-	-	-	1.217	1.217
Mean fish length (cm)	-	-	-	-	-	50.3	50.3
Length range (cm)	-	-	-	-	-	48-52	48-52

Appendix Table 5. Stomach contents of barndoor skate, *Raja laevis* (Mitchill).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	100.0	-	-	-	1.1
<i>Crangon septemspinosus</i>	-	-	18.5	100.0	-	-	0.4
<i>Dichelopandalus leptocerus</i>	-	-	81.5	100.0	-	-	1.7
Pisces	100.0	-	<0.1	-	-	-	97.9
<i>Clupea harengus</i>	100.0	100.0	-	-	-	-	97.9
Unidentified Pisces	-	-	<0.1	100.0	-	-	<0.1
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Number of specimens examined		1		1		-	2
Number of empty stomachs		0		0		-	0
Mean stomach content weight(g)		26.055		0.540		-	13.298
Mean fish length (cm)		112.0		88.0		-	100.0
Length range (cm)		112		88		-	88-112

Appendix Table 6. Stomach contents of winter skate, Raja ocellata (Mitchill).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Number of specimens examined	-	-	1	-	-	-	1
Number of empty stomachs	-	-	1	-	-	-	1
Mean stomach content weight(g)	-	-	0.000	-	-	-	0.000
Mean fish length (cm)	-	-	87.0	-	-	-	87.0
Length range (cm)	-	-	87	-	-	-	87

Appendix Table 7. Stomach contents of thorny skate, *Raja radiata* (Donovan).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	<u>2.2</u>	-	-	-	<u>2.2</u>
Unidentified Nereidae	-	-	0.1	20.0	-	-	0.1
Unidentified Polychaeta	-	-	2.1	60.0	-	-	2.1
Crustacea	-	-	<u>87.6</u>	-	-	-	<u>87.6</u>
<u>Ampelisca macrocephala</u>	-	-	1.9	20.0	-	-	1.9
<u>Byblis serrata</u>	-	-	0.2	20.0	-	-	0.2
<u>Unciola inermis</u>	-	-	4.0	20.0	-	-	4.0
<u>Unciola</u>	-	-	0.6	20.0	-	-	0.6
<u>Anonyx sarsi</u>	-	-	4.0	20.0	-	-	4.0
<u>Anonyx</u>	-	-	5.2	20.0	-	-	5.2
<u>Hippomedon serratus</u>	-	-	1.0	20.0	-	-	1.0
<u>Psammonyx noblis</u>	-	-	5.2	20.0	-	-	5.2
<u>Paroedicerus</u>	-	-	7.4	20.0	-	-	7.4
<u>Leptocheirus pinguis</u>	-	-	4.1	20.0	-	-	4.1
<u>Harpinia propingua</u>	-	-	0.4	20.0	-	-	0.4
<u>Rhachotropis aculata</u>	-	-	0.2	20.0	-	-	0.2
Unidentified Oedicerotidae	-	-	0.4	20.0	-	-	0.4
Unidentified Gammaridea	-	-	7.0	40.0	-	-	7.0
<u>Crangon septemspinosa</u>	-	-	27.2	20.0	-	-	27.2
Unidentified Crangonidae	-	-	1.8	20.0	-	-	1.8
Unidentified Cumacea	-	-	<0.1	20.0	-	-	<0.1
Unidentified Crustacea	-	-	17.0	60.0	-	-	17.0
Animal remains	-	-	<u>3.0</u>	20.0	-	-	<u>3.0</u>
Sand	-	-	<u>7.2</u>	20.0	-	-	<u>7.2</u>
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Number of specimens examined	-	-	-	5	-	-	5
Number of empty stomachs	-	-	-	0	-	-	0
Mean stomach content weight(g)	-	-	-	0.180	-	-	0.180
Mean fish length (cm)	-	-	-	19.4	-	-	19.4
Length range (cm)	-	-	-	14-25	-	-	14-25

Appendix Table 8. Stomach contents of blueback herring, *Alosa aestivalis* (Mitchill).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	<u>47.0</u>	-	<u>79.4</u>	-	<u>59.1</u>
<i>Gammarus annulatus</i>	-	-	-	-	45.9	66.7	17.2
Unidentified Gammaridea	-	-	-	-	33.5	66.7	12.6
Unidentified Hyperiidea	-	-	0.5	33.3	-	-	0.3
Unidentified Calanoida	-	-	41.7	83.3	-	-	26.0
Unidentified Copepoda	-	-	4.8	16.7	-	-	3.0
Unidentified Crustacea	-	-	-	-	<0.1	33.3	<0.1
Cephalopoda	-	-	<0.1	16.7	-	-	<0.1
Pisces	-	-	<u>1.2</u>	16.7	<u>20.6</u>	33.3	<u>8.5</u>
Animal remains	-	-	<u>51.8</u>	50.0	<u>&lt;0.1</u>	33.3	<u>32.4</u>
Trematoda	-	-	<u>&lt;0.1</u>	16.7	-	-	<u>&lt;0.1</u>
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Number of specimens examined	-	-	-	6	-	3	9
Number of empty stomachs	-	-	-	0	-	0	0
Mean stomach content weight(g)	-	-	-	0.135	-	0.162	0.144
Mean fish length (cm)	-	-	-	24.2	-	28.0	25.4
Length range (cm)	-	-	-	22-26	-	26-30	22-30

Appendix Table 9. Stomach contents of alewife, *Alosa pseudoharengus* (Wilson).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	-	-	<u>0.4</u>	-	<u>0.3</u>
Unidentified Flabelligeridae	-	-	-	-	0.4	5.0	0.3
Crustacea	<u>100.0</u>	-	<u>93.1</u>	-	<u>99.5</u>	-	<u>98.3</u>
<i>Gammarus annulatus</i>	-	-	-	-	94.1	80.0	77.1
<i>Unciola</i>	-	-	0.2	5.0	-	-	<0.1
Unidentified Gammaridea	-	-	<0.1	5.0	2.8	15.0	2.3
Parathemisto	100.0	50.0	36.7	10.0	-	-	6.9
Unidentified Hyperiidea	-	-	<0.1	10.0	-	-	<0.1
<i>Crangon septemspinosa</i>	-	-	-	-	1.9	5.0	1.6
Decapoda larvae	-	-	<0.1	5.0	-	-	<0.1
Unidentified Decapoda	-	-	5.2	10.0	-	-	0.9
Unidentified Calanoida	-	-	46.3	45.0	-	-	8.2
Unidentified Copepoda	-	-	4.7	10.0	-	-	0.8
Unidentified Crustacea	-	-	-	-	0.7	10.0	0.5
Pisces (scales)	-	-	0.9	10.0	-	-	0.2
Animals remains	-	-	5.0	20.0	0.1	5.0	1.0
Trematoda	-	-	<0.1	10.0	-	-	<0.1
Nematoda	-	-	<0.1	10.0	-	-	<0.1
Sand	-	-	1.0	5.0	-	-	0.2

Number of specimens examined	2	20	20	42
Number of empty stomachs	1	6	2	9
Mean stomach content weight(g)	0.032	0.131	0.609	0.329
Mean fish length (cm)	24.5	25.3	26.2	25.6
Length range (cm)	24-25	22-28	24-28	22-28

Appendix Table 10. Stomach contents of American shad, *Alosa sapidissima* (Wilson).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	<u>74.9</u>	-	<u>100.0</u>	-	<u>90.7</u>
<u>Gammarus annulatus</u>	-	-	-	-	0.2	33.3	0.1
<u>Parathemisto</u>	-	-	-	-	0.6	33.3	0.4
<u>Neomysis americana</u>	-	-	-	-	87.2	33.3	54.9
Unidentified Calanoida	-	-	74.9	75.0	-	-	27.7
Unidentified Crustacea	-	-	-	8.3	12.0	66.7	7.6
Chaetognatha	-	-	<u>1.2</u>	16.7	-	-	<u>0.4</u>
Pisces	-	-	<u>9.2</u>	-	-	-	<u>3.5</u>
Pisces eggs	-	-	-	1.0	-	-	0.4
Pisces scales	-	-	-	8.2	-	-	3.1
Animal remains	-	-	<u>14.7</u>	16.7	-	-	<u>5.4</u>
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Number of specimens examined	-	-	-	12	-	3	15
Number of empty stomachs	-	-	-	1	-	0	1
Mean stomach content weight(g)	-	-	-	0.296	-	2.017	0.640
Mean fish length(cm)	-	-	-	33.2	-	36.0	33.7
Length range (cm)	-	-	-	27-43	-	31-39	27-43

Appendix Table 11. Stomach contents of Atlantic herring, *Clupea harengus harengus* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	<u>100.0</u>	-	-	-	<u>100.0</u>
Unidentified Calanoida	-	-	100.0	100.0	-	-	100.0
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Number of specimens examined	-	-	1	-	-	-	1
Number of empty stomachs	-	-	0	-	-	-	0
Mean stomach content weight(g)	-	-	0.105	-	-	-	0.105
Mean fish length (cm)	-	-	29.0	-	-	-	29.0
Length range(cm)	-	-	29	-	-	-	29

Appendix Table 12. Stomach contents of goosefish, *Lophius americanus* (Valenciennes).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Cephalopoda	-	-	<u>5.9</u>	-	-	-	<u>5.9</u>
Loligo	-	-	5.9	25.0	-	-	5.9
Pisces	-	-	<u>94.1</u>	-	-	-	<u>94.1</u>
Unidentified Rajidae	-	-	79.5	25.0	-	-	79.5
Unidentified Pleuronectiformes	-	-	10.1	25.0	-	-	10.1
Unidentified Pisces	-	-	4.5	25.0	-	-	4.5
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Number of specimens examined	-	-	-	4	-	-	4
Number of empty stomachs	-	-	-	1	-	-	1
Mean stomach content weight(g)	-	-	-	660.033	-	-	660.033
Mean fish length (cm)	-	-	-	72.3	-	-	72.3
Length range (cm)	-	-	-	49-97	-	-	49-97

Appendix Table 13. Stomach contents of fourbeard rockling, *Enchelyopus cimbrius* (Linnaeus)

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	100.0	-	-	-	-	-	100.0
Nephtys	73.0	100.0	-	-	-	-	73.0
Unidentified Polychaeta	27.0	100.0	-	-	-	-	27.0
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Number of specimens examined		1		-		-	1
Number of empty stomachs		0		-		-	0
Mean stomach content weight(g)		0.200		-		-	0.200
Mean fish length (cm)		24.0		-		-	24.0
Length range (cm)		24		-		-	24

Appendix Table 14. Stomach contents of Atlantic cod, *Gadus morhua* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	0.5	-	6.8	-	2.6
<i>Aphrodita hastata</i>	-	-	-	-	6.7	20.0	2.4
Unidentified Nephthyidae	-	-	0.1	3.8	-	-	<0.1
Other Polychaeta	-	-	<0.1	11.5	-	-	<0.1
Unidentified Polychaeta	-	-	0.4	15.4	0.1	20.0	0.2
Crustacea	1.0	-	21.9	-	6.0	-	8.6
<i>Aeginina longicornis</i>	-	-	0.1	3.8	-	-	<0.1
<i>Unciola inermis</i>	-	-	0.2	7.7	-	-	<0.1
<i>Gammarus annulatus</i>	-	-	-	-	3.5	40.0	1.3
<i>Melita dentata</i>	-	-	0.1	7.7	-	-	<0.1
<i>Leptocheirus pinguis</i>	-	-	0.1	19.2	-	-	<0.1
Other Gammaridea	-	-	0.1	19.2	-	-	0.1
Unidentified Gammaridea	-	-	<0.1	7.7	1.3	20.0	0.5
<i>Cancer irroratus</i>	-	-	4.2	7.7	<0.1	20.0	1.2
<i>Crangon septemspinosus</i>	-	-	0.2	7.7	-	-	<0.1
Unidentified Hippolytidae	-	-	0.1	3.8	-	-	<0.1
<i>Lebbeus polaris</i>	-	-	0.4	3.8	-	-	0.1
<i>Hyas coarctatus</i>	-	-	1.3	3.8	-	-	0.4
<i>Pagurus pubescens</i>	-	-	4.3	15.4	-	-	1.2
<i>Pagurus acadianus</i>	-	-	-	-	1.2	20.0	0.4
Unidentified Paguridae	-	-	0.6	3.8	-	-	0.2
<i>Pandalus montagui</i>	-	-	5.8	3.8	-	-	1.6
<i>Dichelopandalus leptocerus</i>	-	-	3.7	26.9	-	-	1.1
Unidentified Decapoda	0.1	16.7	0.1	11.5	-	-	<0.1
<i>Meganocyttiphanes norvegica</i>	0.9	50.0	-	-	-	-	0.3
Unidentified Crustacea	-	-	0.6	23.1	-	-	0.2
Mollusca	91.8	-	38.0	-	14.6	-	48.7
Unidentified Pectinidae (viscera)	-	-	32.5	11.5	-	-	9.2
<i>Nassarius trivittatus</i>	-	-	-	-	12.9	20.0	4.7
Unidentified Gastropoda	-	-	0.4	3.8	-	-	0.1
<i>Illex illecebrosus</i>	91.1	16.7	-	-	-	-	32.4
Unidentified Cephalopoda	0.7	16.7	5.1	3.8	1.7	20.0	2.3
Echinodermata	-	-	9.6	-	-	-	2.7
<i>Ophiopholis aculeata</i>	-	-	9.5	11.5	-	-	2.7
Unidentified Ophiuroidea	-	-	0.1	7.7	-	-	<0.1
Pisces	7.2	-	23.8	-	71.9	-	35.3
Unidentified Gadidae	-	-	14.5	3.8	-	-	4.1
<i>Paralichthys dentatus</i>	-	-	-	-	71.9	20.0	26.0
Unidentified Pisces	7.2	50.0	9.3	23.1	-	-	5.2
Animal remains	-	-	1.7	30.8	0.5	20.0	0.8
Plant remains	-	-	-	-	0.1	20.0	<0.1
Sand and rock	-	-	4.5	11.5	0.1	20.0	1.3
Nematoda	-	-	<0.1	7.7	<0.1	60.0	<0.1
Trematoda	-	-	<0.1	11.5	-	-	<0.1
Number of specimens examined		6		26		5	37
Number of empty stomachs		0		2		1	3
Mean stomach content weight(g)		30.182		5.517		36.814	13.746
Mean fish length(cm)		75.7		49.3		84.6	58.3
Length range (cm)		49-95		20-83		64-104	20-104

Appendix Table 15. Stomach contents of haddock, *Melanogrammus aeglefinus* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	<u>3.7</u>	-	-	-	<u>3.7</u>
<i>Travisia</i>	-	-	0.1	3.4	-	-	0.1
Unidentified Aphroditidae	-	-	1.0	3.4	-	-	1.0
Unidentified Glyceridae	-	-	0.1	10.3	-	-	0.1
<i>Phyllodoce mucosa</i>	-	-	0.1	3.4	-	-	0.1
<i>Harmathoe</i>	-	-	0.1	3.4	-	-	0.1
Other Polychaeta	-	-	0.1	13.8	-	-	0.1
Unidentified Polychaeta	-	-	2.2	37.9	-	-	2.2
Crustacea	-	-	<u>18.0</u>	-	-	-	<u>18.0</u>
<i>Erichthonius rubricornis</i>	-	-	0.3	34.5	-	-	0.3
<i>Unciola inermis</i>	-	-	11.3	24.1	-	-	11.3
<i>Leptocheirus pinguis</i>	-	-	0.2	20.7	-	-	0.2
Other Gammaridea	-	-	0.1	17.2	-	-	0.1
Unidentified Gammaridea	-	-	0.9	24.1	-	-	0.9
<i>Crangon septemspinosus</i>	-	-	0.1	3.4	-	-	0.1
<i>Pagurus pubescens</i>	-	-	1.1	3.4	-	-	1.1
<i>Pagurus acadianus</i>	-	-	0.1	3.4	-	-	0.1
<i>Dichelopandalus leptoceras</i>	-	-	3.5	17.2	-	-	3.5
Other Decapoda	-	-	<0.1	3.4	-	-	<0.1
Unidentified Decapoda	-	-	0.1	10.3	-	-	0.1
Other Crustacea	-	-	<0.1	13.8	-	-	<0.1
Unidentified Crustacea	-	-	0.3	13.8	-	-	0.3
Mollusca	-	-	<u>0.3</u>	-	-	-	<u>0.3</u>
Unidentified Gastropoda	-	-	0.1	6.9	-	-	0.1
Other Mollusca	-	-	<0.1	17.2	-	-	<0.1
Unidentified Mollusca	-	-	0.2	3.4	-	-	0.2
Echinodermata	-	-	<u>24.7</u>	-	-	-	<u>24.7</u>
<i>Strongylocentrosus drobachiensis</i>	-	-	0.1	3.4	-	-	0.1
<i>Echinarachnius parma</i>	-	-	0.6	3.4	-	-	0.6
<i>Ophiopholis aculeata</i>	-	-	10.7	10.3	-	-	10.7
<i>Ophiura sarsi</i>	-	-	12.6	17.2	-	-	12.6
Unidentified Ophiuroidea	-	-	0.2	17.2	-	-	0.2
Unidentified Echinodermata	-	-	0.5	3.4	-	-	0.5
Pisces	-	-	<u>48.3</u>	6.9	-	-	<u>48.3</u>
Animal remains	-	-	<u>2.8</u>	31.0	-	-	<u>3.2</u>
Sand	-	-	<u>1.8</u>	17.2	-	-	<u>1.8</u>
Number of specimens examined	-	-	-	29	-	-	29
Number of empty stomachs	-	-	-	0	-	-	0
Mean stomach content weight(g)	-	-	-	3.858	-	-	3.858
Mean fish length (cm)	-	-	-	34.3	-	-	34.3
Length range (cm)	-	-	-	9-68	-	-	9-68

Appendix Table 16. Stomach contents of silver hake, *Merluccius bilinearis* (Mitchill).

Stomach contents	AREA A		AREA B		AREA C		Total	
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	
Crustacea	0.4	-	10.2	-	6.8	-	3.2	
<i>Gammarus annulatus</i>	-	-	-	-	6.5	35.3	0.4	
Parathemisto	<0.1	14.3	<0.1	8.8	-	-	<0.1	
<i>Hippomedon serratus</i>	-	-	<0.1	1.5	-	-	<0.1	
Unidentified <i>Dedicerotidae</i>	-	-	<0.1	1.5	-	-	<0.1	
Unidentified <i>Trionidae</i>	-	-	<0.1	2.9	-	-	<0.1	
<i>Crangon septemspinosus</i>	-	-	0.2	2.9	0.1	23.5	0.1	
<i>Pagurus pubescens</i>	-	-	0.3	1.5	-	-	0.1	
<i>Dichelopandalus leptocerus</i>	-	-	6.2	20.6	-	-	1.5	
<i>Meganyctiphanes norvegica</i>	-	-	2.9	7.4	-	-	0.7	
Unidentified <i>Euphausiacea</i>	0.3	42.9	0.1	5.9	-	-	0.1	
<i>Calanus</i>	-	-	0.3	1.5	-	-	0.1	
Unidentified <i>Calanoida</i>	-	-	<0.1	1.5	-	-	<0.1	
Unidentified Crustacea	0.1	14.3	0.2	10.3	0.2	5.9	0.2	
Cephalopoda	-	-	-	-	<0.1	5.9	<0.1	
Chaetognatha	-	-	<0.1	2.9	-	-	<0.1	
Pisces	99.6	-	89.6	-	93.2	-	96.8	
Unidentified <i>Clupeidae</i>	97.4	14.3	-	-	-	-	19.4	
<i>Merluccius bilinearis</i>	1.7	14.3	1.0	2.9	-	-	0.6	
<i>Anmodytes americanus</i>	-	-	20.9	1.5	-	-	5.1	
<i>Scomber scombrus</i>	-	-	-	-	74.7	11.8	44.2	
Unidentified Pisces	0.5	14.3	67.0	7.4	18.5	23.5	27.5	
Animal remains	-	-	0.2	4.4	-	-	<0.1	
Nematoda	-	-	<0.1	1.5	-	-	<0.1	
Number of specimens examined		7		68		17		92
Number of empty stomachs		1		24		2		27
Mean stomach content weight(g)		15.056		1.890		18.241		5.946
Mean fish length (cm)		30.1		26.8		41.9		29.8
Length range (cm)		16-49		6-59		28-57		6-59

Appendix Table 17. Stomach contents of pollock, *Pollachius virens* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	<u>0.3</u>	-	-	-	<u>0.2</u>
Unidentified Polynoidea	-	-	0.3	5.6	-	-	0.2
Crustacea	-	-	<u>5.1</u>	-	<u>2.3</u>	-	<u>4.8</u>
<i>Gammarus annulatus</i>	-	-	-	-	1.8	100.0	0.1
Unidentified Gammaridea	-	-	<0.1	5.6	-	-	<0.1
Parathemisto	-	-	0.3	50.0	-	-	0.2
Unidentified Hyperidea	-	-	<0.1	5.6	-	-	<0.1
<i>Crangon septemspinosa</i>	-	-	0.2	11.1	-	-	0.2
<i>Dichelopandalus leptocerus</i>	-	-	4.1	38.9	-	-	3.8
<i>Idotea baltica</i>	-	-	-	-	0.3	100.0	<0.1
<i>Idotea metallica</i>	-	-	-	-	0.1	100.0	<0.1
<i>Meganyctiphanes norvegica</i>	-	-	0.3	38.9	-	-	0.3
Unidentified Euphausiacea	-	-	<0.1	5.6	-	-	<0.1
Unidentified Crustacea	-	-	0.2	16.7	0.1	100.0	0.2
Mollusca	-	-	<u>83.9</u>	-	<u>87.6</u>	-	<u>84.2</u>
<i>Clione limacina</i>	-	-	0.5	44.4	-	-	0.5
Unidentified Pteropoda	-	-	<0.1	11.1	-	-	<0.1
<i>Loligo pealei</i>	-	-	10.1	11.1	87.6	100.0	15.4
<i>Illex</i>	-	-	72.5	5.6	-	-	67.6
Unidentified Cephalopoda	-	-	0.8	11.1	-	-	0.7
Pisces	-	-	<u>2.6</u>	-	-	-	<u>2.4</u>
<i>Maurolicus pennanti</i>	-	-	0.1	5.6	-	-	0.1
<i>Merluccius bilinearis</i>	-	-	0.4	11.1	-	-	0.4
Unidentified Pisces	-	-	2.1	22.2	-	-	1.9
Animal remains	-	-	<u>1.2</u>	38.9	<u>9.9</u>	100.0	<u>2.0</u>
Rock	-	-	<u>5.6</u>	5.6	-	-	<u>5.2</u>
Feather	-	-	-	-	<u>0.2</u>	100.0	<u>&lt;0.1</u>
Nematoda	-	-	<u>1.3</u>	5.6	-	-	<u>1.2</u>
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Number of specimens examined	-	-	-	18	-	1	19
Number of empty stomachs	-	-	-	1	-	0	1
Mean stomach content weight(g)	-	-	-	13.823	-	18.236	14.055
Mean fish length(cm)	-	-	-	80.2	-	106.0	81.6
Length range (cm)	-	-	-	60-105	-	106	60-106

Appendix Table 18. Stomach contents of red hake, Urophycis chuss (Walbaum).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
<u>Polychaeta</u>	-	-	<u>11.9</u>	-	-	-	<u>7.4</u>
<u>Euinca pennata</u>	-	-	1.4	7.7	-	-	0.9
Unidentified Goniadidae	-	-	0.1	7.7	-	-	0.1
<u>Phyllodoce groenlandica</u>	-	-	4.2	7.7	-	-	2.6
<u>Phyllodoce mucosa</u>	-	-	1.5	15.4	-	-	0.9
Unidentified Terebellidae	-	-	1.0	7.7	-	-	0.6
Unidentified Polychaeta	-	-	3.7	23.1	-	-	2.3
<u>Crustacea</u>	-	-	<u>27.6</u>	-	<u>93.0</u>	-	<u>52.8</u>
<u>Aeginina longicornis</u>	-	-	0.3	7.7	-	-	0.2
Unidentified Caprellidea	-	-	<0.1	15.4	-	-	<0.1
<u>Amplisca agassizi</u>	-	-	<0.1	7.7	-	-	<0.1
<u>Erichthonius rubicornis</u>	-	-	<0.1	23.1	-	-	<0.1
<u>Erichthonius</u>	-	-	<0.1	7.7	-	-	<0.1
<u>Unciola inermis</u>	-	-	0.7	23.1	-	-	0.4
<u>Unciola irrorata</u>	-	-	1.6	38.5	-	-	1.0
<u>Gammarus annulatus</u>	-	-	-	-	86.4	100.0	33.2
Unidentified Lysianassidae	-	-	0.1	15.4	-	-	0.1
<u>Leptocheirus pinguis</u>	-	-	10.3	61.5	-	-	6.3
Unidentified Gammaridea	-	-	0.5	15.4	-	-	0.3
<u>Parathemisto</u>	-	-	<0.1	7.7	-	-	<0.1
Unidentified Cancridae	-	-	0.4	7.7	-	-	0.3
<u>Crangon septemspinosus</u>	-	-	0.3	7.7	1.9	66.7	0.9
<u>Pagurus acadianus</u>	-	-	0.9	7.7	-	-	0.6
Unidentified Paguridae	-	-	2.1	15.4	-	-	1.3
<u>Dichelopandalus leptocerus</u>	-	-	7.8	30.8	4.7	33.3	6.6
Unidentified Decapoda	-	-	0.9	15.4	-	-	0.5
Unidentified Isopoda	-	-	<0.1	7.7	-	-	<0.1
Unidentified Crustacea	-	-	1.7	23.1	-	-	1.1
Mollusca	-	-	<0.1	7.7	-	-	<0.1
Echinodermata	-	-	<0.1	7.7	-	-	<0.1
Pisces	-	-	<u>57.6</u>	30.8	-	-	<u>35.5</u>
Animal remains	-	-	1.8	30.8	7.0	33.3	3.6
Sand	-	-	0.9	15.4	-	-	0.6
Trematoda	-	-	0.2	23.1	-	-	0.1
Number of specimens examined	-	-	-	13	-	3	16
Number of empty stomachs	-	-	-	0	-	0	0
Mean stomach content weight(g)	-	-	-	1.529	-	4.128	2.017
Mean fish length (cm)	-	-	-	35.1	-	39.3	35.9
Length range (cm)	-	-	-	11-45	-	37-43	11-45

Appendix Table 19. Stomach contents of white hake, *Urophycis tenuis* (Mitchill).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	<u>0.1</u>	-	-	-	<u>0.1</u>
<i>Phyllodoce mucosa</i>	-	-	<0.1	9.1	-	-	<0.1
Unidentified Phyllodocidae	-	-	0.1	9.1	-	-	0.1
Crustacea	<u>100.0</u>	-	<u>0.5</u>	-	<u>76.5</u>	-	<u>2.0</u>
<i>Unciola inermis</i>	-	-	<0.1	9.1	-	-	<0.1
<i>Gammarus annulatus</i>	-	-	-	-	76.5	100.0	0.1
<i>Gammarus macronatus</i>	-	-	<0.1	9.1	-	-	<0.1
<i>Anonyx sarsi</i>	-	-	<0.1	9.1	-	-	<0.1
<i>Leptocheirus pinguis</i>	-	-	<0.1	9.1	-	-	<0.1
<i>Crangon septemspinosus</i>	-	-	0.1	9.1	-	-	0.1
<i>Dichelopandalus leptocerus</i>	-	-	0.3	18.2	-	-	0.3
Unidentified Pandalidae	100.0	100.0	-	-	-	-	1.4
Unidentified Crustacea	-	-	0.1	9.1	-	-	0.1
Pisces	-	-	<u>99.2</u>	-	<u>23.5</u>	-	<u>97.7</u>
<i>Merluccius bilinearis</i>	-	-	0.1	9.1	-	-	0.1
Unidentified Gadidae	-	-	81.8	9.1	-	-	80.5
Unidentified Pisces	-	-	17.3	27.3	23.5	100.0	17.1
Animal remains	-	-	<0.1	9.1	-	-	<0.1
Sand	-	-	<u>0.2</u>	9.1	-	-	<u>0.2</u>
Nematoda	-	-	<0.1	9.1	-	-	<0.1

Number of specimens examined	1	11	1	13
Number of empty stomachs	0	3	0	3
Mean stomach content weight(g)	6.271	40.472	0.812	34.791
Mean fish length (cm)	48.0	52.1	50.0	51.6
Length range (cm)	48	28-67	50	28-67

Appendix Table 20. Stomach contents of black sea bass, *Centropristis striata* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	<u>37.0</u>	-	-	-	<u>37.0</u>
<i>Unciola irrorata</i>	-	-	0.9	100.0	-	-	0.9
<i>Cancer irroratus</i>	-	-	25.2	100.0	-	-	25.2
<i>Dichelopandalus leptocerus</i>	-	-	10.9	100.0	-	-	10.9
Mollusca	-	-	<u>63.0</u>	100.0	-	-	<u>63.0</u>
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Number of specimens examined	-	-	1	-	-	-	1
Number of empty stomachs	-	-	0	-	-	-	0
Mean stomach content weight(g)	-	-	1.509	-	-	-	1.509
Mean fish length (cm)	-	-	33.0	-	-	-	33.0
Length range (cm)	-	-	33	-	-	-	33

Appendix Table 21. Stomach contents of Atlantic wolffish, *Anarhichas lupus* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Number of specimens examined	-	-	1	-	-	-	1
Number of empty stomachs	-	-	1	-	-	-	1
Mean stomach content weight(g)	-	-	0.000	-	-	-	0.000
Mean fish length (cm)	-	-	98.0	-	-	-	98.0
Length range (cm)	-	-	98	-	-	-	98

Appendix Table 22. Stomach contents of Atlantic mackerel, *Scomber scombrus* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	36.5	-	99.6	-	98.3
<i>Gammarus annulatus</i>	-	-	-	-	99.5	94.9	97.5
<i>Gammarus</i>	-	-	-	-	<0.1	1.0	<0.1
Unidentified Hyperiidea	-	-	<0.1	15.4	-	-	<0.1
<i>Crangon septemspinosa</i>	-	-	-	-	<0.1	4.1	<0.1
Decapoda larvae	-	-	<0.1	7.7	-	-	<0.1
Unidentified Decapoda	-	-	-	-	<0.1	1.0	<0.1
<i>Neomysis americana</i>	-	-	-	-	<0.1	1.0	<0.1
Unidentified Mysidacea	-	-	-	-	<0.1	1.0	<0.1
Unidentified Calanoida	-	-	31.0	92.3	<0.1	3.1	0.6
Unidentified Copepoda	-	-	5.5	7.7	<0.1	1.0	0.1
Unidentified Crustacea	-	-	-	-	0.1	2.0	0.1
Chaetognatha	-	-	4.1	15.4	-	-	0.1
Hydrozoa	-	-	-	-	<0.1	4.1	<0.1
Bryozoa	-	-	-	-	<0.1	5.1	<0.1
Pisces	-	-	58.3	-	0.1	-	1.3
Pisces bones	-	-	-	-	<0.1	1.0	<0.1
Pisces scales	-	-	58.3	69.2	0.1	16.3	1.3
Animal remains	-	-	1.1	15.4	0.3	3.1	0.3
Nematoda	-	-	-	-	<0.1	5.1	<0.1
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Number of specimens examined	-	-	13	-	98	-	111
Number of empty stomachs	-	-	0	-	2	-	2
Mean stomach content weight(g)	-	-	0.060	-	5.642	-	5.082
Mean fish length (cm)	-	-	36.2	-	33.0	-	33.4
Length range (cm)	-	-	32-38	-	26-39	-	26-39

Appendix Table 23. Stomach contents of butterflyfish, *Peprilus triacanthus* (Peck).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	-	-	4.6	-	2.7
<i>Gammarus annulatus</i>	-	-	-	-	4.6	12.5	2.7
Salpida	-	-	-	-	90.2	12.5	52.7
Animal remains	-	-	100.0	28.5	5.2	12.5	44.6
Nematoda	-	-	-	-	<0.1	12.5	<0.1
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Number of specimens examined	-	-	14	-	8	-	22
Number of empty stomachs	-	-	10	-	6	-	16
Mean stomach content weight(g)	-	-	0.030	-	0.073	-	0.045
Mean fish length (cm)	-	-	15.9	-	21.1	-	18.3
Length range (cm)	-	-	6-20	-	14-24	-	6-24

Appendix Table 24. Stomach contents of sea raven, *Hemitripteris americanus* (Gmelin).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Number of specimens examined	-	-	-	-	1	-	1
Number of empty stomachs	-	-	-	-	1	-	1
Mean stomach content weight(g)	-	-	-	-	0.000	-	0.000
Mean fish length (cm)	-	-	-	-	27.0	-	27.0
Length range (cm)	-	-	-	-	27	-	27

Appendix Table 25. Stomach contents of longhorn sculpin, *Myoxocephalus octodecemspinosus* (Mitchill).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	3.4	33.3	-	-	3.4
Crustacea	-	-	72.5	-	-	-	72.5
<u>Ericthonius rubicornius</u>	-	-	10.3	33.3	-	-	10.3
<u>Ericthonius</u>	-	-	3.4	33.3	-	-	3.4
<u>Unciola lrorata</u>	-	-	31.0	33.3	-	-	31.0
Unidentified Crustacea	-	-	27.8	33.3	-	-	27.8
Sand	-	-	24.1	33.3	-	-	24.1
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Number of specimens examined	-	-	-	3	-	-	3
Number of empty stomachs	-	-	-	0	-	-	0
Mean stomach content weight(g)	-	-	-	0.010	-	-	0.010
Mean fish length (cm)	-	-	-	16.7	-	-	16.7
Length range (cm)	-	-	-	8-29	-	-	8-29

Appendix Table 26. Stomach contents of alligatorfish, *Aspidophoroides monoptyerygius* (Bloch).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	100.0	-	-	-	100.0
<i>Ericthonius rubicornis</i>	-	-	100.0	100.0	-	-	100.0

Number of specimens examined	-	1	-	1
Number of empty stomachs	-	0	-	0
Mean stomach content weight (g)	-	0.003	-	0.003
Mean fish length (cm)	-	8.0	-	8.0
Length range (cm)	-	8	-	8

Appendix Table 27. Stomach contents of windowpane, Scophthalmus aquosus (Mitchill).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Crustacea	-	-	-	-	<u>99.3</u>	-	<u>99.3</u>
<u>Gammarus annulatus</u>	-	-	-	-	69.0	100.0	69.0
<u>Neomysis americana</u>	-	-	-	-	30.3	25.0	30.3
Pisces	-	-	-	-	<u>0.7</u>	-	<u>0.7</u>
<u>Scophthalmus aquosus</u>	-	-	-	-	0.7	25.0	0.7
Unidentified Pisces	-	-	-	-	<0.1	25.0	<0.1
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Number of specimens examined	-	-	-	-	4	-	4
Number of empty stomachs	-	-	-	-	0	-	0
Mean stomach content weight(g)	-	-	-	-	5.409	-	5.409
Mean fish length (cm)	-	-	-	-	26.8	-	26.8
Length range (cm)	-	-	-	-	25-28	-	25-28

Appendix Table 28. Stomach contents of witch flounder, *Glyptocephalus cynoglossus* (Linnaeus).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	<u>98.8</u>	-	<u>97.4</u>	-	-	-	<u>98.5</u>
Unidentified Maldanidae	2.8	100.0	-	-	-	-	2.1
<i>Lumbrineris fragilis</i>	-	-	57.7	100.0	-	-	13.6
<i>Onuphis erimita</i>	4.1	33.3	-	-	-	-	3.1
<i>Onuphis</i>	16.9	33.3	-	-	-	-	13.0
<i>Goniada maculata</i>	-	-	7.0	100.0	-	-	1.6
Unidentified Nephthyidae	2.5	66.7	1.2	100.0	-	-	2.2
Unidentified Spionidae	-	-	0.5	100.0	-	-	0.1
Unidentified Ampharetidae	44.7	66.7	-	-	-	-	34.2
Unidentified Polychaeta	27.8	100.0	31.0	100.0	-	-	28.6
Crustacea	<u>1.2</u>	-	<u>2.6</u>	-	-	-	<u>1.5</u>
<i>Casco bigelowi</i>	0.7	33.3	-	-	-	-	0.5
Unidentified Decapoda	0.5	33.3	-	-	-	-	0.4
Unidentified Crustacea	-	-	2.6	100.0	-	-	0.6
Number of specimens examined		3		1		-	4
Number of empty stomachs		0		0		-	0
Mean stomach content weight(g)		1.122		1.033		-	1.100
Mean fish length (cm)		47.3		58.0		-	50.0
Length range (cm)		41-51		58		-	41-58

Appendix Table 29. Stomach contents of American plaice, *Hippoglossoides platessoides* (Fabricius).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	<u>2.7</u>	-	<u>24.2</u>	-	-	-	<u>16.5</u>
<i>Nephtys incisa</i>	1.2	7.7	-	-	-	-	0.4
<i>Potamethus</i>	-	-	24.2	14.3	-	-	15.5
Unidentified Polychaeta	1.5	7.7	-	-	-	-	0.6
Crustacea	<u>1.0</u>	-	<u>3.8</u>	-	-	-	<u>2.9</u>
<i>Ericthonius rubricornis</i>	-	-	<0.1	14.3	-	-	<0.1
Unidentified Gammaridea	<0.1	7.7	-	-	-	-	<0.1
<i>Crangon septemspinosa</i>	-	-	0.7	14.3	-	-	0.5
<i>Pagurus</i>	-	-	3.1	14.3	-	-	2.0
Unidentified Cumacea	<0.1	7.7	-	-	-	-	<0.1
<i>Meganyctiphanes norvegica</i>	1.0	7.7	-	-	-	-	0.4
Porifera	<u>3.3</u>	7.7	-	-	-	-	<u>1.2</u>
Mollusca	<u>0.3</u>	-	<u>3.2</u>	-	-	-	<u>2.2</u>
Unidentified Pelecypoda	0.3	7.7	3.2	14.3	-	-	2.2
Echinodermata	<u>92.7</u>	-	<u>66.8</u>	-	-	-	<u>75.9</u>
<i>Ophiura sarsi</i>	-	-	64.1	28.6	-	-	41.0
<i>Ophiura</i>	-	-	1.4	14.3	-	-	0.9
Unidentified Ophiuroidea	14.8	69.2	1.3	14.3	-	-	6.0
Unidentified Echinodermata	77.9	15.4	-	-	-	-	28.0
Pisces	-	-	<u>2.0</u>	-	-	-	<u>1.3</u>
<i>Merluccius bilinearis</i>	-	-	2.0	14.3	-	-	1.3
Trematoda	<0.1	15.4	-	-	-	-	<0.1
Nematoda	<0.1	7.7	-	-	-	-	<0.1
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Number of specimens examined		13		7		-	20
Number of empty stomachs		3		1		-	4
Mean stomach content weight(g)		0.401		1.324		-	0.724
Mean fish length (cm)		28.6		40.4		-	32.8
Length range (cm)		12-46		32-47		-	12-47

Appendix Table 30. Stomach contents of yellowtail flounder, *Limanda ferruginea* (Storer).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	<u>37.2</u>	-	<u>4.6</u>	-	<u>23.9</u>
Unidentified Maldanidae	-	-	0.7	30.0	0.9	25.0	0.8
Unidentified Orbinidae	-	-	<0.1	10.0	-	-	<0.1
<i>Glycera capitata</i>	-	-	0.1	10.0	-	-	0.1
<i>Phyllodoce groenlander</i>	-	-	0.1	-	-	-	<0.1
<i>Phyllodoce mucosa</i>	-	-	2.2	10.0	-	-	1.3
<i>Phyllodoce</i>	-	-	<0.1	20.0	0.2	25.0	0.1
Unidentified Sigalionidae	-	-	-	-	3.5	50.0	1.4
Unidentified Syllidae	-	-	<0.1	20.0	-	-	<0.1
Unidentified Sabellidae	-	-	8.3	50.0	-	-	4.9
Unidentified Cirratulidae	-	-	0.1	20.0	-	-	0.1
Unidentified Ampharetidae	-	-	12.2	60.0	-	-	7.2
<i>Amphitrite cirrata</i>	-	-	3.0	10.0	-	-	1.8
Unidentified Polychaeta	-	-	10.5	70.0	-	-	6.2
Crustacea	-	-	<u>42.6</u>	-	<u>90.8</u>	-	<u>62.5</u>
<i>Aeginina longicornis</i>	-	-	0.3	20.0	-	-	0.2
Unidentified Caprellidea	-	-	0.1	20.0	-	-	<0.1
<i>Corophium</i>	-	-	1.0	50.0	-	-	0.6
<i>Erichthonius rubricornis</i>	-	-	10.6	30.0	-	-	6.3
<i>Unciola inermis</i>	-	-	27.7	100.0	-	-	16.3
<i>Gammarus annulatus</i>	-	-	-	-	90.8	100.0	37.4
Unidentified Lysianassidae	-	-	<0.1	10.0	-	-	<0.1
<i>Anonyx sarsi</i>	-	-	0.6	20.0	-	-	0.3
<i>Hippomedon serratus</i>	-	-	0.2	10.0	-	-	0.1
<i>Leptocheirus pinguis</i>	-	-	0.3	30.0	-	-	0.2
<i>Phoxocephalus holboellii</i>	-	-	<0.1	20.0	-	-	<0.1
Unidentified Amphipoda	-	-	0.6	10.0	-	-	0.3
<i>Pagurus pubescens</i>	-	-	0.5	20.0	-	-	0.3
Unidentified Paguridae	-	-	0.3	10.0	-	-	0.2
<i>Edotea</i>	-	-	0.1	10.0	-	-	0.1
Chiridotea	-	-	0.3	20.0	-	-	0.2
Unidentified Cumacea	-	-	<0.1	10.0	-	-	<0.1
Mollusca	-	-	<u>2.8</u>	-	-	-	<u>1.7</u>
Unidentified Pelecypoda	-	-	0.5	40.0	-	-	0.3
Unidentified Gastropoda	-	-	2.3	10.0	-	-	1.4
Echinodermata	-	-	<0.1	30.0	-	-	<0.1
Animal remains	-	-	3.0	30.0	4.6	25.0	3.4
Sand	-	-	14.3	80.0	-	-	8.4
Nematoda	-	-	<u>0.1</u>	10.0	-	-	<u>0.1</u>
Number of specimens examined	-	-	-	10	-	4	14
Number of empty stomachs	-	-	-	0	-	0	0
Mean stomach content weight(g)	-	-	-	0.643	-	1.123	0.780
Mean fish length (cm)	-	-	-	35.6	-	33.0	34.9
Length range (cm)	-	-	-	18-43	-	30-37	18-43

Appendix Table 31. Stomach contents of winter flounder, *Pseudopleuronectes americanus* (Walbaum).

Stomach contents	AREA A		AREA B		AREA C		Total Percentage weight
	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	Percentage weight	Percentage occurrence	
Polychaeta	-	-	<u>86.3</u>	-	-	-	<u>71.6</u>
Phyllodoce	-	-	4.8	50.0	-	-	4.0
Unidentified Sabellidae	-	-	3.4	50.0	-	-	2.8
Unidentified Polychaeta	-	-	78.1	50.0	-	-	64.8
Crustacea	-	-	<u>13.7</u>	-	-	-	<u>11.4</u>
<i>Erichthonius rubricornis</i>	-	-	8.9	50.0	-	-	7.4
<i>Unciola irrorata</i>	-	-	4.8	50.0	-	-	4.0
Echinodermata	<u>100.0</u>	<u>75.0</u>	-	-	-	-	<u>17.0</u>
Unidentified Ophiuroidea	100.0	-	-	-	-	-	17.0
Trematoda	<u>&lt;0.1</u>	<u>25.0</u>	-	-	-	-	<u>&lt;0.1</u>

Number of specimens examined	4	2	1	7
Number of empty stomachs	1	0	1	2
Mean stomach content weight(g)	0.008	0.073	0.000	0.025
Mean fish length (cm)	21.0	21.5	31.0	22.6
Length range (cm)	18-24	21-22	31	18-31